Mount Lofty Golf Estate

Ecological Flora and Fauna Assessment

Mount Lofty Golf Estate Ecological Flora and Fauna Assessment

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Version 3

Prepared by EBS Ecology for Trice – Project & Development Managers on behalf of Mount Lofty Estate Pty Ltd

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Cover photograph: VA A1 – *Eucalyptus viminalis ssp. viminalis* and *Eucalyptus obliqua* woodland over *Acacia melanoxylon*.

EBS Ecology
112 Hayward Avenue
Torrensville, South Australia 5031
t: 08 7127 5607
http://www.ebsecology.com.au
email: info@ebsecology.com.au

GLOSSARY AND ABBREVIATION OF TERMS

ALA	Atlas of Living Australia
BAM	Bushland Assessment Method
BDBSA	Biological Databases of South Australia
CEMP	Construction Environmental Management Plan
Clearance	The killing, destruction, removal or damage of vegetation including pruning
DA	Development Application
DAWE	Department of Agriculture, Water and the Environment (Commonwealth) (now DCCEEW)
DCCEEW	Department of Climate Change, Energy, the Environment and Water (Commonwealth) (previously DAWE)
DEH	Department for Environment and Heritage
DEW	Department for Environment and Water
EBS Ecology	Environmental and Biodiversity Services Pty Ltd, trading as EBS Ecology
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ha	hectare(s)
IBRA	Interim Bio-regionalisation of Australia
km(s)	kilometre(s)
LSA Act	*Landscape South Australia Act 2019*
m(s)	metre(s)
MGCP	Mount George Conservation Park
Mount Lofty Estate	Mount Lofty Golf Estate Pty Ltd
MNES	Matters of National Environmental Significance, as defined under the EPBC Act
mm(s)	Millimetre(s)
Native vegetation	A plant or plants of a species indigenous to South Australia (including dead trees >600mm diameter, and planted vegetation protected under the Native Vegetation Act such as SEB's or Heritage Agreements)
NPW Act	*National Parks and Wildlife Act 1972*
NV Act	*Native Vegetation Act 1991*
NV Regs	*Native Vegetation Regulations 2017*
NVC	Native Vegetation Council
PDI Act	*Planning, Development and Infrastructure Act 2016*
PMST	Protected Matters Search Tool
the Project	The proposed redevelopment of the Stirling Golf Course at the Stirling Golf Club consisting of a redeveloped golf course, hotel, hotel pods and associated infrastructure
the Project Area	Proposed development at the Stirling Golf Club, 35 Golflinks Road, Stirling South Australia 5152
SA	South Australia / South Australian

Search Area	5 km buffer of the Project Area considered in the desktop assessment database searches
SEB	Significant Environmental Benefit
ssp.	Subspecies
sp.	Species (singular)
SSCC	SA Seed Conservation Centre
STAM	Scattered Tree Assessment Method
STCS	Subtropical and Temperate Coastal Saltmarsh TEC
TEC	Threatened Ecological Communities
TPZ	Tree Protection Zone
Trice	Trice – Project & Development Managers
TSSC	Threatened Species Scientific Committee
UBS	Unit Biodiversity Score
VA(s)	Vegetation Association(s)
WoNS	Weeds of National Significance
%	Percent

EXECUTIVE SUMMARY

EBS Ecology were engaged by Trice – Project & Development Managers (Trice) on behalf of Mount Lofty Golf Estate Pty Ltd to undertake an ecological flora and fauna assessment for the proposed redevelopment of the Stirling Golf Club in South Australia. The development was declared a major project on 17th December 2020 by the Minister for Planning and Local Government and therefore the development will be assessed by a state-run process. It is proposed that the redevelopment will include new practice facilities, a new Clubhouse and Pro Shop, new car parking and maintenance facilities, a new wedding centre, hotel and chalets, a spa and wellness centre, restaurants, an outdoor entertainment and event space along with re-routing and improving the existing golf course.

This ecological flora and fauna assessment report summarises the relevant ecological protection legislation, the results of the desktop and field assessments and identifies potential ecological constraints with the proposed Project. Mitigation and management measures are presented to reduce any impacts to ecological matters, where possible.

Desktop assessment results

A desktop assessment was conducted to assess the potential for any threatened and migratory species (both nationally 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). A Protected Matters Search Tool (PMST) report was generated on 11 August 2022 to identify MNES under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). A Biological Database of South Australia (BDBSA) was undertaken (Recordset number: DEWNRBDBSA220816-1) to identify threatened flora and fauna species under the *National Parks and Wildlife Act 1972* (NPW Act) previously recorded within 5 km of the Project Area.

Matters of National Environmental Significance

The PMST report identified 36 threatened species and 13 migratory species protected under the EPBC Act) which may be relevant to the Project Area.

EPBC Act listed threatened species

The PMST report identified 18 flora and 18 fauna species listed as threatened under the EPBC Act as potentially occurring within 5 kilometres (km) of the Project Area. The report identified six species as ‘known to occur’.

EPBC Act listed migratory species

the PMST report identified 10 species listed as migratory under the EPBC Act that might occur within 5 km of the Project Area. Only one migratory species has been identified by the PMST report as known to occur within the Search Area, Rufous Fantail (*Rhipidura rufifrons*).

NPW Act listed threatened species

The database searches indicate that, excluding species also listed under the EPBC Act, 107 flora and 38 fauna species listed as threatened under the NPW Act have been recorded previously within 5 km of the Project Area. This includes 95 Rare, 29 Vulnerable and 21 Endangered species.

Threatened Ecological Communities

No Threatened Ecological Communities will be impacted by the proposed project as there are no TECs located within 5 km of the Project or within the Project Area.

Nationally important wetlands

Two nationally important wetlands were identified within 5 kilometres of the proposed Project. These two wetlands are located outside of Project Area itself and as such the proposed Project will not impact on them.

Introduced Species

A BDBSA search identified 45 Declared flora species under the *Landscape South Australia Act 2019* (LSA Act), that have records within 5 km of the Project Area. Of these, 17 are Weeds of National Significance (WoNS).

A BDBSA search identified 19 introduced fauna species that have records within 5 km of the Project Area.

Phytophthora

The nearest records of Phytophthora to the Project Area are in Mount George Conservation Park (MGCP) approximately 600 m away, although neither of the two records have been confirmed via a soil test. The risk of potential spread of Phytophthora would need to be addressed throughout the Project.

Field survey results

The field survey for the ecological assessment was conducted on 26 August to assess the site and determine high and low value habitat and ecological constraints within the Project Area. Where time permitted, vegetation data was collected in accordance with legislative requirements, but further field surveys will be required once detailed design are finalized.

Flora

A total of 60 flora species, including 31 introduced species were recorded within the Project Area during the field assessment.

Pockets of remnant native vegetation coexist with large remnant scattered trees and planted vegetation within the Project Area. Two vegetation associations (VAs) were recorded within the Project Area:

- Vegetation Association A1 – *Eucalyptus viminalis ssp. viminalis* and *Eucalyptus obliqua* over *Acacia melanoxylon*.
- Vegetation Association A1b – *Eucalyptus viminalis ssp. viminalis* and *Eucalyptus obliqua* over *Acacia melanoxylon* and degraded understorey.

A total of 71 native scattered trees were recorded within the Project Area, which included three *Acacia melanoxylon* (Blackwood), 24 *Eucalyptus obliqua* (Messmate Stringybark) and 44 State Rare *Eucalyptus viminalis ssp. viminalis* (Manna Gum). All trees were categorised based on their Unit Biodiversity Score and were of a mature age, ranging from poor to excellent in health. Some trees contain hollows which could provide suitable habitat for fauna species.

No flora species listed under the EPBC Act were recorded within the Project Area.

One flora species listed under the NPW Act as Rare was recorded in the Project Area:

- *Eucalyptus viminalis ssp. viminalis* (Manna Gum).

A total of 31 introduced flora species were recorded during the field survey. Seven of these species are Declared under the *Landscape South Australia Act 2019* (LSA Act) and five are WoNS.

Fauna

A total of 21 fauna species were recorded within the Project Area, 20 were birds and one was a mammal.

No fauna species listed under the EPBC Act were recorded within the Project Area.

One fauna species listed under the NPW Act as Rare was recorded in the Project Area:

- Common Brushtail Possum (*Trichosurus vulpecula*).

One of these species is introduced fauna:

- Common Blackbird (*Turdus merula*)

Pockets of remnant native vegetation were often degraded by the presence of introduced flora species and fragmented from more intact remnant native vegetation but may be used by fauna as wildlife corridors to more intact and better quality native vegetation, particularly to the surrounding areas in MGCP.

All the scattered trees within the Project Area provide good resting, foraging and roosting habitat for fauna. A total of 25 scattered trees contain hollows which provide suitable breeding habitat for fauna species.

Phytophthora

No areas of Phytophthora dieback were observed during the field survey.

Likelihood of occurrence assessment

Threatened flora

Database searches identified 11 flora species listed as threatened under the EPBC Act as known or likely to occur within 5 kilometres of the Project Area. None of these flora species were assessed as potentially occurring within the Project Area itself, based on survey effort, recent records and suitable habitat within the Project Area.

An additional 73 flora species listed as threatened under the NPW Act have records within 5 kilometres of the Project Area. Of these, 37 threatened flora species were assessed as relevant to the proposed project, as follows:

- Seven flora species are deemed *known / highly likely or likely* to occur within the Project Area based on recent records and suitable habitat; and
- 30 flora species listed under the NPW Act were assessed as *possible* to occur within the Project Area based on recent records and suitable habitat.

Threatened fauna

Database searches identified 10 fauna species listed as threatened under the EPBC Act as known or likely to occur within 5 kilometres of the Project Area, consisting of eight birds and two mammals. Of these, four

fauna species (2 birds and 2 mammals) were assessed as likely to occur within the Project Area based on survey effort, recent records and suitable habitat:

- Bassian Thrush (*Zoothera lunulata halmaturina*) – nationally Endangered and State Rare;
- Chestnut-rumped Heathwren (*Hylacola pyrrhopygia parkeri*) – nationally Endangered and State Endangered;
- Grey-headed Flying-fox (*Pteropus poliocephalus*) – nationally Vulnerable and State Rare; and
- Southern Brown Bandicoot (*Isoodon obesulus obesulus*) – nationally Endangered and State Vulnerable.

One additional nationally listed threatened species was assessed as possible to occur within the Project Area based on survey effort, recent records and suitable habitat:

- White-throated Needletail (*Hirundapus caudacutus*) – nationally Vulnerable and migratory and State Vulnerable.

An additional 30 fauna species listed as threatened under the *National Parks and Wildlife Act 1972* have records within 5 kilometres of the Project Area. Of these, 27 threatened fauna species were assessed as relevant to the proposed project, as follows:

- 11 fauna species (9 bird species and 2 mammal species) are deemed *known / highly likely or likely* to occur within the Project Area based on recent records and suitable habitat; and
- 16 fauna species (14 bird species, one frog species, one mammal species) were assessed as *possible* to occur within the Project Area based on recent records and suitable habitat.

Migratory fauna

Database searches identified five fauna species listed as migratory under the EPBC Act as known or likely to occur within 5 kilometres of the Project Area. Of these, two migratory species were assessed as possible to occur within the Project Area based on survey effort, recent records and suitable habitat:

- Fork-tailed Swift (*Apus pacificus*) – nationally migratory;
- Satin Flycatcher (*Myiagra cyanoleuca*) – nationally migratory and State Endangered.

Potential impacts to flora and fauna

The Project Area is largely comprised of pockets of remnant native vegetation, scattered trees and planted (amenity) vegetation associated with the golf course. MGCP is directly adjacent to the Project Area and supports a large assemblage of both nationally and State listed flora and fauna (DEH 2006). Few patches of naturally occurring native or remnant vegetation remain in the landscape, and those that do are generally impacted at some level by weed invasion and lacking an intact understorey. Regardless, vegetation that remains in the Project Area is of high habitat value as it provides a corridor for movement to better quality vegetation. Additionally, the remaining remnant scattered trees contain a significant number of hollows, likely to be utilised by less conspicuous or nocturnal species and utilised for nesting, either by birds or other fauna.

