



# Square Kilometre Array Ecological Assessment

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# Square Kilometre Array Ecological Assessment

Client: Department of Industry, Science, Energy and Resources

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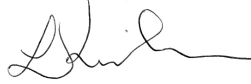
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Prepared by Floora de Wit and Jared Leigh

Reviewed by Linda Kirchner

## Revision History

| Rev | Revision Date | Details                   | Authorised                                            |                                                                                       |
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|     |               |                           | Name/Position                                         | Signature                                                                             |
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## Executive Summary

AECOM Australia Pty Ltd (AECOM) were engaged by Wajarri Enterprises Group (Wajarri) to conduct a flora and vegetation assessment and a fauna assessment for the Square Kilometre Array Low Project (SKA1-Low). The SKA1-Low array has an updated footprint and survey area on Boolardy and Kalli Station in the Murchison region. Surveys originally undertaken in 2014 were updated and additional field surveys conducted to describe the existing environment of the new survey area.

The survey area includes a numerous linear corridors and 512 array stations spanning a total of 4,918 ha. A flora and vegetation assessment and basic fauna assessment was undertaken in November 2020 by Botanist Floor de Wit and Ecologist Jared Leigh. The survey focussed on corridors that deviated significantly from the 2014 survey area. The remaining areas relied on extrapolation and interpretation of aerial imagery and historical results.

A summary of the results is presented below:

- No Threatened or Priority Ecological Communities were considered likely to occur and none were recorded in the survey area
- Ten native vegetation communities were mapped including six Acacia Open Woodlands on flats, two Mixed Shrublands on granite outcrops, and two Woodlands associated with ephemeral drainage lines were recorded
- Nine Priority flora species were considered likely to occur, of which three were confirmed to occur in the survey area:
  - *Petrophile pauciflora* (Priority 3) – two populations comprising 163 individuals
  - *Sauropus* sp. Woolgorong (M. Officer s.n. 10/8/94) (Priority 3) – one population, no counts obtained
  - *Eremophila simulans* subsp. *megacalyx* (Priority 3) – may have been recorded, no identification material was available both in 2014 and in 2020. If the identification is correct, it was recorded at two locations and represented a dominant understorey shrub species with more than 1,000 individuals.
- Eight broad fauna habitats were defined and mapped within the survey area. Much of the habitat is in non-pristine condition and so habitat corridors remain a valuable asset to local fauna. Within the survey area these linkages consist of the more significant drainage channels and creek lines.
- Direct and indirect evidence of the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) and Biodiversity Conservation BC Act listed Western Spiny-tailed Skink *Egernia stokesii badia* was recorded a total of five times across the 2014 and 2020 AECOM surveys. However, none of these observations are within the current survey area, due to a refinement of the survey area after the 2014 survey, and the granite boulders and heaps habitat that occurs within the survey area provides minimal quality habitat for the skink.
- The Northern Shield-backed Trapdoor Spider *Idiosoma clypeatum* was recorded twice in rocky areas with scattered *Acacia* and *Eremophila*. However, again none of these records are within the current survey area. This species is likely to utilise habitats that are common within the region.



## 1.0 Introduction

### 1.1 Background

The Square Kilometre Array (SKA) Project is a large international radio telescope project which aims to answer key cosmological questions using radio waves from across the universe to look back into the cosmic dark ages. As with all big science projects, the SKA project will draw on the skills, experiences and support of 14 countries working collaboratively to construct and operate elements of the SKA project, with the first phase of the project being hosted by South Africa and Australia. Australia will host the SKA1-Low Frequency Aperture Array (SKA1-Low).

SKA1-Low is an entirely new array and will consist of up to 512 array stations. Each array station will consist of up to 256 individual antennas, representing more than 130,000 antennas in total. The majority of array stations will be in a densely populated core with three spiral arms, spread over a distance of 65 km.

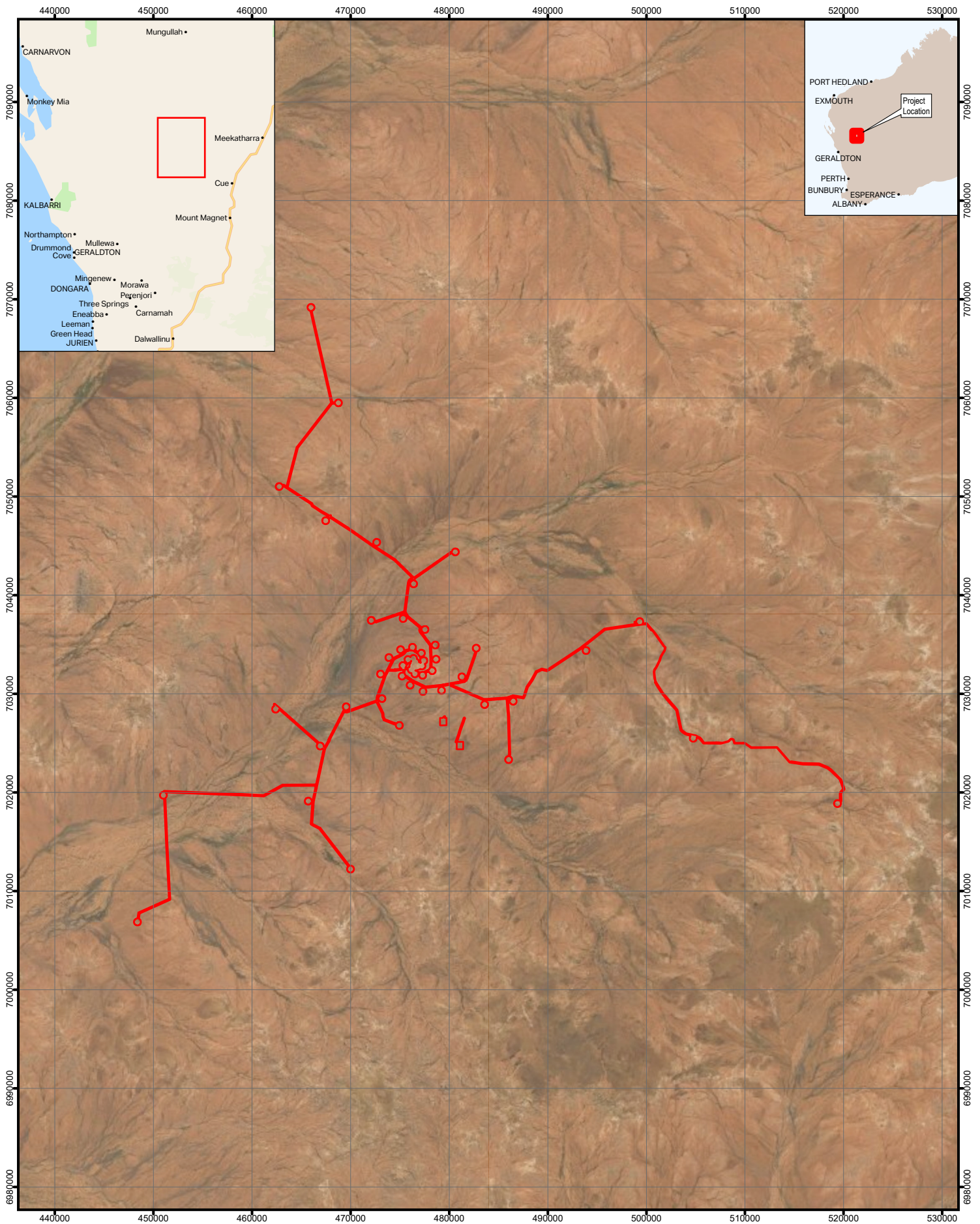
### 1.2 Location

The Project incorporates the SKA-Low array, (the survey area), which extends from Boolardy Station to Kalli Station in the Shire of Murchison. The survey area is approximately 250 km northeast of Geraldton, and 570 km north of Perth (Figure 1).

The survey area incorporates several linear “arms” with a central core. It includes 4,918 ha of native vegetation.

### 1.3 Objectives

The aim of the flora, vegetation and fauna assessment was to define the ecological values of the reconfigured footprint of the SKA1-Low survey area. Significant environmental factors and constraints were targeted to quantify conservation significant elements. Data collected, with consideration for the original surveys and report completed in 2014, was compiled into this technical report, the results of which are presented in a manner suitable for inclusion in environmental assessment documentation. The results will be used to inform the ultimate SKA design, environmental impact assessments and identify environmental factors or areas that require management.



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**LEGEND**  
 Survey Area

**Survey Area**

**WAJARRI CORPORATION**

*SQUARE KILOMETRE ARRAY – FLORA AND FAUNA ASSESSMENT*

**Figure 1**

## 2.0 Existing Environment

### 2.1 Climate

The Shire of Murchison receives an arid climate with a mean annual rainfall of 190-240 mm (Curry et al., 1994). Rainfall varies significantly depending on the occurrence of sporadic significant rainfall events that are driven by cyclonic weather from the north and cold fronts from the southwest. The summer months are hot and consist of long periods where the temperature exceeds 37.5 degrees Celsius. Winters are cool and sunny with cold evenings and mild days.

The closest weather station to the project area is Meekatharra Airport (station 7045) located approximately 185 km east of Boolardy Station and the adjacent Kalli Station. An annual average rainfall of 235.8 mm has been recorded since 1944. The regional average annual evaporation is between 2,800 and 3,600 mm (BoM, 2020). Total annual rainfall to date for 2020 is 150.6 mm which is below average (BoM, 2020). Rainfall in the past six years has been below average (considering every second year). Mean annual rainfall since 1990 is 276 mm, with 170.2 mm recorded in 2020 (BoM, 2020).

Average maximum temperatures peak between December and February, with the highest recorded daily temperature of 38.3°C in January 2020 and the lowest recorded daily temperature of 7.4°C in July 2020. Temperatures do not always coincide with rainfall averages due to the high variability in rainfall (BoM, 2020).

The consecutive months of below average rainfall between March and July prior to the field survey may have implications on the survey results, further discussed in Section 4.0.

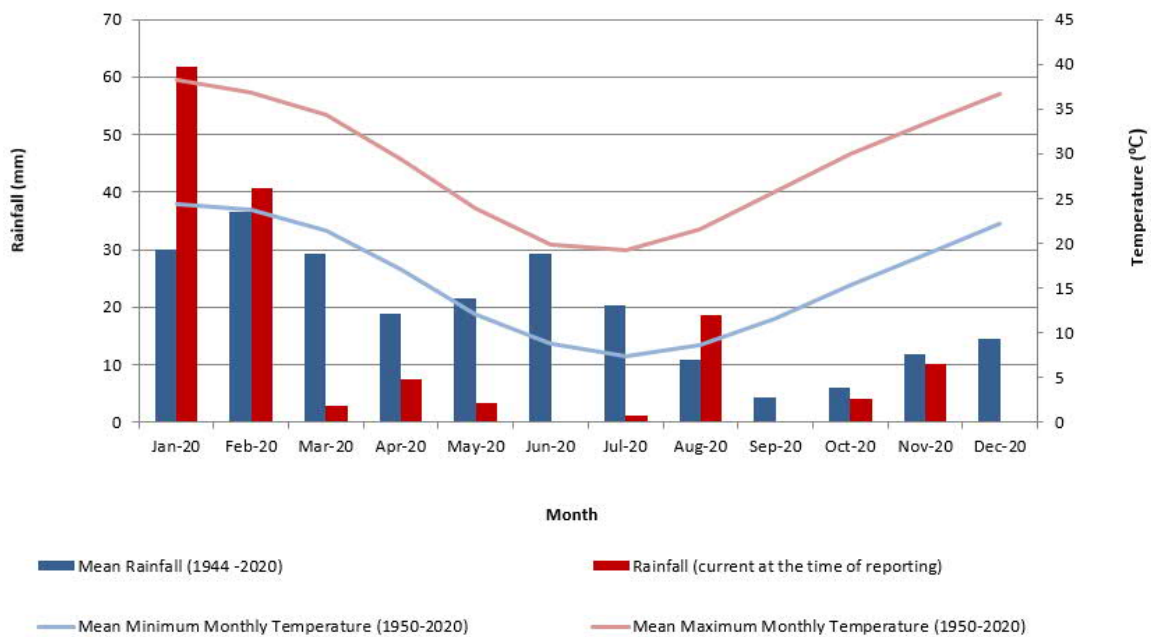


Figure 2 Rainfall and temperature data for Meekatharra Airport (Station 7045 BoM, 2020)

### 2.2 IBRA Region

There are 89 recognised Interim Biogeographical Regions of Australia (IBRA) that have been defined based on climate, geology, landforms and characteristic vegetation and fauna (CALM, 2002). The SKA project is located in the Murchison IBRA bioregion, in the centre of the Western Murchison Subregion. The Murchison bioregion is on the northern part of the Yilgarn Craton which is divided into the Eastern and Western Murchison. There are six wetlands (lakes) of national importance in the bioregion including Ballard, Barlee, Marmion, Wooleen, Breberle and Anneen Lakes.



The Western Murchison subregion, described by Desmond *et al.* (2001), supports low Mulga woodlands with bunch grasses and ephemerals (annuals). Landscape features include outcrop and extensive fine-textured hardpan washplains. Quaternary sandplains support hummock grasslands, calcareous soils support Saltbush and saline alluvia support *Halosarcia* low shrublands. The subregion contains the headwaters of the Murchison and Wooramel Rivers which drain westwards to the coast. Rare features of the area include calcrete aquifers with short-range endemics, rare fauna, and flora. The land use is predominantly grazing native pastures (96%) and Crown Reserves (2.8%).

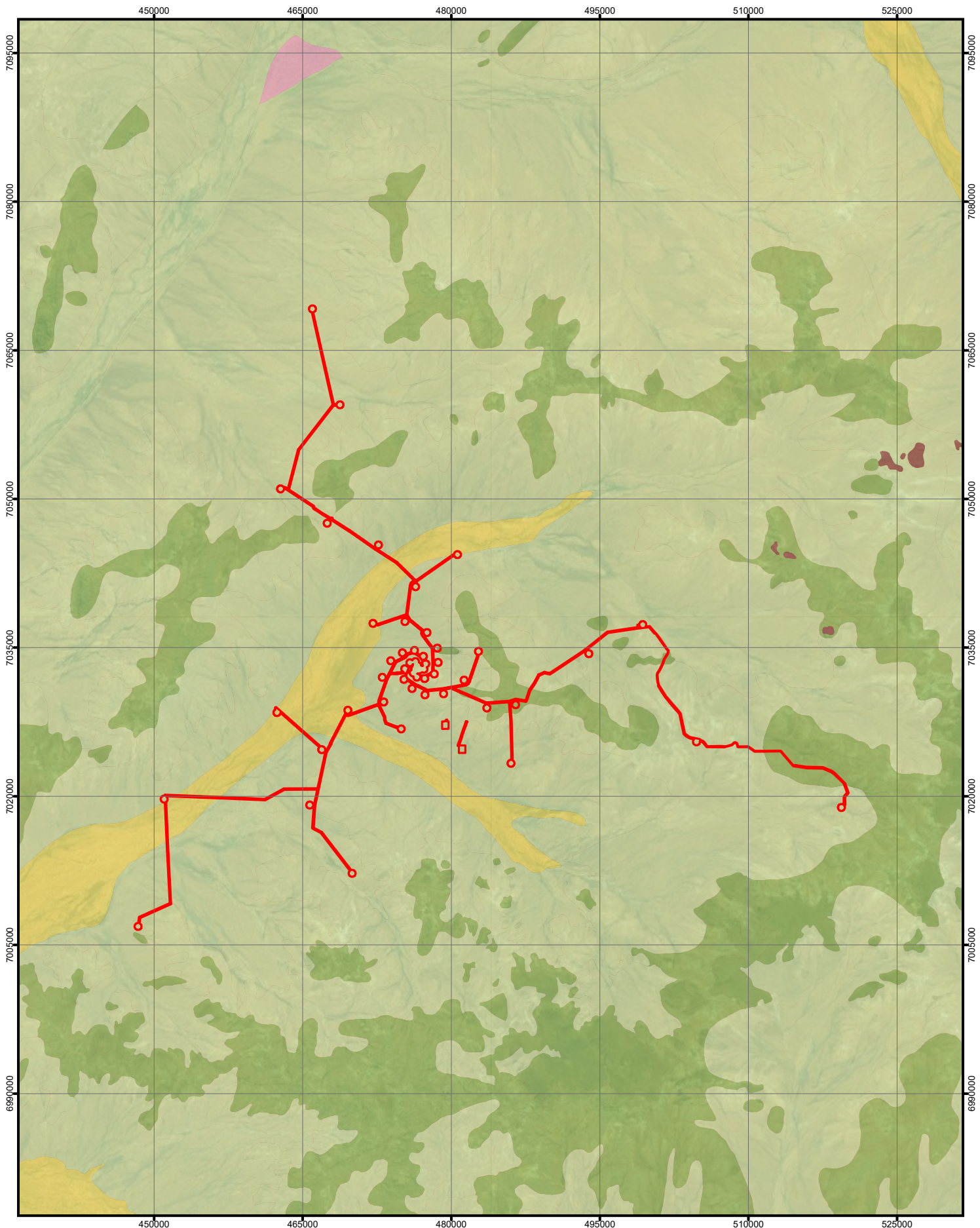
## 2.3 Vegetation

The survey area intersects with six vegetation associations mapped by Beard (1976) representing pre-European vegetation (Table 1; Figure 3). All associations have more than 90% remaining within the Murchison IBRA region and the Shire of Murchison (Govt. of WA, 2019).

**Table 1 Pre-European vegetation associations that intersect with the survey area**

| Veg. Assoc.            | Description                                                                                                                         | Area (ha)       | % Remaining           |                    |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------|--------------------|
|                        |                                                                                                                                     |                 | Murchison IBRA Region | Shire of Murchison |
| 18                     | Low woodland; Mulga ( <i>Acacia aneura</i> )                                                                                        | 998.34          | 99.68                 | 100.00             |
| 29                     | Sparse low woodland; Mulga, discontinuous in scattered groups                                                                       | 4,190.53        | 99.98                 | 100.00             |
| 39                     | Shrublands; Mulga scrub                                                                                                             | 360.09          | 99.10                 | 99.99              |
| 204                    | Succulent steppe with open scrub; scattered Mulga & <i>Acacia sclerosperma</i> over Saltbush & Bluebush                             | 526.76          | 99.60                 | 100.00             |
| 341                    | Low woodland over scrub; Mulga over <i>Acacia sclerosperma</i> , Bowgada, <i>A. victoriae</i> & Minnieritchie ( <i>A. grasbyi</i> ) | 100.05          | 100.00                | 100.00             |
| 2081                   | Shrublands; Bowgada and associated spp. scrub                                                                                       | 30.43           | 99.87                 | 100.00             |
| <b>Total Area (ha)</b> |                                                                                                                                     | <b>4,918.33</b> | -                     | -                  |





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**LEGEND**

Survey Area

**Pre-European Vegetation**

- Low woodland, open low woodland or sparse woodland, Mulga Acacia aneura and associated species.
- Saltbush and bluebush with scrub or open scrub, Mulga, other wattle Atriplex spp, Maireana spp. with Acacia aneura & other Acacia spp.
- Saltbush and/or bluebush with scattered low trees, Mulga, other wattle, casuarina Atriplex spp. Maireana spp. with Acacia aneura, A. papyrocarpa, Allocasuarina cristata
- Scrub, open scrub or sparse scrub, Wattle, teatree & other species
- Acacia spp. Melaleuca spp.
- Rock,

**Pre-European Vegetation Mapping**

**WAJARRI CORPORATION**

SQUARE KILOMETRE ARRAY – FLORA AND FAUNA ASSESSMENT

**Figure 3**

## 2.4 Land Systems

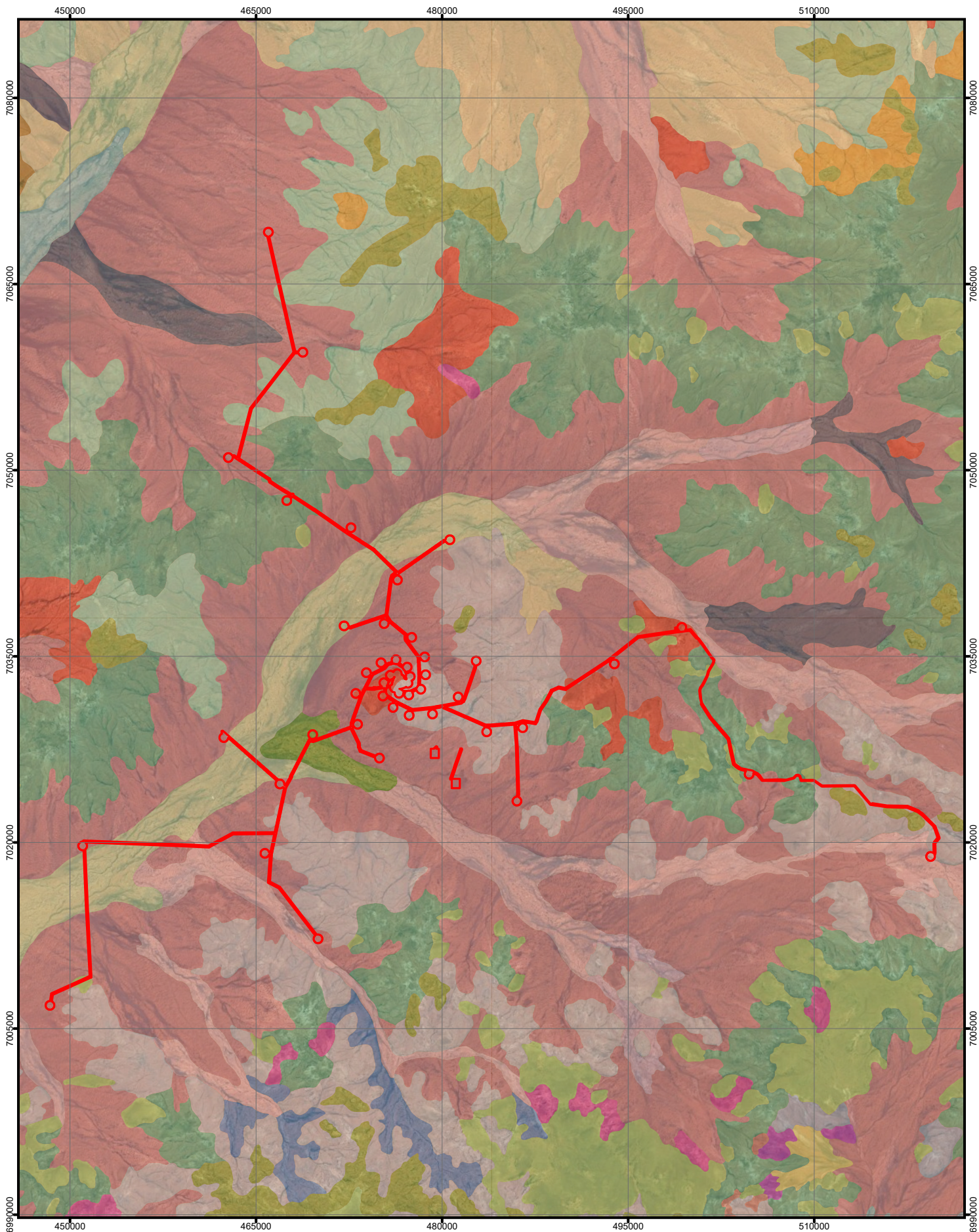
The mapping of soils, landscapes and vegetation in the Rangelands of Western Australia was conducted in the Wiluna-Meekatharra region in 1963 (Tille, 2006). This became the responsibility of the Department of Agriculture using a procedure developed by the CSIRO. The survey adopted the land system approach, where a land system is defined as an area or group of areas throughout which there is a recurring pattern of topography, soils and vegetation (Tille, 2006).

There are ten land systems that intersect with the survey area, described in Table 2 and mapped in Figure 4.

**Table 2 Land systems of the survey area**

| Land System            | Description                                                                                                                                                                                                                                                | Area (ha)      |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| Beringarra             | Major riverine plains with active lower floodplains flanking channelled watercourses; supports mostly halophytic shrublands and mixed <i>Acacia</i> shrublands and low woodlands with minor perennial grasses; severely degraded and eroded in many areas. | 395.34         |
| Challenge              | Gently undulating gritty-surfaced plains, occasional granite hills, tors and low breakaways, with <i>Acacia</i> shrublands.                                                                                                                                | 1037.46        |
| Ero                    | Tributary floodplains with shallow, erodible duplex soils on red-brown hardpan, more or less saline and supporting <i>Acacia</i> shrublands with halophytic and non-halophytic undershrubs; grazed preferentially and widely degraded and eroded.          | 60.99          |
| Kalli                  | Elevated, gently undulating red sandplains edged by stripped surfaces on laterite and granite; tall <i>Acacia</i> shrublands and understorey of wanderrie grasses (and spinifex locally); replaced by more extensive areas of Bullimore land system.       | 74.85          |
| Koonmarra              | Quartz-strewn stony plains and low rises with outcropping granite, gneiss and schists; supports scattered Mulga and other mainly non-saline shrubs.                                                                                                        | 86.30          |
| Millrose               | Level or very gently undulating stony plains on hardpan and granite with irregularly distributed sandy Wanderrie banks, supporting mostly scattered Mulga shrublands with minor Wanderrie grasses.                                                         | 425.06         |
| Norie                  | Granite hills with exfoliating domes and extensive tor fields, supporting acacia shrublands.                                                                                                                                                               | 3.73           |
| Roderick               | Broad, saline riverine plains, with numerous grassy drainage foci and claypans adjacent to central alluvial plains and major channels; also non-saline marginal hardpan wash plains; mainly supports halophytic shrublands with minor perennials.          | 93.94          |
| Sherwood               | Breakaways, kaolinised footslopes and extensive gently sloping plains on granite supporting Mulga shrublands and minor halophytic shrublands.                                                                                                              | 264.56         |
| Yanganoo               | Almost flat hardpan wash plains, with or without small Wanderrie banks and weak grooving; supporting Mulga shrublands and Wanderrie grasses on banks.                                                                                                      | 2476.17        |
| <b>Total Area (ha)</b> |                                                                                                                                                                                                                                                            | <b>4918.41</b> |





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| LEGEND                                    |                        |                                                                 |
|-------------------------------------------|------------------------|-----------------------------------------------------------------|
| <span style="color: red;">—</span>        | Survey Area            |                                                                 |
| Land System Mapping                       |                        |                                                                 |
| <span style="color: lightcoral;">■</span> | Farmer Land System     | <span style="color: lightgreen;">■</span> Norrie Land System    |
| <span style="color: yellow;">■</span>     | Jundee Land System     | <span style="color: lightgreen;">■</span> Roderick Land System  |
| <span style="color: lightcoral;">■</span> | Agamemnon Land System  | <span style="color: lightblue;">■</span> Sherwood Land System   |
| <span style="color: yellow;">■</span>     | Belele Land System     | <span style="color: lightblue;">■</span> Tindalarra Land System |
| <span style="color: lightgreen;">■</span> | Koonmarra Land System  | <span style="color: purple;">■</span> Violet Land System        |
| <span style="color: lightgreen;">■</span> | Beringarra Land System | <span style="color: purple;">■</span> Waguin Land System        |
| <span style="color: lightblue;">■</span>  | Mileura Land System    | <span style="color: purple;">■</span> Yandil Land System        |
| <span style="color: lightblue;">■</span>  | Millieux Land System   | <span style="color: purple;">■</span> Yanganoo Land System      |
| <span style="color: lightblue;">■</span>  | Millrose Land System   |                                                                 |
| <span style="color: lightblue;">■</span>  | Cunyu Land System      |                                                                 |
| <span style="color: lightblue;">■</span>  | Ero Land System        |                                                                 |
| <span style="color: lightblue;">■</span>  | Mindura Land System    |                                                                 |
| <span style="color: lightblue;">■</span>  | Narryer Land System    |                                                                 |

**Land System Mapping**

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 FLORA AND FAUNA ASSESSMENT

**Figure 4**

## 3.0 Legislative Framework

### 3.1 Overview

Table 3 summarises the key legislation governing the protection and management of Western Australia's conservation significant species and communities, which are further discussed below.

**Table 3 Relevant legislation, regulations and guidance**

| Legislation                                                                                     | Purpose                                                                                                                                                                                        |
|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Commonwealth of Australia</b>                                                                |                                                                                                                                                                                                |
| <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act)                 | Provides for the protection of the environment and the conservation of biodiversity.                                                                                                           |
| <b>Western Australia</b>                                                                        |                                                                                                                                                                                                |
| <i>Biodiversity Conservation Act 2016</i> (BC Act)                                              | Provides for the conservation and protection of Western Australia's biodiversity and biodiversity components.                                                                                  |
| <i>Environmental Protection Act 1986</i> (EP Act)                                               | Preventing, controlling and abating environmental harm and conserving, preserving, protecting, enhancing and managing the environment.                                                         |
| <i>Biosecurity and Agriculture Management Act 2007</i> (BAM Act)                                | Provides for the management, control and prevention of certain plants and animals, and for the protection of agriculture and related resources generally.                                      |
| EPA Technical Guidance – Terrestrial Fauna Surveys for Environmental Impact Assessment, 2020    | Provides guidance on the standard of survey required to assist in collecting the appropriate data for decision-making associated with the protection of Western Australia's terrestrial fauna. |
| EPA Technical Guidance – Flora and vegetation Surveys for Environmental Impact Assessment, 2016 | Provides guidance to ensure adequate flora and vegetation data of an appropriate standard are obtained and used in EIA.                                                                        |

### 3.2 *Environment Protection and Biodiversity Conservation Act 1999*

#### 3.2.1 Matters of National Environmental Significance

Matters of national environmental significance include:

- listed threatened species and ecological communities
- migratory species protected under international agreements
- Ramsar wetlands of international importance
- the Commonwealth marine environment
- world Heritage properties
- national Heritage places
- Great Barrier Reef Marine Park
- a water resource, in relation to coal seam gas development and large coal mining development
- nuclear actions.

If an action is likely to have a significant impact on MNES this action must be referred to the Minister for the Environment for a decision on whether assessment and approval is required under the EPBC Act.



### 3.2.2 Flora and Fauna

The EPBC Act is the main piece of Federal legislation protecting biodiversity in Australia. Species at risk of extinction are recognised at a Commonwealth level and are categorised in one of six categories as outlined in Table 4, with an additional category for other specially protected fauna.

**Table 4 Categories of species listed under Schedule 179 of the EPBC Act**

| Code | Conservation Category  |
|------|------------------------|
| Ex   | Extinct Taxa           |
| ExW  | Extinct in the Wild    |
| CE   | Critically Endangered  |
| E    | Endangered             |
| V    | Vulnerable             |
| CD   | Conservation Dependent |

### 3.2.3 Vegetation Communities

Communities can be classified as Threatened Ecological Communities (TECs) under the EPBC Act. The EPBC Act protects Australia's ecological communities by providing for:

- identification and listing of ecological communities as threatened
- development of conservation advice and recovery plans for listed ecological communities
- recognition of key threatening processes
- reduction of the impact of these processes through threat abatement plans.

Categories of federally listed TECs are described in Table 5.

**Table 5 Categories of TECs that are listed under the EPBC Act**

| Code | Conservation Category                                                                                                                                         |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CE   | Critically Endangered<br>If, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future.                             |
| E    | Endangered<br>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<br>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. |

## 3.3 Western Australian Legislation

### 3.3.1 Flora and Fauna

Under the BC Act, flora and fauna can be listed as Threatened (T) or extinct (X). Threatened flora are plants which have been assessed as being at risk of extinction (DBCA, 2019). The Minister for the Environment may declare species of flora to be protected if they are considered to be in danger of extinction, rare or otherwise in need of special protection (WAH, 1998-).

Plants and animals that are considered Threatened and need to be specially protected because they are under identifiable threat of extinction are listed under the BC Act. These categories are defined in Table 6.

Table 6 Conservation codes for flora and fauna listed under the *Biodiversity Conservation Act 2016*

| Code      | Conservation Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CR</b> | <b>Critically Endangered Species</b><br>Threatened species considered to be facing an extremely high risk of extinction in the wild in the immediate future.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>EN</b> | <b>Endangered Species</b><br>Threatened species considered to be facing a very high risk of extinction in the wild in the near future.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>VU</b> | <b>Vulnerable Species</b><br>Threatened species considered to be facing a high risk of extinction in the wild in the medium-term future.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>EX</b> | <b>Extinct Species</b><br>Species where there is no reasonable doubt that the last member of species has died.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>MI</b> | <b>Migratory Species</b><br>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. 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 <i>Convention on the Conservation of Migratory Species of Wild Animals</i> (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. |
| <b>CD</b> | <b>Species of special conservation interest (conservation dependent fauna)</b><br>Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>OS</b> | <b>Other specially protected species</b><br>Fauna otherwise in need of special protection to ensure their conservation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

Species that have not yet been adequately surveyed to warrant being listed under the BC Act, or are otherwise data deficient, are added to Priority Lists under Priorities 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 placed in Priority 4. Categories and definitions of Priority Flora and Fauna species are provided in Table 7.

### 3.3.2 Vegetation 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.

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. Categories of TECs are defined in Table 8.

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 9.

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

There is currently no formal protection afforded to TECs or PECs listed at the state level.

**Table 7 Conservation codes for WA flora and fauna listed by DBCA and endorsed by the Minister for Environment**

| Code      | Conservation Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>P1</b> | <b>Priority One – Poorly Known Species</b><br>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.                                                                              |
| <b>P2</b> | <b>Priority Two – Poorly Known Species</b><br>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.                                                                                                                                                                                            |
| <b>P3</b> | <b>Priority Three – Poorly Known Species</b><br>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.                                                                                                                                                                                       |
| <b>P4</b> | <b>Priority Four – Rare, Near Threatened and other species in need of monitoring</b><br>a. 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.<br>b. 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.<br>Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy. |

**Table 8 Conservation codes for State listed ecological communities**

| Conservation Code | Category                   |
|-------------------|----------------------------|
| PD                | Presumed Totally Destroyed |
| CR                | Critically Endangered      |
| EN                | Endangered                 |
| VU                | Vulnerable                 |

**Table 9 Conservation categories for Priority Ecological Communities**

| Code | Conservation 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. |
| P5   | Priority Five: conservation dependent ecological communities                                                                                                                                |

### 3.3.3 **Biosecurity and Agriculture Management Act 2007**

Biosecurity is the management of the risk of animal and plant pests and diseases entering, emerging, establishing or spreading in WA to protect the economy, environment and community. Biosecurity is managed under the BAM Act which came into effect 1 May 2013. Exotic animals and plants can become an invasive species if they can establish in new areas where local conditions are favourable for their growth. Each organism listed under the BAM Act comes with certain legal / import requirements:

- Declared Pest, Prohibited - s12. Prohibited organisms are declared pests by virtue of section 22(1) and may only be imported and kept subject to permits.
- Permitted - s11. Permitted organisms may be subject to an import permit if they are potential carriers of high-risk organisms.
- Declared Pest - s22(2). Declared pests may be subject to an import permit if they are potential carriers of high-risk organisms and may also be subject to control and keeping requirements once within Western Australia.
- Permitted, Requires Permit - r73. Regulation 73 permitted organisms may only be imported subject to an import permit.

Declared pests can be assigned to a C1, C2 or C3 control category under the Biosecurity and Agriculture Management Regulations 2013:

- C1 Exclusion - Organisms which should be excluded from part or all of Western Australia.
- C2 Eradication - Organisms which should be eradicated from part or all of Western Australia.
- C3 Management - Organisms that should have some form of management applied that will alleviate the harmful impact of the organism, reduce the numbers or distribution of the organism or prevent or contain the spread of the organism.
- Unassigned - Declared pests that are recognised as having a harmful impact under certain circumstances, where their subsequent control requirements are determined by a Plan or other legislative arrangements under the BAM Act.

### 3.3.4 **Environmental Protection Act 1986 (and Clearing Regulations)**

Section 38 (Part IV) of the EP Act provides that any person may refer a significant proposal (one that is likely to have a significant effect on the environment) to the EPA. The EP Act also states that where the environmental impact of a proposal can be adequately assessed and managed through other legislative mechanisms the proposal is unlikely to require formal environmental impact assessment.

If a proposal is not formally assessed by the EPA under Part IV of the EP Act, a Part V native Vegetation Clearing Permit may be required. Under Section 51C of the EP Act, clearing of native vegetation without a Native Vegetation Clearing Permit is an offence unless an exemption applies. Exemptions offered for clearing under Regulation 5 of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* do not apply within Environmentally Sensitive Areas (ESA).



## 4.0 Methodology

### 4.1 Desktop Assessment

A comprehensive desktop assessment was undertaken to gather background information of the local area, restricted up to an 80 km radius from the survey area centre point (latitude: -26.77592 longitude: 117.19408). Sources used to inform the desktop assessment included:

- DBCA threatened species and communities database
- Western Australian Herbarium (WAH) records
- NatureMap
- Atlas of Living Australia (AoLA)
- EPBC Act Protected Matters Search Tool (PMST) database
- Alexander Holm & Associates (2008) Radio Astronomy Project Environmental Assessment
- AECOM (2014) Square Kilometre Array Ecological Assessment.

All flora and fauna of conservation significance identified in the desktop assessment was assessed for their likelihood of occurrence in the survey area (Table 10).

Available literature was consulted including Beard (1976) vegetation mapping, Land Systems Mapping (Department of Agriculture, 1991), a review of the Western Murchison subregion (Desmond *et al.*, 2001) and environmental studies conducted by Alexander Holm & Associates (2008) for the MRO area. These documents were used to define the existing environment and provide local and regional context for the survey results.

**Table 10** Categories of likelihood of occurrence for species of conservation significance identified in the desktop assessment

| Category | Flora                                                                                                          | Fauna                                                                                                                                                                                  | Communities                                                                                                                                                                                                                |
|----------|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Likely   | Habitat is present in the survey area and it has been recorded in close proximity                              | Survey areas are within the known distribution of the species, habitat is present in the survey area and it has been recorded in close proximity previously                            | Known occurrences of the community in close proximity to the Survey area. Vegetation looks the same within the known occurrence and survey area based on aerial imagery. Geographic location is similar to the survey area |
| May      | Habitat may be present in the survey area and/or it has been previously recorded in close proximity            | Survey area are within the known distribution of the species, marginal habitat may be present and/or it has been previously recorded in close proximity                                | Known occurrence of the community in the local area, and/or vegetation looks the same within known occurrence and survey area based on aerial imagery. Geographic location is similar to the survey area                   |
| Unlikely | No suitable habitat is present and there have been no recorded locations in close proximity to the survey area | Survey area are outside known distribution for that species, or no suitable habitat is present and there have been no recent recorded locations in close proximity to the survey areas | Known occurrence of the community in close proximity to the Survey area however geographic location does not occur in survey area                                                                                          |

## 4.2 Flora and Vegetation

A detailed flora and vegetation assessment was undertaken between 19 and 23 November 2020 utilising methods outlined in the EPA (2016) Flora Survey Technical Guide. The assessment was completed by Floora de Wit (collection permit FB62000137). Floora de Wit has 13 years' experience undertaking flora and vegetation assessments and was the lead botanist for the 2014 ecological assessment project (AECOM, 2014).

Floristic data was sampled from 32 relevés, defined as unbounded quadrats. Relevés were determined to be a better representation of vegetation due to the sparse foliage cover and isolated occurrence of many species. In 2020 the survey team had a good understanding of the expected vegetation communities therefore more focus was placed on targeting significant flora species, using relevés to support the delineation of vegetation communities as necessary.

Data collected at sample point locations included the presence of plant species, their cover abundance, structural composition of vegetation, physical environment, and presence/absence of disturbance. Each sample point location was given a unique site number, and the following parameters recorded:

- date
- location using hand-held GPS (accuracy of 5 m)
- photograph
- soil details (type, colour, moisture)
- topography
- vegetation condition using the Keighery (1994) scale
- disturbance notes
- fire history
- species present
  - estimated height
  - estimated percentage cover.

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.

### 4.2.1 Vegetation Mapping

Vegetation communities were described and mapped based on changes in dominant species composition and landform. The 2020 dataset was combined with the 2014 dataset to analyse floristic similarity of sample point locations (see survey effort in Figure 5). Relevé data had a high similarity to the 2014 quadrat data, further supporting the decision to use relevés as a method for recording floristics. The complete dataset included the 32 relevés from 2020, and 64 quadrats and 28 observation points from 2014.

Only data collected from within the survey area, or directly adjacent, is included in this report.

Vegetation community descriptions were based on the National Vegetation Information System (NVIS) framework at level V Association (DotEE, 2017a). This is consistent with the AECOM (2014) vegetation mapping.

Vegetation condition was determined using the Keighery (1994) condition scale (Table 11). The scale is based on disturbance (e.g. grazing, erosion), degree of alteration to community and habitat structure and site ecology.

**Table 11 Bushland condition ratings (Keighery, 1994)**

| Descriptor          | Explanation                                                                                                                                                                                                                                                                                                                                  |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pristine            | Pristine or nearly so, no obvious signs of disturbance                                                                                                                                                                                                                                                                                       |
| Excellent           | Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species                                                                                                                                                                                                                                   |
| Very Good           | Vegetation structure altered obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing                                                                                                                               |
| Good                | Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing |
| Degraded            | Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance of vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing                 |
| Completely Degraded | The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as “parkland cleared” with the flora comprising weed or crop species with isolated native trees or shrubs                                                                        |

#### 4.2.2 Targeted Searches

Targeted surveys were conducted for conservation significant flora and fauna identified in the desktop assessment considered likely to occur. Target sites included granite outcrops, breakaways, and saline riverine areas. This was informed by the desktop assessment and the 2014 results which showed that these locations were most likely to support Priority flora species.

Where targeted Threatened or Priority Flora species were observed, the following data were collected:

- location using a hand-held GPS
- 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
- vegetation condition
- associated dominant species
- soil type and colour
- topography.

### 4.3 Fauna

AECOM has conducted two Level 1 / basic fauna surveys over sections of the survey and surrounding areas in 2014 and 2020. The 2014 survey was reported in AECOM (2014) and details have largely been incorporated into this report where relevant.

The 2020 basic fauna survey was conducted between 20<sup>th</sup> and 23<sup>rd</sup> November 2020 by Ecologist Jared Leigh. Jared has over 16 years' experience in the environmental industry and completed a Bachelor of Science (Environmental) majoring in Zoology and Marine Biology. The survey was conducted in accordance with Technical Guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA, 2020). The survey was conducted concurrently with the flora and vegetation survey, which enables consistent mapping of the fauna habitats and vegetation communities.

The field survey was undertaken following completion of the desktop assessment, with the survey primarily focused on verifying the findings of the desktop assessment and identifying and mapping (significant) fauna habitat. Signs of threatened fauna species with potential to utilise the habitats of the survey area were searched for during the basic fauna survey. These species are discussed in Table 14.

Fauna habitats were assessed for specific habitat components, including consideration of structural diversity and refuge opportunities for fauna, in order to determine the potential for these habitats to support conservation significant species. The fauna habitat assessments included:

- location
- general habitat description
- habitat condition and disturbance types
- dominant / characteristic flora species and vegetation layers
- presence and abundance of key habitat features such as large mature trees, small and large hollows, fallen logs, coarse and fine litter, decorticating bark, bare ground, grass, stones and boulders, rock crevices, soil cracks, vines, dense shrubs, water bodies etc.
- presence of fauna and secondary signs (e.g. scats, digging, tracks, burrows, eggshell, bones, feathers etc.)
- connectivity of habitat.

In addition to recording all observed fauna and birds identified from distinctive calls, details of indirect evidence such as scats, tracks and diggings was documented. In particular, attention was given to conservation significant species identified in the desktop assessment as having the potential to occur in the area.

The taxonomy and nomenclature of vertebrate species for mammals, reptiles and amphibians is consistent with the Western Australian Museum's Checklist of Vertebrates of Western Australia (2020) and the Australian Faunal Directory (<https://biodiversity.org.au/afd/home>) for avian species.

#### 4.4 Survey Limitations

No significant limitations were identified that may influence the outcome of the field surveys. Seven limitations were considered as defined in the EPA Technical Guide (2016). These are discussed in Table 12.

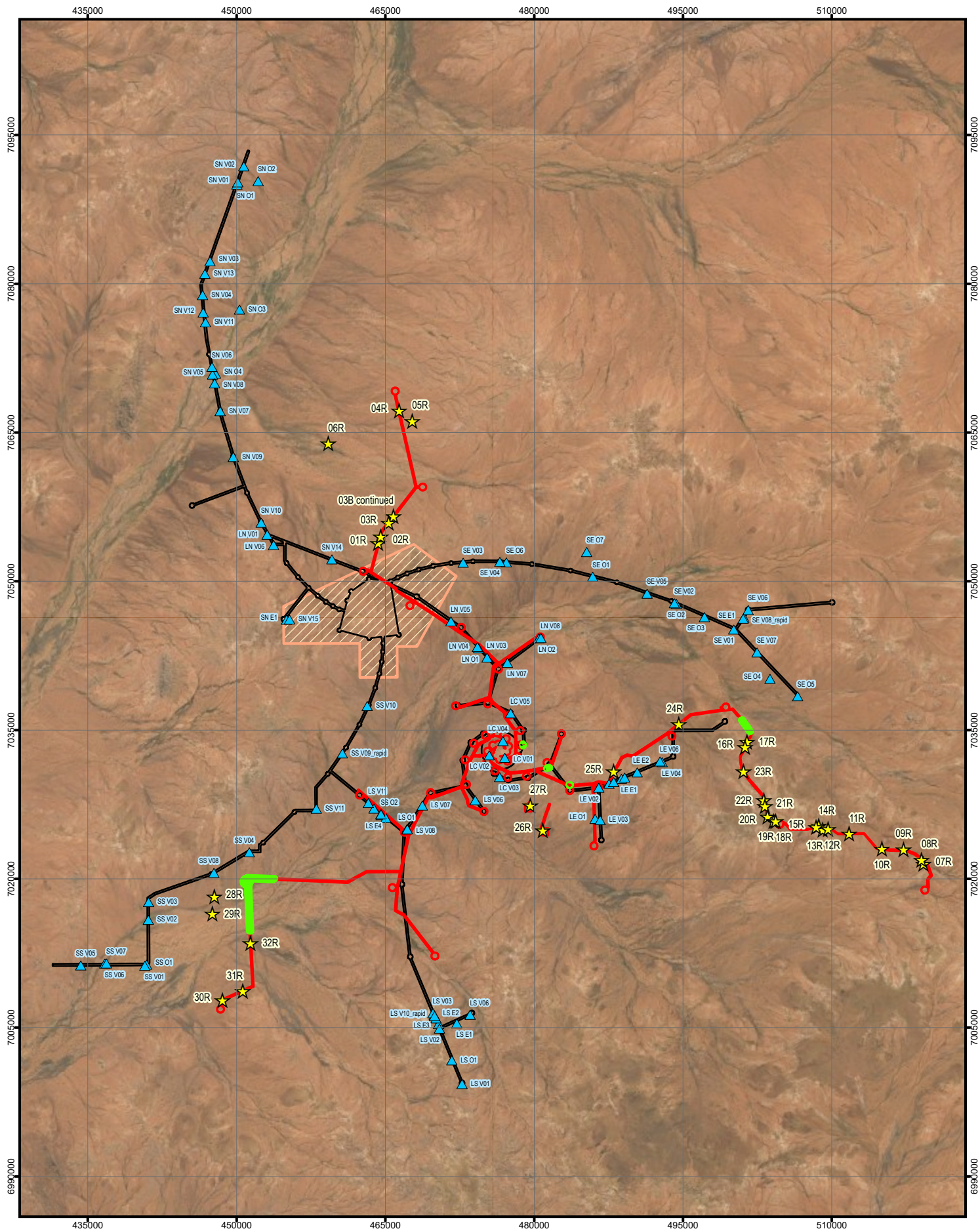
**Table 12 Limitations of the ecological survey**

| Limitation                                            | Flora and Vegetation Assessment                                                                                                                                                                                                       | Basic Fauna Survey                                                                                                                                                                                                                                                                            |
|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Availability of contextual information on the region  | <b>Not a limitation</b><br>Sufficient resources were available to provide contextual information. These included NatureMap, DBCA databases, FloraBase, Alexander & Holmes (2008) and AECOM (2014) ecological survey reports.          | <b>Not a limitation</b><br>Sufficient resources were available to provide contextual information. These included NatureMap and DBCA database, AoLA EPBC Act PMST, Alexander Holm & Associates (2008), AECOM (2014), Phoenix Environmental Sciences (Phoenix [2015]) and various field guides. |
| Competency/experience of consultant conducting survey | <b>Not a limitation</b><br>The flora and vegetation assessment was led by Floora de Wit who has more than 13 years' experience conducting surveys of similar scope. Floora was also involved in the 2014 surveys for the SKA project. | <b>Not a limitation</b><br>The fauna survey was undertaken by Ecologist Jared Leigh who has more than 16 years' experience in the environmental industry in WA.                                                                                                                               |

| Limitation                                                                                                | Flora and Vegetation Assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Basic Fauna Survey                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Proportion of flora/fauna identified, recorded and/or collected (based on sampling, timing and intensity) | <p><b>Not a limitation</b></p> <p>Survey effort includes</p> <ul style="list-style-type: none"> <li>- 24 people days in late August to September 2014 completing 65 quadrats</li> <li>- Four people days in mid November 2020 completing 32 relevés.</li> </ul> <p>Vegetation communities were determined by comparing floristic data from 32 relevés and 65 quadrats completed in 2014 and 2020. Survey effort is shown in Figure 5.</p> <p>Species richness was low in 2020, a reflection of a reduced survey effort due to being combined with the 2014 dataset, and the dry climate.</p>                                 | <p><b>Minor limitation</b></p> <p>The 2014 and 2020 surveys were conducted in Spring over a sufficient time period to assess the habitats of the survey area.</p> <p>Species diversity was low in 2020, a reflection of a reduced survey effort due to being combined with the 2014 dataset, and the dry conditions proceeding the survey.</p> <p>The 2020 field survey focussed on surveying areas that were far from areas previously surveyed in 2014 and 2008. Areas not accessed were mapped using extrapolation from 2014 mapping and aerial imagery. A couple of small areas of potential granite were identified on the aerial imagery after the 2020 field survey that were surveyed but not mapped in 2014. These areas have subsequently been mapped as Granite boulders and heaps, but have not been confirmed in the field.</p> |
| Completion (is further work needed)                                                                       | <p><b>Not a limitation</b></p> <p>No further surveys are recommended due to the lack of threatened flora and communities considered likely to occur, and the overall degradation of the vegetation as a result of extensive historical grazing.</p>                                                                                                                                                                                                                                                                                                                                                                          | <p><b>Minor limitation</b></p> <p>The objectives of the basic fauna survey were met, however further assessment of granite boulders and heaps as Western Spiny-tailed Skink habitat may be required if granite is to be impacted by the project.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Remoteness and/or access problems                                                                         | <p><b>Moderate limitation</b></p> <p>Sampling was restricted to areas that were accessible within the timeframe provided. The field survey focussed on accessing areas that were far from areas previously surveyed in 2014 and 2008. Areas not accessed were mapped using extrapolation from 2014 mapping, and assessing aerial imagery.</p> <p>The vegetation was noted to be homogenous in the region. As such, this is not considered a significant limitation for vegetation mapping.</p> <p>More effort was spent accessing areas likely to support Priority flora species (major waterways and granite outcrops).</p> | <p><b>Moderate limitation</b></p> <p>Sampling was restricted to areas that were accessible within the timeframe provided. The field survey focussed on accessing areas that were far from areas previously surveyed in 2014 and 2008. Areas not accessed were mapped using extrapolation from 2014 mapping and aerial imagery. Habitats were homogenous in the region. As such, this is not considered a significant limitation for habitat mapping and the basic fauna survey objectives.</p>                                                                                                                                                                                                                                                                                                                                               |

| Limitation                                                                                         | Flora and Vegetation Assessment                                                                                                                                                                                                                                                                                                                                                                          | Basic Fauna Survey                                                                                                                                                                                                             |
|----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Timing, weather, season, cycle                                                                     | <p><b>Moderate limitation</b></p> <p>Annual species were absent and several species lacked suitable material for confident identification. The species <i>Eremophila simulans</i> was collected from two locations. Lack of suitable material means that the subspecies was unable to be determined. The subspecies <i>megacalyx</i> is a Priority 3 species considered likely to occur in the area.</p> | <p><b>Minor to moderate limitation</b></p> <p>The survey was conducted after a period of dry weather and species observed was probably low as a result. However, this did not significantly impact the basic fauna survey.</p> |
| Disturbances (e.g. fire flood, accidental human intervention) which affected results of the survey | <p><b>Not a limitation</b></p> <p>No disturbances were observed that may have influenced the outcome of the survey.</p>                                                                                                                                                                                                                                                                                  | <p><b>Not a limitation</b></p> <p>The fauna survey was not disrupted or impacted.</p>                                                                                                                                          |





PROJECT ID 60647200  
 CREATED BY WYATTK2  
 APPROVED BY J.LEIGH  
 LAST MODIFIED 28 JAN 2021

**AECOM**  
 www.aecom.com

Datum: GDA 1994 MGA Zone 50

1:500,000  
 (when printed at A4)

Data sources:  
 Base Data: (c) Based on information provided by and with the permission of the Western Australian Land Information Authority trading as Landgate (2021), Geoscience Australia, Streetpro

**LEGEND**

- 2020 Survey Area
- 2014 Survey Area
- ★ 2020 Flora Sites
- ▲ 2014 Flora Sites
- Not Accessed
- Alexander & Holmes 2008 Mapping

**Survey Effort**

**WAJARRI CORPORATION**

**SQUARE KILOMETRE ARRAY – FLORA AND FAUNA ASSESSMENT**

**Figure 5**



## 5.0 Desktop Study Results

### 5.1 Conservation Significant Communities

There are no EPBC Act listed TECs identified in the desktop assessment.

One Priority 1 PEC was identified during the desktop assessment, namely, “Meka calcrete groundwater assemblage type on Murchison palaeodrainage on Meka Station.”. This PEC occurs 7 km south of the nearest infrastructure corridor.

The extent of this PEC is mapped on Figure 6

### 5.2 Conservation Significant Flora

No flora species listed as Threatened under the EPBC Act or BC Act were identified in the desktop assessment as potentially occurring in the survey area. Sixty-six Priority flora species were determined to potentially occur. Of these, nine species are considered likely to occur, seven species may occur, and the remaining 48 species are unlikely to occur. Species considered likely to, or may occur, are detailed in Table 13.

Numerous species considered unlikely to occur are associated with Mt Weld and Weld Ranges, therefore suitable habitat is not present within the survey area. The comprehensive desktop results are presented in Appendix A and mapped on Figure 6.

**Table 13 Flora desktop results**

| Species                                                            | WA Cons. Code | Habitat                                                               | Justification                                                                          |
|--------------------------------------------------------------------|---------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| <i>Calandrinia butcherensis</i>                                    | P1            | Red sands on flats                                                    | Located directly adjacent to survey area, habitat present                              |
| <i>Calandrinia</i> sp. Boolardy Station (P. Jayasekara 719-JHR-01) | P1            | Flat. Low plain. Red/orange sand/clay.                                | Recorded close to survey area between the two southern arms.                           |
| <i>Eremophila muelleriana</i>                                      | P3            | Red sand, sandy clay, lateritic sand. Flats, sand dunes, hills.       | Recorded within the Project area directly adjacent to the survey area, habitat present |
| <i>Eremophila simulans</i> subsp. <i>megacalyx</i>                 | P3            | Found on rangeland plains road verge with red, sandy gravel laterite. | Recorded within survey area                                                            |
| <i>Gunniopsis divisa</i>                                           | P3            | Loam, quartz. Roadsides. IN the Murchison, Yalgoo IBRA regions        | Recorded during 2014 surveys.                                                          |
| <i>Hemigenia tysonii</i>                                           | P3            | Red Sands, plains and gently undulating dunes.                        | Recorded during 2014 surveys, suitable habitat may be present.                         |
| <i>Ptilotus beardii</i>                                            | P3            | Clayey soils. Saline flats, low breakaways.                           | Recorded during 2014 surveys, suitable habitat present.                                |
| <i>Sauropus</i> sp. Woolgorong (M. Officer s.n. 10/8/94)           | P3            | Red sand. Plains.                                                     | Recorded during 2014 surveys, suitable habitat present.                                |
| <i>Verticordia jamiesonii</i>                                      | P3            | Sandy clay soils. Lateritic breakaways.                               | Recorded during 2014 surveys, suitable habitat present.                                |

Priority Species Department of Environment and Conservation's Priority Species List: Priority 1, P2, P3, P4

### 5.3 Conservation Significant Fauna

The desktop fauna assessment identified 21 conservation significant fauna species that could potentially occur within the survey area. This included four species (Golden Gudgeon *Hypseleotris aurea*, Night Parrot *Pezoporus occidentalis*, Woma *Aspidites ramsayi* [southwest subpop] and Arid bronze azure butterfly *Ogyris subterrestris petrina*) DBCA specifically requested AECOM to assess.

The likelihood of occurrence of fauna species was determined by assessing the likely presence of suitable habitat in the survey area and reviewing the recent records and distribution of the species. This assessment determined that:

- three species are 'likely to occur'
- eight species 'may occur'
- ten species are 'unlikely to occur'.

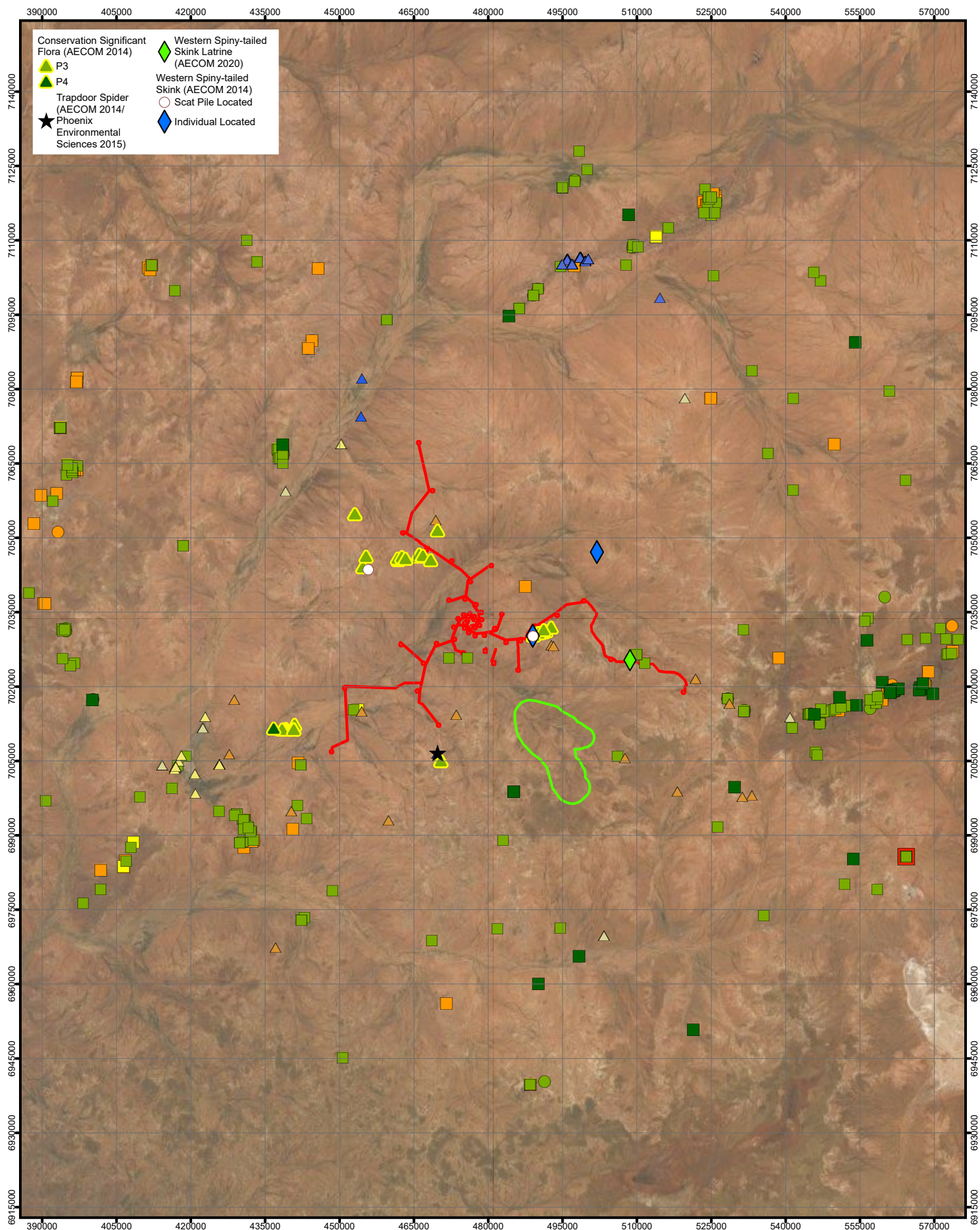
The eleven species considered as 'likely to occur' and "may occur" in the survey area include eight bird, one mammal, one reptile and one invertebrate species. These species vary to that in AECOM (2014) due to several changes in conservation status and reorganisation of taxa. Table 14 identifies the 11 species and provides relevant ecological information. The conservation significant categories as defined by DBCA, the BC Act and the EPBC Act are defined in Section 3.0. The full desktop assessment for all fauna species and their likelihood of occurrence in the survey area are presented in Appendix A3.

