Fauna Survey, Targeted Fauna Survey

Bremer Bay Airfield

Report Prepared For the Shire of Jerramungup

15 February 2024

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1. EXECUTIVE SUMMARY

The Shire of Jerramungup is currently investigating a potential site for a new airstrip in support of the of the existing Bremer Bay Airfield, the proposed construction of the new cross-runway is a recommendation of the Bremer Bay Airfield Master Plan, adopted in 2015 to guide the future development of the Airfield.

In support of the long term fauna surveys and monitoring of fauna populations within the Bremer Bay Airfield and within the local Government Reserve **24521**, the author of this report was engaged to undertake a detailed field assessment for the likelihood of occurrence of a number of Threatened and Priority Fauna , including a systematic search for Malleefowl and active/ inactive Malleefowl mounds.

In addition, a series of extensive on ground fauna surveys were carried out during August, September, October, November and December of 2023 and January and February of 2024, the key objectives of these surveys were to update the previous fauna surveys that were carried out between 2010 and 2017 and again between 2018 and the beginning of 2023.

Based on the recent field assessments, Survey Areas 1,2 and 3 were found to support significant Fauna Assemblages, however; in regards to Avian species their presence was determined by a number of factors, including the flowering time and seed availability of a number of plant species, especially within the *Proteaceous* rich, Kwongkan vegetation communities.

Based on long term surveys, 11 Honeyeater species were recorded nesting within various Sub - Mallee Habitat Systems of Survey Areas 1,2 and 3, in addition 6 pairs of Western Whipbird (Western Mallee) *Psophodes nigrogularis oberon* (**p4**), were recorded breeding during the 2023 survey period.

Although no Malleefowl were observed during the recent surveys carried out between 2023 and the first two months of 2024, a series of meandering search activities within Survey Areas 1,2 and 3 identified an inactive and very old Melleefowl Mound, located in a patch of Mallee - Eucalypt Woodland within the South-Western section of Survey Area 1.

Extensive surveys were carried out to identify suitable Foraging/Breeding habitat for Malleefowl, these on ground surveys were conducted over a period of weeks, this allowed for a more accurate assessment of potential Malleefowl Habitats.

The survey results indicate that Malleefowl are likely to utilise suitable habitats within Survey Areas 1 and 3 as Foraging areas and that they are unlikely to breed within Survey Areas 1,2 and 3, mostly due to the relatively small mosaic areas of potentially suitable breeding habitat, in addition the author has not recorded Malleefowl within Survey Areas 1,2 and 3 since he began surveying the Bremer Bay Airfield from October 2010 to February 2024.

The results of the Fauna Surveys demonstrate the high conservation values of the **Key** *Proteaceous,* Kwongkan Vegetation communities that occur within Survey Areas 1,2 and 3.

The Fauna Survey results are based on the extensive on ground surveys that were carried out during August, September, October, November, and December of 2023 and January and February of 2024, these include:

- 89 Bird species, of these 51 species were recorded breeding within Survey Areas 1,2 and 3,
  - 1 Species with a Conservation Status of **(V) Vulnerable**
  - 1 Species with a Conservation Status of **(P4) Priority**
  - 1 Species with a Conservation Status of **(EN) Endangered**
  - 1 Species with a Conservation Status of **(OS) Other specially protected species**
  - 1 Species Classified as **Introduced**
- 26 Reptile species,(**1 species classified as P4, Priority**)
- 9 Frog Species
- 5 Bat species, (likely to occur within Survey Areas 1,2 and 3)
- 6 Native Mammal species
- 4 Feral Animal species

2. INTRODUCTION

The Shire of Jerramungup is currently investigating a potential site for the development of a new Airstrip in support of the existing Bremer Bay Airfield, the proposed construction of the new cross runway is a recommendation of the Bremer Bay Airfield Master Plan, adopted in 2015 to guide the future development of the Airfield.

The Bremer Bay Airfield currently supports a single runway that does not allow planes to land in heavy crosswinds, this creates serious logistical issues for RFDS and other emergency response aircraft, including water bombers that service the adjacent National Park, Farming Community and the Bremer Bay town site.

The construction of the new cross runway is essential for the Bremer Bay Airfield to function adequately and provide safer options for Emergency Aircraft to safely land during major crosswind events.

The Shire of Jerramungup is responsible for the Management of the Bremer Bay Airfield which is located 4km West of the Bremer Bay town site, recent upgrades to Don Ende Drive, which is the only access road to the Airfield has increased the safety and efficiency for all road users, including Emergency service vehicles that regularly use the road to access the Airfield.

The Bremer Bay Airfield is located within the Southern boundaries of the Fitzgerald River National Park, and lies within local Government Reserve **24521**, the park itself covers an area of 329,039 hectares and lies on the central South coast of Western Australia between the towns of Bremer Bay and Hopetown to the East.

The Fitzgerald River National Park is an internationally recognised Biosphere Reserve under the United Nations Educational Scientific and Cultural Organization (UNESCO).

The Park supports one of the most Botanically and Floristically rich National Parks in Australia, with over 1883 plant species which equates to almost 15% of the States described plant species and more than 75 species that are found no where else.

The Fitzgerald River National Park is also significant in that the Park supports the largest number of Faunal species than any other Reserve in the South-West Region of Western Australia, including 200 bird species, 41 Reptile species, 12 Frog species and 22 Mammal species.

In support of the Shire of Jerramungup's referral application **2019/8434 Proposed cross runway clearing at Bremer Bay Airfield**, the Shire have engaged Steve Elson (Shire of Jerramungup Environment Officer), to conduct a follow up Fauna Survey in support of the 2017 Fauna Survey and to undertake a Targeted Fauna Survey for Malleefowl and active/inactive Malleefowl mounds that may be present within and beyond the proposed application area.

The Key Objectives of the follow up Fauna survey will be to undertake:

- A detailed and comprehensive Fauna survey within and beyond the proposed application area.
- A detailed and comprehensive Targeted Fauna survey, including systematic search activities for Malleefowl (*Leipoa ocellata*; (**Vulnerable**), for potential nesting sites (Mounds) and potential foraging habitats within and beyond the proposed application area.
- Desktop assessment, Data provided by Birdlife Australia W.A Branch, W. A Museum, Department of Biodiversity Conservation and Attractions, in addition refer to **3.2** for associated desktop search activities and literature reviews.

In addition to the Fauna survey, mapping of critical breeding and foraging habitats for a number of Avian species that are listed as Threatened, Endangered, Vulnerable or listed as Priority 1-4.

3. SURVEY METHODOLOGY

3.1 About the Author:

In support of the long term monitoring of Fauna populations and their reliance on habitat systems within the Bremer Bay Air-field, the Shire of Jerramungup's Environmental Officer Steve Elson was engaged to conduct a comprehensive and detailed field assessment for the presence of active/inactive Malleefowl mounds, including critical foraging habitat within and beyond the proposed application area for the new cross runway.

Steve Elson has an extensive background in Avian Ecology with a key focus on ***The Breeding Ecology of The Avian Fauna of South Western Australia***, over the last 35 years Steve has worked on numerous Environmental projects, including 18 scientific publications and Author of the **Photographic Guide to The Shorebirds of South Western Australia.**

Steve holds a Diploma in Conservation and Land Management and currently works as the Senior Environmental Officer for the Shire of Jerramungup, Steve's long-term Environmental projects include:

- Monitoring Fairy Tern Breeding colonies, Rouse Head Fremantle 1993-2003
- The Breeding Ecology of The Avian Fauna of South Western Australia 1985-Current.
- Environmental Officer for the Rural skills Education Program Kelmscott Senior High school 2003-2006
- Mapping and monitoring Hooded Plover populations within the Salt Lake Systems of South Western Australia 2004-2008. (***Stilt****, April 2008 No 53, The Journal For the East Asian - Australian Flyway*).
- Avian Fauna Survey of the Cranbrook Salt Lake Systems, (Summary Report 2021). Gillamii Centre.
- Avian Fauna Survey of Mondurup Reserve (2012) Mount Barker. (Wilson Inlet Catchment Committee SCNRM).
- Development of a Fauna Data base for the Shire of Jerramungup's Road Reserves, 2010-Current.
- A Field study on the Breeding Ecology of the Grey Honeyeater, Western Australia. Research Gate November 2022.

3.2 Database Searches

A desktop assessment was undertaken to identify critical habitats and faunal species recorded within a 10 km radius of the proposed application area, the database search would also assist in collating vital information on Target species and Fauna populations and their reliance on the habitat systems within and beyond the proposed application area. Information was sourced from:

- National Recovery Plan for Malleefowl. Department for Environment and Heritage, South Australia. Benshemesh, J. (2007).
- Protected Matters Search Tool (DotEE 2024). Department of Climate Change, Energy, the Environment and Water.
- Shire Of Jerramungup's Fauna Surveys Database (Established 2010).
- NatureMap Department of Parks and Wildlife (DBCA 2024).
- DBCA, Threatened and Priority Fauna Database.
- Atlas of Living Australia Database.
- WALGA (WA Local Government Association) Environmental Planning Tool (2019).
- Weeds of National Significance (WoNS). Department of Agriculture and Food, WA.
- Birdlife Australia's Atlas and Bird Data, Datasets.
- South Coast Threatened Birds, Recovery Plan Western Australian Wildlife Management Program **No. 44**, September 2014

3.3 Field Surveys (Fauna Survey Techniques).

In support of the long term monitoring of Faunal populations within the Bremer Bay Airfield a detailed and systematic search activity was carried out to identify the presence of active/inactive Malleefowl mounds.

The Targeted search activities were carried out on the 7th of December 2023 and the 14th and 15th of December 2023 and the 12th of January 2024.

To ensure all Survey Areas were effectively covered, Transects including Meandering search methods were employed, this involved the flagging of vegetation at 25m apart, along the existing fire-breaks and walking from the South Easterly point to the North Westerly point of each Survey Area, repeating this action until each Survey Area was completed.

It should be noted that during the on ground search activities for active/inactive Malleefowl mounds, their were instances where the vegetation was quite dense, thus requiring a closer examination of habitats, this often resulted in Meandering efforts being as little as 3-4m apart.

The Transects and Meandering survey methods were also employed to gather data on Priority Fauna species including, Rare, Threatened and Endangered Fauna that may occur within the Survey Areas, these include:

- Western Whipbird *Psophodes nigrogularis oberon*, (Western Mallee) **P4**.
- Carnabys Black Cockatoo *Zanda latirostris,* **Endangered**
- Chuditch, Western Quoll *Dasyurus geoffroii* **Vulnerable**

In total, 3 Survey Areas were identified for their high Biodiversity value, the 3 Survey Areas also fall within the application area for the proposed new cross runway, all 3 Survey Areas are located within Local Government Reserve **24521**.

For the purpose of this report, the 3 Survey Areas are described as:

- **Survey Area 1** - Located on the Southern end of the Bremer Bay Airfield, the Survey Area covers approximately 38.397 hectares.
- **Survey Area 2** - Located within the boundary of the Bremer Bay Airfield, the Survey Area covers approximately 40.186 hectares.
- **Survey Area 3** - Located North of the Bremer Bay Airfield, the Survey Area covers approximately 43.022 hectares.

The combined Survey Areas support a total of 122.178 hectares, (Refer to Maps **Appendix C**).

Additional Fauna surveys were carried out during Autumn, Winter and Spring of 2020, 2021, and 2023, targeted Fauna Surveys were also carried during December of 2023 and January and February of 2024, these surveys were undertaken during maintenance activities of the Bremer Bay Airfield and during seed collecting activities for the Shire of Jerramungup's revegetation projects. (***Flora Licence No FT61000406 –3***). The timing of these survey periods allowed for a more accurate account of Faunal species being present within all 3 Survey Areas, the timing also reflected the critical breeding period for both Amphibians and Avian Species.

A number of other survey techniques were employed to gather field based data on the Fauna Assemblage's associated with the 3 Survey Areas, these Include:

- Spotlighting for Nocturnal species, such as Bats, owls, Geckos and Burrowing Frogs.
- Observational Surveys during early mornings and afternoons, (Bird and Reptile Surveys).
- Active search methods employed prior to carrying out pruning, weed control and slashing of maintenance zones within the Bremer Bay Airfield. During this period, all Fauna encountered were photographed, documented and immediately released from the work zones, these activities were carried out under DBCAs **Regulation 50 (1)(d).**
- Opportunistic observations including actively searching for Scats, Tracks, regurgitated pellets, platelets in the case of Quails, burrows and other associated diggings, signs of feeding activity in the case of Carnaby's Black Cockatoos and other seed eating Fauna, feathers, fur and skeletal remains of Fauna also aid in the identification process.
- Passive Photography using various DSLRs and lenses, including 600mm with 2x converter.

4. DESKTOP ASSESMENT RESULTS AND DISCUSSION

4.1 Desktop Assessment and Literature Review

The desktop survey results revealed that the 3 Survey Areas associated with the proposed construction of the new cross runway, form critical contiguous linkages to the North and East of the Fitzgerald River National Park, the Park itself supports over 200 bird species including several **Priority**, **Rare** and **Endangered** species such as the Western Whipbird *Psphodes nigrpgularis oberon* **Priority 4** (**P4**), Western Bristlebird *Dasyornis longirotris* **Endangered** (**EN**), Western Ground Parrot *Pezoporus flaviventris* **Critically Endangered** (**CR**)*,* Malleefowl *Leipoa ocellata* **Vulnerable** (**VU**), Carnaby's Black Cockatoo *Zanda latirostris,* **Endangered (EN)**.

In support of the desktop assessment, an **EPBC Act Protected Matters Report** was generated to identify Faunal species and **PECs** (**Priority Ecological Communities**) and **TECs** (**Threatened Ecological Communities**), that may occur within the 3 Survey Areas associated with the proposed construction of the new cross runway.