Recommendations and considerations

The following broad recommendations and considerations should be taken into account for the proposed Project:

- Retain high value vegetation where possible, particularly those areas assessed as having high fauna habitat value (in particular trees/vegetation with a high biodiversity score and trees with hollows) and consider Project design that avoids this constraint.
- Utilise existing disturbed areas including areas defined as exotic vegetation for Project infrastructure where possible. See Appendix 10 for a map and photographs of suggested areas and routes that EBS recommends in order to avoid impact to native vegetation.
- Ensure infrastructure is a sufficiently located away from large remnant trees (i.e., a minimum of 10 metres away but preferably outside of the Tree Protection Zone (TPZ) of trees).
- Ensure that the design and construction methods minimise impacts to all vegetation, as much as possible, including impacts to the TPZ of large remnant trees.
- Vegetation clearing required for the Project outside the parameters of maintenance activities would require approval under the *Native Vegetation Act 1991* (NV Act). This would require a Clearance Data Report and a Clearing Application lodged with the Native Vegetation Council. The completion of additional field work may also be required.
- If native flora species that provide suitable resting, foraging and breeding areas for some fauna species are impacted by works then a suitably qualified fauna spotter (or the likes) needs to assess the presence of fauna prior to any flora removal.
- Collate additional information to determine if a referral under the EPBC Act (i.e., undertake an EPBC Self-assessment of MNES, conduct targeted threatened species surveys), is required.
- Develop a Construction Environmental Management Plan (CEMP) for the construction phase of the project that includes detailed strategies for the management of native vegetation and fauna. This should include the management of Declared and Environmental weeds across the Project Area to prevent their spread into surrounding areas as well as Phytophthora risk.

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1 INTRODUCTION

Mount Lofty Golf Estate Pty Ltd (Mount Lofty Estate) are proposing to redevelop the Stirling Golf Course at the Stirling Golf Club (The Project), located in Stirling, South Australia (SA). Trice – Project & Development Managers (Trice) on behalf of Mount Lofty Estate have engaged EBS Ecology (EBS) to undertake an ecological flora and fauna assessment to support the Development Application (DA).

The proposed Mount Lofty Golf Estate's new development is summarised as follows:

- Hotel - 3-5 level hotel building comprising:
  - 56 hotel suites.
  - 15 x two bedroom serviced apartments.
  - 15 x three bedroom serviced apartments.
  - 2 penthouse serviced apartments.
  - Back of house, plant storage and maintenance areas.
  - A 537m^2 function room.
  - A 212m^2 restaurant with 89 m^2 external terrace.
  - 186m^2 sports bar.
  - A 189m^2 gallery and cafe.
  - A 94m^2 wellness centre with 125m^2 gym and spa/massage treatment rooms.
- Private retreats – 'Pods'
  - 17 x one bedroom units.
  - 1 x back of house Service Pod.
- Adaptive reuse of the existing perfumery:
  - Refurbishment of the existing local heritage place to accommodate a multipurpose space for use as café, retail or functions.
  - Extension to the Perfumery to include a covered outdoor dining area.
  - Orchard and perfumery garden plantings to reimagine the former use of the building as a "Scent Factory".
  - Note: the perfumery building will temporarily house the golf club whilst construction is occurring.
- Golf Course Facilities Building - 2-5 level building comprising:
  - Retention of 18-hole golf course with improvements.
  - Refurbished function facilities, cart storage and 138m^2 clubhouse in new building.
  - New 97m^2 pro-shop, administration areas, gym and change rooms.
- Car Parking, Access and Waste Management
  - A total of 200 car parking spaces in two car parking areas.
  - Emergency vehicle access via western entry from Golflinks Road.
  - Main access point via Golflinks Road.
  - Designated service bay for waste collection and service vehicles.
  - Porte cochere and valet area for guests and buses.

  - A separate entry from Old Carey Gully Road to provide maintenance vehicle access and public access to the perfumery building.
  - Designated waste storage areas.
- Subdivision – following construction of the proposed development, it is proposed to divide the site into three (3) allotments:
  - Allotment 532, with an approximate area of 9,924m^2 together with a right of way 'A', comprising the hotel building and pods.
  - Allotment 533, with an approximate area of 5,056m^2 together with a right of way 'B', comprising the golf club and facilities building.
  - Allotment 531, with an approximate area of 38.4 hectares, comprising the balance of the golf course, subject to easements 'A' and 'B'.

The proponents additionally intend to rebrand the development as the Mount Lofty Golf Estate which was the original name of the course when it opened in 1925. The aim of the development will be to improve access to tourists and capitalise on the growing tourism market.

The development has been declared a major project by the Minister for Planning and Local Government (the South Australian Government Gazette 2020, p. 5848) and will be assessed by a state-run process. At the time of preparing this report, the development design has not been finalized and layout will be guided by the reports of numerous specialists. Preliminary drawings of the Project Area (as provided to EBS on 08/09/22) are provided in Attachment 1.

1.1 Objectives

The overall aim of the ecological flora and fauna assessment is to identify potential ecological constraints associated with the proposed Project. The flora and fauna assessment includes a desktop assessment and a site assessment. The specific objectives include the following:

- Identify, describe and map state and nationally threatened flora and fauna and ecological communities across the Project Area to enable assessment by State *National Parks and Wildlife Act 1972* (NPW Act) and Commonwealth regulators *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act). This will include native as well as introduced flora and fauna species;
- Determine the likelihood of presence likelihood of presence and status of State (NPW Act) and Commonwealth (EPBC Act), listed flora and fauna species and ecological communities, including Weeds of National Significance (WoNS) and other weed species;
- Assess the impacts the proposed works are likely to have on any matters of State and/or National Environmental Significance;
- Review information regarding the habits and habitat requirements of threatened species; and
- Provide recommendations to avoid impacts to biodiversity including clearing of native vegetation and impact to threatened species and ecological communities.

1.1 Project Area

The Project Area is located at the Stirling Golf Club at 35 Golflinks Road, Stirling, which is located approximately 2.5 kilometres (km) northwest of Bridgewater and 15 km southeast of Adelaide (Figure 1, pg. 2).

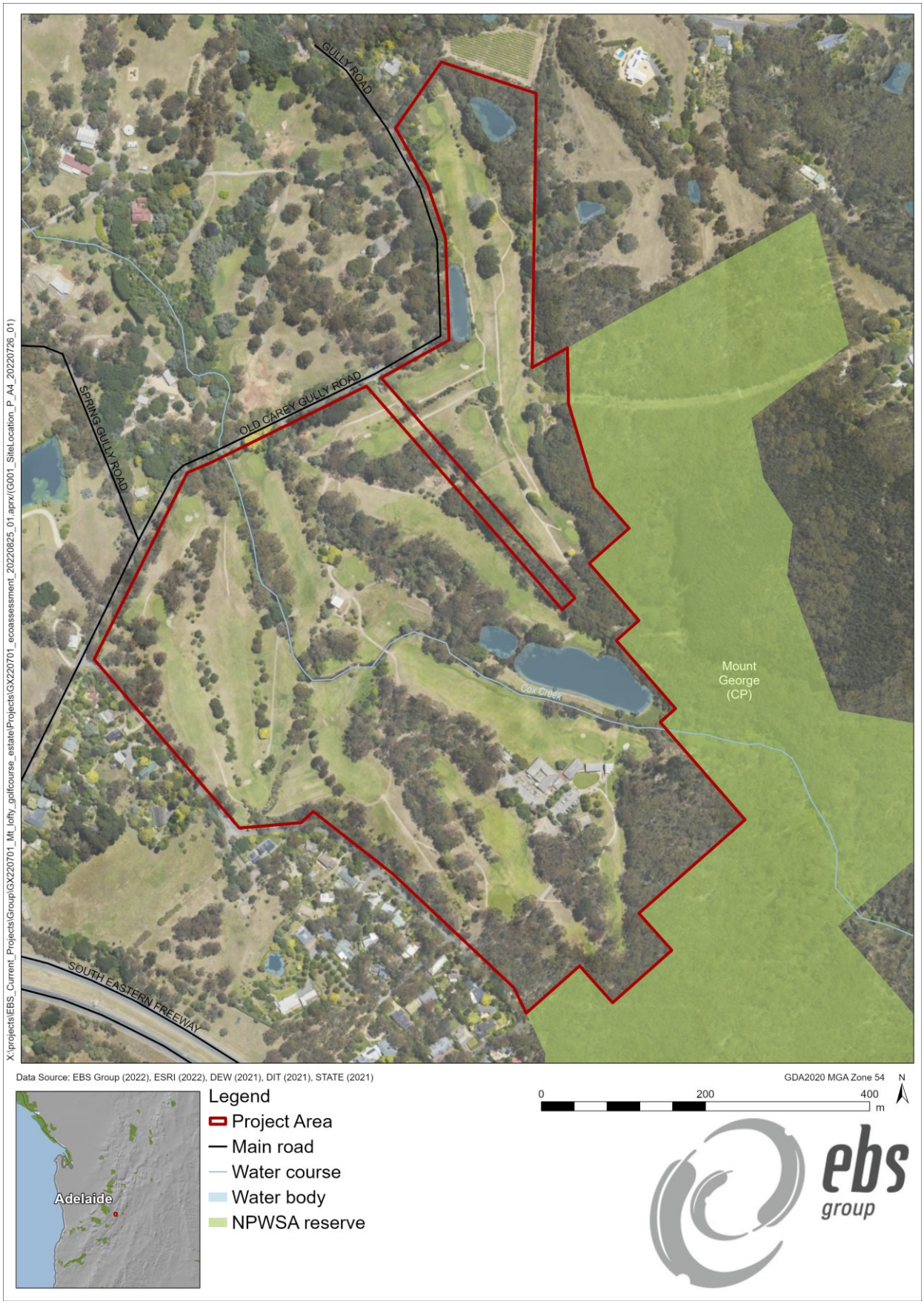


Figure 1. The Project Area at the Stirling Golf Club.

2 BACKGROUND INFORMATION

2.1 Administrative boundaries

This Project is located within the Adelaide Hills Council Local Government Area. It is situated within the Hills and Fleurieu Landscape Management Region and the Onkaparinga Hundred (DEW 2022a).

2.2 Interim Biogeographic Regionalisation for Australia (IBRA)

The Project Area occurs in the Mount Lofty Ranges subregion of the Flinders Lofty Block Bioregion. At a local scale the IBRA subregions are further categorised by Environmental Associations, the Project Area falls within the Uraidla Environmental Association (Table 1).

Approximately 15% (46,342 ha) of the Mount Lofty Ranges IBRA Subregion and approximately 26% (3,674 ha) of the Uraidla IBRA Environmental Association is mapped as remnant vegetation. Of this, 27% (12,706 ha) and 20% (749 ha) is formerly conserved and protected, respectively (DCCEEW 2022a).

Table 1. IBRA bioregion, subregion, and environmental association environmental landscape summary.

Flinders Lofty Block IBRA bioregion	
Temperate to arid Proterozoic ranges, alluvial fans and plains, and some outcropping volcanics, with the semi-arid to arid north supporting native cypress, black oak (belah) and mallee open woodlands, Eremophila and Acacia shrublands, and bluebush/saltbush chenopod shrublands on shallow, well-drained loams and moderately deep, well-drained red duplex soils. The increase in rainfall to the south corresponds with an increase in low open woodlands of *Eucalyptus obliqua* and *E. baxteri* on deep lateritic soils, and *E. fasciculosa* and *E. cosmophylla* on shallower or sandy soils.	
Mount Lofty Ranges IBRA subregion	
This subregion extends from north of the Fleurieu Peninsula to the Barossa Valley and is predominantly an undulating to low hilly upland with steeper marginal ranges and hills. The Barossa Valley is the lowest area in this subregion and represents a structural basin. The rest of the subregion consists of hilly uplands on sandstone and shale with northerly trending strike ridges and dissected lateritic tableland remnants. Low open woodland commonly dominated by *Eucalyptus obliqua* and *E. baxteri* are found in higher rainfall areas on deep, lateritic soils. Shallower or sandy soils support *E. fasciculosa*, *E cosmophylla* and in the northern part of the region *E. goniocalyx*. *E leucoxylon* dominates the woodlands on podzolised soils in the lower rainfall areas, *E. viminalis ssp. cygnetensis* dominate the wetter and cooler woodlands and *E. odorata* characterises drier sites. Eucalypts give way to drooping sheoak (*Allocasuarina verticillata*) in the most arid woodlands and in coastal situations on shallow rocky soils.	
Remnant vegetation	Approximately 15% (46,342 hectares (ha)) of the subregion is mapped as remnant native vegetation, of which 27% (12,706 ha) is formally conserved.
Landform	Hills and valleys; alternating subparallel hilly ridges and valleys with a general N-S trend in north. In south, hilly dissected tableland.
Geology	Dissected lateritized surface in south.
Soil	Hard setting loams with red clayey subsoils, highly calcareous loamy earths, Hard setting loams with mottled yellow clayey subsoil, Coherent sandy soils, Cracking clays.
Vegetation	Eucalyptus woodlands with a shrubby understorey.
Conservation significance	129 species of threatened fauna, 270 species of threatened flora. 4 wetlands of national significance.