Table 14 Conservation significant fauna species that are likely to and may occur in the survey area

| Scientific Name              | Common Name              | Conservation Status |                    | Ecology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------------|--------------------------|---------------------|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                              |                          | State               | EBPC Act           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Birds</b>                 |                          |                     |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <i>Calidris ferruginea</i>   | Curlew Sandpiper         | CR                  | CE                 | The Curlew Sandpiper is a small, slim bird weighing 57 g. In Australia, Curlew Sandpipers occur around the coasts and are also quite widespread inland, though in smaller numbers. In Western Australia, they are widespread around coastal and sub coastal plains from Cape Arid to the south-west Kimberley. Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas and less often recorded inland around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand.                                                                                                                                                                                                                                             |
| <i>Calidris subminuta</i>    | Long-toed Stint          | MI                  | Marine / Migratory | The Long-toed Stint is a very small sandpiper and member of the Calidridinae family. The species is characterised by its distinctive shape; a small head, long slim neck, rounded belly, short rear-end, long legs (often held flexed), short straight bill tapering to finely pointed tip, folded primaries that fall level with the tail and show little or no primary projection beyond the tertials (Higgins & Davies, 1996). In Western Australia this species is found mainly along the coast, with a few scattered inland records. It is distributed along most of the Australian coastline with large densities on the Victorian and Tasmanian coasts. The Red-necked Stint has been recorded in all coastal regions, and found inland in all states when conditions are suitable. |
| <i>Falco peregrinus</i>      | Peregrine Falcon         | OS                  | -                  | The Peregrine Falcon is a medium-sized raptor (length 35-55cm; wingspan 80-105cm) with slate-grey back, a striking charcoal black head and face which contrast with a pale cream bib on the neck and breast (Birdlife Australia, 2020). A well-known falcon, the Peregrine inhabits a vast array of environs in Australia. Usually uncommon and migratory (Pizzey & Knight, 2007). This species lays its eggs in recesses of cliff faces, tree hollows or large abandoned nests (Bamford, 2009)                                                                                                                                                                                                                                                                                            |
| <i>Gelochelidon nilotica</i> | Gull-billed Tern         | MI                  | Migratory          | The Gull-billed Tern is entirely white, except for a black crown from bill to nape, a grey back and upper wings and darker flight feathers. The iris is dark brown, bill and legs black. The sexes are similar. In non-breeding plumage, the head is mainly white, the crown streaked brownish-grey and the ear coverts are dull black. Gull-billed Terns are found in freshwater swamps, brackish and salt lakes, beaches and estuarine mudflats, floodwaters, sewage farms, irrigated croplands and grasslands. They are only rarely found over the ocean.                                                                                                                                                                                                                               |
| <i>Oxyura australis</i>      | Blue-billed Duck         | P4                  | -                  | The Blue-billed Duck is a compact diving duck with males having a large scooped bright, light blue bill. The tail is dark with stiff pointed feather tips and is usually held flat on the surface of the water except when in display (Birdlife Australia, 2020). The Blue-billed Duck is endemic to south eastern and south western Australia. It prefers deep water in large permanent wetlands and swamps with aquatic vegetation. This species of duck is fully aquatic and rarely comes onto land (OoEH, 2018)                                                                                                                                                                                                                                                                        |
| <i>Rostratula australis</i>  | Australian Painted Snipe | EN                  | EN                 | The Australian Painted Snipe is a stocky wading bird around 220–250 mm in length with a long pinkish bill. It has been recorded less frequently at a smaller number of more scattered locations farther west in South Australia, the Northern Territory and Western Australia. The Australian Painted Snipe generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains.                                                                                                                                                                                                               |

| Scientific Name                 | Common Name                            | Conservation Status |                    | Ecology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|----------------------------------------|---------------------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                 |                                        | State               | EBPC Act           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <i>Tringa glareola</i>          | Wood Sandpiper                         | MI                  | Marine / Migratory | The Wood Sandpiper is a small thin wader and member of the Tringinae family. The species has a length of 19–23 cm, a wingspan of 56–57 cm and a weight of 55 g. The species has a short straight bill and long legs. The Wood Sandpiper uses well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes. They are typically associated with emergent, aquatic plants or grass, and dominated by taller fringing vegetation, such as dense stands of rushes or reeds, shrubs, or dead or live trees, especially Melaleuca and River Red Gums <i>Eucalyptus camaldulensis</i> and often with fallen timber. They also frequent inundated grasslands, short herbage or wooded floodplains, where floodwaters are temporary or receding, and irrigated crops. They are also found at some small wetlands only when they are drying (Higgins & Davies, 1996). |
| <i>Tringa nebularia</i>         | Common Greenshank                      | MI                  | Marine / Migratory | The Common Greenshank is a largely built wader, weighing up to 190 g for both sexes. The species is found in inland wetlands and sheltered coastal habitats (DotE, 2015). The Common Greenshank is generally absent from the Western Deserts although there are a few records from the Great Sandy Desert and the Nullarbor Plain. It occurs around most of the coast from Cape Arid in the south to Carnarvon in the north-west. In the Kimberleys it is recorded in the south-west and the north-east, with isolated records from the Bonaparte Archipelago (Higgins & Davies, 1996).                                                                                                                                                                                                                                                                                                             |
| <b>Invertebrates</b>            |                                        |                     |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <i>Idiosoma clypeatum</i>       | Northern Shield-backed Trapdoor Spider | P3                  | -                  | <i>Idiosoma clypeatum</i> is one of seven highly autapomorphic species in the polyphyletic 'sigillate complex'. <i>Idiosoma clypeatum</i> has a widespread distribution in Western Australia's inland arid zone, principally throughout the Yalgoo and Murchison bioregions where it is the only known species in the nigrum-group (excluding a population of <i>I. formosum</i> from the southern Yalgoo. It extends from near Paynes Find, the Blue Hill Range, Kadji Kadji Nature Reserve, and Karara in the south, north and north-east to at least Coolcalalaya Homestead, Jack Hills, Albion Downs, Yakabindie, and Yeelirrie. This distribution seems to be strongly correlated with annual rainfall of less than 250 mm (Rix <i>et al.</i> , 2018)                                                                                                                                          |
| <b>Reptiles</b>                 |                                        |                     |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <i>Egernia stokesii badia</i>   | Western Spiny-tailed Skink             | VU                  | E                  | The Western Spiny-tailed Skink belongs to a group of moderately large, rock-dwelling reptiles (Chapple, 2003). Two colour forms exist; the brown form and black form, the latter is delineated from the former by its black colouration, lack of patterning in adults and differing head and scale morphology (DotE, 2015). The black form occupies rock crevices in large, isolated rocky outcrops, typically granite (Duffield & Bull, 2002). Crevices are usually identifiable by a "latrine" or scat pile, resulting from regular defecation of all family members, in close proximity to the entrance (Chapple, 2003).                                                                                                                                                                                                                                                                         |
| <b>Mammals</b>                  |                                        |                     |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <i>Sminthopsis longicaudata</i> | Long-tailed Dunnart                    | P4                  | -                  | The Long-tailed Dunnart is unique among dunnarts in that its tail is twice the length of the head and body. They are grey with a very pale underbelly, white legs and feet. Adults weigh 15-20 g. <i>Sminthopsis longicaudata</i> inhabits exposed rock and stony soils with hummock grasses and shrubs. Flat-topped hills, lateritic plateaus, sandstone ranges and breakaways. Sparse mulga over spinifex. The species has been recorded in disjunct populations across arid Australia with populations recorded in the southern Carnarvon Basin.                                                                                                                                                                                                                                                                                                                                                 |





PROJECT ID 60647200  
 CREATED BY WYATTK2  
 APPROVED BY J.LEIGH  
 LAST MODIFIED 28 JAN 2021

**AECOM**  
 www.aecom.com

Datum: GDA 1994 MGA Zone 50

1:1,000,000  
 (when printed at A4)

Data sources:  
 Base Data: (c) Based on information provided by and with the permission of the Western Australian Land Information Authority trading as Landgate (2021), Geoscience Australia, Streetpro

**LEGEND**

Survey Area  
 TEC / PEC (DBCA)  
 Priority 1  
 Threatened and Priority Flora Database (DBCA)  
 Priority 1  
 Priority 3  
 Priority 4

WA Herb (DBCA)  
 Threatened  
 Priority 1  
 Priority 2  
 Priority 3  
 Priority 4

**Desktop Threatened Fauna (DBCA)**

- ▲ Critically Endangered
- ▲ Endangered
- ▲ Vulnerable
- ▲ Migratory Species
- ▲ Specially Protected
- ▲ Priority 3
- ▲ Priority 4

**Desktop Results**

**WAJARRI CORPORATION**

*SQUARE KILOMETRE ARRAY – FLORA AND FAUNA ASSESSMENT*

**Figure 6**

## 6.0 Field Survey Results and Discussion

### 6.1 Vegetation



#### 6.1.1 Vegetation Communities



No TECs or PECs were anticipated to occur and none were recorded in the survey area. Ten native vegetation communities were defined and mapped by comparing floristic data from 32 relevés and 65 quadrats. The vegetation was largely homogenous, characterised by Mulga Open Woodlands on hard clay on flat terrain, sometimes with quartz on the surface. Distinct areas included deep sand plains dominated by shrubs, and granite outcrops with sparse vegetation. Granite boulders and outcrops were noted to be statistically similar to adjacent Mulga on plains, however they were described separately as the landform was considered significantly different. Further, the granite outcrops provide suitable habitat for several Priority flora and fauna species, therefore the distinction was considered important.



Vegetation communities are mapped in Figure 7.





Table 15 Vegetation communities recorded in the survey area



| Description                                                                                                                                                                                                                                                                                                                                                                                                                                    | Site details                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Photo                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>Plains</b>                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                      |
| <p><b>AfSa</b><br/>Acacia Woodland</p> <p><i>Acacia fuscaneura</i>, <i>Acacia incurvaneura</i> and occasional <i>Acacia pruinocarpa</i> low open woodland over <i>Senna artemisioides</i> subsp. <i>helmsii</i>, <i>Acacia tetragonophylla</i> and <i>Senna</i> sp. Meekatharra (E. Bailey 1-26) mid to tall sparse shrubland.</p>                                                                                                             | <p>Plains, rarely with quarts on the surface. Red clay soils.</p> <p>Species richness:</p> <ul style="list-style-type: none"> <li>• 2020 – 7 native species</li> <li>• Total – 41 native species</li> </ul> <p>Quadrats:</p> <ul style="list-style-type: none"> <li>• 2020 – 1 site</li> <li>• 2014 – 4 quadrats</li> </ul>                                                                                                                                                  |   |
| <p><b>AfEfPo</b><br/>Acacia Woodland</p> <p><i>Acacia fuscaneura</i>, <i>Acacia incurvaneura</i> and <i>Acacia victoriae</i> subsp. <i>victoriae</i> low open woodland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i>, <i>Acacia tetragonophylla</i> and <i>Eremophila phyllopoda</i> low to tall open shrubland over <i>Ptilotus obovatus</i>, <i>Solanum lasiophyllum</i> and <i>Maireana planifolia</i> low sparse shrubland.</p> | <p>Common community found across variety of landscapes including hardpan clays, clay loams and clay sandy soils on flat terrain. May have quarts or granite rocks (small to large) on surface.</p> <p>Species richness:</p> <ul style="list-style-type: none"> <li>• 2020 – 58 native species</li> <li>• Total – 110 native and 1 weed species</li> </ul> <p>Quadrats:</p> <ul style="list-style-type: none"> <li>• 2020 – 11 sites</li> <li>• 2014 – 10 quadrats</li> </ul> |  |

| Description                                                                                                                                                                                                                                                                                                                                                                                                                       | Site details                                                                                                                                                                                                                                                                                                                                                                                                                                        | Photo                                                                                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <p><b>AiAtEf</b><br/>Acacia Woodland</p> <p><i>Acacia incurvaneura</i>, <i>Acacia craspedocarpa</i> and <i>Acacia fuscaneura</i> low open woodland over <i>Acacia tetragonophylla</i>, <i>Acacia kempeana</i> and <i>Acacia oswaldii</i> sparse tall shrubland over <i>Eremophila fraseri</i> subsp. <i>parva</i>, <i>Senna artemisioides</i> subsp. <i>helmsii</i> and <i>Eremophila macmillaniana</i> sparse mid shrubland.</p> | <p>Flat terrain with red clay with a variable soil profile reflecting erosion. Alluvial sands found close to drainage channels transition to clay loams on flats.</p> <p>Species richness:</p> <ul style="list-style-type: none"> <li>• 2020 – 29 native species</li> <li>• Total – 76 native and 2 weed species</li> </ul> <p>Quadrats:</p> <ul style="list-style-type: none"> <li>• 2020 – 4 sites</li> <li>• 2014 – 13 quadrats</li> </ul>       |   |
| <p><b>AvEp</b><br/>Acacia Woodland</p> <p><i>Acacia victoriae</i> subsp. <i>victoriae</i>, <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> and <i>Acacia tetragonophylla</i> tall shrubland over <i>Eremophila pterocarpa</i> subsp. <i>pterocarpa</i>, <i>Senna</i> sp. Meekatharra (E. Bailey 1-26) and <i>Atriplex amnicola</i> mixed chenopod shrubland</p>                                                             | <p>Hardwash plains with red-brown sandy loam clay soils.</p> <p>Species richness:</p> <ul style="list-style-type: none"> <li>• 2020 – 19 native species</li> <li>• Total – 50 native and 3 weed species</li> </ul> <p>Quadrats:</p> <ul style="list-style-type: none"> <li>• 2020 – 1 site</li> <li>• 2014 – 5 quadrats</li> </ul> <p>In 2014 a populations of Priority 3 <i>Gunniopsis divisa</i> was recorded (outside the 2020 survey area).</p> |  |

| Description                                                                                                                                                                                                                                                                                                                                                                  | Site details                                                                                                                                                                                                                                                                                                | Photo                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <p><b>AaEcPo</b><br/>Acacia Woodland</p> <p><i>Acacia aptaneura</i>, <i>Acacia aneura</i> and <i>Acacia incurvaneura</i> low open woodland over <i>Eremophila compacta</i>, <i>Eremophila simulans</i> and <i>Eremophila gilesii</i> mid open shrubland over <i>Ptilotus obovatus</i>, <i>Ptilotus drummondii</i> and <i>Aristida</i> sp. low mixed shrub and grassland.</p> | <p>Low rises or plains with deep sandy red soils.</p> <p>Species richness:</p> <ul style="list-style-type: none"> <li>• 2020 – 42 native species</li> </ul> <p>Quadrats:</p> <ul style="list-style-type: none"> <li>• 2020 – 8 sites</li> </ul>                                                             |   |
| <p><b>ApAgEf</b><br/>Acacia Woodland</p> <p><i>Acacia pteraneura</i> low woodland to open woodland over <i>Acacia grasbyi</i> and <i>Acacia tetragonophylla</i> tall sparse shrubland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i>, <i>Senna artemisioides</i> subsp. <i>helmsii</i> and <i>Eremophila fraseri</i> subsp. <i>parva</i> mid shrubland.</p>        | <p>Undulating flat terrain with red-brown sandy loam soils.</p> <p>Species richness:</p> <ul style="list-style-type: none"> <li>• 2020 – NA</li> <li>• Total – 48 native species</li> </ul> <p>Quadrats:</p> <ul style="list-style-type: none"> <li>• 2020 – 0 sites</li> <li>• 2014 – 8 quadrat</li> </ul> |  |



| Description                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Site details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Photo                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <p><b>Granite</b></p> <p><b>AiTdPb</b><br/>Mixed Shrubland</p> <p><i>Acacia incurvaneura</i>, <i>Acacia fuscaneura</i> and <i>Acacia caesaneura</i> low isolated clumps of trees over <i>Thryptomene decussata</i>, <i>Eremophila forrestii</i> subsp. <i>forrestii</i> and <i>Acacia oswaldii</i> mid open shrubland over <i>Ptilotus drummondii</i>, <i>Eragrostis eriopoda</i> and <i>Solanum lasiophyllum</i> low sparse mixed shrub and grassland.</p> | <p>Granite outcrops on undulating terrain.</p> <p>Species richness:</p> <ul style="list-style-type: none"> <li>• 2020 – 29 native species</li> <li>• Total – 29 native species</li> </ul> <p>Quadrats:</p> <ul style="list-style-type: none"> <li>• 2020 – 4 sites</li> <li>• 2014 – 1 quadrat</li> </ul> <p>In 2014 populations of Priority 3 <i>Ptilotus beardii</i> and <i>Verticordia jamiesonii</i> were recorded (outside the 2020 survey area).</p>                                                                                                                                                                                         |   |
| <p><b>ArCc</b><br/>Mixed Shrubland</p> <p><i>Acacia rhodophloia</i> low open woodland over <i>Corchorus crozophorifolius</i>, <i>Cymbopogon ambiguus</i> and <i>Eremophila platycalyx</i> subsp. <i>platycalyx</i> mixed low to mid shrub and grassland.</p>                                                                                                                                                                                                | <p>Granite domes and boulders with light brown sand loam soils. Also includes <i>Dodonaea viscosa</i> subsp. <i>spathulata</i> and <i>Eremophila latrobei</i> subsp. <i>latrobei</i>.</p> <p>Species richness:</p> <ul style="list-style-type: none"> <li>• 2020 – 20 native species</li> <li>• Total – 31 native species</li> </ul> <p>Quadrats:</p> <ul style="list-style-type: none"> <li>• 2020 – 2 sites</li> <li>• 2014 – 2 quadrats</li> </ul> <p>In 2014 populations of Priority 3 <i>Ptilotus beardii</i> were recorded (outside the 2020 survey area). In 2020 populations of Priority 3 <i>Petrophile pauciflora</i> were recorded.</p> |  |

| Description                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Site details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Photo                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>Drainage</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                      |
| <p><b>AiAbSa</b><br/>Acacia Woodland</p> <p><i>Acacia incurvaneura</i>, <i>Hakea lorea</i> subsp. <i>lorea</i> and <i>Acacia aneura</i> low open woodland over <i>Acacia burkittii</i>, <i>Acacia tetragonophylla</i> and <i>Acacia victoriae</i> subsp. <i>victoriae</i> tall shrubland over <i>Senna artemisioides</i> subsp. <i>helmsii</i>, <i>Ptilotus obovatus</i> and <i>Senna artemisioides</i> subsp. <i>x sturtii</i> low to mid sparse shrubland.</p> | <p>Undefined broad drainage and flat terrain. Red-brown sandy loam soils.</p> <p>Species richness:</p> <ul style="list-style-type: none"> <li>• 2020 – 12 native species</li> <li>• Total – 33 native and 1 weed species</li> </ul> <p>Quadrats:</p> <ul style="list-style-type: none"> <li>• 2020 – 1 site</li> <li>• 2014 – 3 quadrats</li> </ul>                                                                                                                                                                                                            |   |
| <p><b>AcAsTd</b><br/>Casuarina Woodland</p> <p><i>Allocasuarina campestris</i> low to mid woodland over <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i>, <i>Exocarpos aphyllus</i> and <i>Scaevola spinescens</i> mid to tall open shrubland over <i>Tecticornia doliiformis</i>, <i>Atriplex amnicola</i> and <i>Tecticornia ?indica</i> mid chenopod shrubland.</p>                                                                                      | <p>Associated with major drainage channels. Exposed granite at some locations. Soils are light red sand to sandy clay. Trees are confined to banks of channels.</p> <p>Species richness:</p> <ul style="list-style-type: none"> <li>• 2020 – NA</li> <li>• Total – 46 native and 2 weed species</li> </ul> <p>Quadrats:</p> <ul style="list-style-type: none"> <li>• 2020 – no sites</li> <li>• 2014 – 3 quadrats</li> </ul> <p>In 2014 a population of Priority 3 <i>Frankenia confusa</i> was recorded in this community (outside the 2020 survey area).</p> |  |

### 6.1.2 Condition

Boolardy station has been used for sheep and cattle grazing since 1876. The impact of this, combined with a drying climate, is prevalent across the survey area (Plate 1). It has resulted in a loss of total biomass, erosion of the surface, and soil compaction. The 'native vegetation' currently present is unlikely to be a good reflection of pre-European vegetation. Lacking a suitable reference of condition, the entire survey area has been considered in 'Very Good' condition. Vegetation condition is mapped in Figure 7.



**Plate 1** Dry conditions prevail at Boolardy Station



## 6.2 Flora

### 6.2.1 Diversity

A total of 91 native flora species from 41 genera and 23 families were recorded. No weed species were recorded during the survey.

Six species that were collected for confirmation lacked suitable material for a confident identification at the WA Herbarium. This included *Eremophila simulans* which lacked material suitable to infer the subspecies. One of the *E. simulans* subspecies (*megacalyx*) is listed as a Priority 3 species and was considered likely to occur.

The complete species list is provided in **Appendix B**. All site data is presented in Appendix C.

### 6.2.2 Conservation Significant Flora

No species listed under the EPBC Act or the BC Act were recorded during the field survey.

Three Priority 3 flora species were recorded:

- *Petrophile pauciflora*
- *Sauropus* sp. Woolgorong (M. Officer s.n. 10/8/94)
- *Eremophila simulans* subsp. *megacalyx* may have been recorded.

Species are discussed in detail below.

#### ***Petrophile pauciflora* (P3)**

*P. pauciflora* is a short robust shrub (Plate 2). The species was recorded on and near granite outcrops near the eastern boundary of Boolardy Station and on Kalli Station (Figure 7). Where the species occurs it was considered locally common, with 163 individuals recorded (Table 16). Where granite outcrops extended beyond the survey area, so did the *P. pauciflora* populations.

This species was not recorded in 2014.

**Table 16** *Petrophile pauciflora* (P3) records in the survey area recorded by AECOM

| Survey     | No. of locations | No. of individuals | Plant life cycle              |
|------------|------------------|--------------------|-------------------------------|
| AECOM 2020 | 2                | 163                | Old flower material available |



**Plate 2** *Petrophile pauciflora* habit (left) and habitat (right)

### ***Sauropus* sp. Woolgorong (M. Officer s.n. 10/8/94) (P3)**

*S. sp. Woolgorong* is a shrub that grows up to 1 m tall with yellow flowers (Plate 3). It is known from sporadic records in the Western Murchison IBRA subregion. In 2014 it was recorded at two locations comprising approximately 201 individuals (Table 17). It was recorded at one site in 2020, at the time it was not recognised as the Priority species. It was vegetative and generally in poor condition. It formed a co-dominant understorey shrub species. The 2020 record is approximately 20 km from the 2014 record and 62 km from the nearest DBCA record.

The spatial distribution of *Sauropus* sp. Woolgorong is shown in Figure 7.

**Table 17** *Sauropus* sp. Woolgorong records in the survey area recorded by AECOM

| Survey     | No. of locations | No. of individuals | Plant life cycle |
|------------|------------------|--------------------|------------------|
| AECOM 2014 | 2                | ~210               | Vegetative       |
| AECOM 2020 | 1                | Not counted        | Vegetative       |



**Plate 3** *Sauropus* sp. Woolgorong

### ***Eremophila simulans* (potential P3)**

*E. simulans* was collected in the survey area. All individuals were vegetative (no fruiting or flowering material) at the time of the field survey. The specimen was submitted to the WA Herbarium for format identification by Mike Hislop. Mike advised that there was not enough suitable identification material to determine what subspecies the sample represented.

*Eremophila simulans* subsp. *megacalyx* was recorded by Alexander Holms & Associates (2008) in the MRO. At that time it was not listed as a Priority species. This species was potentially recorded in 2014. At this time the sample collected was also vegetative and unable to be confirmed as the Priority 3 species. It was assumed to represent subspecies *megacalyx* as a precaution. *E. simulans* subsp. *megacalyx* is known to occur in the local area, was recorded in 2014, and there are several DBCA database records nearby.

*E. simulans* was recorded mostly on community AaEcPo, a mixed shrubland on plains with sandy surface (Plate 4; Figure 7). This corresponds to descriptions of habitat in the DBCA database search results. Two populations were recorded, comprising more than 1,0000 individuals (Table 18). At one location this species represented the dominant mid-storey shrub species.

**Table 18** *Eremophila simulans* records in the survey area recorded by AECOM

| Survey     | No. of locations | No. of individuals    | Plant life cycle |
|------------|------------------|-----------------------|------------------|
| AECOM 2014 | 3                | 8                     | Vegetative       |
| AECOM 2020 | 2                | +1000, locally common | Vegetative       |





Plate 4 *Eremophila simulans* habit

### 6.2.3 Other Species

In 2014 five Priority flora species were recorded in addition to those mentioned above in Section 6.2.2. This included:

- *Frankenia confusa* (P4) delisted from P2
- *Gunniopsis divisa* (P3)
- *Hemigenia tysonii* (P3)
- *Ptilotus beardii* (P3)
- *Verticordia jamiesonii* (P3).

Their distribution is shown on Figure 6 and discussed below.

#### ***Frankenia confusa* (P4)**

*Frankenia confusa* is a low diffuse shrub that grows up to 0.75 m tall. It occurs on wet pale brown sand, brown clay and grey soils on banks of rivers, waterholes and river floodplains.

*F. confusa* was recorded at one location including 20 individuals in 2014. At the time this species was listed as a Priority 2 species. It was recorded on the bank of a major well-defined channel, the same channel that intersects with the current survey area.

No *Frankenia* species were observed in any of the ephemeral drainage channels. Its occurrence nearby was associated with a wider channel that had undulating banks of clay loam soils that supported several samphire shrub species. This community was not recorded in the current survey area.

#### ***Gunniopsis divisa* (P3)**

*Gunniopsis divisa* is a prostrate annual succulent herb that grows up to 10 cm high. The stems radiate from the base and are fleshy and hairless. The flowers are a pale yellow, fading to white and flowers occur in August. This species is commonly found on colluvial outwash associated with banded ironstone formations.

*G. divisa* was recorded at nine locations comprising 149 individuals within the wide ephemeral drainage line that also intersects with the current survey area (Figure 6).

The absence of this species could be attributed to survey timing. No annuals were present at the time of the 2020 field survey. Its absence in the survey area cannot be confidently determined.

### ***Hemigenia tysonii* (P3)**

*Hemigenia tysonii* is a perennial woody upright shrub that grows up to 0.5 m high with purple-blue-pink/white flowers. This species is commonly found on red sand, sandy clay, lateritic sands on flats, sand dunes and hills.

*H. tysonii* was recorded at one location northeast of the MRO in 2014 comprising 2 individuals. The population was found in Mulga open woodland on a sandy rise.

The species is locally uncommon and considered unlikely to occur in the survey area following significant survey effort between 2014 and 2020.

### ***Ptilotus beardii* (P3)**

*Ptilotus beardii* is a compact perennial rigid shrub that grows 0.15-0.5 m tall. This species has dark bark on the lower stems and cobweb-like indumentums on young shoots that become glabrescent with age. *Ptilotus beardii* grows on clayey soils, saline flats and low breakaways.

*P. beardii* was recorded at six locations comprising +1,300 individuals. Of these locations it was considered locally common at four of them. *P. beardii* is associated with granite outcrops and plains adjacent to granite domes and boulders. This species is a perennial shrub that was noted to have reduced biomass when recorded in 2014.

Searches for this species were undertaken at all granite outcrops, no individuals were recorded. It is possible that this species has since senesced due to prevailing dry conditions or was overlooked if it lacked suitable flowering material (flowering period in 2014 was late August early September).

### ***Verticordia jamiesonii* (P3)**

*Verticordia jamiesonii* is a short shrub that grows up to 60 cm tall. It has one basal stem and is openly and irregularly branched. The species has tiny leaves, shining red buds, and cream to white flowers with distinct hairs on the stamens, staminodes and style.

*V. jamiesonii* grows on sand and clay, sometimes with lateritic gravel in pockets of soil and crevices on weathered, heavy laterite on low breakaways and on rocky hills in open shrublands. One population was recorded comprising more than 270 individuals. It was considered locally common at this location.

This species was anticipated to occur amongst granite rocky outcrops. It was easy to identify in 2014 when it was in flower. Targeted searches in 2020 did not record this species. It is possible that it was overlooked lacking suitable flowering material, however no species that closely resembled *Verticordia* was observed. It may occur in areas identified as potential granite outcrops that were not accessed.

## **6.3 Fauna**

Results presented below largely incorporate those from AECOM (2014) where relevant.

### **6.3.1 Fauna Inventory**

A total of 92 fauna species were recorded across the two field surveys conducted by AECOM in 2014 and 2020 (refer to Appendix D). This comprised 61 bird, 15 reptile, 14 mammal, one amphibian and one invertebrate species. Fifty vertebrate fauna species were identified during the 2020 survey, with an additional 11 species added 81 species identified by AECOM (2014). Conditions encountered during the 2020 survey were very dry, with a lack of water and flowering plants probably leading to less species being observed, with minimal water and nectivorous birds observed compared to the 2014 survey. The AECOM 2014 survey also had significantly longer in the field.



### 6.3.1.1 Conservation Significant Fauna

Eight conservation significant fauna species were recorded during the 2014 and 2020 surveys. These include:

- Western Spiny-tailed Skink *Egernia stokesii badia*
- Northern Shield-backed Trapdoor Spider *Idiosoma clypeatum*
- Black-faced Cuckoo-shrike *Coracina novae-hollandiae*
- Magpie Lark *Grallina cyanoleuca*
- Whistling Kite *Haliastur sphenurus*
- Australian Kestrel *Falco cenchroides*
- Welcome Swallow *Hirundo neoxena*
- Australian Pipit *Anthus australis*.

However, these seven avian species are listed as Marine under the EPBC Act and are therefore only considered significant when on Commonwealth land. These species are not discussed further as the survey area does not contain any Commonwealth land.






#### 6.3.1.1.1 Western Spiny-tailed Skink

The Western Spiny-tailed Skink *Egernia stokesii badia* is listed under the EPBC Act as Endangered and under the WC Act as Vulnerable. It belongs to the cunninghamii group; a group of moderately large, rock-dwelling reptiles (Chapple, 2003). Two colour forms exist; the brown form and black form, the latter is delineated from the former by its black colouration, lack of patterning in adults and differing head and scale morphology (DotEE, 2020). Western Spiny-tailed Skinks are saxicolous (rock dwelling), occupying rock crevices in large, isolated rocky outcrops, typically granite (Duffield & Bull, 2002). Occasionally, hollow logs or semi-arboreal habitats are utilised for shelter, with the brown form predominantly occupying York Gum woodland (Chapple, 2003). Crevices occupied by the black form of Western Spiny-tailed Skink are usually identifiable by a “latrine” or scat pile, resulting from regular defecation of all family members, in close proximity to the entrance (Chapple, 2003).

Granite outcrops within the survey and surrounding area were subject to intense searches during the 2014 and 2020 field surveys, during which direct and indirect evidence of the skink was recorded a total of five times, with two direct observations and three scat piles and latrines recorded. However, none of these records are now within the current survey area, due to a refinement of the survey area after the 2014 survey. Refer to Figure 7 for the three observations within one kilometre of the survey area. The latrine recorded during this survey is also just outside of the survey area (40 m south).

Granite boulders and heaps have been mapped across the survey area, and these have generally been assessed for quality as skink habitat. This assessment was largely based on whether lateral crevices are present, and relative size and fragmentation of the granite outcrops. Generally, the survey area avoids the more significant outcrops in the area, and minimal quality habitat for the Western Spiny-tailed Skink exists in the survey area.

**Table 19 Western Spiny-tailed Skink observations**

| Evidence   | Year | Location  |            | Photo                                                                                |
|------------|------|-----------|------------|--------------------------------------------------------------------------------------|
|            |      | Latitude  | Longitude  |                                                                                      |
| Individual | 2014 | -26.69691 | 117.019238 |    |
| Scat pile  | 2014 | -26.85012 | 116.889499 |   |
| Individual | 2014 | -26.84938 | 116.889037 |  |
| Scat pile  | 2014 | -26.72834 | 116.555373 |  |
| Latrine    | 2020 | -26.89377 | 117.086468 |  |

### 6.3.1.1.2 Northern Shield-back Trapdoor Spider

AECOM (2014) and a subsequent targeted survey by Phoenix (2015) recorded a threatened trapdoor spider species (*Idiosoma nigrum*) twice within the survey and surrounding area. However in 2018, a conservation systematics review was published (Rix *et al.*, 2018) that detailed the revision of the genus *Idiosoma*. One of the results of this review was that *I. nigrum* was shown to contain multiple species and the distribution of *I. nigrum* included only those populations within the central and central-western Wheatbelt bioregion (Rix *et al.*, 2018). The *Idiosoma* populations recorded through the Murchison bioregion are now regarded as the Northern Shield-backed Trapdoor Spider *I. clypeatum* (Rix *et al.*, 2018). The review concluded that *I. clypeatum* is the only known species from this genus in the Murchison bioregion (Rix *et al.*, 2018) and its distribution seems to be strongly correlated with annual rainfall of less than 250 mm. The species is Priority 3 listed by the DBCA.

The Northern Shield-backed Trapdoor Spider was recorded twice in rocky areas with scattered *Acacia* and *Eremophila*. However, none of these records are within the current survey area, due to a refinement of the survey area after the 2014 survey.



Plate 5 Northern Shield-backed Trapdoor Spider burrow recorded in 2014

### 6.3.1.1.3 Additional Species

Based on the desktop assessment and the field survey, the following additional conservation significant fauna species have the potential to utilise the habitats within the survey area:

- six threatened, Marine and Migratory listed waders and waterbird species (Curlew Sandpiper *Calidris ferruginea*, Long-toed Stint *Calidris subminuta*, Gull-billed Tern *Gelochelidon nilotica*, Australian Painted Snipe *Rostratula australis*, Wood Sandpiper *Tringa glareola*, Common Greenshank *Tringa nebularia*) that may seasonally utilise the marginal channel and creek line habitats:
- Peregrine Falcon *Falco peregrinus* (listed as OS under the BC Act) may utilise the major channel creek lines with large eucalypts. Generally the breakaways within the survey area do not provide suitable habitat for this falcon.

Refer to Table 20 and Appendix A for further detail on all of these conservation significant species.

### 6.3.2 Introduced Fauna

Ten introduced fauna species were recorded in the survey area. Species comprised:

- Common Myna *Acridotheres tristis*
- Goat *Capra hircus*
- European Cattle *Bos taurus*
- Camel *Camelus dromedaries*
- Dog *Canis familiaris* (either Dingo *Canis familiaris dingo* or Feral Dog *Canis familiaris familiaris*)
- Red Fox *Vulpes vulpes*
- Cat *Felis catus*
- Rabbit *Oryctolagus cuniculus*
- Horse *Equus caballus*.

All of these species except for European Cattle and the Dingo are Declared Pests under the BAM Act. Generally all of these species were identified directly or indirectly (scats and tracks) sporadically throughout the survey area.

### 6.3.3 Fauna Habitats

The survey area is generally fairly homogenous in regards to fauna habitat, predominantly comprising sparse vegetation on hardpan and sandplains, with or without surface rocks. Less common but more significant fauna habitats include granite (domes, heaps and boulders); drainage channels and rocky breakaways. These less common habitats tend to have more structural complexity and microhabitats, support species of conservation significance, and have an associated higher fauna habitat quality. Although the more common fauna habitats may also potentially provide habitat for conservation significant species, these are well represented in the region.

Eight broad fauna habitats were defined and mapped within the survey area, predominantly based on vegetation, landform and soils. Habitat mapping generally closely aligns with the vegetation mapping in Figure 7. The most common fauna habitat was the hardpan plain with intermittent sandplain making up, 3,281 ha and 66.7% of the survey area. Within this habitat, hardpans can persist for several kilometres, vegetation is generally sparse with no large trees or dense understorey, minimal leaf litter apart from at the base of trees and shrubs, and occasional smaller logs and fallen branches. This habitat supports a diverse range of common bird species in the area and some reptiles and macropods. The habitat is not considered to be significant and is extensive throughout the landscape.

Table 20 describes these fauna habitats, includes the area and percentage these cover within the survey area, and the conservation significant fauna species with potential to utilise these habitats. Refer to Figure 7 for habitat mapping.


#### 6.3.3.1 Fauna Habitat Linkages


Habitat linkages are typically areas or corridors of vegetation that link (larger) areas of fauna habitat. Linkages are important as they enable fauna to move freely between remnant bushland patches, therefore increasing gene-flow between populations. A study conducted by Gilbert *et al.* (1998) found that corridors and/or linkages do maintain species richness in the fragmented landscapes.



The Project is located in the Midwest region, where land use is predominantly grazing native pastures (96%) and Crown Reserves (2.8%). As such, much of the existing habitat is in non-pristine condition and so habitat corridors remain a valuable asset to local fauna. Habitat linkages are also considered to be of importance in this dry landscape where large bare areas are common. Within the survey area these linkages consist of the more significant drainage channels and creek lines and impacts to these should be minimised. The most valuable linkage corridors occur within the channels and creek line habitat as mapped in Figure 7.




Table 20 Fauna habitats of the survey area

| Fauna Habitat                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Habitat for conservation significant fauna                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Survey Area |      | Representative Photo                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------|-------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Ha          | %    |                                                                                     |
| <p><b>Channels and creek line</b></p> <p>Major and minor drainage lines subject to occasional flooding. Minor drainage areas tend to exhibit little variation in habitat characteristics to hardpan plains (when dry), apart from slightly higher vegetation cover and sandier soils. Major drainage channels tend to contain larger trees (e.g. eucalypts, <i>Allocasuarina</i> sp.) with steep channels.</p> <p>This habitat provides value to fauna through the use as linkages throughout the landscape, and although impacted from grazing and other introduced fauna is of moderate to high quality for this area.</p> | <p>This habitat may seasonally provide habitat for waterbird species including:</p> <ul style="list-style-type: none"> <li>• Curlew<br/><i>Sandpiper Calidris ferruginea</i></li> <li>• Long-toed Stint<br/><i>Calidris subminuta</i></li> <li>• Gull-billed Tern<br/><i>Gelochelidon nilotica</i></li> <li>• Australian Painted Snipe<br/><i>Rostratula australis</i></li> <li>• Wood Sandpiper<br/><i>Tringa glareola</i></li> <li>• Common Greenshank<br/><i>Tringa nebularia</i>.</li> </ul> <p>May provide habitat for Peregrine Falcon <i>Falco peregrinus</i>.<br/>Possible habitat for the Northern Shield-backed Trapdoor Spider <i>Idiosoma clypeatum</i>*</p> | 184.73      | 3.76 |  |


| Fauna Habitat                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Habitat for conservation significant fauna                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Survey Area |      | Representative Photo                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------|-------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Ha          | %    |                                                                                     |
| <p><b>Granite boulders and heaps</b></p> <p>Low hills of emergent granite and rock piles of various sizes with scattered <i>Acacia</i> sp. and <i>Eremophila</i> sp. This habitat contains some leaf litter beneath vegetation, but does not contain a dense understorey, large trees, significant hollows or logs &gt; 300 mm diameter.</p> <p>This habitat provides water catchment and a relatively high diversity of flora and fauna. However in general, the larger more significant areas of this habitat lie outside the survey area, with the survey area aligned to avoid these areas.</p> <p>A couple of small areas of potential granite have been identified on the aerial imagery. These areas were not mapped. These areas were surveyed in 2014 but not mapped as granite. These areas have subsequently been mapped as Granite boulders and heaps, but have not been confirmed in the field.</p> | <p>The survey area generally only provides marginal habitat for the Western Spiny-tailed Skink. The survey area has been aligned to avoid better quality granite habitat, which can be found directly adjacent the survey area.</p> <p>Possible habitat for the Northern Shield-backed Trapdoor Spider <i>Idiosoma clypeatum</i>. Exact habitat requirements for this species are unknown. However, it generally occurs near the bases of <i>Acacia</i> or <i>Eremophila</i> (Tim Moulds [Invertebrate Solutions, pers comm., 2020]).</p> | 3.19        | 0.06 |  |



| Fauna Habitat                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Habitat for conservation significant fauna                                                                                                                                                                                                                                                      | Survey Area |       | Representative Photo                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------|--------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                 | Ha          | %     |                                                                                      |
| <p><b>Granite domes</b></p> <p>Domes of emergent granite with occasional small cracks and fissures. No value floristically however provides value for small reptile species which seek shelter underneath rocks exfoliated from the surface. Water may pool on surface.</p> <p>Vegetation, leaf litter and fallen logs / branches are rare. Moderate quality habitat with some niche microhabitats.</p>                                                                                                            | None according to the desktop assessment and field survey results.                                                                                                                                                                                                                              | 1.76        | 0.04  |   |
| <p><b>Hardpan plain with intermittent sandplain</b></p> <p>This habitat contains sparse <i>Acacia</i> over mixed native shrubs on hardpan plain with intermittent sandplains.</p> <p>This habitat has abundant bare ground and does not contain a dense understorey, large trees, significant hollows, logs &gt; 300 mm diameter, surface rocks or significant leaf litter. Microhabitats are scarce and this habitat is generally likely to be utilised by larger mammal, and some reptile and avian species.</p> | Possible habitat for the Northern Shield-backed Trapdoor Spider <i>Idiosoma clypeatum</i> . Exact habitat requirements for this species are unknown. However, it generally occurs near the bases of <i>Acacia</i> or <i>Eremophila</i> (Tim Moulds [Invertebrate Solutions, pers comm., 2020]). | 3,281.33    | 66.72 |  |



| Fauna Habitat                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Habitat for conservation significant fauna                                                                                                                                                                                                                                                            | Survey Area |       | Representative Photo                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------|--------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                       | Ha          | %     |                                                                                      |
| <p>This is moderate to low quality habitat due to minimal structural complexity and disturbance through grazing and introduced fauna.</p> <p>This habitat may contain some smaller areas of scattered granite, especially when adjacent granite outcrops. These areas are generally not suitable habitat for the Western Spiny-tailed Skink.</p>                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                       |             |       |                                                                                      |
| <p><b>Non-saline stony or gritty surfaced plains</b></p> <p>Similar to Hardpan plains, with occasional <i>Acacia</i> sp. over open mixed native shrubs, but with quarts and stones on orange clay soils.</p> <p>This habitat does not contain dense understorey, large trees, significant hollows, logs &gt; 300 mm diameter, large rocks or significant leaf litter. Microhabitats are scarce and this habitat is generally likely to be utilised by larger mammal, and some reptile and avian species.</p> <p>This is moderate to low quality habitat due to minimal structural complexity and disturbance through grazing and introduced fauna.</p> | <p>Possible habitat for the Northern Shield-backed Trapdoor Spider <i>Idiosoma clypeatum</i>. Exact habitat requirements for this species are unknown. However, it generally occurs near the bases of <i>Acacia</i> or <i>Eremophila</i> (Tim Moulds [Invertebrate Solutions, pers comm., 2020]).</p> | 1,120.69    | 22.79 |  |



| Fauna Habitat                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Habitat for conservation significant fauna                                                                                                                                                                                                                                                                                                                                                              | Survey Area |      | Representative Photo                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------|-------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                         | Ha          | %    |                                                                                     |
| <p><b>Rocky breakaways, slopes and plateau edges</b></p> <p>This habitat consists of ferruginised duricrust and weathered granite on white to orange to light brown sandy clayey soils. It includes steep breakaway faces and short rocky upper slopes (Alexander Holm &amp; Associates, 2008) with scattered <i>Acacia</i> sp. and <i>Eremophila</i> sp. It contains areas of moderate leaf litter at the base of vegetation, stones and rocks up to 2m, and occasional rock crevices.</p> <p>This habitat does not contain dense understorey, large trees, large hollows, logs &gt; 300 mm diameter or large boulders.</p> <p>This is considered moderate to high quality fauna habitat with abundant microhabitats, overhangs, fissures etc. Generally the survey area has been aligned to avoid the significant breakaways of higher quality.</p> | <p>Possible habitat for the Northern Shield-backed Trapdoor Spider <i>Idiosoma clypeatum</i>. Exact habitat requirements for this species are unknown. However, it generally occurs near the bases of <i>Acacia</i> or <i>Eremophila</i> (Tim Moulds [Invertebrate Solutions, pers comm., 2020])</p> <p>Marginal habitat (within the survey area) for the Peregrine Falcon <i>Falco peregrinus</i>.</p> | 27.63       | 0.56 |  |

| Fauna Habitat                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Habitat for conservation significant fauna                                                                                                                                                                                                                                                      | Survey Area |      | Representative Photo                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------|--------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                 | Ha          | %    |                                                                                      |
| <p><b>Saline lower footslopes below breakaways</b></p> <p>The saline lower footslopes found below breakaways. Vegetation cover is intermittent with large sparse areas common.</p> <p>Habitats is moderate to low quality habitat due to minimal structural complexity.</p>                                                                                                                                                                                                                                                                                                                                                             | None according to the desktop assessment and field survey results.                                                                                                                                                                                                                              | 6.86        | 0.14 |   |
| <p><b>Sandplain</b></p> <p>Alluvial plains of orange to brown sands (often with thin crust). Supports <i>Acacia</i>, <i>Eremophila</i> and <i>Ptilotus</i> species.</p> <p>This habitat contains significant bare ground with some leaf litter around the base of vegetation. It does not contain a dense understorey, large trees, significant hollows, logs &gt; 300 mm diameter or rocks. Microhabitats are scarce and this habitat is generally likely to be utilised by larger mammal, and some reptile and avian species.</p> <p>This is moderate to low quality habitat due to minimal structural complexity and disturbance</p> | Possible habitat for the Northern Shield-backed Trapdoor Spider <i>Idiosoma clypeatum</i> . Exact habitat requirements for this species are unknown. However, it generally occurs near the bases of <i>Acacia</i> or <i>Eremophila</i> (Tim Moulds [Invertebrate Solutions, pers comm., 2020]). | 77.66       | 1.58 |  |

| Fauna Habitat                         | Habitat for conservation significant fauna | Survey Area     |            | Representative Photo |
|---------------------------------------|--------------------------------------------|-----------------|------------|----------------------|
|                                       |                                            | Ha              | %          |                      |
| through grazing and introduced fauna. |                                            |                 |            |                      |
| <b>TOTAL Area (ha)</b>                |                                            | <b>4,918.33</b> | <b>100</b> |                      |

Notes: \* Exact habitat requirements for this species are unknown. However, it generally occurs near the bases of *Acacia* or *Eremophila* (Tim Moulds [Invertebrate Solutions, pers comm., 2020]).

## 7.0 Conclusions

The flora and vegetation and fauna assessment was successfully completed for the defined survey area on Boolardy and Kalli Station in November 2020 for the Square Kilometre Array Project.

A summary of the results is presented below:

- No Threatened or Priority Ecological Communities were anticipated to occur and none were recorded. Ten native vegetation communities were recorded and mapped. None are considered regionally significant as vegetation communities were widespread and common in the area, despite some supporting populations of Priority species. The area comprises largely of Acacia open woodland with pockets of granite outcrops and ephemeral drainage lines.
- The region was noted to be very dry and has been impacted from extensive historical grazing. This has led to a reduced biomass, significant erosion, and compacted soil profile.
- Three Priority 3 flora species were recorded including *Petrophile pauciflora* (163 individuals) *Sauropus* sp. Woolgorong (M. Officer s.n. 10/8/94). Both species are restricted to the southeast arm. The Priority 3 *Eremophila simulans* subsp. *megacalyx* was unable to be confidently identified. A sample representing *E. simulans* was collected and assumed to represent the Priority 3 species. More than 1,000 individuals of *E. simulans* were recorded in the survey area.
- Eight broad fauna habitats were defined and mapped within the survey area, comprising hardpan plain and intermittent sandplain, rocky breakaways, granite domes, granite boulders and heaps, channels and creek lines, sandplains, non-saline stony or gritty surfaced plains, and saline lower footslopes below breakaways. Much of the existing habitat is in non-pristine condition and so habitat corridors remain a valuable asset to local fauna. Within the survey area these linkages consist of the more significant drainage channels and creek lines and impacts to these should be minimised.
- The granite boulders and heaps fauna habitat may support populations of the saxicolous EPBC Act and BC Act listed Western Spiny-tailed Skink *Egernia stokesii badia*. Direct and indirect evidence of the skink was recorded a total of five times across 2014 and 2020. However, none of these records are within the current survey area, due to a refinement of the survey area after the 2014 survey. The latrine recorded in this survey is also just outside of the current survey area.
- The Northern Shield-backed Trapdoor Spider *Idiosoma clypeatum* was recorded twice (AECOM, 2014; Phoenix, 2015) in rocky areas with scattered *Acacia* and *Eremophila*. However, none of these records are within the current survey area. This species is likely to utilise habitats that are common within the region.

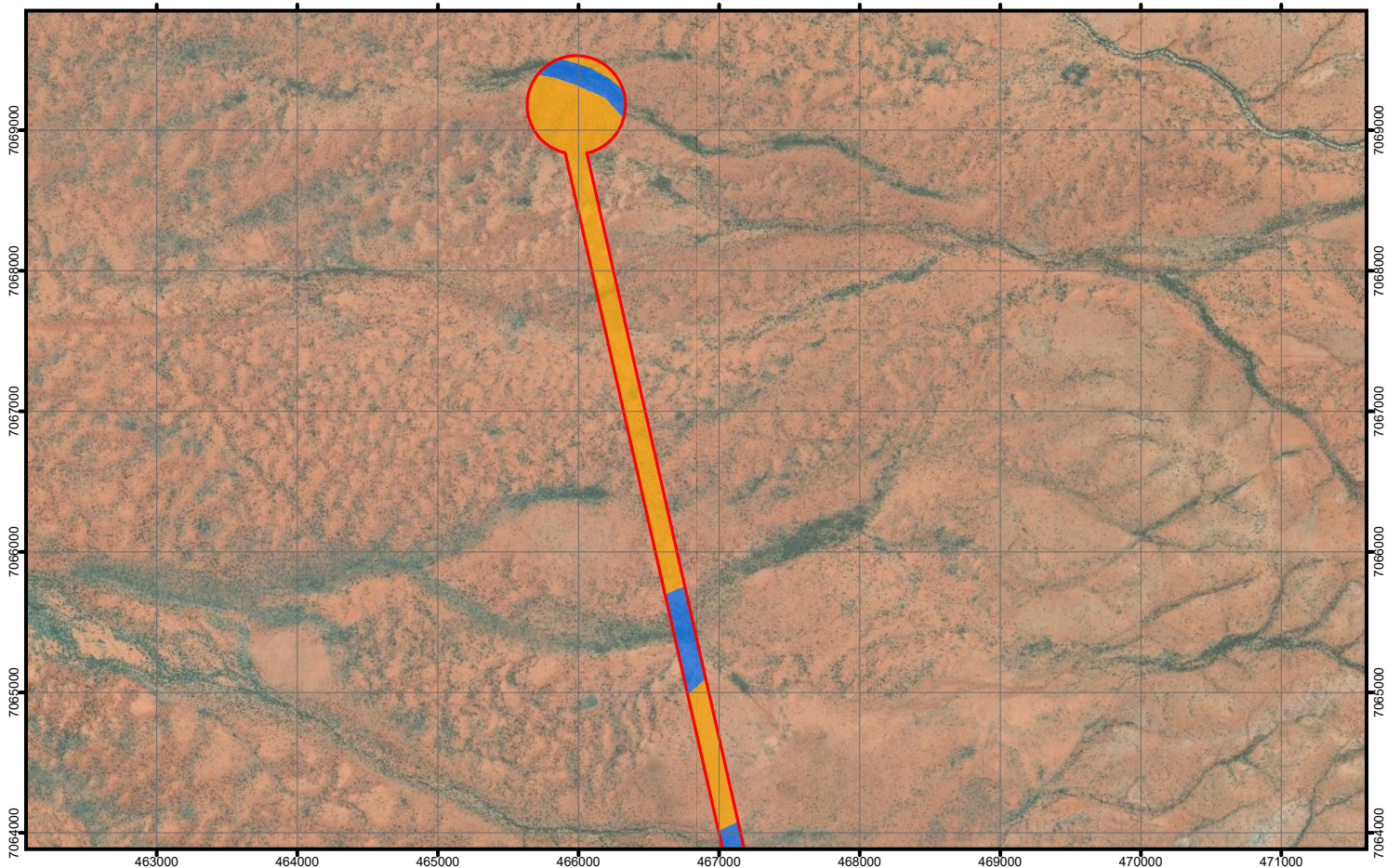
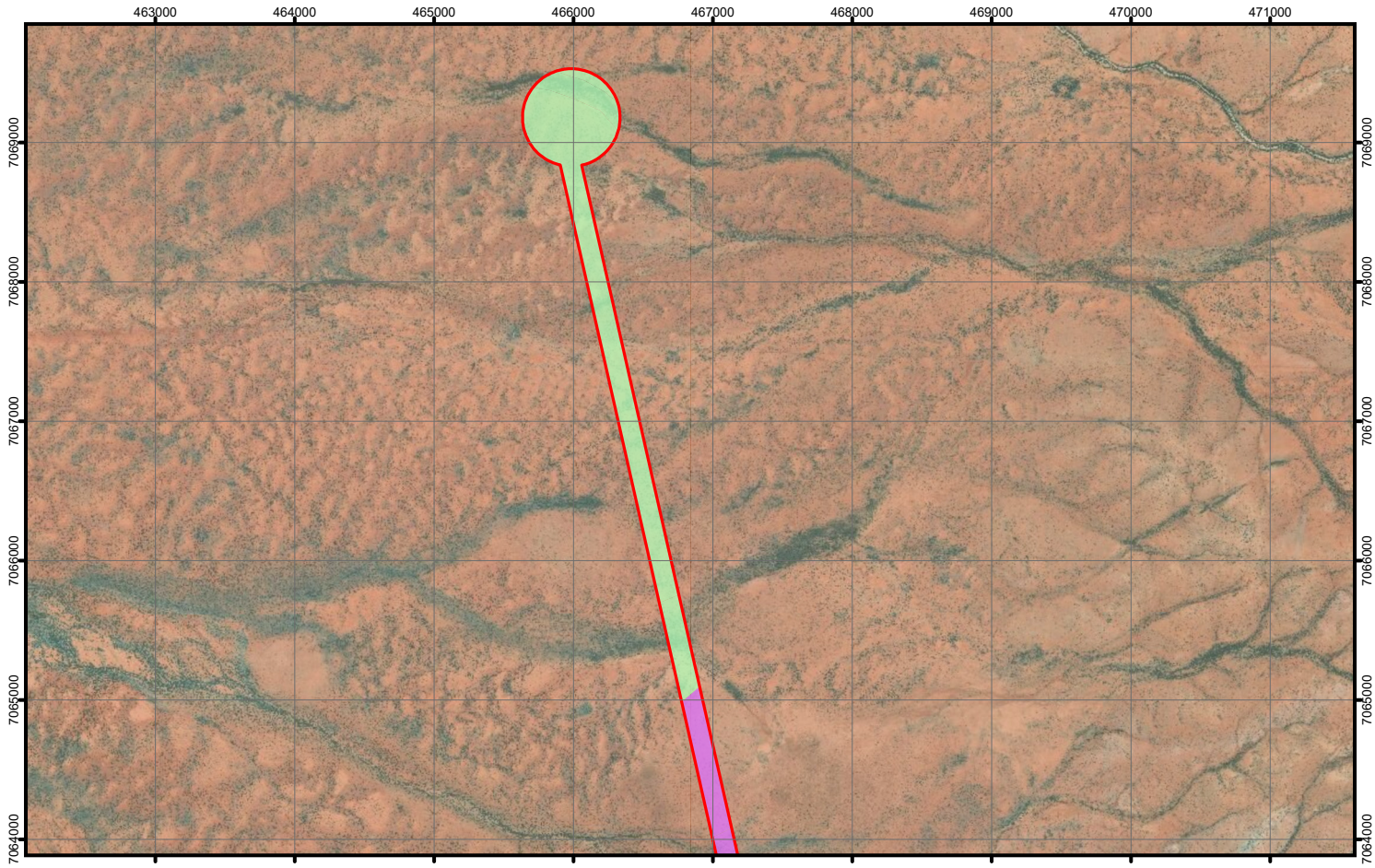


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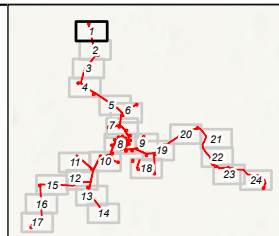
**LEGEND**

**Vegetation Communities**

- AfEIPo
- AiAIEf

**Fauna Habitat**

- Channels and creek line
- Hardpan plain with intermittent sandplain



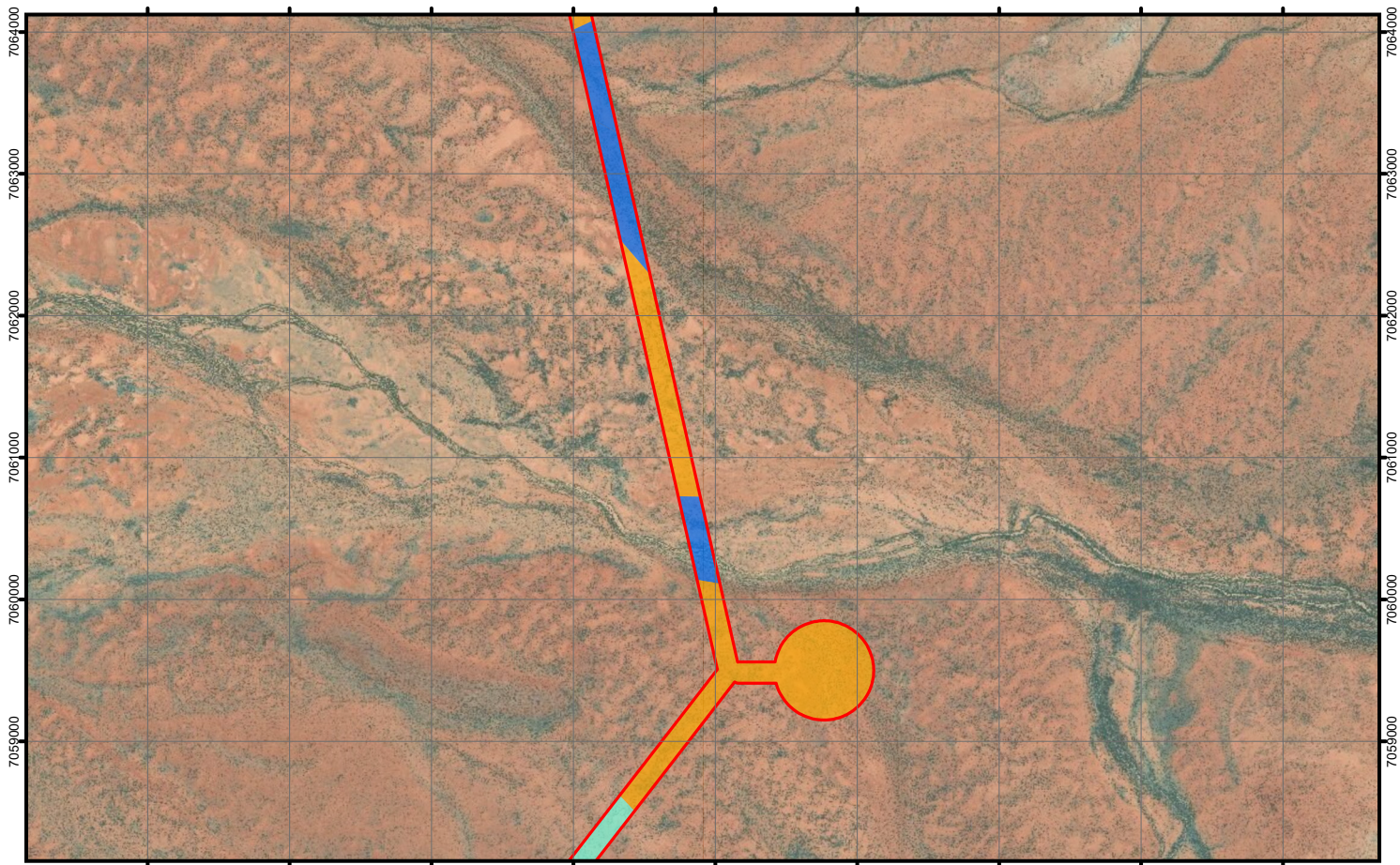
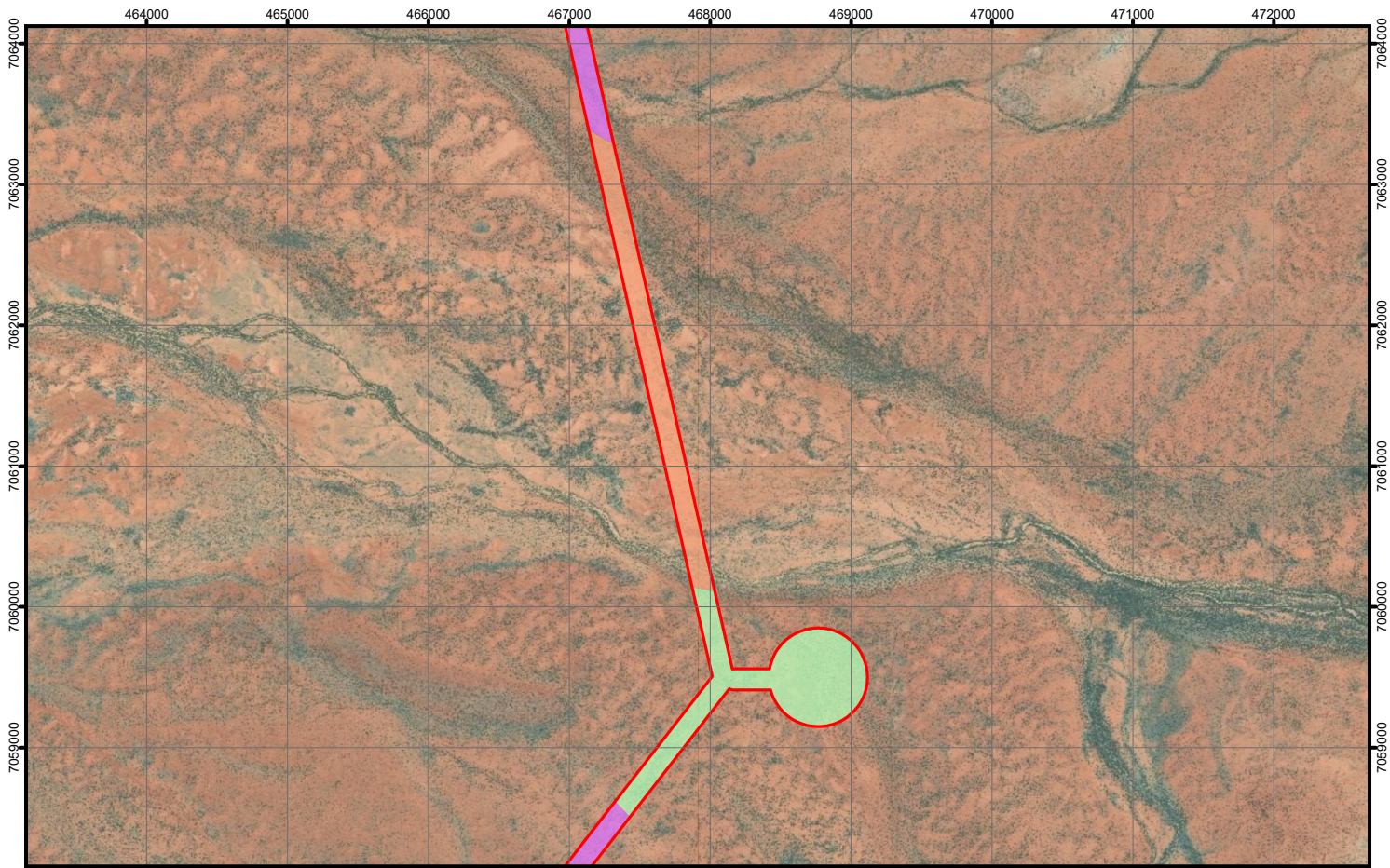
**Vegetation Communities, Fauna Habitats and Observations**

**WAJARRI CORPORATION**

SQUARE KILOMETRE ARRAY – FLORA AND FAUNA ASSESSMENT

**Figure 7.1**





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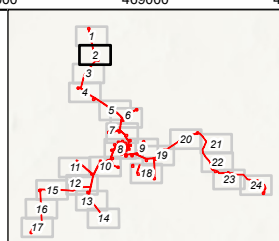
**LEGEND**

**Vegetation Communities**

- AfeFpo
- AiAbSa
- AiAtEf

**Fauna Habitat**

- Channels and creek line
- Hardpan plain with intermittent sandplain
- Non saline stony or gritty surfaced plains