The desktop assessment identified a number of Listed Threatened Ecological Communities and Listed Threated Faunal Species that may occur within a 10km radius of the 3 Survey Areas, these include:

4.2 Vegetation Communities

- *Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province*, (Listed as **Endangered**). All 3 Survey Areas supported significant Floristic components that meet the criteria as being listed as Kwongkan TEC. The 3 Survey Areas were found to support significant and for the most part intact Ecological Communities including, Melaleuca dominant shrublands, Banksia shrublands, Mallee Heath, Mallee Eucalypt Woodland and Ephemeral seasonal wetland.
- *Subtropical and Temperate Coastal Saltmarsh*, (Listed as **Vulnerable**). Not recorded within the 3 Survey Areas.

4.3 Vertebrate Fauna of Conservation Significance (Likelihood of Occurrence)

- **Australasian Bittern** *Botaurus poiciloptilus*, (**Listed as Endangered**). Unlikely to occur within the 3 Survey Areas due to lack of suitable foraging or breeding habitat, however; it should be noted that during the field surveys carried out in September 2023, a small seasonally filled wetland had formed within the perimeter fence line and just beyond the North Western Section of the Bremer Bay Airfield. The wetland often fills each year during the winter months and also during major Summer/Autumn rainfall events, the key vegetation systems within the ephemeral wetland include low ground cover, consisting of sedges and grasses which were partially or completely submerged in water, measurements at the wetlands deepest point were 38cm, the mid layer canopy associated with the wetland comprised mostly of Melaleuca shrubs, the upper canopy vegetation consisting of Eucalypt spp, (**Refer to Map, Appendix C**).

- **Western Bristlebird** *Dasyornis longirostris,* (**Listed as Endangered**). Based on long term Fauna surveys of the Bremer Bay Airfield and desktop search activities, it is Unlikely that any Western Bristlebird populations currently occupy habitats within the 3 Survey Areas. Fragmented populations still exist in Two Peoples Bay Nature Reserve, Fitzgerald River National Park and Waychinicup National Park (McNee 1986). The Western Bristlebird is restricted to floristically diverse coastal heathland where the birds occupy heathland that is 0.5-1.5m tall, comprising of a diverse range of shrubs including, *Banksia coccinea*, *Banksia attenuata*, *Banksia dryandroides*, *Melaleuca striata*, *Melalueca thymoides, Hakea cucullata*, *Hakea trifurcata*, *Lambertia* spp, *Adenanthos* spp *Leptospermum* spp, *Daviesia reversifolia* and *Allocasuarina humilis*. Their habitat usually supports abundant sedges and sometimes, thickets of stunted Mallee Eucalyptus species, (Gilfillan et al, 2007; McNee 1986; Smith 1987; Smith & Moore 1977). It is estimated that 125 pairs of Western Bristlebirds occupy suitable habitats within the Fitzgerald River National Park (Burbidge 2016).

- **Malleefowl** *Leipoa ocellata* (**Listed as Vulnerable**).

The Malleefowl *Leipa ocellata* is listed as Vulnerable under the *Environment Protection and Biodiversity Conservation* (EPBC) *Act 1999* and this classification is consistent with international standards (IUCN 2001, criteria VU A1c,e and 2b, c, e). The Malleefowl occurs in semi-arid to arid shrublands and low woodlands, especially those dominated by Mallee and Acacia shrublands, for breeding Malleefowl generally require a sandy substrate and abundance of leaf litter.
Based on the long term Fauna Surveys of the Bremer Bay Airfield, the author of this report has concluded that due to The uninterrupted and contiguous linkage to the Fitzgerald River National Park it is likely that from time to time Malleefowl may utilize Survey Areas 1 and 3 as foraging sites and that it is unlikely that Malleefowl will breed within Survey Areas 1,2 and 3. This is based on long term surveys and monitoring of Avian Fauna assemblages of the Bremer Bay Airfield, (October 2010-Current), no Malleefowl or active Malleefowl mounds were observed or located within Survey Areas 1,2 and 3.
It should be noted however; that several pockets of potential breeding habitat, though small were identified within Survey Areas 1 and 3, these areas were consistent with the breeding requirements for Malleefowl to construct their incubator-nests, these include a sandy substrate, and abundance of leaf litter, these key attributes within Survey Area 1 were found to support dense patches of *Lambertia inermis, Eucalypt* spp, including *Eucalyptus pleurocarpa* and *Eucalyptus ecostata,* Eucalyptus *angulosa*, and Eucalyptus *uncinata,* also dense patches of *Melaleuca* shrubs and healthy populations of *Banksia alliacea,* and *Hakea denticulata*, on the ground leaf litter densities varied within Survey Area 1 and were most prolific at the bases of clumps of *Mallee Eucalypt* spp and *Lambertia inermis*. Interspersed between clumps of dense vegetation were open areas of sandy substrate soils, including numerous trails established by Western Grey Kangaroos *Macropus fuliginosus* as they traverse between agricultural lands and native Vegetation network systems.
A detailed ground search of Survey Area 1, (12th of January 2024) revealed a very old abandoned Malleefowl mound located within the South-Western Section of the Survey Area. (**Refer to Maps Appendix C**).
Extensive search activities within Survey Area 3 identified several areas supporting dense patches of *Melaleuca* Shrublands, (1.5m-2.2m in height) interspersed with upper canopy vegetation including *Banksia attenuata, Nuytsia floribunda* and several *Mallee Eucalypt* spp, this type of vegetation structure and associated floristic components were consistent with similar habitats that supported Malleefowl mounds further South of the Survey Area.
Based on the extensive field observations within Survey Area 3, Western Grey Kangaroos were found to utilize potential Malleefowl breeding habitat as resting sites, numerous dens were located under most of the dense *Melaleuca* Shrubs. Over the survey period, Western Grey Kangaroo numbers within Survey Area 3 ranged from 20-40 individuals.
It should be noted that possible disturbances from Western Grey Kangaroos *Macropus fuliginosus* may impact on Malleefowl, successfully constructing and maintaining a viable nesting mound.
Based on the extensive field surveys carried out within Survey Areas 1,2 and 3, it is unlikely that Malleefowl will establish Breeding territory within Survey Area 2, in regards to Survey Areas 1 and 3 it may be possible in time for malleefowl to establish a breeding territory as both Survey Areas 1 and 3 support significant continuous, uninterrupted natural habitats That connect with the greater expanse of the Fitzgerald River National Park. (**Refer to Maps Appendix C**).

- **Carnaby's Black Cockatoo** *Zanda latirostris* (**Listed as Endangered**)

  Based on the long term surveys and monitoring of Fauna populations within the Bremer Bay Airfield, Carnaby's Black Cockatoo sightings had decreased during the period from February 2020 to February 2024, pervious counts of 100+ Individuals were regularly observed foraging within the proposed application area, especially during the post breeding season months between 2010 and 2019.

  A possible explanation for the reduced mobile feeding flocks in recent years may be attributed to the destructive fire that impacted on one of the Carnaby's Black Cockatoo key Breeding Habitats within the Stirling Range National Park. The Fire sparked by lightning destroyed more than 40,000 hectares of land including key foraging and breeding habitat. The fire occurred during the hottest and driest periods of the year.

  During the recent field surveys from December 2023 to February 2024, no Carnaby's Black Cockatoos were observed within Survey Areas 1,2 and 3, (**Reserve 24521**), during the July and August Surveys Carnaby's Black Cockatoos were recorded on two occasions, the small flocks of 12 and 18 were observed flying over the Survey Areas in a North Easterly Direction.

- **Western Ground Parrot** *Pezoporus Flaviventris* (**listed as Critically Endangered**)

  The Western Ground Parrot is one of the most Critically Endangered Avian species in Western Australia, the population Estimate is <140 (Gilfillan *et al* 2006; Bondin *et al* 2011). Populations are now restricted to a few localities along the South Coast including the Fitzgerald River National Park , Cape Arid National Park and Nearby parts of Nuytsland Nature Reserve.

  Based on long term Fauna Surveys within the Bremer Bay Airfield, including extensive search activities carried out within Potential Western Ground Parrot habitat, no birds were located during the Survey period (October 2010-February 2024).

  The examination of several old nests of Yellow-Rumped Thornbill *Acanthiza chrysorrhoa*, Welcome Swallow *Hirundo Neoxena* and Western Spinebill *Acanthorhynchus superciliosus*, revealed no Western Ground Parrot Feathers.

  It should be noted that these three *Passerine* Species typically line their nests with green Parrot feathers.

  Based on Literature Reviews and Extensive Fauna surveys within Survey Areas 1,2 and 3 (**Reserve 24521**). It is highly unlikely that Western Ground Parrot populations occur within the proposed application area.

  Threatened Mammal Species

Communications with the Department of Biodiversity Conservation and Attractions (**DBCA**) Albany Branch, W.A (02-02-2024). Confirmation was sought on the likelihood of occurrence for a number of Threatened and Priority Native Mammal species That may occur within the proposed application area and Survey Areas 1,2 and 3 (**Reserve 24521**).

Mark Blythman (Conservation Operations Officer), (**DBCA**) advises that:

- Dibbler *Parantechinus apicalis* **Possible but unlikely to occur within application area.**
- Heath Mouse, Dayang, Heath Rat *Pseudomys shortridgei* **Possible but unlikely to occur within application area**.
- Red-tailed Phascogale Phascogale calura **Possible but unlikely to occur within application area**.
- Chuditch, Western Quoll *Dasyurus geoffroii* **Likely to move through the application area on occasions**.

5. FIELD SURVEY RESULTS AND DISCUSSION

The survey results are based on numerous field surveys and monitoring of fauna populations within the Bremer Bay Airfield and more specifically within local Government Reserve **24521** which falls within the proposed application area.

Fauna surveys were carried out since 2010, the key objective of these surveys were to identify and record all Vertebrate Fauna that utilize the diverse habitat systems within Reserve **24521**.

Between 2020 and the first few months of 2024, detailed and systematic Fauna surveys were carried out during Autumn, Winter and Spring and during the summer months of 2024.

In support of previous Fauna surveys, targeted Fauna surveys were carried out on the 7th of December 2023 and the 14th and 15th of December 2023 and the 12th of January 2024, these systematic search activities were employed to gather real time data on the presence of Malleefowl and active/inactive Malleefowl mounds within the proposed application area and Reserve **24521**.

5.1 Amphibians:

Frog surveys were undertaken during nocturnal search activities, this was the key period to identify several species of Burrowing Frogs which were recorded along the external firebreak and boundary fence line of the Bremer Bay Airfield.

Frog species identified during the nocturnal field surveys include, *Heleioporus eyrie*, *Lymnodynastes dorsalis*, *Neobatrachus albipes*, and *Myobatrachus gouldii.*

During maintenance activities within the Bremer Bay Airfield several mature specimens of *Lymnodynastes dorsalis* and *Myobatrachus gouldii* were located in soil heaps.

During the Winter and Spring months between 2020 and 2023, surveys were carried out within a shallow, seasonal ephemeral wetland which fills with water each year, the seasonal wetland is located on the North-Western boundary of the Bremer Bay Airfield, surveys were also carried out within man made drains that were put in place to mitigate flooding of the Airfield.

Species recorded within the Seasonal Ephemeral Wetland and man made drainage systems include *Litoria adelaidensis, Litoria cyclorancha, Pseudophryne guentheri* and *Crinia georgiana.*

Surveys were also carried out within areas supporting perched water bodies in modified landscapes, mostly associated with the Airfield and maintenance tracks along the perimeter fence line. These water bodies usually only filled during the winter months and during major rainfall events in summer and autumn.

Species recorded within these modified landscapes include, *Crinia georgiana*, *Crinea pseudinsignifera*, *Pseudophryne guentheri* and *Litoria cyclorancha.*

During the survey period a total of 9 Frog species were recorded, the Conservation Status of all Frog species recorded have a classification level of **Least Concern**.

5.2 Reptiles

Reptile surveys were carried out intermittently throughout each month of the year between January 2020 and January 2024**,** the majority of search efforts were carried out during maintenance activities within the Bremer Bay Airfield, whilst more intensive survey efforts were carried out during the meandering surveys for Malleefowl and Malleefowl mounds, the surveys for the most part were conducted during the early mornings, on the 7th, 14th and 15th of December 2023 and on the 12th of January 2024.

In support of the intensive search activities for Herpetofauna within Survey Areas 1, 2 and 3, many microhabitats were examined for specific reptile species including within leaf litter, under fallen logs and Abiotic materials, also prior to slashing of maintenance zones, abandoned Stick-nest ant mounds were examined.

Based on long term observations of Reptile species that were recorded between October 2010 and January 2024, a total of 26 reptile species were identified and recorded within the Bremer Bay Airfield, this includes Survey Areas 1, 2 and 3 which are all located in Reserve **24521**.

The present status of 25 of the 26 Reptiles species recorded within Survey Areas 1,2 and 3 are of **Least Concern**, the Southern Carpet Python *Morelia spilota imbricata* is classified under the 2000 IUCN Red List of Threatened Species, and under the Western Australian Wildlife Conservation Act is classified as Schedule 4 (Specially Protected Fauna), (**DBCA library**).

5.3 Birds

In support of the previous Avian Fauna surveys of the Bremer Bay Airfield, additional species were recorded during the survey period between 2020 and 2023, species include, Pied Butcherbird *Cractus nigrogularis*, subspecies *picatus*, in recent years this species has increased its breeding distribution range further South with 1 pair recorded nesting along Done Ende drive and 2 pairs nesting within Agricultural lands along Swamp Road.

