Native Vegetation Clearance

Morgan Solar Project – Green Gold Energy

Data Report

Clearance under the *Native Vegetation Regulations 2017*

16/07/2024

Prepared by H. Merigot – EBS Ecology (NVC Accredited Consultant)

Native Vegetation Clearance Morgan Solar Project Data Report

16 July 2024

Version 5

Prepared by EBS Ecology for Green Gold Energy

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Cover photograph: *Eucalyptus socialis* (Beaked Red Mallee) Very Open Woodland Over *Maireana sedifolia* (Pearl Bluebush) (VA2), located within the Project Area.

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Glossary and abbreviations

BAM	Bushland Assessment Method
BDBSA	Biological Database of South Australia (maintained by DEW)
BESS	Battery Energy Storage System
DCCEEW	Department of Climate Change, Energy, the Environment and Water (Commonwealth)
DEW	Department for Environment and Water (South Australia)
EBS	Environment and Biodiversity Services Pty Ltd (trading as EBS Ecology)
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999*
GGE	Green Gold Energy (the client)
ha	Hectare(s)
HA	Heritage Agreement(s)
IBRA	Interim Biogeographical Regionalisation of Australia
km	Kilometre(s)
kV	kilovolt
MBC	Mallee Bird Community
mm	Millimetre
mw	Megawatt
NatureMaps	Initiative of DEW that provides a common access point to maps and geographic information about South Australia's natural resources in an interactive online mapping format
NPW Act	*National Parks and Wildlife Act 1972*
NV Act	*Native Vegetation Act 1991*
NVC	Native Vegetation Council
PMST	Protected Matters Search Tool (under the EPBC Act; maintained by DCCEEW)
Project	Morgan Solar Project
Project Area	9230 Goyder Highway, Morgan. Parcel (CT/6154/660).
PV	Photovoltaic
SA	South Australia(n)
Search Area	5 km buffer of the Project Area considered in the desktop assessment database searches
SEB	Significant Environmental Benefit
sp.	Species
spp.	Species (plural)
ssp.	Sub-species
TEC	Threatened Ecological Community
VA	Vegetation association

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1. Application information

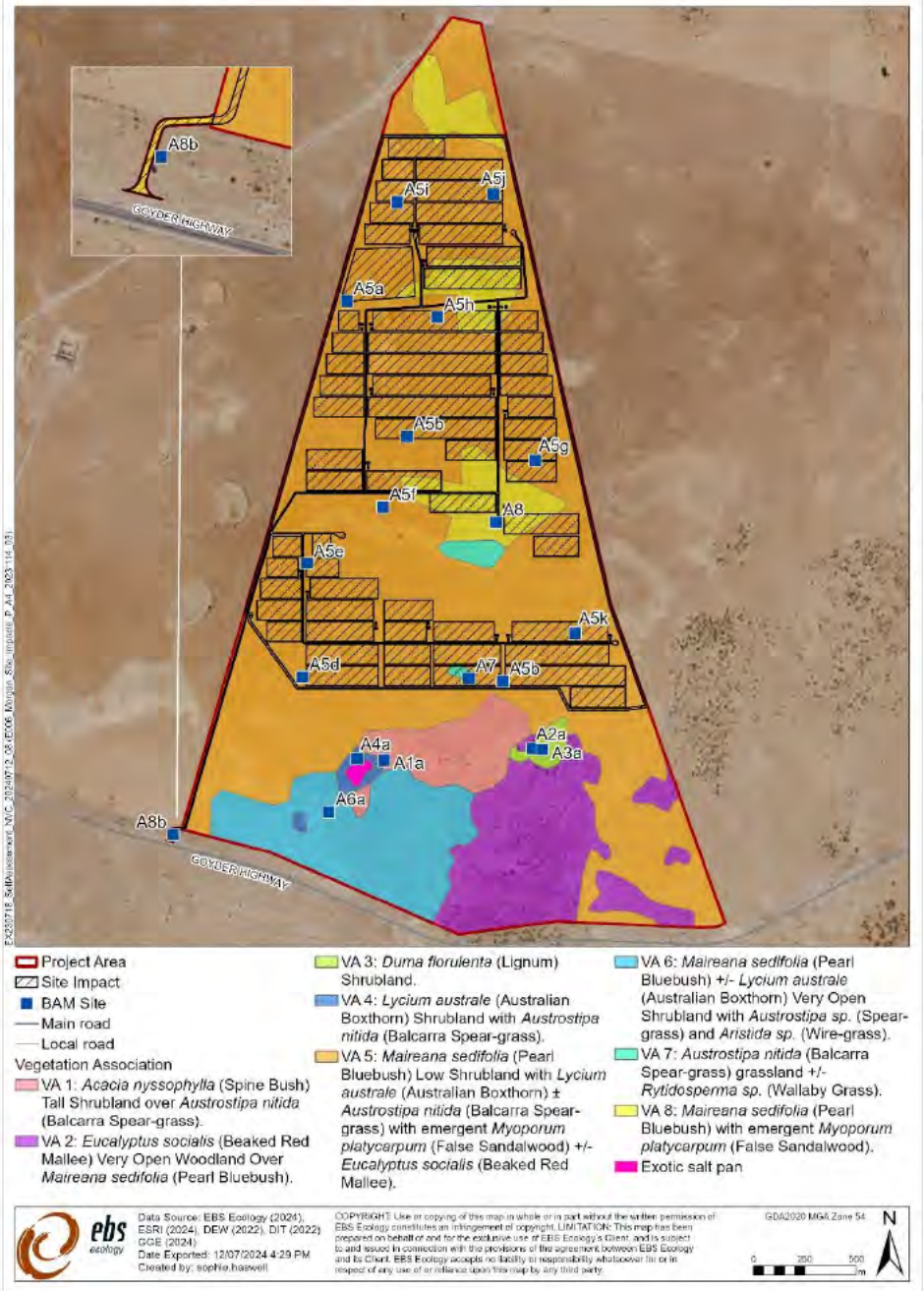
Details of the native vegetation clearance application are summarised in Table 1 with a summary of the proposed clearance provided in Table 2.

Table 1. Application details.

Applicant:	Morgan Solar Farm Pty Ltd.		
Key contact:	Fullarton SA 5063 Australia M: + E:		
Landowner:	Edel New Energy Australia Pty Ltd		
Site Address:	Lot 104 Goyder Highway, Stuart, South Australia, 5230		
Local Government Area:	Mid Murray Council	**Hundred**	Stuart
Title ID:	CT/6154/660	**Parcel ID**	D93178 A104

Table 2. Summary of the proposed clearance.

Purpose of clearance:	Clearance required for the construction of a solar farm and Battery Energy Storage System (BESS) and associated infrastructure.
Native Vegetation Regulation:	Regulation 12, Schedule 1; clause 34, Infrastructure.
Description of the vegetation under application:	Eight Vegetation Associations (VA): **VA1:** *Acacia nyssophylla* (Spine Bush) tall shrubland over *Austrostipa nitida* (Balcarra Spear-grass). **VA2:** *Eucalyptus socialis* (Beaked Red Mallee) very open woodland over *Maireana sedifolia* (Pearl Bluebush). **VA3:** *Duma florulenta* (Lignum) shrubland. **VA4:** *Lycium australe* (Australian Boxthorn) shrubland with *Austrostipa nitida* (Balcarra Spear-grass). **VA5:** *Maireana sedifolia* (Pearl Bluebush) low shrubland with *Lycium australe* (Australian Boxthorn) ± *Austrostipa nitida* (Balcarra Spear-grass) with emergent *Myoporum platycarpum* (False Sandalwood) +/- *Eucalyptus socialis* (Beaked Red Mallee). **VA6:** *Maireana sedifolia* (Pearl Bluebush) +/- *Lycium australe* (Australian Boxthorn) very open shrubland with *Austrostipa sp.* (Spear-grass) and *Aristida* sp. (Wire-grass). **VA7:** *Austrostipa nitida* (Balcarra Spear-grass) grassland +/- *Rytidosperma* sp. (Wallaby Grass). **VA8:** *Maireana sedifolia* (Pearl Bluebush) with emergent *Myoporum platycarpum* (False Sandalwood).
Total proposed clearance – area (ha) and/or number of trees:	The total proposed area of clearance is 202.15 hectares (ha) of native vegetation. • 0 ha of VA1(not impacted) • 0 ha of VA2 (not impacted) • 0 ha of VA3 (not impacted) • 0.00 ha of VA4 (not impacted) • 184.89 ha of VA5

	• 0 ha of VA6 • 0.58 ha of VA7 • 16.68 ha of VA8
Level of clearance:	Level 4
Overlay (Planning and Design Code):	Native Vegetation Overlay
Map of proposed clearance area:	
Mitigation Hierarchy:	***Avoidance*** Concept Footprint – During the initial Concept Footprint (provided in 2020) ecologists were engaged to determine the vegetations associations across the Project Area. Based on the survey outcome, native vegetation areas of poorer condition and lower value were identified (along with the converse) and the initial impact footprint was further adjusted targeting such areas, as per recommendations by EBS (EBS 2021).

	As a result, the infrastructure footprint avoids impacting areas of structurally diverse woodland vegetation, including mallee woodland (VA2), which supports a variety of fauna habitat components such as hollows and nesting trees. Further refinement of the design has resulted in the avoidance of the southern end of the Project Area. This includes the complete avoidance of VA1, VA3, VA4 and VA6. ***Minimization*** For the most part, clearance areas have been proposed in areas of more disturbed vegetation, or vegetation which contains fewer habitat resources such as upper storey vegetation, dense vegetation and water sources. The proposed solar panel array has been micro-sited to avoid these ecological constraints. The VA most impacted is VA5, which contains more open chenopod shrubland which has been subjected to higher grazing pressures. The construction contractor is responsible for ensuring that the construction process meets Morgan Solar's standards in relation to minimising environmental harm, protecting areas of cultural heritage significance and obtaining all required approvals or licences. ***Rehabilitation or restoration*** Rehabilitation and restoration of vegetation will be permitted in the solar array following the initial construction impact, including regeneration of low grasses and shrubs under the installed solar panels and in alternate 'gap' corridors initially used for access. Rehabilitation of native vegetation is preferable for solar farm projects to reduce dust accumulation on panels and associated maintenance.
SEB Offset proposal	Payment of **$1,617,350.44** which includes an admin fee of **$84,315.90** (including GST).

2. Purpose of clearance

2.1. Description

Green Gold Energy (GGE as a joint venture partner and our client) is proposing to construct the Morgan Solar Farm (the Project) on land owned by joint venture partners at Lot 104 Goyder Highway, Morgan (CT/6154/660), located approximately 5 kilometres (km) east of the township of Morgan, and approximately 400 metres (m) north of the River Murray, in the Riverland region of South Australia (SA) (Figure 1). The township of Morgan is located about 161 km northeast of Adelaide.

EBS Ecology (EBS) was engaged by GGE to undertake a native vegetation clearance assessment and prepare a native vegetation clearance report for the construction of the proposed solar farm, BESS, substation and associated infrastructure required for its operation.

Objectives

The native vegetation assessment, in accordance with the *Native Vegetation Act 1991* (NV Act) and *Native Vegetation Regulations 2017* (the Regs), had the primary objectives to:

- Undertake a desktop assessment of the likelihood of occurrence and status of threatened flora and fauna protected under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and State *National Parks and Wildlife Act 1972* (NPW Act);
- Assess native vegetation within the Project Area for clearance using the Native Vegetation Council (NVC) endorsed Bushland Assessment Method (BAM) in accordance with the NV Act;
- Identification of any "Declared" plants under the *Landscape South Australia Act 2019* that may be significant in relation to the Project requirements; and
- Calculate the Significant Environmental Benefit (SEB) offset requirements for the Project based on the client supplied impact footprint.

2.2. Background

The Project Area consists of remnant native vegetation on pastoral land in the Mid Murray Council within the Murraylands and Riverland landscape management region and the Hundred of Stuart. The Project Area is currently used for grazing by livestock. The area receives a mean annual rainfall of 254 millimetres (mm) (DEW 2023a). The River Murray is located 0.4 km south of the Project Area, on the other side of the Goyder Highway (DEW 2023a). The Project Area is zoned as Rural under the Mid Murray Council Development Plan and is located within the Hundred of Stuart (DEW 2023a). The Project Area falls under the River Murray and Crown Lands Indigenous Land Use Agreement (DEW 2023a).

There is one protected area under the NPW Act in close proximity to the Project Area; Morgan Conservation Park, approximately 4 km southwest, on the other side of the River Murray. There are two Heritage Agreements (HAs) protected under the NV Act within 5 km of the Project Area (HA 1340 and 1198), however neither are in close proximity to the Project Area (DEW 2023a). There are no existing SEB areas protected under the NV Act within the Project Area or in close vicinity. There are no road or rail sites of significance within or surrounding the Project Area (DEW 2023a).

The land directly south of the Project Area on the eastern side (D55701 A100) is recognised as a geological monument as declared by the Geological Society of Australia. The geological monument is titled "River Murray (Cadell)", with the stratigraphic names being Norwest Bend Formation and Mannum Limestone (DEW 2023a). Geological monuments represent rare, unique and representative occurrences of geological interest for future reference, research and training. The status of 'geological monument' conferred on any site by the Geological Society of Australia does not give automatic protection or a right of access.

Bioregions

Interim Biogeographical Regionalisation of Australia (IBRA) is a landscape-based approach to classifying the land surface across a range of environmental attributes, which is used to assess and plan for the protection of biodiversity. The Project Area is located within the Murray Darling Depression IBRA bioregion and Braemer IBRA subregion (Table 3). All of the Braemer subregion is mapped as being remnant vegetation, however less than 1% (3,461 ha) is formally conserved (DEW 2019). Four IBRA environmental associations occur within the Braemer IBRA subregion: Florieton, Parcoola, Blanchetown and Renmark. The Florieton IBRA association covers the largest area within the Project boundary.

Table 3: IBRA bioregion and subregion environmental landscape summary.

Murray Darling Depression IBRA bioregion	
An extensive gently undulating sand and clay plain of Tertiary and Quaternary age frequently overlain by Aeolian dunes. Vegetation consists of semi-arid woodlands of Black Oak / Belah, Bullock Bush / Rosewood and Acacia spp., Mallee shrublands and heathlands and savanna woodlands.	
Braemer IBRA subregion (MDD7)	
Gently inclined outwash plains of calcrete rises with Blackoak woodland or Pearl Bluebush low shrubland separated by alluvial flats of Low Bluebush and Blackbush low shrubland; isolated low, rocky hills of Pearl Bluebush and Blackoak with some Mulga or Mallee; River Red Gum watercourses with Cottonbush floodplains, Nitrebush flats and depressions of Australian Boxthorn.	
Remnant vegetation	Approximately 100% (957,367 ha) of the subregion is mapped as remnant native vegetation, of which less than 1% (3,461 ha) is formally conserved.
Landform	Plains with variable dune cover, from dune formations with relatively small plains between two plains with isolated tracts of dunes. Claypans, saline soils, swamps, and intermittent lakes in low-lying areas.
Geology	Exposed caliche and crusty loamy soils; colluvial sand, silt, clay and gravel along footslopes of Olay Spur. Evaporite deposits; gypsum and halite.
Soil	Brown calcareous earths, highly calcareous loamy earths, cracking clays, yellow grey, hard setting loamy soils with red clayey subsoils.
Vegetation	Chenopod shrublands.
Conservation significance	29 species of threatened fauna, 14 species of threatened flora. 0 wetlands of national significance.

Previous assessments

Two surveys were previously undertaken by EBS Ecology (February 2020 and October 2020). The September 2023 updated assessment was to reassess the flora surveys undertaken and update the SEB calculations for the purpose of a Native Vegetation Clearance, taking account of the inclusion of the BESS into the Project and the alteration to the site layout.

2.3. General location map

The location of the Project Area is shown in Figure 1.

Figure 1. General location of the Project Area.

2.4. Details of the proposal

The Morgan Solar Farm Project Area is 634.87 ha in size. The proponent intends to construct a 108 MW solar farm, BESS or 97.7MWh and ancillary infrastructure covering approximately 202.08 ha. A small area approximately 0.06 ha is located outside the Project Area (access track).The solar farm will be made up of the following infrastructure components:

- Installation of solar photovoltaic (PV) panels with a total export capacity of 108 MW.
- Installation of 20 Inverters (battery storage units) with a combined battery capacity of 91.7MWh
- 30-metre (m) setback from the boundary, which includes an 11 metre of cleared area for a fence line and a firebreak.
- Installation of underground cabling connecting the PV panels to Inverter Transformer Twin Skids connected to the on-site substation.
- Development of an on-site substation located near the western boundary in the northern part of the site, in close proximity to the existing 132 kV transmission lines which traverse the site in a west-east direction at that location.
- Installation of an overhead transmission line connecting the on-site substation to the ElectraNet substation located approximately 1.2 km to the west of the subject site.
- Installation of a synchronous condenser plus flywheel / battery energy storage system (BESS) to be housed within a compound located adjacent the on-site substation.
- Development of buildings and structures to support the operation of the solar farm, including:
    - storage containers housing batteries to be distributed across the site;
    - customer room accommodating metres that will be accessed by ElectraNet;
    - monitoring building; and
    - warehouse storing equipment and general items
- Installation of rainwater tanks for fire-fighting purposes.
- Development of the site access point and access road off Goyder Highway.
- Development of internal access roads / tracks within the subject site.
- Installation of closed-circuit TV devices.
- Development of cyclone mesh security fencing around the perimeter of the site.