Uraidla IBRA environmental association	
Remnant vegetation	Approximately 26% (3,674 ha) of the association is mapped as remnant native vegetation, of which 20% (749 ha) is formally conserved.
Landform	Hilly uplands on sandstone and shale with long smooth slopes.
Geology	Sandstone, shale and alluvium.
Soil	Hard pedal or apedal mottled-yellow soils, red duplex soils on the slopes, grey-brown weakly structured sandy soils and bleached sands.
Vegetation	Open forest of messmate stringybark or brown stringybark on the slopes and crests, and open forests of mountain gum on the valley floors.
Conservation significance	29 species of threatened fauna, 96 species of threatened flora. 1 wetlands of national significance.

2.3 Current land use

The Project Area is currently the site of the Stirling Golf Club. Pockets of remnant native vegetation and planted vegetation cooccur within the area. The Stirling Golf Club is adjacent to Mount George Conservation Park (MGCP) (see Figure 1, p4).

2.4 Watercourses and wetlands

Cox Creek runs through the Project Area from the adjacent Mount George Conservation Park. There are also three artificially constructed lakes or dams to the north of the Stirling Golf Club clubhouse and in the northern section of the Project Area (see Figure 1, p4).

2.5 Conservations areas

The MGCP is located directly adjacent to the Stirling Golf Club and supports a large assemblage of both nationally and State listed flora and fauna (DEH 2006) (see Figure 1, p4).

Kenneth Stirling Conservation Park and Cleland National Park are within 2.5 km of the Project Area. Like MGCP, these conservation areas also support many nationally and State listed flora and fauna.

3 COMPLIANCE AND LEGISLATIVE SUMMARY

Impacts to biodiversity including clearing of native vegetation and impact to threatened species and ecological communities as a result of the Project, are subject to Commonwealth and State legislation as listed in Table 2.

Table 2. Commonwealth and South Australian legislation relevant to the Project Area.

Jurisdiction	Legislation
Commonwealth	• *Environment Protection and Biodiversity Conservation Act 1999*
South Australia	• *Native Vegetation Act 1991* • *National Parks and Wildlife Act 1972* • *Landscape South Australia Act 2019* • *Planning Development and Infrastructure Act 2016*

3.1 **Note: This summary is not intended to be a substitute for particular legal advice and does not address the legal implications of every set of circumstances.**

3.2 Environment Protection and Biodiversity Conservation Act 1999

The *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the *Environment Protection and Biodiversity Conservation Regulations 2000* provide a legal framework to protect and manage Nationally and Internationally important flora, fauna, ecological communities and heritage places – defined in the Act as Matters of National Environmental Significance (MNES). The nine MNES protected under the Act are:

1. World Heritage properties;
2. National Heritage places;
3. Wetlands of international importance (listed under the Ramsar Convention);
4. Listed threatened species and ecological communities;
5. Migratory species protected under international agreements;
6. Commonwealth marine areas;
7. The Great Barrier Reef Marine Park;
8. Nuclear actions (including uranium mines); and
9. A water resource, in relation to coal seam gas development and large coal mining development.

Two (2) of the nine (9) MNES protected under the Act are of relevance to the Project Area:

- listed threatened species and ecological communities; and
- migratory species protected under international agreements.

Any action that has, will have, or is likely to have a significant impact on MNES requires referral under the EPBC Act. Substantial penalties apply for undertaking an action that has, will have, or is likely to have a significant impact on a MNES without approval.

The EPBC Act Significant Impact Guidelines provide overarching guidance on determining whether an action is likely to have a significant impact on a matter of national environmental significance (refer to EBS 2022b for further details on the significant impact for Endangered and Vulnerable species).

3.3 Native Vegetation Act 1991

The Project Area is in the Adelaide Hills council, which is currently subject to the *Native Vegetation Act 1991* (NV Act). Native vegetation within the Project Area is protected under the NV Act and *Native Vegetation Regulations 2017*. Any proposed clearance of native vegetation in South Australia (unless exempt under the *Native Vegetation Regulations 2017*) is to be assessed against the NV Act Principles of Clearance and requires approval from the Native Vegetation Council (NVC). A net environmental benefit, either through contribution to the Native Vegetation Fund or via implementation of an on-ground Significant Environmental Benefit (SEB), is generally conditional on an approval being granted.

Native vegetation refers to any naturally occurring local plant species that are indigenous to South Australia, from small ground covers and native grasses to large trees and water plants.

“Clearance", in relation to native vegetation, means:

- The killing or destruction of native vegetation.
- The removal of native vegetation.
- The severing of branches, limbs, stems, or trunks of native vegetation.
- The burning of native vegetation.
- Any other substantial damage to native vegetation, and includes the draining or flooding of land, or any other act or activity, that causes the killing or destruction of native vegetation, the severing of branches, limbs, stems or trunks of native vegetation or any other substantial damage to native vegetation.

Approval must be obtained before performing any activity that could cause substantial damage to native plants. This also applies to dead trees that may provide habitat for animals. These activities include but are not limited to:

- The cutting down, destruction or removal of whole plants.
- The removal of branches, limbs, stems, or trunks (including brush cutting and woodcutting).
- Burning.
- Poisoning.
- Slashing of understorey.
- Drainage and reclamation of wetlands.
- Grazing by animals (in some circumstances).
- Change of land use.

Under the NV Act, the NVC considers applications to clear native vegetation under ten principles. Native vegetation should not be cleared if it is significantly at odds with these principles:

- It contains a high level of diversity of plant species.
- It is an important wildlife habitat.
- It includes rare, vulnerable, or endangered plant species.
- The vegetation comprises a plant community that is rare, vulnerable, or endangered.

- It is a remnant of vegetation in an area which has been extensively cleared.
- It is growing in, or association with, a wetland environment.
- It contributes to the amenity of the area.
- The clearance of vegetation is likely to contribute to soil erosion, salinity, or flooding.
- The clearance of vegetation is likely to cause deterioration in the quality of surface or underground water.
- After clearance, the land is to be used for a purpose which is unsustainable.

The principles apply in all cases, except where the clearance of native vegetation fits an exemption set out in the *Native Vegetation Regulations 2017* or can be classified as an 'intact stratum'. 'Intact stratum' means that applications will usually be denied when the vegetation has not been seriously degraded by human activity within the last 20 years.

All approved vegetation clearance must also be conditional on achieving a SEB to offset the clearance. The requirement for a SEB also applies to several of the exemptions. Potential SEB offsets include:

- The establishment and management of a set-aside area to encourage the natural regeneration of native vegetation.
- The protection and management of an established area of native vegetation.
- Entering into a Heritage Agreement on land where native vegetation is already established to further preserve or enhance the area in perpetuity.
- A payment to the Native Vegetation Fund.

3.4 National Parks and Wildlife Act 1972

Native plants and animals in South Australia are protected under the *National Parks and Wildlife Act 1972* (NPW Act). It is an offence to take a native plant or protected animal without approval. Threatened plant and animal species are listed in Schedules 7 (Endangered species), 8 (Vulnerable species) and 9 (Rare species) of the Act. Persons must not:

- Take a native plant on a reserve, wilderness protection area, wilderness protection zone, land reserved for public purposes, a forest reserve or any other Crown land.
- Take a native plant of a prescribed species on private land. Take a native plant on private land without the consent of the owner (such plants may also be covered by the *Native Vegetation Act 1991*).
- Take a protected animal or the eggs of a protected animal without approval.
- Keep protected animals unless authorised to do so.
- Use poison to kill a protected animal without approval.

Conservation rated flora and fauna species listed on Schedules 7, 8, or 9 of the NPW Act may occur within the Project Area. Persons must comply with the conditions imposed upon permits and approvals.

3.5 Landscape South Australia Act 2019

The *Landscape South Australia Act 2019* (LSA Act) has repealed the *Natural Resources Management Act 2004*. Under the LSA Act, new regional landscape boards have been established. The aim is to deliver Landscape related services to regional communities, including effective water management, pest plant and animal control, soil and land management and support for broader sustainable primary production programs. Under the LSA Act, landholders have a legal responsibility to manage declared pest plants and animals and prevent land and water degradation.

3.6 Planning Development and Infrastructure Act 2016

The *Planning, Development and Infrastructure Act 2016* (PDI Act) repealed the *Development Act 1993*. The PDI Act, along with the *Planning, Development and Infrastructure (General) Regulations 2017* and *Planning and Design Code,* provide the legislative framework for carrying out planning and development works within the state. The *Planning and Design Code* is the cornerstone of the new system and has replaced all council development plans to become the single source of planning policy for assessing development applications. No development can be undertaken without an appropriate Development Approval being obtained from the relevant authority after an application and assessment process.

3.6.1 Regulated and significant trees

The *Planning and Design Code* includes a new Regulated and Significant Tree Overlay, which requires conservation of regulated and significant trees to provide aesthetic and environmental benefits and mitigate tree loss (Desired Outcome 1 of the Assessment Provisions within the Regulated and Significant Tree Overlay).

The Project Area is not located within the Regulated and Significant Tree Overlay (which only applies to the Adelaide metropolitan area and hills face zone from Gawler to Aldinga Beach). As such, Regulated and Significant Tree controls associated with the PDI Act do not apply across the Project Area.

4 METHODS

4.1 Desktop assessment

A desktop assessment was conducted to assess the potential for any threatened and migratory species (both nationally 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).

4.1.1 Protected Matters Search Tool

A Protected Matters Search Tool (PMST) report was generated on 11 August 2022 to identify MNES under the EPBC Act (DCCEEW 2022b). The PMST is maintained by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) and was used to identify flora and fauna species or ecological communities of national environmental significance that may occur or have suitable habitat within the Project Area. Species and Threatened Ecological Communities (TECs) identified in the PMST report that are known or likely 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 desktop assessment report as the Project Area is terrestrial. No species listed as marine by the PMST report have been included as the Project Area is not within a marine protected area. A 5 km buffer from the Project Area was applied to the PMST.

4.1.2 Biological Database of South Australia

A Biological Database of South Australia (BDBSA) search was obtained from the Department of Environment and Water (DEW) on 16 August 2022 (Recordset number: DEWNRBDBSA220816-1) to identify threatened flora and fauna species previously recorded within 5 km of the Project Area (DEW 2022b). A buffer of 5 km from the Project Area was used to determine where possible threatened species occurred closest to the Project Area.

The BDBSA is comprised of an integrated collection of corporate databases which meet DEW standards for data quality, integrity and maintenance. In addition to DEW biological data, the BDBSA also includes data from partner organisations (Birds Australia, Birds SA, Australasian Wader Study Group, SA Museum, and other State Government Agencies). Only species with records since 1995 and a spatial reliability of less than 1 km were assessed for their likelihood of occurrence.

4.1.3 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 2022a); and
- Reports, design drawings, plans and web-based information, including:
    - Design Drawings and CAD files as provided by Trice.

- Preliminary Tree Assessment ATS6360-035GolRdPTA (Arborman 2022a)
- Arboricultural Impact Assessment and Development Impact Report Site: Stirling Golf Club, 35 Golflinks Road, Stirling ATS6360-035GolRdDIR (Arborman 2022b)
- 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 threatened ecological communities); and
- Flora and fauna species of conservation significance known or likely to occur within the area.