Black-eared Cuckoos *Chalcites osculans* were also noted to increase their distribution range further South with 8 individual observations of birds foraging amongst low Heath vegetation within Survey Areas 1 and 3, it was also noted that on several occasions Male birds were observed and heard calling from the tops of exposed branches.

A species not recorded in previous surveys was the Red-winged Fairy-Wren *Malurus elegans,* a single pair was identified breeding within the maintenance zones of Survey Area 2, the nest supporting 3 eggs was located at the base of a clump of sedges.

During August, September, October, November, December of 2023, and January and February of 2024, extensive surveys were carried out within Survey Areas 1,2 and 3, the Key objective of these systematic and methodical surveys were to identify and record those species that were breeding within all 3 Survey Areas.

Extensive search activities were undertaken on the 29th of August,4th of September,6th of September,8th of September,19th of September, 21st of September, 4th of October, 6th of October and 20th of October, during this period 51 species were recorded breeding within Survey Areas 1,2 and 3, 38 species were recorded as opportunistic observations, mostly of birds foraging within the 3 Survey Areas, it should also be noted that Survey Areas 1,2 and 3 did not support suitable breeding habitat for Raptor Species or Hollow dependant species such as Parrots, Cockatoos, Owls or Owlet Nightjars, during the survey period non of the vegetation communities were found to support significant breeding hollows.

Based on the more recent Avian Fauna Survey carried out between 2020 and 2023 and January and February of 2024, a total of 89 bird species were recorded within Survey Areas 1,2 and 3.

The Conservation Status of the 89 bird species recorded during the survey period are as follows:

- 84 species with a Conservation Status of **Least Concern**.
- 1 species with a Conservation Status of **(VU) Vulnerable**. Malleefowl *Leipoa ocellata* (NOT Recorded during the survey period).
- 1 species with a Conservation Status of **(P4) Priority 4**. Western Whipbird (Western Mallee) *Psophodes nigrogularis oberon*
- 1 species with a Conservation Status of **(EN) Endangered**. Carnaby's Black Cockatoo *Calyptorhynchus latirostris*
- 1 species with a Conservation Status of **(OS) Other specially protected species**. Peregrine Falcon *Falco peregrinus*

5.4 Bats

No formal surveys were carried out on Bat species within Survey Areas 1,2 and 3, However; it should be noted that during nocturnal Surveys for Owls and Frog Species, opportunistic observations were carried out to at least confirm the presence of Bat species.

During the survey period, on several occasions small micro-Bats were observed and heard whilst walking along the Firebreaks adjacent to the out-side boundary fence of the Bremer Bay Airfield, between 8pm and 10pm on the 29th of August 2023 small unidentified Bats could be seen flying through the light beam of the head torches, although not identified at a species level, this confirmed that Bats regularly use the Survey Areas as foraging zones.

Throughout the entire Fauna survey period, including numerous systematic meandering surveys of the 3 Survey Areas, no significant Bat roosting sites were identified as most of the floristic components within each survey area did not support suitable hollow bearing trees that would support small colonies of Micro-Bats.

In support of the limited field surveys for identifying Bat species within Survey Areas 1,2 and 3, a literature review of the (**Wellstead Estuary Fauna Survey 2008 Angela Sanders)**, identified 5 Bat Species that are likely to occur within Survey Areas 1,2 and 3, these include Gould's wattled Bat *Chalinolobus gouldii*, Chocolate wattled Bat *Chalinolobus morio*, Unidentified long-eared Bat *Nyctophilus* sp, White-striped free-tailed Bat *Tadarida australis* and Southern forest Bat *Vespadelus regulus*.

The 5 Bat Species that are likely to occur within Survey Areas 1,2 and 3 have a conservation rating of **Least Concern**.

5.5 Native Mammals

In support of previous Fauna Surveys of the Bremer Bay Airfield, more recent surveys identified additional Native Mammal species recorded within Survey Areas 1,2 and 3. whilst conducting extensive search activities for Malleefowl and Malleefowl Mounds, Bush Rats *Rattus fuscipes* were observed on many occasions, especially during early morning surveys where most sightings were within areas of dense low Mallee heath of Survey Areas 1 and 3, individuals were also observed feeding at the edges of the maintenance tracks within Survey Area 2.

During the Survey periods, between December 2023 and February 2024, 6 Native Mammal species were recorded within Survey Areas 1,2 and 3. All 6 Native Mammal species have a conservation rating of **Least Concern**.

- Western Pygmy Possum *Cercartetus concinnus*
- Honey Possum *Tarsipes rostratus*
- Western Grey Kangaroo *Macropus fuliginosus*
- Western Brush Wallaby *Macropus irma*
- Bush Rat *Rattus fuscipes*
- Short-beaked Echidna *Tachglossus aculeatus*

5.6 Feral Animals

Throughout the entire survey period, from October 2010 to the first week of February 2024, a number of Feral animal species have been recorded within all Survey Areas, this includes all habitat systems within Survey Areas 1,2 and 3.

The evidence of Feral animal activity was extremely high within all habitat systems of the 3 Survey Areas, Scats and tracks were most evident along the sandy firebreaks and at the edges of muddy pools, Feral animals were also photographed using DSLRs and surveillance cameras placed within areas of high fauna activity.

Feral animal activity was also very high between the transitional farming zones and Reserve **24521.**

Based on the long term monitoring of Feral animals within Survey Areas 1,2 and 3, it is highly likely that two of the Key predator species, Red Fox and Feral Cat would have a major impact on many of the native ground/near ground dependant fauna, especially reptiles and small marsupials, including Honey Possum *Trsipes rostratus* and Western Pygmy Possum *Cercarteus concinnus*.

During the survey period, 4 Feral Animal species were recorded within Survey Areas 1,2 and 3, these include:

- House Mouse *Mus musculus*
- Red Fox *Vulpes vulpes*
- Cat *Felis catus*
- Rabbit *Oryctolagus cuniculus*

6. Fauna Habitat Descriptions

During the on ground surveys carried out between October 2010 and February 2024, a total of 8 Fauna Habitat systems were identified, these include both natural habitats and modified man-made habitats found within Survey Areas 1,2,and 3.

The Natural Habitat systems were found to be in Excellent condition with minimal fragmentation of habitats other than fire breaks and access tracks, weed species were also found to be minimal within Survey Areas 1 and 3, Survey Area 2 however; was found to support minor incursions of Coastal Teatree *Leptospermum laevigatum,* this species was also found along the road verge of Done Ende Drive and within drainage systems leading to the entrance to the Bremer Bay Airfield.

The Coastal Teatree is currently being controlled by the Shire Of Jerramungup's Environment Team, (February 2024)

The modified Habitat systems were mostly located within Survey Area 2 though several man-made drainage systems were put in place to drain excess water from the Airstrip and divert the water flow into Survey Areas 1 and 3, these areas were found to support perched water bodies during the Winter months and during major rainfall events that occur over the Summer/ Autumn months.

In support of mapping the various Fauna Habitat systems within Survey Areas 1,2 and 3, Drone footage was used at various altitudes to capture Habitat structure as well the transitional zones between Key habitat systems.

Satellite imagery was also accessed through Landgate to assist in the overall mapping of Fauna Habitats within Survey Areas 1,2 and 3.

The key Fauna Habitat systems within Survey Areas 1,2 and 3 are described as:

6.1 Seasonal Ephemeral Wetland

The Seasonal Ephemeral Wetland was located on the North Western boundary of the Bremer Bay Airfield, since June 2020, site surveys indicate that the wetland fills during most winter months and again during major rainfall events over the Summer/Autumn months, however during this period if follow up rains do not occur, the wetland often dries up within two weeks.

During August and October of 2023 several site visits were carried out to measure the water depths, measurements were recorded at the deepest point as:

- 14th of August 2023 = 23 cm
- 16th of October 2023 = 28 cm

Fauna Surveys were carried out over an extended period during the winter and spring months between 2020 and 2023 and again during December 2023 and January and February of 2024.

Faunal assemblages recorded within the wetland system include 4 species of frog, *Litoria adelaidensis*, *Litoria cyclorancha*, *Pseudophryne guentheri* and *Crinia georgiana*, several Reptile species were also recorded, including Tiger Snake *Notechis scutatus*, Crowned Snake *Elapognathus coronatus,* Common Dwarf Skink *Menetia greyii,* and South-western Clawless Gecko *Crenadactylus ocellatus ocellatus.*

During the survey period in August 2023, observation were made of 5 separate clusters of egg masses located in small depressions under dead vegetation on the edges of the flooded wetland, these were found to belong to *Pseudophryne guentheri.*

Avian species recorded breeding within the vegetation systems of the wetland include Common Bronzewing *Phaps chalcoptera*, Brush Bronzewing *Phaps elegans*, Crested Pigeon *Ocyphaps lophotes,* Inland Thornbill *Acanthiza apicalis*, Weebill *Smicrornis brevirostris,* Yellow-rumped Thornbill *Acanthiza chrysorrhoa*, Spotted Scrubwren *Sericornis frontalis*, New Holland Honeyeater *Phylidonyris novaehollandiae*, Purple-gaped Honeyeater *Lichenostomus cratitus*, Tawny-crowned Honeyeater *Gliciphila melanops,* Western Spinebill *Acanthorhynchus superciliosus*, Brown Honeyeater *Lichmera indistincta*, Red Wattlebird *Anthochaera carunculata*, Black-faced Cuckoo-shrike *Coracina novaehollandiae*, Australian Raven *Corvus coronoides*, Grey Fantail *Rhipidura albiscapa*, Willie Wagtail *Rhipidura leucophrys,* and Silvereye *Zosterops lateralis*.

The key floristic components within the Ephemeral wetland system were of an upper canopy of Eucalypt occidentalis >5m, mid-layer canopy of Melaleuca pritzelii (**p3**) , *Melaleuca calycina, Hakea marginata* <2m, supported with dense ground cover of sedges <1m.

6.2 *Banksia* Shrubland (Kwonkgan TEC)

The Banksia shrubland habitat systems (**Kwonkgan TEC**), were mostly located within the North-Eastern sections of Survey Areas 1 and 2, and within the central zones of Survey Area 3, the key floristic components within the *Banksia* Shrublands were *Banksia coccinea*, *Banksia baxteri, Banksia attenuata* and *Nuytsia floribunda,* the mid-layer vegetation communities comprised of a number of species that are critical foraging and breeding habitat for a diverse range of Honeyeater species, as well as for other *Passerine* species including, Southern Emu-wren *Stipiturus malachurus*, Blue-breasted Fairy-wren *Malurus* pulcherrimus, Western Fieldwren *Calamanthus montanellus,* and Western Whipbird (Western Mallee) *Psophodes nigrogularis oberon* (P4)

Long term monitoring of Fauna populations within the **Banksia** Shrubland indicate a high level of reliance for a number of Faunal species that rely on the rich nectar bearing flowers and seeds of the *Proteaceous* rich plant communities. as well as invertebrate species that are attracted to the flowering shrubs and trees at various times of the year.

The Endangered Carnaby's Black Cockatoo although only recorded twice during the 2023 survey period, were found to rely on the high diversity of food resources that form the overall floristic components within the *Banksia* Shrublands, previous Fauna Surveys Carried out in 2017 to 2019 indicate that Carnaby's Black Cockatoos rely on a number of Key food plants within Survey Areas 1,2 and 3, the food plants are based on the Authors observations on the Feeding Habits of Black-Cockatoos within Reserve **24521** and areas just beyond the key Survey Areas 1,2 and 3, including the Road verges along Borden/Bremer Road and *Proteaceous* dominant Kwongkan communities along Point Henry Road, Bremer Bay.

Carnaby's Black Cockatoos were observed to feed on the seeds of:

Banksia attenuata

Banksia Baxteri

Banksia coccinia

Banksia falcata

Banksia gardenri

Banksia media

Banksia nutans

Banksia sessilis (Point Henry Road, Bremer Bay)

Hakea corymbosa

Hakea pandanicarpa

Lambertia inermis

Fauna surveys carried out during the winter and spring months between 2020 and 2023 and the summer months between December 2023 and February 2024, identified a number of Mammal and Reptile species including, Honey Possum *Tarsipes rostratus*, Western Pygmy Possum *Cercartetus concinnus* and Bush Rat *Rattus fuscipes.*

During the search activities of micro habitats including within abandoned stick nest ant mounds, soil heaps, abiotic materials and amongst fallen leaf litter and under fallen branches, a number of small ground dwelling reptile species were identified, including, South-western Clawless Gecko *Crenadactylus ocellatus ocellatus*, South-western Sandplain Worm Lizard *Aprasia repens*, Striated Worm Lizard *Aprasia striolata*, Fraser's Delma *Delma fraseri*, Four-toed Mulch Skink *Hemiegris peronei peronei*, South-Western Five-toed Lerista *Lerista microtis microtis*, Common Dwarf Skink *Menetia greyii*, Bardick *Echiopsis curta*, Crowned Snake *Elapognathus coronatus*, Tiger Snake *Notechis scutatus* and Gould's Hooded Snake Parasuta gouldii.

6.3 Low Mallee Heath (Kwonkgan TEC)

The Low Mallee Heath vegetation communities (**Kwonkgan TEC**), comprised of the majority of the Faunal habitat systems within Survey Areas 1,2 and 3, these unique vegetation communities were found to support the most floristically diverse plant species.

Many of the plant species identified within the Low Heath vegetation communities were found to be critical nesting sites for a number of Priority Avian species, including the Western Whipbird (Western Mallee) *Psophodes nigrogularis oberon* (**P4**).