The Site plan highlighting the key infrastructure areas that will require clearance are shown in Figure 2 and Figure 3.

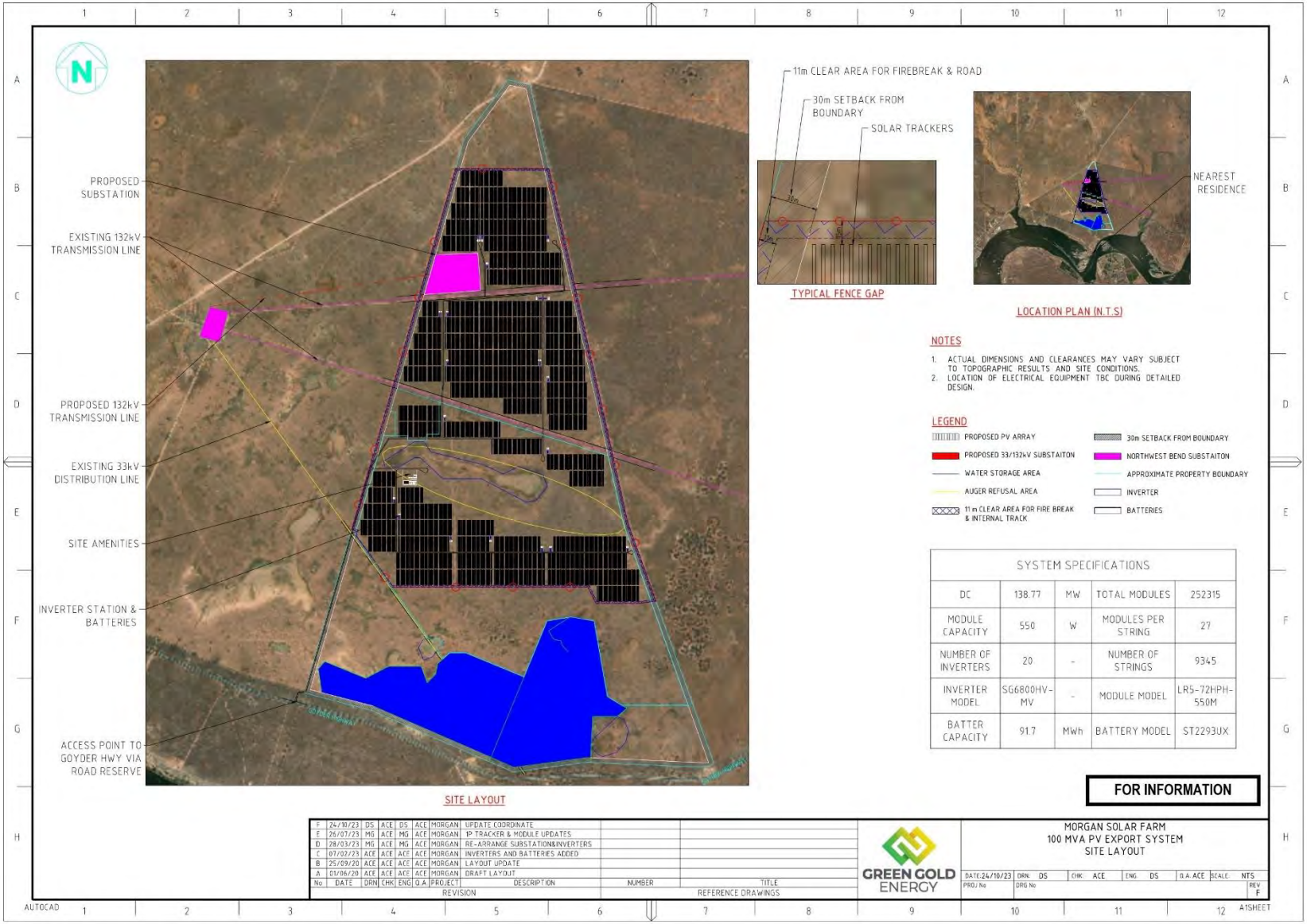


Figure 2. Site Plan provided by Green Gold Energy (supplied to EBS on 13/11/2023).

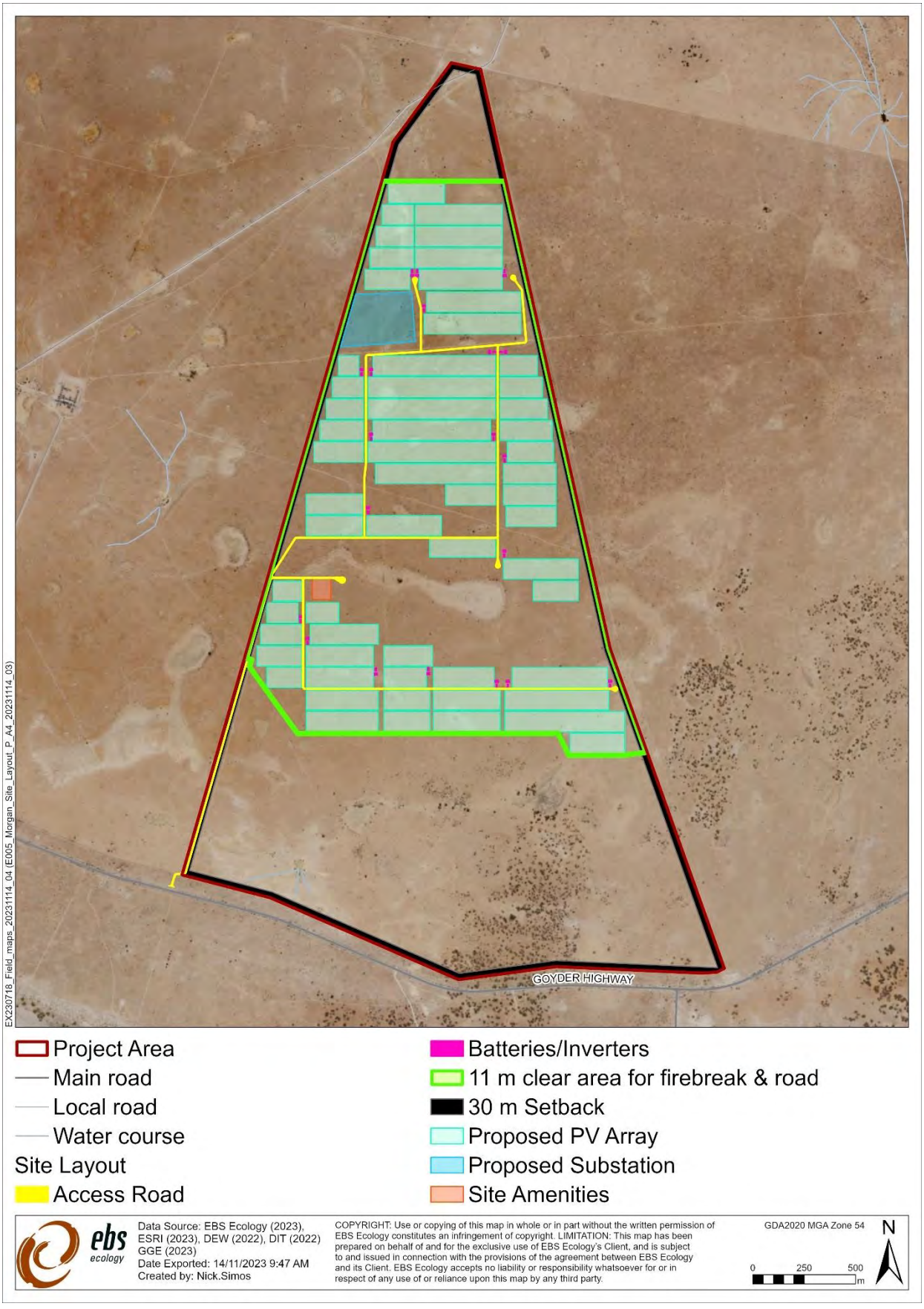


Figure 3. Project Area map with the infrastructure design (as per plans provided on 13/11/2023).

2.5. Approvals <u>required</u> *or* <u>obtained</u>

- ***Native Vegetation Act 1991*** (NV Act) – this data report is supplied in support of the application and fulfils the requirements of the NV Act to clear native vegetation.
- ***Planning, Development and Infrastructure Act 2016*** (PDI Act) - provisions relating to Regulated or Significant Trees do not apply for this Project.
- ***Environment Protection and Biodiversity Conservation Act 1999*** (EPBC Act) - Matters of National Significance are likely to be impacted by this Project, including up to 3 nationally listed threatened fauna species and a Threatened Ecological Community. A significant impact self-assessment should be undertaken for all MNES which may be impacted by the Project. If impacts are considered significant to any MNES, an EPBC Referral to the Commonwealth Government under the EPBC Act will be required, which may impose conditions on Project approval.
- ***National Parks and Wildlife Act 1972*** (NPW Act) (e.g., flora collection permit) – all flora surveys conducted as part of the native vegetation clearance application were undertaken by EBS Ecology under Scientific Research Licence K25613-23.
- ***Landscapes South Australia Act 2019*** (LSA Act) A permit to transport declared weeds on a public road may be required for this Project.
- ***Aboriginal Heritage Act 1988*** – approval will be required if any sites, objects or remains are uncovered during the works. A 'Stop Work' procedure should be implemented if any items of this nature are located.

2.6. Native Vegetation Regulation

The proposal will be assessed under Regulation 12, Schedule 1; clause 34 (Infrastructure) of the *Native Vegetation Regulations 2017*.

2.7. Development Application information

This Data report is to be submitted with the Development Application.

This Data report is to be submitted with the variation to application (DA 711/V053/21). The application is being varied to include a BESS (91.7 MWh capacity) and an increase in the capacity of the solar arrays (increase from 100MW to 108MW) in an optimised layout.

3. Method

3.1. Flora assessment

The flora assessment was undertaken by NVC Accredited Consultant H. Merigot and Ecologist K. Madden on 21 September 2023 in accordance with the Bushland Assessment Method (BAM) (NVC 2020). An additional survey was undertaken in July 2024, after the addition to an access road to the proposed project design. The 2024 survey was completed by J. Carpenter, an NVC Accredited Consultant.

3.1.1. Bushland Assessment Method

The BAM is derived from the Nature Conservation Society of South Australia's Bushland Condition Monitoring methodology (Croft *et al.* 2007, 2008a, 2008b, 2009; Milne and Croft 2012; Milne and McCallum 2012). The BAM is used to assess areas of native vegetation requiring clearance and calculate the SEB requirements.

Details of site selection/stratification and assessment protocols, and the biodiversity value components assessed and the factors that influence these components are outlined in the *Bushland Assessment Manual* (NVC 2020).

The Conservation Significance Scores were calculated from direct observations of flora and direct and historical observations of fauna species of conservation significance. All fauna identified as known or likely to occur in the Protected Matters Search Tool (PMST), and fauna with Biological Database of South Australia (BDBSA) records since 1995 and with a spatial reliability of less than 1 km, within 5 km of the Project Area, were included in the BAM scoresheets. Species determined as unlikely to occur within the Project Area will be removed by the Native Vegetation Branch if the finding is supported. Marine and/or wetland species were omitted from the scoresheets given the Project Area is terrestrial.

Given the extent of some vegetation associations impacted and their variance in condition, multiple BAM sites were surveyed. Where this occurred, scores from each site were averaged, with the mean score for the vegetation association used to determine the SEB.

Loss Factor

As per the *Guide for calculating a Significant Environmental Benefit Under the Native Vegetation Act 1991 and Native Vegetation Regulations 2017* (July 2020) (NVC 2018), the following information regarding loss factors is in place for BAM assessments.

Scale of impact – Patch of vegetation (Bushland or Rangeland Assessment)	Loss Factor
Complete removal of vegetation under assessment	1
Clearance where at least one stratum of the vegetation in the application area will not be impacted Example – The understorey stratum of vegetation will be impacted, but the overstorey will remain intact	0.8
Removal of vegetation where the clearance is linear and narrow in nature (1m or less wide) and the path of the clearance has been carefully planned and varied, such as micrositing, in order to avoid vegetation as much as possible Example – The development of a recreational track which is specifically placed to avoid as much vegetation as possible	0.6

Table 1. Loss factor for clearance of patches of vegetation.

A loss factor of 1 was implemented for the entire Project Area (*pers. comms* P. Farmer, Native Vegetation Council).

3.2. Fauna assessment

A desktop assessment was undertaken to determine the potential for any threatened fauna species and Threatened Ecological Communities (TECs) (both Commonwealth and State listed) to occur within the Project Area. This was achieved by undertaking database searches using a 5 km buffer of the Project Area (Search Area).

3.2.1. Protected Matters Search Tool report

A Protected Matters Search Tool (PMST) report was generated on 2 July 2024 to identify nationally threatened flora and fauna, migratory fauna and TECs under the EPBC Act relevant to the Project Area (DCCEEW 2024a). Only species and TECs identified in the PMST report that are likely or known to occur within the Search Area were assessed for their likelihood of occurrence within the Project Area.

All species considered exclusively marine (including whales, sharks, fish, dolphins, marine turtles and marine birds) were not assessed in this report as the Project Area is terrestrial. No species listed as marine by the PMST have been included as the Project Area contains no marine habitat.

3.2.2. Biological Database of South Australia data extract

A data extract from the Biological Database of South Australia (BDBSA) was obtained from the Department for Environment and Water (DEW) to identify flora and fauna species that have been recorded within 5 km of the Project Area (data extracted on 2 July 2024; DEW 2024 Recordset number: DEWNRBDBSA240702-2).

The BDBSA is comprised of an integrated collection of species records from the South Australian Museum, conservation organisations, private consultancies, Birds SA, Birdlife Australia and the Australasian Wader Study Group, which meet the Department for Environment and Water's (DEW) standards for data quality, integrity and maintenance. Only species with records since 1995 and a spatial reliability of less than 1 km were assessed for their likelihood of occurrence.

3.2.3. Literature Review

Existing information and literature relevant to the Project Area was reviewed, including:

- Aerial imagery;
- Spatial datasets, e.g., DEW biological survey sites, IBRA, vegetation cover, protected areas, vegetation floristic mapping, surface and ground water and roadside significant sites from NatureMaps (DEW 2023); and
- Reports, plans and web-based information, including:
    - South Australian (SA) Planning and Design Code, Part 10;
    - SA Planning and Property Atlas; and
    - EPBC Act species profiles, conservation advice and recovery plans.

The aforementioned information was used to assess:

- Vegetation cover within the Project Area and immediate surrounds;
- Potential Vegetation Associations present (including TECs); and
- Flora and fauna species of conservation significance known or likely to occur within the Project Area.

3.2.4. Likelihood of occurrence

The criteria for the likelihood of occurrence of threatened species within the Project Area are described in Table 4.

Table 4. Criteria for the likelihood of occurrence of threatened species within the Project Area.

Likelihood	Criteria
Highly Likely/Known	Recorded in the last 10 years, the species does not have highly specific niche requirements, the habitat is present and falls within the known range of the species distribution or; The species was recorded as part of field surveys.
Likely	Recorded within the previous 20 years, the area falls within the known distribution of the species and the area provides habitat or feeding resources for the species.
Possible	Recorded within the previous 20 years, the area falls inside the known distribution of the species, but the area provides limited habitat or feeding resources for the species. Recorded within 20 - 40 years, survey effort is considered adequate, habitat and feeding resources present, and species of similar habitat needs have been recorded in the area.
Unlikely	Recorded within the previous 20 years, but the area provides no habitat or feeding resources for the species, including perching, roosting or nesting opportunities, corridor for movement or shelter. Recorded within 20 - 40 years; however, suitable habitat does not occur, and species of similar habitat requirements have not been recorded in the area. No records despite adequate survey effort.

3.2.5. Field survey

Fauna surveys were conducted in conjunction with the flora assessments along the site. Weather conditions during the survey were favourable, with recent rain and mild daytime temperatures.

All native and exotic fauna species opportunistically encountered (directly observed, or tracks, scats, burrows, nests, and other signs of presence) during the native vegetation clearance assessment were recorded. Potential fauna refuge sites, such as hollows, were noted as an indication of availability of suitable habitat. Particular attention was paid to

identifying habitat for threatened species identified in the desktop assessment. For each opportunistic fauna observation, the species, number of individuals, GPS location, detection methodology (sight, sound, or sign) and habitat were recorded.

In addition to opportunistic records, 2 dedicated 20-minute, ~2-hectare (ha) bird surveys (Birdlife Australia 2023) were undertaken during the field survey within in each broad vegetation association. At each survey site, the observer walked through similar vegetation recording all birds seen and heard during a timed 20-minute period. For each sighting the following were recorded (as a minimum):

- Detection method (e.g. seen, heard).
- Number of individuals.
- Activity (i.e., foraging, resting on tree, advertising).

3.2.6. Limitations

The desktop assessment was based on existing datasets and references from a range of sources. EBS Ecology has not attempted to verify the accuracy of any such information. The findings and conclusions expressed by EBS Ecology are based solely upon information in existence at the time of the assessment.