4.1.4 Assessment of the likelihood of occurrence

The likelihood of each threatened flora and fauna species potentially occurring within the Project Area was assessed. A likelihood of occurrence rating (Highly Likely / Known, Likely, Possible, Unlikely) was assigned to each threatened species identified in the desktop database searches. The ratings take the following criteria into consideration:

Each threatened species has been rated as either highly likely/known, likely, possible, or unlikely to occur in the Project Area according to the criteria listed in Table 3.

Table 3. Criteria for the likelihood of occurrence of threatened species.

Likelihood	Criteria
Highly Likely/Known	• BDBSA records in the last 10 years, the species does not have highly specific needs, and the habitat is largely intact. • Species observed within the Project Area during field survey.
Likely	• BDBSA records in the last 10 years, the species does not have highly specific habitat needs and the habitat is largely intact, or • BDBSA records in the last 10 years, the species does have highly specific habitat needs and these needs occur in the area.
Possible	• No BDBSA records, survey effort is considered not adequate, suitable habitat does occur (or isn't known if it does occur) and species of similar habitat needs have been recorded in the area, or • BDBSA records within the last 40 years, and the area is not largely intact, or • BDBSA records in the last 10 years, the species does not have highly specific needs, and habitat is largely intact.
Unlikely	• No BDBSA records despite survey effort considered adequate, or • No BDBSA records and survey effort is considered not adequate, and no suitable habitat is known to occur in the area, or • No BDBSA records and survey effort is not considered adequate, and no suitable is known to occur in the area, and species of similar habitat needs have no records either.

4.2 Field assessment

The field survey for the ecological assessment was conducted on 26 August 2022 by N. Piscioneri and NVC Accredited J. Skewes to assess the site and determine high and low value habitat and ecological features within the Project Area.

Where time permitted, vegetation data was collected in accordance with the Bushland Assessment Method (BAM) (NVC 2020a) and Scattered Tree Assessment Method (STAM) (NVC 2020b). Detailed vegetation assessment is reported in the *Native Vegetation Clearance Mount Lofty Golf Estate Data Report* EBS Ecology (2022b *in preparation*).

4.2.1 Fauna

No targeted surveys for threatened fauna were undertaken.

All native and exotic vertebrate fauna species opportunistically encountered during the field survey (directly observed, or tracks, scats, burrows, nests, and other signs of presence) were recorded across the Project Area. Potential fauna refuge sites, such as hollows, rock crevices and creek lines were noted as an indication of availability of suitable habitat. Particular attention was given to identifying potential habitat for threatened species. For each opportunistic fauna observation, the species, number of individuals, GPS location, detection methodology (sight, sound, or sign) and habitat were recorded.

4.3 Limitations

4.3.1 Desktop assessment

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

Flora and fauna records were sourced from the PMST and BDBSA. The BDBSA only includes verified flora and fauna records submitted to DEW or partner organisations. It is recognised that knowledge is poorly captured, and it is possible that significant species occur 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 give 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.

The EPBC Act protected matters report and BDBSA flora and fauna records were limited to a 5 km buffer around the Project Area. Fauna species, in particular birds can traverse distances in excess of 20 km. It is also acknowledged that the presence of species may not be adequately represented by database records. Hence the EPBC and BDBSA results may not highlight all potential threatened flora and fauna species that may occur in the area, within a 5 km radius. A precautionary approach has therefore been adopted, with reference to existing EPBC and BDBSA records and native vegetation cover. The combination of database records and background research have provided a solid baseline foundation for determining the flora and fauna that are likely to, or are known to, occur within the Project Area.

4.3.2 Mapping

Mapping may be inaccurate and not reflect the vegetation on site. Some types of native vegetation based on interpretation of imagery are difficult to observe and distinguish (e.g., native grasslands and low shrublands). Hence these types of vegetation may be under-represented.

4.3.3 Flora

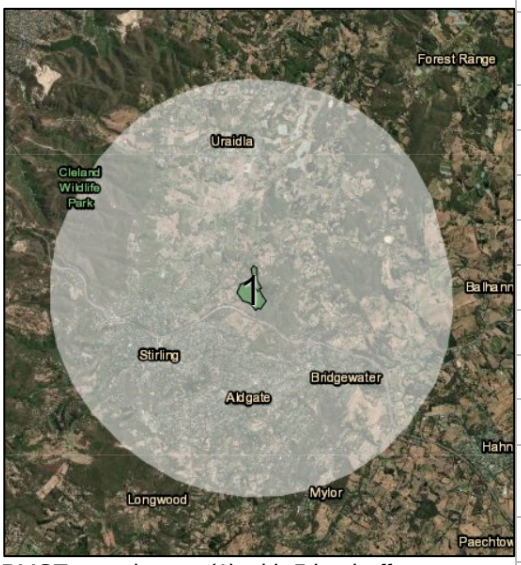
The ecological assessment was conducted just before spring. Threatened orchid species and numerous forbs, herbs and grasses are only just beginning to flower at this time of year, and therefore it is possible that species were present that were undetectable at the time of the field survey.

5 DESKTOP ASSESSMENT RESULTS

5.1 Matters of National Environmental Significance (MNES)

The PMST report identified 36 threatened species and 13 migratory species protected under the EPBC Act, which may be relevant to the Project Area. Table 4 summarises the results of the PMST report and the relevant MNES are discussed further below.

Table 4. Summary of the EPBC Act Protected Matters Search Tool results (5 km buffer).

	Matters of National Environment Significance under EPBC Act	Identified within the search area
 PMST search area (1) with 5 km buffer.	World Heritage Properties	None
	National Heritage Properties	None
	Wetlands of International Importance	None
	Great Barrier Reef Marine Park	None
	Commonwealth Marine Areas	None
	Listed Threatened Ecological Communities	0
	Listed Threatened Species	36 (18 flora and 18 fauna)
	Listed Migratory Species	13
	Commonwealth Lands	13
	Commonwealth Heritage Places	None
	Listed Marine Species	19
	Whales and other Cetaceans	None
	Critical Habitats	None
	Commonwealth Reserves Terrestrial	None
	Australian Marine Parks	None
	Habitat critical to the Survival of Marine Turtles	None
	State and Territory Reserves	53
	Regional Forest Agreements	None
	Nationally Important Wetlands	2
	EPBC Act referrals	4
	Key Ecological Features	None
	Biologically Important Areas	None
	Bioregional Assessments	None
	Geological and Bioregional Assessments	None

5.2 EPBC Act listed threatened species

The PMST report identified 18 flora species and 18 fauna species (13 birds, three mammals, one frog and one reptile) listed as threatened under the EPBC Act as potentially occurring within 5 km of the Project Area. The report identified six species as ‘known to occur’, as listed in Table 5.

Searches of the BDBSA and Bird Life Australia Atlas indicate that historical records of 14 species occur within the Search Area.

Table 5. Threatened flora and fauna species potentially occurring within 5 km of the Project Area.

Scientific name	Common name	Conservation status		Presence Type	Year of last record
		EPBC Act	NPW Act		
FLORA					
Caladenia argocalla	White-beauty Spider-orchid	EN	E	Likely to occur	No record
Caladenia behrii	Pink-lipped Spider-orchid	EN	E	Likely to occur	No record
Caladenia gladiolata	Bayonet Spider-orchid	EN	E	Likely to occur	No record
Caladenia rigida	Stiff White Spider-orchid	EN	E	Likely to occur	1961
Caladenia tensa	Greencomb Spider-orchid	EN		May occur	No record
Corybas dentatus	Toothed Helmet-orchid	VU		May occur	No record
Dodonaea procumbens	Trailing Hop-bush	VU		May occur	No record
Euphrasia collina subsp. osbornii	Osborn's Eyebright	EN	E	Known to occur	1973
Glycine latrobeana	Clover Glycine	VU	V	Likely to occur	1990
Olearia pannosa ssp. pannosa	Silver Daisy-bush	VU		May occur	No record
Prasophyllum goldsackii	Goldsack's Leek-orchid	EN		May occur	No record
Prasophyllum pallidum	Pale Leek-orchid	VU	R	Likely to occur	No record
Prasophyllum pruinosum	Plum Leek-orchid	EN	E	Known to occur	1941
Pterostylis cucullata	Leafy Greenhood	VU	E	Likely to occur	1913
Senecio macrocarpus	Large-fruit Fireweed	VU		May occur	No record
Thelymitra epipactoides	Metallic Sun-orchid	EN		May occur	No record
Thelymitra matthewsii	Spiral Sun-orchid	VU	E	Likely to occur	No record
Veronica derwentiana subsp. homalodonta	Mount Lofty Speedwell	CE	E	Likely to occur	No record
FAUNA					
Aprasia pseudopulchella	Flinders Ranges Worm-lizard	VU		May occur	No record
Botaurus poiciloptilus	Australasian Bittern	EN	E	Known to occur	No record
Calidris ferruginea	Curlew Sandpiper	CE, Mi		May occur	No record
Cinclosoma punctatum anachoreta	Mt Lofty Ranges Spotted Quail-thrush	CE		May occur	1924
Dasyurus maculatus maculatus	Spot-tailed Quoll	EN		May occur	No record
Falco hypoleucos	Grey Falcon	VU	R	Likely to occur	No record
Grantiella picta	Painted Honeyeater	VU	R	Likely to occur	No record
Hirundapus caudacutus	White-throated Needletail	VU, Mi	V	Likely to occur	1990
Hylacola pyrrhopygia parkeri	Chestnut-rumped Heathwren	EN	E	Known to occur	2020
Isoodon obesulus obesulus	Southern Brown Bandicoot	EN	V	Known to occur	2021
Leipoa ocellata	Malleefowl	VU	V	Likely to occur	No record
Litoria raniformis	Growling Grass Frog	VU		May occur	1978
Numenius madagascariensis	Eastern Curlew	CE, Mi		May occur	No record
Pedionomus torquatus	Plains-wanderer	CE		May occur	No record
Polytelis anthopeplus monarchoides	Regent Parrot	CE		May occur	1996
Pteropus poliocephalus	Grey-headed Flying-fox	VU	R	Likely to occur	2020
Rostratula australis	Australian Painted Snipe	EN	E	Likely to occur	1980
Zoothera lunulata halmaturina	Bassian Thrush	EN	R	Known to occur	2022

Conservation status (EPBC Act/NPW Act): CE = Critically Endangered. EN/E = Endangered. VU/V = Vulnerable. R = Rare. Mi = Migratory.
Presence Type: As identified in the PMST report.
Year of last record: Historical records within 5 km of the Project Area, obtained from the *BDBSA* and *Bird Life Australia – Bird Atlas Database*.

5.3 EPBC Act listed migratory species

Excluding species also listed as threatened, the PMST report (DCCEEW 2022b) identified 10 bird species listed as migratory under the EPBC Act that might occur within 5 km of the Project Area. These species are listed in Table 6. Note that migratory species that also have a threatened status are discussed in Section 5.2.

Only one migratory species has been identified by the PMST report as known to occur within the Search Area, Rufous Fantail (*Rhipidura rufifrons*).

Table 6. Listed migratory species potentially occurring within 5 km of the Project Area.

Scientific name	Common name	Conservation status		Presence Type	Year of last record
		EPBC Act	NPW Act		
Actitis hypoleucos	Common Sandpiper	Mi	R	May occur	No record
Apus pacificus	Fork-tailed Swift	Mi	-	Likely to occur	No record
Calidris acuminata	Sharp-tailed Sandpiper	Mi	-	May occur	No record
Calidris melanotos	Pectoral Sandpiper	Mi	-	May occur	No record
Gallinago hardwickii	Latham's Snipe	Mi	-	Likely to occur	No record
Motacilla cinerea	Grey Wagtail	Mi	-	May occur	No record
Motacilla flava	Yellow Wagtail	Mi	-	May occur	No record
Myiagra cyanoleuca	Satin Flycatcher	Mi	-	Likely to occur	No record
Rhipidura rufifrons	Rufous Fantail	Mi	-	Known to occur	No record
Tringa nebularia	Common Greenshank	Mi	-	Likely to occur	No record

Conservation status (EPBC Act/NPW Act): CE = Critically Endangered. EN/E = Endangered. VU/V = Vulnerable. R = Rare. Mi = Migratory
Presence Type: As identified in the PMST report.
Year of last record: Historical records within 5 km of the Project Area, obtained from the *BDBSA* and *Bird Life Australia – Bird Atlas Database*.