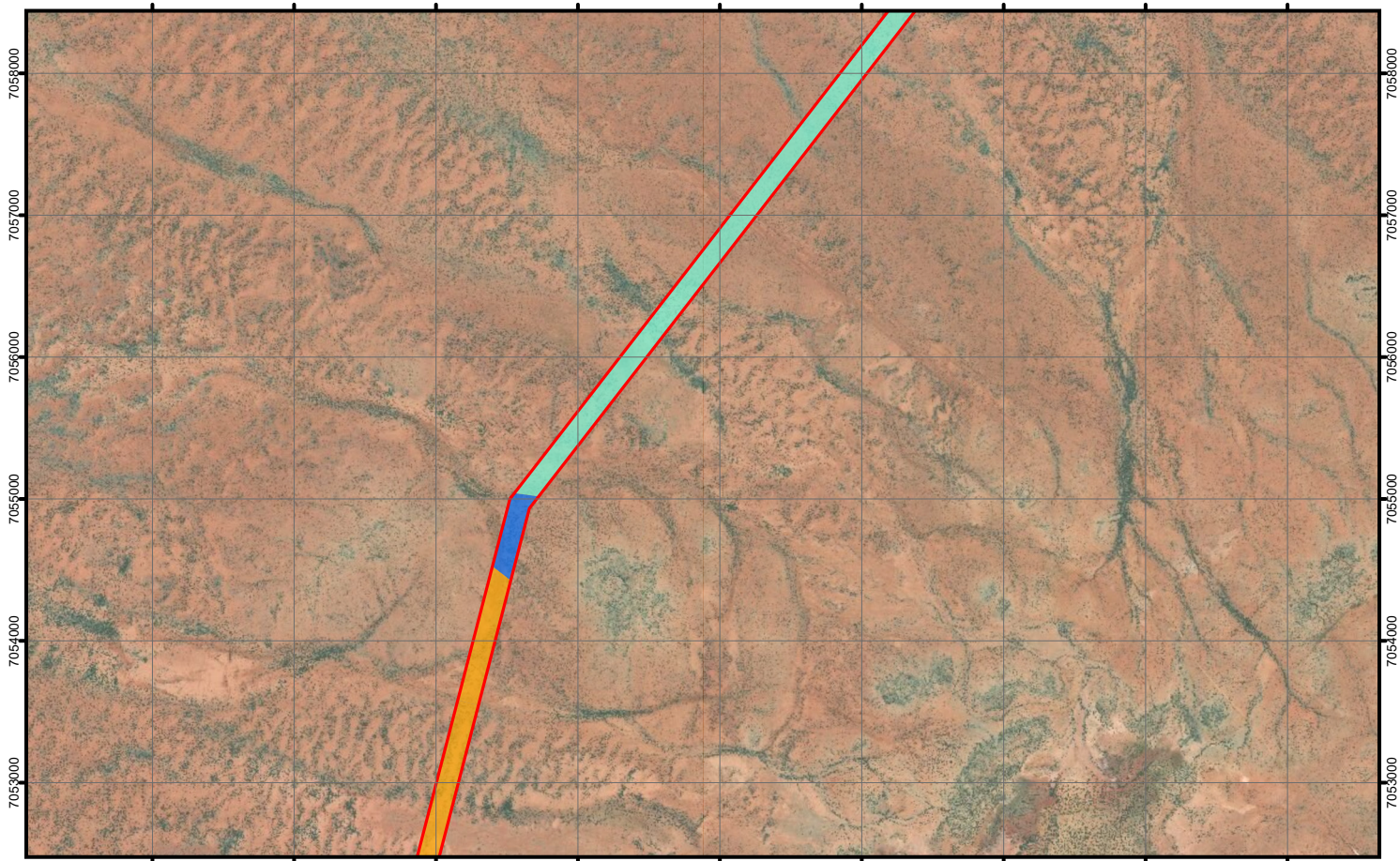
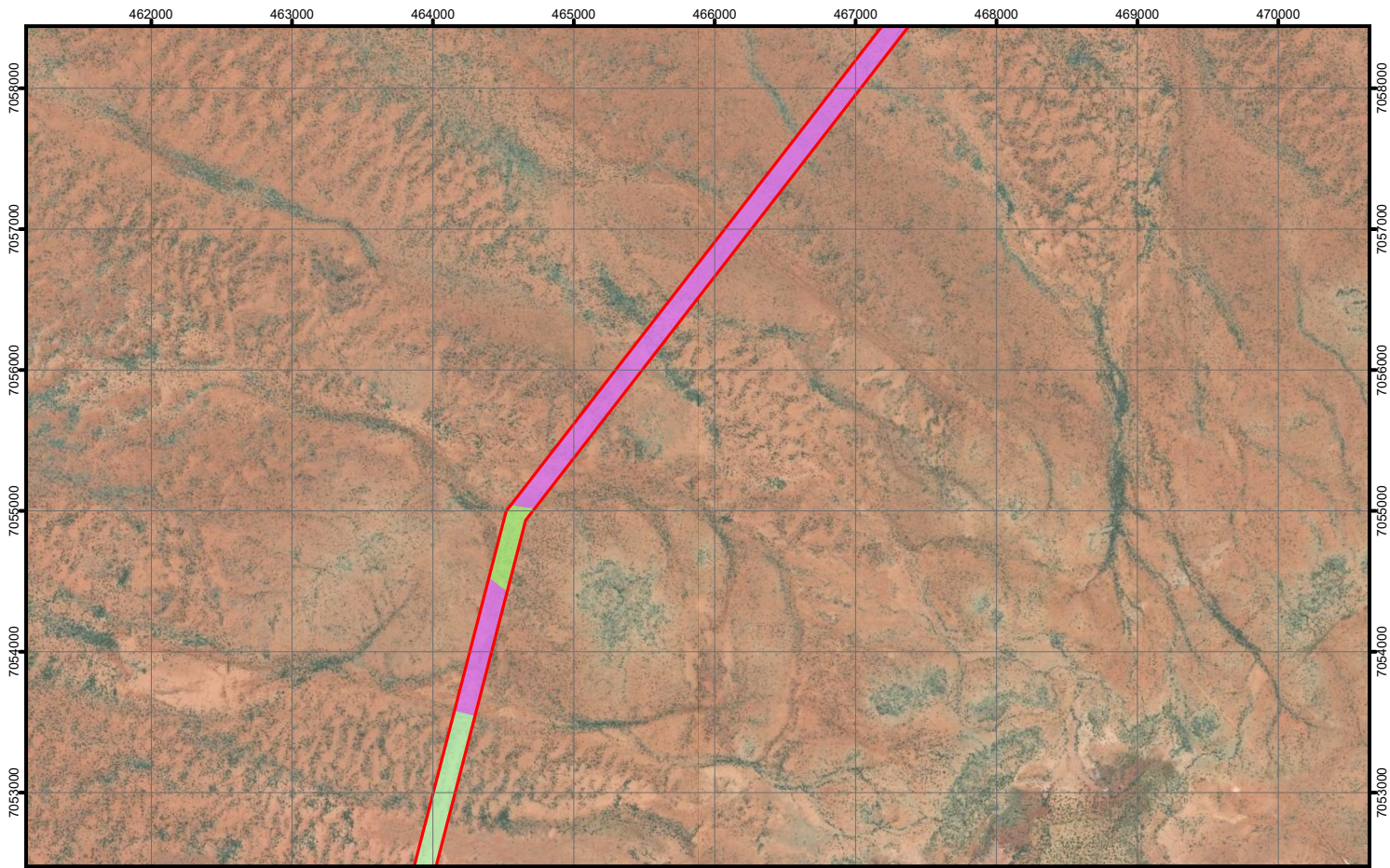
**Vegetation Communities, Fauna Habitats and Observations**

**WAJARRI CORPORATION**

SQUARE KILOMETRE ARRAY – FLORA AND FAUNA ASSESSMENT

**Figure 7.2**





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0 250 500 750 metres

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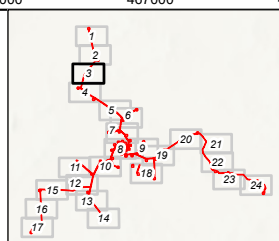
**LEGEND**

**Vegetation Communities**

- AfEIPo
- AiATeF
- AvEp

**Fauna Habitat**

- Channels and creek line
- Hardpan plain with intermittent sandplain
- Non saline stony or gritty surfaced plains



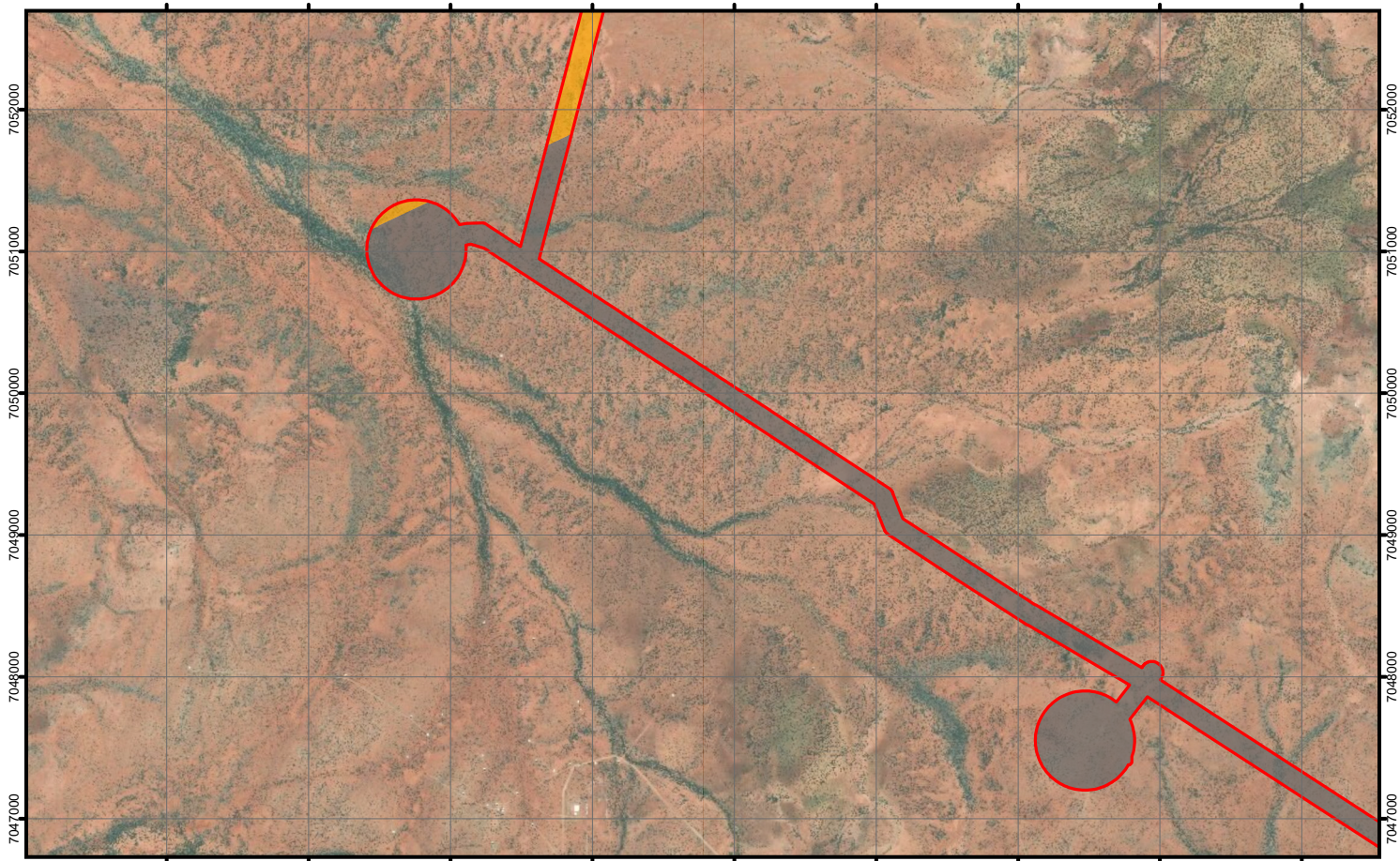
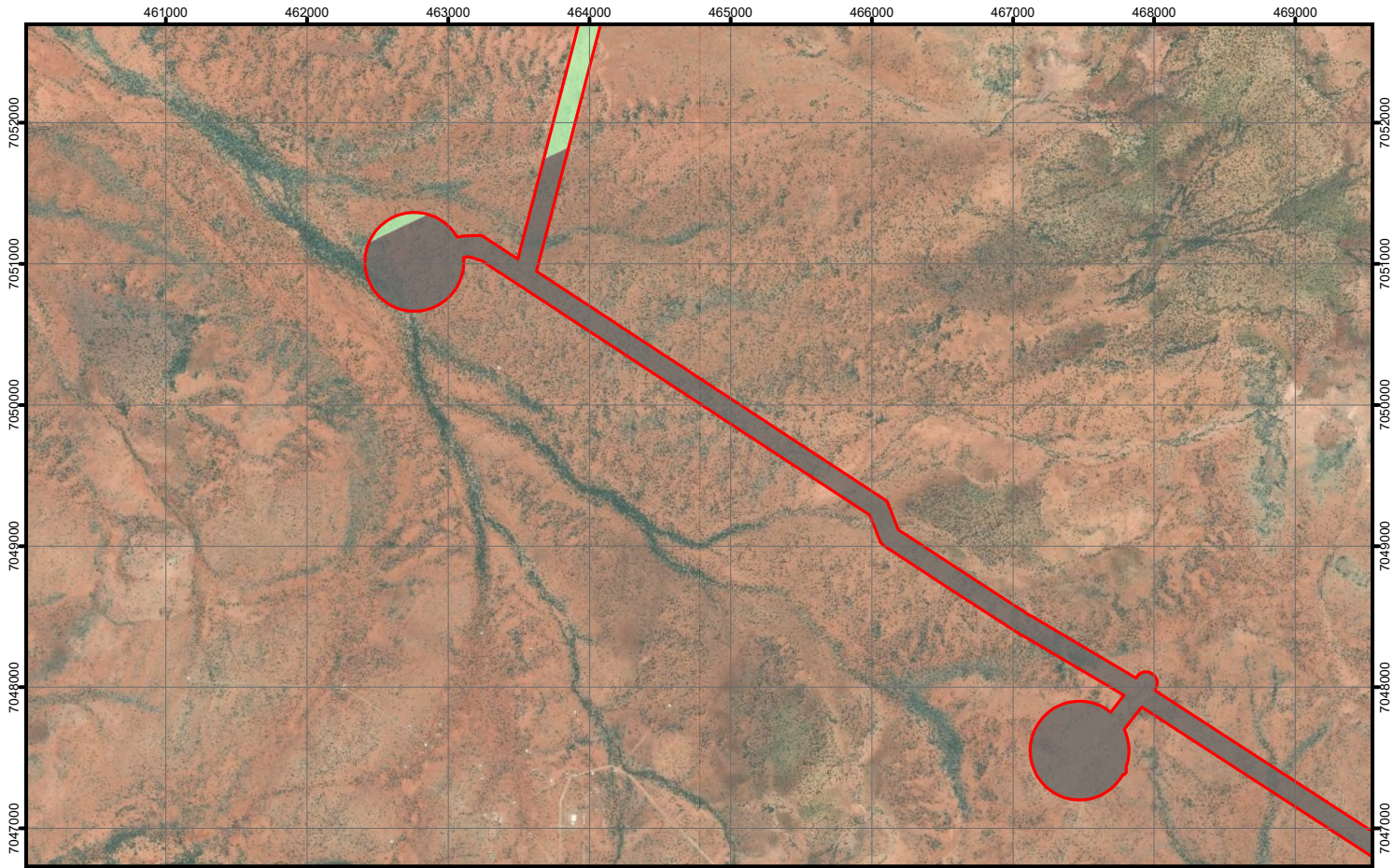
**Vegetation Communities, Fauna Habitats and Observations**

**WAJARRI CORPORATION**

SQUARE KILOMETRE ARRAY – FLORA AND FAUNA ASSESSMENT

**Figure 7.3**





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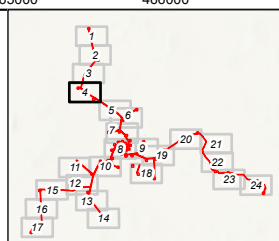
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**LEGEND**

**Vegetation Communities**  
 AiAIEf  
 MRO

**Fauna Habitat**  
 Hardpan plain with intermittent sandplain  
 MRO



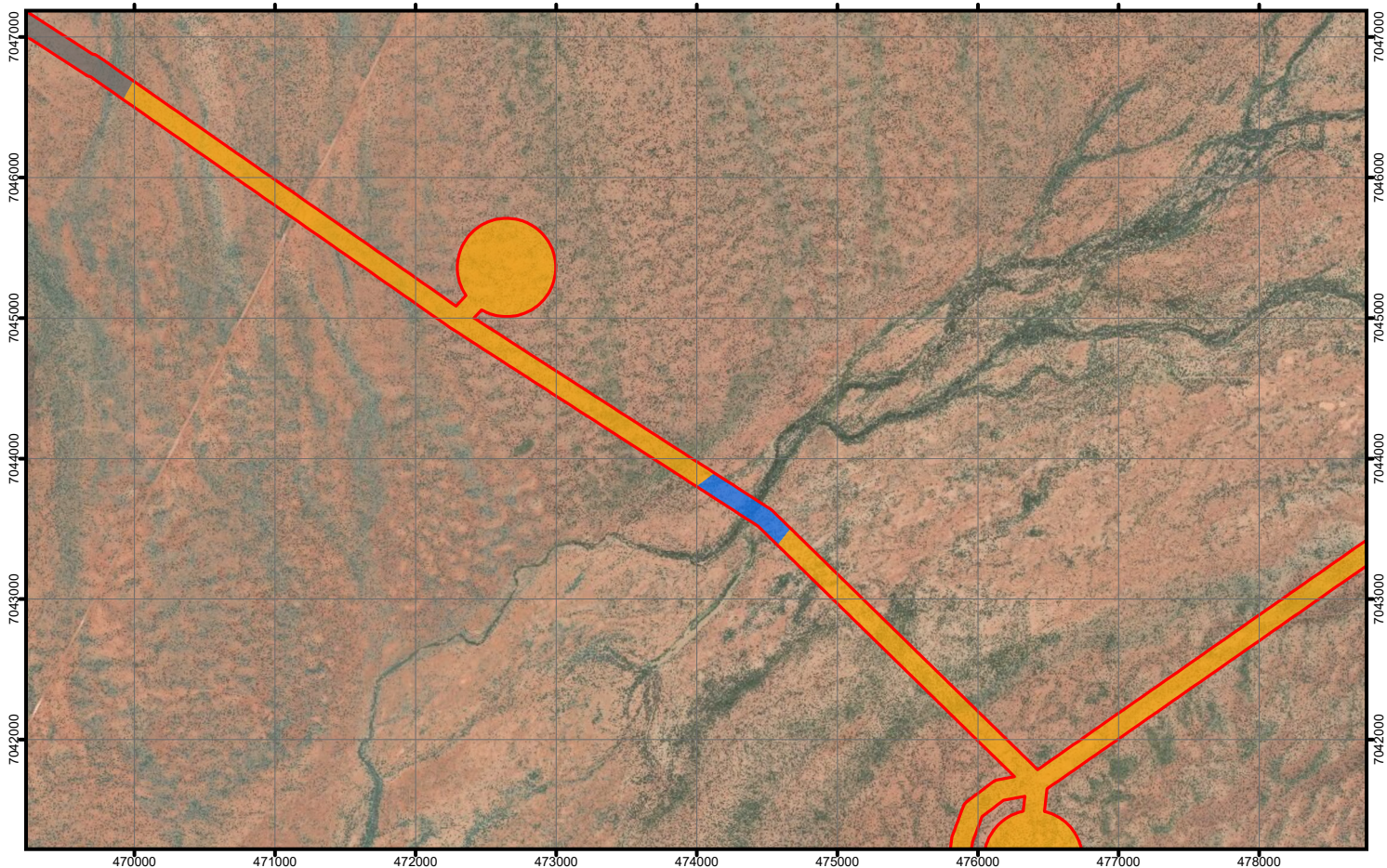
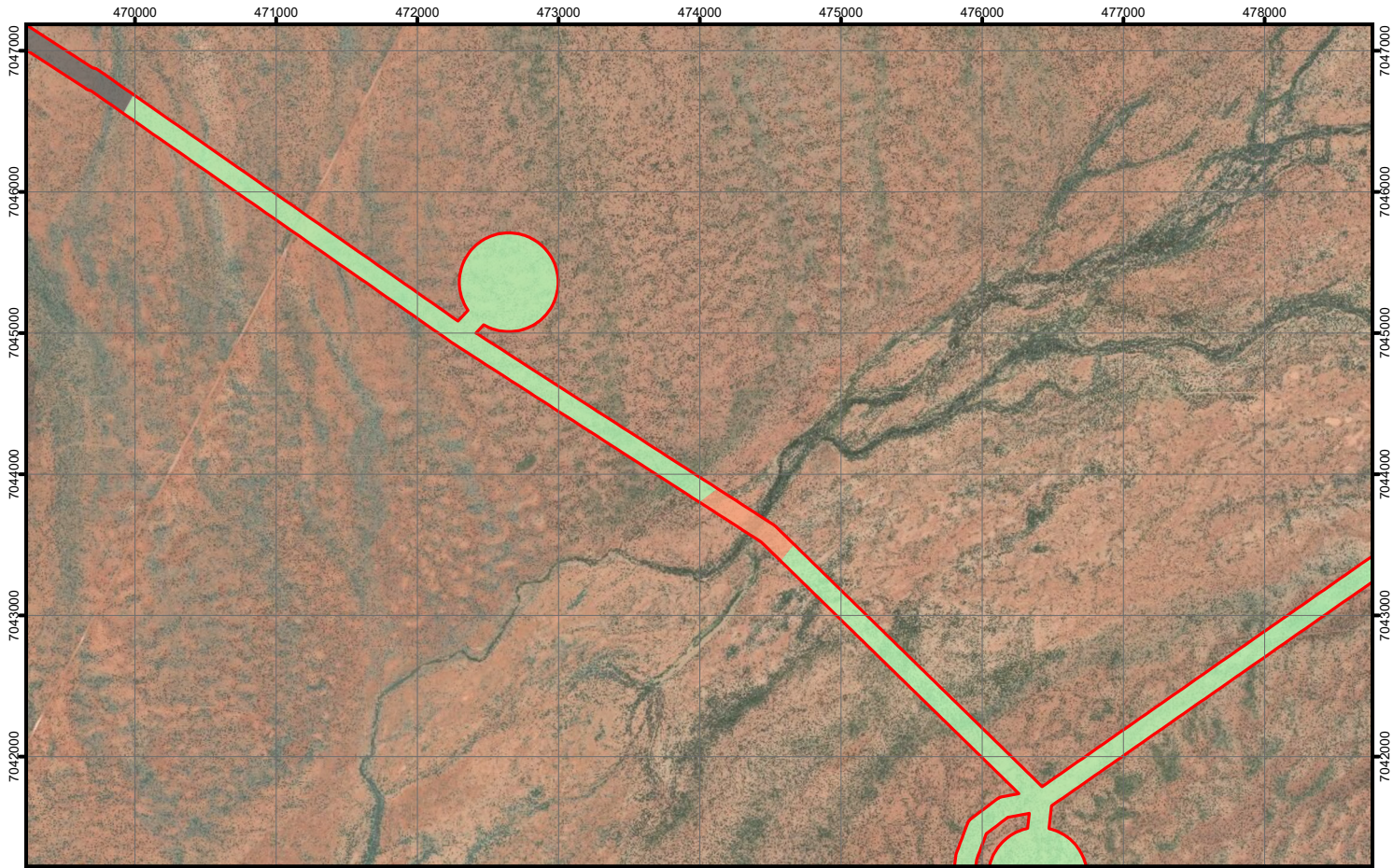
**Vegetation Communities, Fauna Habitats and Observations**

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SQUARE KILOMETRE ARRAY – FLORA AND FAUNA ASSESSMENT

**Figure 7.4**





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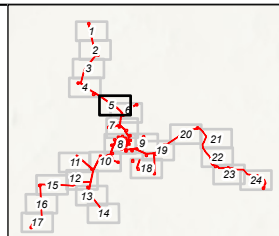
**LEGEND**

**Vegetation Communities**

- AfSa
- AiAbSa
- AiATeF
- MRO

**Fauna Habitat**

- Channels and creek line
- Hardpan plain with intermittent sandplain
- MRO
- Non saline stony or gritty surfaced plains



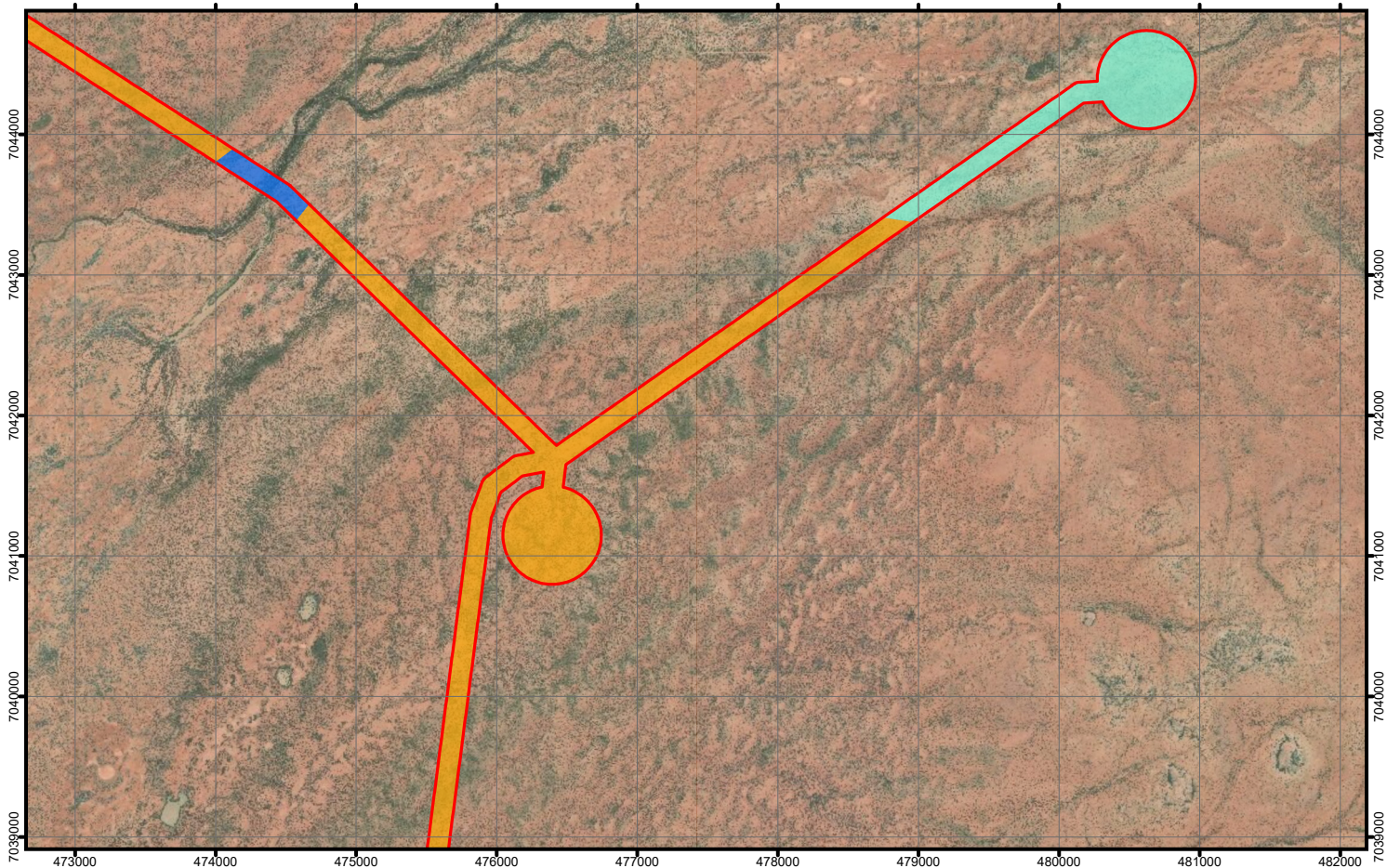
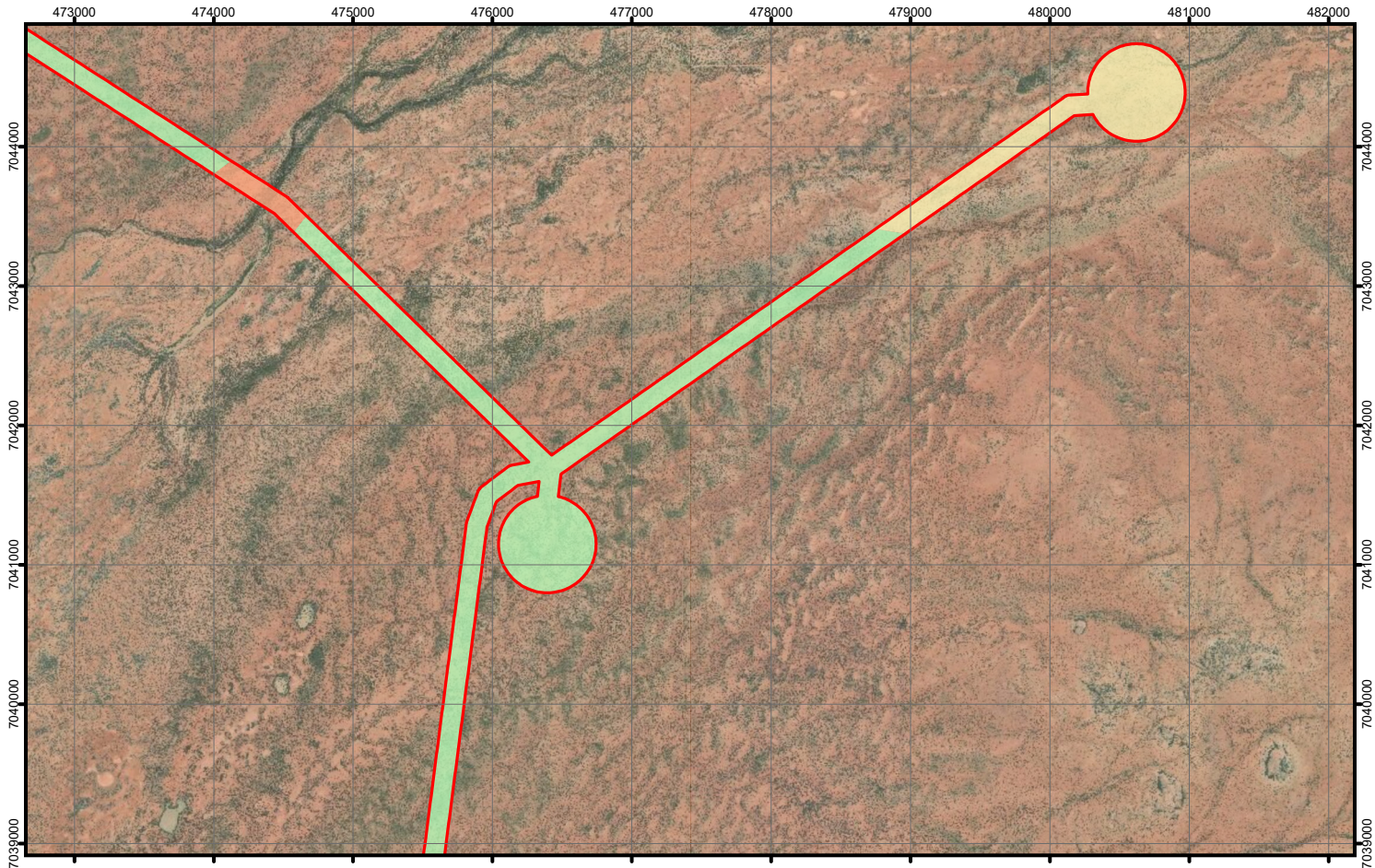
**Vegetation Communities, Fauna Habitats and Observations**

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SQUARE KILOMETRE ARRAY – FLORA AND FAUNA ASSESSMENT

**Figure 7.5**





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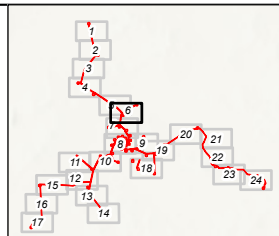
**LEGEND**

**Vegetation Communities**

- AfSa
- AiAbSa
- AiATeF

**Fauna Habitat**

- Channels and creek line
- Hardpan plain with intermittent sandplain
- Non saline stony or gritty surfaced plains



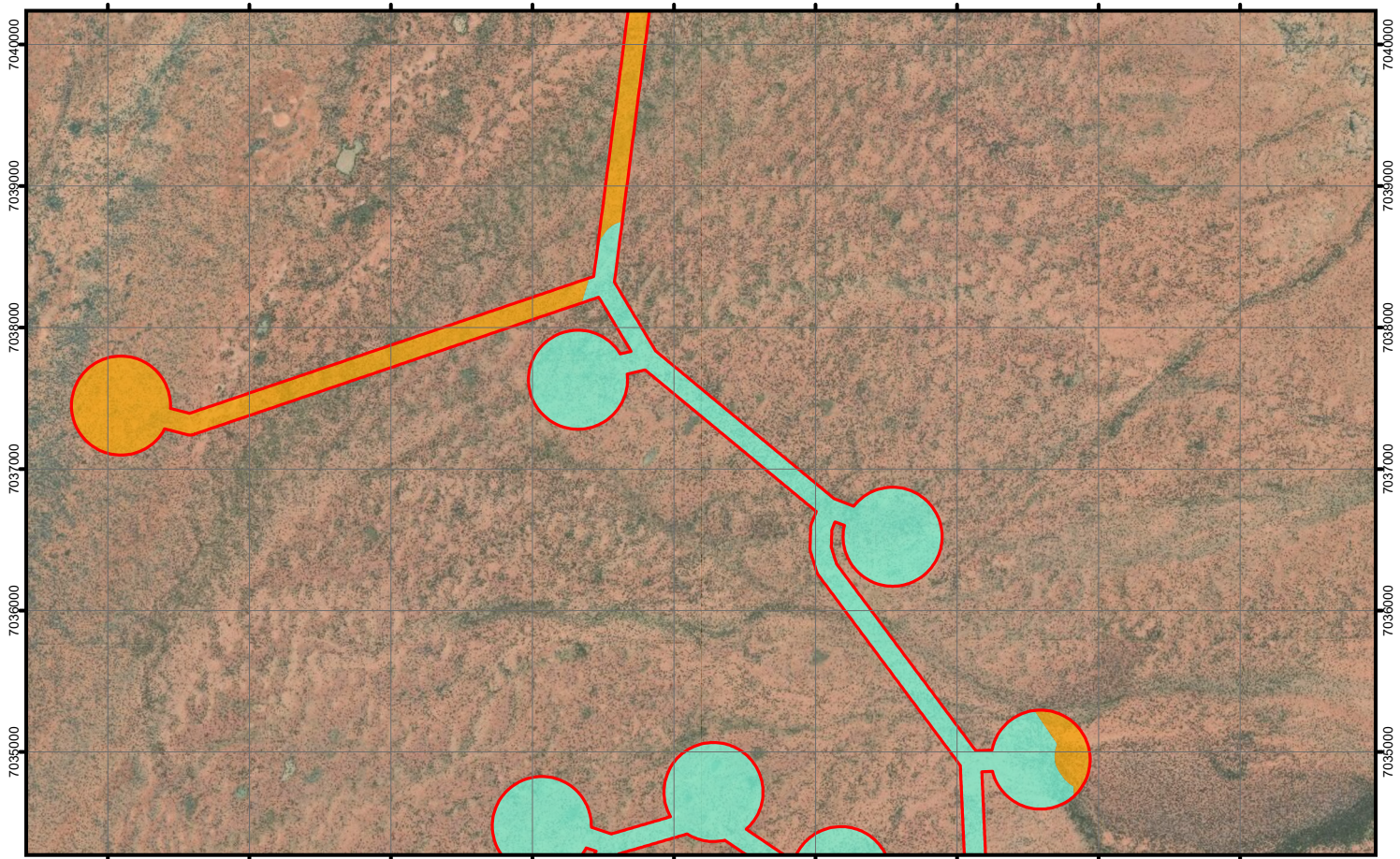
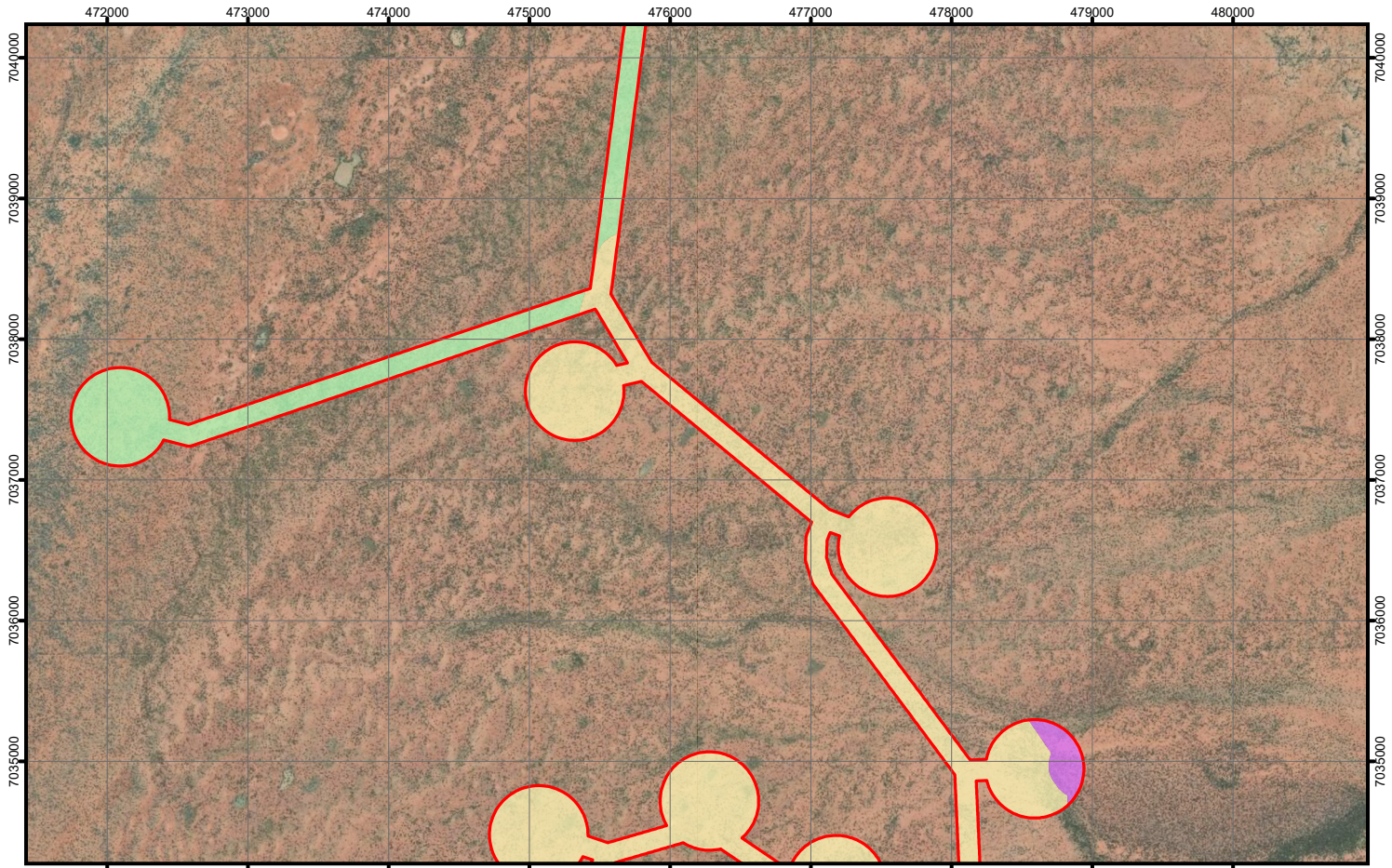
**Vegetation Communities, Fauna Habitats and Observations**

**WAJARRI CORPORATION**

SQUARE KILOMETRE ARRAY – FLORA AND FAUNA ASSESSMENT

**Figure 7.6**





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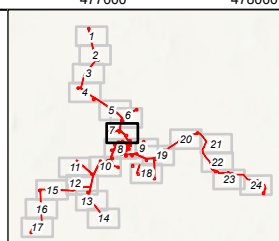
**LEGEND**

**Vegetation Communities**

- AfEIPo
- AfSa
- AiATeF

**Fauna Habitat**

- Hardpan plain with intermittent sandplain
- Non saline stony or gritty surfaced plains



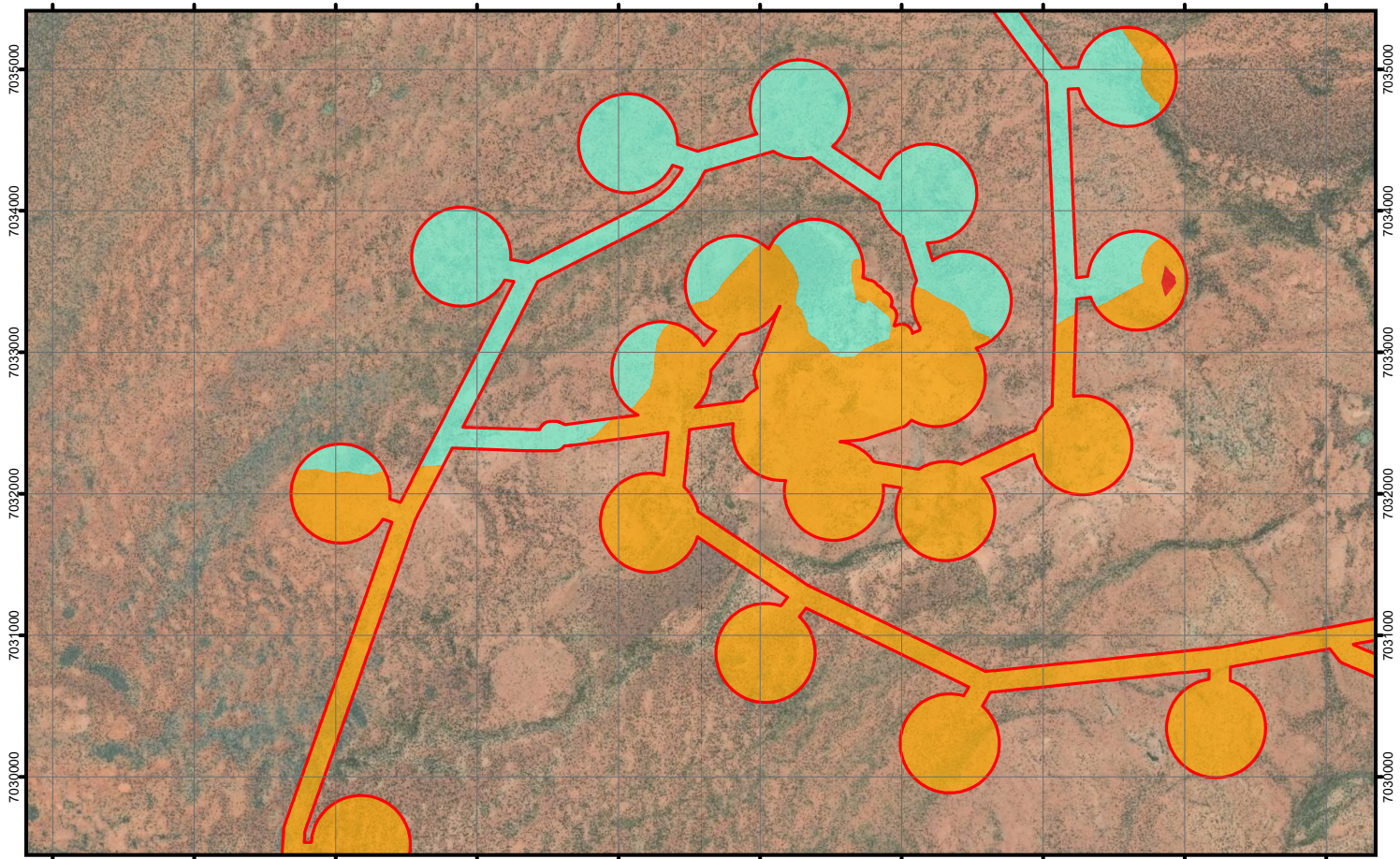
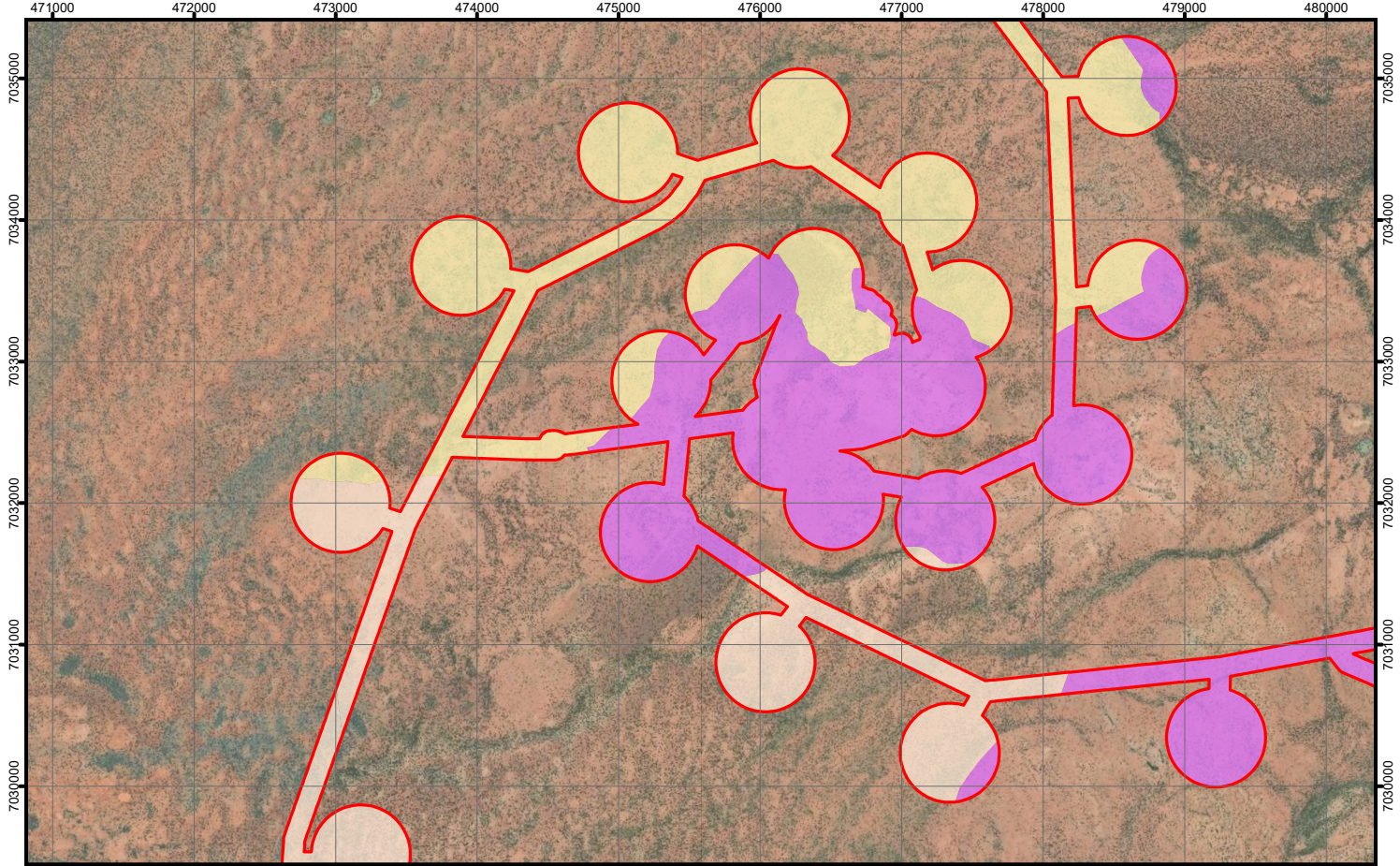
**Vegetation Communities, Fauna Habitats and Observations**

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SQUARE KILOMETRE ARRAY – FLORA AND FAUNA ASSESSMENT

**Figure 7.7**





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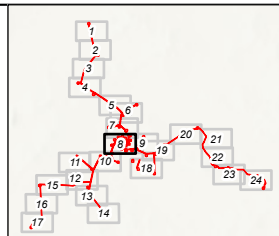
**LEGEND**

**Vegetation Communities**

- AfEFPo
- AfSa
- ApAgEf

**Fauna Habitat**

- Granite domes
- Hardpan plain with intermittent sandplain
- Non saline stony or gritty surfaced plains



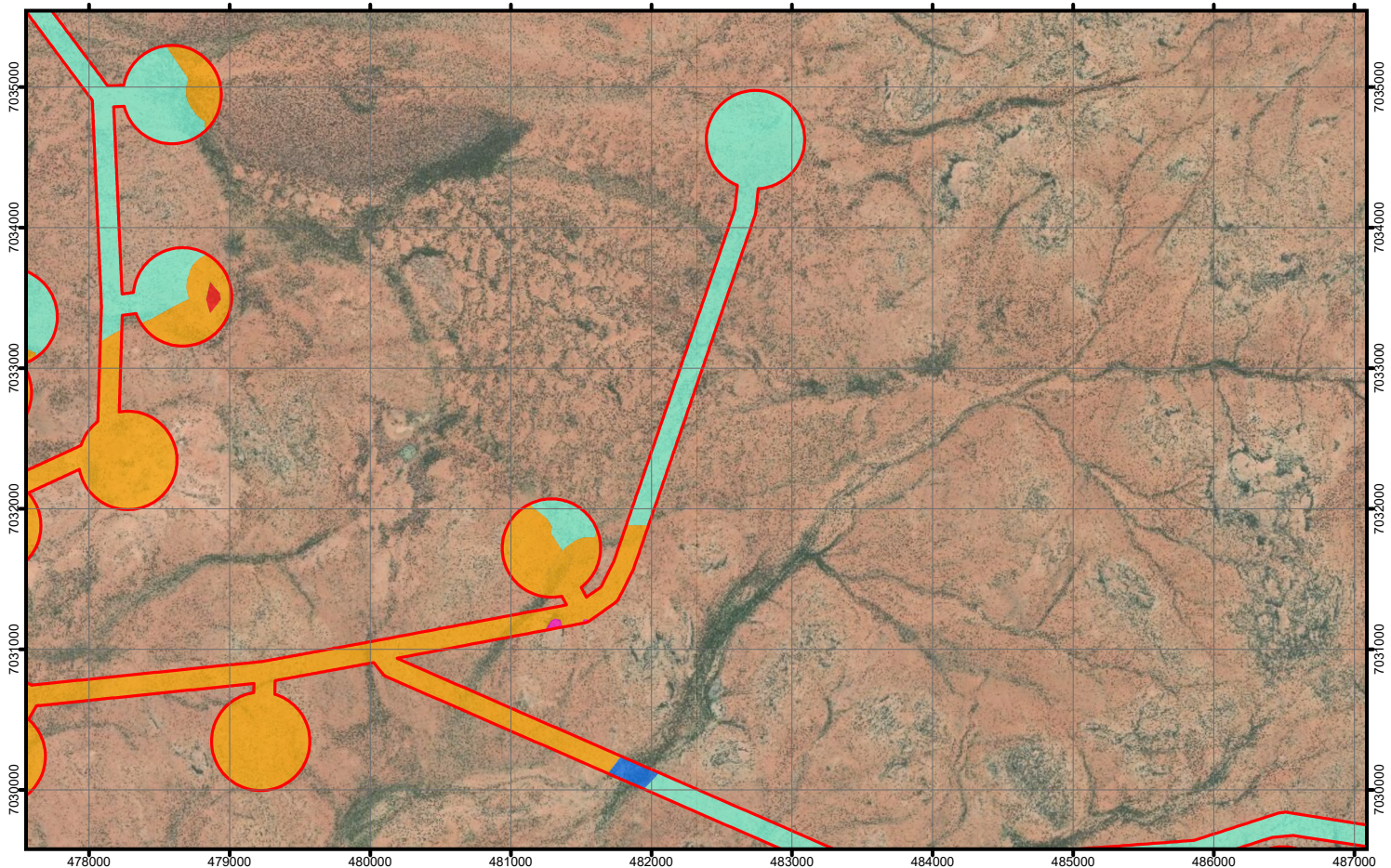
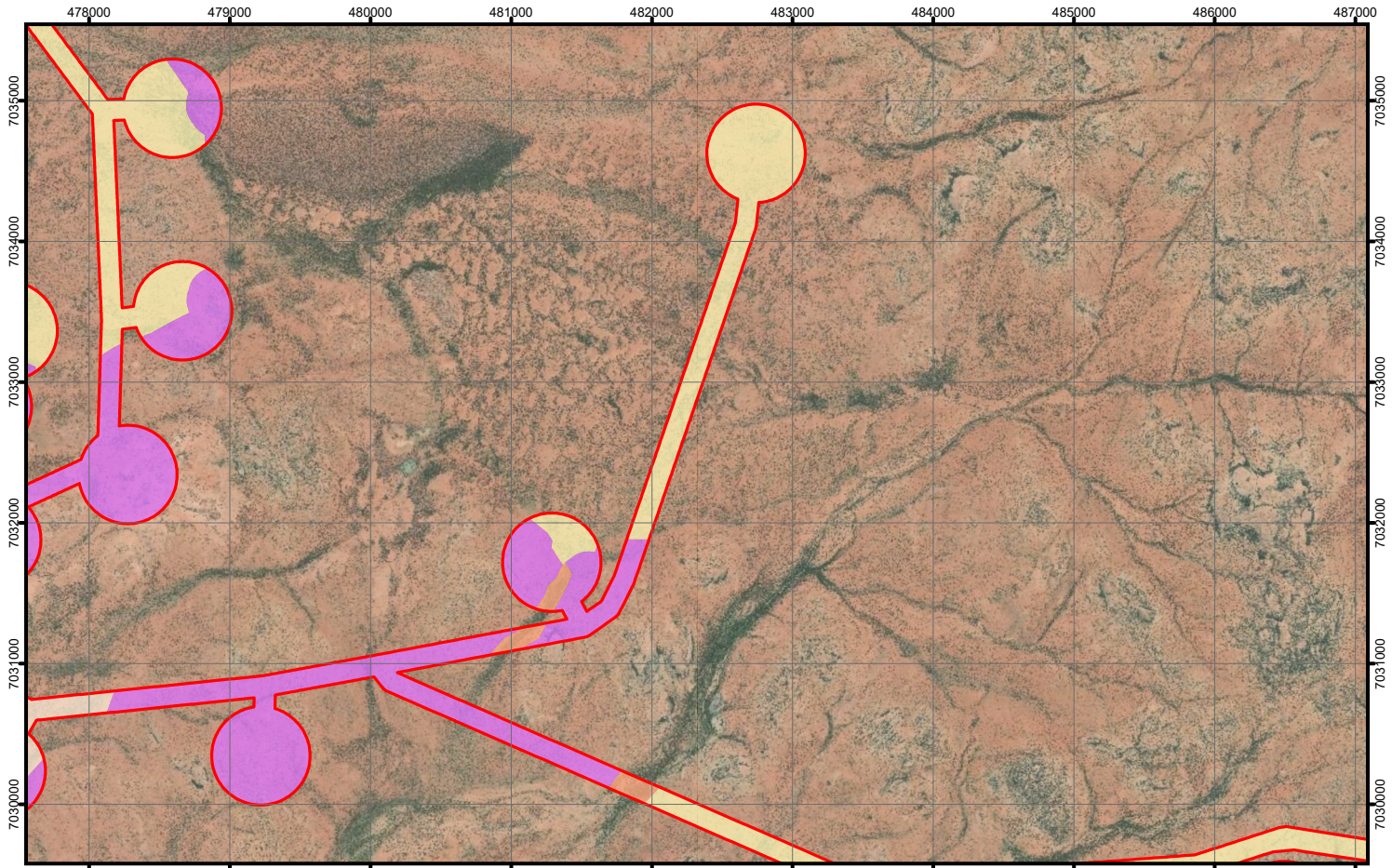
**Vegetation Communities, Fauna Habitats and Observations**

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SQUARE KILOMETRE ARRAY – FLORA AND FAUNA ASSESSMENT

**Figure 7.8**





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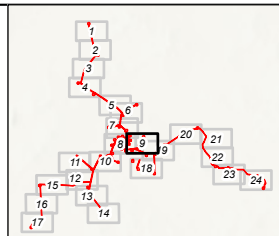
**LEGEND**

**Vegetation Communities**

- AfEFPo
- AfSa
- AiAbSa
- ApAgEf

**Fauna Habitat**

- Channels and creek line
- Granite boulders and heaps
- Granite domes
- Hardpan plain with intermittent sandplain
- Non saline stony or gritty surfaced plains



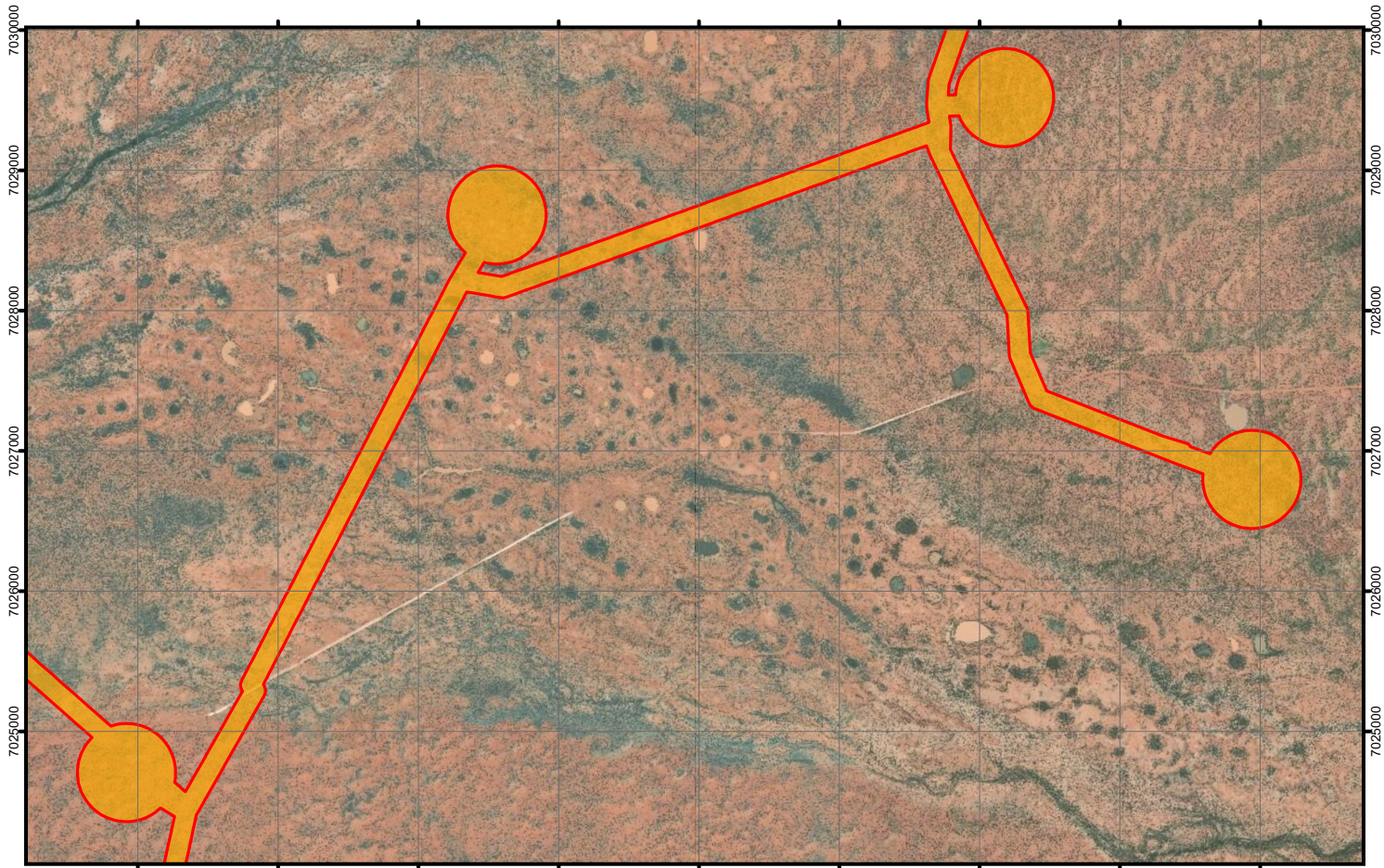
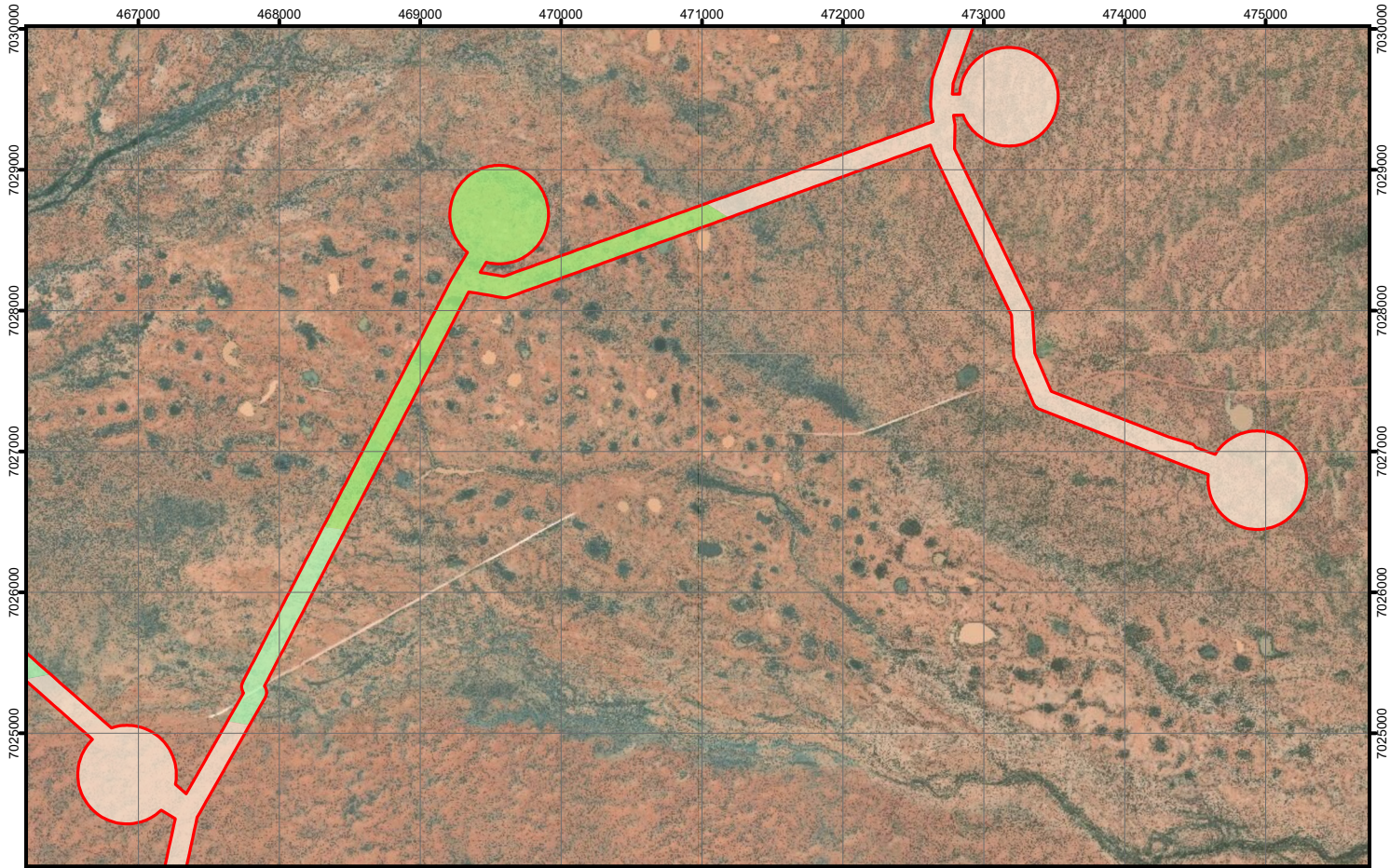
**Vegetation Communities, Fauna Habitats and Observations**

**WAJARRI CORPORATION**

SQUARE KILOMETRE ARRAY – FLORA AND FAUNA ASSESSMENT

**Figure 7.9**





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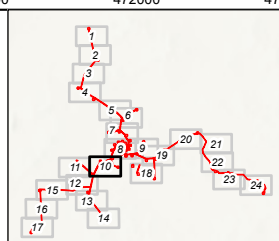
**LEGEND**