Flora and fauna records were retrieved from the PMST and BDBSA extract. The BDBSA only includes verified flora and fauna records submitted to DEW or partner organisations. It is recognised that information is imperfectly captured, and it is possible that significant species may occur in the Project Area that are not reflected by database records. Although much of the BDBSA data has been through a variety of validation processes, the lists may contain errors and should be used with caution. DEW gives no warranty that the data is accurate or fit for any particular purpose of the user or any person to whom the user discloses the information.

No species-specific targeted flora or fauna surveys were undertaken.

3.2.7. Spatial data limitations

All spatial data has been captured or converted to the following coordinate reference system.

Datum: Geocentric Datum of Australia 2020 (GDA2020).

Projection: Map Grid of Australia 2020 (MGA2020), Zone 54.

All location coordinates listed in this report are expressed using this system. Spatial data converted from other coordinate reference systems may have accuracy limitations.

4. Assessment outcomes

4.1. Vegetation assessment

4.1.1. General description of the vegetation, the site and matters of significance

The Project Area and surrounds are currently used for grazing. Nine vegetation associations (Vas) have been identified within the Project Area. The vegetation is grazed, but considered to be in good condition generally, with medium weed occurrence/abundance.

Much of the Project Area is comprised of shrubland dominated by the highly palatable Chenopod shrub species *Maireana sedifolia* (Pearl Bluebush), a species that is typical of limestone plains in this area (VA5 and VA8). Three other shrubland communities are present in the Project Area: an ephemeral, intermittent soak populated by the important habitat plant *Duma florulenta* (VA3), a mid-dense stand of *Acacia nyssophylla* (Spine Bush) that is codominant with the ubiquitous *Austrostipa nitida* (Balcarra grass) (VA1), and a *Lycium australe* (Australian Boxthorn) dominant covering with an understory of *Austrostipa nitida* (Balcarra Spear-grass) (VA4 and VA6).

Smaller patches of Mallee and Woodland vegetation are also present in the Project Area (VA2). A large patch of diverse *Eucalyptus socialis* (Beaked Red Mallee) is located in the southeast of the Project Area.

A large amount of the understory in the Project Area is comprised of shrublands with grasses present. A smaller patch of the Project Area is comprised of solely *Austrostipa nitida* and *Rytidosperma* (Wire-grass) grassland (VA7).

The Project Area is not within a recognised surface water catchment. Several small water bodies are mapped across the Project Area. These are identified as feature type "Land Subject to Inundation". There are two small dams located near the south-western boundary, with three small, connected surface water courses identified as feature type Channel/Drain/Ditch (DEW 2023a).

The River Murray is a Prescribed Watercourse. The Project Area falls within the Murray Basin Groundwater basin, which is a shallow sedimentary basin. The south-eastern section of the Project Area is recognised as a high River Murray salinity impact zone. The land immediately south of the Project Area boundary is part of the River Murray Protection Area (DEW 2019).

Power lines traverse through the Project Area to a substation located on the western side of the Project Area.

Eight Vegetation Associations (VA's) were identified on site;

- **VA1:** *Acacia nyssophylla* (Spine Bush) Tall Shrubland over *Austrostipa nitida* (Balcarra Spear-grass).
- **VA2:** *Eucalyptus socialis* (Beaked Red Mallee) Very Open Woodland Over *Maireana sedifolia* (Pearl Bluebush).
- **VA3:** *Duma florulenta* (Lignum) Shrubland.

- **VA4:** *Lycium australe* (Australian Boxthorn) Shrubland with *Austrostipa nitida* (Balcarra Spear-grass).
- **VA5:** *Maireana sedifolia* (Pearl Bluebush) Low Shrubland with *Lycium australe* (Australian Boxthorn) ± *Austrostipa nitida* (Balcarra Spear-grass) with emergent *Myoporum platycarpum* (False Sandalwood) +/- *Eucalyptus socialis* (Beaked Red Mallee).
- **VA6:** *Maireana sedifolia* (Pearl Bluebush) +/- *Lycium australe* (Australian Boxthorn) Very Open Shrubland with *Austrostipa sp.* (Spear-grass) and *Aristida* sp. (Wire-grass).
- **VA7:** *Austrostipa nitida* (Balcarra Spear-grass) grassland +/- *Rytidosperma* sp. (Wallaby Grass).
- **VA8:** *Maireana sedifolia* (Pearl Bluebush) with emergent *Myoporum platycarpum* (False Sandalwood).

Throughout the Project Area 42 plant species were recorded, listed in Appendix 1. This includes 8 introduced plants, or weeds. Weed Species included two plants Declared under the LSA Act, as listed below.

- *Cynara cardunculus* ssp. *flavescens* (Wild Artichoke)
- *Marrubium vulgare* (Horehound)

Fourteen (14) fauna species (11 birds, two reptiles, one mammals) were recorded during the field assessment listed in Appendix 2. Of these it included one EPBC listed species, Southern Whiteface (*Aphelocephala leucopsis leucopsis*) EPBC listed Vulnerable, one State Rare species Black Falcon (*Falco subniger*) and one introduced species Eurasian Skylark (*Alauda arvensis arvensis*).

4.1.2. Details of the vegetation associations proposed to be impacted

The following summaries are provided for the eight vegetation associations recorded within the Project Area (Table 5 to

Table 12). Refer to the BAM Scoresheets in Attachment 1 for detailed information.

The vegetation associations within the Project Area are mapped in Figure 4.

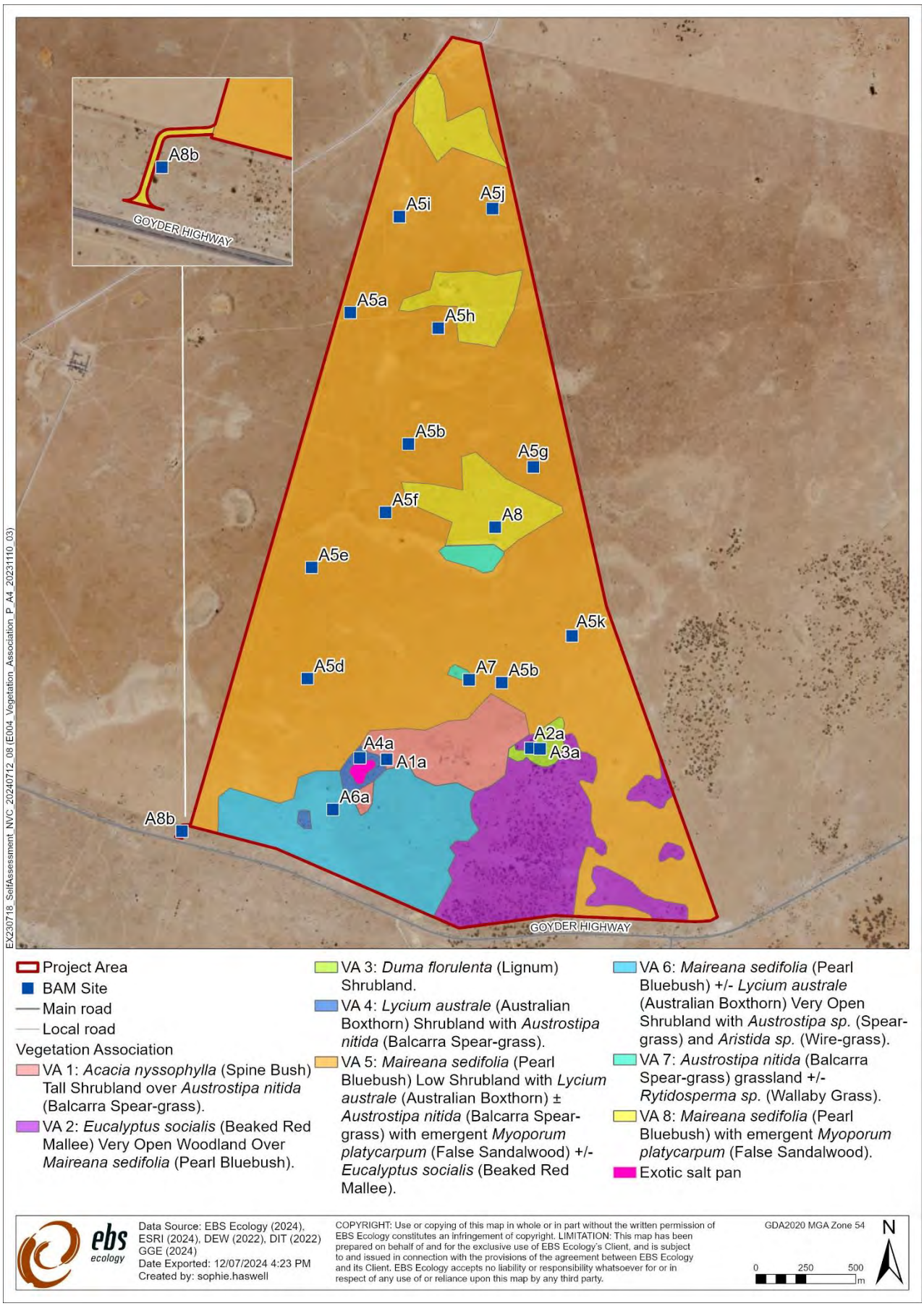


Figure 4. Location of BAM surveys sites and Vegetation Associations mapped within the Project Area.

Table 5. Summary of VA1.

<table>
<tr><td>Vegetation Association</td><td colspan="5">Vegetation Association 1: Accacia nyssophylla (Spine Bush) Tall Shrubland over Austrostipa nitida (Balcarra Spear-grass).</td></tr>
<tr><td>Benchmark Community</td><td colspan="5">MDBSA 1.2 Tall Shrubland with Open Arid adapted Understorey on Limestone Plains.</td></tr>
<tr><td></td><td colspan="5">  </td></tr>
<tr><td rowspan="3">General description</td><td colspan="5">Relatively diverse understory of grassland and chenopods with minimal weeds.</td></tr>
<tr><td colspan="2">Over storey</td><td colspan="2">Mid storey</td><td>Under storey</td></tr>
<tr><td colspan="2"></td><td colspan="2">Acacia nyssophylla</td><td>Austrostipa nitida
Maireana sedifolia</td></tr>
<tr><td>Threatened species or community</td><td colspan="5">This vegetation association did not meet the requirements of a threatened community. It is likely to provide habitat for threatened species such as Southern Whiteface which were observed during the field survey and Blue-winged Parrots. This VA will not be impacted based on the current designs.</td></tr>
<tr><td>Landscape context score</td><td>1.06</td><td>Vegetation Condition Score</td><td>54.18</td><td>Conservation significance score</td><td>1.10</td></tr>
<tr><td>Unit biodiversity Score</td><td>63.17</td><td>Area (ha)</td><td>0</td><td>Total biodiversity Score</td><td>NA</td></tr>
</table>

Table 6: Summary of VA2.

<table>
<tr><td>Vegetation Association</td><td colspan="5">Vegetation Association 2: Eucalyptus socialis (Beaked Red Mallee) Very Open Woodland Over Maireana sedifolia (Pearl Bluebush).</td></tr>
<tr><td>Benchmark Community</td><td colspan="5">MDBSA 2.1 Open Mallee / Low Open Woodland with Chenopod Shrub Understorey.</td></tr>
<tr><td colspan="6">  </td></tr>
<tr><td>General description</td><td colspan="5">Eucalyptus socialis dominant overstory with diverse healthy midstory over a relatively exotic understory.
<table>
<tr><th>Over storey</th><th>Mid storey</th><th>Under storey</th></tr>
<tr><td>Eucalyptus socialis
Eucalyptus gracilis</td><td>Acacia nyssophylla
Acacia spinescens
Myoporum platycarpum
Maireana sedifolia</td><td>Austrostipa sp.</td></tr>
</table></td></tr>
<tr><td>Threatened species or community</td><td colspan="5">This vegetation association met the requirements to be considered the Mallee bird threatened ecological community. It is likely to provide habitat for threatened species such as Southern Whiteface which were observed during the field survey, Regent Parrots and Blue-winged Parrots. This VA will not be impacted based on the current designs.</td></tr>
<tr><td>Landscape context score</td><td>1.06</td><td>Vegetation Condition Score</td><td>47.50</td><td>Conservation significance score</td><td>1.50</td></tr>
<tr><td>Unit biodiversity Score</td><td>75.53</td><td>Area (ha)</td><td>0</td><td>Total biodiversity Score</td><td>241.68</td></tr>
</table>

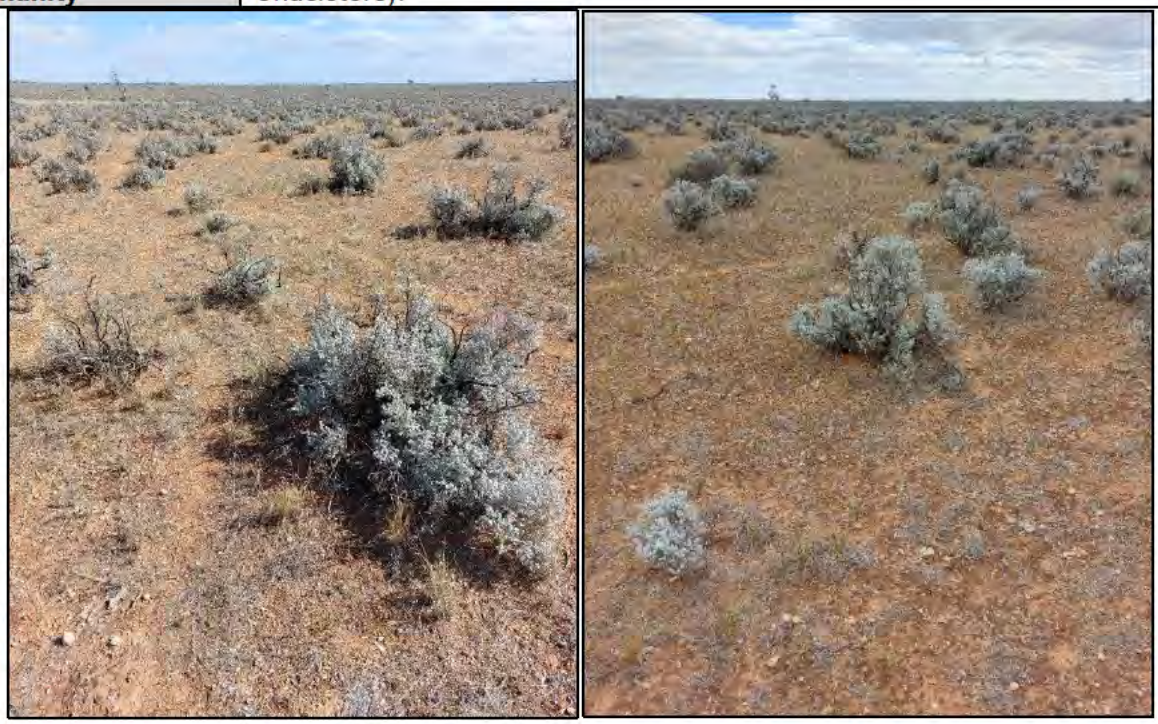
Table 7: Summary of VA3.

<table>
<tr><td>Vegetation Association</td><td colspan="5">Vegetation Association 3: Duma florulenta (Lignum) Shrubland.</td></tr>
<tr><td>Benchmark Community</td><td colspan="5">MDBSA 10.6 Lignum shrublands / Red Gum, River Box, Cooba.</td></tr>
<tr><td colspan="6">  </td></tr>
<tr><td rowspan="3">General description</td><td colspan="5">Duma florulenta dominant midstory with some exotic understory. The site is subject to grazing and is relatively degraded.</td></tr>
<tr><td colspan="2">Over storey</td><td colspan="2">Mid storey</td><td>Under storey</td></tr>
<tr><td colspan="2"></td><td colspan="2">Duma florulenta
Maireana sedifolia</td><td>Eriochiton sclerolaenoides
Austrostipa sp.</td></tr>
<tr><td>Threatened species or community</td><td colspan="5">This vegetation association did not meet the requirements of a threatened community. It is possible that this vegetation association could provide habitat for threatened species such as Brown Quails and Blue-winged Parrots assessed as ‘possible’ in the desktop. This VA will not be impacted based on the current designs.</td></tr>
<tr><td>Landscape context score</td><td>1.06</td><td>Vegetation Condition Score</td><td>56.87</td><td>Conservation significance score</td><td>1.10</td></tr>
<tr><td>Unit biodiversity Score</td><td>66.31</td><td>Area (ha)</td><td>0</td><td>Total biodiversity Score</td><td>NA</td></tr>
</table>

Table 8: Summary of VA4.

Vegetation Association	Vegetation Association 4; *Lycium australe* (Australian Boxthorn) Shrubland with *Austrostipa nitida* (Balcarra Spear-grass).				
Benchmark Community	MDBSA 2.2 Chenopod open shrublands.				
					
General description	Dense native shrubland that has been subject to grazing with some exotic understory.				
	Over storey		**Mid storey**		**Under storey**
			Lycium australe *Maireana sedifolia*		*Sclerolaena obliquicuspis* *Eriochiton sclerolaenoides*
Threatened species or community	This vegetation association did not meet the requirements of a threatened community. It is likely to provide habitat for threatened species such as Southern Whiteface which were observed within the *Lycium australe* during the field survey. This VA will not be impacted based on the current designs.				
Landscape context score	1.06	**Vegetation Condition Score**	53.50	**Conservation significance score**	1.10
Unit biodiversity Score	62.38	**Area (ha)**	0	**Total biodiversity Score**	NA

Table 9: Summary of VA5.