Some of the key foraging and nesting shrubs include, *Adenanthos cuneatus*, *Banksia nutans*, *Banksia obovata*, *Banksia obtusa*, *Banksia plumosa* subsp. *Plumosa*, *Hakea corymbosa*, *Hakea ferruginea*, *Isopogon trilobus*, *Melaleuca striata*, Melaleuca *suberosa*, *Taxandria spathulata* and *Calothamnus gracilis.*

The upper canopy of the Low Mallee Heath vegetation rarely exceeded 1m in height though some areas were found to support small populations of *Eucalyptus pleurocarpa* and *Hakea obliqua* which towered over the lower floristic components.

During the extensive meandering style Fauna surveys of the Low Mallee Heath vegetation communities, a detailed survey was carried out on the breeding activities on a number of Avian species recorded nesting during the Winter, Spring and Summer months of 2023 and the first two months of 2024.

Avian species recorded nesting within the Low Mallee Heath vegetation communities include:

- Blue-breasted Fairy-wren *Malurus pulcherrimus*
- Southern Emu-wren *Stipiturus malachurus* sub-species *westernensis*
- Western Fieldwren *Calamanthus montanellus*
- Inland Thornbill *Acanthiza apicalis*
- Brown Honeyeater *Lichmera indistincta*
- New Holland Honeyeater *Phylidonyris novaehollandiae* subspecies *longirostris*
- White-cheeked Honeyeater *Phylidonyris nigro* subspecies *gouldii*
- Western Spinebill Acanthorhynchus superciliosus
- Western Whipbird (Western Mallee) *Psophodes nigrogularis oberon* (**P4**)

Reptile Fauna assemblages were similar to that of the Banksia Shrublands, though Bardick *Echiopsis curta* were commonly recorded high amongst vegetation, especially during cool cloudy days, other species recorded were Western Bluetongue *Tiliqua occipitalis*, Western Bobtail *Tiliqua rugosa rugosa,* Crowned Snake *Elapognathus coronatus* and several specimens of the Orange-eyed South-western Spiny-tailed Gecko *Strophurus spinigerus inornatus*, these were located on the vertical branches of *Allocasuarina humilis*.

6.4 Mallee Eucalypt Woodland

The Mallee Eucalypt Woodlands were found to be patchy in occurrence and not regarded as the key dominant habitat systems within Survey Areas 1,2 and 3.

The transitional zones between the Mallee Eucalypt Woodland and the more dominant Low Mallee Heath/ Mallee Heath communities were not clearly defined as a number of floristic components that are represented in both Mallee Heath communities were also present within the understorey vegetation community of the Mallee Eucalypt Woodlands.

During the Fauna Habitat assessments within Survey Area 1, a number of floristic components were identified as critical nesting sites for a number of Avian species, the key nesting Shrubs/trees include *Banksia alliacea*, *Banksia nutans, Hakea denticulata*, *Hakea corymbosa*, *Hakea ferruginea, Lambertia inermis*, and several *Melaleuca* sp, including *Melaleuca subtrigona* and *Melaleuca striata*.

The examination of Drone footage (**Survey Area 1**) clearly demonstrates the complex vegetation communities and the patchy distribution of Mallee Eucalypt Woodlands and their mixed association with the low Mallee Heath/Mallee Heath communities.

The examination and assessment of the Eucalypt Mallee Woodlands were critical in determining the potential viability of these habitat systems to support potential breeding habitat for Malleefowl.

During the survey period between August and December 2023 and January and February of 2024, a number of Avian species were recorded breeding within the vegetation communities of the Mallee Eucalypt Woodlands and within the transitional zones between the Woodlands and Mallee Heath vegetation communities, species include, Tawny Frogmouth *Podargus strigoides* subspecies *brachpterus*, Weebill *Smicronis brevirostris* subspecies *occidentalis*, Western Gerygone *Gerygone fusca* subspecies *fusca*, Inland Thornbill *Acanthiza apicalis*, Yelow-rumped Thornbill *Acanthiza chrysorrhoa* chrysorrhoa, Red Wattlebird *Anthocchaera carunculata* subspecies *woodwardi*, Yellow-throated Miner *Manorina flavigula* subspecies *wayensis*, Purple-gaped Honeyeater *Lichenostomus cratitius* subspecies *occidentalis*, Brown-headed Honeyeater *Melithreptus brevirostris* subspecies *magnirostris*, Brown honeyeater *Lichmera indistincta*, New Holland Honeyeater *Phylidonyris novaehollandiae* subspecies *longirostris*, Tawny-crowned Honeyeater *Phylidonyris melanops melanops*, Western Spinebill *Acanthorhynchus superciliosus*, Western Whipbird (Western Mallee) *Psophodes nigrogularis oberon,*(**P4**), Grey Fantail *Rhipidura fuliginosa* subspecies *preissi*, Willie Wagtail *Rhipidura leucophrys leocphrys*, Black-faced Cuckoo-Shrike *coracina novaehollandiae* subspecies *melanops*, Black-faced Woodswallow *artamus cinereus*, Grey Butcherbird *Cracticus torquatus* subspecies *leucopteris*, Silvereye *Zosterops lateralis* subspecies *chloronotus* and Red-eared Firetail *Stagonopleura oculata*.

Fauna Survey carried out within the South-Eastern corner of Survey Area 1 identified a number of reptile species including, Southern Carpet Python *Morelia spilota imbricata* (P4), The mature 1.4m specimen was encountered on the edge of a minor creek line to the West of Don Ende Drive, other reptile fauna observed during the meandering surveys of the Southern end of Survey Area 1 include, Western Marbled Gecko *Christinus marmoratus*, South-western Clawless Gecko *Crenadactylus ocellatus ocellatus*, Western Bearded Dragon *Pogona minor minor*, Common Dwarf Skink *Menetia greyii*, Western Bobtail *Tiliqua rugosa rugosa*, and Dugite Pseudonaja *affinis affinis.*

6.5 Mallee Heath

The Mallee Heath shrublands consist of a number of Sub-Mallee vegetation communities that support a rich and diverse range of plant species including, *Lambertia inermis*, *Hakea trifurcata*, *Hakea ferruginea*, *Allocasuarina humilis*, *Banksia nutans*, *Banksia repens, Melaleuca striata, Melaleuca thymoides, Melaleuca subtrigona*, *Melaleuca suberosa*, *Melalueca rigidifolia, Taxandria spathulata*, *Calothamnus gracilis, Hakea corymbosa, Adenanthos cuneatus*, *Banksia alliacea*, *Hakea denticulata*, *Isopogon buxifolius,* and *Banksia falcata.*

The upper canopy vegetation is often sparse, supporting populations of Eucalypt species including, *Eucalyptus buprestium, Eucalyptus pleurocarpa, Eucalyptus adesmophloia, Eucalyptus incrassata,* and *Eucalyptus uncinata*.

Survey Area 3 was found to support fragmented patches of *Nuytsia floribunda* and several small populations of *Banksia Attenuata* over Mallee Heath and amongst populations of *Phymatocarpus maxwellii.*

The low ground vegetation comprised of a mixed vegetation community of Sedges, Rushes and Grasses including, *Xanthorrhoea platyphylla, Lepidosperma* sp, *Lomandra* sp*, Desmocladus* sp, *Amphipogon turbinatus, Patersonia occidentalis, Conostylis setigera, Anarthria gracilis, Anarthria prolifera* and *Lepidosperma* sp.

During the Fauna surveys within Survey Areas 1,2 and 3, the diverse and floristically rich and complex Sub-Mallee Heath vegetation communities were represented in all 3 Survey Areas. Based on the extensive on ground surveys during July, August, September, October, November and December 2023, Honeyeater species, (Family *Meliphagidae*) were found to be the most dominant group of Avian species recorded breeding within the 3 Survey Areas, species include, Red Wattlebird *Anthochaera carunculata* subspecies *woodwardi,* Western Wattlebird *Anthochaera lunulata,* Tellow-throated Miner *Manorina flavigula* subspecies *wayensis*, Purple-gaped Honeyeater *lichenostomus cratitius* subspecies *ocidentalis*, Brown-headed Honeyeater *Melithreptus brevirostis* subspecies *magnirostris*, Brown Honeyeater *Lichmera indistincta,* New Holland Honeyeater *Phylidonyris novaehollandiae* subspecies *longirostris*, Tawny-crowned Honeyeater *Gliciphila melanops,* and Western Spinebill *Aacanthorhynchus superciliosus.*

Reptile Fauna observed during the meandering surveys and during search activities of micro habitats, identified a number of species including, South-western Clawless Gecko *Crenadactylus ocellatus ocellatus*, Orange-eyed Southwestern Spiny-tailed Gecko *Strophurus spinigerus inornatus*, Southwestern Sandplain Worm Lizard *Aprasia repens,* Striated Worm Lizard *Aprasia striolata*, Western Bearded Dragon *pogona minor minor,* (in the process of laying eggs), Southwestern Cool Skink *Acritoscincus trillineatum,* Four-toed Mulch Skink *Hemiergis peronei peronei,* Southwestern Five-toed Lerista *Lerista microtis microtis*, Common Dwarf Skink *Menetia greyii*, Shrubland Pale-flecked Morethia *Morethia obscura*, Western Bobtail *Tiliqua rugosa rugosa,* Gould's Hooded Snake *Parasuta gouldii* and Dugite *Pseudonaja affinis affinis.*

6.6 Mallee Heath/ *Phymatocarpus* Shrubland

The *Phymatocarpus* Shrublands were mostly located within Survey Area 3 and the Northern end of Survey Area 2, the key habitat structure was of dense to open patches of *Phymatocarpus maxwellii* with some populations reaching heights of more than 2m. The associated vegetation communities consist of small fragmented patches of *Banksia Attenuata*, *Nuytsia floribunda* and *Eucalyptus pleurocarpa,* the mid to lower level vegetation communities consist of *Melalueca suberosa, Taxandria spathulata, Hakea nitida, Hakea ferruginea, Isopogon buxifolius, Grevillea nudiflora, Callothamnus gracilis,* and *Banksia repens.*

The ground cover vegetation varied in densities, especially in disturbed areas where Western Grey Kangaroos *Macropus fuliginosus* disturbed the soil profile to create dens under the dense vegetation communities supporting *Phymatocarpus maxwellii*. The local Kangaroo population is generally very stable due to the suitable foraging zones within nearby Agricultural lands, the population is generally sedentary and localised, given that Kangaroos also have access to semi-permanent water sources from Farm dams and seasonal perched water bodies within the low lying access tracks that surround the Bremer Bay Airfield.

During the 2023 Fauna Survey period (July-December). a number of Avian species were recorded breeding within Survey Area 3, including, Crested Pigeon *Ocphaps lophotes*, Common Bronzewing *Phaps chalcoptera*, Southern Emu-wren *Stipiturus malachurus* subspecies *westernensis,* Spotted Scrub-wren *Sericornis frontalis,* Red Wattlebird *Anthochaera carunculata* subspecies *woodwardi,* Purple-gaped Honeyeater *Lichenostomus cratitius* subspecies *occidentalis,* Brown Honeyaeater *Lichmera indisticta,* New-Holland Honeyeater *Phylidonyris novaehollandiae,* White-cheeked Honeyeater *Phylidonyris melanops melanops*, Grey Fantail *Rhipidura fuliginosa* subspecies *preissi* and Silvereye *Zosterops lateralis* subspecies *chlorono-tus.*

During the Meandering search activities carried out during December 2023 and January and February 2024, a number of other faunal species were recorded including, Shot-beaked Echidna *Tachglossus aculeatus*, South-western Clawless Gecko ocellatus ocellatus, Orange-eyed Southwestern Spiny-tailed Gecko *Strophurus spinigerus inornatus,* Western Bobtail *Tiliqua rugosa rugosa,* Black-backed Snake *Parasuta nirgiceps,* and Dugite *Pseudonaja affinis affinis.*

6.7 Bremer Bay Airstrip and associated cleared management zones

The Bremer Bay Airstrip and associated aircraft parking areas, slashed buffer zones and other open/cleared areas within the Bremer Bay Airfield (Survey Area 2), were found to support suitable foraging and nesting areas for a number of Avian species.

During the Winter and Spring Fauna surveys of 2023, a number of ground nesting birds were recorded breeding within the maintenance zones of the Bremer Bay Airfield, including Banded Lapwing *Vanellus tricolor* Black-fronted Dotterel *Elseyornis melanops* White-fronted Chat *Epthianura albifrons*, Australian Pipit *Anthus novaeseelandiae* subspecies *australis.*

During maintenance activities a number of soil heaps and stick ant nests were examined prior to carrying out weed control/slashing operations, the site surveys identified a number of Frog and Reptile species including, *Lymnodynastes dorsalis, Myobatrachus gouldii*, South-Western Blind Snake *Ramphotyphlops australis*, Bardick *Echiopsis curta*, Crowned Snake *Elapognathus coronatus*, and South-Western Five-toed lerista *Lerista microtis microtis*.

6.8 Buildings and other structures including Aircraft hangers

Opportunistic Surveys were carried out within and around the Key structures of the Bremer Bay Airfield, with one main structure, the Aircraft Hanger being identified as a key roosting site for Nankeen Kestrels *Falco cenchroides* and occasional day time roost for Eastern Barn Owls *Tyto alba* subspecies *delicatula.*

Surveys carried out during September 2023 identified two active nests within the roof cavities of the Aircraft hanger both nests belonging to Welcome Swallows *Hirundo neoxena* subspecies *carteri,* one nest was found to support 3 eggs whilst the other nest supported 4 eggs.

6.9 Man-made Drainage Systems

The Drainage systems located within the Bremer Bay Airfield were put in place to divert water from the Airstrip and critical infrastructure, during the winter months many of the drainage systems fill with water including areas where the runoff creates pools of standing water, these modified habitat systems have allowed for several frog species to breed including, *Crinia georgiana*, *Crinia pseudinsignifera*, *Psuedophryne guentheri* and *Litoria cyclorancha*.