5.4 NPW Act listed threatened species

The database searches indicate that, excluding species also listed under the EPBC Act, 107 flora and 38 fauna species listed as threatened under the NPW Act have been recorded previously in the Search Area. This includes 95 Rare, 29 Vulnerable and 21 Endangered species.

A list of all species listed as threatened under the NPW Act recorded previously in the Search Area is provided in Appendix 1.

5.5 Listed Threatened Ecological Communities (TEC)

No TECS were identified by the PMST to potentially occur within 5km of the Project Area.

As such, no TECs will be impacted by the proposed project.

5.6 Nationally important wetlands

Two nationally important wetlands were identified within 5 km of the proposed Project:

- Englebrook Reserve
- Cleland Perched Swamps

Englebrook Reserve is a nationally important wetland located to the south of Bridgewater which conserves an intact *Eucalyptus obliqua* (Messmate Stringybark) open forest and several flora species of significance (Seaman 2002). This area is approximately 3 km southeast of the Project Area.

The Cleland Perched Swamps are a nationally important wetland consisting of 5 small swamps located within Cleland National Park and Eurilla Conservation Park. These swamps are important due to the presence of many State listed flora species and for the presence of the nationally listed Southern Brown Bandicoot (*Isoodon obesulus obesulus*) (Seaman 2002). These swamps are between approximately 2.5 to 5 km west of the Project Area.

These wetlands are not located within the Project Area itself and as such the proposed Project will not impact on them.

5.7 State and Territory Reserves

A total of 53 State and Territory Reserves were identified in the PMST. Of these, five reserves are within 1 km of the Project Area:

- Heritage Agreement 357
- Heritage Agreement 856
- Heritage Agreement 1609
- Heritage Agreement 1610; and
- Mount George Conservation Park (MGCP).

MGCP is the most relevant of these reserves to the Project. This reserve is directly adjacent (to the east and southeast) of the Project Area (see Figure 1, pg. 2) and supports a large assemblage of both nationally and State listed flora and fauna (DEH 2006). Species that have been observed within MGCP include but are not limited to the nationally Endangered and State Rare Bassian Thrush (*Zoothera lunulata halmaturina*) and State Rare Scarlet Robin (*Petroica boodang boodang*) (DEW 2022b).

5.8 Introduced Species

5.8.1 Introduced flora species

A BDBSA search identified 45 Declared flora species under the LSA Act, that have records within 5 km of the Project Area. Of these, 17 are Weeds of National Significance (WoNS). A summary of these species and the latest sighting (year) is provided in Table 7.

Table 7. Declared weeds identified within 5 km of the Project Area (DEW 2022b).

Scientific Name	Common Name	Weeds of National Significance (WoNS)	Latest sighting (year)
Acer negundo	Box Elder		2015
Alisma lanceolatum	Water Plantain		2014
Arundo donax	Giant Reed		2020
Asparagus asparagoides f.	Bridal Creeper	Yes	2019
Asparagus scandens	Snakefeather	Yes	2018
Billardiera heterophylla	Blue-bell Creeper		2022
Cenchrus macrourus	African Feather-grass		2013
Chrysanthemoides monilifera ssp. monilifera	Boneseed	Yes	2022
Convolvulus arvensis	Field Bindweed		2009
Coprosma repens	New Zealand Mirror-bush		2021
Cortaderia selloana ssp. selloana	Common Pampas Grass		2022
Crataegus monogyna	Hawthorn		2022
Cytisus scoparius	English Broom	Yes	2022
Echium plantagineum	Salvation Jane		2022
Erica arborea	Tree Heath		2022
Erica baccans	Berry-flower Heath		2021
Euphorbia terracina	False Caper		2012
Fraxinus angustifolia ssp. angustifolia	Narrow-leaved Ash		2022
Fraxinus angustifolia ssp. oxycarpa	Desert Ash		2009
Gazania linearis	Gazania		2018
Genista monspessulana	Montpellier Broom	Yes	2022
Leptospermum laevigatum	Coast Tea-tree		1990
Moraea flaccida	One-leaf Cape Tulip		2019
Pinus halepensis	Aleppo Pine		2019
Pittosporum undulatum	Sweet Pittosporum		2022
Polygala myrtifolia	Myrtle-leaf Milkwort		2009
Rhamnus alaternus	Blowfly Bush		2022
Rosa canina	Dog Rose		2022
Rosa rubiginosa	Sweet Briar		2022
Rubus anglocandicans		Yes	2022
Rubus erythrops		Yes	2022
Rubus fruticosus aggregate	Blackberry	Yes	2018
Rubus laciniatus	Cut-leaf Blackberry	Yes	2022
Rubus leucostachys	Blackberry	Yes	2019
Rubus riddelsdellii		Yes	2011
Rubus rubritinctus		Yes	2016
Rubus ulmifolius var. anoplothyrsus	Thornless Blackberry	Yes	2009

Rubus ulmifolius var. ulmifolius	Blackberry	Yes	2018
Salix alba	White Willow	Yes	2012
Salix cinerea	Grey Sallow	Yes	2019
Silene vulgaris	Bladder Campion		2017
Silybum marianum	Variegated Thistle		2020
Ulex europaeus	Gorse	Yes	2022
Watsonia meriana var. bulbillifera	Bulbil Watsonia		2022
Zantedeschia aethiopica	White Arum Lily		2020

Given the large number of Declared weeds recorded within 5 km of the Project Area, there is a large risk of these species and other environmental weeds becoming established within the Project Area and in the surrounding areas due to the proposed Project. Implementation of correct transportation of Declared Weeds and associated permits to transport these weeds on a public road may be required.

5.8.2 Introduced fauna species

A BDBSA search identified 19 introduced fauna species (eight birds, eight mammals two fish and one slug) that have records within 5 km of the Project Area. A summary of these species and the latest sighting (year) is provided in Table 8.

Table 8. Introduced fauna species identified within 5 km of the Project Area (DEW 2022b).

Common Name	Scientific Name	Latest sighting (year)
Black Rat	*Rattus rattus*	2022
Brown Rat	*Rattus norvegicus*	2020
Common Blackbird	*Turdus merula merula*	2022
Eastern Gambusia	*Gambusia holbrooki*	2005
European Brown Hare	*Lepus europaeus*	2019
European Goldfinch	*Carduelis carduelis britannica*	2022
European Greenfinch	*Chloris chloris*	2020
European Rabbit	*Oryctolagus cuniculus*	2022
Fallow Deer	*Cervus dama*	2022
Feral Cat	*Felis catus*	2022
Feral Pigeon	*Columba livia*	2002
House Mouse	*Mus musculus*	2019
House Sparrow	*Passer domesticus domesticus*	2016
Indian Peafowl	*Pavo cristatus*	2000
Mallard	*Anas platyrhynchos platyrhynchos*	2004
Red Fox	*Vulpes vulpes*	2022
Redfin Perch	*Perca fluviatilis*	2005
Spotted Dove	*Spilopelia chinensis*	2017
Yellow Cellar Slug	*Limacus flavus*	2016

5.9 Phytophthora

Phytophthora dieback as a result of the plant pathogen *Phytophthora cinnamomi* poses a significant threat to the environment. This pathogen is easily spread and can cause severe disease and death of plant species. Any activity that moves soil, water or plant material can spread Phytophthora (DCCEEW 2021).

The nearest records of Phytophthora to the Project Area are in MGCP approximately 600 metres away, although neither of the two records have been confirmed via a soil test (DEW 2022a).

The potential spread of Phytophthora will need to be addressed throughout the Project.

6 FIELD SURVEY RESULTS

6.1 Flora

A detailed vegetation assessment is reported elsewhere in the *Native Vegetation Clearance Mount Lofty Golf Estate Data Report* EBS Ecology (2022b *in preparation*), but the below sections broadly describe the vegetation present on site.

Remnant pockets of native vegetation coexist with large remnant scattered trees and planted vegetation (including exotic vegetation associated with the golf course) within the Project Area. A total of 60 flora species, including 31 introduced species were recorded within the Project Area. Timing of the survey likely influenced this result, with spring annual forbs and grasses only just beginning to flower or appear. Flora species observed during the survey are provided in Appendix 2.

6.1.1 Vegetation associations

Two vegetation associations (VAs) were recorded within the Project Area, as assessed using the BAM:

- Vegetation Association A1 – *Eucalyptus viminalis ssp. viminalis* and *Eucalyptus obliqua* woodland over *Acacia melanoxylon*.
- Vegetation Association A1b – *Eucalyptus viminalis ssp. viminalis* and *Eucalyptus obliqua* woodland over *Acacia melanoxylon* and degraded understorey.

Photographs of VA A1 and VA A1b are provided in Figure 2 and Figure 3.

Both vegetation associations and any areas of planted vegetation are provided in Figure 4. Any fairways and greens associated with the golf course are classified as exotic vegetation but are not mapped.

Figure 2. VA A1 – *Eucalyptus viminalis ssp. viminalis* and *Eucalyptus obliqua* woodland over *Acacia melanoxylon*.

Figure 3. VA A1b – *Eucalyptus viminalis ssp. viminalis* and *Eucalyptus obliqua* woodland over *Acacia melanoxylon* and degraded understorey.

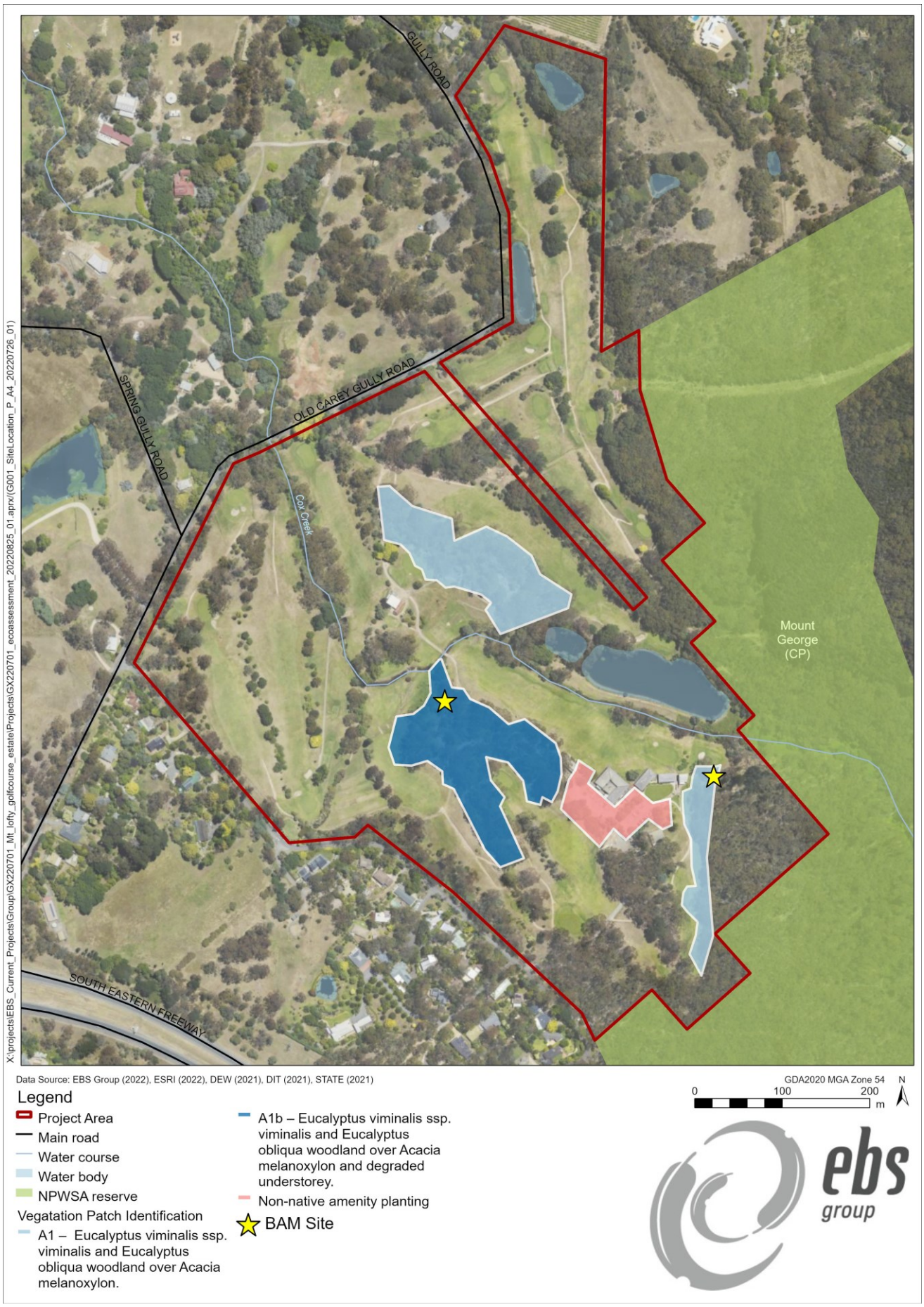


Figure 4. Vegetation associations and planted vegetation recorded within the Project Area. Any fairways and greens associated with the golf course are classified as exotic vegetation but are not mapped.