<table>
<tr><td>Vegetation Association</td><td colspan="5">Vegetation Association 5: Maireana sedifolia (Pearl Bluebush) Low Shrubland with Lycium australe (Australian Boxthorn) ± Austrostipa nitida (Balcarra Spear-grass) with emergent Myoporum platycarpum (False Sandalwood) +/- Eucalyptus socialis (Beaked Red Mallee).</td></tr>
<tr><td>Benchmark Community</td><td colspan="5">MDBSA 2.1 Open Mallee / Low Open Woodland with Chenopod Shrub Understorey.</td></tr>
<tr><td colspan="6">  </td></tr>
<tr><td rowspan="3">General description</td><td colspan="5">Relatively disturbed area with grazed Maireana sedifolia dominant Shrubland and minimal exotic or weed species present.</td></tr>
<tr><td colspan="2">Over storey</td><td colspan="2">Mid storey</td><td>Under storey</td></tr>
<tr><td colspan="2"></td><td colspan="2">Maireana sedifolia
Lycium australe
Myoporum platycarpum</td><td>Trichanthodium skirrophorum
Hyalosperma semisterile</td></tr>
<tr><td>Threatened species or community</td><td colspan="5">This vegetation association did not meet the requirements of a threatened community. It is possible that this vegetation association could provide habitat for threatened species such as Brown Quails and Blue-winged Parrots assessed as 'possible' in the desktop. These sites have been averaged to calculate an accurate SEB offset.

It is assumed, that the access track outside the Project Area (not surveyed) will likely represent this VA, based on aerial imagery and surrounding surveyed vegetation. Therefore, this has been included in the area calculations for this VA.</td></tr>
<tr><td>Landscape context score</td><td>1.06</td><td>Vegetation Condition Score</td><td>35.35 (mean)</td><td>Conservation significance score</td><td>1.10</td></tr>
<tr><td>Unit biodiversity Score</td><td>41.22 (mean)</td><td>Area (ha)</td><td>184.89</td><td>Total biodiversity Score</td><td>7620.82</td></tr>
</table>

Table 10: Summary of VA6.

Vegetation Association	Vegetation Association 6; *Maireana sedifolia* (Pearl Bluebush) +/- *Lycium australe* (Australian Boxthorn) Very Open Shrubland with *Austrostipa* sp. (Spear-grass) and *Aristida* sp. (Wire-grass).				
Benchmark Community	MDBSA 2.1 Open Mallee / Low Open Woodland with Chenopod Shrub Understorey.				
					
General description	Highly grazed area of sparse shrubland with the understory restricted to almost entirely sclerophyll species.				
	Over storey		**Mid storey**		**Under storey**
			Maireana sedifolia *Lycium australe*		*Austrostipa nitida* *Aristida* sp. *Eriochiton sclerolaenoides*
Threatened species or community	This vegetation association did not meet the requirements of a threatened community. It is likely to provide habitat for threatened species such as Southern Whiteface which were observed during the field survey. This VA will not be impacted based on the current design.				
Landscape context score	1.06	**Vegetation Condition Score**	29.36	**Conservation significance score**	1.10
Unit biodiversity Score	34.23	**Area (ha)**	0	**Total biodiversity Score**	119.81

Table 11: Summary of VA7.

Vegetation Association	Vegetation Association 7; *Austrostipa nitida* (Balcarra Spear-grass) grassland +/- *Rytidosperma* sp. (Wallaby Grass).				
Benchmark Community	MDBSA 9.1 Woodlands with an Open Grassy Understorey.				
					
General description	Degraded and grazed grassland with minimal native diversity and considerable cover of exotic weeds broadly spread. One dead tree within the vegetation association signifying the previous community may have been open woodland.				
	Over storey		**Mid storey**		**Under storey**
			Mairena sedifolia		*Austrostipa nitida* *Eriochiton sclerolaenoides*
Threatened species or community	This vegetation association did not meet the requirements of a threatened community.				
Landscape context score	1.06	**Vegetation Condition Score**	20.86	**Conservation significance score**	1.10
Unit biodiversity Score	24.32	**Area (ha)**	0.58	**Total biodiversity Score**	14.11

Table 12: Summary of VA8.

Vegetation Association	Vegetation Association 8; *Maireana sedifolia* (Pearl Bluebush) with emergent *Myoporum platycarpum* (False Sandalwood).				
Benchmark Community	MDBSA 2.1 Open Mallee / Low Open Woodland with Chenopod Shrub Understorey.				
					
General description	Relatively disturbed area with grazed *Maireana sedifolia* dominant Shrubland and minimal exotic or weed species present.				
	Over storey		**Mid storey**		**Under storey**
	Myoporum platycarpum		*Acacia oswaldii* *Acacia nyssophylla* *Lycium australe* *Myoporum platycarpum*		*Maireana sedifolia* *Austrostipa* sp.
Threatened species or community	This vegetation association did not meet the requirements of a threatened community. It is likely to provide habitat for threatened species such as Southern Whiteface which were observed during the field survey.				
Landscape context score	1.06	**Vegetation Condition Score**	38.19 (mean)	**Conservation significance score**	1.10
Unit biodiversity Score	44.53 (mean)	**Area (ha)**	16.68	**Total biodiversity Score**	742.71

4.1.3. Site map showing areas of proposed impact

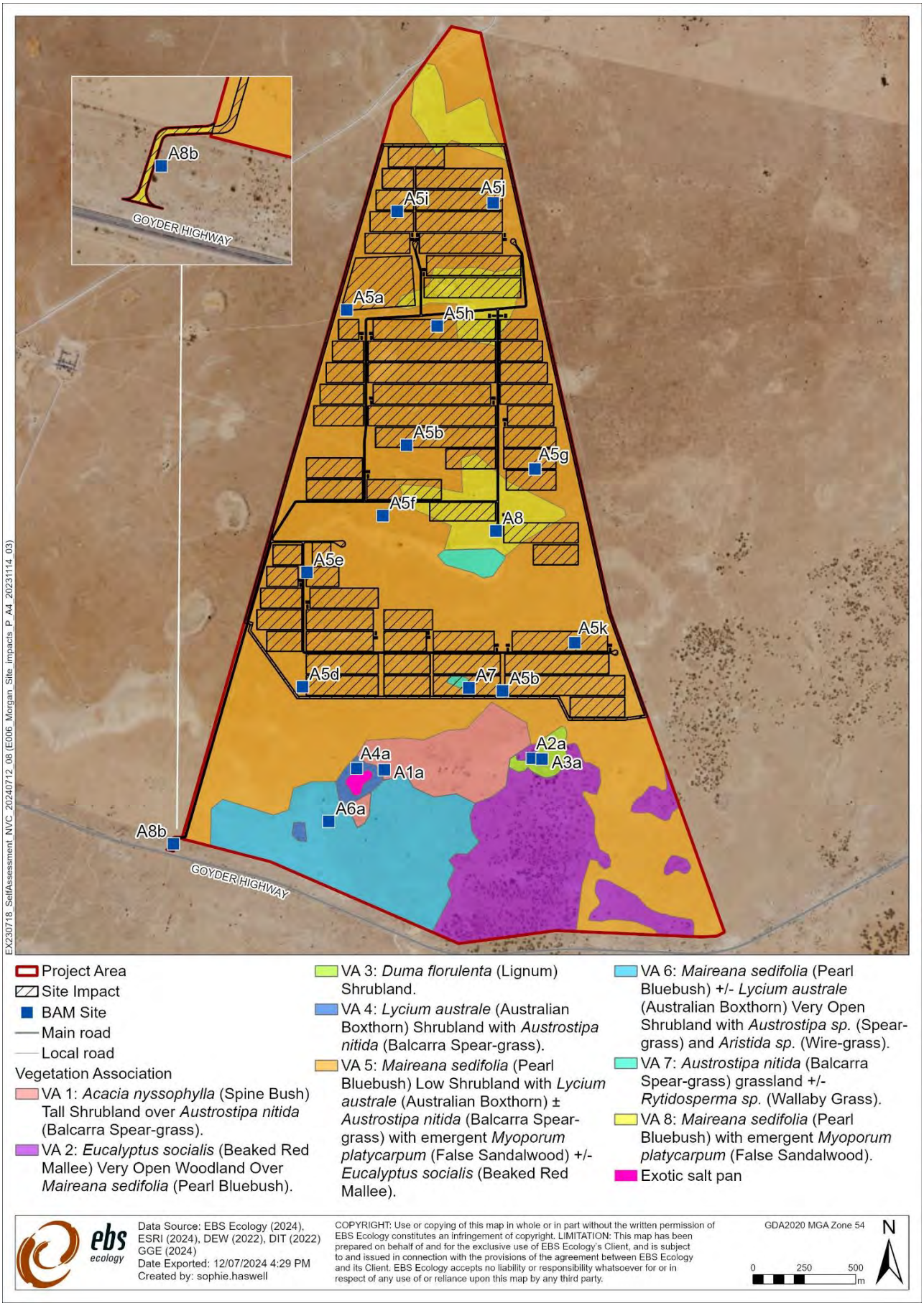


Figure 5. Proposed impact areas and Vegetation Associations mapped during the 2023 field assessment.

4.2. Threatened species assessment

This section presents the results of the desktop assessment, including a summary of both the PMST and BDBSA search results, as well as an assessment of the likelihood of identified threatened species and ecological communities occurring within the Project Area.

4.2.1. Threatened Ecological Communities

The PMST search identified three TECs as potentially located within the Project Area:

- Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions (EPBC Act: Endangered);
- Plains mallee box woodlands of the Murray Darling Depression, Riverina, and Naracoorte Coastal Plain Bioregions (EPBC Act: Critically Endangered); and
- Mallee Bird Community of the Murray Darling Depression Bioregion (EPBC Act: Endangered).

The Buloke Woodlands and Plains mallee box woodlands communities were not present within the Project Area and therefore not impacted. These two TECs are therefore not relevant to this clearance application.

The Mallee Bird Community (MBC) is considered to occur within the Project Area as determined by the assessment against the criteria provided in Table 13. However, most of these records are outdated and it is likely that the survey effort in the area is limited and there are likely to be other species present. However, this site does meet the criteria for the MBC.

Table 13. Determining criteria of the Mallee Bird TEC based on habitat presence, location and bird species present within.

Criteria	Criteria description	Meets criteria (yes or no)
1	Where is the site located? Is the site located within the appropriate IBRA bioregions and subregions? If yes, move on to criteria 2.	Yes – Murray Darling Depression Bioregion.
2	Is a patch of native vegetation at least 10 hectares present (either wholly or partially within the site)? If yes, does the patch of native vegetation contain an area or areas of at least 5 hectares dominated by mallee? When it comes to a patch definition, allowances are made for 'breaks' of up to 100 m between areas of native vegetation. If yes, move on to criteria 3.	Yes
3	What terrestrial bird species are recorded and more importantly how many Mallee Bird TEC Species have been recorded from bird surveys in the Project Area or from existing records within 20 km of the site within the last ten years? If at least 3 MBC Species, including any mix of mallee specialist and dependant species are noted, then the TEC may be present.	Nine Mallee Bird TEC specialist and dependant species have been recorded within 5 km of the site within the last 10 years: - Chestnut Quailthrush - Crested Bellbird - Jacky Winter - Regent Parrot - Shy Heathwren - Southern Scrub-robin - White-eared Honeyeater - White-fronted Honeyeater - Yellow-plumed Honeyeater

4.2.2. Threatened flora

A total of two threatened flora species were identified via desktop assessment as potentially occurring within the Project Area. This includes the State Rare *Callistemon brachyandrus* (Prickly Bottlebrush) and *Myoporum parvifolium* (Creeping Boobialla) (Table 14 and Figure 6 on page 32). The Prickly Bottlebrush has been assessed and possibly occurring within the Project Area based on recent records (2022) and suitable habitat. The Creeping Boobialla has been assessed as unlikely due to unsuitable habitat and records >20 years. Refer to Appendix 3 for further information on these species.

No listed flora species were identified as present during field survey.

Table 14: Likelihood of occurrence of threatened flora identified in the desktop assessment. The data source and threat levels are described in the table footer.

Scientific name	Common name	Conservation status		Source	Last sighting (year)	Likelihood of occurrence within project area
		Aus	SA			
Callistemon brachyandrus	Prickly Bottlebrush		R	1	2022	**Possible**
Myoporum parvifolium	Creeping Boobialla		R	1	2002	**Unlikely**

Source; 1- BDBSA. NPW Act; R= Rare

4.2.3. Threatened fauna

The field survey recorded 14 fauna species. This included 11 bird species, two reptiles, and one mammal which are listed in Appendix 3.

The desktop assessment identified 39 threatened fauna species as either recorded in the BDBSA within 5 km of the Project Area since 1995 (Table 15, Figure 7 and Figure 8 on page 34). Species listed as 'known to occur' or 'likely to occur' by the PMST report consisting of 36 birds, one amphibian, one reptile and one mammal. Twenty of these fauna species are listed as threatened under the NPW Act and nineteen of these species are threatened under the EPBC Act. A summary of species assessed as known to occur, likely to occur, or possible to occur are listed in Table 15 below. The remaining species were assessed as unlikely to occur within the Project Area. Refer to Appendix 3 for the detailed likelihood assessment.

EPBC Act

One fauna species listed under the EPBC Act was observed within the Project Area;

- Southern Whiteface (*Aphelocephala leucopsis leucopsis*): EPBC Act - Vulnerable.

Two additional EPBC Act listed species was listed as <u>likely</u> to occur in the Project Area:

- Regent Parrot (*Polytelis anthopeplus monarchoides*): EPBC Act & NPW Act – Vulnerable; and
- Hooded Robin (*Melanodryas cucullata cucullata*): EPBC Act - Endangered & NPW Act – Rare.

Three EPBC Act listed threatened species were identified as <u>possibly</u> occurring in the Project Area:

- Blue-winged Parrot (*Neophema chrysostoma*): EPBC Act & NPW Act – Vulnerable.
- Diamond Firetail (*Stagonopleura guttata*): EPBC Act & NPW Act – Vulnerable.
- Grey Falcon (*Falco hypoleucos*): EPBC Act & NPW Act – Vulnerable.

A small group of Southern Whiteface were observed within the Project Area, utilising the *Lycium australe* (Australian Boxthorn) shrubland VA4.

NPW Act

Three species listed as threatened under the NPW Act have been identified as likely to occur within the Project Area:

- Slender-billed Thornbill (Acanthiza iredalei iredalei): NPW Act – Rare.
- White-winged Chough (*Corcorax melanorhamphos*): NPW Act – Rare.
- Little Eagle (*Hieraaetus morphnoides*): NPW Act – Rare.

An additional seven species listed under the NPW Act have been assessed as possible to occur within the Project Area:

- Brown Quail (*Coturnix ypsilophora australis*): NPW Act – Vulnerable.
- Little Friarbird (*Philemon citreogularis citreogularis*): NPW Act – Rare.
- Striped Honeyeater (*Plectorhyncha lanceolata*): NPW Act – Rare.
- Gilberts Whistler (*Pachycephala inornata*): NPW Act – Rare.
- Carpet Python (*Morelia spilota*): NPW Act – Rare.
- Common Brushtail Possum (*Trichosurus vulpecula*): NPW Act – Rare.

Table 15. Likelihood of occurrence of threatened species identified in the desktop assessment. The data source and threat levels are described in the table footer.