When these modified habitats fill with water both during winter and after major Summer/Autumn rainfall events, these bodies of perched water act as critical watering points for a number of Faunal species including many small *Passerine* species such as Honeyeaters, Wrens and Thornbills.

Fauna Surveys carried out post summer rainfall events identified a number of perched water bodies, mostly on the outer perimeter fence-line along the maintenance track, these bodies of water though shallow attracted a number of Faunal species including Western Grey Kangaroo *Macropus fuliginosus*, Short-beaked Echidna *Tachglossus aculeatus*, Emu *Dromaius novaehollandiae*, Southern Heath Monitor *Varanus rosenbergi*, and Dugite *Pseudonaja affinis affinis*.

7. PHYSICAL ENVIRONMENT

7.1 Climate

The climate associated with the Bremer Bay Airfield is supported with a Mediterranean –type climate with cool, wet winters and warm to hot, dry summers. The average monthly minimum and maximum temperatures for the Bremer Bay Airfield range from 14-26 degrees Celsius during the summer months and from 7-16 degrees Celsius during the winter months, the average annual rainfall is 630 mm. Below is a chart that highlights the annual rainfall figures over a four year period.

Bremer Bay Weather Station 9654, Bureau of Meteorology

Annual Rainfall 2020	Annual Rainfall 2021	Annual Rainfall 2022	Annual Rainfall 2023
520.8mm	689.3mm	659.4mm	424mm

7.2 Climate Change

The continued loss of terrestrial climatic habitats caused by anthropogenic emissions of greenhouse gasses is listed under the EPBC Act as a key threatening process. In addition to the kind of unpredictable stochastic weather events, the Fitzgerald Biosphere Region has experienced a trend of decreased winter rainfall and increased summer rainfall since the mid-20th century and predictions are that these trends may continue (Gilillian *et al.* 2009b; IOCI 2005).

7.3 Topography, Hydrology and Geology

The Bremer Bay Airfield is situated on the top of a ridgeline which extends to the North of Survey Area 3, the flat to gentle undulating landscape gradually changes to a moderate slope that drains water into a nearby creek system to the North, which gradually drains into the Wellstead Estuary.

The topography to the South of the Bremer Airfield located within Survey Area 1 supports flat to gentle undulating landscapes with a minor creek system that rarely flows, but is well defined in the landscape adjacent to the Southern Agricultural boundary fence of Survey Area 1, the creek system also meanders to the East through installed drainage system to guide water flow under Don Ende Drive.

The only natural rock formations are of exposed Spongolite, mostly evident on the Northern end of Survey Area 3, the exposed Spongolite formations are due to erosion caused mostly by rainfall moving down the slope before it reaches the creek system to the North, other evidence of erosion caused by rainfall activity is along the access track with several areas supporting deep washouts.

The topographical landscapes within Survey areas 1,2 and 3 did not support Granite rock formations or other significant rock formations.

8. SURVEY LIMITATIONS

This report is based on long term surveys and monitoring of Faunal assemblages that rely on the various habitat systems within local Government Reserve **24521**, in support of these extensive survey efforts the author of this report is confident to conclude that between 80-90% of Vertebrate Fauna have been identified within the proposed application area for the new cross runway and a similar percentage of Vertebrate Fauna identified beyond the immediate application area, which also covers Survey Areas 1,2 and 3 of this report.

Targeted search activities were also carried out to identify Threatened and Priority species that may occur within and beyond the proposed application area, including Survey Areas 1,2 and 3. One of the key objectives was to investigate the likelihood of Malleefowl populations utilizing the various habitat systems within the application area as foraging/breeding habitat.

In support of the field surveys, Exhaustive Desktop search activities were employed to gather relevant data on Threatened and Priority species that may occur within and beyond the application area, other than the Fauna surveys carried out by the author of this report, their is limited data available on Faunal assemblages within local Government Reserve **24521**.

In response to the lack of current data specifically relating to Threatened and Priority Fauna, (Mammal Species) and their likelihood of occurrence within the proposed application area, including Survey Areas 1, 2 and 3, further investigations were undertaken to clarify or verify the likelihood of occurrence for a number of Threatened and Priority Fauna (Mammal Species).

To support the investigation, the **Department of Bio-diversity Conservation and Attractions** (DBCA), Albany Branch were contacted, (Refer to **page 10**, information provided by DBCA on Threatened Mammal Species).

In conclusion to the Survey Limitations of this report, the desk top information is very limited due to the fact that Reserve **24521** has rarely been extensively surveyed or monitored for potential breeding populations of a number of Threatened Mammal species.

9. DISCUSSION

In support of the long term monitoring of Vertebrate Fauna within and beyond the Bremer Bay Airfield, specifically, within Government Reserve 24521 and Survey Areas 1,2 and 3, the area was found to support significant fauna populations including, 11 Honeyeater Species that rely on and breed within the *Proteaceous* rich, Kwongkan Shrublands (TEC).

During the Survey period between July and December 2023 and January and February 2024, a total of 134 Vertebrate fauna were recorded within Survey Areas 1,2 and 3, this equates to approximately 80-90% of species, it should also be noted that many Avian species are highly nomadic and although some species were not recorded during the 2023 Fauna Surveys, they were recorded in previous years, species include Brown Songlark *Cincloramphus cruralis,* Rufous Songlark *Cincloramphus mathewsi,* and Red-capped Robin *Petroica goodenovii.*

A number of other Avian species have experienced a major decline in populations, as well as a retraction in their distribution range, species include Australian Bustard *Ardeotis australis,* Bush Stone-curlew *Burhinus grallarius and* Hooded Robin *Melanodryas cucullata.*

Based on the extensive on ground search activities for Malleefowl and Malleefowl nesting mounds, either active or inactive, only a single old Malleefowl mound was located within the South-West corner of Survey Area 1, the Survey results indicate that Malleefowl are likely to move through suitable habitat systems within Survey Areas 1 and 3, though are unlikely to breed within Survey Areas 1 and 3 due to the relatively small patchy areas of potentially suitable breeding habitat.

In conclusion to this report the proposed extension of the new cross run way is essential for the Bremer Bay Airfield to function adequately and provide safer options for RFDS and other emergency response aircraft, including Water Bombers to land aircraft safely during major crosswind events.

10. KEY RECOMMENDATIONS

In support of this report the author has included **Key Recommendations** that should be implemented to minimize any Environmental impacts resulting from earth moving/clearing activities associated with the proposed construction of the new cross runway at the Bremer Bay Airfield.

The implementation of these **Key Recommendations** will assist in maintaining the Ecological Integrity of the natural landscapes associated with the Bremer Bay Airfield, the **Key Recommendations** include:

1. Prior to any earth moving/clearing activities within the proposed application area, that all Staff/ contractors undertake training (Green Card) in Dieback hygiene, as well as training in working in Environmentally sensitive areas.
2. The Shire Of Jerramungup in consultation with key stakeholders to develop an appropriate Dieback Management Plan, in support of the regions current Environmental Management Standards.
3. Signage to be placed at various access points within the Bremer Bay Airfield, indicating the presence of Dieback and the impacts of Dieback on the Regions Biodiversity.
4. Native seed resources to be collected for future revegetation projects across the Shire.
5. Prior to any clearing operations, a qualified Fauna specialist (observer) to be in place to assist in the recovery of any fauna that may be impacted on during any clearing activities.
6. Prior to any site rehabilitation/revegetation, to consult with a Fauna specialist to identify suitable habitats within the Bremer Bay Airfield that support populations of threatened Faunal species.
7. Monitor and evaluate population trends of Faunal Assemblages in response to post clearing activities and construction of the new cross runway.
8. Collaborate with community education initiatives to promote awareness of Threatened Ecological Communities and Rare and Endangered Fauna within the Bremer Bay Airfield and Government Reserve **24521**.
9. Collaborate with Farmers, Community Groups and other Key stakeholders in developing a weed management program to control invasive weeds along Done Ende Drive and within the Boundary of the Bremer Bay Airfield.
10. Conduct Follow up Fauna surveys and continue to value add to the Shire of Jerramungup's Fauna Data base.
11. Feral Animal control, continue to monitor the impacts of Feral cats and Foxes on Native Fauna within the Bremer Bay Airfield and Government Reserve **24521**.
12. Prior to any earth moving activities all plant machinery to be cleaned and checked for soil deposits, weed seeds and other foreign materials, all plant machinery to be in good working condition with no oil/chemical leaks.

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12. FAUNA CONSERVATION CATEGORIES

APPENDIX A

Conservation Codes for Western Australian Flora and Fauna

Specially protected fauna or flora are species* which have been adequately searched for and are deemed to be, in the wild, either rare, at risk of extinction, or otherwise in need of special protection, and have been gazetted as such. Conservation codes have been transitioned under regulations 170, 171 and 172 of the *Biodiversity Conservation Regulations 2018*.

T Threatened species – Schedules 1-4

Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act).

- **Threatened fauna** is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for Threatened Fauna.
- **Threatened flora** is that subset of 'Rare Flora' listed under schedules 1 to 3 of the *Wildlife Conservation (Rare Flora) Notice 2018* for Threatened Flora.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

CR Critically endangered species

Threatened species considered to be *"facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines"*.

Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for critically endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for critically endangered flora.

EN Endangered species

Threatened species considered to be *"facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines"*.

Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for endangered flora.

VU Vulnerable species

Threatened species considered to be *"facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines"*.

Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the *Wildlife*

Conservation (Specially Protected Fauna) Notice 2018 for vulnerable fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for vulnerable flora.

EX Presumed extinct species

Species where "*there is no reasonable doubt that the last member of the species has died*", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).

Published as presumed extinct under schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for extinct fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for extinct flora.

EW Extinct in the wild species

Species that "*is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form*", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).

Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.

Specially protected species

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

MI Migratory species

Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).

Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.

Published as migratory birds protected under an international agreement under schedule 5 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

CD Species of special conservation interest (conservation dependent fauna)

Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).

Published as conservation dependent fauna under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

OS Other specially protected species

Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

Published as other specially protected fauna under schedule 7 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

P Priority species

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

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

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

Priority 1: Poorly-known species

Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

Priority 2: Poorly-known species

Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

Priority 3: Poorly-known species

Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

Priority 4: Rare, Near Threatened and other species in need of monitoring

(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.

(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.

(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

*Species includes all taxa (plural of taxon - a classificatory group of any taxonomic rank, e.g. a family, genus, species or any infraspecific category i.e. subspecies or variety, or a distinct population).

Western Australian Ecological Communities

Threatened Ecological Communities

The BC Act provides for the statutory listing of threatened ecological communities (TECs) by the Minister.

Presumed Totally Destroyed (PD)

An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future.

Critically Endangered (CR)

An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated.

Endangered (EN)

An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.

Vulnerable (VU)

An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.

Priority Ecological Communities

Possible threatened ecological communities that do not meet survey criteria or that are not adequately defined are added to the Priority Ecological Community List under priorities 1, 2 and 3. These three categories are ranked in order of priority for survey and/or definition of the community. 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. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5.

Priority One: Poorly-known ecological communities

Ecological communities that are known from very few occurrences with a very restricted distribution (generally ≤5 occurrences or a total area of ≤ 100ha).

Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) or for which current threats exist. May include communities with occurrences on protected lands. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.

Priority Two: Poorly-known ecological communities

Communities that are known from few occurrences with a restricted distribution (generally ≤10 occurrences or a total area of ≤200ha). At least some occurrences are not believed to be under immediate threat (within approximately 10 years) of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.

Priority Three: Poorly known ecological communities

(i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or:

(ii) communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat (within approximately 10 years), or;

(iii) munities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, inappropriate fire regimes, clearing, hydrological change etc.

Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.

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. These communities require regular monitoring.

(i) Rare. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These communities are usually represented on conservation lands.

(ii) Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for a higher threat category.

(iii) Ecological communities that have been removed from the list of threatened communities during the past five years.

Priority Five: Conservation Dependent ecological communities

Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

Commonwealth of Australia Conservation Codes

Threatened Flora and Fauna

Threatened fauna and flora may be listed under Section 178 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in any one of the following six categories:

Extinct

A native species is eligible to be included in the extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.

Extinct in the wild

A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time:

a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or
b) it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.

Critically endangered

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the five criteria for the category identified in Part 7.01 of the EPBC Regulations, and it is therefore considered to be facing an extremely high risk of extinction in the wild.

Endangered

A taxon is Endangered when the best available evidence indicates that it meets any of the five criteria for the category identified in Part 7.01 of the EPBC Regulations, and it is therefore considered to be facing a very high risk of extinction in the wild.

Vulnerable

A taxon is Vulnerable when the best available evidence indicates that it meets any of the five criteria for the category identified in Part 7.01 of the EPBC Regulations, and it is therefore considered to be facing a high risk of extinction in the wild.

Conservation dependent

A native species is eligible to be included in the conservation dependent category at a particular time if, at that time:

a) the species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or
b) the following subparagraphs are satisfied:
    i. the species is a species of fish;

ii. the species is the focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised;

iii. the plan of management is in force under a law of the Commonwealth or of a State or Territory;

iv. cessation of the plan of management would adversely affect the conservation status of the species.

The EPBC Act does not provide for listing in a data deficient category. Where sufficient data (evidence) is unavailable to allow assessment by the Threatened Species Scientific Committee against the criteria for listing, the species are found to be ineligible. A recommendation is made to the Minister to not include the species in any category under the EPBC Act. For reasons of transparency and to inform future research, the Threatened Species Scientific Committee publishes the names of those species found to be data deficient. As data deficient is not a listing category under the EPBC Act, this has no statutory implications and the species is not considered to be listed under the EPBC Act.