**Vegetation Communities**

- AiATef
- ApAgEf
- AvEp

**Fauna Habitat**

- Hardpan plain with intermittent sandplain



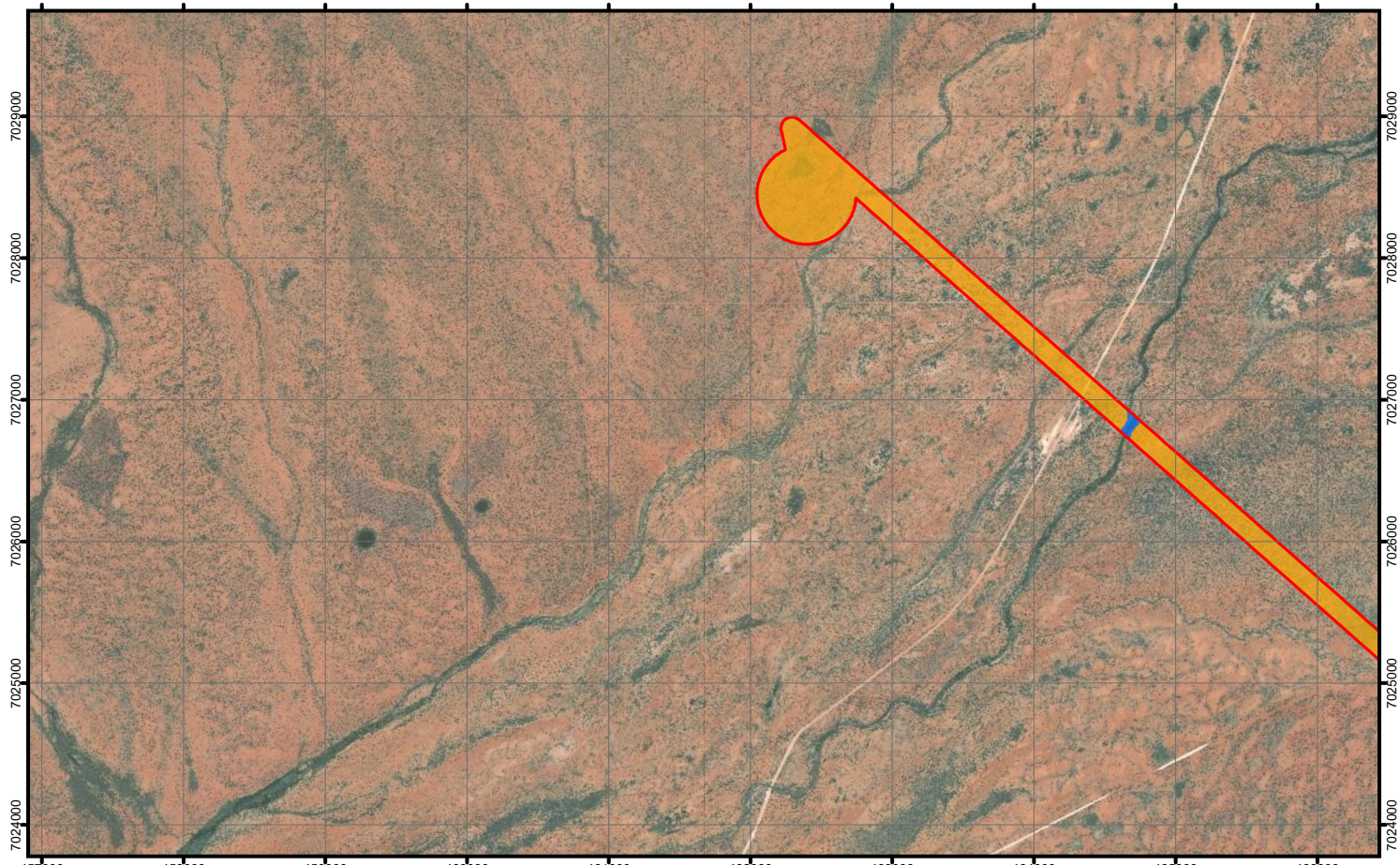
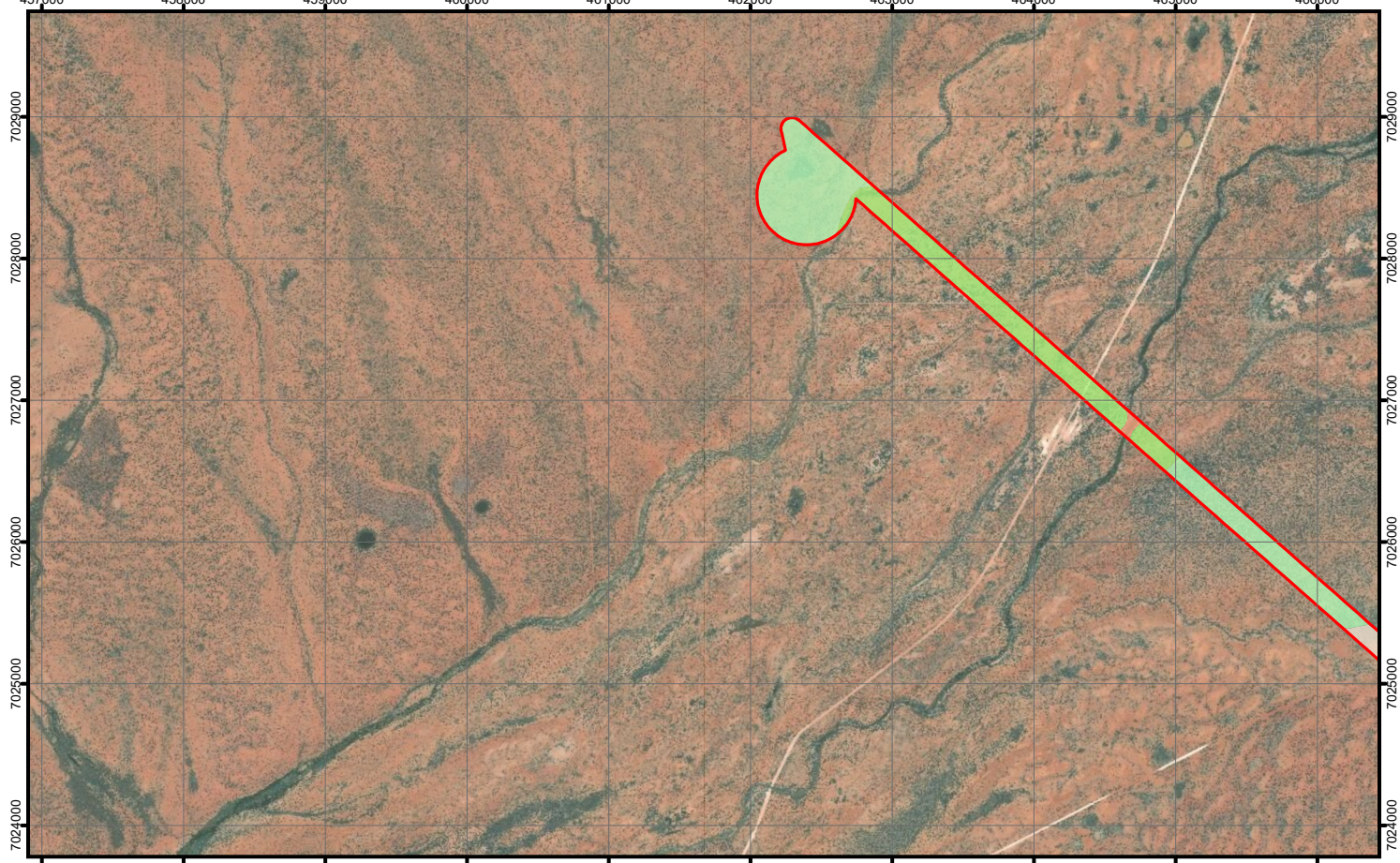
**Vegetation Communities, Fauna Habitats and Observations**

**WAJARRI CORPORATION**

SQUARE KILOMETRE ARRAY – FLORA AND FAUNA ASSESSMENT

**Figure 7.10**





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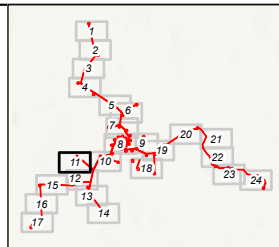
**LEGEND**

**Vegetation Communities**

- AiAbSa
- AiAtEf
- ApAgEf
- AvEp

**Fauna Habitat**

- Channels and creek line
- Hardpan plain with intermittent sandplain



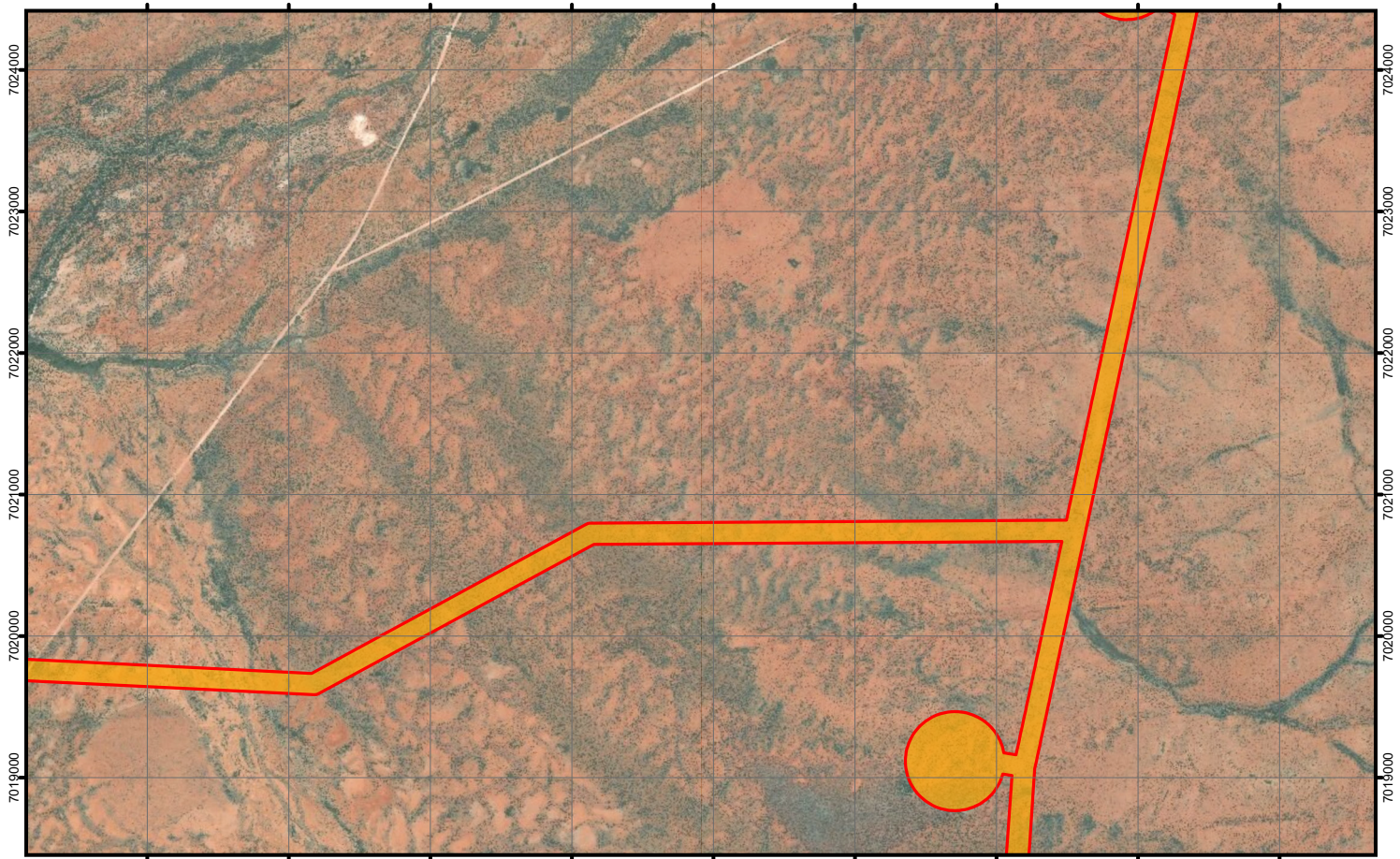
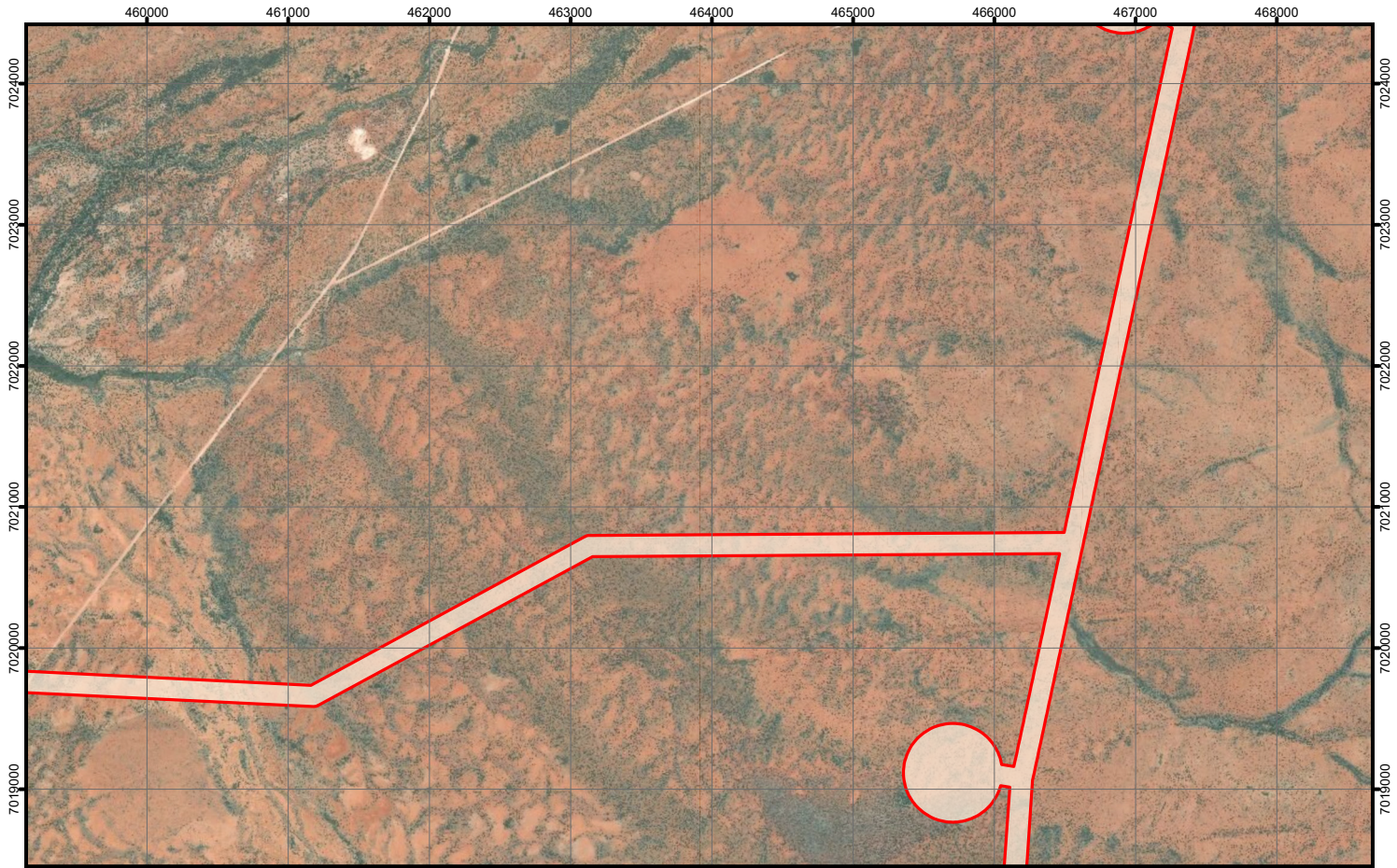
**Vegetation Communities, Fauna Habitats and Observations**

**WAJARRI CORPORATION**

SQUARE KILOMETRE ARRAY – FLORA AND FAUNA ASSESSMENT

**Figure 7.11**





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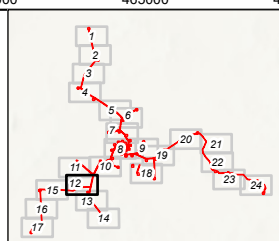
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**LEGEND**

Fauna Habitat  
 Hardpan plain with intermittent sandplain

Vegetation Communities  
 ApAgEf



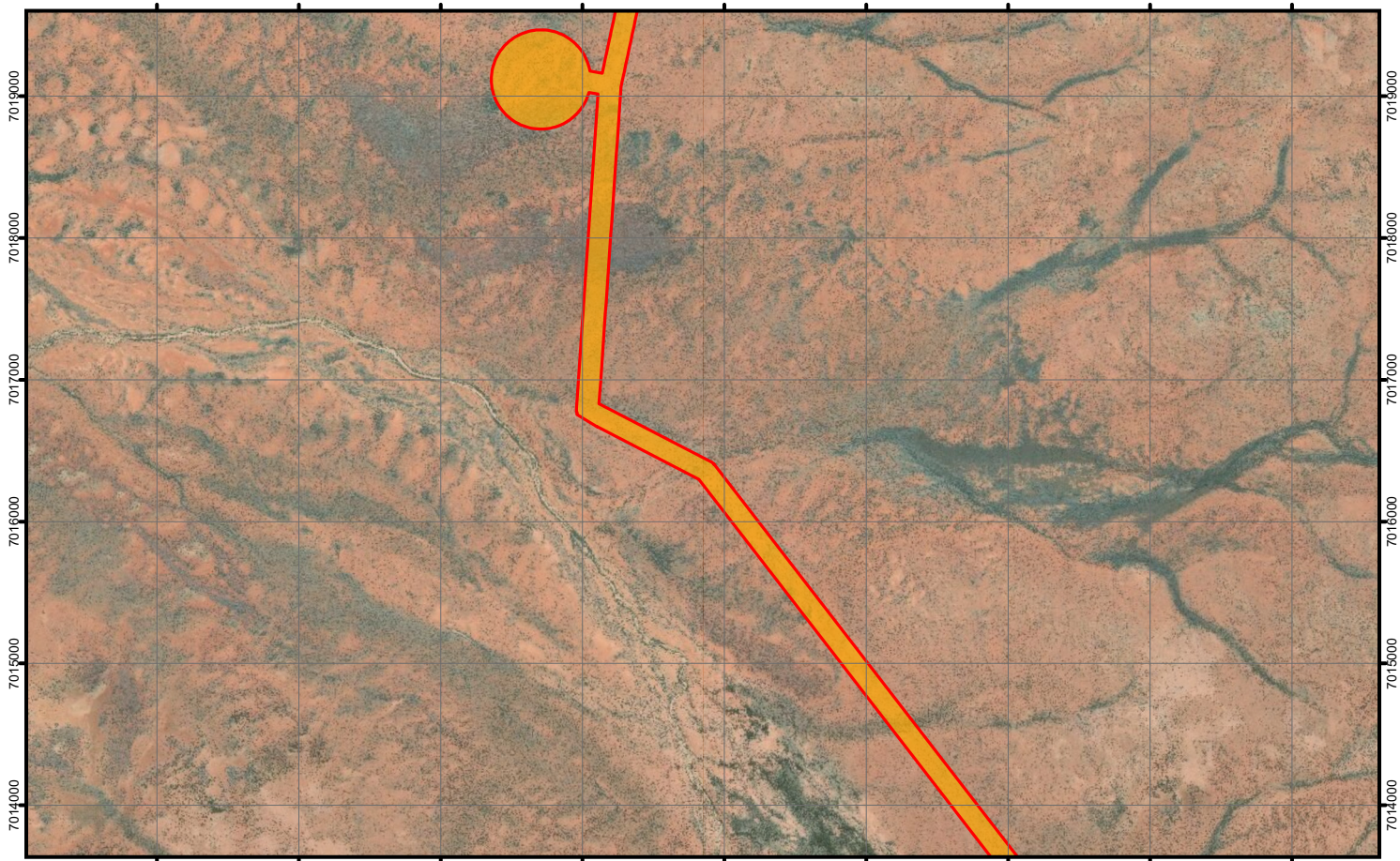
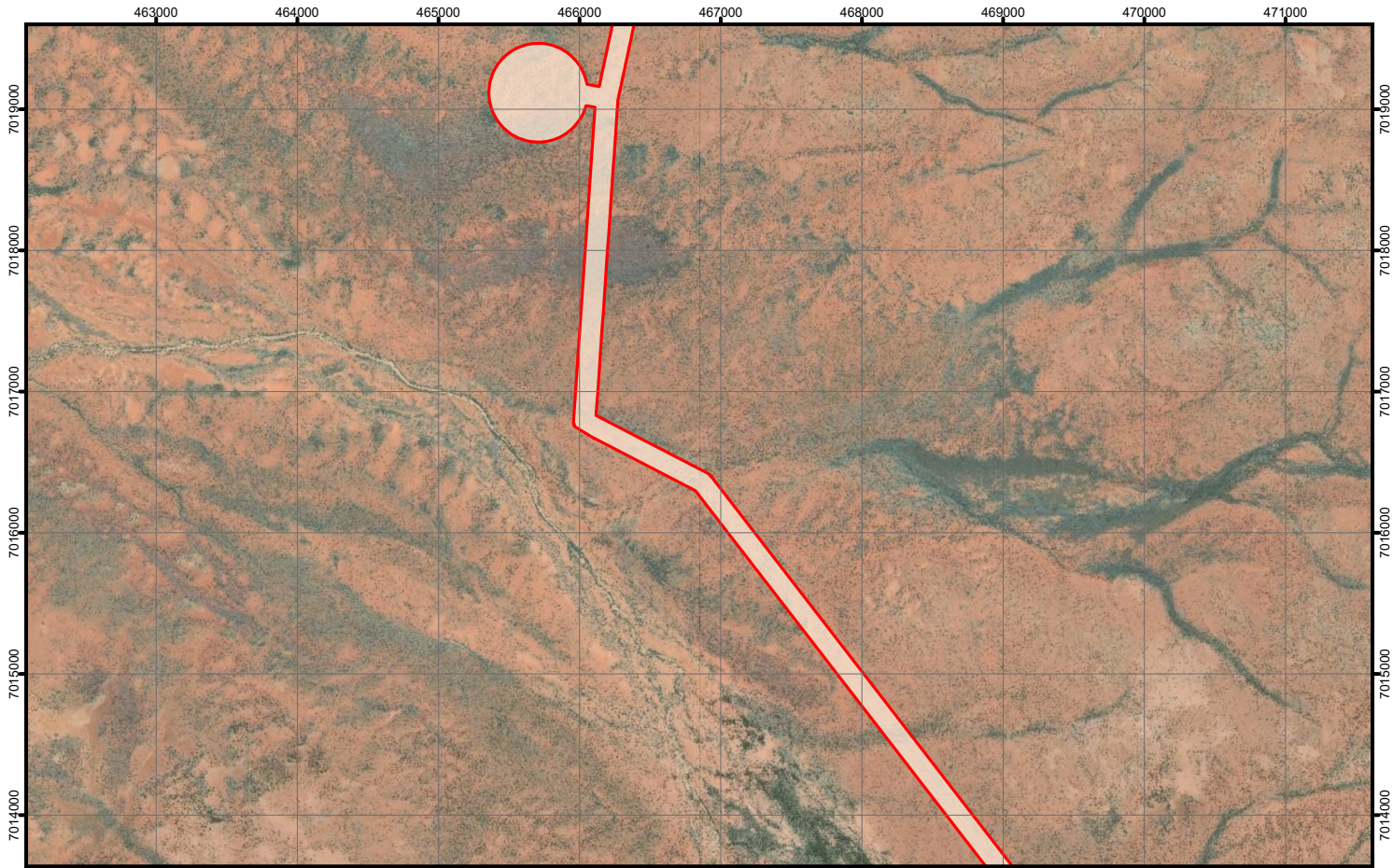
**Vegetation Communities, Fauna Habitats and Observations**

**WAJARRI CORPORATION**

SQUARE KILOMETRE ARRAY – FLORA AND FAUNA ASSESSMENT

**Figure 7.12**





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Datum: GDA 1994 MGA Zone 50

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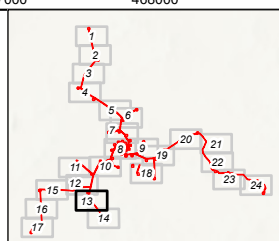
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**LEGEND**

Fauna Habitat  
 Hardpan plain with intermittent sandplain

Vegetation Communities  
 ApAgEf



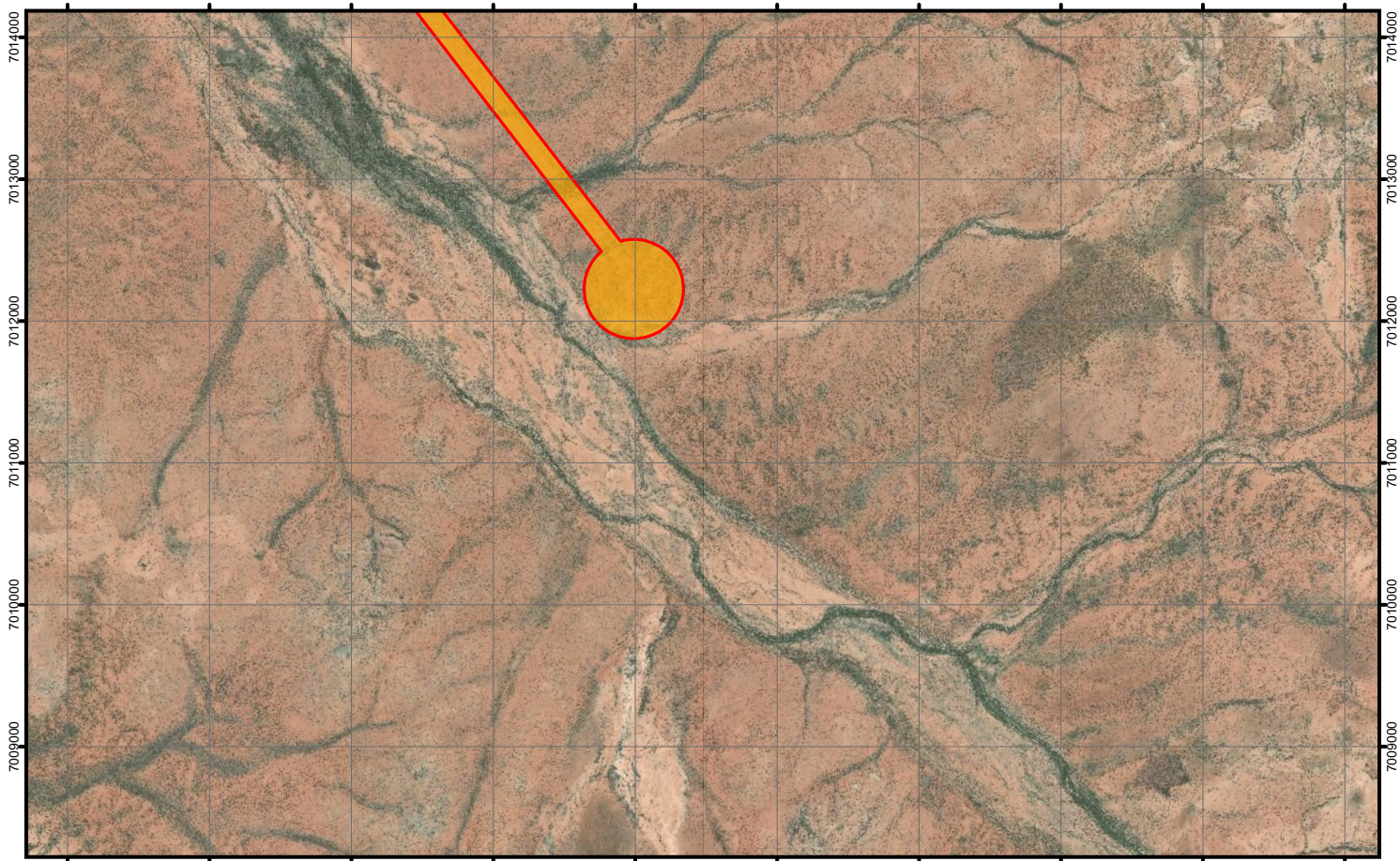
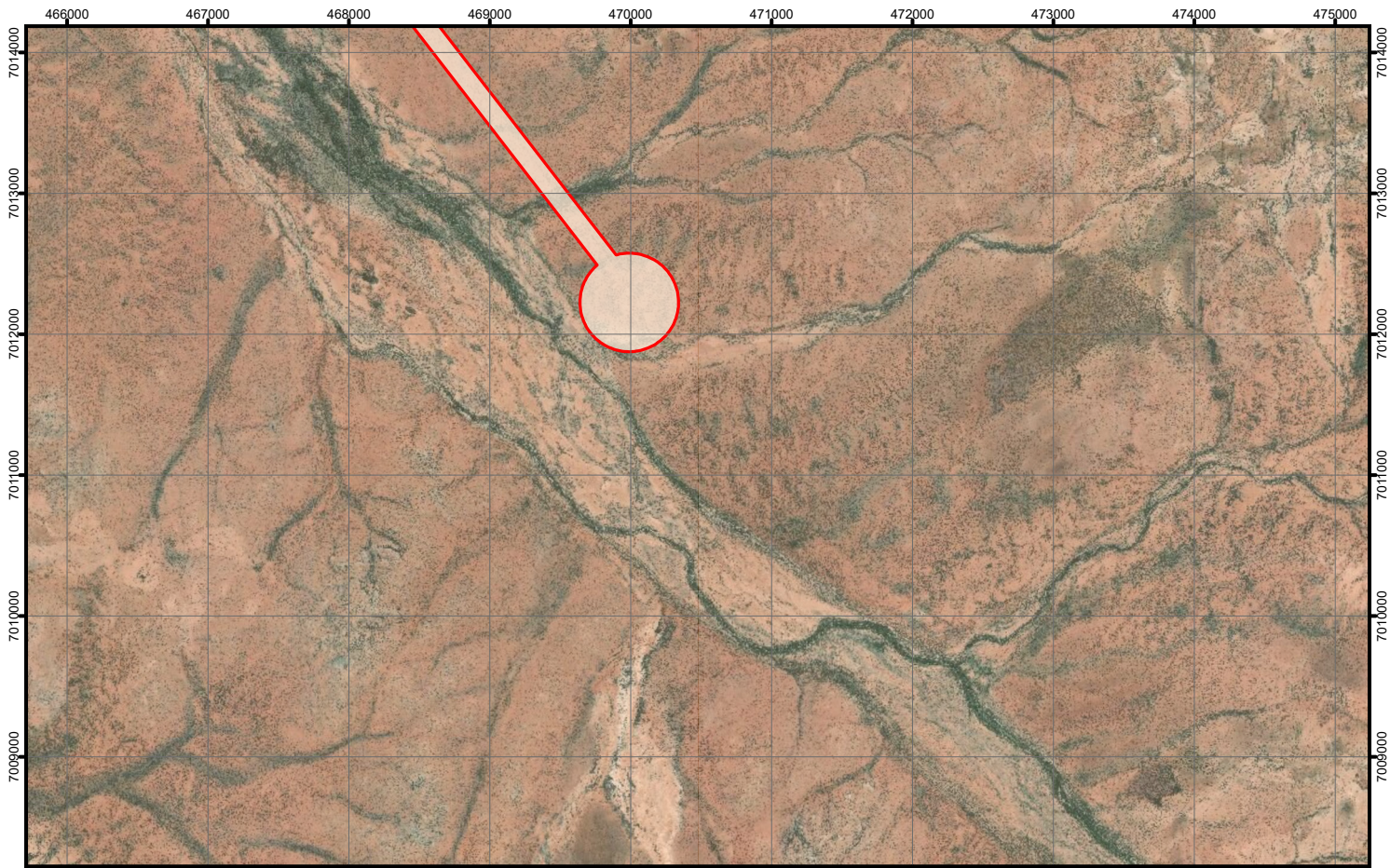
**Vegetation Communities, Fauna Habitats and Observations**

**WAJARRI CORPORATION**

SQUARE KILOMETRE ARRAY – FLORA AND FAUNA ASSESSMENT

**Figure 7.13**





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**AECOM**  
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Datum: GDA 1994 MGA Zone 50

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 metres

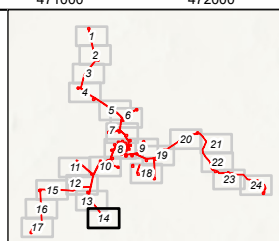
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 Base Data: (c) Based on information provided by and with the permission of the Western Australian Land Information Authority trading as Landgate (2021), Geoscience Australia, Streetpro

**LEGEND**

Fauna Habitat  
 Hardpan plain with intermittent sandplain

Vegetation Communities  
 ApAgEf



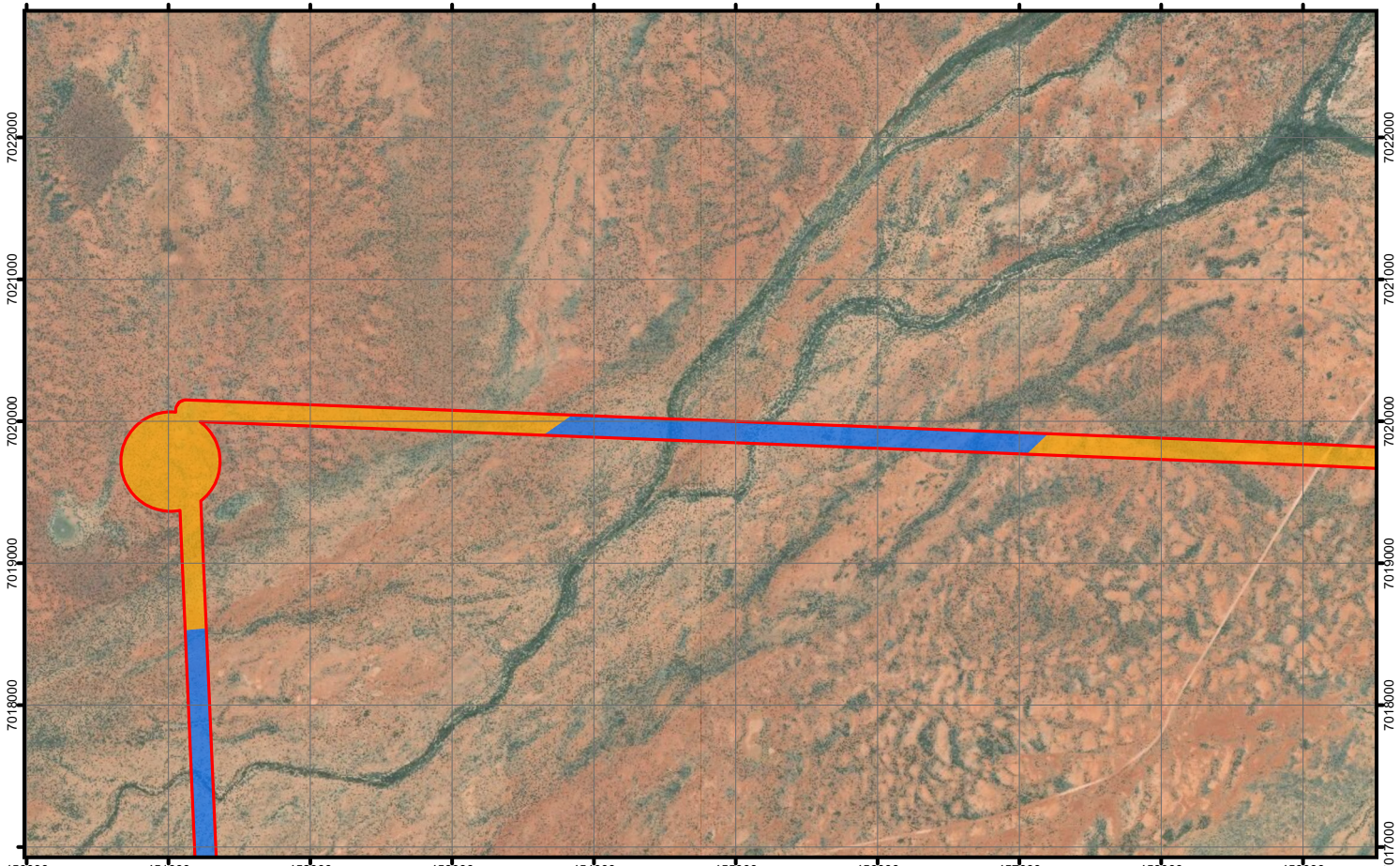
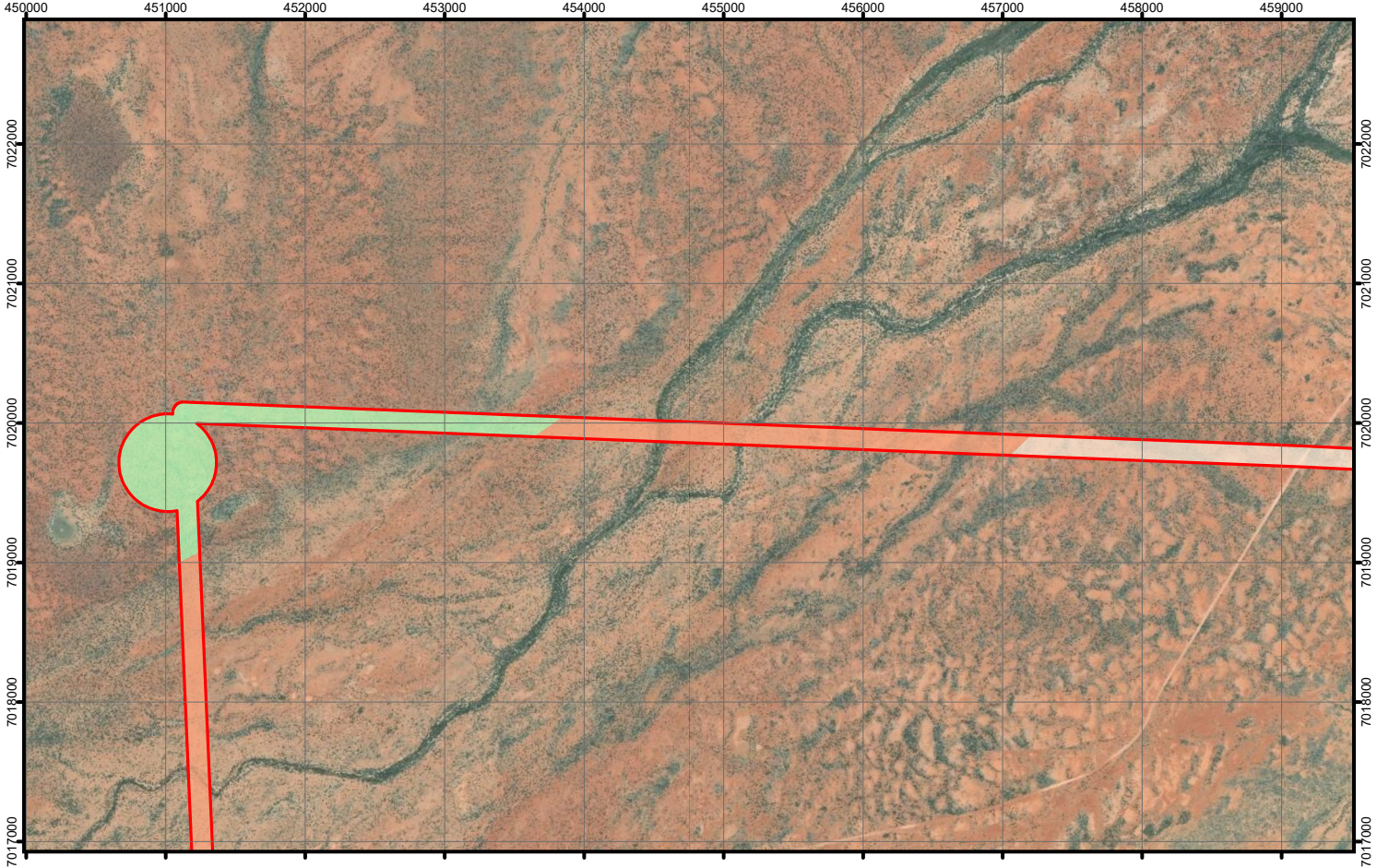
**Vegetation Communities, Fauna Habitats and Observations**

**WAJARRI CORPORATION**

SQUARE KILOMETRE ARRAY –  
 FLORA AND FAUNA ASSESSMENT

**Figure 7.14**





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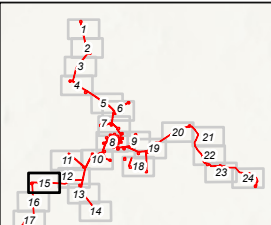
**LEGEND**

**Vegetation Communities**

- AiAbSa
- AiAtEf
- ApAgEf

**Fauna Habitat**

- Channels and creek line
- Hardpan plain with intermittent sandplain



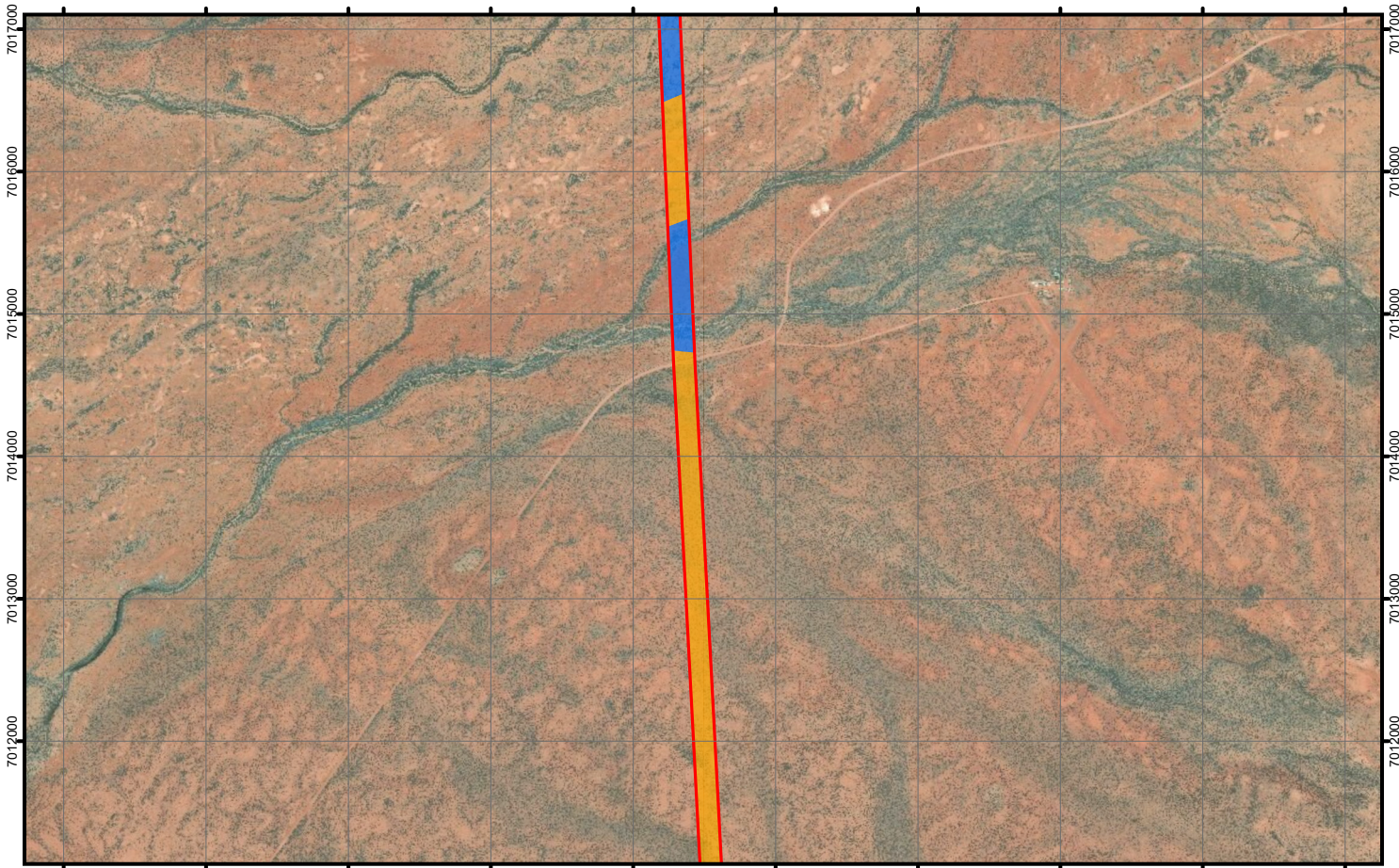
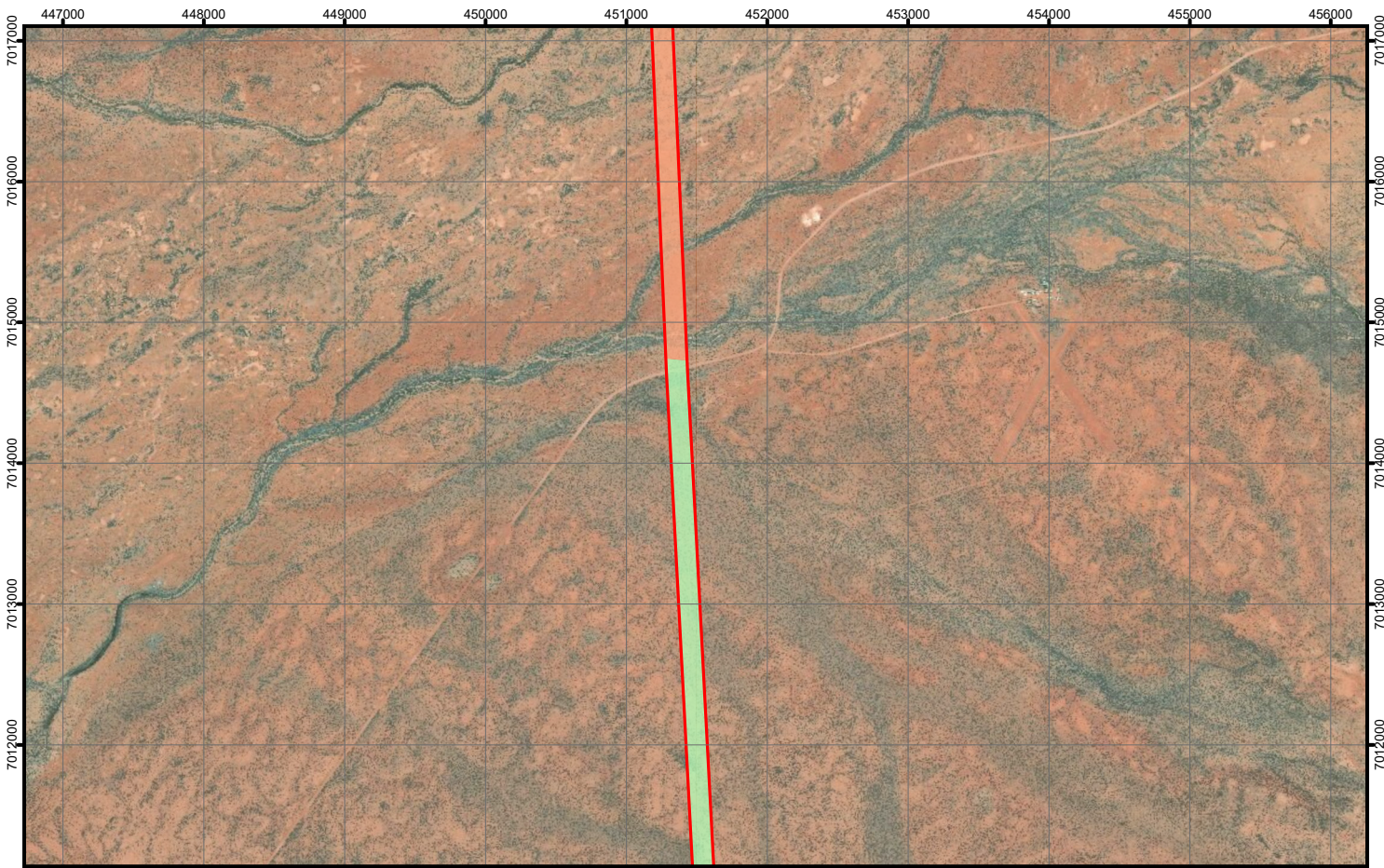
**Vegetation Communities, Fauna Habitats and Observations**

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SQUARE KILOMETRE ARRAY – FLORA AND FAUNA ASSESSMENT

**Figure 7.15**





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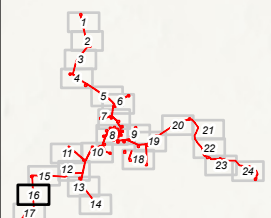
Data sources:  
 Base Data: (c) Based on information provided by and with the permission of the Western Australian Land Information Authority trading as Landgate (2021), Geoscience Australia, Streetpro

**LEGEND**

- Vegetation Communities**
- AiAbSa
  - AiAtEf

**Fauna Habitat**

- Channels and creek line
- Hardpan plain with intermittent sandplain

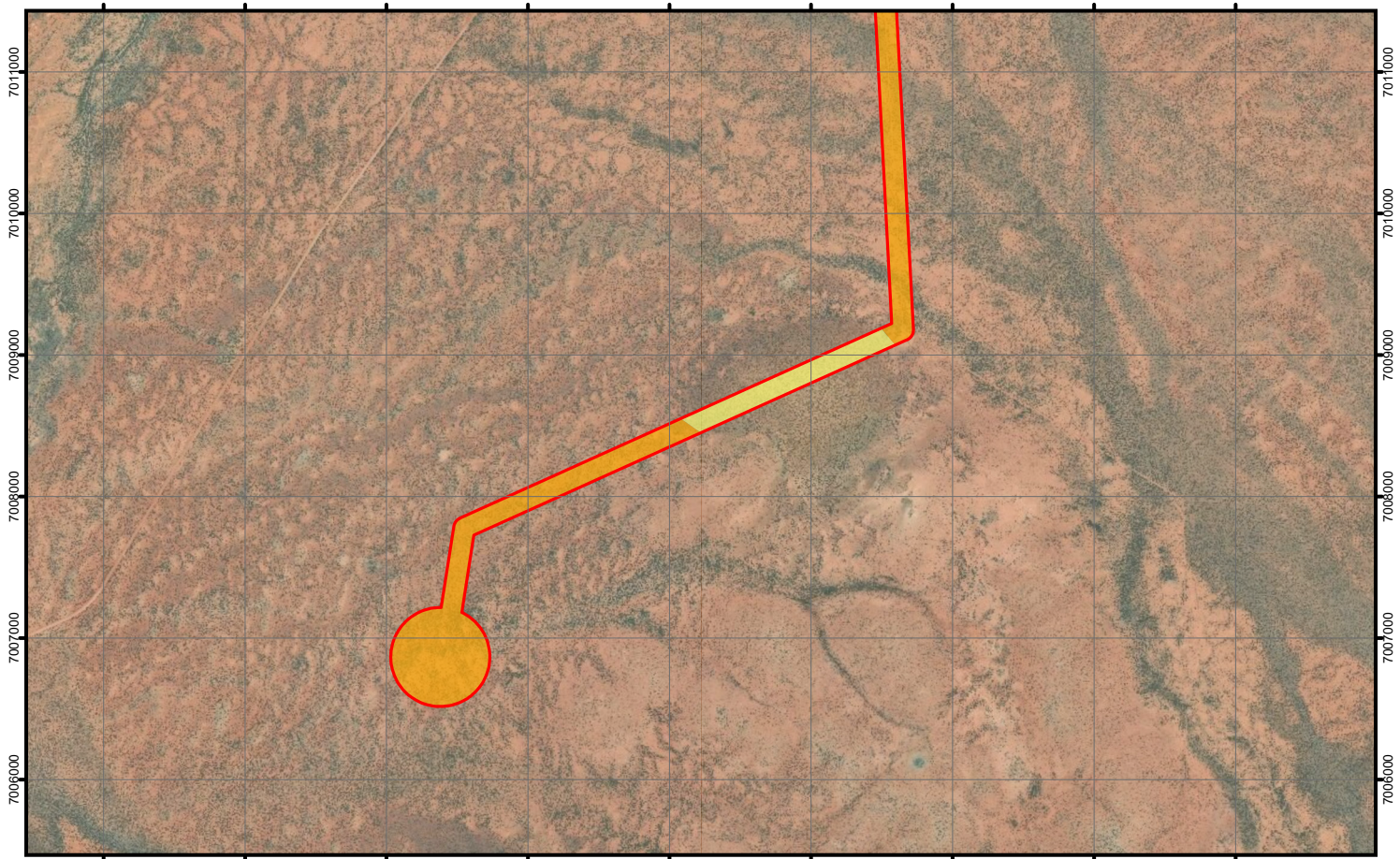
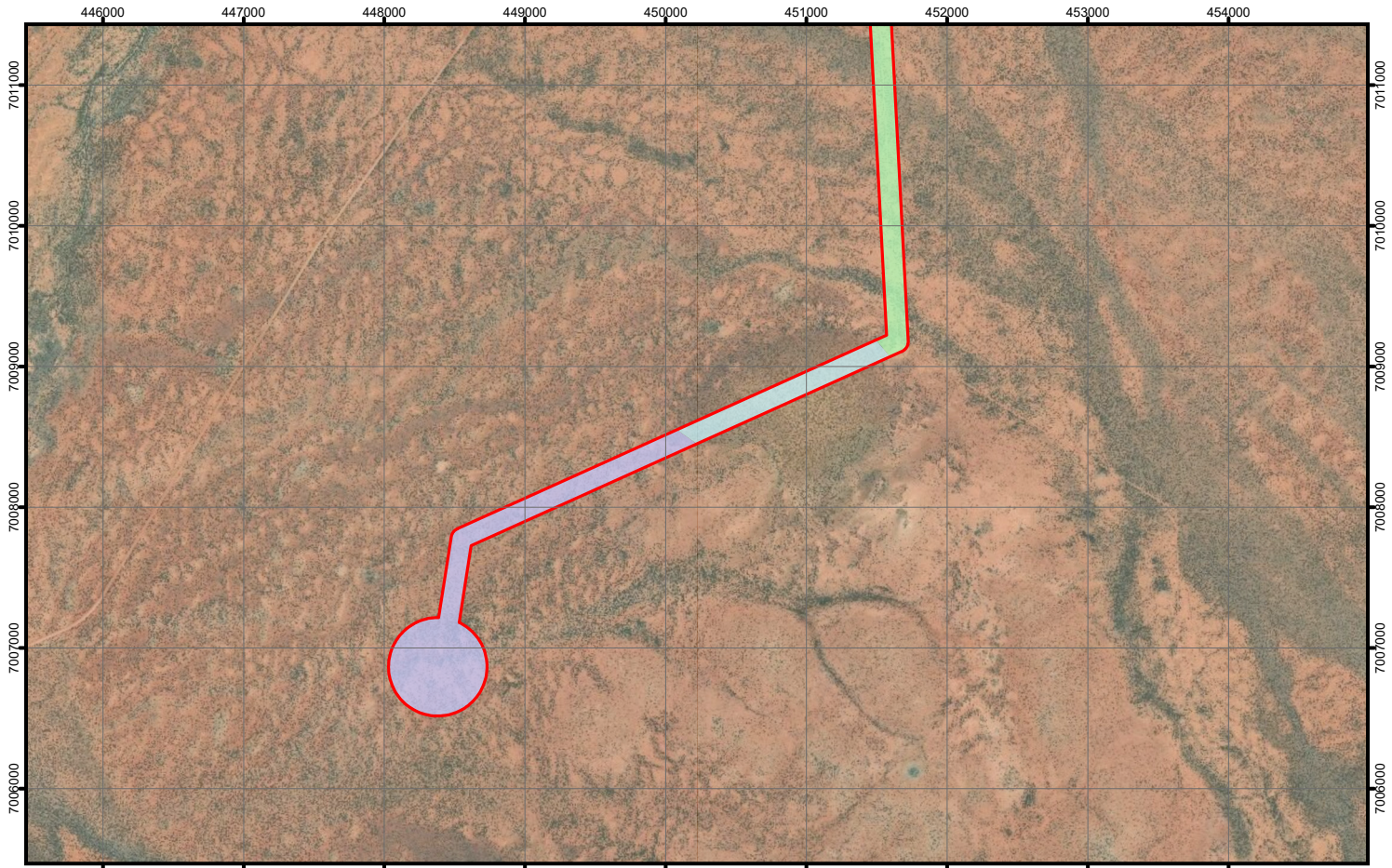


**Vegetation Communities, Fauna Habitats and Observations**

**WAJARRI CORPORATION**  
 SQUARE KILOMETRE ARRAY –  
 FLORA AND FAUNA ASSESSMENT

**Figure 7.16**





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Data sources:  
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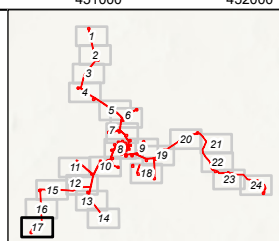
**LEGEND**

**Vegetation Communities**

- AaEcPo
- AiAtEf
- AiTdPb

**Fauna Habitat**

- Hardpan plain with intermittent sandplain
- Sandplain



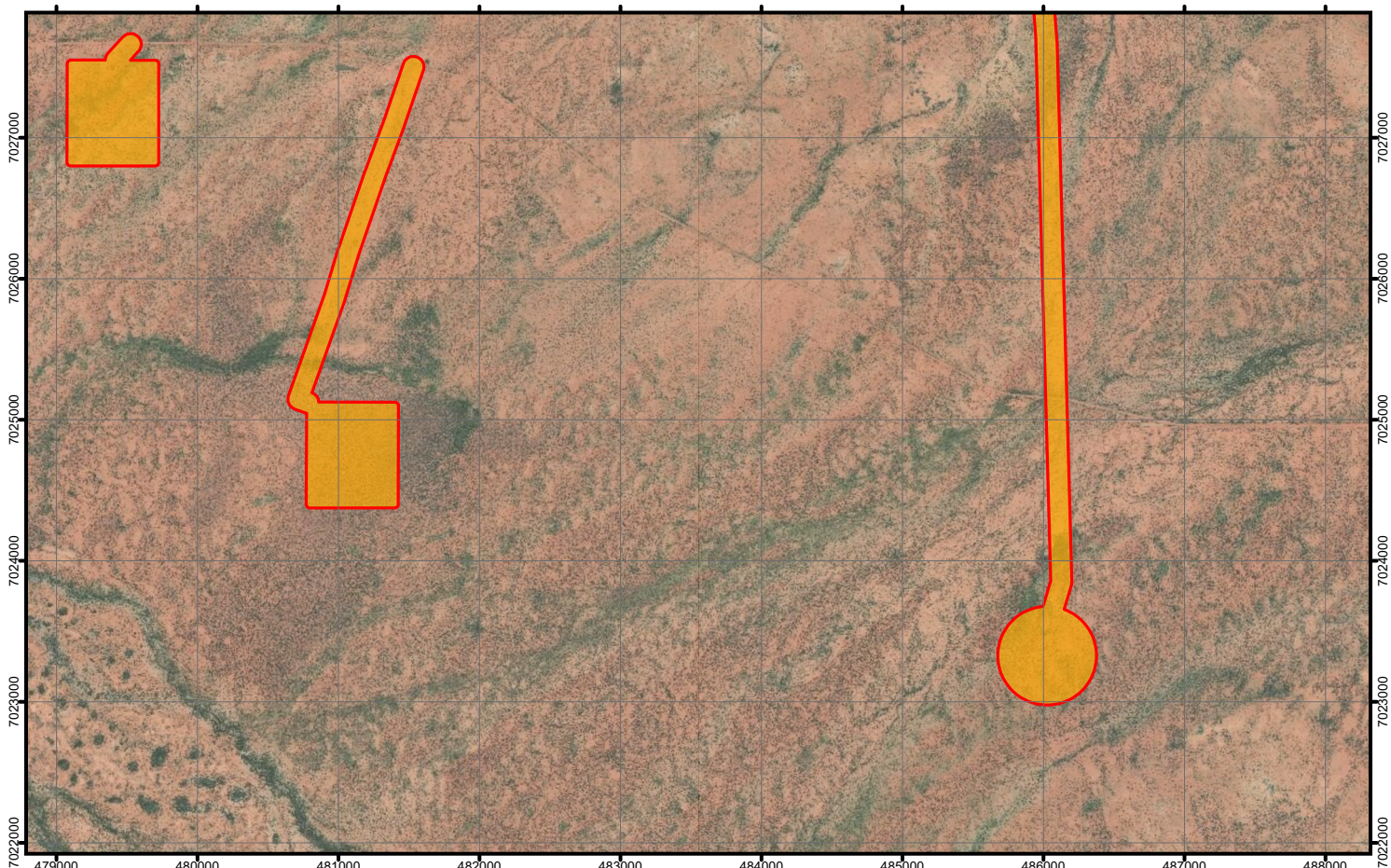
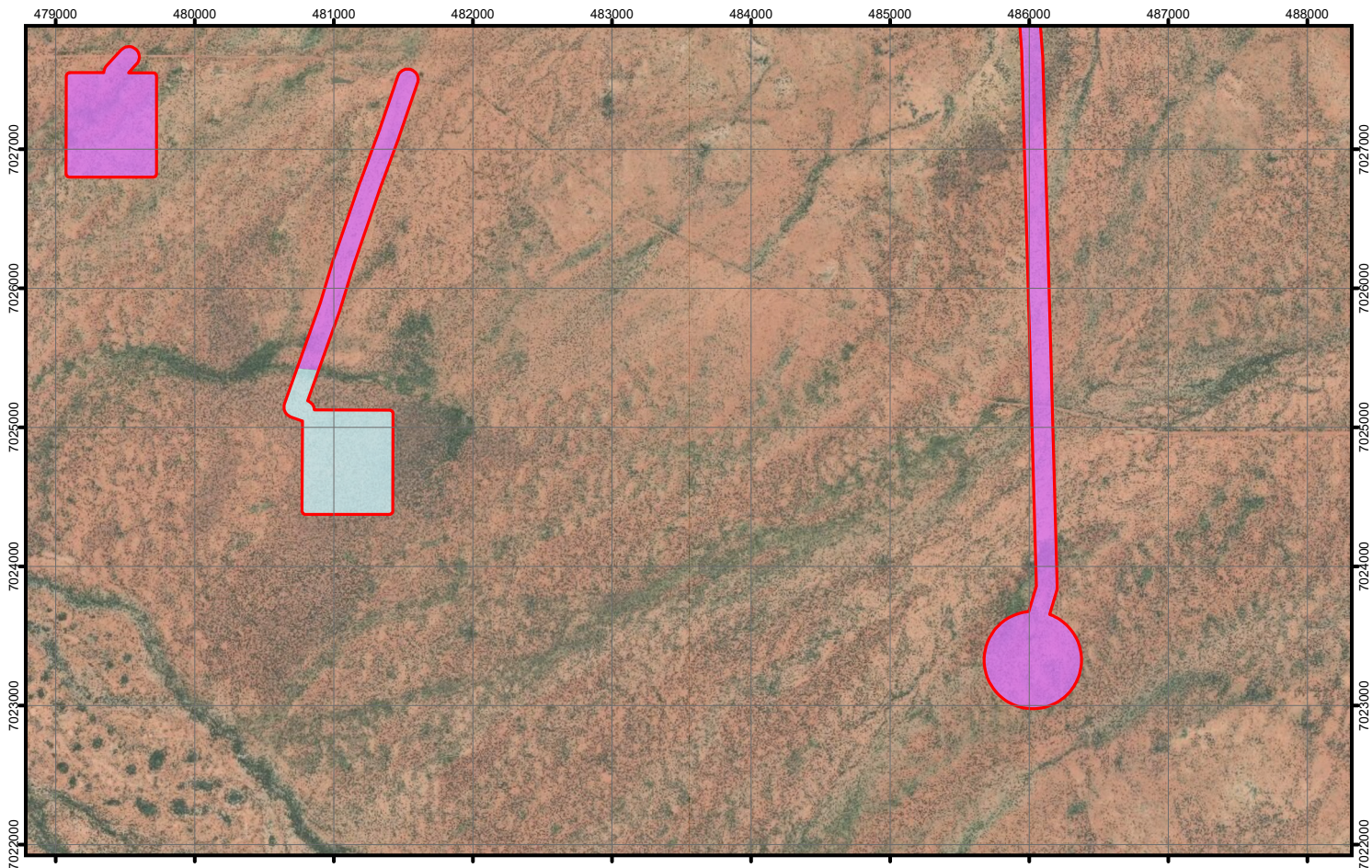
**Vegetation Communities, Fauna Habitats and Observations**