Scientific name	Common name	Conservation status		Source	Last sighting (year)	Likelihood of occurrence within project area
		Aus	SA			
AVES						
Acanthiza iredalei hedleyi	Slender-billed Thornbill	-	R	2	2010	**Likely**
Aphelocephala leucopsis leucopsis	Southern Whiteface	VU	-	1, 2, 3	Known, 2017	**Known**
Corcorax melanorhamphos	White-winged Chough	-	R	2	2020	**Likely**
Coturnix ypsilophora australis	Brown Quail	-	V	2	2014	**Possible**
Falco hypoleucos	Grey Falcon	VU	V	1	Likely	**Possible**
Hieraaetus morphnoides	Little Eagle	-	V	2	2021	**Likely**
Melanodryas cucullata cucullata	Hooded Robin (YP, MN, AP, MLR, MM, SE)	EN	R	1,2	Known, 2004	**Likely**
Neophema chrysostoma	Blue-winged Parrot	VU	V	1	Known	**Possible**
Pachycephala inornata	Gilbert's Whistler	-	R	2	2004	**Possible**

Scientific name	Common name	Conservation status		Source	Last sighting (year)	Likelihood of occurrence within project area
		Aus	SA			
Philemon citreogularis citreogularis	Little Friarbird	-	R	2	2011	**Possible**
Plectorhyncha lanceolata	Striped Honeyeater	-	R	2	2017	**Possible**
Polytelis anthopeplus monarchoides	Regent Parrot	VU	V	1, 2	Likely, 2019	**Likely**
Stagonopleura guttata	Diamond Firetail	VU	V	1	Known	**Possible**
MAMMALS						
Trichosurus vulpecula	Common Brushtail Possum	-	R	2	2004	**Possible**
REPTILES						
Morelia spilota	Carpet Python	-	R	2	2007	**Possible**

Source; 1 PMST 2- BDBSA, 3 – Recorded/observed in the field survey.
NPW Act; V = Vulnerable, R= Rare
EPBC Act; VU = Vulnerable

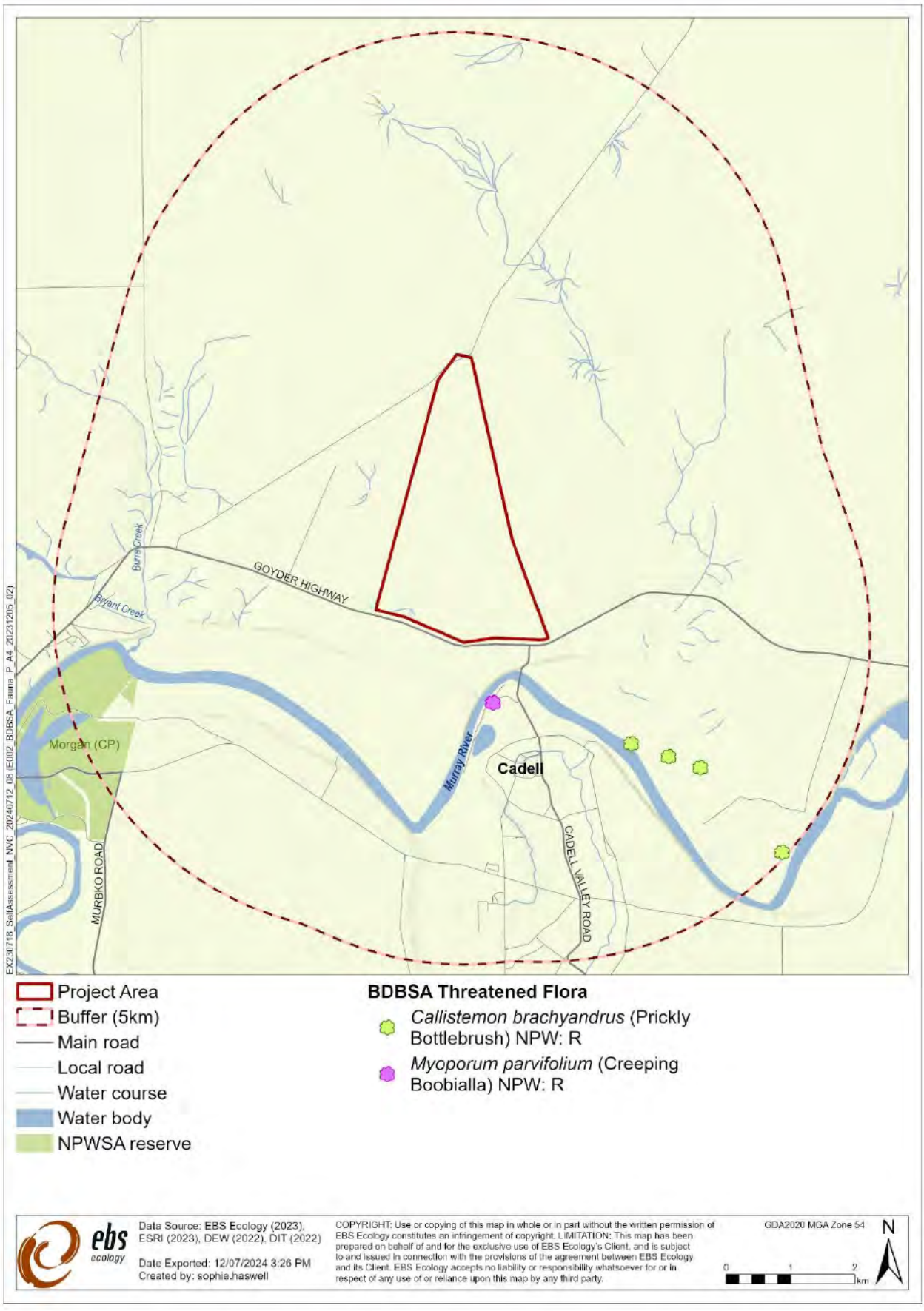


Figure 6. Threatened flora species recorded within 5 km of the Project Area since 1995.

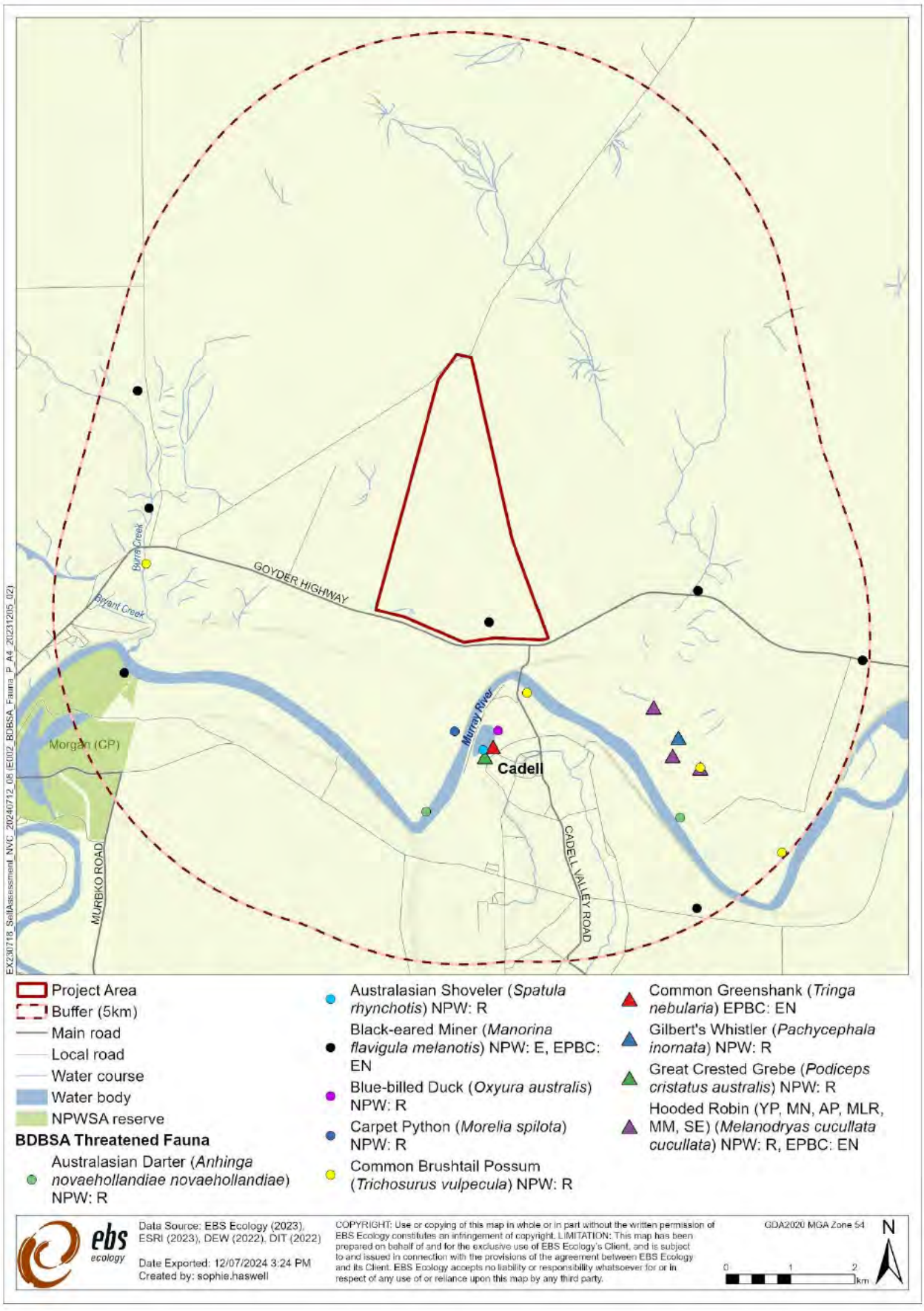


Figure 7. Threatened fauna species recorded within 5 km of the Project Area since 1995 (Map 1).

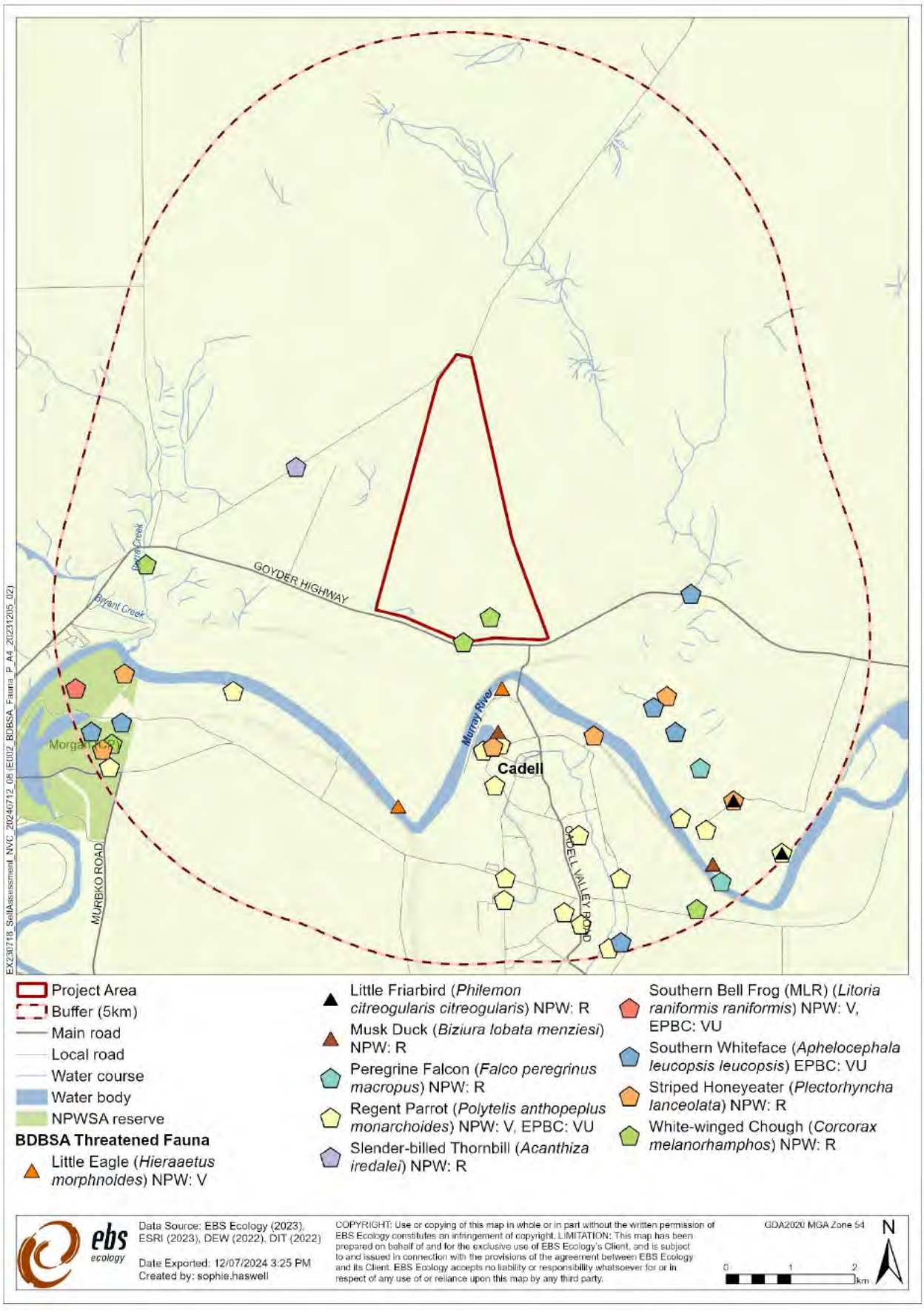


Figure 8. Threatened fauna species recorded within 5 km of the Project Area since 1995 (Map 2).

4.2.4. Threatened species discussion

Impact significance is a moderating factor that may be considered by the NVC when assessing the clearance application. The NVC will consider an impact to be significant if it will:

1. Lead to a long-term decrease in the size of a population, or
2. Reduce the area of occupancy of the species, or
3. Fragment an existing population into two or more populations, or
4. Adversely affect habitat critical to the survival of a species, or
5. Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or
6. Result in invasive species that are harmful to a threatened species becoming established in the threatened species habitat, or
7. Interfere with the recovery of the species.

EPBC Act listed species assessed as likely to occur in the Project Area are discussed below.

Southern Whiteface

Southern Whiteface are widespread across the southern half of mainland Australia, where they occupy open woodlands and shrublands with grassy understorey. The species forages in the understorey of low tree density habitats, and use low bushes, small hollows or crevices to nest. Southern Whiteface have recently been listed as nationally Vulnerable under the EPBC Act due to a substantial decline in their population (30-50%) over the last 10 years. Multiple records of Southern Whiteface occur within 5 km of the Project Area, and the species was detected on site during the field survey. An EPBC self-assessment is likely to be required to determine the significance of impact for this species.

Regent Parrot

Regent Parrots are confined to the semi-arid interior of south-eastern mainland Australia, and in SA is restricted to the Murray-Mallee districts. Regent Parrots utilise River Red Gum (*Eucalyptus camaldulensis*) forests or woodlands for colonial nesting, and surrounding (~20 km radius) Mallee woodland vegetation with shrub and herb layer for foraging. The National Recovery Plan for the Regent Parrot lists all known sites for nesting, food resources, water, shelter, essential travel routes, dispersal and buffer areas within its current normal range as 'critical habitat'.

The Project Area occurs within 5 km of known nesting habitat along the Murray River at Morgan and there are multiple records of the species within 5 km. The Project Area is more open than their typical 'mallee woodland' foraging habitat, however it contains known foraging species including *E. socialis*, *E. oleosa*, *Maireana spp.* and others. An EPBC self-assessment is likely to be required to determine the significance of impact for this species.

Hooded Robin

Hooded Robins occur in south-eastern Australia where there are estimated to be 100 subpopulations. They utilise dry eucalypt and acacia woodland and shrublands with an open understorey of grasses and herbs. The species has recently been listed as nationally Endangered under the EPBC Act (effective 31st March 2023) due to a significant (>50%) population decline over the last 10 years. Critical habitat for the species includes areas which contain their known

preferred habitat. There are multiple records of Hooded Robin within 5 km of the Project Area. An EPBC self-assessment may be required to determine the significance of impact for this species.

4.3. Cumulative impacts

When exercising a power or making a decision under Division 5 of the Native Vegetation Regulations 2017, the NVC must consider the potential cumulative impact, both direct and indirect, that is reasonably likely to result from a proposed clearance activity.

Direct clearance of native vegetation associated with the Project includes:

- Clearance directly required for the substation;
- Clearance for the solar panel arrays
- Clearance required for construction access; and
- Clearance for cable trenching.

The impact footprint does not account for clearance of unformed tracks which may be made within the Project Area during construction for access to installation sites, nor does it account for infrequent vehicular access along solar PV array gaps for irregular maintenance activities or annual cleaning.

Indirect impacts to native vegetation and fauna may include:

- Potential generation of dust during construction.
- Potential increase in dust deposition from clearance associated with solar panel installation (at least until understory vegetation regenerates).
- Impacts to retained vegetation from effects of altered hydrology, sunlight and heat radiation from infrastructure.
- Disturbance to nesting fauna species, particularly during construction.
- Reduction in or deterrent to access to ephemeral water resources for local birds following rainfall events (including dams).

Table 16. Summary of impact for each project component and proposed loss factor.

Infrastructure component	Area (ha)	Proposed loss factor
Proposed PV Array	178.64	1.0
Proposed 33/132 Kv Substation	7.87	1.0
Inverters and batteries	0.31	1.0
Main access tracks within the Project Area	5.43	1.0
Access track outside the Project Area	0.06	1.0
11m clear area for firebreak and road	8.91	1.0
Site amenities	0.92	1.0
Total hectares impacted	**202.15**	

4.4. Addressing the Mitigation Hierarchy

When exercising a power or making a decision under Division 5 of the Native Vegetation Regulations 2017, the NVC must have regard to the mitigation hierarchy. The NVC will also consider, with the aim to minimize, impacts on biological diversity, soil, water and other natural resources, threatened species or ecological communities under the EPBC Act or listed species under the NPW Act.

a) Avoidance – outline measures taken to avoid clearance of native vegetation

Concept Footprint – During the Initial Footprint period in 2020 Ecologists were engaged to determine the vegetations associations across the Project Area. On the basis of the survey outcome, native vegetation areas of poorer condition and lower value were identified (along with the converse) and the initial footprint was further adjusted targeting such areas as per recommendations by EBS Ecology in their report in 2021 (EBS 2021).

As a result, the initial infrastructure footprint has avoided impacting areas of structurally diverse woodland vegetation, including mallee woodland (VA2), which supports a variety of habitat components such as hollows and nesting trees. Further refinement of the design has resulted in the avoidance of the southern end of the Project Area. This includes the complete avoidance of the following VAs, VA1, VA3, VA4 and VA6.

b) Minimization – if clearance cannot be avoided, outline measures taken to minimize the extent, duration and intensity of impacts of the clearance on biodiversity to the fullest possible extent (whether the impact is direct, indirect or cumulative).