6.1.2 Scattered trees

A total of 71 native scattered trees were recorded within the Project Area, which included three *Acacia melanoxylon* (Blackwood), 24 *Eucalyptus obliqua* (Messmate Stringybark) and 44 State Rare *Eucalyptus viminalis ssp. viminalis* (Manna Gum) (Figure 5). Of these xx were previously assessed by Arborman (Arborman 2022a). The tree ID numbering of Arborman has been provided in Table 9, for cross-referencing purposes.

All trees were categorised based on their Unit Biodiversity Score (UBS). A tree with a UBS of less than 4 was categorised as low in quality and should be retained as much as possible but may be removed. A tree with a UBS between 4 and 7 was categorised as moderate in quality and should be retained where possible and a tree with a UBS of greater than 7 was categorised as high in quality and should be avoided. All trees were of a mature age and ranged from poor to excellent in health. Some trees contain hollows which could provide suitable habitat for fauna species.

A summary of the scattered trees recorded within the Project Area is provided in Table 9.

Table 9. Scattered trees recorded within the Project Area.

Tree no.	Scientific Name	No. of trees	EPBC Act	NPW Act	Hollows	Unit Biodiversity Score (UBS)	Arborist Report Tree no.
1	*Eucalyptus viminalis ssp. viminalis*	1		R	2 small	4.69	
2	*Eucalyptus viminalis ssp. viminalis*	1		R		2.61	
3	*Acacia melanoxylon*	1				2.55	
4	*Eucalyptus viminalis ssp. viminalis*	1		R	1 small	6.24	
5	*Eucalyptus viminalis ssp. viminalis*	1		R		2.22	
6	*Eucalyptus viminalis ssp. viminalis*	2		R		3.67	2 and 3
7	*Eucalyptus obliqua*	1				1.23	4
8	*Acacia melanoxylon*	1			1 medium	2.54	
9	*Eucalyptus viminalis ssp. viminalis*	1		R	1 small	8.58	5
10	*Eucalyptus obliqua*	1			1 small	4.35	44
11	*Eucalyptus obliqua*	1				0.42	
12	*Eucalyptus viminalis ssp. viminalis*	1		R		2.13	45
13	*Eucalyptus viminalis ssp. viminalis*	1		R	1 small 1 medium	8.71	46
14	*Eucalyptus viminalis ssp. viminalis*	1		R		5.95	48
15	*Eucalyptus obliqua*	1			1 small	2.42	47
16	*Eucalyptus viminalis ssp. viminalis*	1		R		3.91	
17	*Eucalyptus viminalis ssp. viminalis*	1		R		2.27	
18	*Eucalyptus viminalis ssp. viminalis*	1		R		2.50	
19	*Eucalyptus viminalis ssp. viminalis*	1		R	2 small 2 medium	7.03	35

Tree no.	Scientific Name	No. of trees	EPBC Act	NPW Act	Hollows	Unit Biodiversity Score (UBS)	Arborist Report Tree no.
20	*Eucalyptus obliqua*	1				0.59	
21	*Eucalyptus obliqua*	1				2.02	34
22	*Eucalyptus obliqua*	1				0.54	33
23	*Eucalyptus obliqua*	1				1.99	
24	*Eucalyptus viminalis ssp. viminalis*	1		R	1 small 3 medium 1 large	11.25	36
25	*Eucalyptus viminalis ssp. viminalis*	1		R		6.03	37
26	*Eucalyptus viminalis ssp. viminalis*	1		R		1.13	38
27	*Eucalyptus viminalis ssp. viminalis*	1		R		2.12	
28	*Eucalyptus viminalis ssp. viminalis*	1		R	1 medium	9.08	39
29	*Eucalyptus viminalis ssp. viminalis*	1		R	1 small	6.09	40
30	*Eucalyptus viminalis ssp. viminalis*	1		R	1 small	7.01	41
31	*Eucalyptus viminalis ssp. viminalis*	1		R	1 large	2.03	42
32	*Eucalyptus viminalis ssp. viminalis*	1		R		3.51	43
33	*Eucalyptus viminalis ssp. viminalis*	1		R	1 medium	4.39	31
34	*Eucalyptus viminalis ssp. viminalis*	1		R	1 small	7.01	32
35	*Eucalyptus viminalis ssp. viminalis*	1		R	1 large	4.05	30
36	*Eucalyptus viminalis ssp. viminalis*	1		R		4.53	28
37	*Eucalyptus viminalis ssp. viminalis*	1		R	2 small	4.84	27
38	*Eucalyptus obliqua*	1			1 small 1 medium	5.99	26
39	*Eucalyptus viminalis ssp. viminalis*	1		R	1 medium	7.79	25
40	*Eucalyptus viminalis ssp. viminalis*	1		R		6.24	24
41	*Eucalyptus viminalis ssp. viminalis*	1		R		6.14	6
42	*Eucalyptus viminalis ssp. viminalis*	1		R		4.15	7
43	*Eucalyptus obliqua*	1				3.66	9
44	*Eucalyptus viminalis ssp. viminalis*	1		R		1.42	
45	*Eucalyptus viminalis ssp. viminalis*	1		R		2.43	11
46	*Eucalyptus obliqua*	1				2.50	12
47	*Eucalyptus viminalis ssp. viminalis*	1		R		4.27	13
48	*Eucalyptus obliqua*	1				2.51	10
49	*Eucalyptus obliqua*	1				2.51	

Tree no.	Scientific Name	No. of trees	EPBC Act	NPW Act	Hollows	Unit Biodiversity Score (UBS)	Arborist Report Tree no.
50	*Eucalyptus obliqua*	1			4 small	6.66	14
51	*Acacia melanoxylon*	1				4.07	
52	*Eucalyptus obliqua*	1			1 small	4.51	15
53	*Eucalyptus viminalis ssp. viminalis*	1		R	1 small 1 medium	9.60	16
54	*Eucalyptus viminalis ssp. viminalis*	1		R		4.67	20
55	*Eucalyptus obliqua*	1				2.59	19
56	*Eucalyptus obliqua*	1				4.47	18
57	*Eucalyptus obliqua*	1				2.35	21
58	*Eucalyptus viminalis ssp. viminalis*	1		R		7.63	17
59	*Eucalyptus obliqua*	1				3.61	23
60	*Eucalyptus viminalis ssp. viminalis*	1		R	1 small 1 medium	7.00	22
61	*Eucalyptus viminalis ssp. viminalis*	1		R	1 small	4.29	29
62	*Eucalyptus viminalis ssp. viminalis*	1		R		1.19	
63	*Eucalyptus obliqua*	1				0.52	
64	*Eucalyptus obliqua*	1				1.36	
65	*Eucalyptus viminalis ssp. viminalis*	1		R		3.64	
66	*Eucalyptus viminalis ssp. viminalis*	1		R	2 small	3.64	
67	*Eucalyptus obliqua*	1				3.48	
68	*Eucalyptus viminalis ssp. viminalis*	1		R		2.42	
69	*Eucalyptus obliqua*	1				1.33	
70	*Eucalyptus obliqua*	1		R		3.34	

Conservation status: Aus: Australia (EPBC Act). SA: South Australia (NPW Act).
Conservation Codes: CE: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare. ssp.: the conservation status applies at the sub-species level.

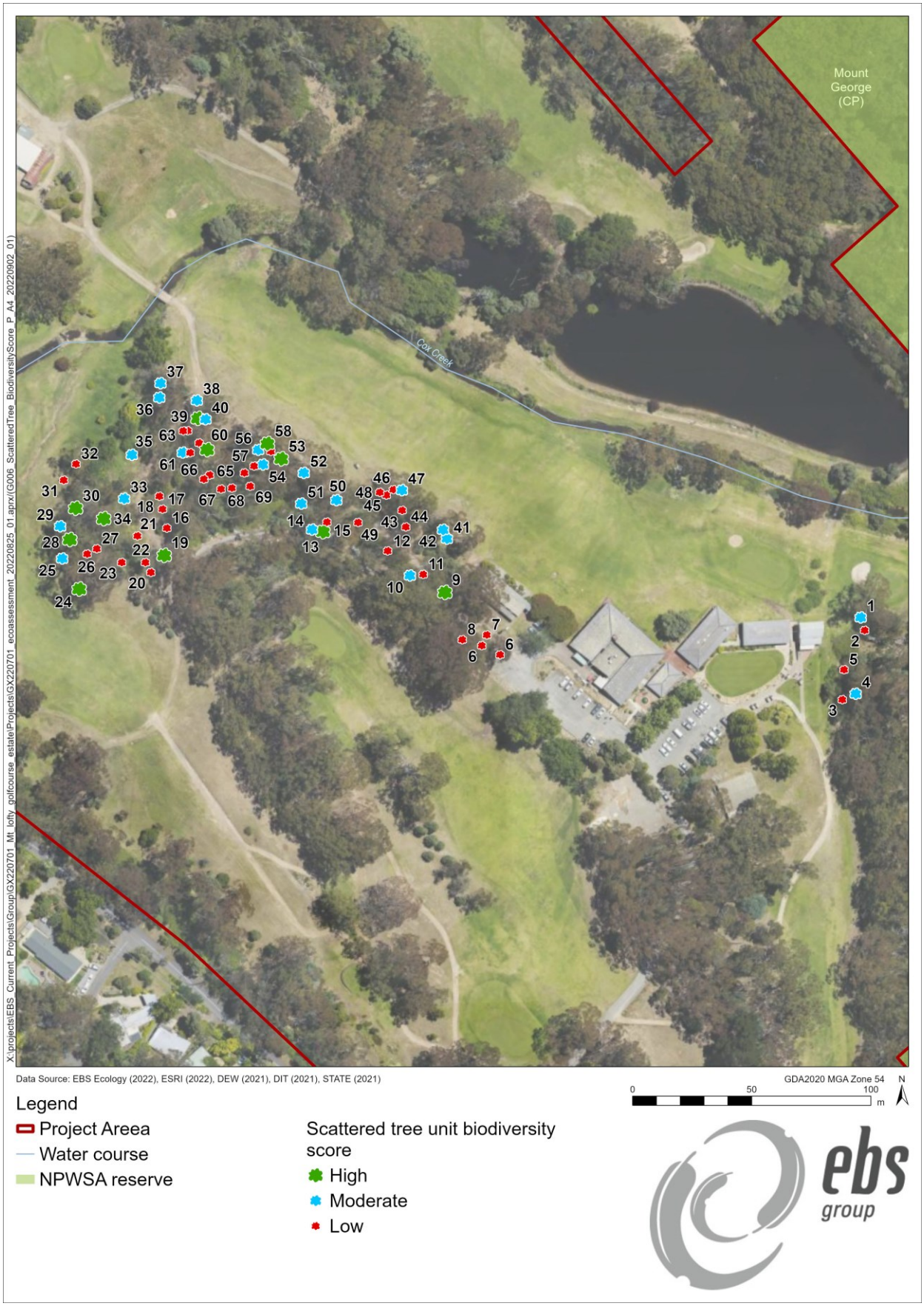


Figure 5. Scattered trees recorded within the Project Area, categorised according to Unit Biodiversity Score (UBS)

6.1.3 Threatened flora

No flora species listed under the EPBC Act were recorded within the Project Area.