**WAJARRI CORPORATION**

SQUARE KILOMETRE ARRAY – FLORA AND FAUNA ASSESSMENT

**Figure 7.17**





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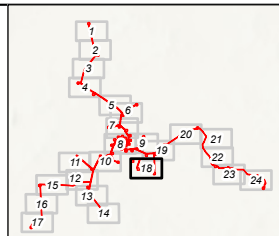
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Data sources:  
 Base Data: (c) Based on information provided by and with the permission of the Western Australian Land Information Authority trading as Landgate (2021), Geoscience Australia, Streetpro

**LEGEND**

**Vegetation Communities**  
 AaEcPo  
 AfEfPo

**Fauna Habitat**  
 Hardpan plain with intermittent sandplain



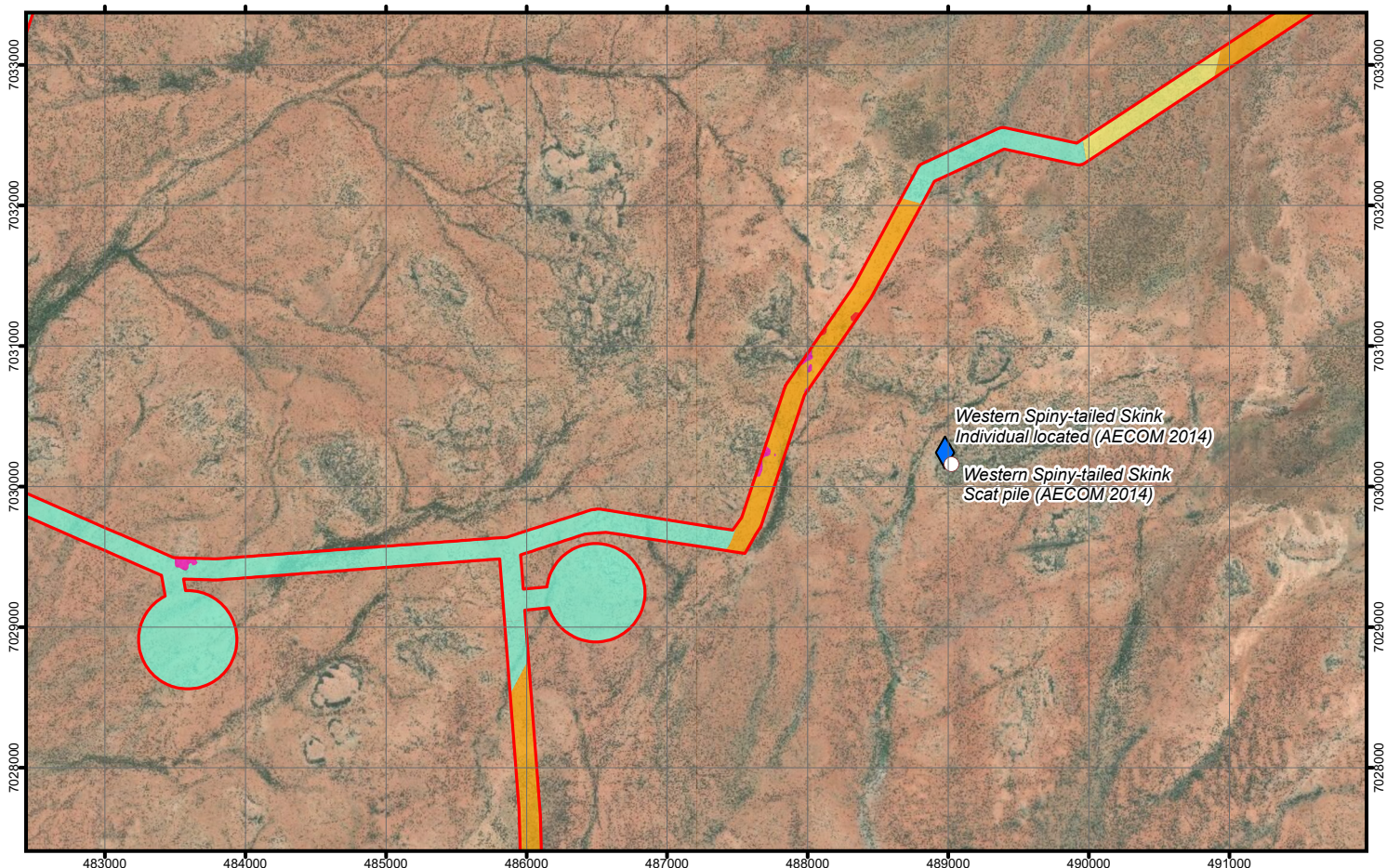
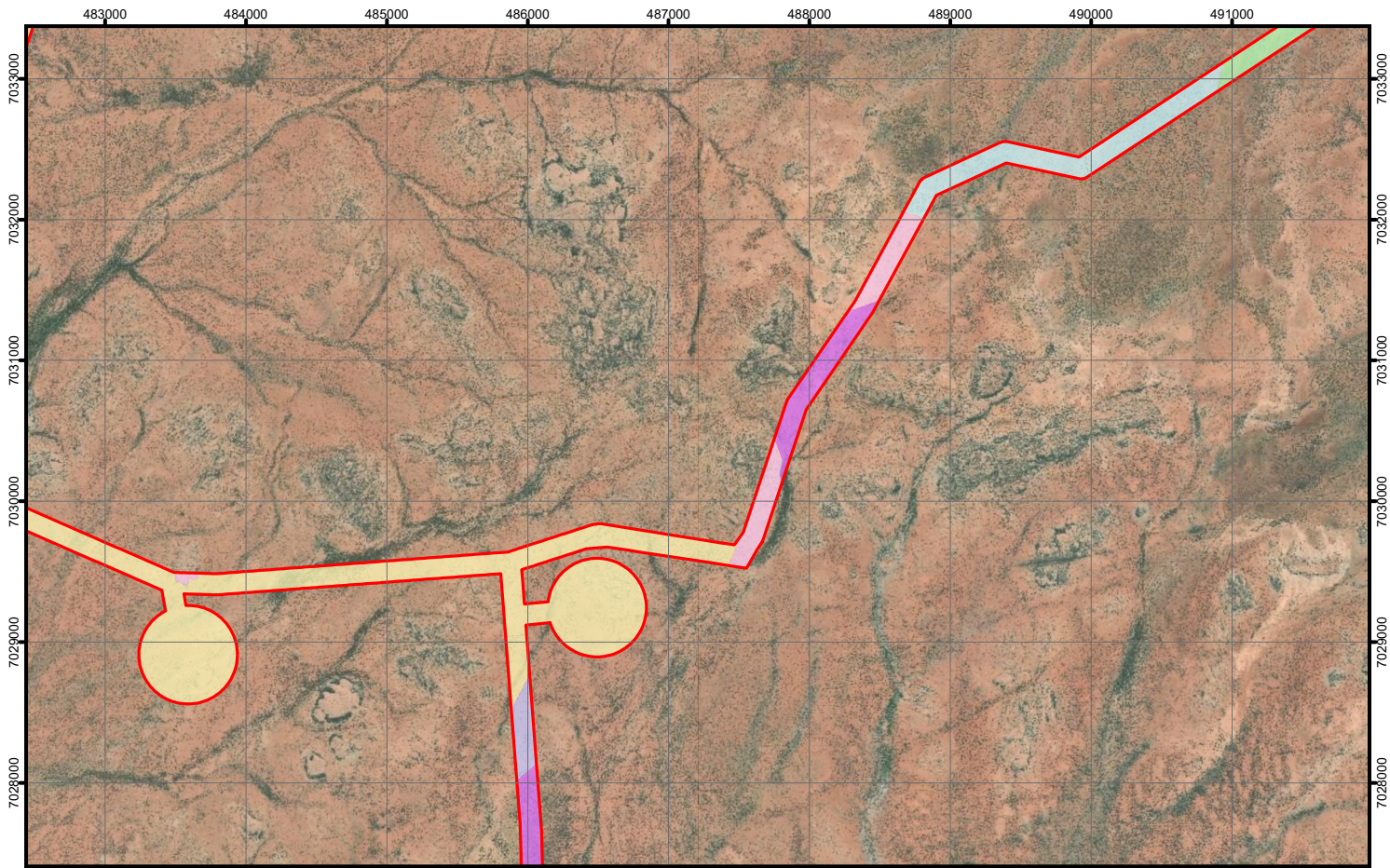
**Vegetation Communities, Fauna Habitats and Observations**

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SQUARE KILOMETRE ARRAY – FLORA AND FAUNA ASSESSMENT

**Figure 7.18**





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1:50,000  
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Data sources:  
 Base Data: (c) Based on information provided by and with the permission of the Western Australian Land Information Authority trading as Landgate (2021), Geoscience Australia, Streetpro

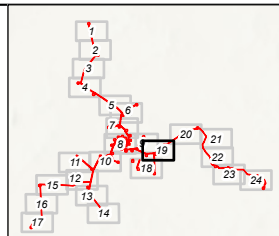
**LEGEND**

**Vegetation Communities**

- AaEcPo
- AfEfPo
- AfSa
- AiAtEf
- AiTdPb
- ArCc

**Fauna Habitat**

- Granite boulders and heaps
- Granite domes
- Hardpan plain with intermittent sandplain
- Non saline stony or gritty surfaced plains
- Sandplain



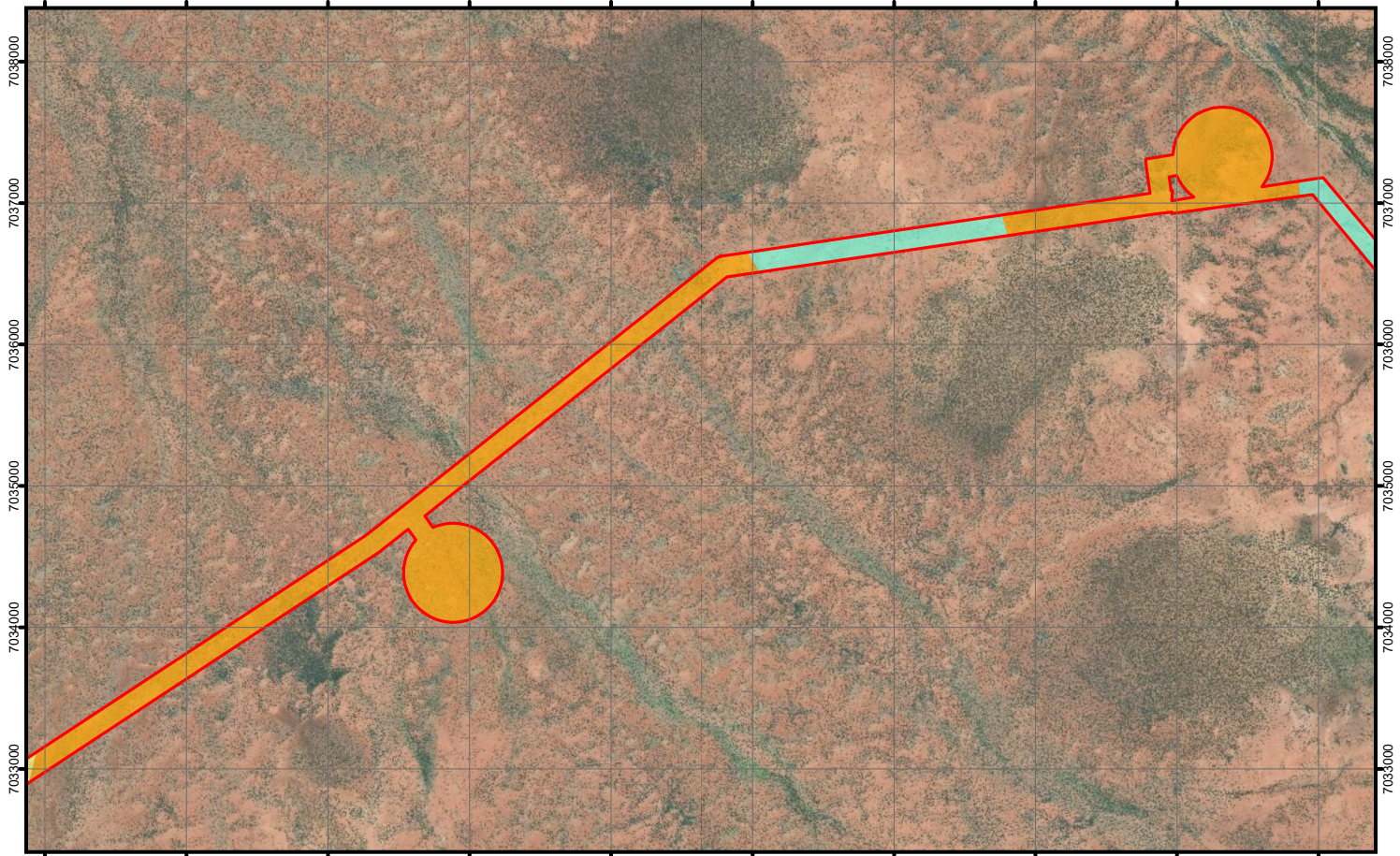
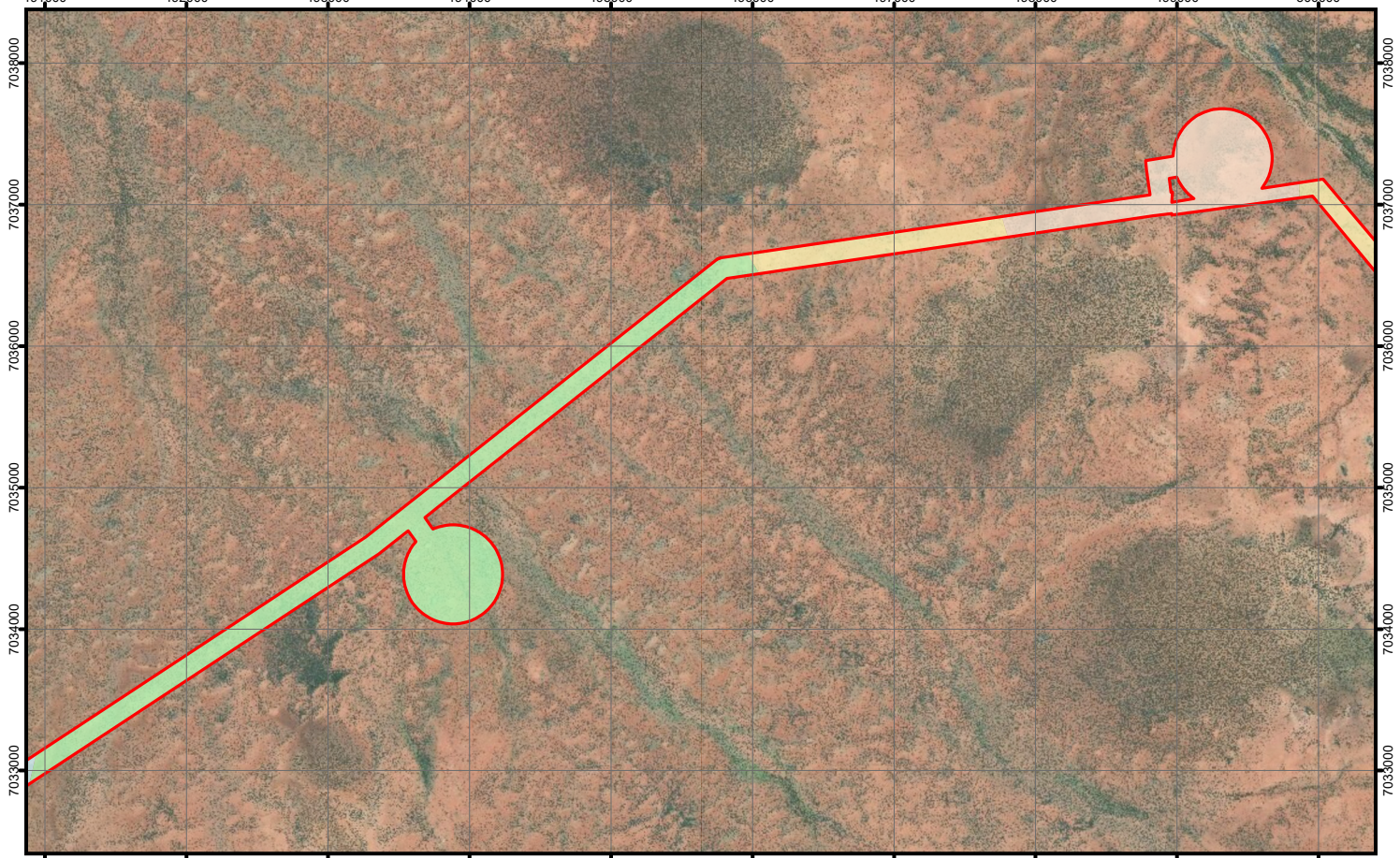
**Vegetation Communities, Fauna Habitats and Observations**

**WAJARRI CORPORATION**

SQUARE KILOMETRE ARRAY – FLORA AND FAUNA ASSESSMENT

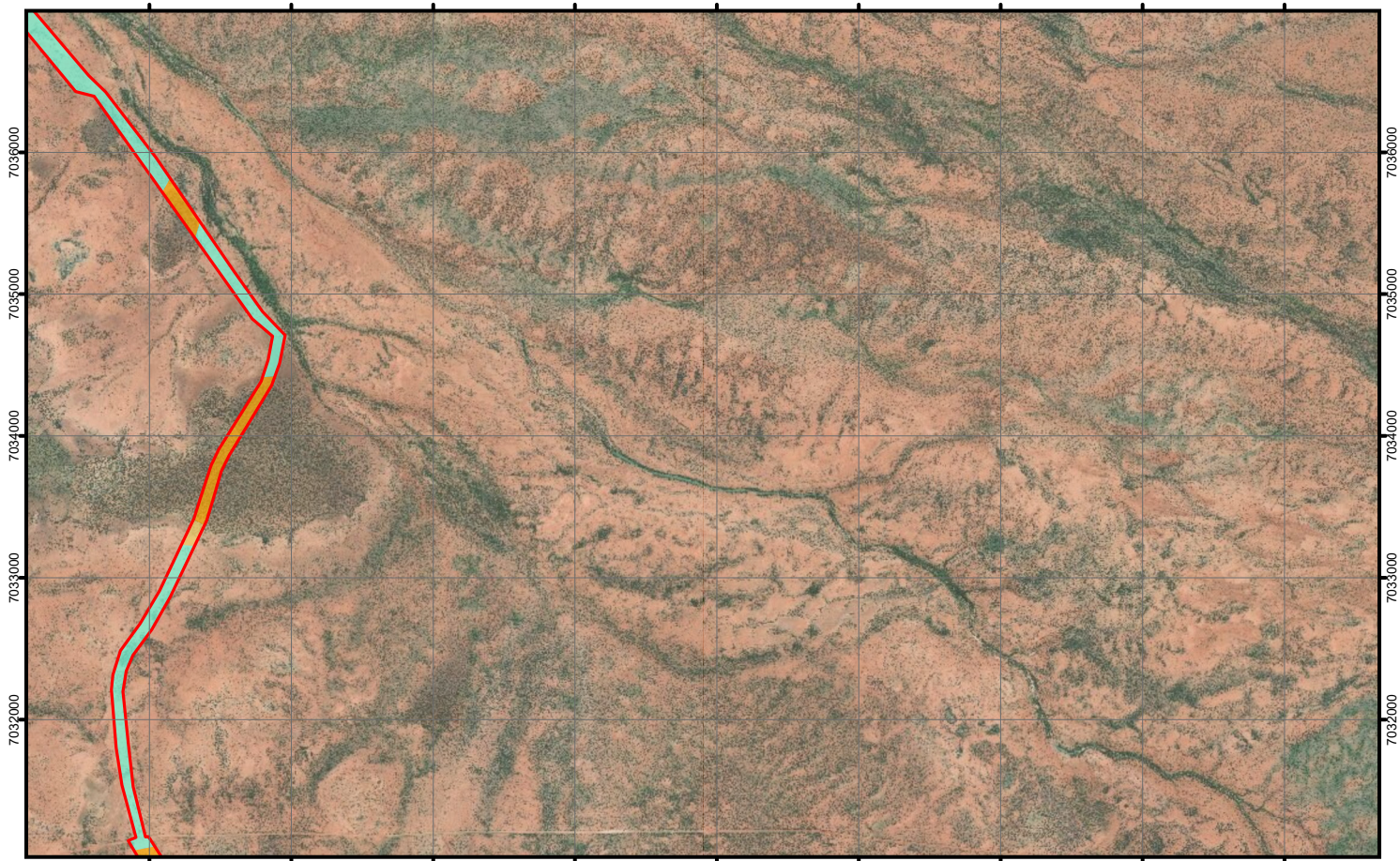
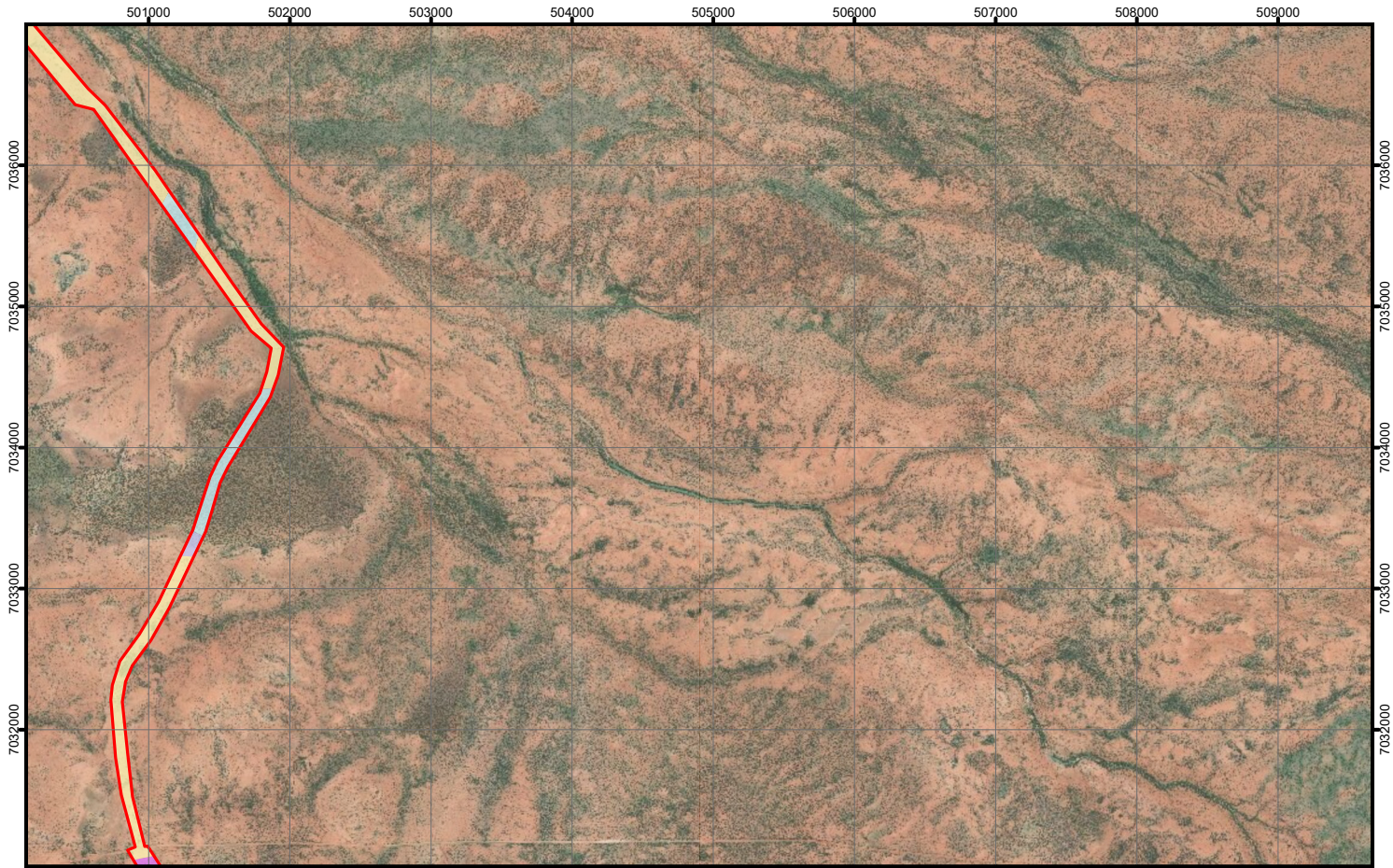
**Figure 7.19**





|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                 |  |                                                                                                                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>PROJECT ID 60647200<br/>                 CREATED BY WYATTK2<br/>                 APPROVED BY J.LEIGH<br/>                 LAST MODIFIED 28 JAN 2021</p> <p><b>AECOM</b><br/>                 www.aecom.com</p> <p>Datum: GDA 1994 MGA Zone 50<br/>                 0 250 500 750 metres</p> <p>1:50,000<br/>                 (when printed at A4)</p> <p>Data sources:<br/>                 Base Data: (c) Based on information provided by and with the permission of the Western Australian Land Information Authority trading as Landgate (2021), Geoscience Australia, Streetpro</p> | <p><b>LEGEND</b></p> <p><b>Vegetation Communities</b></p> <ul style="list-style-type: none"> <li>AaEcPo</li> <li>AfSa</li> <li>AiATef</li> <li>ApAgEf</li> </ul> <p><b>Fauna Habitat</b></p> <ul style="list-style-type: none"> <li>Hardpan plain with intermittent sandplain</li> <li>Non saline stony or gritty surfaced plains</li> <li>Sandplain</li> </ul> |  | <p><b>Vegetation Communities, Fauna Habitats and Observations</b></p> <p><b>WAJARRI CORPORATION</b></p> <p>SQUARE KILOMETRE ARRAY – FLORA AND FAUNA ASSESSMENT</p> <p><b>Figure 7.20</b></p> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|





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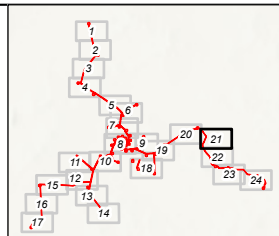
**LEGEND**

**Vegetation Communities**

- AaEcPo
- AfEfPo
- AfSa
- AiTdPb

**Fauna Habitat**

- Hardpan plain with intermittent sandplain
- Non saline stony or gritty surfaced plains
- Saline lower footslopes below breakaways



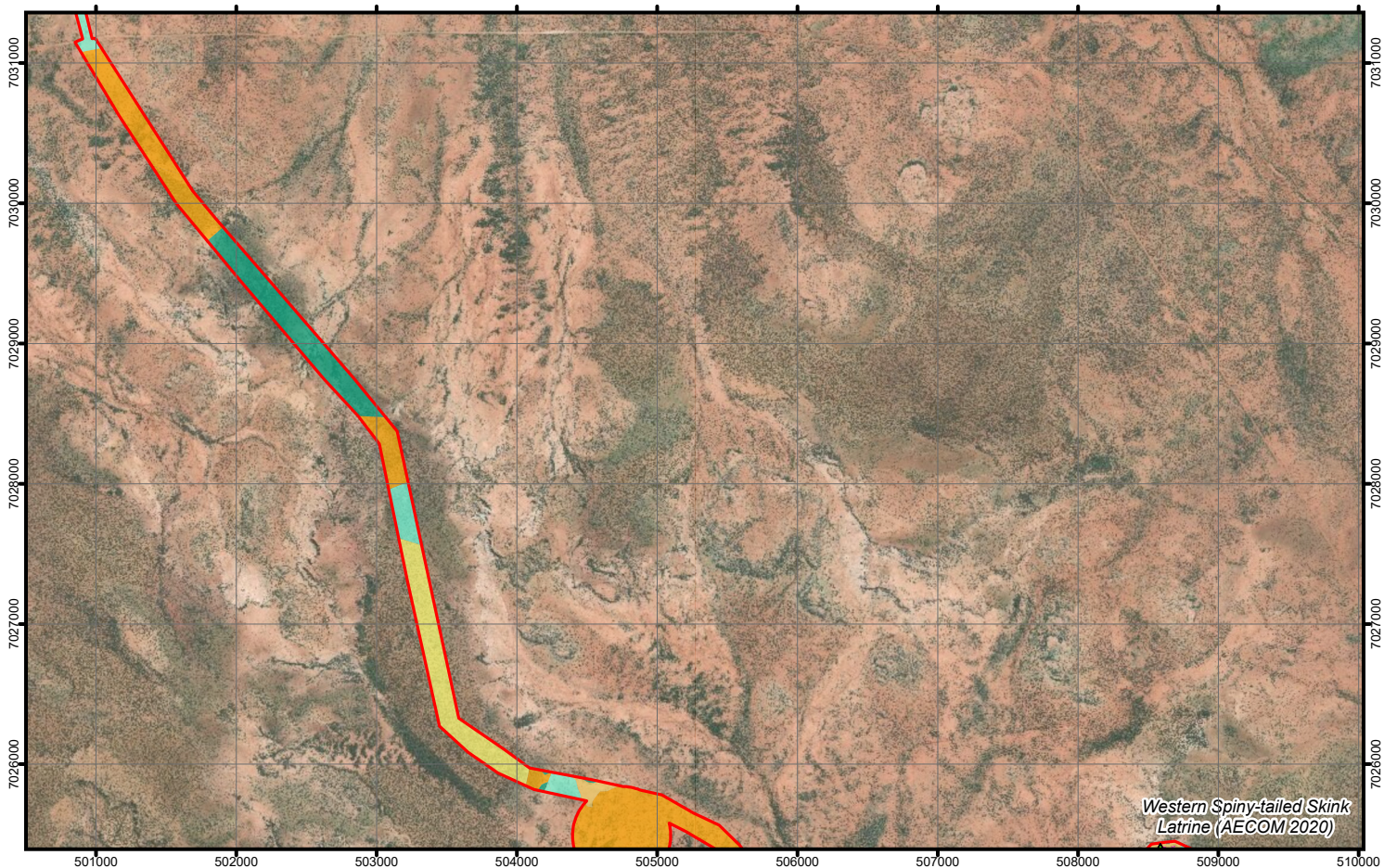
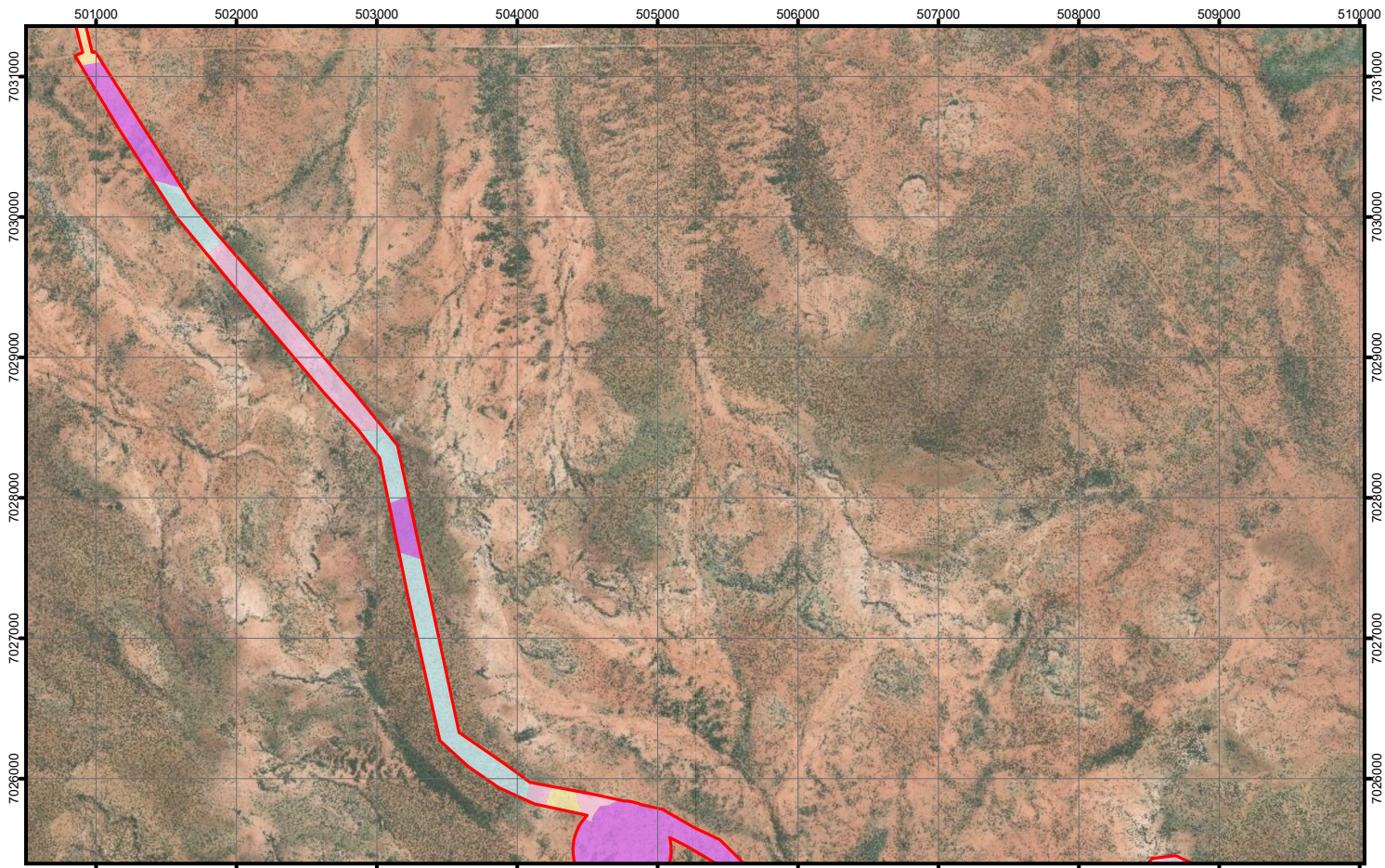
**Vegetation Communities, Fauna Habitats and Observations**

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SQUARE KILOMETRE ARRAY – FLORA AND FAUNA ASSESSMENT

**Figure 7.21**





Western Spiny-tailed Skink  
Latrine (AECOM 2020)

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Data sources:  
 Base Data: (c) Based on information provided by and with the permission of the Western Australian Land Information Authority trading as Landgate (2021), Geoscience Australia, Streetpro

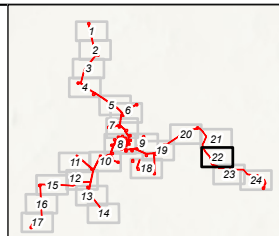
**LEGEND**

**Vegetation Communities**

- AaEcPo
- AfEfPo
- AfSa
- ArCc

**Fauna Habitat**

- Granite boulders and heaps
- Hardpan plain with intermittent sandplain
- Non saline stony or gritty surfaced plains
- Rocky breakaway and plateau edges
- Saline lower footslopes below breakaways
- Sandplain



**Vegetation Communities, Fauna Habitats and Observations**

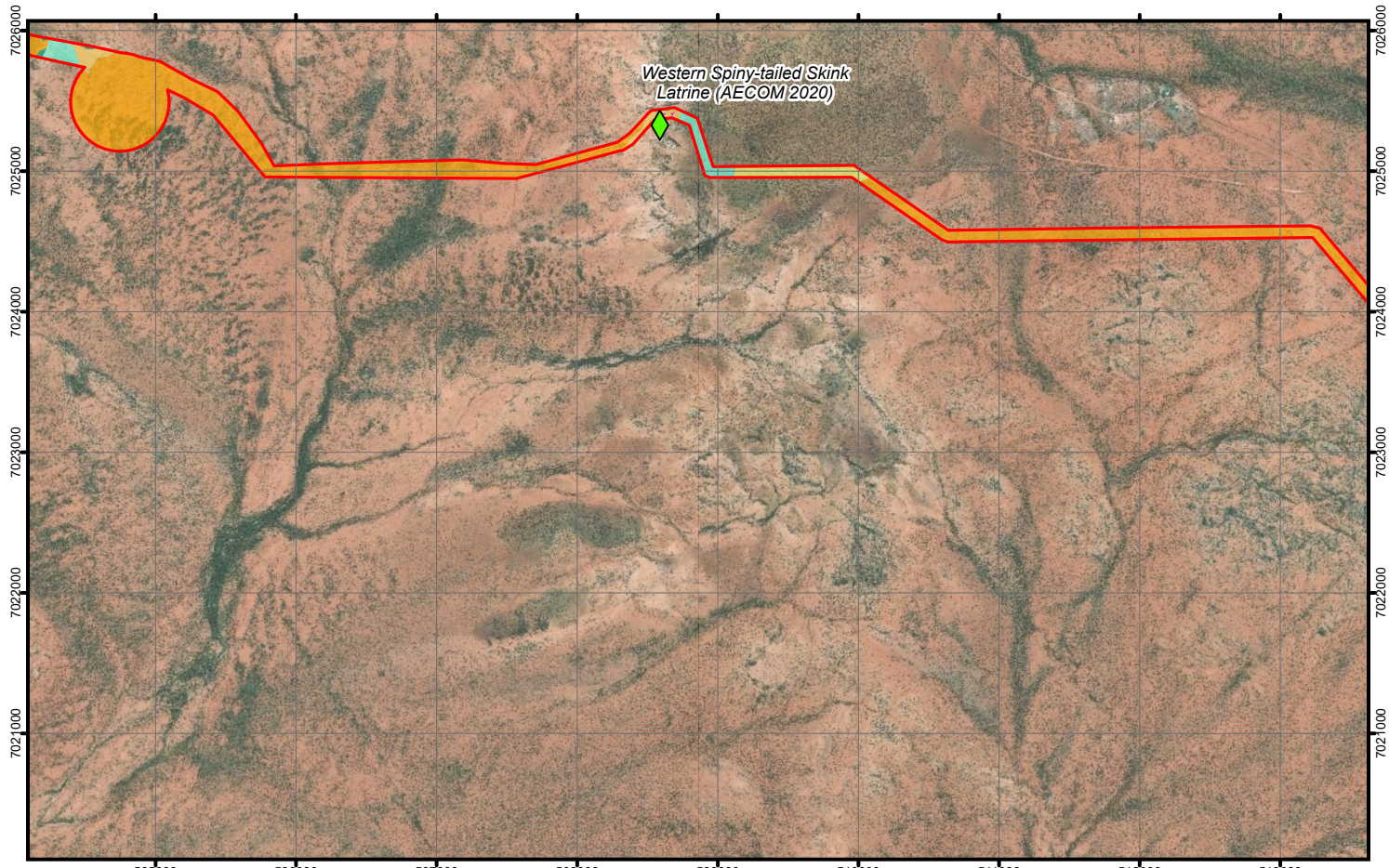
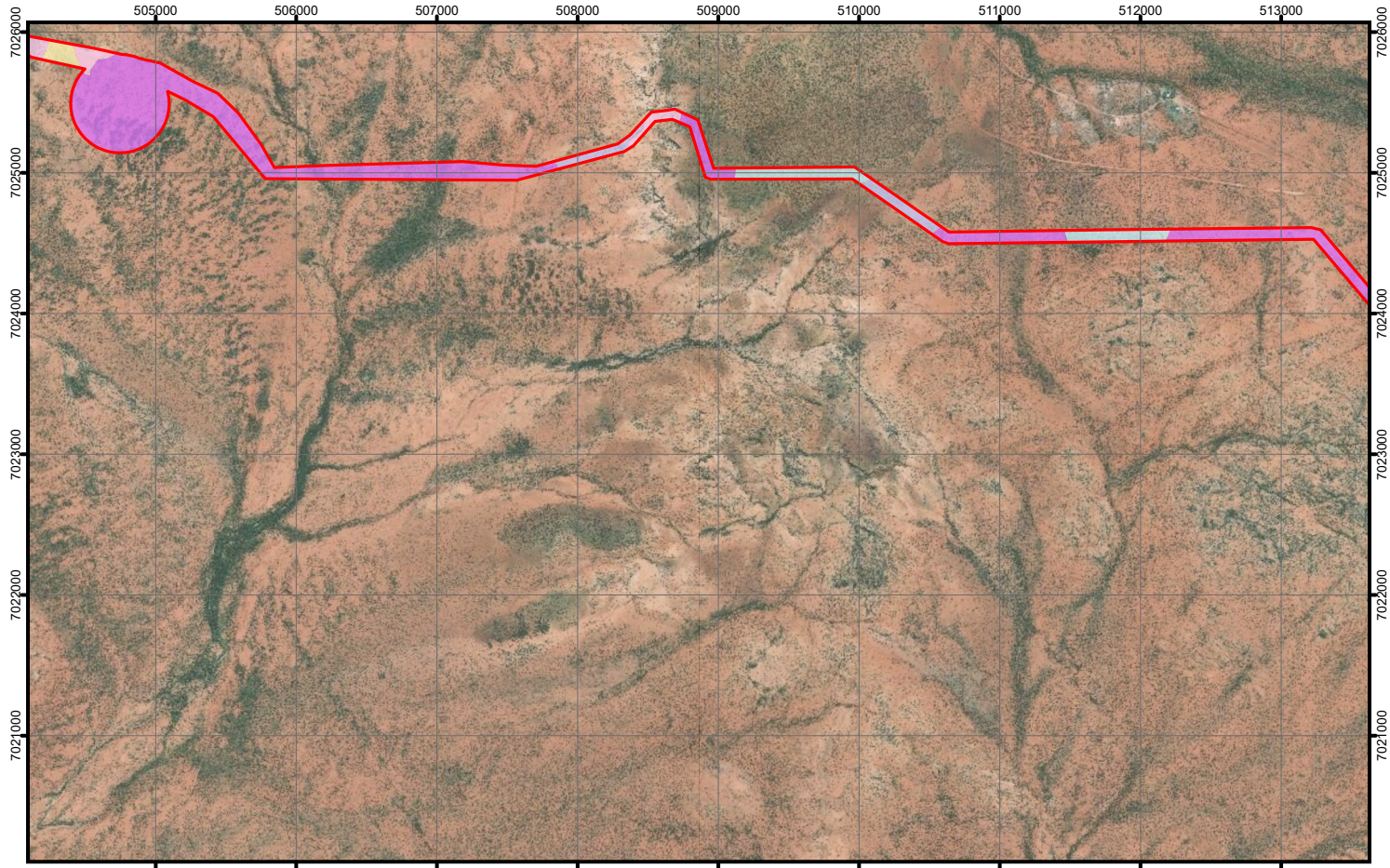
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SQUARE KILOMETRE ARRAY – FLORA AND FAUNA ASSESSMENT

**Figure 7.22**



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Data sources:  
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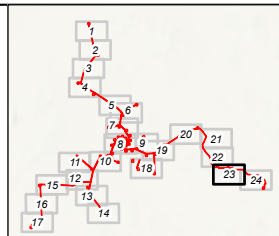
**LEGEND**

**Vegetation Communities**

- AaEcPo
- AfEfPo
- AfSa
- AiTdPb
- ArCc

**Fauna Habitat**

- Granite boulders and heaps
- Hardpan plain with intermittent sandplain
- Non saline stony or gritty surfaced plains
- Rocky breakaway and plateau edges
- Saline lower footslopes below breakaways
- Sandplain



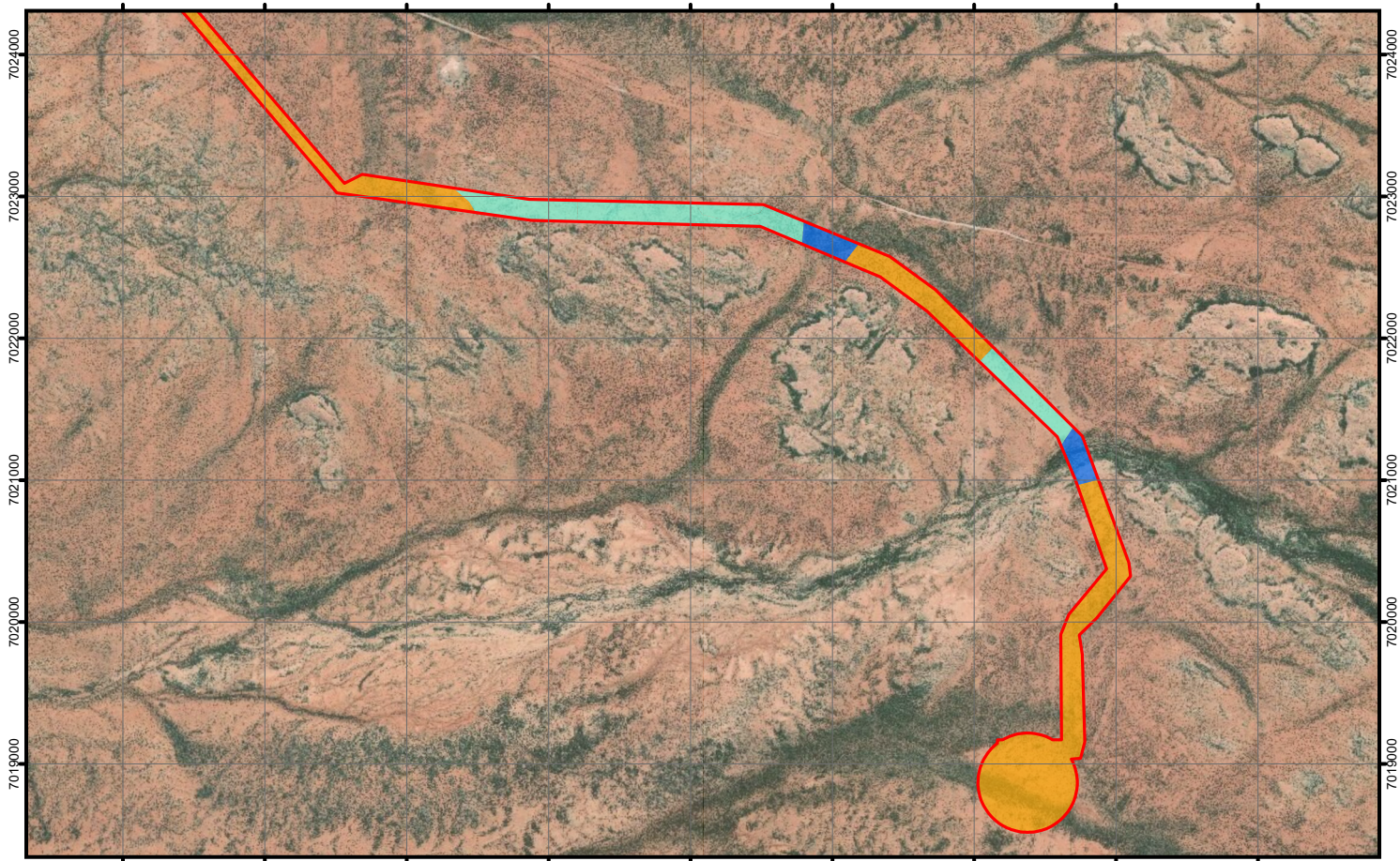
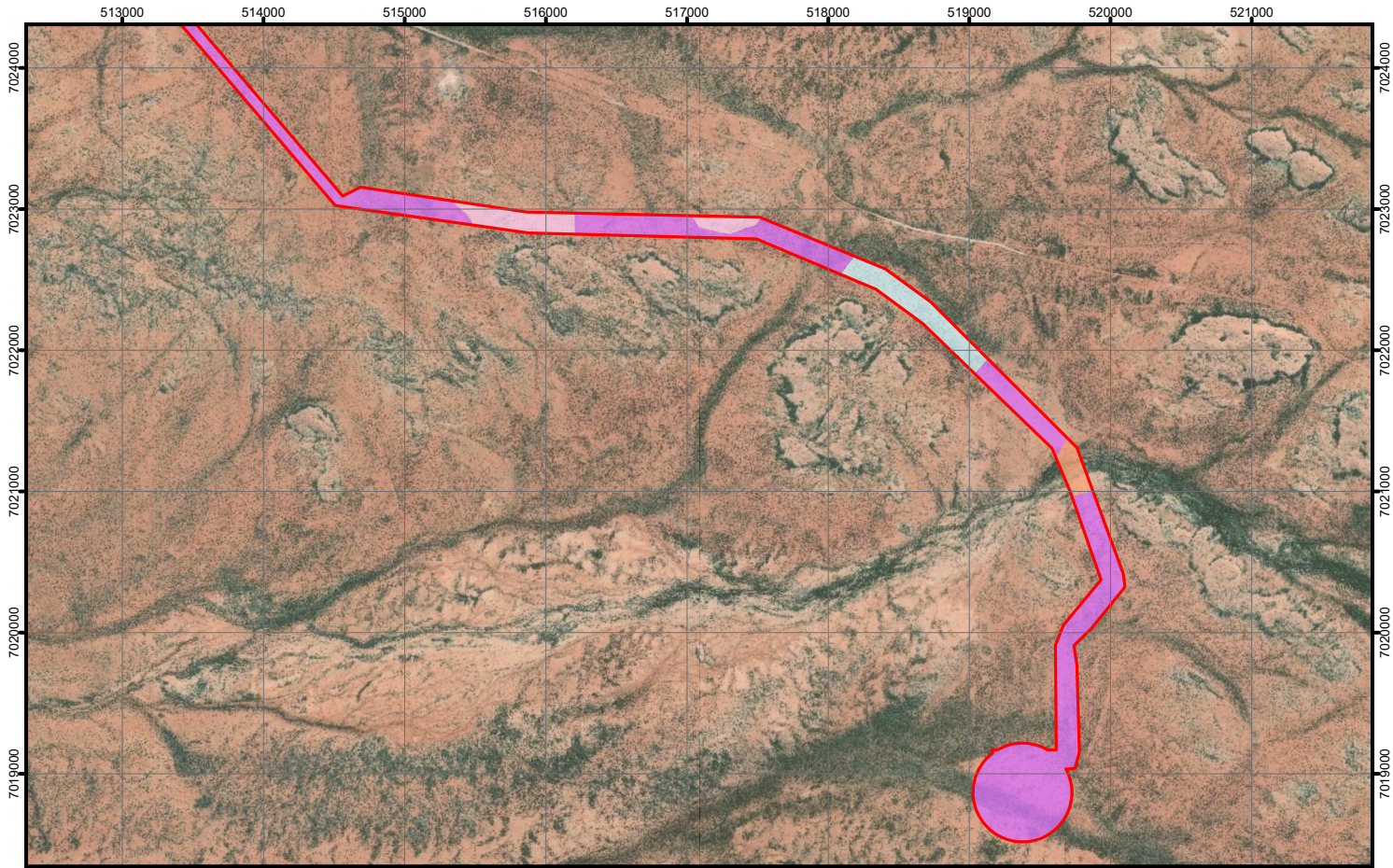
**Vegetation Communities, Fauna Habitats and Observations**

**WAJARRI CORPORATION**

SQUARE KILOMETRE ARRAY – FLORA AND FAUNA ASSESSMENT

**Figure 7.23**





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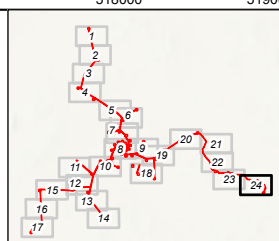
**LEGEND**

**Vegetation Communities**

- AaEcPo
- AfEFPo
- AiAbSa
- ArCc

**Fauna Habitat**

- Channels and creek line
- Hardpan plain with intermittent sandplain
- Non saline stony or gritty surfaced plains



**Vegetation Communities, Fauna Habitats and Observations**

**WAJARRI CORPORATION**

SQUARE KILOMETRE ARRAY – FLORA AND FAUNA ASSESSMENT

**Figure 7.24**



# Appendix A

## Desktop Results

A1 EPBC Protected Matters Search

A2 Flora Desktop

A3 Fauna Desktop





# EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 09/11/20 12:30:53

[Summary](#)

[Details](#)

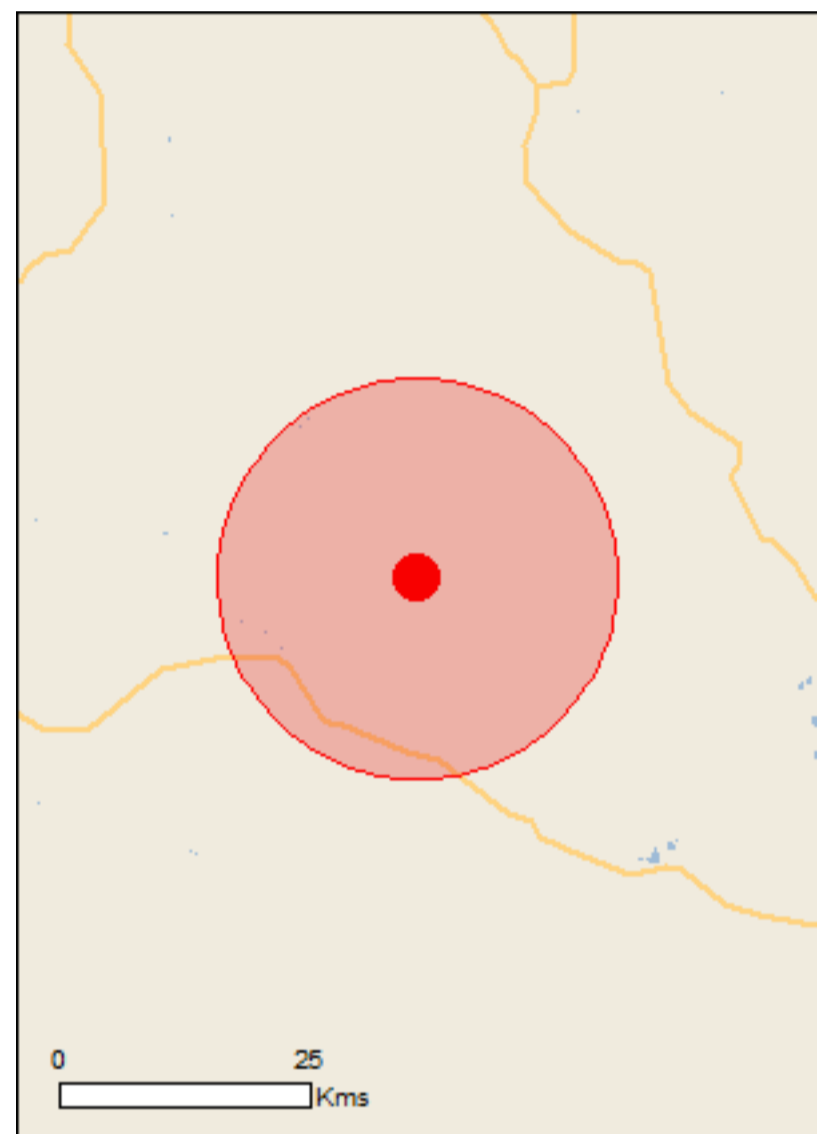
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

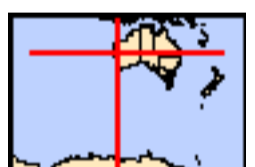
[Acknowledgements](#)



This map may contain data which are  
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[Coordinates](#)

Buffer: 20.0Km





# Summary

## Matters of National Environmental Significance

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

|                                                           |      |
|-----------------------------------------------------------|------|
| <a href="#">World Heritage Properties:</a>                | None |
| <a href="#">National Heritage Places:</a>                 | None |
| <a href="#">Wetlands of International Importance:</a>     | None |
| <a href="#">Great Barrier Reef Marine Park:</a>           | None |
| <a href="#">Commonwealth Marine Area:</a>                 | None |
| <a href="#">Listed Threatened Ecological Communities:</a> | None |
| <a href="#">Listed Threatened Species:</a>                | 5    |
| <a href="#">Listed Migratory Species:</a>                 | 6    |

## Other Matters Protected by the EPBC Act

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

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

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

|                                                    |      |
|----------------------------------------------------|------|
| <a href="#">Commonwealth Land:</a>                 | None |
| <a href="#">Commonwealth Heritage Places:</a>      | None |
| <a href="#">Listed Marine Species:</a>             | 10   |
| <a href="#">Whales and Other Cetaceans:</a>        | None |
| <a href="#">Critical Habitats:</a>                 | None |
| <a href="#">Commonwealth Reserves Terrestrial:</a> | None |
| <a href="#">Australian Marine Parks:</a>           | None |

## Extra Information

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

|                                                  |      |
|--------------------------------------------------|------|
| <a href="#">State and Territory Reserves:</a>    | None |
| <a href="#">Regional Forest Agreements:</a>      | None |
| <a href="#">Invasive Species:</a>                | 7    |
| <a href="#">Nationally Important Wetlands:</a>   | None |
| <a href="#">Key Ecological Features (Marine)</a> | None |



# Details

## Matters of National Environmental Significance

### Listed Threatened Species [\[ Resource Information \]](#)

| Name | Status | Type of Presence |
|------|--------|------------------|
|------|--------|------------------|

#### Birds

|                                                               |                       |                                                  |
|---------------------------------------------------------------|-----------------------|--------------------------------------------------|
| <a href="#">Calidris ferruginea</a><br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat may occur within area |
|---------------------------------------------------------------|-----------------------|--------------------------------------------------|

|                                                                |            |                                                  |
|----------------------------------------------------------------|------------|--------------------------------------------------|
| <a href="#">Pezoporus occidentalis</a><br>Night Parrot [59350] | Endangered | Species or species habitat may occur within area |
|----------------------------------------------------------------|------------|--------------------------------------------------|

|                                                                          |            |                                                  |
|--------------------------------------------------------------------------|------------|--------------------------------------------------|
| <a href="#">Rostratula australis</a><br>Australian Painted Snipe [77037] | Endangered | Species or species habitat may occur within area |
|--------------------------------------------------------------------------|------------|--------------------------------------------------|

#### Other

|                                                                                                        |            |                                                        |
|--------------------------------------------------------------------------------------------------------|------------|--------------------------------------------------------|
| <a href="#">Idiosoma nigrum</a><br>Shield-backed Trapdoor Spider, Black Rugose Trapdoor Spider [66798] | Vulnerable | Species or species habitat likely to occur within area |
|--------------------------------------------------------------------------------------------------------|------------|--------------------------------------------------------|

#### Reptiles

|                                                                                                                |            |                                                       |
|----------------------------------------------------------------------------------------------------------------|------------|-------------------------------------------------------|
| <a href="#">Egernia stokesii badia</a><br>Western Spiny-tailed Skink, Baudin Island Spiny-tailed Skink [64483] | Endangered | Species or species habitat known to occur within area |
|----------------------------------------------------------------------------------------------------------------|------------|-------------------------------------------------------|

### Listed Migratory Species [\[ Resource Information \]](#)

\* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

| Name | Threatened | Type of Presence |
|------|------------|------------------|
|------|------------|------------------|

#### Migratory Terrestrial Species

|                                                         |  |                                                  |
|---------------------------------------------------------|--|--------------------------------------------------|
| <a href="#">Motacilla cinerea</a><br>Grey Wagtail [642] |  | Species or species habitat may occur within area |
|---------------------------------------------------------|--|--------------------------------------------------|

|                                                         |  |                                                  |
|---------------------------------------------------------|--|--------------------------------------------------|
| <a href="#">Motacilla flava</a><br>Yellow Wagtail [644] |  | Species or species habitat may occur within area |
|---------------------------------------------------------|--|--------------------------------------------------|

#### Migratory Wetlands Species

|                                                                |  |                                                  |
|----------------------------------------------------------------|--|--------------------------------------------------|
| <a href="#">Actitis hypoleucos</a><br>Common Sandpiper [59309] |  | Species or species habitat may occur within area |
|----------------------------------------------------------------|--|--------------------------------------------------|

|                                                                    |  |                                                  |
|--------------------------------------------------------------------|--|--------------------------------------------------|
| <a href="#">Calidris acuminata</a><br>Sharp-tailed Sandpiper [874] |  | Species or species habitat may occur within area |
|--------------------------------------------------------------------|--|--------------------------------------------------|

|                                                               |                       |                                                  |
|---------------------------------------------------------------|-----------------------|--------------------------------------------------|
| <a href="#">Calidris ferruginea</a><br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat may occur within area |
|---------------------------------------------------------------|-----------------------|--------------------------------------------------|



| Name                                                           | Threatened | Type of Presence                                 |
|----------------------------------------------------------------|------------|--------------------------------------------------|
| <a href="#">Calidris melanotos</a><br>Pectoral Sandpiper [858] |            | Species or species habitat may occur within area |

## Other Matters Protected by the EPBC Act

### Listed Marine Species [\[ Resource Information \]](#)

\* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

| Name         | Threatened | Type of Presence |
|--------------|------------|------------------|
| <b>Birds</b> |            |                  |

|                                                                |  |                                                  |
|----------------------------------------------------------------|--|--------------------------------------------------|
| <a href="#">Actitis hypoleucos</a><br>Common Sandpiper [59309] |  | Species or species habitat may occur within area |
|----------------------------------------------------------------|--|--------------------------------------------------|

|                                                                |  |                                                        |
|----------------------------------------------------------------|--|--------------------------------------------------------|
| <a href="#">Ardea alba</a><br>Great Egret, White Egret [59541] |  | Species or species habitat likely to occur within area |
|----------------------------------------------------------------|--|--------------------------------------------------------|

|                                                                    |  |                                                  |
|--------------------------------------------------------------------|--|--------------------------------------------------|
| <a href="#">Calidris acuminata</a><br>Sharp-tailed Sandpiper [874] |  | Species or species habitat may occur within area |
|--------------------------------------------------------------------|--|--------------------------------------------------|

|                                                               |                       |                                                  |
|---------------------------------------------------------------|-----------------------|--------------------------------------------------|
| <a href="#">Calidris ferruginea</a><br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat may occur within area |
|---------------------------------------------------------------|-----------------------|--------------------------------------------------|

|                                                                |  |                                                  |
|----------------------------------------------------------------|--|--------------------------------------------------|
| <a href="#">Calidris melanotos</a><br>Pectoral Sandpiper [858] |  | Species or species habitat may occur within area |
|----------------------------------------------------------------|--|--------------------------------------------------|

|                                                                   |  |                                                        |
|-------------------------------------------------------------------|--|--------------------------------------------------------|
| <a href="#">Chrysococcyx osculans</a><br>Black-eared Cuckoo [705] |  | Species or species habitat likely to occur within area |
|-------------------------------------------------------------------|--|--------------------------------------------------------|

|                                                           |  |                                                  |
|-----------------------------------------------------------|--|--------------------------------------------------|
| <a href="#">Merops ornatus</a><br>Rainbow Bee-eater [670] |  | Species or species habitat may occur within area |
|-----------------------------------------------------------|--|--------------------------------------------------|

|                                                         |  |                                                  |
|---------------------------------------------------------|--|--------------------------------------------------|
| <a href="#">Motacilla cinerea</a><br>Grey Wagtail [642] |  | Species or species habitat may occur within area |
|---------------------------------------------------------|--|--------------------------------------------------|

|                                                         |  |                                                  |
|---------------------------------------------------------|--|--------------------------------------------------|
| <a href="#">Motacilla flava</a><br>Yellow Wagtail [644] |  | Species or species habitat may occur within area |
|---------------------------------------------------------|--|--------------------------------------------------|

|                                                                             |             |                                                  |
|-----------------------------------------------------------------------------|-------------|--------------------------------------------------|
| <a href="#">Rostratula benghalensis (sensu lato)</a><br>Painted Snipe [889] | Endangered* | Species or species habitat may occur within area |
|-----------------------------------------------------------------------------|-------------|--------------------------------------------------|



## Extra Information

### Invasive Species

[ [Resource Information](#) ]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

| Name                                                          | Status | Type of Presence                                       |
|---------------------------------------------------------------|--------|--------------------------------------------------------|
| <b>Mammals</b>                                                |        |                                                        |
| Canis lupus familiaris<br>Domestic Dog [82654]                |        | Species or species habitat likely to occur within area |
| Capra hircus<br>Goat [2]                                      |        | Species or species habitat likely to occur within area |
| Equus asinus<br>Donkey, Ass [4]                               |        | Species or species habitat likely to occur within area |
| Felis catus<br>Cat, House Cat, Domestic Cat [19]              |        | Species or species habitat likely to occur within area |
| Oryctolagus cuniculus<br>Rabbit, European Rabbit [128]        |        | Species or species habitat likely to occur within area |
| Vulpes vulpes<br>Red Fox, Fox [18]                            |        | Species or species habitat likely to occur within area |
| <b>Plants</b>                                                 |        |                                                        |
| Cenchrus ciliaris<br>Buffel-grass, Black Buffel-grass [20213] |        | Species or species habitat likely to occur within area |



# Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

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

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

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

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

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

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

# Coordinates

-26.77592 117.19408



# Acknowledgements

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

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

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

Please feel free to provide feedback via the [Contact Us](#) page.