For the most part, clearance areas have been proposed in areas of more disturbed vegetation, or vegetation which contains fewer habitat resources such as upper storey vegetation, dense vegetation and water sources. The proposed solar panel array has been micro-sited to avoid these ecological constraints. The VA most impacted is VA5, which contains more open chenopod shrubland which has been subjected to higher grazing pressures.

The construction contractor is responsible for ensuring that the construction process meets Morgan Solar's standards in relation to minimising environmental harm, protecting areas of cultural heritage significance and obtaining all required approvals or licences.

c) Rehabilitation or restoration – outline measures taken to rehabilitate ecosystems that have been degraded, and to restore ecosystems that have been degraded, or destroyed by the impact of clearance that cannot be avoided or further minimized, such as allowing for the re-establishment of the vegetation.

Rehabilitation and restoration of vegetation will be permitted in the solar array following the initial construction impact, including regeneration of low grasses and shrubs under the installed solar panels and in alternate 'gap' corridors initially used for access. The client has outlined that the vegetation where panels will be stationed, will be "rolled" and that the vegetation will be allowed to regenerate. Rehabilitation of native vegetation is preferable for solar farm projects to reduce dust accumulation on panels and associated maintenance.

d) Offset – any adverse impact on native vegetation that cannot be avoided or further minimized should be offset by the achievement of a significant environmental benefit that outweighs that impact.

Any adverse impact on native vegetation or ecosystems that cannot be avoided or minimised will be offset by implementing an SEB that outweighs that impact. The applicant will mitigate in the form of a payment to the Native Vegetation Fund.

4.5. Principles of Clearance (Schedule 1, *Native Vegetation Act 1991*)

The Native Vegetation Council will consider Principles 1(b), 1(c) and 1(d) when assigning a level of Risk under Regulation 16 of the Native Vegetation Regulations. The Native Vegetation Council will consider all the Principles of clearance of the Act as relevant, when considering an application referred under the *Planning, Development and Infrastructure Act 2016*.

Table 17. Assessment against the Principles of Clearance.

Principle of clearance	Considerations
Principle 1(a) – it comprises a high level of diversity of plant species	Relevant information Forty-two species were recorded within the Project Area consisting of thirty-four native species and nine weed species. Considering the property has been utilised for grazing, there was minimal weed invasion, although there were areas in the south of the Project Area showing heavy grazing impacts (VA6). Patches; Bushland Plant Diversity Score – A5 – 13.6 (mean) A7 – 10.0 A8 – 20.0 (mean)
	Assessment against the principles Seriously at Variance NIL At Variance - A5 and A8
	Moderating factors that may be considered by the NVC *Amount of clearance related to area of remnant* The Project Area is surrounded by native vegetation, with the NatureMaps SA Native Vegetation layer showing 79% native vegetation coverage within 5 km of the site. 202.15 hectares of clearance represents 1.67% of an approximate 12,046.59 ha of vegetation within a 5 km radius and therefore this moderating factor is unlikely to apply.
Principle 1(b) – significance as a habitat for wildlife	Relevant information One nationally listed threatened species was detected during the field survey: • Southern Whiteface (*Aphelocephala leucopsis leucopsis*) – EPBC Act: Vulnerable. Based on proximity of and time since the most recent record and the type of habitats available within the Project Area, other threatened species which may utilise the Project Area include: **Likely** • Regent Parrot (*Polytelis anthopeplus monarchoides*) - EPBC Act: Vulnerable and NPW Act: Vulnerable. • Hooded Robin (*Melanodryas cucullata cucullata*) - EPBC Act: Endangered and NPW Act: Rare. • White-winged Chough (*Corcorax melanorhamphos*) - NPW Act: Rare. • Little Eagle (*Hieraaetus morphnoides*) - NPW Act: Vulnerable.

Principle of clearance	Considerations
	• Slender-billed Thornbill (*Acanthiza iredalei iredalei*) - NPW Act: Rare. **Possible** • Blue-winged Parrot (*Neophema chrysostoma*): EPBC Act and NPW Act – Vulnerable; • Diamond Firetail (*Stagonopleura guttata*): EPBC Act and NPW Act – Vulnerable; • Grey Falcon (*Falco hypoleucos*): EPBC Act – Vulnerable; and • Brown Quail (*Coturnix ypsilophora australis*): NPW Act – Vulnerable; • Bluebonnet (*Northiella haematogaster* (NC)): NPW Act – Rare; • Little Friarbird (*Philemon citreogularis citreogularis*): NPW Act – Rare; • Striped Honeyeater (*Plectorhyncha lanceolata*): NPW Act: Rare; • Gilberts Whistler (*Pachycephala inornata*): NPW Act: Rare; • Carpet Python (*Morelia spilota*): NPW Act: Rare; and • Common Brushtail Possum (*Trichosurus vulpecula*): NPW Act: Rare. Of these, two nationally listed species have records within 5 km of the Project Area, and are considered likely to occur, Regent Parrot and Hooded Robin. Three other species are considered to possibly occur. All nationally listed species known or considered likely to occur are discussed in Section 4.2.1, however, briefly: **Southern Whiteface** The Project Area contains suitable foraging and breeding habitat for the Southern Whiteface. Multiple records of Southern Whiteface occur within 5 km of the Project Area, and the species was detected on site during the field survey. A significant impact self-assessment is likely to be required to determine the significance of impact for this species. **Regent Parrot** The Project Area occurs within 5 km of known nesting habitat along the Murray River at Morgan. The National Recovery Plan for the Regent Parrot lists all known sites for nesting, food resources, water, shelter, essential travel routes, dispersal and buffer areas within its current normal range as 'critical habitat'. A significant impact self-assessment is likely to be required to determine the significance of impact for this species. **Hooded Robin** Critical habitat for the species includes areas which contain their known preferred habitat. There are multiple records of Hooded Robin within 5km of the Project Area. A significant impact self-assessment may be required to determine the significance of impact for this species. More generally, vegetation within the site contains suitable habitat for a wide range of species and contains habitat features which support sheltering (trees, shrubs, sandy soil, woody debris), nesting (structurally diverse vegetation), and foraging (seeds, fruits, seasonal nectar). It is likely to support a range of common and less common species. A total of 14 native fauna species were recorded within the Project Area during the field survey which occurred over one day. The vegetation occurs in a landscape which has not been largely cleared and formed a contiguous block of vegetation with the surrounding landscape for many kilometres, except for road or housing infrastructure, and therefore is unlikely to be critical for movement of fauna through the landscape. Damp drainage depressions, a man-made dam and drainage lines are unlikely to hold water during times of drought, and therefore do not contribute significantly as a refuge for fauna.

<table>
<tr><th>Principle of clearance</th><th>Considerations</th></tr>
<tr><td></td><td>
<table>
<tr><th>VA</th><th>Threatened Fauna Score</th><th>UBS</th></tr>
<tr><td>A5</td><td>0.1</td><td>41.22 (mean)</td></tr>
<tr><td>A7</td><td>0.1</td><td>24.32</td></tr>
<tr><td>A8</td><td>0.1</td><td>44.53 (mean)</td></tr>
</table>
<u>Assessment against the principles</u>
<u>Seriously at Variance</u>
- A5 and A8

<u>Moderating factors that may be considered by the NVC</u>
Impact Significance

Given the abundance of uncleared landscapes surrounding the Project Area, particularly habitat for Southern Whiteface, clearance may be considered to be not significant, given that it is unlikely to:
• lead to a long-term decrease in the size of a population;
• reduce the area of occupancy of a species;
• fragment an existing population into two or more populations;
• decrease availability of habitat such that the extent of a species is likely to decline;
• result in invasive species becoming established in the threatened species habitat;
• interfere with the recovery of a species.

Additionally, given the open nature of the woodland being impacted by the proposed clearance, this woodland is not considered preferred habitat for the Regent Parrot and as such is unlikely to be considered critical habitat.

However, a significant impact self-assessment is required to determine the level of impact this Project may have on several MNES, as it may be considered habitat critical to the survival of some species. A significant impact self-assessment is planned for this Project.

Common species

For more common species occurring within the Project Area, higher quality areas of vegetation, including those areas where structural diversity is higher, are being avoided for clearance. The habitat under application is unlikely to be essential habitat for local populations of common species.</td></tr>
<tr><td>Principle 1(c) – plants of a rare, vulnerable or endangered species</td><td><u>Relevant information</u>
No listed threatened plant species were recorded at the site and a desktop assessment combined with habitat assessment during the field survey, found that there was only one possible listed threatened species occurring within the Project Area, Callistemon brachyandrus (Prickly Bottlebrush).

Threatened Flora Score(s) – 0 (all sites)</td></tr>
<tr><td></td><td><u>Assessment against the principles</u>
<u>Seriously at Variance</u>
N/A

<u>At Variance</u> –
N/A</td></tr>
</table>

<table>
<tr><th>Principle of clearance</th><th>Considerations</th></tr>
<tr><td></td><td><u>Moderating factors that may be considered by the NVC</u>
N/A</td></tr>
<tr><td rowspan="3">Principle 1(d) – the vegetation comprises the whole or part of a plant community that is Rare, Vulnerable or endangered</td><td><u>Relevant information</u>
One listed TEC (EPBC Act) was identified within the Project Area.
<table><tr><th>Threatened Ecological Community</th><th>EPBC Status</th><th>Likelihood of Occurrence</th></tr><tr><td>Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions</td><td>EN</td><td>Unlikely
There is no woodland community in the Project Area. Buloke and associated co-dominant tree species do not occur and the Project Area is outside the known distribution of the community.</td></tr><tr><td>Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions</td><td>CE</td><td>Unlikely
Although mapped within 5 km, no ‘mallee-box’ communities occur in the Project Area. Annual rainfall is below annual average rainfall for the typical range of community.</td></tr><tr><td>Mallee Bird Community of the Murray Darling Depression Bioregion</td><td>EN</td><td>Known
This area has been assessed as the TEC</td></tr></table>Threatened Community Score – 1.4
All other VA’s = 1</td></tr>
<tr><td><u>Assessment against the principles</u>
<u>Seriously at Variance</u>
No VAs are at variance with this principle</td></tr>
<tr><td><u>Moderating factors that may be considered by the NVC</u>
N/A</td></tr>
<tr><td rowspan="3">Principle 1(e) – it is significant as a remnant of vegetation in an area which has been extensively cleared</td><td><u>Relevant information</u>
The Project Area contains one IBRA Subregion (and association): Braemer (Florieton). The Braemer subregion (Florieton land system name) is largely uncleared and utilised for pastoral grazing, comprising bluebush low shrubland plans with isolated patches of Black Oak, Sugarwood, and depressions of Australian boxthorn, Nitre bush and Blackbush. The condition of the landscape is area is largely influenced by climatic conditions and is unlikely to decline significantly as a result of human disturbance on its current trajectory.
<table><tr><th>Subregion</th><th>Remnancy</th><th>Association</th><th>Remnancy</th></tr><tr><td>Braemer</td><td>100%</td><td>Florieton</td><td>99%</td></tr></table>Total Biodiversity Score – 8796.50</td></tr>
<tr><td><u>Assessment against the principles</u>
Not at variance</td></tr>
<tr><td><u>Moderating factors that may be considered by the NVC</u>
<u>N/A</u></td></tr>
<tr><td>Principle 1(f) – it is growing in, or in association with, a</td><td><u>Relevant information</u>
Several areas were identified as drainage / moist depressions and were associated with low-lying areas (such as the lignum vegetation association). This area was not inundated in the recent River Murray floods and is considered to be largely damp due to groundwater and the lower lying nature of the area. As such the block was not considered to be associated with a wetland environment.</td></tr>
</table>

Principle of clearance	Considerations
wetland environment	Assessment against the principles Seriously at Variance N/A At Variance – N/A
	Moderating factors that may be considered by the NVC N/A
Principle 1(g) – it contributes significantly to the amenity of the area in which it is growing or is situated	Relevant information The block under application is situated away from the main highway on minor agricultural / access roads and is unlikely to contribute significantly to the local amenity. The site is within The River Murray and Crown Lands ILUA (SI2011/025) and may therefore have cultural values, and require further investigation.
	N/A
	Moderating factors that may be considered by the NVC N/A

Principles of Clearance (h-m) will be considered by comments provided by the local NRM Board or relevant Minister. The Data Report should contain information on these principles where relevant and where sufficient information or expertise is available.

4.6. Risk assessment

The level of risk associated with the application

Table 18. Summary of the level of risk associated with the application.

Total clearance	No. of trees	N/A
	Area (ha)	202.15
	Total biodiversity Score	8,377.62
Seriously at variance with principle 1(b), 1(c) or 1 (d)		1(b)
Risk assessment outcome		Level 4

5. Clearance summary

Clearance Area(s) Summary table

Two IBRA associations occur within the proposed clearance area, however, SEB calculations have been based off of the Florieton IBRA association only as the calculations are the same for each association. The clearance area summary is provided in Table 19.

Table 19. Summary of proposed clearance areas with a loss factor of 1.

Block	Site	Species diversity score	Threatened Ecological community Score	Threatened plant score	Threatened fauna score	UBS	Area (ha)	Total Biodiversity score	Loss factor	Loadings	Reductions	SEB Points required	SEB payment	Admin Fee
A	A5a	20.00	1.00	0.00	0.10	39.64	184.89	7329.78	1			7696.27	$1,342,103.71	$73,815.70
A	A5b	14.00	1.00	0.00	0.10	37.31	184.89	6898.62	1			7243.55	$1,263,156.43	$69,473.60
A	A5d	12.00	1.00	0.00	0.10	40.81	184.89	7545.36	1			7922.63	$1,381,577.35	$75,986.75
A	A5e	10.00	1.00	0.00	0.10	34.98	184.89	6467.45	1			6790.82	$1,184,209.16	$65,131.50
A	A5f	14.00	1.00	0.00	0.10	48.97	184.89	9054.43	1			9507.15	$1,657,892.82	$91,184.11
A	A5g	16.00	1.00	0.00	0.10	47.81	184.89	8838.85	1			9280.79	$1,618,419.18	$89,013.05
A	A5h	12.00	1.00	0.00	0.10	46.64	184.89	8623.27	1			9054.43	$1,578,945.54	$86,842.00
A	A5i	14.00	1.00	0.00	0.10	37.31	184.89	6898.62	1			7243.55	$1,258,183.38	$69,200.09
A	A5j	10.00	1.00	0.00	0.10	32.65	184.89	6036.29	1			6338.10	$1,100,910.45	$60,550.08
A	A5k	14.00	1.00	0.00	0.10	46.06	184.89	8515.48	1			8941.25	$1,559,208.72	$85,746.48
A	**A5 Mean[1]**	**13.60**				**41.22**	**184.89**	**7620.82**	**1**			**8001.85**	**$1,394,460.67**	**$76,694.34**
A	**A7**	**10.00**	**1.00**	**0.00**	**0.10**	**24.32**	**0.58**	**14.10**	**1**			**14.81**	**$2,582.60**	**$142.04**
A	A8	20.00	1.00	0.00	0.10	41.98	16.68	700.16	1			735.17	$128,201.26	$7,051.07
A	A8b	20.00	1.00	0.00	0.10	47.08	16.68	785.25	1			824.51	$143,781.27	$7,907.97
A	**A8 Mean[2]**	**20.00**				**44.53**	**16.68**	**742.71**	**1**			**779.84**	**$135,991.27**	**$7,479.52**
[1]Average of all A5 sites. [2]Average of all A8 sites. [3]Sum of A5 Mean, A7 and A8 Mean.						**Total[3]**	**202.15**	**8377.62**				**8796.50**	**$1,533,034.54**	**$84,315.90**

Table 20. Total summary.

	Total Biodiversity score	Total SEB points required	SEB Payment	Admin Fee	Total Payment
Application	8377.62	8796.50	$1,533,034.54	$84,315.90	$1,617,350.44
Economies of Scale Factor				0.23	
Rainfall (mm)				254	

6. Significant Environmental Benefit

A Significant Environmental Benefit (SEB) is required for approval to clear under Division 5 of the *Native Vegetation Regulations 2017*. The NVC must be satisfied that as a result of the loss of vegetation from the clearance that an SEB will result in a positive impact on the environment that is over and above the negative impact of the clearance.

ACHIEVING AN SEB

Indicate how the SEB will be achieved by ticking the appropriate box and providing the associated information:

☐ Establish a new SEB Area on land owned by the proponent.

☐ Use SEB Credit that the proponent has established.

☐ Apply to have SEB Credit assigned from another person or body.

☐ Apply to have an SEB to be delivered by a Third Party.

☒ Pay into the Native Vegetation Fund.

PAYMENT SEB

If a proponent proposes to achieve the SEB by paying into the Native Vegetation Fund, summary information must be provided on the amount required to be paid and the manner of payment:

The total SEB payment required for the clearance of **202.15** ha of native vegetation with a Total Biodiversity Score of **8377.62** is **$1,617,350.44,** which includes an administration fee of **$84,315.90.**

7. References

Atlas of Living Australia website (2023a). Species pages: *Northiella narethae* (Naretha Blue Bonnet). Available from: https://bie.ala.org.au/species/https://biodiversity.org.au/afd/taxa/8abc16cd-d2b6-43e7-853e-0275a2ed7697 [Accessed 18/10/2023].