One flora species listed under the NPW Act as Rare was recorded in the Project Area:

- *Eucalyptus viminalis ssp. viminalis* (Manna Gum).

This species was present in large numbers throughout the Project area in remnant patches of native vegetation and as scattered trees.

6.1.4 Non-native amenity planting

Fairways and greens directly associated with the golf course were broadly classified as exotic vegetation that is planted and therefore amenity vegetation. These patches were only broadly assessed, are not provided in detail, and are not mapped. Planting of amenity vegetation was also recorded surrounding the main clubhouse (see Figure 4). If these areas are impacted, approval may still be required under the *PDI Act*.

6.1.5 Introduced flora

A total of 31 introduced flora species were recorded during the field survey. Seven of these species are Declared under the LSA Act and five are WoNS (Table 10). Introduced flora species which were dominant in the Project Area include *Fumaria capreolata* (White-flower Fumitory), *Iris sp.* (Iris) and *Rubus fruticosus aggregate* (Blackberry).

Table 10. Introduced flora species recorded during the field survey.

Scientific Name	Common Name	Declared	WoNS
Acacia mearnsii	Black Wattle		
Agapanthus praecox ssp. orientalis			
Anagallis sp.			
Asphodelus fistulosus	Onion Weed		
Briza maxima	Large Quaking-grass		
Cenchrus clandestinus	Kikuyu		
Cytisus scoparius	English Broom	Yes	Yes
Dactylis glomerata	Cocksfoot		
Freesia cultivar	Freesia		
Fumaria capreolata	White-flower Fumitory		
Galium aparine	Cleavers		
Genista monspessulana	Montpellier Broom	Yes	Yes
Hakea sp.	Hakea/Needlewood		
Hedera helix	English Ivy		
Hypochaeris glabra	Smooth Cat's Ear		
Iris sp.	Iris		
Narcissus sp.			
Oxalis pes-caprae	Soursob		
Oxalis purpurea	One-o'clock		
Pinus radiata	Radiata Pine		
Pittosporum undulatum	Sweet Pittosporum	Yes	

Scientific Name	Common Name	Declared	WoNS
Plantago lanceolata var.	Ribwort		
Quercus ilex			
Rhamnus alaternus	Blowfly Bush	Yes	
Romulea sp.	Onion-grass		
Rubus fruticosus aggregate	Blackberry	Yes	Yes
Senecio pterophorus	African Daisy		
Sonchus sp.	Sow-thistle		
Sporobolus africanus	Rat-tail Grass		
Ulex europaeus	Gorse	Yes	Yes
Vinca major	Blue Periwinkle		
Acacia mearnsii	Black Wattle		
Agapanthus praecox ssp. orientalis			
Anagallis sp.			
Asphodelus fistulosus	Onion Weed		
Briza maxima	Large Quaking-grass		
Cenchrus clandestinus	Kikuyu		
Cytisus scoparius	English Broom	Yes	Yes
Dactylis glomerata	Cocksfoot		
Freesia cultivar	Freesia		

6.2 Fauna

A more detailed fauna assessment is reported elsewhere in the *Native Vegetation Clearance Mount Lofty Golf Estate Data Report* EBS Ecology (2022b *in preparation*), but the below sections broadly describe the fauna and fauna habitat present on site.

6.2.1 Threatened fauna

A total of 22 fauna species were recorded within the Project Area, 20 were birds and two were mammals.

No fauna species listed under the EPBC Act were recorded within the Project Area.

One fauna species listed under the NPW Act as Rare was recorded in the Project Area:

- Common Brushtail Possum (*Trichosurus vulpecula*).

The scat of this species was observed in VA A1 directly adjacent to the main building of the Golf Club.

One of the species recorded within the Project Area is introduced fauna:

- Common Blackbird (*Turdus merula*)

Fauna species observed during the survey are provided in Appendix 3.

6.2.2 Fauna habitat

Remnant pockets of native vegetation coexist with large remnant scattered trees and planted vegetation within the Project Area.

Two VAs were recorded within the Project Area and intact native vegetation is present in some areas of the Project Area and in the adjacent MGCP. Many of these pockets of remnant native vegetation were degraded by the presence of introduced flora species and fragmented from more intact remnant native vegetation. Nonetheless, they may be used by fauna as wildlife corridors to more intact and better quality native vegetation, particularly to the surrounding areas in MGCP.

A total of 71 scattered trees were recorded within the Project Area. All the scattered trees within the Project Area provide good resting, foraging and roosting habitat for fauna and all trees score a maximum threatened fauna suitability score of 1.8 (trees are assigned a value between 0 and 1.8 points based on habitat score according to the STAM). A total of 25 scattered trees contain hollows (see Table 9), which provide suitable breeding habitat for fauna species.

6.2.3 Phytophthora

No areas of Phytophthora dieback were observed during the Field survey. Nonetheless, given there are Phytophthora records within 600 m of the Project Area, the potential spread of Phytophthora needs to be addressed throughout the Project.

6.3 Likelihood of occurrence assessment

6.3.1 Threatened flora

The PMST (DCCEEW 2022b) identified 11 flora species listed as threatened under the EPBC Act as known or likely to occur within 5 km of the Project Area (Table 11). None of the species were assessed as potentially occurring within the Project Area based on recent records and suitable habitat. A BDBSA search identified 73 additional State listed flora species, that have records within 5 km of the Project Area, with <1 km reliability (Table 11), which did not appear on the PMST (DEW 2022b). A total of seven of the species were assessed as known / highly likely or likely to occur within the Project Area based on survey effort, recent records and suitable habitat:

- *Acacia gunnii* (Ploughshare Wattle) – State Rare;
- *Deyeuxia densa* (Heath Bent-grass) – State Rare;
- *Deyeuxia minor* (Small Bent-grass) – State Vulnerable;
- *Dianella longifolia var. grandis* (Pale Flax-lily) – State Rare;
- *Eucalyptus viminalis ssp. Viminalis* (Manna Gum) – State Rare and observed within the Project Area;
- *Gastrodia sesamoides* (Potato Orchid) – State Rare;
- *Rytidosperma tenuius* (Short-awn Wallaby-grass) – State Rare.

An additional 30 flora species listed under the NPW Act were assessed as possible to occur within the Project Area based on survey effort, recent records and suitable habitat.

BDBSA flora record located within 5 km of the Project Area is provided in Appendix 4.

A detailed likelihood assessment of threatened flora species information including distribution and preferred habitat information for the Project Area is provided in Appendix 5.

Table 11. Threatened flora identified by the PMST and/or BDBSA search in the Project Area (DCCEEW 2022b; DEW 2022b).

Scientific name	Common name	Conservation status		Source	PMST likelihood/ Year of last record	Likelihood of occurrence within the Project Area
		Aus	SA			
Acacia gunnii	Ploughshare Wattle		R	2	2022	**Likely**
Acacia iteaphylla	Flinders Ranges Wattle		R	2	2022	**Possible**
Acacia stricta	Hop Wattle		R	2	2005	**Unlikely**
Amphibromus archeri	Pointed Swamp Wallaby-grass		R	2	2018	**Possible**
Austrostipa tenuifolia			R	2	2018	**Possible**
Baloskion tetraphyllum ssp. Tetraphyllum	Tassel Cord-rush		V	2	2012	**Unlikely**
Bauera rubioides	Wiry Bauera		R	2	2011	**Unlikely**
Blechnum nudum	Fishbone Water-fern		R	2	2022	**Unlikely**
Blechnum wattsii	Hard Water-fern		R	2	2010	**Unlikely**
Boronia nana var. hyssopifolia	Dwarf Boronia		R	2	2022	**Possible**
Boronia parviflora	Swamp Boronia		R	2	2018	**Unlikely**
Caladenia argocalla	White-beauty Spider-orchid	EN	E	1	Likely	**Unlikely**
Caladenia behrii	Pink-lipped Spider-orchid	EN	E	1	Likely	**Unlikely**
Caladenia gladiolata	Bayonet Spider-orchid	EN	E	1	Likely	**Unlikely**
Caladenia leptochila ssp. Leptochila	Narrow-lip Spider-orchid		R	2	2020	**Possible**
Caladenia necrophylla	Late Spider-orchid		R	2	2008	**Unlikely**
Caladenia pusilla	Pigmy Caladenia		R	2	2013	**Possible**
Caladenia rigida	Stiff White Spider-orchid	EN	E	1	Likely	**Unlikely**
Caleana major	Large Duck-orchid		V	2	2000	**Unlikely**
Callistemon brachyandrus	Prickly Bottlebrush		R	2	2019	**Unlikely**
Cardamine paucijuga	Annual Bitter-cress		R	2	2011	**Possible**
Coronidium gunnianum	Pale Everlasting		E	2	2006	**Possible**
Deyeuxia densa	Heath Bent-grass		R	2	2021	**Likely**
Deyeuxia minor	Small Bent-grass		V	2	2020	**Likely**

Scientific name	Common name	Conservation status		Source	PMST likelihood/ Year of last record	Likelihood of occurrence within the Project Area
		Aus	SA			
Dianella longifolia var. grandis	Pale Flax-lily		R	2	2019	**Likely**
Dicksonia antarctica	Soft Tree-fern		E	2	2020	**Unlikely**
Dipodium pardalinum	Leopard Hyacinth-orchid		V	2	2012	**Possible**
Diuris behrii	Behr's Cowslip Orchid		V	2	2015	**Possible**
Diuris chryseopsis	Cowslip Orchid		E	2	1998	**Unlikely**
Drosera binata	Forked Sundew		R	2	2017	**Possible**
Drosera stricticaulis	Erect Sundew		V	2	1998	**Unlikely**
Eryngium ovinum	Blue Devil		V	2	2013	**Possible**
Eryngium vesiculosum	Prostrate Blue Devil		R	2	2010	**Possible**
Eucalyptus dalrympleana ssp. Dalrympleana	Candlebark Gum		R	2	2022	**Possible**
Eucalyptus fasciculosa	Pink Gum		R	2	2021	**Possible**
Eucalyptus viminalis ssp. Viminalis	Manna Gum		R	2	2022	**Known/Highly Likely**
Euphrasia collina subsp. Osbornii	Osborn's Eyebright	EN	E	1	Known	**Unlikely**
Gastrodia sesamoides	Potato Orchid		R	2	2021	**Likely**
Gleichenia microphylla	Coral Fern		R	2	2022	**Unlikely**
Glycine latrobeana	Clover Glycine	VU	V	1	Likely	**Unlikely**
Gonocarpus micranthus ssp. Micranthus	Creeping Raspwort		R	2	2018	**Possible**
Goodenia brunnea			R	2	2018	**Unlikely**
Grevillea aquifolium	Prickly Grevillea		R	2	1997	**Unlikely**
Hypolepis rugosula	Ruddy Ground-fern		R	2	2022	**Unlikely**
Juncus amabilis			V	2	2009	**Unlikely**
Lagenophora sublyrata	Slender Bottle-daisy		V	2	2019	**Possible**
Leionema hillebrandii	Mount Lofty Phebalium		R	2	2022	**Possible**
Logania saxatilis	Rock Logania		R	2	1996	**Unlikely**
Luzula flaccida	Pale Wood-rush		V	2	2020	**Possible**
Lycopodiella lateralis	Slender Clubmoss		R	2	2017	**Unlikely**