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## Appendix A2 Flora Desktop Results

| Species                                                                                   | WA Cons. Code | Habitat <sup>1</sup>                                                                                                                                                                                                                                                                     | Likelihood | Justification                                                                          | Count Date |
|-------------------------------------------------------------------------------------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------------------------------------------------------------------------------------|------------|
| <i>Acacia atopa</i>                                                                       | P3            | Red clay & red loam. Sometimes in rocky situations. Distributed in the Canarvon, Gascoyne and Murchison IBRA Regions                                                                                                                                                                     | Unlikely   | Located 38 km from SW arm of survey corridor, habitat may be present in survey area    | 1/10/2011  |
| <i>Acacia dilloniorum</i>                                                                 | P1            | found on red clay loam over exposed dolerite outcropping in Weld Range                                                                                                                                                                                                                   | Unlikely   | Located on adjacent BIF range, located outside project area                            | 25/08/2011 |
| <i>Acacia</i> sp. Jack Hills (R. Meissner & Y. Caruso 4)                                  | P1            | Tall shrub to 2 m high, found on rocky banded iron formation on Jack Hills within the Shire of Meekatharra                                                                                                                                                                               | Unlikely   | Located 47 km from N arm of survey corridor, on BIF outcropping                        | 21/11/2013 |
| <i>Acacia</i> sp. Muggon Station (S. Patrick & D. Edinger SP 3235)                        | P2            | Erect, single-stemmed tuberous, perennial, herb (with succulent green leaves), to 0.1 m high. Fl. white, Sep. Sand patches inside rocks, brown sandy clay, granite. Depressions in rock outcrops, breakaways, flats.                                                                     | Unlikely   | Located 37 km from survey area, habitat may be present                                 | /10/1985   |
| <i>Acacia speckii</i>                                                                     | P4            | Decumbent or ascending annual, herb, 0.06-0.1(-0.21) m high. Fl. yellow, Sep to Dec. Sandy or clayey soils. Salt swamps & pans. More records towards coast i.e. Shark Bay                                                                                                                | Unlikely   | Habitat may be present, but located a substantial distance from Survey Area            | 15/07/2010 |
| <i>Anacampseros</i> sp. Eremaean (F. Hort, J. Hort & J. Shanks 3248)                      | P1            | Low rounded shrub, to 1 m high. Fl. pink, Aug. Brown loam. Breakaway. 400+ km west of Wiluna.                                                                                                                                                                                            | Unlikely   | Recorded long distance from survey area, only one record                               | 19/08/2008 |
| <i>Angianthus microcephalus</i>                                                           | P2            | Decumbent or ascending annual, herb, 0.06-0.1(-0.21) m high. Fl. yellow, Sep to Dec. Sandy or clayey soils. Salt swamps & pans.                                                                                                                                                          | May        | Recorded in survey area, very old record                                               | 28/10/1953 |
| <i>Baekkea</i> sp. Mount Barloweerie (J.Z. Weber 5079)                                    | P1            | Shrub, 0.4-0.75 m high. Fl. pink/white, Aug or Oct. Sandy clay.                                                                                                                                                                                                                          | May        | Located 7.5 km from survey area, habitat present                                       | 30/08/2008 |
| <i>Beyeria lapidicola</i>                                                                 | P1            | Shrub to 1 m high, found on ironstone outcrops/breakaways on the midslopes of ranges. Found in three disjointed areas across the midwest of Western Australia (including Weld Range)                                                                                                     | Unlikely   | Located on Weld Range, far from survey area.                                           | 10/03/2009 |
| <i>Calandrinia butcherensis</i>                                                           | P1            | Red sands on flats                                                                                                                                                                                                                                                                       | Likely     | Located directly adjacent to survey area, habitat present                              | 18/10/2016 |
| <i>Calandrinia</i> sp. Boolardy Station (P. Jayasekara 719-JHR-01)                        | P1            | Flat. Low plain. Red/orange sand/clay.                                                                                                                                                                                                                                                   | Likely     | Recorded close to survey area between the two southern arms.                           | 18/10/2006 |
| <i>Calotis</i> sp. Perrinvale Station (R.J. Cranfield 7096)                               | P3            | Red Loam and red-orange sand clay-loam over banded ironstone formation                                                                                                                                                                                                                   | Unlikely   | Long distance >30km from survey area, habitat may be present                           | 9/09/2016  |
| <i>Calytrix verruculosa</i>                                                               | P3            | Sandy clay.                                                                                                                                                                                                                                                                              | May        | Unlikely, habitat 30 km from survey area                                               | 15/09/2009 |
| <i>Chamelaucium</i> sp. Yalgoo (Y. Chadwick 1816)                                         | P1            | Granite outcrops                                                                                                                                                                                                                                                                         | Unlikely   | Far from survey area >60 km                                                            | 12/09/2009 |
| <i>Chthonocephalus muellerianus</i>                                                       | P2            | Red sand.                                                                                                                                                                                                                                                                                | Unlikely   | Unlikely, habitat 30 km from survey area                                               | 11/09/2016 |
| <i>Dicrasyllis linearifolia</i>                                                           | P3            | Red sand. Sandplain.                                                                                                                                                                                                                                                                     | Unlikely   | Old record, >30 km from survey area                                                    | 4/11/1997  |
| <i>Dicrasyllis</i> sp. Cue (A.A. Mitchell 764)                                            | P1            | Drainage area, near granite. Located in the Cue Local Government Area                                                                                                                                                                                                                    | Unlikely   | Old record, >30 km from survey area                                                    | 17/10/1980 |
| <i>Dodonaea amplisemina</i>                                                               | P4            | Red-brown sandy clay on basalt and gabbro and banded ironstone or on dolerite and quartzite. Rocky hills.                                                                                                                                                                                | Unlikely   | Located on Weld Range, far from survey area.                                           | 16/08/2009 |
| <i>Drosera eremaea</i>                                                                    | P1            | Prostrate annual, herb, flowers minute. Fl. brown/brown & yellow, Aug to Sep. Red loam or clay. Near water.                                                                                                                                                                              | Unlikely   | Located on Weld Range, far from survey area, old record                                | 21/07/1981 |
| <i>Eleocharis papillosa</i>                                                               | P3            | Red clay over granite, open clay flats. Claypans.                                                                                                                                                                                                                                        | Unlikely   | Long distance from survey area, relatively old record                                  | 19/08/1999 |
| <i>Eremophila margarethae</i> subsp. straight sepals (G. Cockerton & B. McLean LCH 31310) | P1            | On top of banded ironstone hill found in one location on a banded ironstone hill, at Jack Hills, Meekatharra                                                                                                                                                                             | Unlikely   | Long distance >40 km from survey area                                                  | 25/08/2011 |
| <i>Eremophila muelleriana</i>                                                             | P3            | Red sand, sandy clay, lateritic sand. Flats, sand dunes, hills.                                                                                                                                                                                                                          | Likely     | Recorded within the Project area directly adjacent to the survey area, habitat present | 7/10/2016  |
| <i>Eremophila obliquisejala</i>                                                           | P3            | Sand. Open hardpan plains in Meekatharra and Upper Gascoyne                                                                                                                                                                                                                              | Unlikely   | Located >40 km from survey area                                                        | 10/05/1995 |
| <i>Eremophila rhegos</i>                                                                  | P1            | Skeletal stony loam over granite. Meekatharra and Upper Gascoyne                                                                                                                                                                                                                         | Unlikely   | Only recorded at Mt Weld                                                               | 2/08/1995  |
| <i>Eremophila shonae</i> subsp. <i>diffusa</i>                                            | P3            | Stony yellow or red sandy soils. Found in the Gascoyne and Murchison IBRA regions                                                                                                                                                                                                        | Unlikely   | Only recorded at Mt Weld                                                               | 11/06/2009 |
| <i>Eremophila simulans</i> subsp. <i>megacalyx</i>                                        | P3            | Found on rangeland plains road verge with red, sandy gravel laterite.                                                                                                                                                                                                                    | Likely     | Recorded within survey area                                                            | 16/08/2009 |
| <i>Eremophila</i> sp. Ironstone (G. Cockerton & B. McLean LCH 31311)                      | P1            | Open, densely-leaved shrub, 0.3-0.6 m high. Laterite. Hills, salty places.                                                                                                                                                                                                               | Unlikely   | One record, over 50 km from survey area on BIF outcropping                             | 25/08/2011 |
| <i>Eremophila</i> sp. Murgoo (S.J.J. Davies s.n. 15/8/1960)                               | P3            | Shrub, 0.5-2.3 m high, sometimes widely spreading with several stems or branches from the base. Red-orange sandy clay, orange-yellow sandy clay to clayey loam, coarse gravel, banded ironstone, laterite, quartz, basalt. Gently undulating plains, dry creek beds, hillcrests, ridges. | Unlikely   | Old record, far from survey area                                                       | 15/08/1960 |
| <i>Frankenia confusa</i>                                                                  | P4            | Annual, herb.                                                                                                                                                                                                                                                                            | May        | Recorded during 2014 surveys however suitable habitat unlikely to be present.          | 19/09/1997 |



## Appendix A2 Flora Desktop Results

| Species                                                              | WA Cons. Code | Habitat <sup>1</sup>                                                                                                                                                                                             | Likelihood | Justification                                                            | Count Date |
|----------------------------------------------------------------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------------------------------------------------------------------|------------|
| <i>Goodenia berringbinensis</i>                                      | P4            | Red sandy loam. Along watercourses.                                                                                                                                                                              | Unlikely   | Recorded >30 km from survey area                                         | 12/06/2009 |
| <i>Goodenia grandiflora</i>                                          | P1            | Sandy, gravelly soils. Rocky slopes & breakaways.                                                                                                                                                                | Unlikely   | Only recorded at Mt Weld                                                 | 23/08/2006 |
| <i>Goodenia neogoodenia</i>                                          | P4            | Red loam or clay. Near water.                                                                                                                                                                                    | May        | recorded near (<7.5 km) from survey area, habitat may be present         | 19/08/1999 |
| <i>Grevillea inconspicua</i>                                         | P4            | Erect shrub, 0.2-0.5 m high. Fl. white-cream, Sep. Red sandy soils.                                                                                                                                              | Unlikely   | Only recorded at Mt Weld                                                 | 24/06/2011 |
| <i>Gunniopsis divisa</i>                                             | P3            | Loam, quartz. Roadsides. IN the Murchison, Yalgoo IBRA regions                                                                                                                                                   | Likely     | Recorded during 2014 surveys.                                            | 10/09/2016 |
| <i>Hemigenia exilis</i>                                              | P4            | Prostrate herb. Fl. white, Sep to Oct. Sandy soils. Colluvial plains.                                                                                                                                            | Unlikely   | Recorded >40 km from survey area                                         | 24/08/2011 |
| <i>Hemigenia tysonii</i>                                             | P3            | Red Sands, plains and gently undulating dunes.                                                                                                                                                                   | Likely     | Recorded during 2014 surveys, suitable habitat may be present.           | 8/09/2016  |
| <i>Hemigenia virescens</i>                                           | P3            | Brown very rocky sand, on Beebyn and Madonga stations. In the Shire of Meekatharra                                                                                                                               | Unlikely   | Recorded adjacent to Weld Range, long way from survey area               | 7/03/2011  |
| <i>Hibiscus krichauffianus</i>                                       | P3            | Red sandy soils in disjointed populations recorded across the arid areas of Gascoyne, Wheatbelt and Nullabor Plain                                                                                               | Unlikely   | Old record, far from survey area                                         | /03/1981   |
| <i>Hibiscus sp. Nookawarra Station</i> (S.J.J. Davies s.n. 1/3/1960) | P1            | Found on breakaways in three locations within the Murchison Local Government Area                                                                                                                                | Unlikely   | Recorded far from survey area, old record                                | 26/03/1971 |
| <i>Homalocalyx echinulatus</i>                                       | P3            | Shrub, to 1 m high, differs from other varieties in the linear acuminate leaves 6-20 mm long; cilia to 1.2 mm long. Fl. other, Sep to Oct. White sand, gravel. Open woodland. More common north east of Perth.   | Unlikely   | Recorded at Weld Range, far from survey area                             | 13/09/2009 |
| <i>Indigofera eriophylla</i>                                         | P1            | Sand on rises in the Canarvon and Murchison Local Governement Areas                                                                                                                                              | Unlikely   | Recorded 25 km from survey area SW arm, habitat likely to be present     | 5/10/2016  |
| <i>Indigofera fractiflexa</i> subsp. <i>augustensis</i>              | P2            | crest of banded ironstone with shallow red brown sandy loam soils.                                                                                                                                               | Unlikely   | Recorded >50 km from survey area on BIF                                  | 24/08/2005 |
| <i>Lepidium scandens</i>                                             | P3            | Red sand, clay.                                                                                                                                                                                                  | Unlikely   | Old records, far from survey area                                        | 23/08/1931 |
| <i>Maireana murrayana</i>                                            | P3            | Red clayey sand, dissected sandstone in the Murchison, Meekatharra and Upper Gascoyne Local Government Areas                                                                                                     | Unlikely   | Old records, within 10 km of survey area                                 | /11/1908   |
| <i>Maireana prosthocochaeta</i>                                      | P3            | Laterite. Hills, salty places in the Central Kimberley, Gascoyne and Murchison IBRA regions                                                                                                                      | May        | Recorded within survey area, record date not available                   | -          |
| <i>Micromyrtus placoides</i>                                         | P3            | Red-orange sandy clay, orange-yellow sandy clay to clayey loam, coarse gravel, banded ironstone, laterite, quartz, basalt. Gently undulating. In the Cue, Greater Geraldton and Murchison Local Government Areas | May        | Recorded 11 km from survey area, habitat present in survey area          | 27/08/2008 |
| <i>Neotysonia phyllostegia</i>                                       | P1            | Found in 1908 and 1910 on Mount Narryer                                                                                                                                                                          | Unlikely   | very old record                                                          | /09/1910   |
| <i>Petrophile pauciflora</i>                                         | P3            | Decaying & dissected granite breakaways. In the inland semi-arid Midwest region of Western Australia                                                                                                             | May        | Recorded within 10 km of survey area, habitat present, old records       | 9/10/2016  |
| <i>Petrophile vana</i>                                               | P1            | Shallow, white, gritty clay-soil pockets, laterite. Breakaways.                                                                                                                                                  | Unlikely   | Recorded far from survey area, old records                               | 17/09/1987 |
| <i>Philothea citrina</i>                                             | P1            | Granite breakaways in the Murchison LGA                                                                                                                                                                          | Unlikely   | Recorded within 10 km of survey area, habitat present, old records       | /10/1985   |
| <i>Phyllanthus baeckeoides</i>                                       | P3            | Red lateritic & sandy clay soils. Granite outcrops. In the Eastern Murchison, Shieldand Western Murchison IBRA subregions                                                                                        | Unlikely   | Recorded at Weld Range, far from survey area                             | 28/08/2005 |
| <i>Prostanthera ferricola</i>                                        | P3            | Shallow red-brown skeletal sandy loam on banded ironstone, laterite, basalt or quartz. Gently inclined mid to upper slopes of hills, rocky crests, outcrops.                                                     | Unlikely   | Recorded on Mt Weld and northern BIF hil, both far from survey area      | 29/08/2007 |
| <i>Prostanthera petrophila</i>                                       | P3            | Lateritic soil                                                                                                                                                                                                   | Unlikely   | Recorded on BIF hills far from survey area,                              | 10/09/2006 |
| <i>Prostanthera tysoniana</i>                                        | P3            | Red sandy soils in the Murchison LGA                                                                                                                                                                             | May        | Habitat present, recorded ~8 km from survey area                         | 8/09/2016  |
| <i>Psammomoya ephedroides</i>                                        | P3            | Deep yellow or red sandy loams.                                                                                                                                                                                  | Unlikely   | recorded far from survey area                                            | 4/10/2016  |
| <i>Ptilotus beardii</i>                                              | P3            | Clayey soils. Saline flats, low breakaways.                                                                                                                                                                      | Likely     | Recorded during 2014 surveys, suitable habitat present.                  | 14/10/2016 |
| <i>Ptilotus crosslandii</i>                                          | P3            | Sandy soils. Colluvial plains in the Murchison and Upper Gascoyne LGAs                                                                                                                                           | Unlikely   | Recorded in survey area, extremely old record                            | 26/02/1905 |
| <i>Ptilotus lazardis</i>                                             | P3            | Clay loam. Floodplains.                                                                                                                                                                                          | Unlikely   | Recorded >70 km from survey area                                         | /08/1985   |
| <i>Sauropus sp. Woolgorong</i> (M. Officer s.n. 10/8/94)             | P3            | Red sand. Plains.                                                                                                                                                                                                | Likely     | Recorded during 2014 surveys, suitable habitat present.                  | 13/10/2016 |
| <i>Seringia exastia</i>                                              | T             | Found on the Pindan Sandplain, deep red sands                                                                                                                                                                    | Unlikely   | Old record, ~100 km from survey area                                     | /09/1981   |
| <i>Solanum pycnotrichum</i>                                          | P2            | Banded Iron outcrops and shallow dry creeklines forming shallow gully on rocky siltstone hills. Red silty clay soil.                                                                                             | Unlikely   | habitat present within survey area, recorded within 14 km of survey area | 27/08/2008 |
| <i>Stackhousia clementii</i>                                         | P3            | Skeletal soils. Sandstone hills. Sparsely distributed across Northern Western Australia north or Geraldton                                                                                                       | Unlikely   | Old record, >50 km from survey area                                      | 19/06/1985 |
| <i>Stenanthemum patens</i>                                           | P1            | Rocky hillsides in the Murchison IBRA region                                                                                                                                                                     | Unlikely   | Recorded at Weld Range, far from survey area                             | 24/08/2011 |
| <i>Verticordia jamiesonii</i>                                        | P3            | Sandy clay soils. Lateritic breakaways.                                                                                                                                                                          | Likely     | Recorded during 2014 surveys, suitable habitat present.                  | 15/08/2009 |
| <i>Wurmbea murchisoniana</i>                                         | P4            | Clay, sandy clay, loam. Seasonally inundated clay hollows, rock pools.                                                                                                                                           | Unlikely   | Recorded 83 km from survey area                                          | 25/08/1988 |

## Appendix A2 Flora Desktop Results

| Species                                                         | WA Cons. Code | Habitat <sup>1</sup>                | Likelihood | Justification                   | Count Date |
|-----------------------------------------------------------------|---------------|-------------------------------------|------------|---------------------------------|------------|
| <i>Wurmbea</i> sp. Muggon (T.D. Macfarlane & R. Davis TDM 3336) | P1            | Stony slope of weathered sandstone. | Unlikely   | Recorded 55 km from survey area | 28/05/2014 |

1. Habitat derived from DAWE (2020) and Florabase (WAH, 1998-) unless otherwise cited



## Appendix A3 Fauna Desktop Results

| Species                                 | Common Name                                 | Conservation Status |                    | DBCA        |               | PMST | Ecology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Likelihood of Occurrence |
|-----------------------------------------|---------------------------------------------|---------------------|--------------------|-------------|---------------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
|                                         |                                             | State               | Federal            | Last Record | Total Records |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                          |
| <i>Actitis hypoleucos</i>               | Common Sandpiper                            | MI                  | Marine / Migratory | 1980        | 2             | +    | The Common Sandpiper is widespread throughout Australia, with few important sites on the continent. They visit Australia during the non-breeding season. Preferred habitat is coastal wetlands with muddy margins or rocky shores but has also been recorded in inland wetlands and dams (DotE, 2015).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Unlikely                 |
| <i>Apus pacificus</i>                   | Fork-tailed Swift                           | MI                  | Marine / Migratory | -           | -             | +    | The Fork-tailed Swift is almost exclusively aerial, and a non-breeding visitor to Australia (DotE, 2015). They are rarely seen roosting on land.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Unlikely                 |
| <i>Calidris acuminata</i>               | Sharp-tailed Sandpiper                      | MI                  | Marine / Migratory | 1978        | 3             | +    | The Sharp-tailed Sandpiper is a small to medium sized wader with a length of 17 to 22 cm and weighing 65g. They are widespread in Western Australia from the Pilbara region to the south-west. They prefer muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation (DotEE, 2020).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Unlikely                 |
| <i>Calidris ferruginea</i>              | Curlew Sandpiper                            | CR                  | CE                 | 1978        | 2             | +    | The Curlew Sandpiper is a small, slim weighing 57 g. In Australia, Curlew Sandpipers occur around the coasts and are also quite widespread inland, though in smaller numbers. In Western Australia, they are widespread around coastal and sub coastal plains from Cape Arid to the south-west Kimberley. Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas and less often recorded inland around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | May                      |
| <i>Calidris subminuta</i>               | Long-toed Stint                             | MI                  | Marine / Migratory | 1978        | 3             | +    | The Long-toed Stint is a very small sandpiper and member of the Calidridinae family. The species is characterised by its distinctive shape; a small head, long slim neck, rounded belly, short rear-end, long legs (often held flexed), short straight bill tapering to finely pointed tip, folded primaries that fall level with the tail and show little or no primary projection beyond the tertials (Higgins & Davies, 1996). In Western Australia this species is found mainly along the coast, with a few scattered inland records. It is distributed along most of the Australian coastline with large densities on the Victorian and Tasmanian coasts. The Red-necked Stint has been recorded in all coastal regions, and found inland in all states when conditions are suitable.                                                                                                                                                                                                                                       | May                      |
| <i>Egernia stokesii badia</i>           | Western Spiny-tailed Skink                  | VU                  | E                  | 2013        | 45            | +    | The Western Spiny-tailed Skink belongs to a group of moderately large, rock-dwelling reptiles (Chapple, 2003). Two colour forms exist; the brown form and black form, the latter is delineated from the former by its black colouration, lack of patterning in adults and differing head and scale morphology (DotE, 2015). The black form occupies rock crevices in large, isolated rocky outcrops, typically granite (Duffield & Bull, 2002). Crevices occupied by the black form of Western Spiny-tailed Skink are usually identifiable by a "latrine" or scat pile, resulting from regular defecation of all family members, in close proximity to the entrance (Chapple, 2003).                                                                                                                                                                                                                                                                                                                                             | Likely                   |
| <i>Falco peregrinus</i>                 | Peregrine Falcon                            | OS                  | -                  | 2011        | 7             | -    | The Peregrine Falcon is a medium-sized raptor (length 35-55cm; wingspan 80-105cm) with slate-grey back, a striking charcoal black head and face which contrast with a pale cream bib on the neck and breast (Birdlife Australia, 2020). A well-known falcon, the Peregrine inhabits a vast array of environs in Australia. Usually uncommon and migratory (Pizzey & Knight, 2007). This species lays its eggs in recesses of cliff faces, tree hollows or large abandoned nests (Bamford, 2009)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Likely                   |
| <i>Gelochelidon nilotica</i>            | Gull-billed Tern                            | MI                  | MI                 | 2006        | 12            | +    | The Gull-billed Tern is entirely white, except for a black crown from bill to nape, a grey back and upper wings and darker flight feathers. The iris is dark brown, bill and legs black. The sexes are similar. In non-breeding plumage, the head is mainly white, the crown streaked brownish-grey and the ear coverts are dull black. Gull-billed Terns are found in freshwater swamps, brackish and salt lakes, beaches and estuarine mudflats, floodwaters, sewage farms, irrigated croplands and grasslands. They are only rarely found over the ocean.                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | May                      |
| <i>Idiosoma clypeatum</i>               | Northern Shield-backed Trapdoor Spider      | P3                  | -                  | 2014        | 847           | -    | <i>Idiosoma clypeatum</i> is one of seven highly autapomorphic species in the polyphyletic 'sigillate complex'. <i>Idiosoma clypeatum</i> (formerly known by WAM identification code 'MYG018') has a widespread distribution in Western Australia's inland arid zone, principally throughout the Yalgoo and Murchison bioregions where it is the only known species in the nigrum-group (excluding a population of <i>I. formosum</i> from the southern Yalgoo. It extends from near Paynes Find, the Blue Hill Range, Kadji Kadji Nature Reserve, and Karara in the south, north and north-east to at least Coolcalalaya Homestead, Jack Hills, Albion Downs, Yakabindie, and Yeelirrie. This distribution seems to be strongly correlated with annual rainfall of less than 250 mm. At the southern extent of its range it abuts the northern limit of the closely related species <i>I. kopejtkorum</i> , and on the Geraldton Sandplains is replaced by <i>I. arenaceum</i> and <i>I. kwongan</i> (Rix <i>et al.</i> , 2018) | Likely                   |
| <i>Leipoa ocellata</i>                  | Malleefowl                                  | VU                  | VU                 | -           | 1             | +    | The Malleefowl is a large, ground-dwelling bird with strong feet and a short bill. It is found principally in the semi-arid to arid zone in shrublands and low woodlands dominated by mallee and associated habitats such as such as Broombush ( <i>Melaleuca uncinata</i> ) and Scrub Pine ( <i>Callitris verrucosa</i> ). In WA Malleefowl distribution was associated with landscapes that had lower rainfall, greater amounts of mallee and shrubland that occur as large remnants, and lighter soil surface textures (Benshemesh, 2007). At a finer scale, malleefowl occurrence was associated with mallee/shrubland and thicket vegetation with woodland representing poor habitat for the species (Parsons, 2008).                                                                                                                                                                                                                                                                                                       | Unlikely                 |
| <i>Ninox connivens subsp. connivens</i> | Barking Owl (southwest pop P2), Barking Owl | P2                  | -                  | -           | -             | -    | The Barking Owl is a medium-sized hawk-owl. Hawk-owls lack the definite heart-shaped face of the tyto-owls (Birdlife Australia, 2020). Adult Barking Owls are grey-brown above, with white spots on the wings, and whitish below, heavily streaked with grey-brown. The head is almost entirely grey-brown, and the eyes are large and yellow. Barking Owls are nocturnal birds, although they may sometimes be seen hunting during the day (Birdlife Australia, 2020). Barking Owls are found in open woodlands and the edges of forests, often adjacent to farmland. They are less likely to use the interior of forested habitat. They are usually found in habitats that are dominated by eucalyptus species, and prefer woodlands and forests with a high density of large trees and particularly sites with hollows. <i>Ninox connivens connivens</i> occurs in eastern, south-eastern and south-western Australia (Birdlife Australia, 2020).                                                                             | Unlikely                 |

| Species                                      | Common Name                 | Conservation Status |                    | DBCA        |               | PMST | Ecology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Likelihood of Occurrence |
|----------------------------------------------|-----------------------------|---------------------|--------------------|-------------|---------------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
|                                              |                             | State               | Federal            | Last Record | Total Records |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                          |
| <i>Oxyura australis</i>                      | Blue-billed Duck            | P4                  | -                  | 2009        | 2             | -    | The Blue-billed Duck is a compact diving duck with males having a large scooped bright, light blue bill. The tail is dark with stiff pointed feather tips and is usually held flat on the surface of the water except when in display (Birdlife Australia, 2019). The Blue-billed Duck is endemic to south eastern and south western Australia. It prefers deep water in large permanent wetlands and swamps with aquatic vegetation. This species of duck is fully aquatic and rarely comes onto land (OoEH, 2018)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | May                      |
| <i>Plegadis falcinellus</i>                  | Glossy Ibis                 | MI                  | Marine / Migratory | 2006        | 4             | +    | The Glossy Ibis is the smallest ibis known in Australia. The neck is reddish-brown and the body is a bronze-brown with a metallic iridescent sheen on the wings. The Glossy Ibis has a distinctive long, downwards curved bill that is olive-brown in colour. The facial skin is blue-grey with a white line that extends around the eyes. Within Australia, the Glossy Ibis is generally located east of the Kimberley in Western Australia and Eyre Peninsula in South Australia. The species is also known to be patchily distributed in the rest of Western Australia. The Glossy Ibis' preferred habitat for foraging and breeding are fresh water marshes at the edges of lakes and rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation. Glossy Ibis roost in trees or shrubs usually near, but sometimes far, from water bodies (Brown <i>et al.</i> , 1982; Marchant & Higgins, 1990).                                            | Unlikely                 |
| <i>Rostratula australis</i>                  | Australian Painted Snipe    | EN                  | EN                 | 2015        | 5             | +    | The Australian Painted Snipe is a stocky wading bird around 220–250 mm in length with a long pinkish bill. It has been recorded less frequently at a smaller number of more scattered locations farther west in South Australia, the Northern Territory and Western Australia. The Australian Painted Snipe generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains.                                                                                                                                                                                                                                                                                                                                                                                                                                          | May                      |
| <i>Tringa glareola</i>                       | Wood Sandpiper              | MI                  | Marine / Migratory | 1978        | 2             | +    | The Wood Sandpiper is a small thin wader and member of the Tringinae family. The species has a length of 19–23 cm, a wingspan of 56–57 cm and a weight of 55 g. The species has a short straight bill and long legs. The Wood Sandpiper uses well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes. They are typically associated with emergent, aquatic plants or grass, and dominated by taller fringing vegetation, such as dense stands of rushes or reeds, shrubs, or dead or live trees, especially Melaleuca and River Red Gums <i>Eucalyptus camaldulensis</i> and often with fallen timber. They also frequent inundated grasslands, short herbage or wooded floodplains, where floodwaters are temporary or receding, and irrigated crops. They are also found at some small wetlands only when they are drying. This species uses artificial wetlands, including open sewage ponds, reservoirs, large farm dams, and bore drains (Higgins & Davies, 1996). | May                      |
| <i>Tringa nebularia</i>                      | Common Greenshank           | MI                  | Marine / Migratory | 2004        | 1             | +    | The Common Greenshank is a largely built wader, weighing up to 190 g for both sexes. The species is found in inland wetlands and sheltered coastal habitats (DotE, 2015). The Common Greenshank is generally absent from the Western Deserts although there are a few records from the Great Sandy Desert and the Nullarbor Plain. It occurs around most of the coast from Cape Arid in the south to Carnarvon in the north-west. In the Kimberleys it is recorded in the south-west and the north-east, with isolated records from the Bonaparte Archipelago (Higgins & Davies 1996).                                                                                                                                                                                                                                                                                                                                                                                                                                | May                      |
| <i>Hypseleotris aurea</i>                    | Golden Gudgeon              | P2                  | -                  | -           | -             | -    | Inhabits rocky pools amongst dense clumps of submerged water weeds and dead branches. Presumably the species has a high tolerance to increased salinity levels and water temperatures, which typically occur in the habitat during drought periods. The species is found in the Murchison and Gascoyne Rivers of south-central Western Australia.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Unlikely                 |
| <i>Pezoporus occidentalis</i>                | Night Parrot                | CR                  | E                  | -           | -             | -    | Night parrot roosting and nesting sites are in clumps of dense vegetation, primarily old and large spinifex ( <i>Triodia</i> ) clumps, but sometimes other vegetation types. Often the vegetation in these habitats will be naturally fragmented and therefore well protected from fire. Little is known about foraging sites, but favoured sites are likely to vary across the range of the species.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Unlikely                 |
| <i>Aspidites ramsayi</i> (southwest subpop.) | Woma                        | P1                  | E                  | -           | -             | -    | The Woma is grey-brown or golden-brown on its back with dark brown bands across its body and a yellow or white belly. Unlike other pythons, the Woma has a narrow, pointed head causing it to often be mistaken for a venomous snake. The south west Woma subpopulation is distributed from North to Yuna, south to Boddington, inland to Menzies and east to the western edge of the Nullarbor Plain (Cogger <i>et al.</i> , 1993). The species is nocturnal and primarily inhabits sandplains characterised by woodlands, shrublands, or heath, often with spinifex. but may also inhabit rocky areas as well.                                                                                                                                                                                                                                                                                                                                                                                                      | Unlikely                 |
| <i>Ogyris subterrestris petrina</i>          | Arid Bronze Azure Butterfly | CR                  | CE                 | -           | -             | -    | At the two known extant sites where this butterfly occurs, the vegetation is mature mixed gimlet <i>Eucalyptus salubris</i> / <i>E. salmonophloia</i> woodlands on red-brown loam soils, with an open understorey. In addition to gimlet and salmon gum, other smooth-barked eucalyptus at these sites which have basal ant colonies include <i>E. capillosa wandoo</i> , smooth-barked <i>E. loxophleba lissophloia</i> and <i>E. sheathiana</i> . The species is dependent on a host ant species ( <i>Camponotus</i> sp. nr. <i>terebrans</i> ) to raise its young.                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Unlikely                 |
| <i>Sminthopsis longicaudata</i>              | Long-Tailed Dunnart         | P4                  | -                  | -           | -             | -    | The Long-tailed Dunnart is unique among dunnarts in that its tail is twice the length of the head and body. They are grey with a very pale underbelly, white legs and feet. The head is flattened and it has a long snout and large black eyes. Adults weigh 15-20 g. <i>Sminthopsis longicaudata</i> inhabits exposed rock and stony soils with hummock grasses and shrubs. Flat-topped hills, lateritic plateaus, sandstone ranges and breakaways. Sparse mulga over spinifex. The species has been recorded in distinct populations across arid Australia with populations recorded in the southern Canarvon Basin.                                                                                                                                                                                                                                                                                                                                                                                                | May                      |



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# Appendix B

Flora Species by Family  
by Community Matrix



## Appendix B - Flora Species by Family by Community Matrix

| Family          | Taxon                                                  | Vegetation Community |        |        |      |        |        |        |        |      |      |         |
|-----------------|--------------------------------------------------------|----------------------|--------|--------|------|--------|--------|--------|--------|------|------|---------|
|                 |                                                        | AaEcPo               | AcAsTd | AfEfPo | AfSa | AiAbSa | AiAtEf | AiTdPb | ApAgEf | ArCc | AvEp | Granite |
| Aizoaceae       | <i>Trianthema pilosa</i>                               |                      |        |        | x    |        |        |        |        | x    |      |         |
| Amaranthaceae   | <i>Ptilotus aervoides</i>                              | x                    |        | x      |      |        |        |        |        |      | x    |         |
|                 | <i>Ptilotus drummondii</i>                             | x                    | x      | x      |      |        | x      | x      |        |      |      |         |
|                 | <i>Ptilotus obovatus</i>                               | x                    |        | x      | x    |        | x      | x      | x      | x    | x    | x       |
|                 | <i>Ptilotus schwartzii</i>                             | x                    |        | x      |      |        |        |        |        |      |      |         |
|                 | <i>Ptilotus stirlingii</i>                             |                      |        |        |      |        |        |        | x      |      | x    |         |
| Apocynaceae     | <i>Marsdenia australis</i>                             |                      |        |        | x    |        |        |        |        | x    |      |         |
| Asteraceae      | <i>Calocephalus knappii</i>                            |                      | x      |        |      |        |        |        |        |      |      |         |
|                 | <i>Cephalopterum drummondii</i>                        |                      |        | x      |      |        |        |        |        |      |      |         |
|                 | <i>Gnephosis arachnoides</i>                           |                      |        | x      |      |        |        |        |        |      |      |         |
|                 | <i>Gnephosis eriocephala</i>                           |                      |        |        |      |        |        |        |        |      | x    |         |
|                 | <i>Gnephosis tenuissima</i>                            | x                    |        | x      |      |        | x      | x      |        |      |      | x       |
|                 | <i>Helipterum craspedioides</i>                        |                      |        |        |      |        |        |        | x      |      |      |         |
|                 | <i>Myriocephalus rudallii</i>                          |                      |        |        |      |        | x      |        |        |      |      |         |
|                 | <i>Pluchea rubelliflora</i>                            |                      |        |        |      | x      |        |        |        |      |      |         |
|                 | <i>Pogonolepis stricta</i>                             | x                    |        |        |      |        |        |        |        |      | x    |         |
|                 | <i>Rhodanthe chlorocephala</i> subsp. <i>splendida</i> |                      |        |        | x    |        |        |        |        |      |      |         |
|                 | <i>Sonchus oleraceus</i> *                             |                      | x      |        |      |        |        |        |        |      |      |         |
| Boraginaceae    | <i>Heliotropium curassavicum</i>                       |                      | x      |        |      |        |        |        |        |      |      |         |
| Boryaceae       | <i>Borya sphaerocephala</i>                            |                      |        |        |      |        |        | x      |        |      |      |         |
| Brassicaceae    | <i>Lepidium oxytrichum</i>                             |                      |        | x      |      |        |        | x      |        |      |      |         |
| Campanulaceae   | <i>Wahlenbergia tumidifruca</i>                        |                      | x      |        |      |        |        |        |        |      |      |         |
| Caryophyllaceae | <i>Spergula pentandra</i> *                            |                      |        |        |      |        |        |        |        |      | x    |         |
| Casuarinaceae   | <i>Allocasuarina campestris</i>                        |                      | x      |        |      |        | x      |        |        |      | x    |         |
| Chenopodiaceae  | <i>?Enchylaena tomentosa</i>                           |                      |        | x      |      |        |        |        |        |      |      |         |
|                 | <i>Atriplex ?amnicola</i>                              |                      |        |        |      |        |        |        |        |      | x    |         |
|                 | <i>Maireana convexa</i>                                |                      |        |        | x    |        |        |        |        |      |      |         |
|                 | <i>Maireana planifolia</i>                             | x                    |        | x      | x    |        | x      | x      | x      |      | x    | x       |
|                 | <i>Rhagodia eremaea</i>                                |                      |        | x      | x    | x      |        |        | x      |      |      | x       |
|                 | <i>Sclerolaena cuneata</i>                             |                      |        |        | x    |        |        | x      |        |      | x    |         |
|                 | <i>Sclerolaena densiflora</i>                          |                      | x      | x      |      |        |        |        |        |      |      |         |
|                 | <i>Sclerolaena gardneri</i>                            |                      |        | x      | x    |        |        |        |        |      |      |         |
|                 | <i>Sclerolaena recurvicupsis</i>                       |                      |        |        |      |        |        |        |        |      | x    |         |
|                 | <i>Tecticornia ?indica</i>                             |                      | x      |        |      |        |        |        |        |      |      |         |
|                 | <i>Tecticornia halocnemoides</i>                       |                      |        |        |      |        |        |        |        |      | x    |         |

## Appendix B - Flora Species by Family by Community Matrix

| Family         | Taxon                                                   | Vegetation Community |        |        |      |        |        |        |        |      |      |         |   |
|----------------|---------------------------------------------------------|----------------------|--------|--------|------|--------|--------|--------|--------|------|------|---------|---|
|                |                                                         | AaEcPo               | AcAsTd | AfEfPo | AfSa | AiAbSa | AiAtEf | AiTdPb | ApAgEf | ArCc | AvEp | Granite |   |
|                | <i>Tecticornia indica</i>                               |                      |        |        |      |        |        |        |        |      |      | X       |   |
| Convolvulaceae | <i>Cuscuta planiflora</i> *                             |                      |        |        |      |        |        |        |        |      |      |         | X |
| Cyperaceae     | <i>Cyperus gymnocaulos</i>                              |                      |        |        |      |        | X      |        |        |      |      |         |   |
| Euphorbiaceae  | <i>Euphorbia ?boophthona</i>                            |                      |        |        |      |        |        |        |        | X    |      |         |   |
|                | <i>Euphorbia boophthona</i>                             | X                    |        |        | X    |        |        |        |        | X    | X    |         |   |
|                | <i>Euphorbia drummondii</i>                             |                      | X      |        |      |        |        |        |        |      |      |         |   |
| Fabaceae       | <i>Acacia ?aptaneura</i>                                |                      |        |        |      |        |        |        | X      |      |      |         |   |
|                | <i>Acacia ?caesaneura</i>                               |                      |        | X      |      |        |        |        | X      |      |      |         |   |
|                | <i>Acacia ?distans</i>                                  |                      |        | X      |      |        |        |        |        |      |      |         |   |
|                | <i>Acacia ?aneura</i>                                   | X                    |        | X      |      |        |        | X      |        |      |      |         | X |
|                | <i>Acacia ?cuthbertsonii</i>                            |                      |        | X      |      |        |        |        |        |      |      |         |   |
|                | <i>Acacia aneura</i>                                    | X                    |        | X      |      |        |        |        |        | X    |      | X       |   |
|                | <i>Acacia aptaneura</i>                                 | X                    |        | X      |      |        |        | X      |        |      | X    |         |   |
|                | <i>Acacia aulacophylla</i>                              | X                    |        |        |      |        |        | X      | X      |      | X    |         |   |
|                | <i>Acacia burkittii</i>                                 |                      | X      |        |      |        |        | X      |        |      |      |         |   |
|                | <i>Acacia caesaneura</i>                                | X                    |        | X      | X    |        |        | X      | X      |      | X    |         |   |
|                | <i>Acacia caesaneura (narrow phyllode variant)</i>      |                      |        |        |      |        |        | X      |        | X    |      |         |   |
|                | <i>acacia celastrocarpa</i>                             |                      |        |        |      |        |        | X      |        |      |      |         |   |
|                | <i>Acacia collegialis</i>                               |                      |        | X      |      |        |        |        |        |      | X    |         |   |
|                | <i>Acacia craspedocarpa</i>                             |                      |        |        |      |        |        | X      |        |      |      |         |   |
|                | <i>Acacia cuthbertsonii</i>                             | X                    |        | X      |      |        |        |        |        |      |      |         |   |
|                | <i>Acacia cuthbertsonii</i> subsp. <i>cuthbertsonii</i> |                      |        | X      |      |        |        | X      |        |      |      |         | X |
|                | <i>Acacia fuscaneura</i>                                | X                    |        | X      | X    |        |        | X      | X      |      |      | X       |   |
|                | <i>Acacia grasbyi</i>                                   | X                    |        | X      | X    |        |        | X      |        | X    |      | X       | X |
|                | <i>Acacia incurvaneura</i>                              | X                    |        | X      |      |        |        | X      | X      |      | X    |         | X |
|                | <i>Acacia kempeana</i>                                  | X                    |        | X      |      |        |        |        | X      |      | X    |         |   |
|                | <i>Acacia oswaldii</i>                                  |                      |        | X      | X    |        |        | X      |        | X    |      |         |   |
|                | <i>Acacia palustris</i>                                 |                      |        |        | X    |        |        |        |        |      |      |         |   |
|                | <i>Acacia pruinocarpa</i>                               | X                    |        | X      |      |        |        | X      |        |      |      |         |   |
|                | <i>Acacia pteraneura</i>                                |                      |        |        |      |        |        |        |        | X    |      | X       |   |
|                | <i>Acacia quadrimarginea</i>                            |                      |        | X      |      |        |        |        |        |      |      |         |   |
|                | <i>Acacia ramulosa</i> var. <i>linophylla</i>           |                      |        |        |      |        |        |        |        | X    |      |         |   |
|                | <i>Acacia rhodophloia</i>                               |                      |        |        |      |        |        |        |        |      | X    |         |   |
|                | <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i>   |                      | X      |        |      |        | X      |        |        |      |      | X       |   |
|                | <i>Acacia synchronicia</i>                              |                      |        |        | X    |        |        |        |        |      |      |         |   |
|                | <i>Acacia tetragonophylla</i>                           | X                    | X      | X      | X    |        |        | X      | X      | X    |      | X       | X |
|                | <i>Acacia victoriae</i> subsp. <i>victoriae</i>         |                      | X      | X      |      |        |        | X      |        |      |      | X       |   |
|                | <i>Chorizema ?racemosum</i>                             |                      |        | X      |      |        |        | X      |        |      |      |         |   |
|                | <i>Mirbelia rhagodioides</i>                            |                      |        |        |      |        |        | X      | X      |      |      |         |   |
|                | <i>Senna artemisioides</i> subsp. <i>filifolia</i>      | X                    | X      |        |      |        |        | X      |        |      |      | X       | X |
|                | <i>Senna artemisioides</i> subsp. <i>helmsii</i>        | X                    | X      | X      | X    |        |        | X      |        | X    |      | X       |   |



## Appendix B - Flora Species by Family by Community Matrix

| Family                   | Taxon                                                   | Vegetation Community |        |        |      |        |        |        |        |      |      |         |
|--------------------------|---------------------------------------------------------|----------------------|--------|--------|------|--------|--------|--------|--------|------|------|---------|
|                          |                                                         | AaEcPo               | AcAsTd | AfEfPo | AfSa | AiAbSa | AiAtEf | AiTdPb | ApAgEf | ArCc | AvEp | Granite |
| Frankeniaceae            | <i>Senna artemisioides</i> subsp. <i>oligophylla</i>    | x                    | x      | x      | x    |        |        |        |        |      | x    | x       |
|                          | <i>Senna artemisioides</i> subsp. <i>petiolaris</i>     | x                    |        | x      | x    |        |        |        | x      |      |      |         |
|                          | <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)           | x                    | x      | x      | x    |        |        | x      | x      |      | x    | x       |
|                          | <i>Senna stricta</i>                                    |                      |        |        |      |        |        |        |        |      | x    |         |
| Geraniaceae              | <i>Frankenia pauciflora</i> var. <i>pauciflora</i>      |                      |        |        |      |        |        |        |        |      | x    |         |
| Goodeniaceae             | <i>Erodium aureum</i> *                                 |                      |        | x      |      |        |        |        | x      |      | x    |         |
| Hemerocallidaceae        | <i>Goodenia berardiana</i>                              |                      |        |        |      |        |        |        |        |      | x    |         |
|                          | <i>Goodenia mimuloides</i>                              |                      |        |        |      |        |        |        |        |      | x    |         |
|                          | <i>Scaevola spinescens</i>                              | x                    | x      | x      |      | x      | x      |        |        |      | x    |         |
| Lamiaceae                | <i>Dianella revoluta</i>                                |                      |        | x      |      |        |        |        |        |      |      |         |
| Loranthaceae             | <i>Spartothamnella teucriflora</i>                      |                      |        |        |      |        |        | x      |        |      |      |         |
| Malvaceae                | <i>Amyema fitzgeraldii</i>                              |                      |        |        |      |        |        | x      | x      |      |      |         |
|                          | <i>Amyema nestor</i>                                    |                      | x      |        |      |        |        |        |        |      |      |         |
|                          | <i>?Androcalva luteiflora</i>                           |                      |        |        | x    |        |        | x      |        |      |      |         |
| Myoporaceae              | <i>Alogyne pinoniana</i>                                |                      |        |        |      |        |        |        |        |      |      | x       |
|                          | <i>Alyogyne pinoniana</i>                               |                      |        |        |      |        |        |        |        |      | x    |         |
|                          | <i>Corchorus crozophorifolius</i>                       | x                    |        |        |      |        |        |        |        |      | x    |         |
|                          | <i>Sida ?calyxhymenia</i>                               |                      |        |        | x    |        |        |        |        |      |      | x       |
|                          | <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260) |                      |        | x      |      |        |        |        |        |      |      |         |
| Myrtaceae                | <i>Eremophila compacta</i>                              |                      |        |        |      |        |        | x      |        |      |      |         |
|                          | <i>Eremophila compacta</i> subsp. <i>compacta</i>       |                      |        |        |      |        |        | x      |        |      |      |         |
|                          | <i>Eremophila forrestii</i> subsp. <i>forrestii</i>     |                      |        | x      | x    |        |        | x      |        | x    | x    |         |
|                          | <i>Eremophila fraseri</i> subsp. <i>parva</i>           |                      |        | x      | x    |        |        | x      |        | x    |      |         |
|                          | <i>Eremophila latrobei</i>                              |                      |        | x      | x    |        |        | x      |        | x    |      |         |
|                          | <i>Eremophila mackinlayi</i> subsp. <i>spathulata</i>   |                      |        |        | x    |        |        |        |        |      |      |         |
|                          | <i>Eremophila pantonii</i>                              |                      |        |        |      |        |        | x      |        |      |      |         |
|                          | <i>Eremophila phyllopoda</i>                            |                      |        |        |      |        |        | x      |        |      |      |         |
|                          | <i>Eremophila phyllopoda</i> subsp. <i>phyllopoda</i>   |                      |        |        |      |        |        | x      |        |      |      |         |
|                          | <i>Eremophila platycalyx</i>                            |                      |        |        |      |        |        | x      |        |      |      |         |
|                          | <i>Eremophila platycalyx</i> subsp. <i>platycalyx</i>   |                      |        |        |      |        |        |        |        | x    |      |         |
|                          | <i>Eremophila pterocarpa</i> subsp. <i>pterocarpa</i>   |                      |        |        |      |        |        |        |        |      | x    |         |
|                          | <i>Eremophila serrulata</i>                             |                      |        | x      |      |        |        |        |        |      |      |         |
|                          | <i>Eremophila shonae</i> subsp. <i>shonae</i>           |                      |        |        | x    |        |        |        |        |      |      |         |
| <i>Eremophila spuria</i> |                                                         |                      |        |        |      |        |        |        | x      |      |      |         |
| Myrtaceae                | <i>Aluta aspera</i> subsp. <i>hesperia</i>              | x                    |        |        |      |        |        |        |        |      |      |         |
|                          | <i>Calytrix desolata</i>                                |                      |        |        |      |        |        |        |        |      |      | x       |
|                          | <i>Chamelaucium pauciflorum</i>                         |                      |        |        |      |        |        |        | x      |      |      |         |

## Appendix B - Flora Species by Family by Community Matrix

| Family           | Taxon                                                    | Vegetation Community |        |        |      |        |        |        |        |      |      |         |
|------------------|----------------------------------------------------------|----------------------|--------|--------|------|--------|--------|--------|--------|------|------|---------|
|                  |                                                          | AaEcPo               | AcAsTd | AfEfPo | AfSa | AiAbSa | AiAtEf | AiTdPb | ApAgEf | ArCc | AvEp | Granite |
|                  | <i>Cheyniana microphylla</i>                             |                      |        | x      |      |        |        |        |        |      |      | x       |
|                  | <i>Eucalyptus mannensis</i>                              |                      |        |        |      | x      |        |        |        |      |      |         |
|                  | <i>Eucalyptus victrix</i>                                |                      |        |        |      | x      | x      |        |        |      |      |         |
|                  | <i>Melaleuca stereophloia</i>                            |                      | x      |        |      |        |        |        |        |      |      |         |
|                  | <i>Micromyrtus sulphurea</i>                             |                      |        |        |      |        |        | x      |        |      |      |         |
|                  | <i>Thryptomene decussata</i>                             | x                    |        | x      |      |        |        | x      |        | x    |      |         |
| Nyctaginaceae    |                                                          | x                    |        |        |      |        |        |        |        |      |      | x       |
|                  | <i>Boerhavia coccinea</i>                                | x                    |        |        |      |        |        |        |        |      |      | x       |
| Phyllanthaceae   |                                                          | x                    |        |        |      |        |        |        |        |      |      |         |
|                  | <i>Sauropus</i> sp. Woolgorong (M. Officer s.n. 10/8/94) | x                    |        |        |      |        |        |        |        |      |      |         |
| Poaceae          |                                                          |                      |        |        |      |        |        |        |        |      |      |         |
|                  | <i>Aristida contorta</i>                                 |                      |        | x      |      |        |        |        |        |      |      |         |
|                  | <i>Aristida</i> sp.                                      | x                    |        | x      |      |        |        | x      |        |      |      |         |
|                  | <i>Cymbopogon ambiguus</i>                               |                      |        |        |      |        |        | x      |        | x    |      | x       |
|                  | <i>Eragrostis eriopoda</i>                               |                      |        |        |      |        |        | x      | x      |      |      |         |
|                  | <i>Eriachne</i> sp.                                      |                      |        | x      |      |        |        |        |        |      |      |         |
|                  | <i>Tripogon loliformis</i>                               |                      |        |        |      |        |        | x      |        |      |      |         |
| Portulacaceae    |                                                          |                      |        |        |      |        |        |        |        |      |      |         |
|                  | <i>Calandrinia polymorpha</i>                            |                      |        |        |      |        |        |        | x      |      |      |         |
|                  | <i>Portulaca oleracea</i>                                |                      | x      |        |      |        |        |        |        |      | x    |         |
| Primulaceae      |                                                          |                      |        |        |      |        |        |        |        |      |      |         |
|                  | <i>Samolus repens</i> var. <i>floribundus</i>            |                      | x      |        |      |        |        |        |        |      | x    |         |
| Proteaceae       |                                                          |                      |        |        |      |        |        |        |        |      |      |         |
|                  | <i>Grevillea berryana</i>                                | x                    |        |        |      |        |        | x      |        |      | x    |         |
|                  | <i>Grevillea deflexa</i>                                 |                      |        | x      | x    |        |        | x      | x      |      |      |         |
|                  | <i>Grevillea hakeoides</i> subsp. <i>stenophylla</i>     |                      | x      |        |      |        |        |        |        |      | x    |         |
|                  | <i>Grevillea nematophylla</i> subsp. <i>supraplana</i>   |                      |        |        |      |        |        |        |        |      |      |         |
|                  | <i>Hakea lorea</i> subsp. <i>lorea</i>                   |                      |        | x      |      |        |        |        |        |      |      |         |
|                  | <i>Hakea preissii</i>                                    |                      |        | x      |      |        |        |        | x      |      | x    | x       |
|                  | <i>Hakea recurva</i> subsp. <i>arida</i>                 |                      |        | x      | x    |        |        |        |        |      |      |         |
|                  | <i>Petrophile pauciflora</i>                             |                      |        |        |      |        |        |        |        |      |      | x       |
| Rubiaceae        |                                                          |                      |        |        |      |        |        |        |        |      |      |         |
|                  | <i>Psydrax rigidula</i>                                  | x                    |        | x      |      |        |        |        | x      |      |      |         |
| Santalaceae      |                                                          |                      |        |        |      |        |        |        |        |      |      |         |
|                  | <i>Santalum acuminatum</i>                               | x                    |        |        |      |        |        |        |        |      |      |         |
|                  | <i>Santalum lanceolatum</i>                              |                      |        |        |      |        |        |        |        |      | x    |         |
|                  | <i>Santalum spicatum</i>                                 |                      |        |        |      |        |        |        |        |      |      | x       |
| Sapindaceae      |                                                          |                      |        |        |      |        |        |        |        |      |      |         |
|                  | ? <i>Dodonaea viscosa</i>                                |                      |        |        |      |        |        | x      |        |      |      |         |
|                  | <i>Dodonaea pachyneura</i>                               |                      |        | x      |      |        |        |        | x      |      |      |         |
| Scrophulariaceae |                                                          |                      |        |        |      |        |        |        |        |      |      |         |
|                  | <i>Eremophila compacta</i>                               | x                    |        | x      |      |        |        | x      | x      |      | x    |         |
|                  | <i>Eremophila exilifolia</i>                             |                      |        | x      |      |        |        |        |        |      |      | x       |
|                  | <i>Eremophila forrestii</i>                              | x                    |        | x      |      |        |        | x      | x      |      |      |         |
|                  | <i>Eremophila fraseri</i>                                | x                    |        | x      |      |        |        | x      | x      |      |      | x       |
|                  | <i>Eremophila gilesii</i>                                | x                    |        |        |      |        |        |        |        |      |      |         |



## Appendix B - Flora Species by Family by Community Matrix

| Family         | Taxon                                                    | Vegetation Community |        |        |      |        |        |        |        |      |      |         |
|----------------|----------------------------------------------------------|----------------------|--------|--------|------|--------|--------|--------|--------|------|------|---------|
|                |                                                          | AaEcPo               | AcAsTd | AfEfPo | AfSa | AiAbSa | AiAtEf | AiTdPb | ApAgEf | ArCc | AvEp | Granite |
| Solanaceae     | <i>Eremophila glutinosa</i>                              |                      |        | x      |      |        |        |        |        |      |      |         |
|                | <i>Eremophila latrobei</i>                               |                      |        | x      |      |        |        | x      |        |      |      |         |
|                | <i>Eremophila latrobei</i> subsp. <i>latrobei</i>        |                      |        | x      | x    |        |        | x      |        | x    |      | x       |
|                | <i>Eremophila longifolia</i>                             |                      |        | x      |      |        |        | x      |        |      | x    |         |
|                | <i>Eremophila mackinlayi</i> subsp. <i>spathulata</i>    |                      |        | x      |      |        |        |        |        |      |      |         |
|                | <i>Eremophila maitlandii</i>                             |                      |        |        |      |        |        | x      | x      |      |      | x       |
|                | <i>Eremophila pterocarpa</i>                             |                      |        | x      |      |        |        |        |        |      |      |         |
|                | <i>Eremophila simulans</i>                               | x                    |        |        |      |        |        |        |        | x    |      |         |
| Zygophyllaceae | <i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i> |                      | x      |        |      |        |        |        |        |      |      |         |
|                | <i>Solanum lasiophyllum</i>                              | x                    |        | x      | x    |        |        | x      | x      | x    | x    | x       |
| Zygophyllaceae | <i>Zygophyllum aurantiacum</i>                           |                      |        |        |      |        |        |        |        |      | x    |         |
|                | <i>Zygophyllum simile</i>                                |                      |        |        |      |        |        |        |        |      | x    |         |

# Appendix C

## Flora Site Data



## Appendix C – Flora Site Data

| Site No: LC V01                                                                                                                                                                                                                                                                                                                                                                                                                  | Date: 2014 | Longitude: 116.76884                        | Latitude: -26.83097 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------------------------------------|---------------------|
| <b>Type:</b> Quadrat                                                                                                                                                                                                                                                                                                                                                                                                             |            | <b>Soil Types:</b> Sand, Clay               |                     |
| <b>Topography:</b> MS                                                                                                                                                                                                                                                                                                                                                                                                            |            | <b>Soil Description:</b> RedDry             |                     |
| <b>Outcrops:</b> Granite, Quartz                                                                                                                                                                                                                                                                                                                                                                                                 |            | <b>Fire:</b> 10+                            |                     |
| <b>Condition:</b> Very Good                                                                                                                                                                                                                                                                                                                                                                                                      |            | <b>Condition Notes:</b> Cattle, dead plants |                     |
| <b>Vegetation Type:</b> AfEfPo                                                                                                                                                                                                                                                                                                                                                                                                   |            |                                             |                     |
| <b>Vegetation Description:</b> <i>Acacia fuscaneura</i> , <i>Acacia incurvaneura</i> and <i>Acacia victoriae</i> subsp. <i>victoriae</i> low open woodland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Acacia tetragonophylla</i> and <i>Eremophila phyllopoda</i> low to tall open shrubland over <i>Ptilotus obovatus</i> , <i>Solanum lasiophyllum</i> and <i>Maireana planifolia</i> low sparse shrubland. |            |                                             |                     |



| Taxon                                               | Ht (cm) | Foliage (%) |
|-----------------------------------------------------|---------|-------------|
| <i>Acacia incurvaneura</i>                          | 500     | 2           |
| <i>Eremophila forrestii</i> subsp. <i>forrestii</i> | 50      | 0.1         |
| <i>Senna artemisioides</i> subsp. <i>petiolaris</i> | 70      | 0.05        |
| <i>Eremophila fraseri</i> subsp. <i>parva</i>       | 100     | 0.1         |
| <i>Cephalopterum drummondii</i>                     | 5       | 0.01        |

| Taxon                                                        | Ht (cm) | Foliage (%) |
|--------------------------------------------------------------|---------|-------------|
| <i>Ptilotus aervoides</i>                                    | 1       | 0.01        |
| <i>Ptilotus obovatus</i>                                     | 30      | 0.5         |
| <i>Sclerolaena densiflora</i>                                | 10      | 0.05        |
| <i>Sclerolaena gardneri</i>                                  | 20      | 0.01        |
| <i>Senna artemisioides</i> subsp. <i>helmsii</i>             | 110     | 0.1         |
| <i>Senna artemisioides</i> subsp. <i>oligophylla</i>         | 50      | 0.05        |
| <i>Senna</i> sp. <i>Meekatharra</i> ( <i>E. Bailey</i> 1-26) | 40      | 2           |
| <i>Solanum lasiophyllum</i>                                  | 20      | 0.01        |
| <i>Erodium aureum</i> *                                      | 5       | 0.01        |



|                        |                   |                             |                            |
|------------------------|-------------------|-----------------------------|----------------------------|
| <b>Site No:</b> LC V02 | <b>Date:</b> 2014 | <b>Longitude:</b> 116.75307 | <b>Latitude:</b> -26.82865 |
|------------------------|-------------------|-----------------------------|----------------------------|

**Type:** Quadrat**Soil Types:** Sand, Clay**Topography:** Plains**Soil Description:** RedDry**Outcrops:****Fire:** 10+**Condition:** Very Good**Condition Notes:** Dead plants**Vegetation Type:** AfEfPo

**Vegetation Description:** *Acacia fuscaneura*, *Acacia incurvaneura* and *Acacia victoriae* subsp. *victoriae* low open woodland over *Eremophila forrestii* subsp. *forrestii*, *Acacia tetragonophylla* and *Eremophila phyllopoda* low to tall open shrubland over *Ptilotus obovatus*, *Solanum lasiophyllum* and *Maireana planifolia* low sparse shrubland.