Threatened Ecological Communities

Threatened Ecological communities under the EPBC Act are listed in three categories.

Critically endangered

If, at that time, an ecological community is facing an extremely high risk of extinction in the wild in the immediate future (indicative timeframe being the next 10 years).

Endangered

If, at that time, an ecological community is not critically endangered but is facing a very high risk of extinction in the wild in the near future (indicative timeframe being the next 20 years).

Vulnerable

If, at that time, an ecological community is not critically endangered or endangered, but is facing a high risk of extinction in the wild in the medium-term future (indicative timeframe being the next 50 years).

13. APPENDIX B

Vertebrate Fauna recorded within the Application Area and Survey Areas 1,2 and 3

(Survey Period, July, August, September, October, November, December 2023 and January and February 2024)

Avian Fauna List

Banded Lapwing *Vanellus tricolor* - Recorded Breeding

Black-fronted Dotterel *Elseyornis melanops* - Recorded Breeding

White-faced Heron *Egretta novaehollandiae* - Recorded Foraging

Emu *Dromaius novaehollandiae* - Recorded Foraging

Malleefowl *Leipoa ocellata* - **Not** Recorded during the Survey Period

Painted-button Quail *Turnix varius* - Recorded Breeding

Little Button Quail *Turnix velox* - Recorded Foraging

Stubble Quail *Coturnix pectoralis* - Recorded Breeding

Black-shouldered Kite *Elanus axillaris* - Recorded Foraging

Spotted Harrier *Circus assimilis* - Recorded Foraging

Collared Sparrowhawk *Accipiter cirrocephalus* - Recorded Foraging

Brown Goshawk *Accipiter fasciatus* - Recorded Foraging

Little Eagle *Hieraaetus morphnoides* - Recorded flying over Survey Areas

Wedge-tailed Eagle *Aquila audax* - Recorded Flying over Survey Area

Nankeen Kestrel *Falco cenchroides* - Recorded Foraging

Brown Falcon *Falco berigora* - Recorded Foraging

Australian Hobby *Falco longipennis* - Recorded Foraging

Peregrine Falcon *Falco peregrinus* - Recorded Foraging

Crested Pigeon *Ocyphaps lophotes* - Recorded Breeding

Common Bronzewing *Phaps chalcoptera* - Recorded Breeding

Brush Bronzewing *Phaps elegans* - Recorded Breeding

Carnaby's Black Cockatoo *Calyptorhynchus latirostris* - Recorded as mobile Flock

Galah *Eolophus roseicapilla* - Recorded Foraging

Purple-crowned Lorikeet *Glossopsitta potphyrocephala* - Recorded Foraging

Australian Ringneck *Barnardius zonarius* - Recorded Foraging

Red-capped Parrot *Purpureicephalus spurius* - Recorded Foraging

Regent Parrot *Polytelis anthopeplus* - Recorded as mobile Flock

Elegant Parrot *Neophema elegans* - Recorded Foraging

Pallid Cuckoo *Curulus pallidus* - Recorded Calling

Fan-tailed Cuckoo *Cacomantis flabelliformis* - Recorded Breeding

Horsfield's Bronze Cuckoo *Chrysococcyx basalis* - Recorded Breeding

Shinning Bronze Cuckoo *Chrysococcyx lucidus* subspecies *plagosus* - Recorded Breeding

Black-eared Cuckoo *Chalcites osculans* - Recorded Calling

Southern Boobook *Ninox novaeseelandiae* - Recorded Foraging (Nocturnal Survey)

Eastern Barn Owl *Tyto alba* subspecies *delicatula* - Recorded in Day Time Roost

Tawny Frogmouth *Podargus strigoides* subspecies *brachypterus* - Recorded Breeding

Spotted Nightjar *Eurostopodus argus* - Flushed from Day Time Roost

Australian Owlet Nightjar *Aegothleles cristatus* - Recorded Foraging

Laughing Kookaburra *Daceelo novaeguinea* - Recorded Foraging

Sacred Kingfisher *Todiramphus sanctus* - Recorded Foraging

Rainbow Bee-eater *Merops ornatus* - Recorded in Flocks above Survey Areas

Splendid Fairy-wren *Malurus splendens* subspecies *splendens* - Recorded Breeding

Blue-breasted Fairy-wren *Malurus pulcherrimus* - Recorded Breeding

Southern Emu-wren *Stipiturus malachurus* subspecies *westernesis* - Recorded Breeding

Red-winged Fairy-wren *Malurus elegans* - Recorded Breeding

Spotted Scrubwren *Sericornis frontalis* - Recorded Breeding

Western Fieldwren *Calamanthus campestris* - Recorded Breeding

Weebill *Smicronis brevirostris* subspecies *occidentalis* - Recorded Breeding

Western Gerygone *Gerygone fusca* subspecies *fusca* - Recorded Breeding

Inland Thornbill *Acanthiza apicalis* - Recorded Breeding

Yellow-Rumped Thornbill *Acanthiza chrysorrhoa chrysorrhoa* - Recorded Breeding

Spotted Pardalote *Pardalotus punctatus* subspecies *xanthopyge* - Recorded Breeding

Striated Pardalote *Pardalotus striatus* subspecies *substriatus* - Recorded Foraging

Red Wattlebird *Anthochaera carunculata* subspecies *Woodwardi* - Recorded Breeding

Western Wattlebird *Anthochaera lunulata* - Recorded Breeding

Yellow-throated Miner *Manorina flavigula* subspecies *wetness* - Recorded Breeding

Singing Honeyeater *Lichenostomus virescens virescens* - Recorded Breeding

Purple-gaped Honeyeater *Lichenostomus cratitius* subspecies *occidentalis* - Recorded Breeding

Brown-headed Honeyeater *Melithreptus brevirostris* subspecies *magnirostris* - Recorded Breeding

Brown Honeyeater *Lichmera indistincta* - Recorded Breeding

New-Holland Honeyeater *Phylidonyris novaehollandiae* subspecies l*ongirostris* - Recorded Breeding

White-cheeked Honeyeater *Phylidonyris nigra* subspecies *gouldi* - Recorded Breeding

Tawny-crowned Honeyeater *Phylidonyris melanops melanops* - Recorded Breeding

White-fronted Chat *Epthianura albifrons* - Recorded Breeding

Western Whipbird *Psophodes nigrogularis oberon* (Mallee Race) - Recorded Breeding

Varied Sittella *Daphoenositta chrysoptera* subspecies *pileata* - Recorded Breeding

Western Whistler *Pachycephala pectoralis* subspecies *fuliginosa* - Recorded Breeding

Rufous Whistler *Pachycephala rufiventris rufiventris* - Recorded Breeding

Grey-shrike Thrush *Colluricincla* harmonica subspecies *rufiventris* - Recorded Breeding

Restless Flycatcher *Myiagra inquieta inquieta* - Recorded Foraging

Magpie-lark *Grallina cyanoleuca cyanoleuca* - Recorded Foraging

Grey Fantail *Rhipidura fuliginosa* subspecies *preissi* - Recorded Breeding

Willie Wagtail *Rhipidura leucophrys leucophrys* - Recorded Breeding

Black-faced Cuckoo-shrike *Coracina novaehollandiae* subspecies *melanops* - Recorded Breeding

White-winged Triller *Lalage sueuril* subspecies *tricolor* - Recorded Foraging

Black-faced Woodswallow *Artamus cinereus* - Recorded Breeding

Dusky Woodswallow *Artamus cyanopterus* subspecies *perthi* - Recorded Breeding

Grey Butcherbird *Cracticus torquatus* subspecies *leucopteris* - Recorded Breeding

Pied Butcherbird *Cracticus nigrogularis* subspecies *picatus* - Recorded Breeding along Don Ende Drive

Grey Currawong *Strepera versicolor* subspecies *plumbea* - Recorded Foraging

Australian Magpie *Gymnorhina itbicen* subspecies *dorsalis* - Recorded Breeding

Australian Raven *Corvus coronoides* subspecies *perplexus* - Recorded Breeding

Australian Pipit *Anthus novaeseelandiae* subspecies *australis* - Recorded Breeding

Miistletoebird *Diccaeum hiruninaceum* - Recorded in Flight over Survey Area 1

White-backed Swallow *Cheramoeca leucosterna* - Recorded in Flight over Survey areas 1,2 and 3

Welcome Swallow *Hirundo neoxena* subspecies *carteri* - Recorded Breeding

Tree Martin *Hirundo nigricans* subspecies *neglecta* - Recorded in Flight over Survey Areas 1, 2 and 3

Silvereye *Zosterops lateralis* subspecies *chloronotus* - Recorded Breeding

Red-eared Firetail *Stagonopleura oculata* - Recorded Breeding

Reptile Fauna List

Western Marbled Gecko *Christinus marmoratus*

South-western Clawless Gecko *Crenadactylus ocelllatus ocellatus*

Orange-eyed south-western Spiny-tailed Gecko *Strophurus spinigerus inornatus*

South-western Sandplain Worm Lizard *Aprasia repens*

Striated Worm Lizard *Aprasia striolata*

Fraser's Delma *Delma fraeri*

Burton's Legless Lizard *lialis burtonis*

Southern Scaly Foot *Pygopus lepidopodus*

Western Bearded Dragon *Pogona minor minor*

Southern Heath Monitor *Varanus rosenbergi*

South-western Cool Skink *Acritoscincus trillineatum*

Four-toed Mulch Skink *Hemiergis peronii peronii*

South-western Five-toed *Lerista Lerista microtis microtis*

South-western Four-toed *Lerista Lerista distinguenda*

Common Dwarf Skink *Menetia greyii*

Shrubland Pale-flecked Morethia *Morethia obscura*

Western Bluetongue *Tiliqua occipitalis*

Western Bobtail *Tiliqua rugosa rugosa*

South-western Blind Snake *Ramphotyphlops australis*

Southern Carpet Python *Morelia spilota* subspecies *imbricata*

Bardick *Echiopsis curta*

Crowned Snake *Elapognathus coronatus*

Tiger Snake *Notechis scutas*

Gould's Hooded Snake *Parasuta gouldii*

Black-backed Snake *Parasuta nigriceps*

Dugite *Pseudonaja affinis affinis*

Amphibian Fauna List

Quacking frog *Crinia georgiana*

Bleating Froglet *Crinia pseudinsignifera*

Crawling toadlet *Pseudophryne guentheri*

Slender Tree Frog *Litoria Adelaidensis*

Spotted-thighed Frog *Lioria cyclorhyncha*

Moaning Frog *Heleioporus eyrie*

Western Banjo Frog *Limnodynastes dorsalis*

White-footed Frog *Neobatrachus albipes*

Turtle Frog *Myobatrachus gouldii*

Native Mammals List

Western Pygmy Possum *Cercartetus concinnus*

Honey Possum *Tarsipes rostratus*

Western Grey Kangaroo *Macropus fuliginosus*

Western Brush Wallaby *Macropus Irma*

Bush Rat *Rattus fuscipes*

Short-beaked Echidna *Tachglossus oculeatus*

Feral Animals List

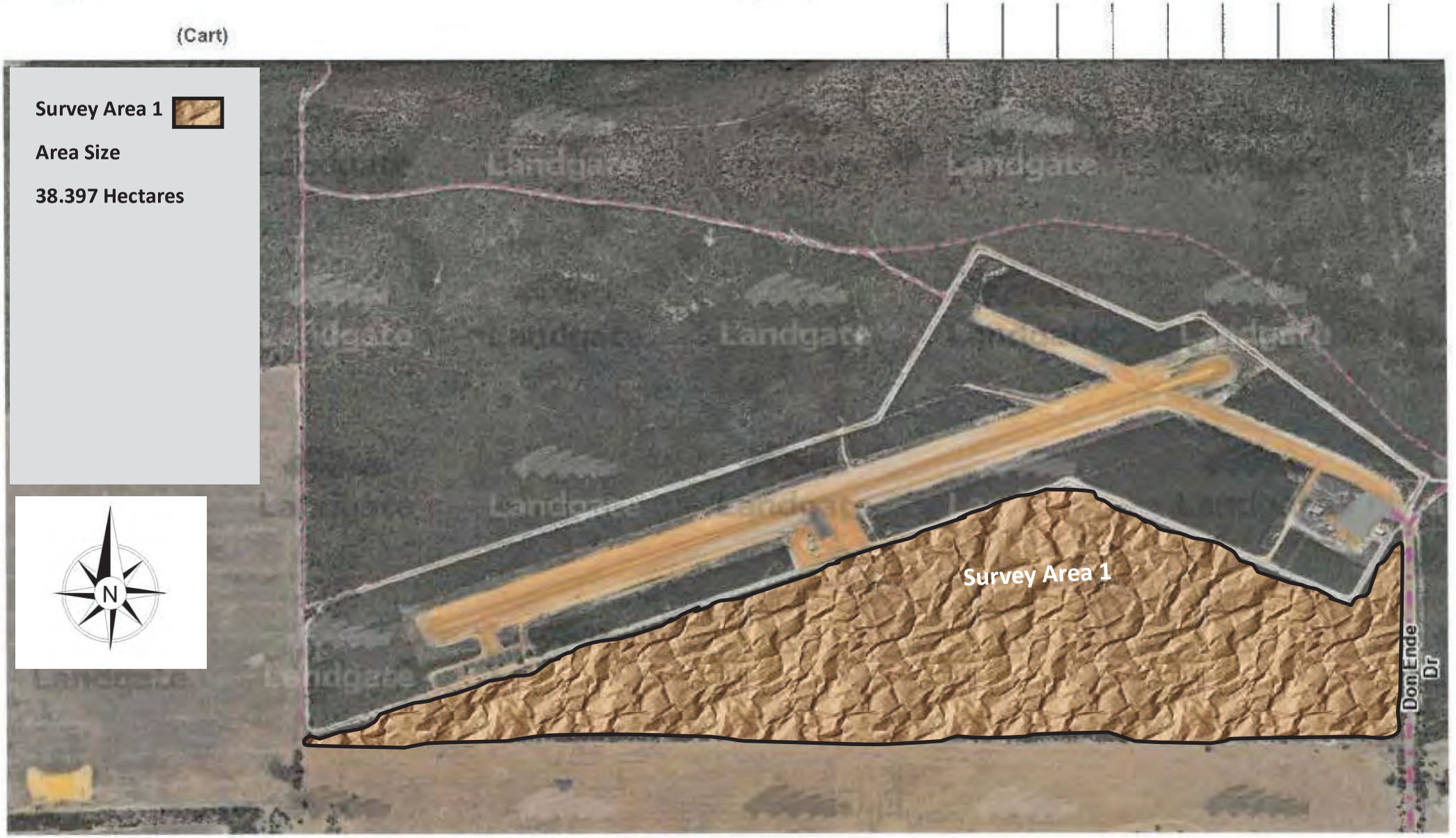
House Mouse *Mus musculus*

Red Fox *Vulpes vulpes*

Cat *Felis catus*

Rabbit *Oryctolagus cuniculis*

(Cart)