Atlas of Living Australia website (2023b). Species pages: *Morelia spilota* (Carpet Python). Available from: https://bie.ala.org.au/species/https://biodiversity.org.au/afd/taxa/8abc16cd-d2b6-43e7-853e-0275a2ed7697 [Accessed 18/10/2023].

Australian museum (2023). Animal factsheet: White-winged Chough (*Corcorax melanorhamphos*) https://australian.museum/learn/animals/birds/white-winged-chough/ [Accessed 18/10/2023].

Benshemesh, J. (2007). National Recovery Plan for Malleefowl. Department for Environment and Heritage, South Australia. Available from: http://www.environment.gov.au/resource/national-recovery-plan-malleefowl-leipoa-ocellata. [Accessed 18/10/2023]. In effect under the EPBC Act from 08-Jan-2010.

Birdlife Australia (2023). Online resource. Retrieved from: https://birdlife.org.au/all-about-birds/australias-birds/find-a-bird [Accessed 18/10/2023].

Birdlife Australia (2023). Online resource. Retrieved from: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://birdata.birdlife.org.au/wp-content/uploads/2015/04/Survey-Techniques-Guide.pdf [Accessed 27/10/2023].

Birds in Backyards (BIB) (2023). Online Resource. Retrieved from: https://www.birdsinbackyards.net/ [Accessed 18/10/2023].

Birds SA (2023). Bird directory, Archives: Birds. Available from: https://birdssa.asn.au/birddirectory/ [Accessed 18/10/2023].

Botanic Gardens of South Australia (2024). Seeds of South Australia. Available from: https://spapps.environment.sa.gov.au/SeedsOfSA/ [Accessed 12/07/ 2024].

Croft S.J., Pedler J.A., Milne T.I. (2007). Bushland Condition Monitoring Manual – Northern Agricultural & Yorke Peninsula Regions. Nature Conservation Society of South Australia, Adelaide.

Croft S.J., Pedler J.A., Milne T.I. (2008a). Bushland Condition Monitoring Manual – Eyre Peninsula Region. Nature Conservation Society of South Australia, Adelaide.

Croft S.J., Pedler J.A., Milne T.I. (2008b). Bushland Condition Monitoring Manual – Southern Mt Lofty Ranges Region. Nature Conservation Society of South Australia, Adelaide.

Croft S.J., Pedler J.A., Milne T.I. (2009). Bushland Condition Monitoring Manual – Murray Darling Basin Region. Nature Conservation Society of South Australia, Adelaide.

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2023a). Species Profile and Threats Database. Department of Agriculture, Water and the Environment. https://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl [Accessed 28 June 2022].

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2024a). Protected Matters Search Tool. Available at: https://www.environment.gov.au/epbc/protected-matters-search-tool [Accessed 02/07/2024].

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2023c). Conservation Advice for *Aphelocephala leucopsis* (southern whiteface). Canberra: Department of Climate Change, Energy, the Environment and Water. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/529-conservation-advice-31032023.pdf [Accessed 18/10/2023]. In effect under the EPBC Act from 31-Mar-2023.

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2023d). Conservation Advice for the *Botaurus poiciloptilus* (Australasian Bittern). Canberra: Department of Climate Change, Energy, the Environment and Water. Available from: https://www.environment.gov.au/biodiversity/threatened/species/pubs/1001-conservation-advice-18012019.pdf [Accessed 18/10/2023]. In effect under the EPBC Act from 18 January 2019.

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2023e). Conservation Advice for *Lophochroa leadbeateri leadbeateri* (Eastern Major Mitchell's Cockatoo). Canberra: Department of Climate Change, Energy, the Environment and Water. Available from: https://www.environment.gov.au/biodiversity/threatened/species/pubs/82926-conservation-advice-31032023.pdf [Accessed 18/10/2023]. In effect under the EPBC Act from 31 March 2023.

Department of Climate Change, Energy, the Environment and Water (2023f). Conservation Advice for *Neophema chrysostoma* (blue-winged parrot). Canberra: Department of Climate Change, Energy, the Environment and Water. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/726-conservation-advice-31032023.pdf [Accessed 18/10/2023]. In effect under the EPBC Act from 31 March 2023.

Department of Climate Change, Energy, the Environment and Water (2023g). Conservation Advice *for Stagonopleura guttata* (diamond firetail). Canberra: Department of Climate Change, Energy, the Environment and Water. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/59398-conservation-advice-31032023.pdf [Accessed 18/10/2023]. In effect under the EPBC Act from 31 March 2023.

Department of Climate Change, Energy, the Environment and Water (2024b). Conservation Advice for *Bidyanus bidyanus* (silver perch). Canberra: Department of Climate Change, Energy, the Environment and Water.

Department of Climate Change, Energy, the Environment and Water (2024c). Species Profile and Threats Database. Available from: https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=66633 [Accessed 12/07/2024].

Department for Environment and Heritage (DEH) (2008). Adelaide and Mount Lofty Ranges Threatened Species Profile for Brown Quail (*Coturnix ypsilophora australis*), https://cdn.environment.sa.gov.au/landscape/docs/hf/pa-fact-brownquail.pdf.

Department for Environment and Heritage (DEH) (2014). Adelaide and Mount Lofty Ranges Threatened Species Profile for Hooded Robin (south-eastern) (*Melanodryas cucullata cucullata*), https://cdn.environment.sa.gov.au/landscape/docs/hf/pa-fact-hoodedrobinsoutheastern.pdf

Department for Environment and Water (DEW) (2023). NatureMaps. Available at: http://data.environment.as.gov.au/NatureMaps/Pages/default.aspx [Accessed 6 October 2023].

Department for Environment and Water (DEW) (2024). Biological Databases of South Australia (BDBSA) data extract: Recordset number DEWNRBDBSA240702-2. Adelaide.

EBS Ecology (2021) Morgan Solar Farm Ecological Assessment. Report to Golder Associates Pty Ltd. EBS Ecology, Adelaide.

eFlora (2007). *Electronic Flora of South Australia species Fact Sheet*. Available from: http://www.flora.sa.gov.au/census.shtml [Accessed 18/10/2023].

Menkhorst, P. and Knight, F. (2004). A Field Guide to Mammals of Australia. Second Edition. Oxford University Press, Australia.

Milne T.I., Croft T. (2012). Bushland Condition Monitoring Manual – Benchmark Communities of the South East. Nature Conservation Society of South Australia, Adelaide.

Milne T.I., McCallum B. (2012). Bushland Condition Monitoring Manual – Benchmark Communities of Kangaroo Island. Nature Conservation Society of South Australia, Adelaide.

Native Vegetation Council (NVC) (2020). Bushland Assessment Manual July 2020. Native Vegetation Council, Adelaide. Available at: https://www.environment.sa.gov.au/topics/native-vegetation/clearing/vegetation-assessments.

Office of Environment and Heritage (2023). Threatened Species Profile for *Stictonetta naevosa* (Freckled Duck). Available from: https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10771 [Accessed 18/10/2023].

PlantNET (The NSW Plant Information Network System) (1992). Royal Botanic Gardens and Domain Trust, Sydney. https://plantnet.rbgsyd.nsw.gov.au [Accessed 18/10/2023]

Simpson, K. and Day, N. (1999). Field guide to the birds of Australia (6th ed). Viking, Camberwell, Victoria.

Threatened Species Scientific Committee (2020). Conservation Advice *Falco hypoleucos* Grey Falcon. Canberra: Department of Agriculture, Water and the Environment. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/929-conservation-advice-09072020.pdf. [Accessed 18/10/2023]. In effect under the EPBC Act from 09-Jul-2020.

8. Appendices

Appendix 1 – Flora species list of flora recorded during the field survey.

Introduced	Common Name	Scientific Name	Conservation status	
			Aus	SA
	Acacia nyssophylla	Spine Bush	-	-
	Acacia oswaldii	Umbrella Wattle	-	-
	Aristida contorta	Curly Wire-grass	-	-
	Aristida sp.	Three-awn/Wire-grass	-	-
	Austrostipa elegantissima	Feather Spear-grass	-	-
	Austrostipa nitida	Balcarra Spear-grass	-	-
	Austrostipa sp.	Spear-grass	-	-
*	*Avena barbata*	Bearded Oat	-	-
*	*Carthamus lanatus*	Saffron Thistle	-	-
*	*Cucumis* sp.	Wild Melon	-	-
	Convolvulus angustissimus	Narrow-leaf Bindweed	-	-
*	*Cynara cardunculus ssp. flavescens*	Artichoke Thistle	-	-
	Duma florulenta	Lignum	-	-
	Einadia nutans ssp.	Climbing Saltbush	-	-
	Enchylaena tomentosa	Ruby Saltbush	-	-
	Enneapogon sp.	Bottle-washers/Nineawn	-	-
	Eriochiton sclerolaenoides	Wooly-fruit Bluebush	-	-
	Eucalyptus gracilis	Yorrell	-	-
	Eucalyptus socialis ssp.	Beaked Red Mallee	-	-
	Euphorbia drummondii		-	-
*	*Hordeum* sp.		-	-
	Hyalosperma semisterile	Orange Sunray	-	-
	Lycium australe	Australian Boxthorn	-	-
	Lysiana sp.	Mistletoe	-	-
	Maireana georgei	Satiny Bluebush	-	-
	Maireana lobiflora	Lobed Bluebush	-	-
	Maireana pyramidata	Black Bluebush	-	-
	Maireana sedifolia	Pearl Bluebush	-	-
*	*Marrubium vulgare*	Horehound	-	-
	Myoporum platycarpum	False Sandalwood	-	-
*	*Nicotiana glauca*	Tree Tobacco	-	-
	Nicotiana goodspeedii	Small-flower Tobacco	-	-
	Oxalis perennans	Native Sorrel	-	-
	Rhagodia parabolica	Mealy Saltbush	-	-
	Rhagodia spinescens	Spiny Saltbush	-	-
	Rytidosperma sp.	Wallaby-grass	-	-
*	*Salvia verbenaca*	Wild Sage	-	-
	Sclerolaena obliquicuspis	Oblique-spined Bindyi	-	-

Introduced	Common Name	Scientific Name	Conservation status	
			Aus	SA
	Sida corrugata var. *corrugata*	Corrugated Sida	-	-
	Teucrium racemosum	Grey Germander	-	-
	Trichanthodium skirrophorum	Wooly Yellow-heads	-	-
	Zygophyllum aurantiacum/eremaeum	Shrubby Twinleaf	-	-

Aus: Australia (*Environment Protection and Biodiversity Conservation Act 1999*). SA: South Australia (*National Parks and Wildlife Act 1972*). *: Introduced.

Appendix 2 – Fauna Species List of fauna recorded during the field survey.

*	Scientific name	Common name	Conservation status	
			Aus	SA
*	*Alauda arvensis arvensis*	Eurasian Skylark		
	Anthus australis australis	Australian Pipit		
	Aphelocephala leucopsis leucopsis	Southern Whiteface	VU	
	Aquila audax audax	Wedge-tailed Eagle		
	Corvus coronoides	Australian Raven		
	Eolophus roseicapilla	Galah		
	Epthianura albifrons	White-fronted Chat		
	Falco subniger	Black Falcon		R
	Gymnorhina tibicen	Australian Magpie		
	Macropus fuliginosus	Western Grey Kangaroo		
	Malurus leucopterus	White-winged Fairywren		
	Milvus migrans affinis	Black Kite		
	Pogona vitticeps	Central Bearded Dragon		
	Tiliqua rugosa	Sleepy Lizard		

Aus: Australia (*Environment Protection and Biodiversity Conservation Act 1999*). SA: South Australia (*National Parks and Wildlife Act 1972*). Conservation codes: CE: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare.
***: Introduced.**

Appendix 3 – Threatened flora and fauna likelihood of occurrence assessment.

Species	Common name	Conservation status		Data Source	Date of last record / PMST Occurrence	Species known habitat preferences	Likelihood of occurrence within project area - comments
		EPBC Act	NPW Act				
PLANTS							
Callistemon brachyandrus	Prickly Bottlebrush	-	R	2	2022	Mostly in the sandy soils of alluvial flats in subarid regions of the Darling and lower Murray river. SA: MU. Also from N.S.W.; Vic (eFlora 2007).	**Possible** – Recorded in the Search Area within the last 5 years. Suitable habitat does occur within the Project Area.
Myoporum parvifolium	Creeping Boobialla	-	R	2	2005	SA: EP MU YP SL KI SE. Subpopulations scattered throughout the EP and also throughout southern SA and Vic. Occurs in sandy coastal areas, Red Gum woodlands, *Melaleuca halmaturorum* (Swamp Teatree) Very Low Open Forests and dune swales (PlantNET 1992).	**Unlikely –** Records more than 20 years old in Search Area. Suitable habitat does not occur within the Project Area.
Swainsona pyrophila	Yellow Swainson-pea	VU	R	1	Likely	Mallee on sandy or loamy soil (DCCEEW 2024b)	**Unlikely –** There are no records of the species within 5 km and no suitable mallee habitat present.
FISH							
Bidyanus bidyanus	Silver Perch	CR	-	1, 2	2012	The Murray-Darling system in open sections of river and faster-flowing water, including rapids and races (DCCEEW 2024b).	**Unlikely** – No suitable habitat in the Project Area.
Maccullochella peelii	Murray Cod	VU	-	1	Known	A diverse range of aquatic habitats in the Murray-Darling system (DCCEEW 2024c).	**Unlikely** – No suitable habitat in the Project Area.

Species	Common name	Conservation status		Data Source	Date of last record / PMST Occurrence	Species known habitat preferences	Likelihood of occurrence within project area - comments
		EPBC Act	NPW Act				
AMPHIBIANS							
Litoria raniformis	Southern Bell Frog	VU	V	1, 2	2011/Known	This species is found mostly amongst emergent vegetation, including *Typha* sp. (bullrush), *Phragmites* sp. (reeds) and *Eleocharis* sp.(sedges), in or at the edges of still or slow-flowing water bodies such as lagoons, swamps, lakes, ponds and farm dams. The Southern Bell Frog can be found floating in warmer waters in temperatures between 18–25°C (DCCEEW 2023a).	**Unlikely** – May make use of dams if inundated to traverse. Requires specific habitat that does not occur within the Project Area.
BIRDS							
Acanthiza iredalei hedleyi	Slender-billed Thornbill	-	R	2	2010	Chenopod shrublands.	**Likely –** Habitat in the Project Area is suitable and there are recent records nearby.
Actitis hypoleucos	Common Sandpiper	Mi	R	1	May occur	Utilises a wide range of coastal and inland wetlands. Mostly found around muddy margins or rocky shores (DCCEEW 2024c).	**Unlikely –** There are no records within 5 km and no suitable wetland habitat present.
Anhinga novaehollandiae novaehollandiae	Australasian Darter	-	R	2	2023	Darters are moderately common in the north-east and especially along the River Murray, they are rare elsewhere. They are mainly to be found in still, shallow inland waters but also in slow flowing rivers, swamps and reservoirs (BIB 2023).	**Unlikely –** There are recent records within the Search Area, although suitable habitat does not occur within the Project Area.
Aphelocephala leucopsis leucopsis	Southern Whiteface	VU	-	1, 2, 3	2022/Known	Southern whiteface occur across most of mainland Australia south of the tropics, from the north-eastern edge of the Western Australian wheatbelt, east to the	**Known –** The Southern Whiteface was observed during the field assessment.

Species	Common name	Conservation status		Data Source	Date of last record / PMST Occurrence	Species known habitat preferences	Likelihood of occurrence within project area - comments
		EPBC Act	NPW Act				
						Great Dividing Range. Southern whiteface forage almost exclusively on the ground, favouring habitat with low tree densities and an herbaceous understorey litter cover (DCCEEW 2023c).	
Apus pacificus	Fork-tailed Swift	Mi (M)	-	1	Likely	The Fork-tailed Swift is a non-breeding visitor to all states and territories of Australia. The Fork-tailed Swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher (DCCEEW 2023a).	**Unlikely –** Species is almost exclusively marine and there are no recent records for this species or suitable breeding habitat within the Project Area.
Biziura lobata menziesi	Musk Duck	-	R	2	2022	Occurs in deep freshwater lagoons, with dense reed beds. They are normally seen singly or in pairs, but may form medium to large groups in the winter (BirdsSA 2023).	**Unlikely –** Although there are historical records less than 10 years old, associated vegetation types (freshwater wetland) for habitat does not occur in the Project Area.
Botaurus poiciloptilus	Australasian Bittern	EN	E	1	Known	Freshwater wetlands and rarely in estuaries or tidal wetlands, favouring wetlands dominated by sedges, rushes and reeds growing over a muddy or peaty substrate (DCCEEW 2023d).	**Unlikely –** Associated vegetation types (freshwater wetland) for habitat does not occur in the Project Area.
Calidris acuminata	Sharp-tailed Sandpiper	Mi (W)	VU	1, 2	Known, 2023	In South Australia (SA), they are widespread in the eastern half, east of a line from Streaky Bay, north-east to Pandiburra Bore and Coonchera Waterhole. In Australasia, the Sharp-tailed Sandpiper prefers muddy edges of	**Unlikely –** A flyover may occur, although the species is unlikely to utilise the Project Area.