| Taxon                                               | Ht (cm) | Foliage (%) |
|-----------------------------------------------------|---------|-------------|
| <i>Acacia tetragonophylla</i>                       | 200     | 0.1         |
| ? <i>Enchylaena tomentosa</i>                       | 10      | 0.01        |
| <i>Acacia fuscaneura</i>                            | 600     | 5           |
| <i>Acacia fuscaneura</i>                            | 500     | 0.5         |
| <i>Acacia ?cuthbertsonii</i>                        | 60      | 0.02        |
| <i>Eremophila forrestii</i> subsp. <i>forrestii</i> | 160     | 10          |
| <i>Eriachne</i> sp.                                 | 20      | 0.01        |
| <i>Hakea recurva</i> subsp. <i>arida</i>            | 250     | 0.2         |

| Taxon                                            | Ht (cm) | Foliage (%) |
|--------------------------------------------------|---------|-------------|
| <i>Maireana planifolia</i>                       | 30      | 0.01        |
| <i>Gnephosis tenuissima</i>                      | 1       | 0.01        |
| <i>Ptilotus obovatus</i>                         | 40      | 0.01        |
| <i>Ptilotus drummondii</i>                       | 30      | 0.1         |
| <i>Rhagodia eremaea</i>                          | 200     | 0.05        |
| <i>Scaevola spinescens</i>                       | 180     | 0.1         |
| <i>Senna artemisioides</i> subsp. <i>helmsii</i> | 200     | 1           |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)    | 200     | 0.1         |
| <i>Solanum lasiophyllum</i>                      | 10      | 0.01        |



| Site No: LC V03                                                                                                                                                                                                                                                                                                                                       | Date: 2014 | Longitude: 116.76361                        | Latitude: -26.84846 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------------------------------------|---------------------|
| <b>Type:</b> Quadrat                                                                                                                                                                                                                                                                                                                                  |            | <b>Soil Types:</b> Sand, Clay               |                     |
| <b>Topography:</b> Plains                                                                                                                                                                                                                                                                                                                             |            | <b>Soil Description:</b> RedDry             |                     |
| <b>Outcrops:</b>                                                                                                                                                                                                                                                                                                                                      |            | <b>Fire:</b> 10+                            |                     |
| <b>Condition:</b> Very Good                                                                                                                                                                                                                                                                                                                           |            | <b>Condition Notes:</b> Dead plants, cattle |                     |
| <b>Vegetation Type:</b> ApAgEf                                                                                                                                                                                                                                                                                                                        |            |                                             |                     |
| <b>Vegetation Description:</b> <i>Acacia pteraneura</i> low woodland to open woodland over <i>Acacia grasbyi</i> and <i>Acacia tetragonophylla</i> tall sparse shrubland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> and <i>Eremophila fraseri</i> subsp. <i>parva</i> mid shrubland. |            |                                             |                     |



| Taxon                                               | Ht (cm) | Foliage (%) |
|-----------------------------------------------------|---------|-------------|
| <i>Acacia oswaldii</i>                              | 200     | 2           |
| <i>Acacia tetragonophylla</i>                       | 200     | 0.2         |
| <i>Acacia ramulosa</i> var. <i>linophylla</i>       | 400     | 0.3         |
| <i>Acacia pteraneura</i>                            | 500     | 8           |
| <i>Chamelaucium pauciflorum</i>                     | 25      | 0.01        |
| <i>Eremophila forrestii</i> subsp. <i>forrestii</i> | 50      | 2           |
| <i>Senna artemisioides</i> subsp. <i>petiolaris</i> | 20      | 0.01        |
| <i>Eremophila fraseri</i> subsp. <i>parva</i>       | 60      | 0.1         |
| <i>Eremophila forrestii</i> subsp. <i>forrestii</i> | 50      | 2           |

| Taxon                                            | Ht (cm) | Foliage (%) |
|--------------------------------------------------|---------|-------------|
| <i>Eremophila spuria</i>                         | 50      | 0.02        |
| <i>Euphorbia boophthona</i>                      | 40      | 0.05        |
| <i>Maireana planifolia</i>                       | 15      | 0.01        |
| <i>Ptilotus obovatus</i>                         | 20      | 0.1         |
| <i>Rhagodia eremaea</i>                          | 70      | 0.01        |
| <i>Senna artemisioides</i> subsp. <i>helmsii</i> | 100     | 1           |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)    | 130     | 2           |
| <i>Solanum lasiophyllum</i>                      | 40      | 0.2         |
| <i>Trianthema pilosa</i>                         | 1       | 0.1         |
| <i>Marsdenia australis</i>                       |         | 0.01        |



| Site No: LC V04                                                                                                                                                                                                                                                                                                       | Date: 2014 | Longitude: 116.76705                | Latitude: -26.81573 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------------------------------|---------------------|
| <b>Type:</b> Quadrat                                                                                                                                                                                                                                                                                                  |            | <b>Soil Types:</b> Clay             |                     |
| <b>Topography:</b> Plains                                                                                                                                                                                                                                                                                             |            | <b>Soil Description:</b> RedDry     |                     |
| <b>Outcrops:</b>                                                                                                                                                                                                                                                                                                      |            | <b>Fire:</b> 10+                    |                     |
| <b>Condition:</b> Very Good                                                                                                                                                                                                                                                                                           |            | <b>Condition Notes:</b> Dead plants |                     |
| <b>Vegetation Type:</b> AfSa                                                                                                                                                                                                                                                                                          |            |                                     |                     |
| <b>Vegetation Description:</b> <i>Acacia fuscaneura</i> , <i>Acacia incurvaneura</i> and occasional <i>Acacia pruinocarpa</i> low open woodland over <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Acacia tetragonophylla</i> and <i>Senna</i> sp. Meekatharra (E. Bailey 1-26) mid to tall sparse shrubland. |            |                                     |                     |



| Taxon                                               | Ht (cm) | Foliage (%) |
|-----------------------------------------------------|---------|-------------|
| <i>Acacia fuscaneura</i>                            | 600     | 10          |
| <i>Acacia oswaldii</i>                              | 150     | 0.2         |
| <i>Acacia tetragonophylla</i>                       | 200     | 0.5         |
| <i>Eremophila forrestii</i> subsp. <i>forrestii</i> | 40      | 0.01        |
| <i>Senna artemisioides</i> subsp. <i>petiolaris</i> | 100     | 0.05        |
| <i>Eremophila fraseri</i> subsp. <i>parva</i>       | 30      | 0.01        |
| <i>Eremophila latrobei</i>                          | 40      | 0.2         |
| <i>Euphorbia boophthona</i>                         | 50      | 0.01        |
| <i>Grevillea deflexa</i>                            | 50      | 0.04        |

| Taxon                                            | Ht (cm) | Foliage (%) |
|--------------------------------------------------|---------|-------------|
| <i>Hakea recurva</i> subsp. <i>arida</i>         | 100     | 0.04        |
| ? <i>Androcalva luteiflora</i>                   | 70      | 0.01        |
| <i>Ptilotus obovatus</i>                         | 30      | 0.1         |
| <i>Senna artemisioides</i> subsp. <i>helmsii</i> | 140     | 2           |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)    | 40      | 0.1         |
| <i>Solanum lasiophyllum</i>                      | 60      | 0.03        |
| <i>Marsdenia australis</i>                       |         | 0.01        |



| Site No: LC V05                                                                                                                                                                                                                                                                                                                                                                                                     | Date: 2014 | Longitude: 116.77482                        | Latitude: -26.79044 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------------------------------------|---------------------|
| <b>Type:</b> Quadrat                                                                                                                                                                                                                                                                                                                                                                                                |            | <b>Soil Types:</b> Sand, Clay               |                     |
| <b>Topography:</b> Plains                                                                                                                                                                                                                                                                                                                                                                                           |            | <b>Soil Description:</b> RedDry             |                     |
| <b>Outcrops:</b>                                                                                                                                                                                                                                                                                                                                                                                                    |            | <b>Fire:</b> 10+                            |                     |
| <b>Condition:</b> Very Good                                                                                                                                                                                                                                                                                                                                                                                         |            | <b>Condition Notes:</b> Cattle, dead plants |                     |
| <b>Vegetation Type:</b> AiAtEf                                                                                                                                                                                                                                                                                                                                                                                      |            |                                             |                     |
| <b>Vegetation Description:</b> <i>Acacia incurvaneura</i> , <i>Acacia craspedocarpa</i> and <i>Acacia fuscaneura</i> low open woodland over <i>Acacia tetragonophylla</i> , <i>Acacia kempeana</i> and <i>Acacia oswaldii</i> sparse tall shrubland over <i>Eremophila fraseri</i> subsp. <i>parva</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> and <i>Eremophila macmillaniana</i> sparse mid shrubland. |            |                                             |                     |



| Taxon                                               | Ht (cm) | Foliage (%) |
|-----------------------------------------------------|---------|-------------|
| <i>Acacia fuscaneura</i>                            | 400     | 3           |
| <i>Acacia oswaldii</i>                              | 180     | 0.2         |
| <i>Acacia fuscaneura</i>                            | 700     | 4           |
| <i>Acacia tetragonophylla</i>                       | 200     | 0.1         |
| <i>Acacia caesaneura</i> (narrow phyllode variant)  | 60      | 0.05        |
| <i>Eragrostis eriopoda</i>                          | 10      | 0.1         |
| <i>Eremophila compacta</i> subsp. <i>compacta</i>   | 50      | 1           |
| <i>Eremophila forrestii</i> subsp. <i>forrestii</i> | 60      | 0.5         |

| Taxon                                               | Ht (cm) | Foliage (%) |
|-----------------------------------------------------|---------|-------------|
| <i>Eremophila forrestii</i> subsp. <i>forrestii</i> | 240     | 0.5         |
| <i>Tripogon loliiformis</i>                         | 6       | 0.01        |
| <i>Mirbelia rhagodioides</i>                        | 40      | 0.01        |
| <i>Senna artemisioides</i> subsp. <i>helmsii</i>    | 160     | 0.5         |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)       | 50      | 0.2         |



| Site No: LE V02                                                                                                                                                                                                                                                                                                       | Date: 2014 | Longitude: 116.86419                             | Latitude: -26.85827 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------------------------------------------|---------------------|
| <b>Type:</b> Quadrat                                                                                                                                                                                                                                                                                                  |            | <b>Soil Types:</b> Sand, Clay                    |                     |
| <b>Topography:</b> Plains                                                                                                                                                                                                                                                                                             |            | <b>Soil Description:</b> Red, scattered rocksDry |                     |
| <b>Outcrops:</b> Granite, Quartz                                                                                                                                                                                                                                                                                      |            | <b>Fire:</b> 10+                                 |                     |
| <b>Condition:</b> Very Good                                                                                                                                                                                                                                                                                           |            | <b>Condition Notes:</b> Dead plants              |                     |
| <b>Vegetation Type:</b> AfSa                                                                                                                                                                                                                                                                                          |            |                                                  |                     |
| <b>Vegetation Description:</b> <i>Acacia fuscaneura</i> , <i>Acacia incurvaneura</i> and occasional <i>Acacia pruinocarpa</i> low open woodland over <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Acacia tetragonophylla</i> and <i>Senna</i> sp. Meekatharra (E. Bailey 1-26) mid to tall sparse shrubland. |            |                                                  |                     |



| Taxon                                               | Ht (cm) | Foliage (%) |
|-----------------------------------------------------|---------|-------------|
| <i>Acacia fuscaneura</i>                            | 400     | 4           |
| <i>Acacia oswaldii</i>                              | 130     | 0.2         |
| <i>Acacia grasbyi</i>                               | 160     | 1           |
| <i>Acacia tetragonophylla</i>                       | 130     | 0.5         |
| <i>Acacia palustris</i>                             | 110     | 0.02        |
| <i>Senna artemisioides</i> subsp. <i>petiolaris</i> | 60      | 1           |
| <i>Eremophila fraseri</i> subsp. <i>parva</i>       | 50      | 0.1         |
| <i>Eremophila forrestii</i> subsp. <i>forrestii</i> | 110     | 0.1         |
| <i>Eremophila shonae</i> subsp. <i>shonae</i>       | 100     | 3           |

| Taxon                                                  | Ht (cm) | Foliage (%) |
|--------------------------------------------------------|---------|-------------|
| <i>Eremophila mackinlayi</i> subsp. <i>spathulata</i>  | 60      | 0.1         |
| <i>Rhodanthe chlorocephala</i> subsp. <i>splendida</i> | 7       | 0.02        |
| <i>Maireana convexa</i>                                | 50      | 0.01        |
| <i>Maireana planifolia</i>                             | 25      | 0.01        |
| <i>Ptilotus obovatus</i>                               | 30      | 0.1         |
| <i>Sclerolaena gardneri</i>                            | 10      | 0.01        |
| <i>Senna artemisioides</i> subsp. <i>helmsii</i>       | 130     | 6           |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)          | 100     | 0.5         |
| <i>Sida ?calyxhymenia</i>                              | 40      | 0.01        |
| <i>Solanum lasiophyllum</i>                            | 40      | 0.02        |
| <i>Trianthema pilosa</i>                               | 1       | 0.01        |



|                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                     |                             |                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-----------------------------|----------------------------|
| <b>Site No:</b> LE V03                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Date:</b> 2014                   | <b>Longitude:</b> 116.86553 | <b>Latitude:</b> -26.88782 |
| <b>Type:</b> Quadrat                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Soil Types:</b> Clay             |                             |                            |
| <b>Topography:</b> Flat                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Soil Description:</b> RedDry     |                             |                            |
| <b>Outcrops:</b>                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Fire:</b> 10+                    |                             |                            |
| <b>Condition:</b> Very Good                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Condition Notes:</b> Dead plants |                             |                            |
| <b>Vegetation Type:</b> AfEfPo                                                                                                                                                                                                                                                                                                                                                                                                  |                                     |                             |                            |
| <b>Vegetation Description:</b> <i>Acacia fuscaneura</i> , <i>Acacia incurvaneura</i> and <i>Acacia victoriae</i> subsp. <i>victoriae</i> low open woodland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Acacia tetragonophylla</i> and <i>Eremophila phyllopoda</i> low to tall open shrubland over <i>Ptilotus obovatus</i> , <i>Solanum lasiophyllum</i> and <i>Maireana planifolia</i> low sparse shrubland |                                     |                             |                            |



| Taxon                                                   | Ht (cm) | Foliage (%) |
|---------------------------------------------------------|---------|-------------|
| <i>Acacia fuscaneura</i>                                | 400     | 0.3         |
| <i>Acacia incurvaneura</i>                              | 600     | 4           |
| <i>Acacia oswaldii</i>                                  | 400     | 0.5         |
| <i>Acacia tetragonophylla</i>                           | 200     | 3           |
| <i>Acacia cuthbertsonii</i> subsp. <i>cuthbertsonii</i> | 60      | 0.05        |
| <i>Senna artemisioides</i> subsp. <i>petiolaris</i>     | 30      | 0.01        |
| <i>Eremophila forrestii</i> subsp. <i>forrestii</i>     | 40      | 0.1         |
| <i>Eremophila fraseri</i> subsp. <i>parva</i>           | 200     | 0.3         |

| Taxon                                               | Ht (cm) | Foliage (%) |
|-----------------------------------------------------|---------|-------------|
| <i>Eremophila forrestii</i> subsp. <i>forrestii</i> | 100     | 2           |
| <i>Eremophila latrobei</i>                          | 50      | 0.05        |
| <i>Eremophila serrulata</i>                         | 120     | 0.01        |
| <i>Grevillea deflexa</i>                            | 40      | 0.1         |
| <i>Maireana planifolia</i>                          | 10      | 0.01        |
| <i>Rhagodia eremaea</i>                             | 130     | 0.1         |
| <i>Senna artemisioides</i> subsp. <i>helmsii</i>    | 130     | 0.2         |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)       | 100     | 0.1         |
| <i>Solanum lasiophyllum</i>                         | 40      | 0.03        |



|                              |                   |                             |                            |
|------------------------------|-------------------|-----------------------------|----------------------------|
| <b>Site No:</b> LE V05_rapid | <b>Date:</b> 2014 | <b>Longitude:</b> 116.87930 | <b>Latitude:</b> -26.85312 |
|------------------------------|-------------------|-----------------------------|----------------------------|

**Type:** Quadrat**Soil Types:** Sand, loam**Topography:** Outcrop**Soil Description:** Light Brown OrangeDry**Outcrops:** Granite**Fire:** 10+**Condition:** Very Good**Condition Notes:****Vegetation Type:** ArCc

**Vegetation Description:** *Acacia rhodophloia* low open woodland over *Corchorus crozophorifolius*, *Cymbopogon ambiguus* and *Eremophila platycalyx* subsp. *platycalyx* mixed low to mid shrub and grassland.



| Taxon                                                 | Ht (cm) | Foliage (%) |
|-------------------------------------------------------|---------|-------------|
| <i>Acacia rhodophloia</i>                             | 400     | 10          |
| <i>Corchorus crozophorifolius</i>                     | 40      | 2           |
| <i>Cymbopogon ambiguus</i>                            | 40      | 1           |
| <i>Eremophila forrestii</i> subsp. <i>forrestii</i>   | 150     | 5           |
| <i>Eremophila platycalyx</i> subsp. <i>platycalyx</i> | 150     | 0.5         |
| <i>Euphorbia boophthona</i>                           | 30      | 0.5         |

| Taxon                                            | Ht (cm) | Foliage (%) |
|--------------------------------------------------|---------|-------------|
| <i>Alyogyne pinoniana</i>                        | 50      | 1           |
| <i>Ptilotus obovatus</i>                         | 50      | 3           |
| <i>Senna artemisioides</i> subsp. <i>helmsii</i> | 70      | 2           |
| <i>Solanum lasiophyllum</i>                      | 50      | 1           |
| <i>Thryptomene decussata</i>                     | 120     | 0.1         |



|                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                         |                             |                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-----------------------------|----------------------------|
| <b>Site No:</b> LN V03                                                                                                                                                                                                                                                                                                                                                                                              | <b>Date:</b> 2014                                       | <b>Longitude:</b> 116.75108 | <b>Latitude:</b> -26.73968 |
| <b>Type:</b> Quadrat                                                                                                                                                                                                                                                                                                                                                                                                | <b>Soil Types:</b> Clay                                 |                             |                            |
| <b>Topography:</b> Flat                                                                                                                                                                                                                                                                                                                                                                                             | <b>Soil Description:</b> RedDry                         |                             |                            |
| <b>Outcrops:</b>                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Fire:</b> 10+                                        |                             |                            |
| <b>Condition:</b> Very Good                                                                                                                                                                                                                                                                                                                                                                                         | <b>Condition Notes:</b> Dead plants, evidence of cattle |                             |                            |
| <b>Vegetation Type:</b> AiAtEf                                                                                                                                                                                                                                                                                                                                                                                      |                                                         |                             |                            |
| <b>Vegetation Description:</b> <i>Acacia incurvaneura</i> , <i>Acacia craspedocarpa</i> and <i>Acacia fuscaneura</i> low open woodland over <i>Acacia tetragonophylla</i> , <i>Acacia kempeana</i> and <i>Acacia oswaldii</i> sparse tall shrubland over <i>Eremophila fraseri</i> subsp. <i>parva</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> and <i>Eremophila macmillaniana</i> sparse mid shrubland. |                                                         |                             |                            |



| Taxon                                                 | Ht (cm) | Foliage (%) |
|-------------------------------------------------------|---------|-------------|
| <i>Acacia craspedocarpa</i>                           | 350     | 6           |
| <i>Acacia fuscaneura</i>                              | 400     | 0.1         |
| <i>Acacia incurvaneura</i>                            | 600     | 10          |
| <i>Acacia tetragonophylla</i>                         | 300     | 5           |
| <i>Eremophila phyllopoda</i> subsp. <i>phyllopoda</i> | 200     | 0.1         |
| <i>Eremophila platycalyx</i>                          | 320     | 0.1         |
| <i>Gnephosis tenuissima</i>                           | 5       | 0.01        |
| <i>Myriocephalus rudallii</i>                         | 10      | 0.01        |

**Site No:** LN V04      **Date:** 2014      **Longitude:** 116.74130      **Latitude:** -26.73004

**Type:** Quadrat

**Soil Types:** S

**Topography:** Drainage

**Soil Description:** Beigey redDry

**Outcrops:** Granite

**Fire:** 10+

**Condition:** Very Good

**Condition Notes:** Dead plants

**Vegetation Type:** AcAsTd

**Vegetation Description:** *Allocasuarina campestris* low to mid woodland over *Acacia sclerosperma* subsp. *sclerosperma*, *Exocarpos aphyllus* and *Scaevola spinescens* mid to tall open shrubland over *Tecticornia doliiformis*, *Atriplex amnicola* and *Tecticornia ?indica* mid chenopod shrubland.



| Taxon                                                 | Ht (cm) | Foliage (%) |
|-------------------------------------------------------|---------|-------------|
| <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> | 300     | 1           |
| <i>Acacia tetragonophylla</i>                         | 300     | 1           |
| <i>Acacia burkittii</i>                               | 800     | 10          |
| <i>Acacia victoriae</i> subsp. <i>victoriae</i>       | 400     | 0.5         |
| <i>Allocasuarina campestris</i>                       | 1000    | 30          |
| <i>Amyema nestor</i>                                  |         | 0.1         |
| <i>Euphorbia drummondii</i>                           | 5       | 0.02        |
| <i>Grevillea hakeoides</i> subsp. <i>stenophylla</i>  | 400     | 0.5         |



| Taxon                                                    | Ht (cm) | Foliage (%) |
|----------------------------------------------------------|---------|-------------|
| <i>Tecticornia ?indica</i>                               | 20      | 0.01        |
| <i>Heliotropium curassavicum</i>                         | 20      | 0.1         |
| <i>Samolus repens</i> var. <i>floribundus</i>            | 40      | 0.01        |
| <i>Melaleuca stereophloia</i>                            | 700     | 2           |
| <i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i> | 30      | 0.01        |
| <i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i> | 50      | 0.01        |
| <i>Calocephalus knappii</i>                              | 3       | 0.01        |
| <i>Portulaca oleracea</i>                                | 5       | 0.01        |
| <i>Ptilotus drummondii</i>                               | 30      | 0.1         |
| <i>Scaevola spinescens</i>                               | 40      | 0.2         |
| <i>Sclerolaena densiflora</i>                            | 15      | 0.01        |
| <i>Senna artemisioides</i> subsp. <i>filifolia</i>       | 200     | 0.2         |
| <i>Senna artemisioides</i> subsp. <i>helmsii</i>         | 5       | 0.02        |
| <i>Senna artemisioides</i> subsp. <i>oligophylla</i>     | 40      | 0.02        |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)            | 6       | 0.02        |
| <i>Sonchus oleraceus</i> *                               | 40      | 0.01        |
| <i>Wahlenbergia tumidifructa</i>                         | 20      | 0.01        |

|                        |                   |                             |                            |
|------------------------|-------------------|-----------------------------|----------------------------|
| <b>Site No:</b> LN V05 | <b>Date:</b> 2014 | <b>Longitude:</b> 116.71454 | <b>Latitude:</b> -26.70661 |
|------------------------|-------------------|-----------------------------|----------------------------|

**Type:** Quadrat**Soil Types:** Clay**Topography:** Flat**Soil Description:** RedDry**Outcrops:** Iron, Quartz**Fire:** 10+**Condition:** Very Good**Condition Notes:** Dead plants**Vegetation Type:** AiAtEf

**Vegetation Description:** *Acacia incurvaneura*, *Acacia craspedocarpa* and *Acacia fuscaneura* low open woodland over *Acacia tetragonophylla*, *Acacia kempeana* and *Acacia oswaldii* sparse tall shrubland over *Eremophila fraseri* subsp. *parva*, *Senna artemisioides* subsp. *helmsii* and *Eremophila macmillaniana* sparse mid shrubland.



| Taxon                                              | Ht (cm) | Foliage (%) |
|----------------------------------------------------|---------|-------------|
| ? <i>Dodonaea viscosa</i>                          | 50      | 0.01        |
| <i>Acacia fuscaneura</i>                           | 500     | 0.3         |
| <i>Acacia incurvaneura</i>                         | 600     | 8           |
| <i>Acacia oswaldii</i>                             | 250     | 0.2         |
| <i>Acacia pruinocarpa</i>                          | 800     |             |
| <i>Acacia grasbyi</i>                              | 160     | 0.1         |
| <i>Acacia tetragonophylla</i>                      | 200     | 1           |
| <i>Acacia caesaneura</i> (narrow phyllode variant) | 160     | 0.1         |



| Taxon                                            | Ht (cm) | Foliage (%) |
|--------------------------------------------------|---------|-------------|
| <i>?Androcalva luteiflora</i>                    | 30      | 0.1         |
| <i>Eremophila fraseri</i> subsp. <i>parva</i>    | 130     | 1.5         |
| <i>Eremophila latrobei</i>                       | 20      | 0.01        |
| <i>Eremophila phyllopoda</i>                     | 60      | 0.2         |
| <i>Eremophila compacta</i>                       | 100     | 0.1         |
| <i>Grevillea deflexa</i>                         | 60      | 0.01        |
| <i>Maireana planifolia</i>                       | 15      |             |
| <i>Senna artemisioides</i> subsp. <i>helmsii</i> | 100     | 0.2         |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)    | 180     | 0.1         |
| <i>Spartothamnella teucriflora</i>               | 70      | 0.02        |

|                                                                                                                                                                                                                                                                                                                                                                                                                     |                                             |                             |                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|-----------------------------|----------------------------|
| <b>Site No:</b> LN V07                                                                                                                                                                                                                                                                                                                                                                                              | <b>Date:</b> 2014                           | <b>Longitude:</b> 116.77166 | <b>Latitude:</b> -26.74441 |
| <b>Type:</b> Quadrat                                                                                                                                                                                                                                                                                                                                                                                                | <b>Soil Types:</b> Clay                     |                             |                            |
| <b>Topography:</b> Flat                                                                                                                                                                                                                                                                                                                                                                                             | <b>Soil Description:</b> RedDry             |                             |                            |
| <b>Outcrops:</b>                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Fire:</b> 10+                            |                             |                            |
| <b>Condition:</b> Very Good                                                                                                                                                                                                                                                                                                                                                                                         | <b>Condition Notes:</b> Cattle, dead plants |                             |                            |
| <b>Vegetation Type:</b> AiAtEf                                                                                                                                                                                                                                                                                                                                                                                      |                                             |                             |                            |
| <b>Vegetation Description:</b> <i>Acacia incurvaneura</i> , <i>Acacia craspedocarpa</i> and <i>Acacia fuscaneura</i> low open woodland over <i>Acacia tetragonophylla</i> , <i>Acacia kempeana</i> and <i>Acacia oswaldii</i> sparse tall shrubland over <i>Eremophila fraseri</i> subsp. <i>parva</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> and <i>Eremophila macmillaniana</i> sparse mid shrubland. |                                             |                             |                            |



| Taxon                                              | Ht (cm) | Foliage (%) |
|----------------------------------------------------|---------|-------------|
| <i>Acacia craspedocarpa</i>                        | 200     | 1           |
| <i>Acacia caesaneura</i> (narrow phyllode variant) | 500     | 1           |
| <i>Acacia incurvaneura</i>                         | 600     | 6           |
| <i>Acacia oswaldii</i>                             | 200     | 1           |
| <i>Acacia pruinocarpa</i>                          | 700     | 1           |
| <i>Acacia tetragonophylla</i>                      | 200     | 2           |
| <i>Acacia victoriae</i> subsp. <i>victoriae</i>    | 600     | 1           |
| <i>Santalum spicatum</i>                           | 400     | 0.2         |



| Taxon                                            | Ht (cm) | Foliage (%) |
|--------------------------------------------------|---------|-------------|
| <i>Eremophila fraseri</i> subsp. <i>parva</i>    | 150     | 0.3         |
| <i>Eremophila latrobei</i>                       | 20      | 0.01        |
| <i>Ptilotus obovatus</i>                         | 40      | 0.01        |
| <i>Senna artemisioides</i> subsp. <i>helmsii</i> | 20      | 0.05        |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)    | 120     | 1           |
| <i>Solanum lasiophyllum</i>                      | 30      | 0.01        |

|                        |                   |                             |                            |
|------------------------|-------------------|-----------------------------|----------------------------|
| <b>Site No:</b> LN V08 | <b>Date:</b> 2014 | <b>Longitude:</b> 116.80570 | <b>Latitude:</b> -26.72194 |
|------------------------|-------------------|-----------------------------|----------------------------|

**Type:** Quadrat**Soil Types:** Clay**Topography:** Flat**Soil Description:** RedDry**Outcrops:****Fire:** 10+**Condition:** Very Good**Condition Notes:** Cattle, dead plants**Vegetation Type:** AfSa

**Vegetation Description:** *Acacia fuscaneura*, *Acacia incurvaneura* and occasional *Acacia pruinocarpa* low open woodland over *Senna artemisioides* subsp. *helmsii*, *Acacia tetragonophylla* and *Senna* sp. Meekatharra (E. Bailey 1-26) mid to tall sparse shrubland.



| Taxon                                               | Ht (cm) | Foliage (%) |
|-----------------------------------------------------|---------|-------------|
| <i>Acacia fuscaneura</i>                            | 600     | 2           |
| <i>Acacia fuscaneura</i>                            | 500     | 1           |
| <i>Acacia synchronicia</i>                          | 200     | 1           |
| <i>Acacia tetragonophylla</i>                       | 200     | 1           |
| <i>Eremophila forrestii</i> subsp. <i>forrestii</i> | 20      | 0.1         |
| <i>Eremophila compacta</i> subsp. <i>compacta</i>   | 40      | 0.05        |
| <i>Maireana planifolia</i>                          | 20      | 0.01        |
| <i>Ptilotus obovatus</i>                            | 20      | 0.1         |
| <i>Rhagodia eremaea</i>                             | 30      | 0.02        |



| Taxon                                                | Ht (cm) | Foliage (%) |
|------------------------------------------------------|---------|-------------|
| <i>Sclerolaena cuneata</i>                           | 10      | 0.01        |
| <i>Senna artemisioides</i> subsp. <i>helmsii</i>     | 110     | 10          |
| <i>Senna artemisioides</i> subsp. <i>oligophylla</i> | 50      | 2           |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)        | 50      | 0.1         |
| <i>Solanum lasiophyllum</i>                          | 20      | 0.01        |

| Site No: LS V04                                                                                                                                                                                                                                                                                                                                                                                                     | Date: 2014 | Longitude: 116.64801                                                                                                                                        | Latitude: -26.88548 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>Type:</b> Quadrat                                                                                                                                                                                                                                                                                                                                                                                                |            | <b>Soil Types:</b> Sand, loam                                                                                                                               |                     |
| <b>Topography:</b> Flat, Plains                                                                                                                                                                                                                                                                                                                                                                                     |            | <b>Soil Description:</b> Red-BrownDry                                                                                                                       |                     |
| <b>Outcrops:</b>                                                                                                                                                                                                                                                                                                                                                                                                    |            | <b>Fire:</b> 10+                                                                                                                                            |                     |
| <b>Condition:</b> Very Good                                                                                                                                                                                                                                                                                                                                                                                         |            | <b>Condition Notes:</b> No weeds observed, however bare ground due to perhaps a combination of reduced soil profile, grazing and lack of frequent rainfall. |                     |
| <b>Vegetation Type:</b> AiAtEf                                                                                                                                                                                                                                                                                                                                                                                      |            |                                                                                                                                                             |                     |
| <b>Vegetation Description:</b> <i>Acacia incurvaneura</i> , <i>Acacia craspedocarpa</i> and <i>Acacia fuscaneura</i> low open woodland over <i>Acacia tetragonophylla</i> , <i>Acacia kempeana</i> and <i>Acacia oswaldii</i> sparse tall shrubland over <i>Eremophila fraseri</i> subsp. <i>parva</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> and <i>Eremophila macmillaniana</i> sparse mid shrubland. |            |                                                                                                                                                             |                     |



| Taxon                                           | Ht (cm) | Foliage (%) |
|-------------------------------------------------|---------|-------------|
| <i>Acacia craspedocarpa</i>                     | 400     | 30          |
| <i>Acacia victoriae</i> subsp. <i>victoriae</i> | 100     | 0           |
| <i>Acacia tetragonophylla</i>                   | 350     | 5           |
| <i>Eremophila fraseri</i> subsp. <i>parva</i>   | 120     | 1           |



| Taxon                                            | Ht (cm) | Foliage (%) |
|--------------------------------------------------|---------|-------------|
| <i>Eremophila pantonii</i>                       | 120     | 0           |
| <i>Grevillea berryana</i>                        | 500     | 0           |
| <i>Scaevola spinescens</i>                       | 150     | 2           |
| <i>Senna artemisioides</i> subsp. <i>helmsii</i> | 100     | 2           |

| Site No: LS V05                                                                                                                                                                                                                                                                                                                                          | Date: 2014 | Longitude: 116.63598                                                                              | Latitude: -26.87693 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------------------------------|---------------------|
| <b>Type:</b> Quadrat                                                                                                                                                                                                                                                                                                                                     |            | <b>Soil Types:</b> Sand, loam                                                                     |                     |
| <b>Topography:</b> Flat, Plains                                                                                                                                                                                                                                                                                                                          |            | <b>Soil Description:</b> Red-brownDry                                                             |                     |
| <b>Outcrops:</b>                                                                                                                                                                                                                                                                                                                                         |            | <b>Fire:</b> 10+                                                                                  |                     |
| <b>Condition:</b> Very Good                                                                                                                                                                                                                                                                                                                              |            | <b>Condition Notes:</b> Area appears to be more heavily grazed. Hardwash plain with minimal soil. |                     |
| <b>Vegetation Type:</b> AvEp                                                                                                                                                                                                                                                                                                                             |            |                                                                                                   |                     |
| <b>Vegetation Description:</b> <i>Acacia victoriae</i> subsp. <i>victoriae</i> , <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> and <i>Acacia tetragonophylla</i> tall shrubland over <i>Eremophila pterocarpa</i> subsp. <i>pterocarpa</i> , <i>Senna</i> sp. Meekatharra (E. Bailey 1-26) and <i>Atriplex amnicola</i> mixed chenopod shrubland |            |                                                                                                   |                     |



| Taxon                                           | Ht (cm) | Foliage (%) |
|-------------------------------------------------|---------|-------------|
| <i>Zygophyllum aurantiacum</i>                  | 10      | 1           |
| <i>Acacia victoriae</i> subsp. <i>victoriae</i> | 300     | 10          |
| <i>Acacia tetragonophylla</i>                   | 400     | 20          |
| <i>Pogonolepis stricta</i>                      | 4       | 0.1         |
| <i>Atriplex ?amnicola</i>                       | 100     | 5           |



| Taxon                                                 | Ht (cm) | Foliage (%) |
|-------------------------------------------------------|---------|-------------|
| <i>Cuscuta planiflora</i> *                           | 1       | 0.01        |
| <i>Eremophila pterocarpa</i> subsp. <i>pterocarpa</i> | 200     | 10          |
| <i>Erodium aureum</i> *                               | 5       | 0.1         |
| <i>Frankenia pauciflora</i> var. <i>pauciflora</i>    | 30      | 0           |
| <i>Goodenia berardiana</i>                            | 5       | 0.1         |
| <i>Goodenia mimuloides</i>                            | 4       | 0.1         |
| <i>Grevillea berryana</i>                             | 700     | 2           |
| <i>Portulaca oleracea</i>                             | 2       | 1           |
| <i>Ptilotus obovatus</i>                              | 30      | 0.5         |
| <i>Ptilotus aevroides</i>                             | 1       | 0.01        |
| <i>Ptilotus stirlingii</i>                            | 5       | 0.01        |

|                        |                   |                             |                            |
|------------------------|-------------------|-----------------------------|----------------------------|
| <b>Site No:</b> LS V06 | <b>Date:</b> 2014 | <b>Longitude:</b> 116.73876 | <b>Latitude:</b> -26.86947 |
|------------------------|-------------------|-----------------------------|----------------------------|

**Type:** Quadrat**Soil Types:** Sand, loam**Topography:** Plains**Soil Description:** Red-BrownDry**Outcrops:****Fire:** 10+**Condition:** Very Good**Condition Notes:** Area has been heavily used by livestock. Many dead stag trees and shrubs**Vegetation Type:** ApAgEf

**Vegetation Description:** *Acacia pteraneura* low woodland to open woodland over *Acacia grasbyi* and *Acacia tetragonophylla* tall sparse shrubland over *Eremophila forrestii* subsp. *forrestii*, *Senna artemisioides* subsp. *helmsii* and *Eremophila fraseri* subsp. *parva* mid shrubland



| Taxon                                               | Ht (cm) | Foliage (%) |
|-----------------------------------------------------|---------|-------------|
| <i>Acacia aneura</i>                                | 600     | 5           |
| <i>Acacia caesaneura</i> (narrow phyllode variant)  | 200     | 2           |
| <i>Acacia pteraneura</i>                            | 500     | 3           |
| <i>Acacia kempeana</i>                              | 250     | 1           |
| <i>Acacia tetragonophylla</i>                       | 300     | 5           |
| <i>Eremophila forrestii</i> subsp. <i>forrestii</i> | 40      | 1           |
| <i>Eremophila fraseri</i> subsp. <i>parva</i>       | 120     | 2           |
| <i>Eremophila latrobei</i>                          | 30      | 0.5         |
| <i>Ptilotus obovatus</i>                            | 30      | 1           |



| Taxon                                            | Ht (cm) | Foliage (%) |
|--------------------------------------------------|---------|-------------|
| <i>Senna artemisioides</i> subsp. <i>helmsii</i> | 170     | 1           |

|                                 |                                       |                             |                            |
|---------------------------------|---------------------------------------|-----------------------------|----------------------------|
| <b>Site No:</b> LS V06          | <b>Date:</b> 2014                     | <b>Longitude:</b> 116.73315 | <b>Latitude:</b> -27.06476 |
| <b>Type:</b> Quadrat            | <b>Soil Types:</b> Sand, loam         |                             |                            |
| <b>Topography:</b> Flat, Plains | <b>Soil Description:</b> Red-BrownDry |                             |                            |
| <b>Outcrops:</b>                | <b>Fire:</b> 10+                      |                             |                            |
| <b>Condition:</b> Very Good     | <b>Condition Notes:</b>               |                             |                            |
| <b>Vegetation Type:</b>         |                                       |                             |                            |
| <b>Vegetation Description:</b>  |                                       |                             |                            |



| Taxon                                         | Ht (cm) | Foliage (%) |
|-----------------------------------------------|---------|-------------|
| <i>Acacia pteraneura</i>                      |         | 5           |
| <i>Acacia grasbyi</i>                         | 250     | 7           |
| <i>Acacia ramulosa</i> var. <i>linophylla</i> | 400     | 1           |
| <i>Acacia tetragonophylla</i>                 | 150     | 1           |
| <i>Calandrinia polymorpha</i>                 | 2       | 1           |
| <i>Helipterum craspedioides</i>               | 7       | 0.1         |



| Taxon                                               | Ht (cm) | Foliage (%) |
|-----------------------------------------------------|---------|-------------|
| <i>Eragrostis eriopoda</i>                          | 20      | 0.5         |
| <i>Eremophila forrestii</i> subsp. <i>forrestii</i> | 120     | 5           |
| <i>Eremophila forrestii</i> subsp. <i>forrestii</i> | 50      | 0.1         |
| <i>Erodium aureum</i> *                             | 5       | 1           |
| <i>Euphorbia ?boophthona</i>                        | 40      | 0.3         |
| <i>Hakea preissii</i>                               | 300     | 1           |
| <i>Maireana planifolia</i>                          | 30      | 0.5         |
| <i>Ptilotus obovatus</i>                            | 40      | 0.5         |
| <i>Ptilotus stirlingii</i>                          | 7       | 0.1         |
| <i>Senna artemisioides</i> subsp. <i>helmsii</i>    | 100     | 2           |
| <i>Solanum lasiophyllum</i>                         | 40      | 1           |

| Site No: LS V07                                                                                                                                                                                                                                                                                                                                          | Date: 2014 | Longitude: 116.68509                  | Latitude: -26.87420 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------------------------------|---------------------|
| <b>Type:</b> Quadrat                                                                                                                                                                                                                                                                                                                                     |            | <b>Soil Types:</b> Sand, loam         |                     |
| <b>Topography:</b> Flat, Drainage                                                                                                                                                                                                                                                                                                                        |            | <b>Soil Description:</b> Red-BrownDry |                     |
| <b>Outcrops:</b>                                                                                                                                                                                                                                                                                                                                         |            | <b>Fire:</b> 10+                      |                     |
| <b>Condition:</b> Very Good                                                                                                                                                                                                                                                                                                                              |            | <b>Condition Notes:</b>               |                     |
| <b>Vegetation Type:</b> AvEp                                                                                                                                                                                                                                                                                                                             |            |                                       |                     |
| <b>Vegetation Description:</b> <i>Acacia victoriae</i> subsp. <i>victoriae</i> , <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> and <i>Acacia tetragonophylla</i> tall shrubland over <i>Eremophila pterocarpa</i> subsp. <i>pterocarpa</i> , <i>Senna</i> sp. Meekatharra (E. Bailey 1-26) and <i>Atriplex amnicola</i> mixed chenopod shrubland |            |                                       |                     |



| Taxon                                                 | Ht (cm) | Foliage (%) |
|-------------------------------------------------------|---------|-------------|
| <i>Acacia aneura</i>                                  | 700     | 5           |
| <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> | 180     | 1           |
| <i>Acacia kempeana</i>                                | 170     | 1           |
| <i>Acacia victoriae</i> subsp. <i>victoriae</i>       | 200     | 2           |
| <i>Acacia tetragonophylla</i>                         | 200     | 2           |



| Taxon                                                 | Ht (cm) | Foliage (%) |
|-------------------------------------------------------|---------|-------------|
| <i>Eremophila forrestii</i> subsp. <i>forrestii</i>   | 140     | 5           |
| <i>Eremophila pterocarpa</i> subsp. <i>pterocarpa</i> | 150     | 1           |
| <i>Pogonolepis stricta</i>                            | 2       | 0.5         |
| <i>Hakea preissii</i>                                 | 50      | 0.1         |
| <i>Sclerolaena recurvicupsis</i>                      | 15      | 0.2         |
| <i>Gnephosis eriocephala</i>                          | 2       | 0.1         |
| <i>Ptilotus stirlingii</i>                            | 2       | 0.5         |
| <i>Ptilotus stirlingii</i>                            | 2       | 0.5         |
| <i>Sclerolaena cuneata</i>                            | 15      | 0.2         |
| <i>Senna artemisioides</i> subsp. <i>filifolia</i>    | 60      | 1           |
| <i>Senna artemisioides</i> subsp. <i>helmsii</i>      | 100     | 2           |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)         | 100     | 10          |
| <i>Solanum lasiophyllum</i>                           | 30      | 0.1         |

**Site No:** LS V09\_rapid    **Date:** 2014    **Longitude:** 116.64310    **Latitude:** -26.88218

**Type:** Quadrat

**Soil Types:** Sandy clay loam

**Topography:** Drainage

**Soil Description:** Light Brown Moist

**Outcrops:**

**Fire:** 10+

**Condition:** Good

**Condition Notes:** Waterway is heavily used by cattle with frequent pugging and soil disturbance

**Vegetation Type:** AvEp

**Vegetation Description:** *Acacia victoriae* subsp. *victoriae*, *Acacia sclerosperma* subsp. *sclerosperma* and *Acacia tetragonophylla* tall shrubland over *Eremophila pterocarpa* subsp. *pterocarpa*, *Senna* sp. Meekatharra (E. Bailey 1-26) and *Atriplex amnicola* mixed chenopod shrubland



| Taxon                                         | Ht (cm) | Foliage (%) |
|-----------------------------------------------|---------|-------------|
| <i>Allocasuarina campestris</i>               | 700     | 40          |
| <i>Samolus repens</i> var. <i>floribundus</i> | 40      | 0.1         |
| <i>Spergula pentandra</i> *                   | 10      | 0.5         |
| <i>Zygophyllum simile</i>                     | 15      | 10          |
| <i>Tecticornia halocnemoides</i>              | 40      | 80          |



| Taxon                            | Ht (cm) | Foliage (%) |
|----------------------------------|---------|-------------|
| <i>Tecticornia halocnemoides</i> | 20      | 1           |
| <i>Tecticornia indica</i>        | 30      | 5           |

|                        |                   |                             |                            |
|------------------------|-------------------|-----------------------------|----------------------------|
| <b>Site No:</b> LS V11 | <b>Date:</b> 2014 | <b>Longitude:</b> 116.63031 | <b>Latitude:</b> -26.87185 |
|------------------------|-------------------|-----------------------------|----------------------------|

**Type:** Quadrat

**Soil Types:** Loam

**Topography:** Flat, Plains

**Soil Description:** Red brownDry

**Outcrops:**

**Fire:** 10+

**Condition:** Very Good

**Condition Notes:**

**Vegetation Type:** AvEp

**Vegetation Description:** *Acacia victoriae* subsp. *victoriae*, *Acacia sclerosperma* subsp. *sclerosperma* and *Acacia tetragonophylla* tall shrubland over *Eremophila pterocarpa* subsp. *pterocarpa*, *Senna* sp. Meekatharra (E. Bailey 1-26) and *Atriplex amnicola* mixed chenopod shrubland





| Taxon                                                  | Ht (cm) | Foliage (%) |
|--------------------------------------------------------|---------|-------------|
| <i>Acacia victoriae</i> subsp. <i>victoriae</i>        | 250     | 2           |
| <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i>  | 400     | 20          |
| <i>Acacia victoriae</i> subsp. <i>victoriae</i>        | 350     | 1           |
| <i>Acacia tetragonophylla</i>                          | 400     | 2           |
| <i>Atriplex ?amnicola</i>                              | 40      | 0.5         |
| <i>Zygophylla aurantiacus</i>                          | 10      | 0.1         |
| <i>Grevillea berryana</i>                              | 700     | 1           |
| <i>Grevillea nematophylla</i> subsp. <i>supraplana</i> | 800     | 2           |
| <i>Ptilotus obovatus</i>                               |         | 0.1         |
| <i>Spergula pentandra</i> *                            | 10      | 0.1         |
| <i>Santalum lanceolatum</i>                            | 600     | 1           |
| <i>Scaevola spinescens</i>                             | 50      | 0.5         |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)          | 50      | 1           |

|                     |                         |                             |                            |
|---------------------|-------------------------|-----------------------------|----------------------------|
| <b>Site No:</b> 01R | <b>Date:</b> 20/11/2020 | <b>Longitude:</b> 116.64105 | <b>Latitude:</b> -26.63557 |
|---------------------|-------------------------|-----------------------------|----------------------------|

**Type:** Revele**Soil Types:** clay, sand on surface**Topography:** flat**Surface:** bare 95%**Outcrops:** none**Litter:** twigs sticks**Condition:** Very Good**Condition Notes:** climate, grazing**Vegetation Type:** AfEfPo

**Vegetation Description:** *Acacia fuscaneura*, *Acacia incurvaneura* and *Acacia victoriae* subsp. *victoriae* low open woodland over *Eremophila forrestii* subsp. *forrestii*, *Acacia tetragonophylla* and *Eremophila phyllopoda* low to tall open shrubland over *Ptilotus obovatus*, *Solanum lasiophyllum* and *Maireana planifolia* low sparse shrubland.



| Taxon                         | Ht (cm) | Foliage (%) |
|-------------------------------|---------|-------------|
| <i>Acacia incurvaneura</i>    | 400     | 5           |
| <i>Acacia tetragonophylla</i> | 150     | 0.5         |
| <i>Aristida contorta</i>      | 5       | 0.1         |
| <i>Eremophila fraseri</i>     | 100     | 1           |
| <i>Eremophila longifolia</i>  | 50      | 0.5         |



| Taxon                                                   | Ht (cm) | Foliage (%) |
|---------------------------------------------------------|---------|-------------|
| <i>Lepidium oxytrichum</i>                              | 2       | 0.1         |
| <i>Maireana planifolia</i>                              | 30      | 1           |
| <i>Ptilotus drummondii</i>                              | 10      | 0.1         |
| <i>Ptilotus obovatus</i>                                | 30      | 1           |
| <i>Senna artemisioides</i> subsp. <i>oligophylla</i>    | 100     | 1           |
| <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260) | 10      | 0.1         |
| <i>Solanum lasiophyllum</i>                             | 30      | 0.1         |

|                     |                         |                             |                            |
|---------------------|-------------------------|-----------------------------|----------------------------|
| <b>Site No:</b> 03R | <b>Date:</b> 20/11/2020 | <b>Longitude:</b> 116.65171 | <b>Latitude:</b> -26.61708 |
|---------------------|-------------------------|-----------------------------|----------------------------|

**Type:** Releve**Soil Types:** clay hard**Topography:** flat**Surface:** rocky quarts, peso and granite**Outcrops:** none**Litter:** none**Condition:** very good**Condition Notes:****Vegetation Type:** AfEfPo

**Vegetation Description:** *Acacia fuscaneura*, *Acacia incurvaneura* and *Acacia victoriae* subsp. *victoriae* low open woodland over *Eremophila forrestii* subsp. *forrestii*, *Acacia tetragonophylla* and *Eremophila phyllopoda* low to tall open shrubland over *Ptilotus obovatus*, *Solanum lasiophyllum* and *Maireana planifolia* low sparse shrubland.



| Taxon                                           | Ht (cm) | Foliage (%) |
|-------------------------------------------------|---------|-------------|
| <i>Acacia fuscaneura</i>                        |         |             |
| <i>Acacia incurvaneura</i>                      |         |             |
| <i>Acacia victoriae</i> subsp. <i>victoriae</i> | 300     | 0.1         |
| <i>Eremophila fraseri</i>                       | 80      | 2           |
| <i>Eremophila longifolia</i>                    | 80      | 1           |



| Taxon                                                | Ht (cm) | Foliage (%) |
|------------------------------------------------------|---------|-------------|
| <i>Maireana planifolia</i>                           | 5       | 0.1         |
| <i>Ptilotus obovatus</i>                             | 30      | 0.1         |
| <i>Rhagodia eremaea</i>                              |         |             |
| <i>Senna artemisioides</i> subsp. <i>helmsii</i>     | 80      | 0.1         |
| <i>Senna artemisioides</i> subsp. <i>oligophylla</i> | 80      | 0.1         |
| <i>Senna artemisioides</i> subsp. <i>petiolaris</i>  | 80      | 0.1         |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)        |         |             |
| <i>Solanum lasiophyllum</i>                          |         | 0.1         |

|                     |                         |                             |                            |
|---------------------|-------------------------|-----------------------------|----------------------------|
| <b>Site No:</b> 02R | <b>Date:</b> 20/11/2020 | <b>Longitude:</b> 116.64380 | <b>Latitude:</b> -26.62969 |
|---------------------|-------------------------|-----------------------------|----------------------------|

**Type:** Releve**Soil Types:** sand over clay**Topography:** drainage**Surface:** bare 80%, some quartz patches**Outcrops:** none**Litter:** twigs sticks**Condition:** very good**Condition Notes:****Vegetation Type:** AvEp

**Vegetation Description:** *Acacia victoriae* subsp. *victoriae*, *Acacia sclerosperma* subsp. *sclerosperma* and *Acacia tetragonophylla* tall shrubland over *Eremophila pterocarpa* subsp. *pterocarpa*, *Senna* sp. Meekatharra (E. Bailey 1-26) and *Atriplex amnicola* mixed chenopod shrubland



| Taxon                                                 | Ht (cm) | Foliage (%) |
|-------------------------------------------------------|---------|-------------|
| <i>Acacia grasbyi</i>                                 | 400     | 0.5         |
| <i>Acacia kempeana</i>                                | 100     | 1           |
| <i>Acacia pteraneura</i>                              | 150     | 0.1         |
| <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> | 200     | 2           |
| <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> | 200     | 0.1         |



| Taxon                                                | Ht (cm) | Foliage (%) |
|------------------------------------------------------|---------|-------------|
| <i>Acacia tetragonophylla</i>                        | 200     | 2           |
| <i>Acacia victoriae</i> subsp. <i>victoriae</i>      | 300     | 4           |
| <i>Eremophila compacta</i>                           | 40      | 0.1         |
| <i>Eremophila longifolia</i>                         | 40      | 1           |
| <i>Hakea preissii</i>                                | 200     | 2           |
| <i>Maireana planifolia</i>                           | 30      | 0.1         |
| <i>Ptilotus obovatus</i>                             | 30      | 0.1         |
| <i>Scaevola spinescens</i>                           | 40      | 0.5         |
| <i>Sclerolaena cuneata</i>                           | 5       | 0.1         |
| <i>Senna artemisioides</i> subsp. <i>helmsii</i>     | 140     | 8           |
| <i>Senna artemisioides</i> subsp. <i>oligophylla</i> | 140     | 4           |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)        | 140     | 5           |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)        | 30      | 1           |
| <i>Senna stricta</i>                                 | 100     | 0.1         |
| <i>Solanum lasiophyllum</i>                          | 30      | 0.1         |

|                     |                         |                             |                            |
|---------------------|-------------------------|-----------------------------|----------------------------|
| <b>Site No:</b> 04R | <b>Date:</b> 20/11/2020 | <b>Longitude:</b> 116.66278 | <b>Latitude:</b> -26.51528 |
|---------------------|-------------------------|-----------------------------|----------------------------|

**Type:** Releve**Soil Types:** hard clay**Topography:** flat**Surface:** bare 90%**Outcrops:** none**Litter:** leaves twigs branches**Condition:** very good**Condition Notes:** dry**Vegetation Type:** AiAtEf

**Vegetation Description:** *Acacia incurvaneura*, *Acacia craspedocarpa* and *Acacia fuscaneura* low open woodland over *Acacia tetragonophylla*, *Acacia kempeana* and *Acacia oswaldii* sparse tall shrubland over *Eremophila fraseri* subsp. *parva*, *Senna artemisioides* subsp. *helmsii* and *Eremophila macmillaniana* sparse mid shrubland.



| Taxon                         | Ht (cm) | Foliage (%) |
|-------------------------------|---------|-------------|
| <i>acacia celastrocarpa</i>   | 200     | 0.5         |
| <i>Acacia incurvaneura</i>    | 500     | 2           |
| <i>Acacia tetragonophylla</i> | 200     | 2           |
| <i>Eremophila compacta</i>    | 50      | 0.1         |
| <i>Eremophila forrestii</i>   | 80      | 0.1         |



| Taxon                                               | Ht (cm) | Foliage (%) |
|-----------------------------------------------------|---------|-------------|
| <i>Eremophila fraseri</i>                           | 80      | 0.1         |
| <i>Eremophila latrobei</i>                          | 50      | 2           |
| <i>Eremophila longifolia</i>                        | 80      | 4           |
| <i>Lepidium oxytrichum</i>                          | 5       | 0.1         |
| <i>Ptilotus drummondii</i>                          | 20      | 0.1         |
| <i>Ptilotus obovatus</i>                            | 30      | 0.1         |
| <i>Senna artemisioides</i> subsp. <i>helmsii</i>    | 100     | 1           |
| <i>Senna artemisioides</i> subsp. <i>petiolaris</i> | 40      | 0.1         |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)       | 80      | 0.1         |
| <i>Solanum lasiophyllum</i>                         |         |             |

|                     |                         |                             |                            |
|---------------------|-------------------------|-----------------------------|----------------------------|
| <b>Site No:</b> 05R | <b>Date:</b> 20/11/2020 | <b>Longitude:</b> 116.67592 | <b>Latitude:</b> -26.52449 |
|---------------------|-------------------------|-----------------------------|----------------------------|

**Type:** Revele**Soil Types:** clay**Topography:** ephemeral drainage**Surface:** bare 50%**Outcrops:** none**Litter:** leaves, twigs, branches, logs**Condition:** very good**Condition Notes:****Vegetation Type:** AfEfPo

**Vegetation Description:** *Acacia fuscanera*, *Acacia incurvaneura* and *Acacia victoriae* subsp. *victoriae* low open woodland over *Eremophila forrestii* subsp. *forrestii*, *Acacia tetragonophylla* and *Eremophila phyllopoda* low to tall open shrubland over *Ptilotus obovatus*, *Solanum lasiophyllum* and *Maireana planifolia* low sparse shrubland.



| Taxon                                                   | Ht (cm) | Foliage (%) |
|---------------------------------------------------------|---------|-------------|
| <i>Acacia cuthbertsonii</i> subsp. <i>cuthbertsonii</i> |         | 0.1         |
| <i>Acacia grasbyi</i>                                   | 200     | 4           |
| <i>Acacia incurvaneura</i>                              | 600     | 12          |
| <i>Acacia tetragonophylla</i>                           |         | 0.1         |
| <i>Eremophila forrestii</i>                             | 80      | 1           |



| Taxon                                                 | Ht (cm) | Foliage (%) |
|-------------------------------------------------------|---------|-------------|
| <i>Eremophila fraseri</i>                             |         | opp         |
| <i>Eremophila latrobei</i>                            |         | 0.1         |
| <i>Eremophila longifolia</i>                          | 50      | 1           |
| <i>Eremophila mackinlayi</i> subsp. <i>spathulata</i> | 50      | 0.5         |
| <i>Gnephosis arachnoides</i>                          | 10      | 4           |
| <i>Gnephosis tenuissima</i>                           |         |             |
| <i>Hakea preissii</i>                                 |         |             |
| <i>Ptilotus drummondii</i>                            | 30      | 3           |
| <i>Ptilotus obovatus</i>                              | 30      | 0.1         |
| <i>Ptilotus schwartzii</i>                            | 20      | 0.1         |
| <i>Senna artemisioides</i> subsp. <i>helmsii</i>      | 100     | 0.1         |

|                     |                         |                             |                            |
|---------------------|-------------------------|-----------------------------|----------------------------|
| <b>Site No:</b> 06R | <b>Date:</b> 20/11/2020 | <b>Longitude:</b> 116.59079 | <b>Latitude:</b> -26.54486 |
|---------------------|-------------------------|-----------------------------|----------------------------|

**Type:** Releve**Soil Types:** clay**Topography:** drainage**Surface:** bare 60%**Outcrops:** none**Litter:** leaves, twigs, shrubs**Condition:** very good**Condition Notes:****Vegetation Type:** AiAtEf

**Vegetation Description:** *Acacia incurvaneura*, *Acacia craspedocarpa* and *Acacia fuscaneura* low open woodland over *Acacia tetragonophylla*, *Acacia kempeana* and *Acacia oswaldii* sparse tall shrubland over *Eremophila fraseri* subsp. *parva*, *Senna artemisioides* subsp. *helmsii* and *Eremophila macmillaniana* sparse mid shrubland.



| Taxon                                                   | Ht (cm) | Foliage (%) |
|---------------------------------------------------------|---------|-------------|
| <i>Acacia ?aptaneura</i>                                | 500     | 1           |
| <i>Acacia ?caesaneura</i>                               | 200     | 1           |
| <i>Acacia burkittii</i>                                 | 500     | 1           |
| <i>Acacia cuthbertsonii</i> subsp. <i>cuthbertsonii</i> | 300     | 8           |
| <i>Acacia incurvaneura</i>                              | 500     | 16          |



| Taxon                         | Ht (cm) | Foliage (%) |
|-------------------------------|---------|-------------|
| <i>Acacia tetragonophylla</i> | 400     | 12          |
| <i>Amyema fitzgeraldii</i>    | 0       | 0.1         |
| <i>Aristida</i> sp.           | 10      | 2           |
| <i>Eremophila fraseri</i>     | 150     | 0.5         |
| <i>Eremophila longifolia</i>  | 400     | 0.5         |
| <i>Eremophila maitlandii</i>  | 300     | 0.5         |
| <i>Eucalyptus victrix</i>     | 500     | 1           |

|                                             |                          |                             |                            |
|---------------------------------------------|--------------------------|-----------------------------|----------------------------|
| <b>Site No:</b> 07R                         | <b>Date:</b> 20/11/2020  | <b>Longitude:</b> 117.19398 | <b>Latitude:</b> -26.92819 |
| <b>Type:</b> Releve                         | <b>Soil Types:</b> sandy |                             |                            |
| <b>Topography:</b> flat                     | <b>Surface:</b> bare 95% |                             |                            |
| <b>Outcrops:</b> granite boulders and domes | <b>Litter:</b>           |                             |                            |
| <b>Condition:</b> very good                 | <b>Condition Notes:</b>  |                             |                            |
| <b>Vegetation Type:</b> Granite             |                          |                             |                            |
| <b>Vegetation Description:</b>              |                          |                             |                            |



| Taxon                                                   | Ht (cm) | Foliage (%) |
|---------------------------------------------------------|---------|-------------|
| <i>Acacia ?aneura</i>                                   | 200     | 3           |
| <i>Acacia cuthbertsonii</i> subsp. <i>cuthbertsonii</i> | 200     | 0.5         |
| <i>Acacia incurvaneura</i>                              | 200     | 1           |
| <i>Acacia tetragonophylla</i>                           | 150     | 3           |
| <i>Alogyne pinoniana</i>                                | 50      | 0.1         |
| <i>Boerhavia coccinea</i>                               | 0       | 0.1         |



| Taxon                                              | Ht (cm) | Foliage (%) |
|----------------------------------------------------|---------|-------------|
| <i>Cymbopogon ambiguus</i>                         | 30      | 0.1         |
| <i>Eremophila fraseri</i>                          | 50      | 2           |
| <i>Euphorbia boopthona</i>                         | 30      | 0.1         |
| <i>Gnephosis tenuissima</i>                        |         |             |
| <i>Hakea preissii</i>                              | 50      | 0.1         |
| <i>Ptilotus obovatus</i>                           | 30      | 3           |
| <i>Rhagodia eremaea</i>                            | 30      | 0.1         |
| <i>Santalum spicatum</i>                           | 200     | 0.1         |
| <i>Senna artemisioides</i> subsp. <i>filifolia</i> | 50      | 0.1         |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)      | 150     | 0.1         |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)      | 50      | 0.1         |
| <i>Sida ?calyxhymenia</i>                          |         |             |
| <i>Solanum lasiophyllum</i>                        | 30      | 1           |

|                     |                         |                             |                            |
|---------------------|-------------------------|-----------------------------|----------------------------|
| <b>Site No:</b> 08R | <b>Date:</b> 21/11/2020 | <b>Longitude:</b> 117.19197 | <b>Latitude:</b> -26.92421 |
|---------------------|-------------------------|-----------------------------|----------------------------|

**Type:** Releve**Soil Types:** clay, sand on surface**Topography:** flat**Surface:** bare 95%**Outcrops:****Litter:** twigs branches**Condition:** very good**Condition Notes:****Vegetation Type:** AaEcPo

**Vegetation Description:** *Acacia aptaneura*, *Acacia aneura* and *Acacia incurvaneura* low open woodland over *Eremophila compacta*, *Eremophila simulans* and *Eremophila gilesii* mid open shrubland over *Ptilotus obovatus*, *Ptilotus drummondii* and *Aristida* sp. low mixed shrub and grassland.



| Taxon                      | Ht (cm) | Foliage (%) |
|----------------------------|---------|-------------|
| <i>Acacia aneura</i>       | 400     | 1           |
| <i>Acacia aptaneura</i>    | 400     | 12          |
| <i>Acacia fuscaneura</i>   |         |             |
| <i>Acacia incurvaneura</i> | 150     | 0.1         |



| Taxon                                                | Ht (cm) | Foliage (%) |
|------------------------------------------------------|---------|-------------|
| <i>Eremophila forrestii</i>                          |         |             |
| <i>Eremophila fraseri</i>                            | 150     | 1           |
| <i>Gnephosis tenuissima</i>                          |         |             |
| <i>Maireana planifolia</i>                           | 50      | 0.1         |
| <i>Ptilotus aervoides</i>                            | 0       | 0.1         |
| <i>Ptilotus drummondii</i>                           | 30      | 0.1         |
| <i>Ptilotus obovatus</i>                             | 30      | 0.1         |
| <i>Senna artemisioides</i> subsp. <i>helmsii</i>     | 100     | 0.5         |
| <i>Senna artemisioides</i> subsp. <i>oligophylla</i> |         |             |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)        |         |             |

|                                        |                                         |                             |                            |
|----------------------------------------|-----------------------------------------|-----------------------------|----------------------------|
| <b>Site No:</b> 09R                    | <b>Date:</b> 21/11/2020                 | <b>Longitude:</b> 117.17371 | <b>Latitude:</b> -26.91478 |
| <b>Type:</b> Revele                    | <b>Soil Types:</b> clay sand on surface |                             |                            |
| <b>Topography:</b> flat                | <b>Surface:</b> bare 99%                |                             |                            |
| <b>Outcrops:</b> granite domes         | <b>Litter:</b>                          |                             |                            |
| <b>Condition:</b> very good            | <b>Condition Notes:</b>                 |                             |                            |
| <b>Vegetation Type:</b> Granite        |                                         |                             |                            |
| <b>Vegetation Description:</b> Granite |                                         |                             |                            |



| Taxon                                             | Ht (cm) | Foliage (%) |
|---------------------------------------------------|---------|-------------|
| <i>Acacia grasbyi</i>                             | 400     | 2           |
| <i>Acacia incurvaneura</i>                        | 400     | 1           |
| <i>Acacia tetragonophylla</i>                     | 200     | 0.5         |
| <i>Eremophila latrobei</i> subsp. <i>latrobei</i> | 80      | 0.1         |
| <i>Eremophila maitlandii</i>                      | 100     | 4           |
| <i>Maireana planifolia</i>                        |         |             |
| <i>Ptilotus obovatus</i>                          | 30      | 0.1         |



| Taxon                                                | Ht (cm) | Foliage (%) |
|------------------------------------------------------|---------|-------------|
| <i>Senna artemisioides</i> subsp. <i>oligophylla</i> | 80      | 0.1         |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)        |         |             |
| <i>Solanum lasiophyllum</i>                          | 20      | 0.1         |

| Site No: 10R                                                                                                                                                                                                                                                                                                                                                                                                                     | Date: 21/11/2020 | Longitude: 117.15159                      | Latitude: -26.91424 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------------------------------|---------------------|
| <b>Type:</b> Releve                                                                                                                                                                                                                                                                                                                                                                                                              |                  | <b>Soil Types:</b> clay with surface sand |                     |
| <b>Topography:</b> flat                                                                                                                                                                                                                                                                                                                                                                                                          |                  | <b>Surface:</b> bare                      |                     |
| <b>Outcrops:</b> none                                                                                                                                                                                                                                                                                                                                                                                                            |                  | <b>Litter:</b> sticks                     |                     |
| <b>Condition:</b> very good                                                                                                                                                                                                                                                                                                                                                                                                      |                  | <b>Condition Notes:</b>                   |                     |
| <b>Vegetation Type:</b> AfEfPo                                                                                                                                                                                                                                                                                                                                                                                                   |                  |                                           |                     |
| <b>Vegetation Description:</b> <i>Acacia fuscaneura</i> , <i>Acacia incurvaneura</i> and <i>Acacia victoriae</i> subsp. <i>victoriae</i> low open woodland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Acacia tetragonophylla</i> and <i>Eremophila phyllopoda</i> low to tall open shrubland over <i>Ptilotus obovatus</i> , <i>Solanum lasiophyllum</i> and <i>Maireana planifolia</i> low sparse shrubland. |                  |                                           |                     |



| Taxon                         | Ht (cm) | Foliage (%) |
|-------------------------------|---------|-------------|
| <i>Acacia ?caesaneura</i>     |         |             |
| <i>Acacia incurvaneura</i>    | 500     | 4           |
| <i>Acacia pruinocarpa</i>     | 500     | 0.1         |
| <i>Acacia tetragonophylla</i> | 200     | 2           |
| <i>Eremophila exilifolia</i>  |         |             |



| Taxon                                            | Ht (cm) | Foliage (%) |
|--------------------------------------------------|---------|-------------|
| <i>Eremophila forrestii</i>                      |         |             |
| <i>Eremophila fraseri</i>                        | 100     | 1           |
| <i>Ptilotus obovatus</i>                         | 30      | 0.1         |
| <i>Senna artemisioides</i> subsp. <i>helmsii</i> | 100     | 0.1         |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)    | 150     | 1           |