14. APPENDIX C

0 100 200m

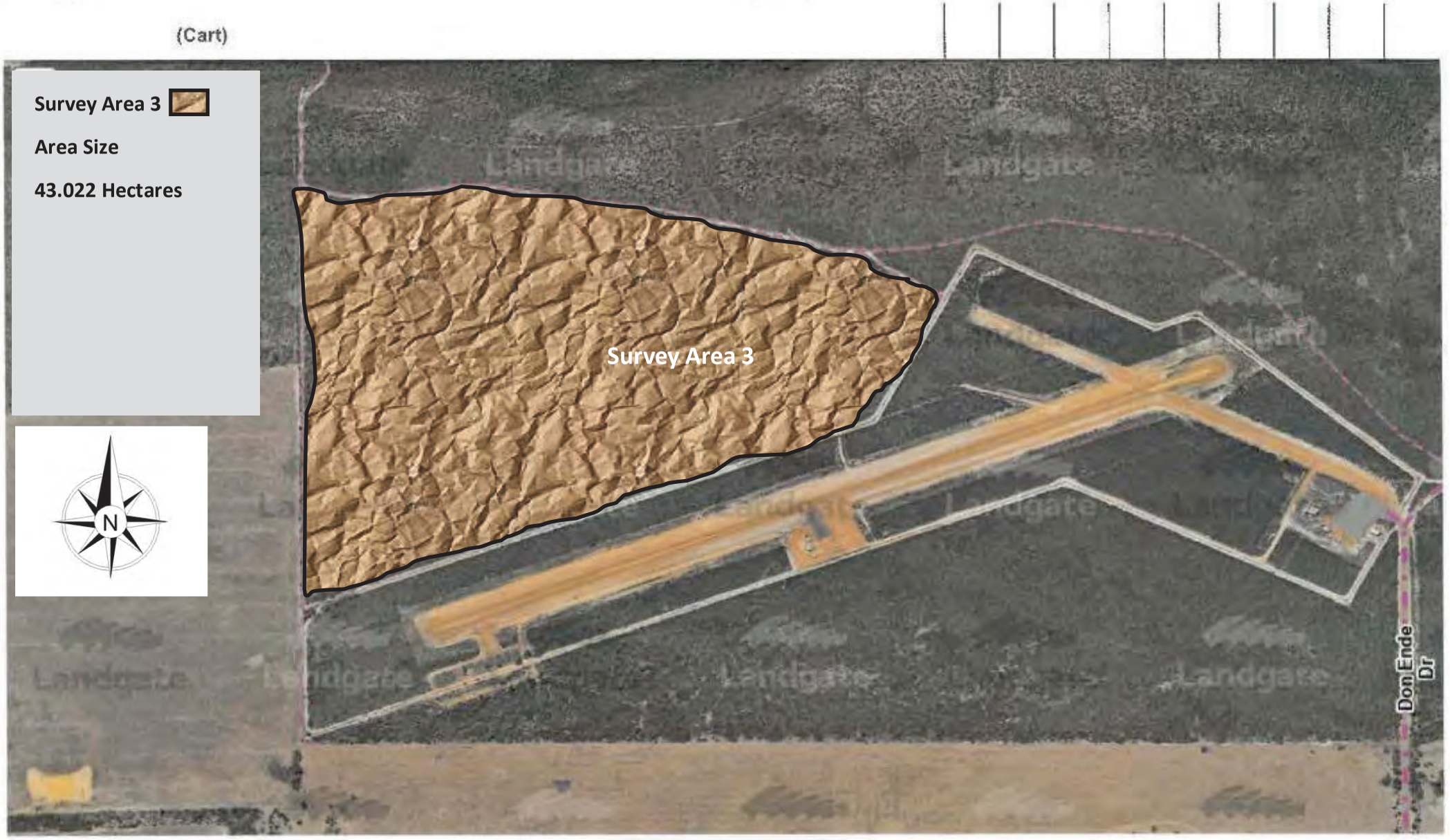
-34.374283 119.336528 Degrees

(Cart)

0 100 200m

-34.374283 119.336528 Degrees

(Cart)



0 100 200m

-34.374283 119.336528 Degrees

(Cart)

0 100 200m

-34.374283 119.336528 Degrees

Bremer Bay Airfield Site Location

Map Printed from WALGA Local Biodiversity Project Environmental Planning Tool on Tue Aug 22 12:37:43 WST 2017

Aboriginal Heritage Sites and other Heritage Sites within the Shire Of Jerramungup