Species	Common name	Conservation status		Data Source	Date of last record / PMST Occurrence	Species known habitat preferences	Likelihood of occurrence within project area - comments
		EPBC Act	NPW Act				
						shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation (DCCEEW 2023a).	
Calidris melanotos	Pectoral Sandpiper	Mi (W)	R	1	Known	In South Australia (SA), the Pectoral Sandpiper is found mostly in the south-east, from north to the Murray River and west to Yorke Peninsula. In Australasia, the Pectoral Sandpiper prefers shallow fresh to saline wetlands (DCCEEW 2023a).	**Unlikely –** A flyover may occur, although the species is unlikely to utilise the Project Area.
Cladorhynchus leucocephalus	Banded Stilt	Mi	V	2	2014	Endemic to Australia, mainly in the south and inland. Found mainly in saline and hypersaline (very salty) waters of the inland and coast, typically large, open and shallow (Birdlife Australia 2023).	**Unlikely –** Although there are historical records less than 10 years old, associated vegetation types (freshwater wetland) for habitat does not occur in the Project Area.
Corcorax melanorhamphos	White-winged Chough	-	R	2	2020	White-winged Choughs are found in open forests and woodlands. They tend to prefer the wetter areas, with lots of leaf-litter, for feeding, and available mud for nest building (Australian Museum 2023).	**Likely –** Recent records within the last 5 years inside the Project Area. Suitable habitat does occur within the Project Area.
Coturnix ypsilophora australis	Brown Quail	-	V	2	2013	Prefers dense grasslands, often on the edges of open forests, and bracken. May sometimes be seen alongside roads (DEH 2008).	**Possible –** Recent records within the last 10 years. Habitat within the Project Area is not preferred for this species.
Falco hypoleucos	Grey Falcon	VU	V	1	Likely	The species occurs in arid and semi-arid Australia, including the Murray-Darling	**Possible –** Suitable hunting habitat may occur within the

Species	Common name	Conservation status		Data Source	Date of last record / PMST Occurrence	Species known habitat preferences	Likelihood of occurrence within project area - comments
		EPBC Act	NPW Act				
						Basin, Eyre Basin, central Australia and Western Australia. The species frequents timbered lowland plains, particularly acacia shrublands that are crossed by tree-lined water courses. The species has been observed hunting in treeless areas and frequents tussock grassland and open woodland, especially in winter (Threatened Species Scientific Committee 2020).	Project Area. With suitable habitat (Tree lined Murray River) being found within 400m of the Project Area. However, this species is uncommon in this area.
Falco peregrinus macropus	Peregrine Falcon	-	R	2	2021	The Peregrine Falcon is found in most habitats, from rainforests to the arid zone, and at most altitudes, from the coast to alpine areas. It requires abundant prey and secure nest sites, and prefers coastal and inland cliffs or open woodlands near water, and may even be found nesting on high city buildings (Birdlife 2017).	**Unlikely –** Although there are historical records less than 10 years old, associated vegetation types for habitat does not occur in the Project Area.
Gallinago hardwickii	Latham's Snipe	VU	R	1	Known	In Australia, Latham's Snipe occurs in permanent and ephemeral wetlands up to 2000 m above sea-level. They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies). However, they can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity (DCCEEW 2023a).	**Unlikely -** There are no watercourses or wetlands in the Project Area.

Species	Common name	Conservation status		Data Source	Date of last record / PMST Occurrence	Species known habitat preferences	Likelihood of occurrence within project area - comments
		EPBC Act	NPW Act				
Hieraaetus morphnoides	Little Eagle		V	2	2021	The Little Eagle is seen over woodland and forested lands and open country, extending into the arid zone. It tends to avoid rainforest and heavy forest (BIB 2023).	**Likely –** Recent records and suitable habitat occurs within the Project Area.
Hydroprogne caspia	Caspian Tern	Mi		2	2014	Within Australia, the Caspian Tern has a widespread occurrence and can be found in both coastal and inland habitat. The Caspian Tern is mostly found in sheltered coastal embayment's (harbours, lagoons, inlets, bays, estuaries and river deltas) and those with sandy or muddy margins are preferred (DCCEEW 2023a).	**Unlikely –** Although there are historical records less than 10 years old, associated vegetation types (coastal embayment's) for habitat does not occur in the Project Area.
Leipoa ocellata	Malleefowl	VU	V	1	Likely	Southern mainland Australia. Malleefowl are found predominantly in mallee eucalypt shrublands, but also occur, or once occurred, in a range of other shrubland communities on sandy soils (Benshemesh 2007).	**Unlikely –** There are no recent records of Malleefowl in the area and suitable habitat (mallee woodlands with high litter loads) does not occur within the Project Area.
Lophochroa leadbeateri leadbeateri	Eastern Major Mitchell's Cockatoo	EN	R	1	Likely	The subspecies occur in the Murray-Darling, Eyre and Bulloo River basins, from Isisford and Roma in the north, through western New South Wales to north-west Victoria and west to eastern South Australia (Higgins 1999). The eastern Major Mitchell's cockatoo lives in arid and semi-arid woodlands dominated by mulga *Acacia aneura* (Mulga), mallee and box eucalypts, slender *Callitris*	**Unlikely –** There are no recent records of Major Mitchells Cockatoo in the area and suitable habitat does not occur within the Project Area.

Species	Common name	Conservation status		Data Source	Date of last record / PMST Occurrence	Species known habitat preferences	Likelihood of occurrence within project area - comments
		EPBC Act	NPW Act				
						gracilis (cypress pine) or *Casuarina cristata* (belah) (DCCEEW 2023e).	
Manorina melanotis	Black-eared Miner	EN	E	1, 2	2019/Known	Black-eared Miners are restricted to small, local colonies in the mallee region of north-western Victoria, east to Hattah-Kulkyne National Park, and through the Murray mallee of South Australia north to the Murray River, and to the far south-west corner of NSW. Black-eared Miners are restricted to mature mallee eucalypt woodland, in areas that have not been burnt for at least 50 years and have not been cleared (DCCEEW 2023a).	**Unlikely –** The species has specific habitat requirements but that habitat does not occur within the Project Area.
Melanodryas cucullata cucullata	Hooded Robin (YP, MN, AP, MLR, MM, SE)	EN	R	1, 2	2020/Known	*Melanodryas cucullata cucullata* occurs across south-eastern Australia, most of NSW, VIC and south-eastern SA, including the AMLR. South-eastern subspecies found in Eucalypt woodland and mallee and Acacia shrubland with a remnant size of >50 ha is required (DEH 2014).	**Likely –** Woodland occurs in the Project area and there are records within the last 20 years.
Myiagra cyanoleuca	Satin Flycatcher	Mi (T)	E	1, 2	Known, 1998	In South Australia, they are occasionally recorded, mostly in the lower south-east, occasionally as far north as Naracoorte. There have been six records at scattered sites in the area from Langhorne Creek, west to eastern Kangaroo Island and north to Sandy Creek. Satin Flycatchers inhabit heavily vegetated gullies in eucalypt-dominated forests and taller	**Unlikely –** Historical records are more than 20 years old, associated vegetation types (vegetated gullies) for habitat does not occur in the Project Area.

Species	Common name	Conservation status		Data Source	Date of last record / PMST Occurrence	Species known habitat preferences	Likelihood of occurrence within project area - comments
		EPBC Act	NPW Act				
						woodlands, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests (DCCEEW 2023a).	
Neophema chrysostoma	Blue-winged Parrot	VU	V	1	Known	Blue-winged Parrots inhabit a range of habitats from coastal, sub-coastal and inland areas, through to semi-arid zones. They tend to favour grasslands and grassy woodlands and are often found near wetlands both near the coast and in semi-arid zones. The species can also be seen in altered environments such as airfields, golf-courses and paddocks (DCCEEW 2023f).	**Possible –** No recent records of the species, but suitable habitat does occur on the Project Area. Survey effort is not considered adequate to detect the species.
Oxyura australis	Blue-billed Duck	-	R	2	2022	Endemic to south-eastern and south-western Australia. Habitat is permanent swamps with dense vegetation. Large open lakes, tidal inlets and bays (Simpson & Day 1999).	**Unlikely –** Records are recent although associated vegetation types (permanent water source) for habitat does not occur in the Project Area.
Pachycephala inornata	Gilbert's Whistler	-	R	2	2004	The Gilbert's Whistler is sparsely distributed over much of the arid and semi-arid zone of inland southern Australia, from the western slopes of NSW to the Western Australian wheatbelt. The Gilbert's Whistler occurs in a range of habitats within NSW, though the shared feature appears to be a dense shrub layer. It is widely recorded in mallee shrublands, but also occurs in box-ironbark woodlands, Cypress Pine and Belah	**Possible –** Historical records are more than 20 years old, associated vegetation types for habitat may occur in the Project Area.

Species	Common name	Conservation status		Data Source	Date of last record / PMST Occurrence	Species known habitat preferences	Likelihood of occurrence within project area - comments
		EPBC Act	NPW Act				
						woodlands and River Red Gum forests, though at this stage it is only known to use this habitat along the Murray, Edwards, and Wakool Rivers (Simpson & Day 1999).	
Pandion haliaetus	Osprey	Mi (W)	E	1	Likely	The breeding range of the Eastern Osprey extends around the northern coast of Australia (including many offshore islands) from Albany in Western Australia to Lake Macquarie in NSW; with a second isolated breeding population on the coast of South Australia, extending from Head of Bight east to Cape Spencer and Kangaroo Island. Eastern Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands (DCCEEW 2023a).	**Unlikely –** The species has specific habitat requirements (coastal) but that habitat does not occur within the Project Area.
Philemon citreogularis citreogularis	Little Friarbird	-	R	2	2011	Widespread in Western New South Wales and northern Victoria along Murray River, to South Australia. The Little Friarbird is found near water, mainly in open forests and woodlands dominated by eucalypts. Also found in wetlands, monsoon forests, mangroves and coastal heathlands (Birdlife 2017).	**Possible –** Suitable habitat of eucalypt woodland occurs within 400m of the Murray River. Most recent record is over 10 years old.
Plectorhyncha lanceolata	Striped Honeyeater	-	R	2	2017	The Striped Honeyeater is found in eastern Australia, mainly inland, from the Yorke Peninsula, South Australia to the coast of New South Wales, around	**Possible –** Suitable habitat of woodland occurs within 400m

Species	Common name	Conservation status		Data Source	Date of last record / PMST Occurrence	Species known habitat preferences	Likelihood of occurrence within project area - comments
		EPBC Act	NPW Act				
						Toukley, and north to Charters Towers, Queensland. The Striped Honeyeater is found in forests and woodlands, often along rivers, as well as mangroves and in urban gardens (BIB 2023).	of the Murray River. Most recent record is 5 years old.
Podiceps cristatus australis	Great Crested Grebe	-	R	2	2000	Distribution occurs in Western and eastern mainland Australia and Tasmania. Specie inhabits in deep freshwater ponds and open wetlands, also coastal saltwater areas (BIB 2023).	**Unlikely –** Historical records are more than 20 years old, associated vegetation types (permanent water source) for habitat does not occur in the Project Area.
Polytelis anthopeplus monarchoides	Regent Parrot	VU	V	1, 2	2019/Likely	In South Australia, the subspecies is restricted to the Murray-Mallee District, where it has been recorded north to Morgan Vale, Canopus and Canegrass Stations and mainly south to Marama and Pinnaroo. The Regent Parrot (eastern) primarily inhabits riparian or littoral *Eucalyptus camaldulensis* (River Red Gum) forests or woodlands and adjacent *E. largiflorens* (Black Box) woodlands. Nearby open mallee woodland or shrubland, usually with a ground cover of *Triodia* (spinifex) or other grasses, supporting various eucalypts, especially *E. socialis* (Beaked Red Mallee) and *E. costata* (Yellow Mallee), as well as *Casuarina cristata* (Belah), *A. luehmannii* (Buloke) or *Callitris preissii* (Slender Cypress Pine) also provide important	**Likely –** Records are within 5 years. Although some woodland occurs in the Project Area, the quality of the vegetation present is not preferred.

Species	Common name	Conservation status		Data Source	Date of last record / PMST Occurrence	Species known habitat preferences	Likelihood of occurrence within project area - comments
		EPBC Act	NPW Act				
						habitat for this subspecies. They often occur in farmland, especially if the farmland supports remnant patches of woodland along roadsides or in paddocks. The subspecies seldom occurs in more extensively cleared areas (DCCEEW 2023a).	
Rostratula australis	Australian Painted Snipe	EN	E	1	Likely	Dense vegetation of swamps, surrounds and shallows of well vegetated wetlands (DCCEEW 2023a).	**Unlikely –** Habitat does not occur within the Project Area.
Spatula rhynchotis	Australasian Shoveler	-	R	2	2019	Shovelers are found in shallow wetlands with abundant emergent vegetation throughout the wetter south and east SA, and on ephemeral lakes and wetlands inland. They can be found on freshwater, brackish and saline waters including inshore waters and estuaries (BirdsSA 2023).	**Unlikely –** Although there are recent records in the Search Area the species has specific habitat requirements (wetlands), but that habitat does not occur within the Project Area.
Stagonopleura guttata	Diamond Firetail	VU	V	1	Known	Endemic to Australia, occurring mainly on the inland slopes of the Great Dividing Range and in the AMLR/Eyre Peninsula region of SA. Reside in a wide range of Eucalypt dominated vegetation communities that have a grassy understorey, including woodland, forest, and mallee. Most occur on the inland slopes of the Great Dividing Ranges, with only small pockets near the coast (DCCEEW 2023g).	**Possible –** Suitable habitat does occur within the Project Area although no recent records have been found.

Species	Common name	Conservation status		Data Source	Date of last record / PMST Occurrence	Species known habitat preferences	Likelihood of occurrence within project area - comments
		EPBC Act	NPW Act				
Stictonetta naevosa	Freckled Duck	-	V	2	2013	The Freckled Duck is found primarily in south-eastern and south-western Australia, occurring as a vagrant elsewhere. It breeds in large temporary swamps created by floods in the Bulloo and Lake Eyre basins and the Murray-Darling system, particularly along the Paroo and Lachlan Rivers, and other rivers within the Riverina. Prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds (Office of Environment & Heritage 2022).	**Unlikely –** Although there are recent records in the Search Area the species has specific habitat requirements (riverine swamps), but that habitat does not occur within the Project Area.
Tringa nebularia	Common Greenshank	Mi (W)		1, 2	Likely, 2014	The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. Habitats include embayment's, harbours, river estuaries, deltas and lagoons and are recorded less often in round tidal pools, rock-flats and rock platforms (DCCEEW 2023a).	**Unlikely –** The species has specific habitat requirements (wetlands) but that habitat does not occur within the Project Area.
Tringa stagnatilis	Marsh Sandpiper	Mi (W)		2	2004	In South Australia occasionally the species has been recorded in the south-east, mostly from The Coorong to Yorke	**Unlikely –** The species has specific habitat requirements (wetlands) but that habitat

Species	Common name	Conservation status		Data Source	Date of last record / PMST Occurrence	Species known habitat preferences	Likelihood of occurrence within project area - comments
		EPBC Act	NPW Act				
						Peninsula, including inland along Murray Valley. On Eyre Peninsula the species has been recorded from Whyalla to Little Swamp and Coffin Bay. It is widespread at the Lake Eyre drainage basin. The Marsh Sandpiper lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, saltpans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks. They are recorded less often at reservoirs, waterholes, soaks, bore-drain swamps and flooded inland lakes (DCCEEW 2023a).	does not occur within the Project Area.
MAMMALS							
Trichosurus vulpecula	Common Brushtail Possum		R	2	2004	In southern Australia, they also reside in wooded areas, but are sometimes found living a semi-terrestrial life where they den in rock crevasses and termite mounds (Menkhorst & Knight 2004).	**Possible –** Recorded in the Search Area within the last 20 years. Suitable habitat may occur within the Project Area.
REPTILES							
Morelia spilota	Carpet Python	-	R	2	2007	This species is one of the most widespread Australian python species. In Australia this python's habitats include rainforest, coastal woodland, along water courses, riverine gorges, savannas and modified environments. In Australia it is	**Possible –** Recorded in the Search Area within the last 20 years. Suitable habitat may occur within the Project Area.

Species	Common name	Conservation status		Data Source	Date of last record / PMST Occurrence	Species known habitat preferences	Likelihood of occurrence within project area - comments
		EPBC Act	NPW Act				
						often found in suburban environments (Atlas of Living Australia 2023b).	

Source; 1- BDBSA, 2 – Protected matters search tool 3 – Observed/recorded in the field,
NPW Act; E= Endangered, V = Vulnerable, R= Rare
EPBC Act; Ex = Extinct, CR = Critically endangered, EN = Endangered; VU = Vulnerable, Mi = Migratory, T = Terrestrial, M = Marine, W = Wetland;
The BDBSA data has been sourced from the South Australian Department for Environment and Water Biological Database of SA, Record set number DEWNRBDBSA230911-1
Frequently used regional codes: EP = Eyre Peninsula, KI = Kangaroo Island; YP = Yorke Peninsula; MM/ MU = Murray Mallee / Murraylands and Riverland; SE = South East, MLR = Mount Lofty Ranges.

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