**Site No:** 11R      **Date:** 21/11/2020      **Longitude:** 117.11846      **Latitude:** -26.90059

**Type:** Releve

**Soil Types:** sandy

**Topography:** undulating

**Surface:** bare

**Outcrops:** none

**Litter:** sticks branches leaves

**Condition:** very good

**Condition Notes:**

**Vegetation Type:** AaEcPo

**Vegetation Description:** *Acacia aptaneura*, *Acacia aneura* and *Acacia incurvaneura* low open woodland over *Eremophila compacta*, *Eremophila simulans* and *Eremophila gilesii* mid open shrubland over *Ptilotus obovatus*, *Ptilotus drummondii* and *Aristida* sp. low mixed shrub and grassland.



| Taxon                         | Ht (cm) | Foliage (%) |
|-------------------------------|---------|-------------|
| <i>Acacia aptaneura</i>       | 400     | 5           |
| <i>Acacia incurvaneura</i>    | 300     | 0.5         |
| <i>Acacia pruinocarpa</i>     | 1000    | 1           |
| <i>Acacia tetragonophylla</i> | 200     | 1           |



| Taxon                                         | Ht (cm)       | Foliage (%) |
|-----------------------------------------------|---------------|-------------|
| <i>Aristida</i> sp.                           | 20            | 5           |
| <i>Boerhavia coccinea</i>                     | 0             | 0.1         |
| <i>Eremophila compacta</i>                    | 60            | 12          |
| <i>Eremophila forrestii</i>                   | 80            | 0.5         |
| <i>Eremophila gilesii</i>                     | 100           | 2           |
| <i>Euphorbia boopthona</i>                    | Euphorbiaceae | Herb        |
| <i>Ptilotus obovatus</i>                      | 50            | 0.5         |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26) | 130           | 2           |
| <i>Solanum lasiophyllum</i>                   | 50            | 1           |
| <i>Thryptomene decussata</i>                  | 200           | 0.5         |

|                     |                         |                             |                            |
|---------------------|-------------------------|-----------------------------|----------------------------|
| <b>Site No:</b> 12R | <b>Date:</b> 21/11/2020 | <b>Longitude:</b> 117.09706 | <b>Latitude:</b> -26.89665 |
|---------------------|-------------------------|-----------------------------|----------------------------|

**Type:** Releve**Soil Types:** sand and clay**Topography:** flat**Surface:** bare 85%**Outcrops:** none**Litter:** bushes, sticks**Condition:** very good**Condition Notes:****Vegetation Type:** AaEcPo

**Vegetation Description:** *Acacia aptaneura*, *Acacia aneura* and *Acacia incurvaneura* low open woodland over *Eremophila compacta*, *Eremophila simulans* and *Eremophila gilesii* mid open shrubland over *Ptilotus obovatus*, *Ptilotus drummondii* and *Aristida* sp. low mixed shrub and grassland.



| Taxon                      | Ht (cm) | Foliage (%) |
|----------------------------|---------|-------------|
| <i>Acacia aneura</i>       | 80      | 0.1         |
| <i>Acacia aptaneura</i>    | 400     | 15          |
| <i>Acacia incurvaneura</i> | 400     | 1           |
| <i>Aristida</i> sp.        | 20      | 1           |
| <i>Eremophila compacta</i> | 50      | 4           |



| Taxon                                         | Ht (cm) | Foliage (%) |
|-----------------------------------------------|---------|-------------|
| <i>Eremophila forrestii</i>                   | 100     | 0.5         |
| <i>Eremophila gilesii</i>                     | 80      | 1           |
| <i>Ptilotus obovatus</i>                      | 30      | 1           |
| <i>Scaevola spinescens</i>                    | 80      | 0.1         |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26) | 80      | 0.1         |
| <i>Solanum lasiophyllum</i>                   | 80      | 0.1         |
| <i>Thryptomene decussata</i>                  | 50      | 0.5         |
| <i>Thryptomene decussata</i>                  | 30      | 4           |

|                     |                         |                             |                            |
|---------------------|-------------------------|-----------------------------|----------------------------|
| <b>Site No:</b> 13R | <b>Date:</b> 21/11/2020 | <b>Longitude:</b> 117.09147 | <b>Latitude:</b> -26.89691 |
|---------------------|-------------------------|-----------------------------|----------------------------|

**Type:** Releve**Soil Types:** clay**Topography:** undulating**Surface:** pesolyte black gravel**Outcrops:** none**Litter:****Condition:** very good**Condition Notes:****Vegetation Type:** AfEfPo

**Vegetation Description:** *Acacia fuscaneura*, *Acacia incurvaneura* and *Acacia victoriae* subsp. *victoriae* low open woodland over *Eremophila forrestii* subsp. *forrestii*, *Acacia tetragonophylla* and *Eremophila phyllopoda* low to tall open shrubland over *Ptilotus obovatus*, *Solanum lasiophyllum* and *Maireana planifolia* low sparse shrubland.



| Taxon                      | Ht (cm) | Foliage (%) |
|----------------------------|---------|-------------|
| <i>Acacia ?distans</i>     | 150     | 1           |
| <i>Acacia anuera</i>       | 200     | 0.1         |
| <i>Acacia aptaneura</i>    | 500     | 1           |
| <i>Acacia incurvaneura</i> | 500     | 2           |
| <i>Dodonaea pachyneura</i> | 150     | 0.1         |



| Taxon                        | Ht (cm) | Foliage (%) |
|------------------------------|---------|-------------|
| <i>Eremophila compacta</i>   | 40      | 0.1         |
| <i>Eremophila forrestii</i>  | 130     | 0.1         |
| <i>Eremophila glutinosa</i>  | 100     | 0.1         |
| <i>Thryptomene decussata</i> | 200     | 2           |

|                                                                                                                                                                                                                                                                                                                                                                                                                         |                         |                             |                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------------------|----------------------------|
| <b>Site No:</b> 14R                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Date:</b> 21/11/2020 | <b>Longitude:</b> 117.08749 | <b>Latitude:</b> -26.89361 |
| <b>Type:</b> Releve                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Soil Types:</b> sand |                             |                            |
| <b>Topography:</b> scarp, breakaway                                                                                                                                                                                                                                                                                                                                                                                     | <b>Surface:</b> rocks   |                             |                            |
| <b>Outcrops:</b> boulders, rocks, gravel                                                                                                                                                                                                                                                                                                                                                                                | <b>Litter:</b> twigs    |                             |                            |
| <b>Condition:</b> very good                                                                                                                                                                                                                                                                                                                                                                                             | <b>Condition Notes:</b> |                             |                            |
| <b>Vegetation Type:</b> AiTdPb                                                                                                                                                                                                                                                                                                                                                                                          |                         |                             |                            |
| <b>Vegetation Description:</b> <i>Acacia incurvaneura</i> , <i>Acacia fuscaneura</i> and <i>Acacia caesaneura</i> low isolated clumps of trees over <i>Thryptomene decussata</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> and <i>Acacia oswaldii</i> mid open shrubland over <i>Ptilotus drummondii</i> , <i>Eragrostis eriopoda</i> and <i>Solanum lasiophyllum</i> low sparse mixed shrub and grassland. |                         |                             |                            |



| Taxon                      | Ht (cm) | Foliage (%) |
|----------------------------|---------|-------------|
| <i>Acacia ?aneura</i>      | 200     | 0.5         |
| <i>Acacia aptaneura</i>    |         | 2           |
| <i>Acacia fuscaneura</i>   | 250     | 0.1         |
| <i>Acacia incurvaneura</i> | 600     | 6           |
| <i>Cymbopogon ambiguus</i> | 20      | 0.5         |



| Taxon                        | Ht (cm) | Foliage (%) |
|------------------------------|---------|-------------|
| <i>Dodonaea pachyneura</i>   | 120     | 0.1         |
| <i>Eremophila compacta</i>   | 50      | 0.1         |
| <i>Eremophila maitlandii</i> | 100     | 0.1         |
| <i>Psydrax rigidula</i>      |         |             |
| <i>Solanum lasiophyllum</i>  | 30      | 0.1         |
| <i>Thryptomene decussata</i> |         | 0.1         |

|                     |                         |                             |                            |
|---------------------|-------------------------|-----------------------------|----------------------------|
| <b>Site No:</b> 15R | <b>Date:</b> 21/11/2020 | <b>Longitude:</b> 117.08482 | <b>Latitude:</b> -26.89451 |
|---------------------|-------------------------|-----------------------------|----------------------------|

**Type:** Releve**Soil Types:** cky some sand**Topography:** flat**Surface:** domes and rocks**Outcrops:** domes granite**Litter:** sticks shrubs**Condition:** very good**Condition Notes:****Vegetation Type:** AiTdPb

**Vegetation Description:** *Acacia incurvaneura*, *Acacia fuscaneura* and *Acacia caesaneura* low isolated clumps of trees over *Thryptomene decussata*, *Eremophila forrestii* subsp. *forrestii* and *Acacia oswaldii* mid open shrubland over *Ptilotus drummondii*, *Eragrostis eriopoda* and *Solanum lasiophyllum* low sparse mixed shrub and grassland.



| Taxon                         | Ht (cm) | Foliage (%) |
|-------------------------------|---------|-------------|
| <i>Acacia aptaneura</i>       | 80      | 0.1         |
| <i>Acacia fuscaneura</i>      | 500     | 5           |
| <i>Acacia incurvaneura</i>    | 500     | 4           |
| <i>Acacia tetragonophylla</i> | 400     | 0.5         |
| <i>Eremophila fraseri</i>     | 40      | 0.1         |



| Taxon                        | Ht (cm) | Foliage (%) |
|------------------------------|---------|-------------|
| <i>Eremophila maitlandii</i> | 100     | 0.1         |
| <i>Sclerolaena cuneata</i>   |         |             |
| <i>Solanum lasiophyllum</i>  | 30      | 0.1         |

|                     |                         |                             |                            |
|---------------------|-------------------------|-----------------------------|----------------------------|
| <b>Site No:</b> 16R | <b>Date:</b> 21/11/2020 | <b>Longitude:</b> 117.01272 | <b>Latitude:</b> -26.82167 |
|---------------------|-------------------------|-----------------------------|----------------------------|

**Type:** Revele**Soil Types:** sand**Topography:** slope**Surface:** rocky**Outcrops:** granite solid**Litter:** twigs**Condition:** very good**Condition Notes:****Vegetation Type:** AiTdPb

**Vegetation Description:** *Acacia incurvaneura*, *Acacia fuscaneura* and *Acacia caesaneura* low isolated clumps of trees over *Thryptomene decussata*, *Eremophila forrestii* subsp. *forrestii* and *Acacia oswaldii* mid open shrubland over *Ptilotus drummondii*, *Eragrostis eriopoda* and *Solanum lasiophyllum* low sparse mixed shrub and grassland.



| Taxon                       | Ht (cm) | Foliage (%) |
|-----------------------------|---------|-------------|
| <i>Acacia aulacophylla</i>  | 80      | 0.1         |
| <i>Acacia fuscaneura</i>    |         |             |
| <i>Acacia incurvaneura</i>  | 200     | 1           |
| <i>Borya sphaerocephala</i> | 5       | 0.1         |
| <i>Dodonaea pachyneura</i>  | 80      | 1           |



| Taxon                                             | Ht (cm) | Foliage (%) |
|---------------------------------------------------|---------|-------------|
| <i>Eremophila latrobei</i> subsp. <i>latrobei</i> | 5       | 0.1         |
| <i>Hakea preissii</i>                             | 30      | 0.1         |
| <i>Micromyrtus sulphurea</i>                      | 30      | 0.5         |
| <i>Mirbelia rhagodioides</i>                      | 40      | 0.1         |
| <i>Ptilotus drummondii</i>                        | 20      | 0.1         |
| <i>Ptilotus obovatus</i>                          | 30      | 0.5         |
| <i>Thryptomene decussata</i>                      | 60      | 2           |

|                     |                         |                             |                            |
|---------------------|-------------------------|-----------------------------|----------------------------|
| <b>Site No:</b> 17R | <b>Date:</b> 21/11/2020 | <b>Longitude:</b> 117.01459 | <b>Latitude:</b> -26.81693 |
|---------------------|-------------------------|-----------------------------|----------------------------|

**Type:** Releve**Soil Types:** clay sand soft**Topography:** flat**Surface:** minor erosion**Outcrops:** none**Litter:** branches, twigs**Condition:** very good**Condition Notes:****Vegetation Type:** AaEcPo

**Vegetation Description:** *Acacia aptaneura*, *Acacia aneura* and *Acacia incurvaneura* low open woodland over *Eremophila compacta*, *Eremophila simulans* and *Eremophila gilesii* mid open shrubland over *Ptilotus obovatus*, *Ptilotus drummondii* and *Aristida* sp. low mixed shrub and grassland.



| Taxon                     | Ht (cm) | Foliage (%) |
|---------------------------|---------|-------------|
| <i>Acacia aneura</i>      | 400     | 0.1         |
| <i>Acacia aptaneura</i>   | 350     | 15          |
| <i>Acacia pruniocarpa</i> | 200     | 0.5         |
| <i>Aristida</i> sp.       | 20      | 0.1         |
| <i>Eremophila gilesii</i> | 100     | 4           |



| Taxon                       | Ht (cm) | Foliage (%) |
|-----------------------------|---------|-------------|
| <i>Eremophila simulans</i>  | 100     | 8           |
| <i>Solanum lasiophyllum</i> | 80      | 0.1         |

|                     |                         |                             |                            |
|---------------------|-------------------------|-----------------------------|----------------------------|
| <b>Site No:</b> 18R | <b>Date:</b> 22/11/2020 | <b>Longitude:</b> 117.04367 | <b>Latitude:</b> -26.88937 |
|---------------------|-------------------------|-----------------------------|----------------------------|

**Type:** Relieve

**Soil Types:** clay hard

**Topography:** flat

**Surface:** calcretr

**Outcrops:** nearby

**Litter:** branches

**Condition:** very good

**Condition Notes:**

**Vegetation Type:** AfSa

**Vegetation Description:** *Acacia fuscaneura*, *Acacia incurvaneura* and occasional *Acacia pruinocarpa* low open woodland over *Senna artemisioides* subsp. *helmsii*, *Acacia tetragonophylla* and *Senna* sp. Meekatharra (E. Bailey 1-26) mid to tall sparse shrubland.



| Taxon                    | Ht (cm) | Foliage (%) |
|--------------------------|---------|-------------|
| <i>Acacia caesaneura</i> | 200     | 0.1         |
| <i>Acacia fuscaneura</i> | 350     | 10          |

| Taxon                                               | Ht (cm) | Foliage (%) |
|-----------------------------------------------------|---------|-------------|
| <i>Acacia grasbyi</i>                               | 300     | 0.5         |
| <i>Eremophila latrobei</i> subsp. <i>latrobei</i>   |         |             |
| <i>Ptilotus obovatus</i>                            | 30      | 0.1         |
| <i>Senna artemisioides</i> subsp. <i>petiolaris</i> | 80      | 0.5         |
| <i>Solanum lasiophyllum</i>                         | 30      | 0.1         |

**Site No:** 19R      **Date:** 22/11/2020      **Longitude:** 117.04184      **Latitude:** -26.88906

**Type:** Releve

**Soil Types:** gravel

**Topography:** rise

**Surface:** rocky, bare 98%

**Outcrops:** numerous granite loose and solid

**Litter:** sticks

**Condition:** very good

**Condition Notes:**

**Vegetation Type:** ArCc

**Vegetation Description:** *Acacia rhodophloia* low open woodland over *Corchorus crozophorifolius*, *Cymbopogon ambiguus* and *Eremophila platycalyx* subsp. *platycalyx* mixed low to mid shrub and grassland.





| Taxon                                             | Ht (cm) | Foliage (%) |
|---------------------------------------------------|---------|-------------|
| <i>Acacia aptaneura</i>                           | 250     | 4           |
| <i>Acacia aulacophylla</i>                        | 120     | 0.1         |
| <i>Acacia caesaneura</i>                          | 200     | 0.5         |
| <i>Acacia collegialis</i>                         | 200     | 1           |
| <i>Acacia incurvaneura</i>                        | 300     | 5           |
| <i>Eremophila latrobei</i> subsp. <i>latrobei</i> | 80      | 0.5         |
| <i>Eremophila simulans</i>                        | 100     | 0.1         |

**Site No:** 20R**Date:** 22/11/2020**Longitude:** 117.03559**Latitude:** -26.88488**Type:** Revele**Soil Types:** sand, clay, some crust on surface**Topography:** flat**Surface:** bare 85%**Outcrops:** none**Litter:** leaves, twigs**Condition:** very good**Condition Notes:****Vegetation Type:** AaEcPo

**Vegetation Description:** *Acacia aptaneura*, *Acacia aneura* and *Acacia incurvaneura* low open woodland over *Eremophila compacta*, *Eremophila simulans* and *Eremophila gilesii* mid open



**Site No:** 20R      **Date:** 22/11/2020      **Longitude:** 117.03559      **Latitude:** -26.88488

shrubland over *Ptilotus obovatus*, *Ptilotus drummondii* and *Aristida* sp. low mixed shrub and grassland.



| Taxon                             | Ht (cm) | Foliage (%) |
|-----------------------------------|---------|-------------|
| <i>Acacia ?aneura</i>             | 200     | 1           |
| <i>Acacia aptaneura</i>           | 400     | 15          |
| <i>Acacia caesaneura</i>          | 200     | 1           |
| <i>Corchorus crozophorifolius</i> |         |             |
| <i>Eremophila forrestii</i>       | 100     | 2           |
| <i>Eremophila simulans</i>        | 130     | 6           |
| <i>Maireana planifolia</i>        | 30      | 0.1         |
| <i>Ptilotus drummondii</i>        | 20      | 0.1         |
| <i>Ptilotus obovatus</i>          | 30      | 0.1         |
| <i>Solanum lasiophyllum</i>       | 50      | 0.5         |
| <i>Thryptomene decussata</i>      | 300     | 0.1         |





|                     |                         |                             |                            |
|---------------------|-------------------------|-----------------------------|----------------------------|
| <b>Site No:</b> 21R | <b>Date:</b> 22/11/2020 | <b>Longitude:</b> 117.03288 | <b>Latitude:</b> -26.87559 |
|---------------------|-------------------------|-----------------------------|----------------------------|

**Type:** Revele**Soil Types:** sand, some clay**Topography:** undulating**Surface:** bare 85%**Outcrops:** none**Litter:** twigs leaves**Condition:** very good**Condition Notes:****Vegetation Type:** AaEcPo

**Vegetation Description:** *Acacia aptaneura*, *Acacia aneura* and *Acacia incurvaneura* low open woodland over *Eremophila compacta*, *Eremophila simulans* and *Eremophila gilesii* mid open shrubland over *Ptilotus obovatus*, *Ptilotus drummondii* and *Aristida* sp. low mixed shrub and grassland.



| Taxon                       | Ht (cm) | Foliage (%) |
|-----------------------------|---------|-------------|
| <i>Acacia aulacophylla</i>  | 300     | 10          |
| <i>Acacia pruinocarpa</i>   |         |             |
| <i>Eremophila compacta</i>  | 50      | 0.1         |
| <i>Eremophila forrestii</i> | 100     | 1           |
| <i>Eremophila simulans</i>  | 100     | 4           |



| Taxon                                               | Ht (cm) | Foliage (%) |
|-----------------------------------------------------|---------|-------------|
| <i>Grevillea berryana</i>                           | 400     | 3           |
| <i>Ptilotus drummondii</i>                          | 30      | 0.1         |
| <i>Santalum acuminatum</i>                          | 200     | 0.1         |
| <i>Senna artemisioides</i> subsp. <i>petiolaris</i> | 150     | 0.1         |
| <i>Solanum lasiophyllum</i>                         | 50      | 0.1         |
| <i>Thryptomene decussata</i>                        |         |             |

**Site No:** 22R      **Date:** 22/11/2020      **Longitude:** 117.03178      **Latitude:** -26.87047

**Type:** Releve

**Soil Types:** clay hard, some sand

**Topography:** slope

**Surface:** gravel 90%

**Outcrops:** rocks small

**Litter:**

**Condition:** very good

**Condition Notes:**

**Vegetation Type:** AfEfPo

**Vegetation Description:** *Acacia fusca*neura, *Acacia incurvaneura* and *Acacia victoriae* subsp. *victoriae* low open woodland over *Eremophila forrestii* subsp. *forrestii*, *Acacia tetragonophylla* and *Eremophila phyllopoda* low to tall open shrubland over *Ptilotus obovatus*, *Solanum lasiophyllum* and *Maireana planifolia* low sparse shrubland.



| Taxon                        | Ht (cm) | Foliage (%) |
|------------------------------|---------|-------------|
| <i>Acacia caesaneura</i>     | 400     | 2           |
| <i>Acacia collegialis</i>    | 200     | 6           |
| <i>Acacia incurvaneura</i>   | 350     | 3           |
| <i>Cheyniana microphylla</i> |         |             |
| <i>Dodonaea pachyneura</i>   | 80      | 0.1         |



| Taxon                                             | Ht (cm) | Foliage (%) |
|---------------------------------------------------|---------|-------------|
| <i>Eremophila forrestii</i>                       |         |             |
| <i>Eremophila latrobei</i> subsp. <i>latrobei</i> | 50      | 0.1         |
| <i>Hakea lorea</i> subsp. <i>lorea</i>            |         |             |
| <i>Psyrax rigidula</i>                            | 250     | 0.1         |

**Site No:** 23R      **Date:** 22/11/2020      **Longitude:** 117.01114      **Latitude:** -26.84410

**Type:** Revele

**Soil Types:** clay, sand on surface

**Topography:** flat undulating

**Surface:** some quartz

**Outcrops:** none

**Litter:** sticks

**Condition:** very good

**Condition Notes:**

**Vegetation Type:** AfEfPo

**Vegetation Description:** *Acacia fuscaneura*, *Acacia incurvaneura* and *Acacia victoriae* subsp. *victoriae* low open woodland over *Eremophila forrestii* subsp. *forrestii*, *Acacia tetragonophylla* and *Eremophila phyllopoda* low to tall open shrubland over *Ptilotus obovatus*, *Solanum lasiophyllum* and *Maireana planifolia* low sparse shrubland.



| Taxon                         | Ht (cm) | Foliage (%) |
|-------------------------------|---------|-------------|
| <i>Acacia collegialis</i>     |         |             |
| <i>Acacia fuscaneura</i>      |         | 2           |
| <i>Acacia grasbyi</i>         | 250     | 2           |
| <i>Acacia incurvaneura</i>    | 500     | 4           |
| <i>Acacia tetragonophylla</i> | 150     | 1           |



| Taxon                                               | Ht (cm) | Foliage (%) |
|-----------------------------------------------------|---------|-------------|
| <i>Eremophila forrestii</i>                         |         | 0.1         |
| <i>Maireana planifolia</i>                          |         | 0.1         |
| <i>Ptilotus obovatus</i>                            |         |             |
| <i>Senna artemisioides</i> subsp. <i>helmsii</i>    | 80      | 0.5         |
| <i>Senna artemisioides</i> subsp. <i>petiolaris</i> |         | 0.1         |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)       | 80      | 0.5         |
| <i>Solanum lasiophyllum</i>                         | 50      | 0.1         |

|                     |                         |                             |                            |
|---------------------|-------------------------|-----------------------------|----------------------------|
| <b>Site No:</b> 24R | <b>Date:</b> 22/11/2020 | <b>Longitude:</b> 116.94553 | <b>Latitude:</b> -26.80093 |
|---------------------|-------------------------|-----------------------------|----------------------------|

**Type:** Releve**Soil Types:** clay**Topography:** flat**Surface:** bare 95%**Outcrops:** none**Litter:** twigs**Condition:** very good**Condition Notes:****Vegetation Type:** AiAtEf

**Vegetation Description:** *Acacia incurvaneura*, *Acacia craspedocarpa* and *Acacia fuscaneura* low open woodland over *Acacia tetragonophylla*, *Acacia kempeana* and *Acacia oswaldii* sparse tall shrubland over *Eremophila fraseri* subsp. *parva*, *Senna artemisioides* subsp. *helmsii* and *Eremophila macmillaniana* sparse mid shrubland.



| Taxon                         | Ht (cm) | Foliage (%) |
|-------------------------------|---------|-------------|
| <i>Acacia aulacophylla</i>    | 100     | 0.1         |
| <i>Acacia caesaneura</i>      | 200     | 2           |
| <i>Acacia fuscaneura</i>      |         |             |
| <i>Acacia incurvaneura</i>    | 400     | 3           |
| <i>Acacia tetragonophylla</i> | 200     | 1           |



| Taxon                                            | Ht (cm) | Foliage (%) |
|--------------------------------------------------|---------|-------------|
| <i>Eremophila forrestii</i>                      | 120     | 0.1         |
| <i>Eremophila fraseri</i>                        | 150     | 1           |
| <i>Ptilotus obovatus</i>                         | 30      | 0.1         |
| <i>Senna artemisioides</i> subsp. <i>helmsii</i> | 100     | 0.1         |
| <i>Solanum lasiophyllum</i>                      | 40      | 0.1         |

| Site No: 25R                                                                                                                                                                                                                                                                                                                                                                                                                     | Date: 22/11/2020 | Longitude: 116.87927    | Latitude: -26.84407 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------------|---------------------|
| <b>Type:</b> Releve                                                                                                                                                                                                                                                                                                                                                                                                              |                  | <b>Soil Types:</b> clay |                     |
| <b>Topography:</b> undulating                                                                                                                                                                                                                                                                                                                                                                                                    |                  | <b>Surface:</b> rocky   |                     |
| <b>Outcrops:</b> intermittent domes and breakaways                                                                                                                                                                                                                                                                                                                                                                               |                  | <b>Litter:</b> branches |                     |
| <b>Condition:</b> very good                                                                                                                                                                                                                                                                                                                                                                                                      |                  | <b>Condition Notes:</b> |                     |
| <b>Vegetation Type:</b> AfEfPo                                                                                                                                                                                                                                                                                                                                                                                                   |                  |                         |                     |
| <b>Vegetation Description:</b> <i>Acacia fuscaneura</i> , <i>Acacia incurvaneura</i> and <i>Acacia victoriae</i> subsp. <i>victoriae</i> low open woodland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Acacia tetragonophylla</i> and <i>Eremophila phyllopoda</i> low to tall open shrubland over <i>Ptilotus obovatus</i> , <i>Solanum lasiophyllum</i> and <i>Maireana planifolia</i> low sparse shrubland. |                  |                         |                     |



| Taxon                         | Ht (cm) | Foliage (%) |
|-------------------------------|---------|-------------|
| <i>Acacia ?aneura</i>         | 60      | 0.1         |
| <i>Acacia fuscaneura</i>      | 400     | 2           |
| <i>Acacia incurvaneura</i>    | 400     | 3           |
| <i>Acacia tetragonophylla</i> | 200     | 0.1         |
| <i>Eremophila exilifolia</i>  | 80      | 2           |



| Taxon                                               | Ht (cm) | Foliage (%) |
|-----------------------------------------------------|---------|-------------|
| <i>Eremophila forrestii</i>                         | 100     | 0.1         |
| <i>Eremophila fraseri</i>                           | 100     | 2           |
| <i>Eremophila glutinosa</i>                         |         |             |
| <i>Eremophila pterocarpa</i>                        |         |             |
| <i>Ptilotus obovatus</i>                            | 30      | 0.1         |
| <i>Senna artemisioides</i> subsp. <i>helmsii</i>    | 150     | 1           |
| <i>Senna artemisioides</i> subsp. <i>petiolaris</i> | 150     | 0.1         |

|                     |                         |                             |                            |
|---------------------|-------------------------|-----------------------------|----------------------------|
| <b>Site No:</b> 26R | <b>Date:</b> 22/11/2020 | <b>Longitude:</b> 116.80744 | <b>Latitude:</b> -26.89724 |
|---------------------|-------------------------|-----------------------------|----------------------------|

**Type:** Revele**Soil Types:** sand over clay**Topography:** flat**Surface:** bare 75%**Outcrops:** none**Litter:** leaves, twigs**Condition:** very good**Condition Notes:****Vegetation Type:** AaEcPo

**Vegetation Description:** *Acacia aptaneura*, *Acacia aneura* and *Acacia incurvaneura* low open woodland over *Eremophila compacta*, *Eremophila simulans* and *Eremophila gilesii* mid open shrubland over *Ptilotus obovatus*, *Ptilotus drummondii* and *Aristida* sp. low mixed shrub and grassland.



| Taxon                      | Ht (cm) | Foliage (%) |
|----------------------------|---------|-------------|
| <i>Acacia caesaneura</i>   | 300     | 2           |
| <i>Acacia fuscaneura</i>   | 500     | 4           |
| <i>Acacia incurvaneura</i> | 500     | 4           |
| <i>Acacia kempeana</i>     | 80      | 0.1         |
| <i>Aristida</i> sp.        | 20      | 3           |



| Taxon                                              | Ht (cm) | Foliage (%) |
|----------------------------------------------------|---------|-------------|
| <i>Eremophila compacta</i>                         | 50      | 8           |
| <i>Eremophila gilesii</i>                          | 80      | 0.1         |
| <i>Euphorbia boopthona</i>                         |         | 0.1         |
| <i>Pogonolepis stricta</i>                         | 1       | 0.5         |
| <i>Senna artemisioides</i> subsp. <i>filifolia</i> | 100     | 0.1         |
| <i>Senna artemisioides</i> subsp. <i>helmsii</i>   | 120     | 0.1         |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)      | 100     | 0.5         |
| <i>Solanum lasiophyllum</i>                        | 30      | 0.1         |

|                     |                         |                             |                            |
|---------------------|-------------------------|-----------------------------|----------------------------|
| <b>Site No:</b> 27R | <b>Date:</b> 22/11/2020 | <b>Longitude:</b> 116.79470 | <b>Latitude:</b> -26.87469 |
|---------------------|-------------------------|-----------------------------|----------------------------|

**Type:** Revele**Soil Types:** clay, some sand on surface**Topography:** flat**Surface:** bare 90%**Outcrops:** none**Litter:** leaves sticks**Condition:** very good**Condition Notes:****Vegetation Type:** AfEfPo

**Vegetation Description:** *Acacia fuscaneura*, *Acacia incurvaneura* and *Acacia victoriae* subsp. *victoriae* low open woodland over *Eremophila forrestii* subsp. *forrestii*, *Acacia tetragonophylla* and *Eremophila phyllopoda* low to tall open shrubland over *Ptilotus obovatus*, *Solanum lasiophyllum* and *Maireana planifolia* low sparse shrubland.



| Taxon                        | Ht (cm) | Foliage (%) |
|------------------------------|---------|-------------|
| <i>Acacia cuthbertsonii</i>  |         |             |
| <i>Acacia fuscaneura</i>     | 300     | 0.5         |
| <i>Acacia incurvaneura</i>   | 500     | 8           |
| <i>Acacia kempeana</i>       | 200     | 0.5         |
| <i>Acacia quadrimarginea</i> |         |             |



| Taxon                                            | Ht (cm) | Foliage (%) |
|--------------------------------------------------|---------|-------------|
| <i>Acacia tetragonophylla</i>                    | 200     | 0.5         |
| <i>Eremophila forrestii</i>                      |         |             |
| <i>Eremophila fraseri</i>                        | 150     | 1           |
| <i>Ptilotus obovatus</i>                         | 30      | 1           |
| <i>Senna artemisioides</i> subsp. <i>helmsii</i> | 130     | 2           |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)    | 100     | 0.1         |
| <i>Solanum lasiophyllum</i>                      | 50      | 0.1         |

|                     |                         |                             |                            |
|---------------------|-------------------------|-----------------------------|----------------------------|
| <b>Site No:</b> 28R | <b>Date:</b> 22/11/2020 | <b>Longitude:</b> 116.47367 | <b>Latitude:</b> -26.95725 |
|---------------------|-------------------------|-----------------------------|----------------------------|

**Type:** Revele**Soil Types:** hard clay**Topography:** flat**Surface:** bare 95%**Outcrops:** none**Litter:** leaves twigs small logs**Condition:** very good**Condition Notes:****Vegetation Type:** AfEfPo

**Vegetation Description:** *Acacia fuscaneura*, *Acacia incurvaneura* and *Acacia victoriae* subsp. *victoriae* low open woodland over *Eremophila forrestii* subsp. *forrestii*, *Acacia tetragonophylla* and *Eremophila phyllopoda* low to tall open shrubland over *Ptilotus obovatus*, *Solanum lasiophyllum* and *Maireana planifolia* low sparse shrubland.



| Taxon                       | Ht (cm) | Foliage (%) |
|-----------------------------|---------|-------------|
| <i>Acacia anuera</i>        | 500     | 1           |
| <i>Acacia cuthbertsonii</i> | 200     | 0.1         |
| <i>Acacia fuscaneura</i>    | 600     | 2           |
| <i>Acacia incurvaneura</i>  | 600     | 8           |
| <i>Acacia kempeana</i>      | 200     | 1           |



| Taxon                                            | Ht (cm) | Foliage (%) |
|--------------------------------------------------|---------|-------------|
| <i>Acacia tetragonophylla</i>                    | 200     | 0.5         |
| <i>Aristida</i> sp.                              | 30      | 0.1         |
| <i>Chorizema ?racemosum</i>                      | 80      | 0.1         |
| <i>Dianella revoluta</i>                         | 40      | 0.1         |
| <i>Eremophila forrestii</i>                      | 50      | 0.5         |
| <i>Eremophila fraseri</i>                        | 150     | 1           |
| <i>Gnephosis arachnoides</i>                     | 10      | 0.1         |
| <i>Gnephosis tenuissima</i>                      | 3       | 0.1         |
| <i>Psyrax rigidula</i>                           | 300     | 0.1         |
| <i>Senna artemisioides</i> subsp. <i>helmsii</i> | 50      | 0.5         |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)    | 130     | 2           |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)    | 150     | 0.5         |
| <i>Solanum lasiophyllum</i>                      | 50      | 0.1         |

**Site No:** 29R      **Date:** 22/11/2020      **Longitude:** 116.47156      **Latitude:** -26.97250

**Type:** Revele

**Soil Types:** sand, clay banks

**Topography:** river

**Surface:** bare 99%

**Outcrops:** none

**Litter:** none

**Condition:** very good

**Condition Notes:** cows

**Vegetation Type:** AiAbSa

**Vegetation Description:** *Acacia incurvaneura*, *Acacia fuscaneura* and *Acacia caesaneura* low isolated clumps of trees over *Thryptomene decussata*, *Eremophila forrestii* subsp. *forrestii* and *Acacia oswaldii* mid open shrubland over *Ptilotus drummondii*, *Eragrostis eriopoda* and *Solanum lasiophyllum* low sparse mixed shrub and grassland.



| Taxon                                                 | Ht (cm) | Foliage (%) |
|-------------------------------------------------------|---------|-------------|
| <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> | 150     | 10          |
| <i>Allocasuarina campestris</i>                       | 500     | 5           |
| <i>Amyema fitzgeraldii</i>                            | 0       | 0.1         |
| <i>Chorizema ?racemosum</i>                           | 80      | 0.5         |
| <i>Cyperus gymnocaulos</i>                            | 100     | 0.1         |



| Taxon                                              | Ht (cm) | Foliage (%) |
|----------------------------------------------------|---------|-------------|
| <i>Eucalyptus mannensis</i>                        | 600     | 0.1         |
| <i>Eucalyptus victrix</i>                          | 800     | 4           |
| <i>Pluchea rubelliflora</i>                        | 5       | 0.1         |
| <i>Rhagodia eremaea</i>                            | 100     | 0.1         |
| <i>Scaevola spinescens</i>                         | 80      | 3           |
| <i>Senna artemisioides</i> subsp. <i>filifolia</i> | 80      | 0.1         |
| <i>Senna artemisioides</i> subsp. <i>helmsii</i>   | 80      | 1           |

|                     |                         |                             |                            |
|---------------------|-------------------------|-----------------------------|----------------------------|
| <b>Site No:</b> 30R | <b>Date:</b> 23/11/2020 | <b>Longitude:</b> 116.48139 | <b>Latitude:</b> -27.05134 |
|---------------------|-------------------------|-----------------------------|----------------------------|

**Type:** Revele**Soil Types:** sand over hard clay**Topography:** flat**Surface:** bare 90%**Outcrops:** none**Litter:** twigs**Condition:** very good**Condition Notes:****Vegetation Type:** AiTdPb

**Vegetation Description:** *Acacia incurvaneura*, *Acacia fuscaneura* and *Acacia caesaneura* low isolated clumps of trees over *Thryptomene decussata*, *Eremophila forrestii* subsp. *forrestii* and *Acacia oswaldii* mid open shrubland over *Ptilotus drummondii*, *Eragrostis eriopoda* and *Solanum lasiophyllum* low sparse mixed shrub and grassland.



| Taxon                         | Ht (cm) | Foliage (%) |
|-------------------------------|---------|-------------|
| <i>Acacia aptaneura</i>       |         |             |
| <i>Acacia caesaneura</i>      | 400     | 1           |
| <i>Acacia fuscaneura</i>      |         |             |
| <i>Acacia incurvaneura</i>    | 400     | 5           |
| <i>Acacia tetragonophylla</i> | 200     | 0.1         |



| Taxon                                             | Ht (cm) | Foliage (%) |
|---------------------------------------------------|---------|-------------|
| <i>Eragrostis eriopoda</i>                        | 30      | 2           |
| <i>Eremophila forrestii</i>                       | 100     | 3           |
| <i>Eremophila fraseri</i>                         | 150     | 0.1         |
| <i>Eremophila latrobei</i> subsp. <i>latrobei</i> | 80      | 0.1         |
| <i>Gnephosis tenuissima</i>                       | 2       | 0.1         |
| <i>Gnephosis tenuissima</i>                       | 2       | 0.1         |
| <i>Grevillea deflexa</i>                          | 30      | 0.5         |
| <i>Maireana planifolia</i>                        | 50      | 0.1         |
| <i>Psydax rigidula</i>                            | 150     | 0.1         |
| <i>Ptilotus drummondii</i>                        | 20      | 0.1         |
| <i>Ptilotus obovatus</i>                          | 30      | 0.1         |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)     | 150     | 0.5         |
| <i>Solanum lasiophyllum</i>                       | 30      | 0.1         |
| <i>Thryptomene decussata</i>                      | 200     | 0.1         |

|                     |                         |                             |                            |
|---------------------|-------------------------|-----------------------------|----------------------------|
| <b>Site No:</b> 31R | <b>Date:</b> 23/11/2020 | <b>Longitude:</b> 116.50216 | <b>Latitude:</b> -27.04299 |
|---------------------|-------------------------|-----------------------------|----------------------------|

**Type:** Releve**Soil Types:** sand**Topography:** hill**Surface:** bate 80%**Outcrops:** none**Litter:** leaves twigs**Condition:** very good**Condition Notes:****Vegetation Type:** AaEcPo

**Vegetation Description:** *Acacia aptaneura*, *Acacia aneura* and *Acacia incurvaneura* low open woodland over *Eremophila compacta*, *Eremophila simulans* and *Eremophila gilesii* mid open shrubland over *Ptilotus obovatus*, *Ptilotus drummondii* and *Aristida* sp. low mixed shrub and grassland.



| Taxon                                      | Ht (cm) | Foliage (%) |
|--------------------------------------------|---------|-------------|
| <i>Acacia aptaneura</i>                    | 200     | 0.5         |
| <i>Acacia cuthbertsonii</i>                | 180     | 0.1         |
| <i>Acacia grasbyi</i>                      | 200     | 0.1         |
| <i>Aluta aspera</i> subsp. <i>hesperia</i> | 100     | 18          |
| <i>Aristida</i> sp.                        | 30      | 2           |



| Taxon                                                    | Ht (cm) | Foliage (%) |
|----------------------------------------------------------|---------|-------------|
| <i>Eremophila forrestii</i>                              | 80      | 0.5         |
| <i>Eremophila simulans</i>                               | 100     | 2           |
| <i>Psyrax rigidula</i>                                   | 200     | 0.1         |
| <i>Ptilotus drummondii</i>                               | 30      | 0.1         |
| <i>Ptilotus schwartzii</i>                               | 20      | 0.1         |
| <i>Sauropus</i> sp. Woolgorong (M. Officer s.n. 10/8/94) | 20      | 0.1         |
| <i>Solanum lasiophyllum</i>                              | 30      | 0.1         |
| <i>Thryptomene decussata</i>                             | 300     | 1           |

|                     |                         |                             |                            |
|---------------------|-------------------------|-----------------------------|----------------------------|
| <b>Site No:</b> 32R | <b>Date:</b> 23/11/2020 | <b>Longitude:</b> 116.51019 | <b>Latitude:</b> -26.99929 |
|---------------------|-------------------------|-----------------------------|----------------------------|

**Type:** Revele**Soil Types:** clay**Topography:** flat**Surface:** bare 95%**Outcrops:** none**Litter:** branches**Condition:** very good**Condition Notes:****Vegetation Type:** AiAtEf

**Vegetation Description:** *Acacia incurvaneura*, *Acacia craspedocarpa* and *Acacia fuscaneura* low open woodland over *Acacia tetragonophylla*, *Acacia kempeana* and *Acacia oswaldii* sparse tall shrubland over *Eremophila fraseri* subsp. *parva*, *Senna artemisioides* subsp. *helmsii* and *Eremophila macmillaniana* sparse mid shrubland.



| Taxon                         | Ht (cm) | Foliage (%) |
|-------------------------------|---------|-------------|
| <i>Acacia caesaneura</i>      | 300     | 1           |
| <i>Acacia craspedocarpa</i>   | 300     | 1           |
| <i>Acacia incurvaneura</i>    | 400     | 6           |
| <i>Acacia pruinocarpa</i>     | 500     | 1           |
| <i>Acacia tetragonophylla</i> | 180     | 1           |



| Taxon                                             | Ht (cm) | Foliage (%) |
|---------------------------------------------------|---------|-------------|
| <i>Eremophila fraseri</i>                         | 100     | 1           |
| <i>Eremophila latrobei</i> subsp. <i>latrobei</i> | 30      | 0.1         |
| <i>Senna artemisioides</i> subsp. <i>helmsii</i>  | 80      | 0.1         |
| <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)     |         |             |

# Appendix D

## Fauna Inventory



Appendix D: Inventory of fauna species recorded in the survey area in 2014 and 2020

| Genus                | Species               | Subspecies       | Vernacular                                | Status     | EPBC Act Status | BC Act / WA Status | BAM Act Status                                 | 2014 | 2020 | 2020 Observations                                                                                                                                    |
|----------------------|-----------------------|------------------|-------------------------------------------|------------|-----------------|--------------------|------------------------------------------------|------|------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Acridotheres</i>  | <i>tristis</i>        |                  | Common Myna                               | Introduced | -               | -                  | Declared Pest - Prohibited s12 (C1 Prohibited) | -    | +    | Observed at infrastructure towards centre of survey area                                                                                             |
| <i>Aegotheles</i>    | <i>cristatus</i>      | <i>cristatus</i> | Australian Owlet-nightjar                 | Native     | -               | -                  | -                                              | -    | +    | Individual observed in open woodland to north of survey area                                                                                         |
| <i>Charadrius</i>    | <i>melanops</i>       |                  | Black-fronted Dotterel                    | Native     | -               | -                  | -                                              | +    | -    | -                                                                                                                                                    |
| <i>Vanellus</i>      | <i>miles</i>          |                  | Masked Lapwing                            | Native     | -               | -                  | -                                              | +    | -    | -                                                                                                                                                    |
| <i>Vanellus</i>      | <i>tricolor</i>       |                  | Banded Lapwing                            | Native     | -               | -                  | -                                              | +    | -    | -                                                                                                                                                    |
| <i>Ardea</i>         | <i>pacifica</i>       |                  | White-necked Heron                        | Native     | -               | -                  | -                                              | +    | -    | -                                                                                                                                                    |
| <i>Threskiornis</i>  | <i>spinicollis</i>    |                  | Straw-necked Ibis                         | Native     | Marine          | -                  | -                                              | +    | -    | -                                                                                                                                                    |
| <i>Phaps</i>         | <i>chalcoptera</i>    |                  | Common Bronzewing                         | Native     | -               | -                  | -                                              | +    | -    | -                                                                                                                                                    |
| <i>Ocyphaps</i>      | <i>lophotes</i>       |                  | Crested Pigeon                            | Native     | -               | -                  | -                                              | +    | +    | Flock of approximately 20 observed to north of survey area                                                                                           |
| <i>Circus</i>        | <i>assimilis</i>      |                  | Spotted Harrier                           | Native     | -               | -                  | -                                              | +    | -    | -                                                                                                                                                    |
| <i>Aquila</i>        | <i>audax</i>          |                  | Wedge-tailed Eagle                        | Native     | -               | -                  | -                                              | +    | +    | One bird observed flying over survey area                                                                                                            |
| <i>Hamirostra</i>    | <i>melanosternon</i>  |                  | Black-breasted Buzzard                    | Native     | -               | -                  | -                                              | +    | +    | Individual observed flying over northern survey area                                                                                                 |
| <i>Haliastur</i>     | <i>sphenurus</i>      |                  | Whistling Kite                            | Native     | Marine          | -                  | -                                              | +    | +    | Observed several times in survey and surrounding area - including one record nesting in large tree near infrastructure towards centre of survey area |
| <i>Falco</i>         | <i>berigora</i>       |                  | Brown Falcon                              | Native     | -               | -                  | -                                              | +    | +    | Observed a few times throughout the survey and surrounding area                                                                                      |
| <i>Falco</i>         | <i>cenchroides</i>    |                  | Australian Kestrel                        | Native     | Marine          | -                  | -                                              | +    | +    | Observed towards north of survey area in open woodland                                                                                               |
| <i>Falco</i>         | <i>longipennis</i>    |                  | Australian Hobby                          | Native     | -               | -                  | -                                              | +    | -    | -                                                                                                                                                    |
| <i>Acanthiza</i>     | <i>apicalis</i>       |                  | Broad-tailed Thornbill (Inland Thornbill) | Native     | -               | -                  | -                                              | +    | -    | -                                                                                                                                                    |
| <i>Acanthiza</i>     | <i>uropygialis</i>    |                  | Chestnut-rumped Thornbill                 | Native     | -               | -                  | -                                              | +    | -    | -                                                                                                                                                    |
| <i>Artamus</i>       | <i>cinereus</i>       |                  | Black-faced Woodswallow                   | Native     | -               | -                  | -                                              | +    | -    | -                                                                                                                                                    |
| <i>Artamus</i>       | <i>minor</i>          |                  | Little Woodswallow                        | Native     | -               | -                  | -                                              | +    | +    | Nesting in breakaway                                                                                                                                 |
| <i>Artamus</i>       | <i>personatus</i>     |                  | Masked Woodswallow                        | Native     | -               | -                  | -                                              | +    | +    | Directly observed in open woodland towards southeast of survey area                                                                                  |
| <i>Lalage</i>        | <i>tricolor</i>       |                  | White-winged Triller                      | Native     | -               | -                  | -                                              | +    | -    | -                                                                                                                                                    |
| <i>Psophodes</i>     | <i>occidentalis</i>   |                  | Chiming Wedgebill                         | Native     | -               | -                  | -                                              | +    | +    | Heard in the southwest of the survey area                                                                                                            |
| <i>Corvus</i>        | <i>bennetti</i>       |                  | Little Crow                               | Native     | -               | -                  | -                                              | +    | -    | -                                                                                                                                                    |
| <i>Corvus</i>        | <i>orru</i>           |                  | Torresian Crow                            | Native     | -               | -                  | -                                              | +    | -    | -                                                                                                                                                    |
| <i>Cracticus</i>     | <i>nigrogularis</i>   |                  | Pied Butcherbird                          | Native     | -               | -                  | -                                              | +    | +    | Observed in open woodlands several times in survey and surrounding area                                                                              |
| <i>Cracticus</i>     | <i>tibicen</i>        |                  | Australian Magpie                         | Native     | -               | -                  | -                                              | +    | -    | -                                                                                                                                                    |
| <i>Cracticus</i>     | <i>torquatus</i>      |                  | Grey Butcherbird                          | Native     | -               | -                  | -                                              | +    | -    | -                                                                                                                                                    |
| <i>Coracina</i>      | <i>novaeollandiae</i> |                  | Black-faced Cuckoo-shrike                 | Native     | Marine          | -                  | -                                              | -    | +    | Observed in the southwest of the survey area                                                                                                         |
| <i>Grallina</i>      | <i>cyanoleuca</i>     |                  | Magpie-lark                               | Native     | Marine          | -                  | -                                              | +    | +    | Observed towards centre of survey area on watered lawns                                                                                              |
| <i>Rhipidura</i>     | <i>leucophrys</i>     |                  | Willie Wagtail                            | Native     | -               | -                  | -                                              | +    | +    | Observed near infrastructure towards centre of survey area                                                                                           |
| <i>Petrochelidon</i> | <i>ariel</i>          |                  | Fairy Martin                              | Native     | -               | -                  | -                                              | +    | +    | Observed small flock near infrastructure towards centre of survey area                                                                               |
| <i>Hirundo</i>       | <i>neoxena</i>        |                  | Welcome Swallow                           | Native     | Marine          | -                  | -                                              | +    | +    | Observed near infrastructure towards centre of survey area                                                                                           |
| <i>Malurus</i>       | <i>lamberti</i>       |                  | Variiegated Fairy-wren                    | Native     | -               | -                  | -                                              | +    | +    | Family group observed in shrubs towards centre of survey area                                                                                        |
| <i>Malurus</i>       | <i>splendens</i>      |                  | Splendid Fairy-wren                       | Native     | -               | -                  | -                                              | +    | -    | -                                                                                                                                                    |
| <i>Epthianura</i>    | <i>albifrons</i>      |                  | White-fronted Chat                        | Native     | -               | -                  | -                                              | +    | -    | -                                                                                                                                                    |
| <i>Manorina</i>      | <i>flavigula</i>      |                  | Yellow-throated Miner                     | Native     | -               | -                  | -                                              | +    | -    | -                                                                                                                                                    |
| <i>Lichmera</i>      | <i>indistincta</i>    |                  | Brown Honeyeater                          | Native     | -               | -                  | -                                              | +    | -    | -                                                                                                                                                    |
| <i>Lichenostomus</i> | <i>penicillatus</i>   |                  | White-plumed Honeyeater                   | Native     | -               | -                  | -                                              | +    | -    | -                                                                                                                                                    |
| <i>Lichenostomus</i> | <i>plumulus</i>       |                  | Grey-fronted Honeyeater                   | Native     | -               | -                  | -                                              | +    | -    | -                                                                                                                                                    |
| <i>Acanthagenys</i>  | <i>rufogularis</i>    |                  | Spiny-cheeked Honeyeater                  | Native     | -               | -                  | -                                              | +    | -    | -                                                                                                                                                    |
| <i>Melanodryas</i>   | <i>cucullata</i>      |                  | Hooded Robin                              | Native     | -               | -                  | -                                              | -    | +    | Flock of six observed in open woodland                                                                                                               |
| <i>Epthianura</i>    | <i>tricolor</i>       |                  | Crimson Chat                              | Native     | -               | -                  | -                                              | +    | +    | Observed twice in well vegetated areas to the central and southwest of the survey area                                                               |
| <i>Gavicalis</i>     | <i>virescens</i>      | <i>virescens</i> | Singing Honeyeater                        | Native     | -               | -                  | -                                              | +    | +    | Several birds observed directly and indirectly in open woodland to north of survey area                                                              |
| <i>Anthus</i>        | <i>australis</i>      |                  | Australian Pipit                          | Native     | Marine          | -                  | -                                              | +    | +    | -                                                                                                                                                    |
| <i>Daphoenositta</i> | <i>chrysoptera</i>    |                  | Varied Sittella                           | Native     | -               | -                  | -                                              | +    | -    | -                                                                                                                                                    |

Appendix D: Inventory of fauna species recorded in the survey area in 2014 and 2020

| Genus                | Species                | Subspecies        | Vernacular                 | Status                 | EPBC Act Status | BC Act / WA Status | BAM Act Status                                        | 2014 | 2020 | 2020 Observations                                                                                                                |
|----------------------|------------------------|-------------------|----------------------------|------------------------|-----------------|--------------------|-------------------------------------------------------|------|------|----------------------------------------------------------------------------------------------------------------------------------|
| <i>Oreoica</i>       | <i>gutturalis</i>      |                   | Crested Bellbird           | Southern Subspecies P4 | -               | -                  | -                                                     | +    | -    | -                                                                                                                                |
| <i>Colluricincla</i> | <i>harmonica</i>       |                   | Grey Shrike-thrush         | Native                 | -               | -                  | -                                                     | +    | -    | -                                                                                                                                |
| <i>Pachycephala</i>  | <i>rufiventris</i>     |                   | Rufous Whistler            | Native                 | -               | -                  | -                                                     | +    | -    | -                                                                                                                                |
| <i>Pardalotus</i>    | <i>striatus</i>        |                   | Striated Pardalote         | Native                 | -               | -                  | -                                                     | +    | +    | Heard in survey area                                                                                                             |
| <i>Microeca</i>      | <i>fascinans</i>       |                   | Jacky Winter               | Native                 | -               | -                  | -                                                     | +    | +    | Observed several times in open woodland in the survey area                                                                       |
| <i>Petroica</i>      | <i>goodenovii</i>      |                   | Red-capped Robin           | Native                 | -               | -                  | -                                                     | +    | -    | -                                                                                                                                |
| <i>Purnella</i>      | <i>albifrons</i>       |                   | White-fronted Honeyeater   | Native                 | -               | -                  | -                                                     | -    | +    | Several birds heard in open woodland to north of survey area                                                                     |
| <i>Pomatostomus</i>  | <i>superciliosus</i>   |                   | White-browed Babbler       | Native                 | -               | -                  | -                                                     | +    | +    | Observed several individuals in open woodland towards centre of survey area, with nests observed commonly throughout survey area |
| <i>Pomatostomus</i>  | <i>temporalis</i>      |                   | Grey-crowned Babbler       | Native                 | -               | -                  | -                                                     | +    | +    | Nests observed commonly throughout survey area                                                                                   |
| <i>Cacatua</i>       | <i>roseicapilla</i>    |                   | Galah                      | Native                 | -               | -                  | -                                                     | +    | +    | Observed towards centre of survey area                                                                                           |
| <i>Cacatua</i>       | <i>sanguinea</i>       |                   | Little Corella             | Native                 | -               | -                  | -                                                     | +    | +    | Observed in larger planted eucalypts near infrastructure                                                                         |
| <i>Platycercus</i>   | <i>varius</i>          |                   | Mulga Parrot               | Native                 | -               | -                  | -                                                     | +    | +    | Observed several times in survey area. Generally in pairs                                                                        |
| <i>Platycercus</i>   | <i>zonarius</i>        |                   | Australian Ringneck        | Native                 | -               | -                  | -                                                     | +    | -    | -                                                                                                                                |
| <i>Taeniopygia</i>   | <i>guttata</i>         | <i>castanotis</i> | Zebra Finch                | Native                 | -               | -                  | -                                                     | -    | +    | Small flock observed in open woodland towards centre of survey area                                                              |
| <i>Dromaius</i>      | <i>novaehollandiae</i> |                   | Emu                        | Native                 | -               | -                  | -                                                     | +    | +    | Observed directly a couple of times (father with young), and scat observed very commonly throughout survey area                  |
| <i>Capra</i>         | <i>hircus</i>          |                   | Goat                       | Introduced             | -               | -                  | Declared Pest - s22(2) (C3 Exempt)                    | +    | +    | Scat recorded commonly throughout survey and surrounding area, and carcass recorded to the north of the survey area              |
| <i>Bos</i>           | <i>taurus</i>          |                   | European Cattle            | Introduced             | -               | -                  | Permitted - s11                                       | +    | +    | Cattle observed directly at water trough adjacent survey area, and scat observed commonly throughout survey area                 |
| <i>Camelus</i>       | <i>dromedarius</i>     |                   | Dromedary, Camel           | Introduced             | -               | -                  | Declared Pest - s22(2) (C3 Exempt)                    | +    | +    | Scat observed throughout survey and surrounding area                                                                             |
| <i>Canis</i>         | <i>familiaris</i>      |                   | Dog                        | Introduced             | -               | -                  | Declared Pest - s22(2) (C3 Exempt)                    | +    | +    | Scat observed on occasion throughout survey area                                                                                 |
| <i>Vulpes</i>        | <i>vulpes</i>          |                   | Red Fox                    | Introduced             | -               | -                  | Declared Pest - s22(2) (C1 Prohibited, C3 Prohibited) | -    | +    | Probably fox scat recorded to north of survey area                                                                               |
| <i>Felis</i>         | <i>catus</i>           |                   | Cat                        | Introduced             | -               | -                  | Declared Pest - s22(2)                                | +    | -    | -                                                                                                                                |
| <i>Sminthopsis</i>   | <i>crassicaudata</i>   |                   | Fat-tailed Dunnart         | Native                 | -               | -                  | -                                                     | +    | -    | -                                                                                                                                |
| <i>Notomys</i> sp.   |                        |                   | Hopping Mouse              | Native                 | -               | -                  | -                                                     | -    | +    | Tracks observed commonly throughout survey area, and carcass located (likely to be either Mitchell's of Spinifex Hopping Mouse)  |
| <i>Macropus</i>      | <i>fuliginosus</i>     | <i>melanops</i>   | Western Grey Kangaroo      | Native                 | -               | -                  | -                                                     | +    | +    | Observed multiple times in survey and surrounding area                                                                           |
| <i>Macropus</i>      | <i>robustus</i>        | <i>erubescens</i> | Euro, Biggada              | Native                 | -               | -                  | -                                                     | +    | +    | Observed directly a couple of times in survey area                                                                               |
| <i>Osphranter</i>    | <i>rufus</i>           |                   | Red Kangaroo, Marlu        | Native                 | -               | -                  | -                                                     | +    | +    | Observed several times in survey and surrounding area                                                                            |
| <i>Oryctolagus</i>   | <i>cuniculus</i>       |                   | Rabbit                     | Introduced             | -               | -                  | Declared Pest - s22(2) (C3 Prohibited)                | +    | +    | Scat, diggings and / or tracks observed in several locations in survey and surrounding area                                      |
| <i>Tachyglossus</i>  | <i>aculeatus</i>       |                   | Short-beaked Echidna       | Native                 | -               | -                  | -                                                     | +    | +    | Tracks and scat observed several times throughout survey and surrounding area                                                    |
| <i>Equus</i>         | <i>caballus</i>        |                   | Horse                      | Introduced             | -               | -                  | Declared Pest - s22(2) (C3 Exempt)                    | +    | -    | -                                                                                                                                |
| <i>Ctenophorus</i>   | <i>caudicinctus</i>    |                   | Western Ring-tailed Dragon | Native                 | -               | -                  | -                                                     | +    | +    | Observed once on track in survey and surrounding area                                                                            |
| <i>Pogona</i>        | <i>minor</i>           |                   | Bearded Dragon             | Native                 | -               | -                  | -                                                     | +    | -    | -                                                                                                                                |
| <i>Ctenophorus</i>   | <i>scutulatus</i>      |                   | Lozenge-marked Dragon      | Native                 | -               | -                  | -                                                     | +    | +    | Observed in open woodland                                                                                                        |



Appendix D: Inventory of fauna species recorded in the survey area in 2014 and 2020

| Genus                  | Species               | Subspecies   | Vernacular                             | Status | EPBC Act Status | BC Act / WA Status | BAM Act Status | 2014 | 2020 | 2020 Observations                                                       |
|------------------------|-----------------------|--------------|----------------------------------------|--------|-----------------|--------------------|----------------|------|------|-------------------------------------------------------------------------|
| <i>Gehyra</i>          | <i>punctata</i>       |              | <i>Gehyra punctata</i>                 | Native | -               | -                  | -              | +    | -    | -                                                                       |
| <i>Gehyra</i>          | <i>variegata</i>      |              | <i>Gehyra variegata</i>                | Native | -               | -                  | -              | +    | -    | -                                                                       |
| <i>Morethia</i>        | <i>butleri</i>        |              | <i>Morethia butleri</i>                | Native | -               | -                  | -              | +    | -    | -                                                                       |
| <i>Lerista</i>         | <i>gascoynensis</i>   |              | <i>Lerista gascoynensis</i>            | Native | -               | -                  | -              | +    | -    | -                                                                       |
| <i>Lerista</i>         | <i>timida</i>         |              | -                                      | Native | -               | -                  | -              | -    | +    | Observed once in leaf litter and fallen logs on sandy soils             |
| <i>Menetia</i>         | <i>greyii</i>         |              | <i>Menetia greyii</i>                  | Native | -               | -                  | -              | +    | -    | -                                                                       |
| <i>Cryptoblepharus</i> | <i>plagiocephalus</i> |              | <i>Cryptoblepharus plagiocephalus</i>  | Native | -               | -                  | -              | +    | -    | -                                                                       |
| <i>Ctenotus</i>        | <i>schomburgkii</i>   |              | -                                      | Native | -               | -                  | -              | -    | +    | Observed several times in survey area                                   |
| <i>Ctenotus</i>        | <i>severus</i>        |              | <i>Ctenotus severus</i>                | Native | -               | -                  | -              | +    | -    | -                                                                       |
| <i>Egernia</i>         | <i>stokesii</i>       | <i>badia</i> | Western Spiny-tailed Skink             | Native | EN              | VU                 | -              | +    | +    | Typical latrine recorded in granite outcrop                             |
| <i>Varanus</i>         | <i>gouldii</i>        |              | Bungarra or Sand Monitor               | Native | -               | -                  | -              | +    | +    | Observed several times in survey and surrounding area                   |
| <i>Litoria</i>         | <i>rubella</i>        |              | Little Red Tree Frog                   | Native | -               | -                  | -              | -    | +    | Observed directly and indirectly (calls) multiple times around the camp |
| <i>Chelodina</i>       | <i>steindachneri</i>  |              | Flat-shelled Turtle                    | Native | -               | -                  | -              | +    | -    | -                                                                       |
| <i>Idiosoma</i>        | <i>clypeatum</i>      |              | Northern Shield-backed Trapdoor Spider | Native | -               | P3                 | -              | +    | -    | Trapdoor burrow was observed in original southeastern arm.              |