Legend

Populated Places

DAA Aboriginal Sites and Other Heritage Places

Local Government Authority

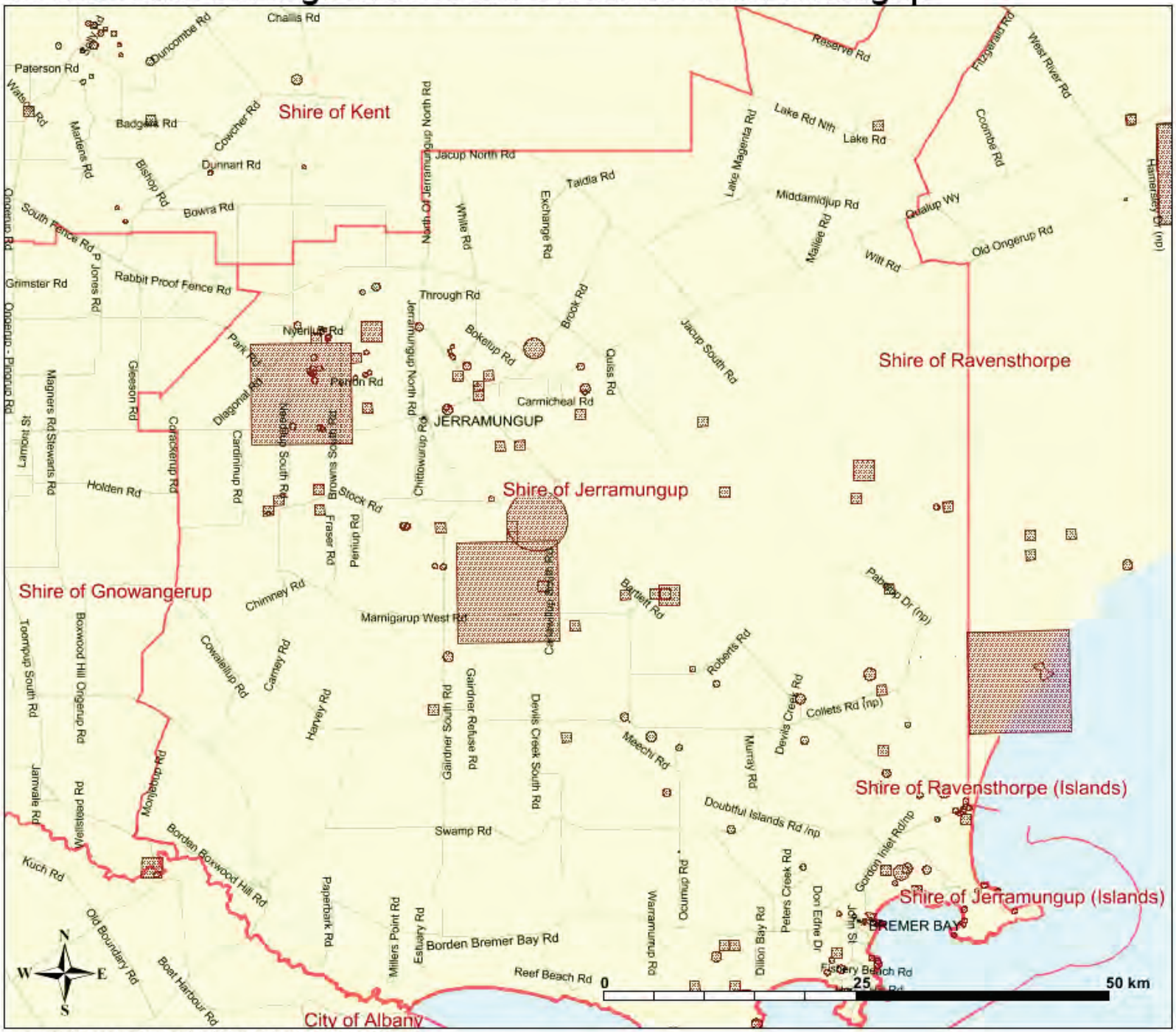
State Roads

Other Roads

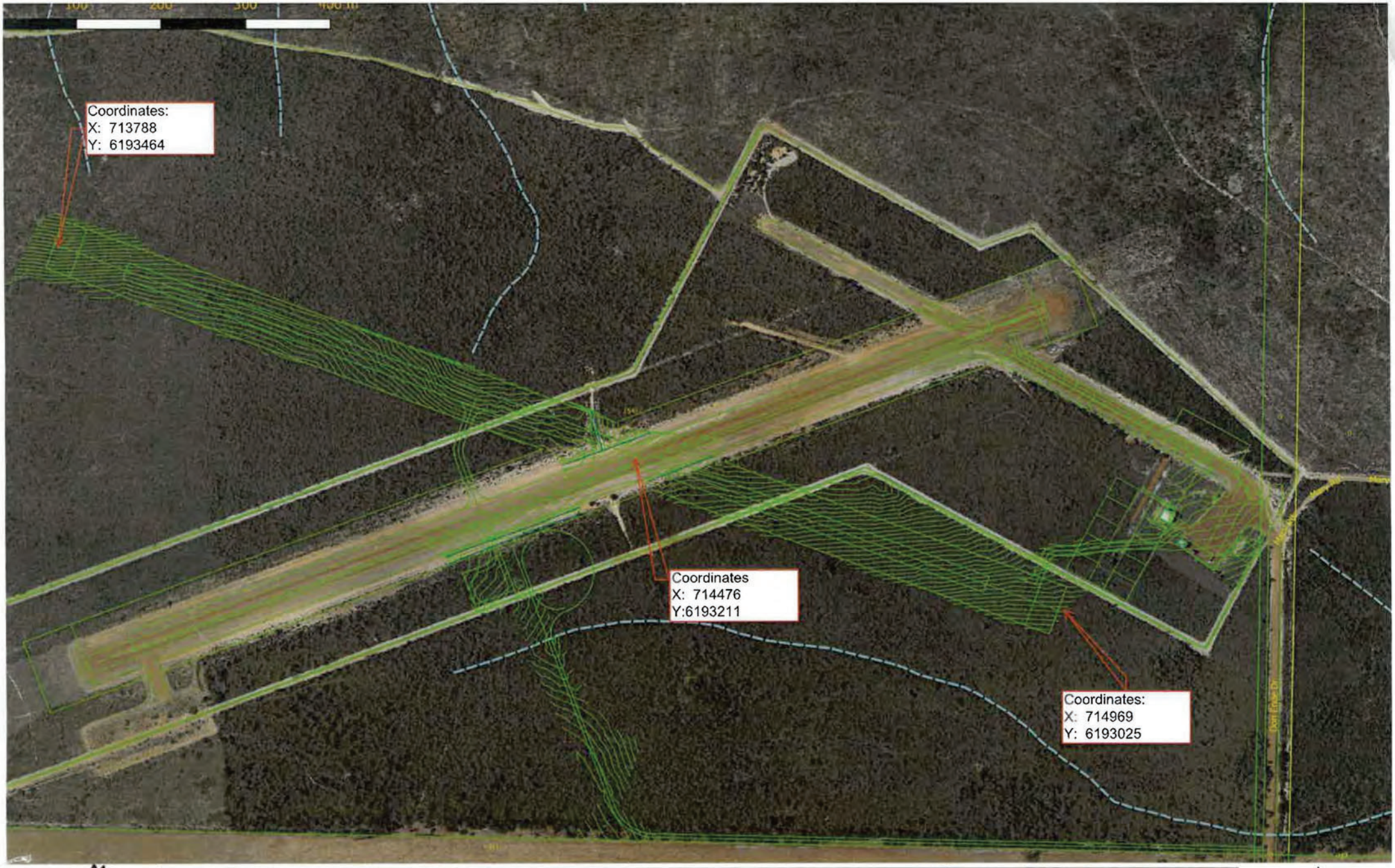
Coast and Sea

water

land



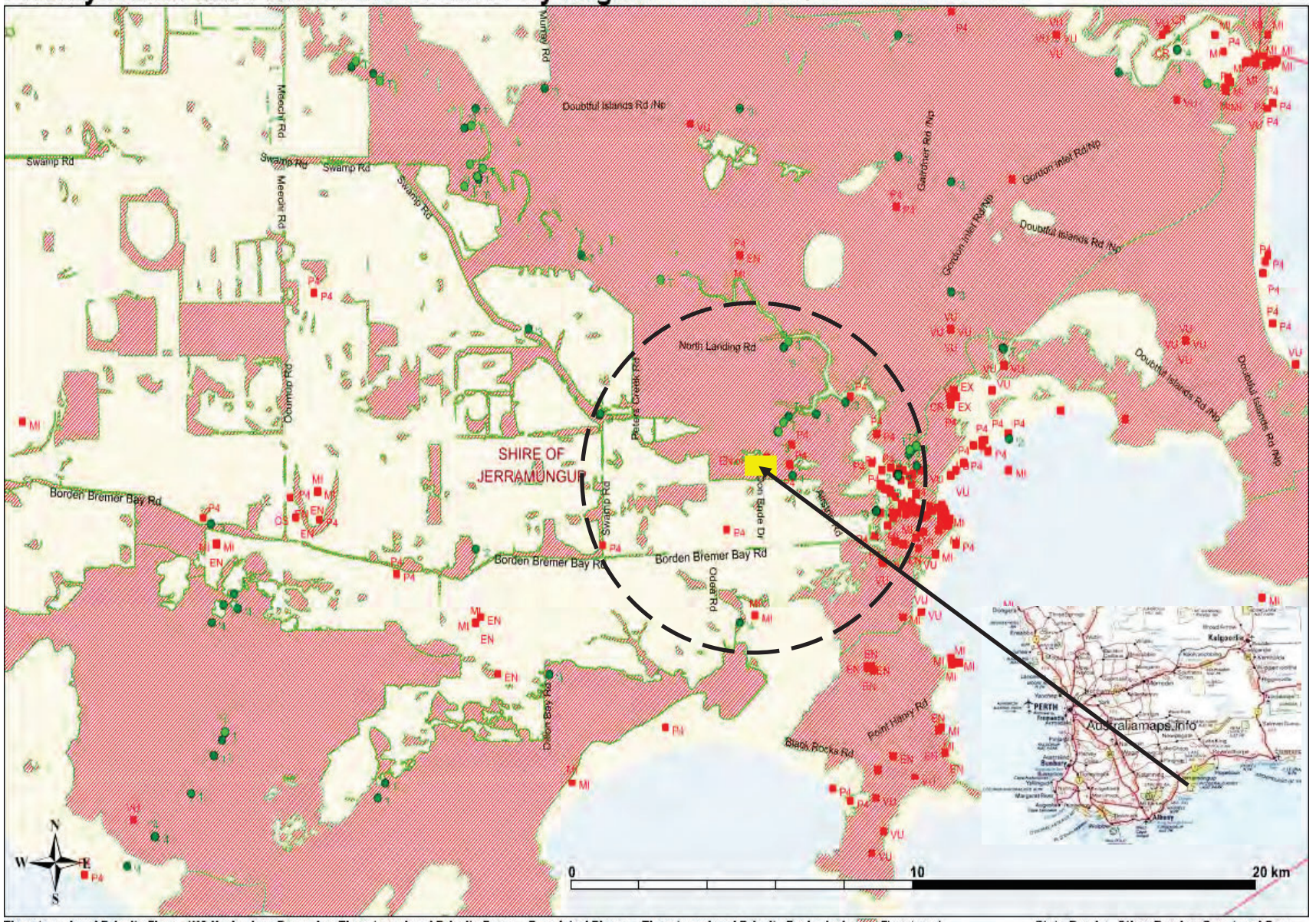
Map Printed from WALGA Local Biodiversity Project Environmental Planning Tool on Wed May 24 14:45:20 WST 2017



PROJECT: BREMER BAY AIRSTRIP PROPOSED CROSS RUNWAY

SCALE 1:4000 @ A3

Priority Fauna and Flora of the Bremer Bay Region (Bremer Bay Airfield)



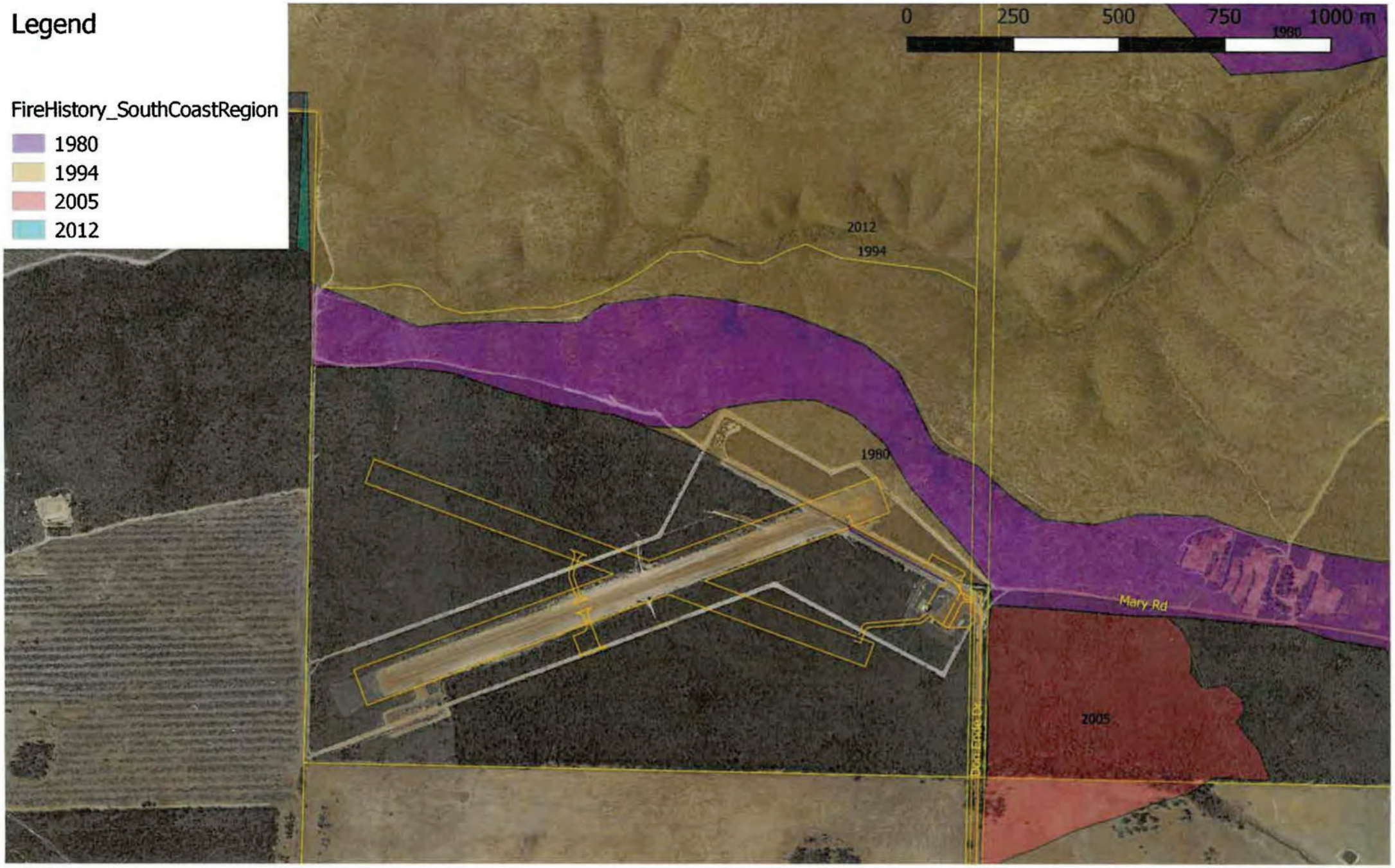
Threatened and Priority Flora | WA Herbarium Records | Threatened and Priority Fauna | Populated Places | Threatened and Priority Ecological Community: Priority | Threatened Local Government Authority | State Roads | Other Roads | Coast and Sea: water, land

Bremer Bay Airfield

10km radius of The Bremer Bay Airfield

Map Printed from WALGA LGmap on Wed May 05 07:57:08 AWST 2021


Survey Area 1
Survey Area 2
Survey Area 3
Potential Malleefowl Breeding Habitat
Old/disused Malleefowl Mound
Approximate Area:
22,383.4 sqm
Survey Area 1
(South-West Zone)
Survey Area 2
(Western Zone)
Survey Area 3
(North Western Zone)



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FIRE HISTORY - DPAW DATASET

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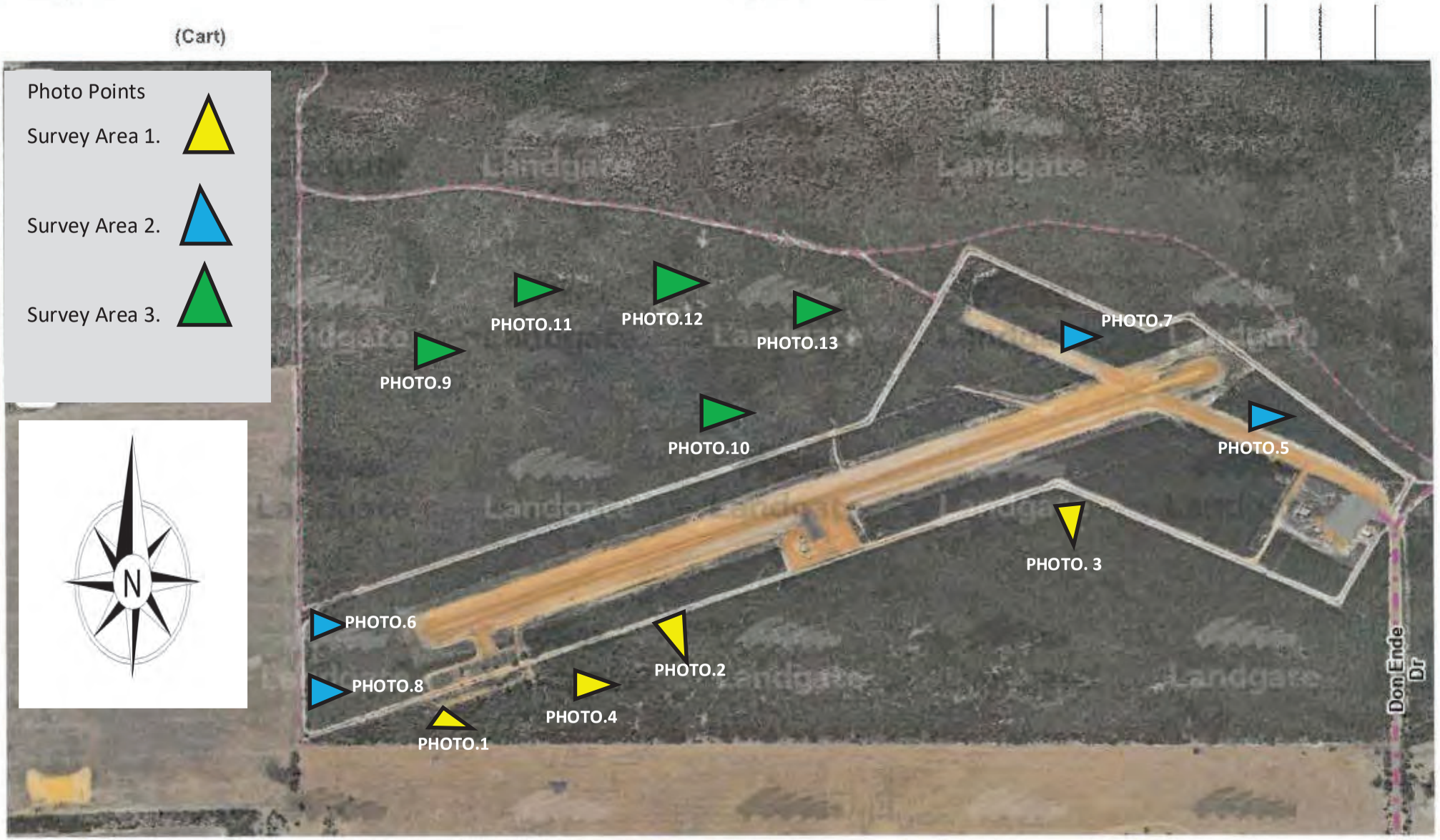

Fauna Habitat Systems of the Bremer Bay Airfield (Survey Areas 1,2 and 3)

PHOTO REFERENCE POINTS

0 100 200m

-34.374283 119.336528 Degrees

15. APPENDIX D

Fauna Habitats Survey Area 1

Photo 1. Mallee Woodland over Shrubland

Photo 2. Mallee Heath, Kwongkan Shrubland

Photo 3. Banksia Kwongkan Shrubland and Heath

Photo 4. Mallee Woodland over sparse shrubland

Fauna Habitats Survey Area 2

Photo 5. Sub-Mallee Habitat supporting a mixture of Shrublands and Heath

Photo 6. Seasonal Ephemeral Wetland *E occidentalis* over shrubs and Sedgeland

Photo 7. Mallee Heath, Kwongkan Shrubland (Mixed Sub-Mallee Vegetation Communities)

Photo 8. Melaleuca Dominant Shubland with Mixed Mallee Eucalypt Spp

Fauna Habitats Survey Area 3

Photo 9. Mallee Heath

Photo 10. *Phymatocarpus* Shrubland

Photo 11. and Photo 12. *Phymatocarpus* Shrublands (Kangaroo Disturbance)

Photo 13. Mallee shrubland (Mallee over Low Kwongkan)