Scientific name	Common name	Conservation status		Source	PMST likelihood/ Year of last record	Likelihood of occurrence within the Project Area
		Aus	SA			
Lycopodium deuterodensum	Bushy Clubmoss		E	2	2009	**Unlikely**
Machaerina gunnii	Slender Twig-rush		R	2	2018	**Unlikely**
Melaleuca armillaris ssp. Akineta	Needle-leaf Honey-myrtle		R	2	2008	**Unlikely**
Mentha diemenica	Slender Mint		R	2	2011	**Possible**
Nymphoides crenata	Wavy Marshwort		R	2	1995	**Unlikely**
Poa umbricola	Shade Tussock-grass		R	2	2018	**Unlikely**
Prasophyllum pallidum	Pale Leek-orchid	VU	R	1	Likely	**Unlikely**
Prasophyllum pruinosum	Plum Leek-orchid	EN	E	1	Known	**Unlikely**
Pterostylis cucullata	Leafy Greenhood	VU	E	1	Likely	**Unlikely**
Pterostylis setifera	Bristly Greenhood		E	2	2018	**Unlikely**
Pultenaea graveolens	Scented Bush-pea		R	2	2022	**Possible**
Pultenaea kraehenbuehlii	Tothill Bush-pea		R	2	2018	**Unlikely**
Ranunculus glabrifolius	Shining Buttercup		V	2	2000	**Possible**
Rytidosperma laeve	Smooth Wallaby-grass		*R*	2	2017	**Possible**
Rytidosperma tenuius	Short-awn Wallaby-grass		R	2	2022	**Likely**
Schizaea fistulosa	Narrow Comb-fern		V	2	2008	**Unlikely**
Schoenus latelaminatus	Medusa Bog-rush		V	2	2012	**Unlikely**
Schoenus lepidosperma ssp. lepidosperma	Slender Bog-rush		R	2	2018	**Unlikely**
Scutellaria humilis	Dwarf Skullcap		R	2	2021	**Unlikely**
Senecio pinnatifolius var. pinnatifolius			R	2	2015	**Possible**
Sphaerolobium minus	Leafless Globe-pea		R	2	2008	**Unlikely**
Sprengelia incarnata	Pink Swamp-heath		R	2	2017	**Unlikely**
Thelymitra aristata	Great Sun-orchid		E	2	2008	**Possible**
Thelymitra batesii			R	2	2021	**Possible**
Thelymitra circumsepta	Naked Sun-orchid		E	2	2018	**Unlikely**
Thelymitra grandiflora	Great Sun-orchid		R	2	2019	**Possible**
Thelymitra ixioides	Spotted Sun-orchid		E	2	2013	**Possible**

Scientific name	Common name	Conservation status		Source	PMST likelihood/ Year of last record	Likelihood of occurrence within the Project Area
		Aus	SA			
Thelymitra latifolia	Blue Star Sun-orchid		V	2	2004	**Possible**
Thelymitra matthewsii	Spiral Sun-orchid	VU	E	1	Likely	**Unlikely**
Thysanotus tenellus	Grassy Fringe-lily		R	2	2015	**Unlikely**
Todea barbara	King Fern		E	2	2018	**Unlikely**
Veronica derwentiana subsp. Homalodonta	Mount Lofty Speedwell	CE	E	1	Likely	**Unlikely**
Xanthosia tasmanica	Southern Xanthosia		R	2	2015	**Possible**
Xyris operculata	Tall Yellow-eye		R	2	2008	**Unlikely**

Conservation status: Aus: Australia (EPBC Act). SA: South Australia (NPW Act).
Conservation Codes: CE: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare. Ssp.: the conservation status applies at the sub-species level.
PMST result: Likelihood of species or species habitat to occur within 5 km of the Project Area.
Source of Information:
1: PMST (DCCEEW 2022b) – 5 km buffer applied to Project Area;
2: BDBSA (DEW 2022b) – 5 km buffer applied to Project Area.

6.3.2 Threatened fauna

The PMST (DCCEEW 2022b) identified 10 nationally listed threatened fauna species as known or likely to occur within 5 km of the Project Area, consisting of eight birds and two mammals. A BDBSA search identified two additional nationally listed threatened fauna species that have records within 5 km of the Project Area (Table 12), which did not appear on the PMST (DEW 2022b). In total, four threatened fauna species were assessed as likely to occur within the Project Area based on survey effort, suitable habitat and recent records:

- Bassian Thrush (*Zoothera lunulata halmaturina*) – nationally Endangered and State Rare;
- Chestnut-rumped Heathwren (*Hylacola pyrrhopygia parkeri*) – nationally Endangered and State Endangered;
- Grey-headed Flying-fox (*Pteropus poliocephalus*) – nationally Vulnerable and State Rare; and
- Southern Brown Bandicoot (*Isoodon obesulus obesulus*) – nationally Endangered and State Vulnerable.

One additional nationally listed threatened species was assessed as possible to occur within the Project Area based on survey effort, recent records and suitable habitat:

- White-throated Needletail (*Hirundapus caudacutus*) – nationally Vulnerable and migratory and State Vulnerable.

A BDBSA search identified 30 additional State listed fauna species that have records within 5 km of the Project Area (Table 12), which did not appear on the PMST (DEW 2022b). A total of 11 of these species were assessed as likely to occur within the Project Area based on survey effort, recent records and suitable habitat:

- Beautiful Firetail (*Stagonopleura bella*) – State Rare;
- Common Brushtail Possum (*Trichosurus vulpecula*) – State Rare and observed within the Project Area;
- Elegant Parrot (*Neophema elegans elegans*) – State Rare;
- Jacky Winter (*Microeca fascinans fascinans*) – State Rare;
- Little Eagle (*Hieraaetus morphnoides*) – State Vulnerable;
- Peregrine Falcon (*Falco peregrinus macropus*) – State Rare;
- Scarlet Robin (*Petroica boodang boodang*) – State Rare;
- Square-tailed Kite (*Lophoictinia isura*) – State Endangered;
- White-winged Chough (*Corcorax melanorhamphos*) – State Rare;
- Yellow-footed Antechinus (*Antechinus flavipes*) – State Vulnerable; and
- Yellow-tailed Black Cockatoo (*Zanda funerea whiteae*) – State Vulnerable.

An additional 16 species were assessed as possible to occur within the Project Area based on recent records and suitable habitat.

BDBSA fauna record located within 5 km of the Project Area is provided in Appendix 6.

Birdlife Australia fauna record located within 5 km of the Project Area is provided in Appendix 7.

A detailed likelihood assessment of threatened fauna species information including distribution and preferred habitat information for the Project Area is provided in Appendix 8.

Table 12. Threatened fauna species identified by the PMST and/or BDBSA search in the Project Area (DCCEEW 2022b; DEW 2022b).

Scientific name	Common name	Conservation status		Source	PMST likelihood/ Year of last record	Likelihood of occurrence within the Project Area
		Aus	SA			
AMPHIBIA						
Pseudophryne bibronii	Brown Toadlet		R	2	2009	**Possible**
AVES						
Anhinga novaehollandiae novaehollandiae	Australasian Darter		R	2, 3	2018 / 2018	**Possible**
Biziura lobata menziesi	Musk Duck		R	2, 3	2015 / 2002	**Possible**
Botaurus poiciloptilus	Australasian Bittern	EN	E	1	Known	**Unlikely**

Scientific name	Common name	Conservation status		Source	PMST likelihood/ Year of last record	Likelihood of occurrence within the Project Area
		Aus	SA			
Cereopsis novaehollandiae novaehollandiae	Cape Barren Goose		R	3	2009	**Possible**
Charadrius mongolus	Lesser Sand Plover	EN	E	3	2002	**Unlikely**
Climacteris affinis	White-browed Treecreeper		R	2	2021	**Possible**
Corcorax melanorhamphos	White-winged Chough		R	2, 3	2020 / 2020	**Likely**
Falco hypoleucos	Grey Falcon	VU	R	1	Likely	**Unlikely**
Falco peregrinus macropus	Peregrine Falcon		R	2, 3	2015 / 2020	**Likely**
Falcunculus frontatus frontatus	Eastern Shriketit		R	2, 3	2006 / 2006	**Possible**
Grantiella picta	Painted Honeyeater	VU	R	1	Likely	**Unlikely**
Hieraaetus morphnoides	Little Eagle		V	2	2019	**Likely**
Hirundapus caudacutus	White-throated Needletail	VU, Mi (T)	V	1	Likely	**Possible**
Hylacola cauta cauta	Shy Heathwren		R	3	1998	**Possible**
Hylacola pyrrhopygia parkeri	Chestnut-rumped Heathwren	EN	E	1, 2, 3	Known / 2020 / 2020	**Likely**
Leipoa ocellata	Malleefowl	VU	V	1	Likely	**Unlikely**
Lewinia pectoralis pectoralis	Lewin's Rail		V	2	2010	**Possible**
Lophoictinia isura	Square-tailed Kite		E	2	2019	**Likely**
Melithreptus gularis gularis	Black-chinned Honeyeater		V	2, 3	2002 / 2000	**Possible**
Microeca fascinans fascinans	Jacky Winter		R	2, 3	2018 / 2001	**Likely**
Neophema elegans elegans	Elegant Parrot		R	2	2021	**Likely**
Oxyura australis	Blue-billed Duck		R	3	2018	**Possible**
Pachycephala inornata	Gilbert's Whistler		R	3	2007	**Possible**
Petroica boodang boodang	Scarlet Robin		R	2, 3	2022 / 2020	**Likely**
Petroica phoenicea	Flame Robin		V	3	2003	**Possible**
Plectorhyncha lanceolata	Striped Honeyeater		R	2	2020	**Possible**
Polytelis anthopeplus monarchoides	Regent Parrot	VU	V	2	1996	**Unlikely**
Rostratula australis	Australian Painted Snipe	EN	E	1	Likely	**Unlikely**
Stagonopleura bella	Beautiful Firetail		R	3	2020	**Likely**
Turnix varius varius	Painted Buttonquail		R	2	2012	**Possible**
Zanda funerea whiteae	Yellow-tailed Black Cockatoo		V	2, 3	2022 / 2020	**Likely**
Zapornia tabuensis	Spotless Crake		R	2	2010	**Possible**

Scientific name	Common name	Conservation status		Source	PMST likelihood/ Year of last record	Likelihood of occurrence within the Project Area
		Aus	SA			
Zoothera lunulata halmaturina	Bassian Thrush	EN	R	1, 2, 3	Known / 2022 / 2018	**Likely**
MAMMALIA						
Antechinus agilis	Agile Antechinus		E	2	2021	**Possible**
Antechinus flavipes	Yellow-footed Antechinus		V	2	2021	**Likely**
Isoodon obesulus obesulus	Southern Brown Bandicoot	EN	V	1, 2	Known / 2021	**Likely**
Pteropus poliocephalus	Grey-headed Flying-fox	VU	R	1, 2	Likely / 2020	**Likely**
Trichosurus vulpecula	Common Brushtail Possum		R	2	2022	**Highly Likely / Known**
REPTILIA						
Egernia cunninghami	Cunningham's Skink		E	2	2022	**Unlikely**
Varanus rosenbergi	Heath Goanna		V	2	2014	**Unlikely**
Varanus varius	Lace Monitor		R	2	2013	**Unlikely**

Conservation status: Aus: Australia (EPBC Act). SA: South Australia (NPW Act).
Conservation Codes: CE: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare. ssp.: the conservation status applies at the sub-species level. Mi: listed as migratory under the EPBC Act. Mi (W): listed as a Migratory Wetland species under the EPBC Act. Mi (Ma): listed as a Migratory Marine species under the EPBC Act.
PMST result: Likelihood of species or species habitat to occur within 5 km of the Project Area.
Source of Information:
1: PMST (DCCEEW 2022b) – 5 km buffer applied to Project Area;
2: BDBSA (DEW 2022b) – 5 km buffer applied to Project Area;
3: Birdlife Australia (DEW 2022b) – 5 km buffer applied to Project Area.

6.3.3 Migratory fauna

The PMST (DCCEEW 2022b) identified five nationally listed migratory species as known or likely to occur within 5 km of the Project Area (Table 13). In total, two nationally listed migratory species were assessed as possible to occur within the Project Area based on survey effort, recent records and suitable habitat:

- Fork-tailed Swift (*Apus pacificus*) – nationally migratory;
- Satin Flycatcher (*Myiagra cyanoleuca*) – nationally migratory and State Endangered.

BDBSA fauna records indicate that the Satin Flycatcher (*Myiagra* cyanoleuca) has been previously recorded within 5 km of the Project Area. BDBSA fauna record located within 5 km of the Project Area is provided in Appendix 6.

A detailed likelihood assessment of nationally listed migratory species information including distribution and preferred habitat information for the Project Area is provided in Appendix 9.

Table 13. Migratory species identified by the PMST and/or BDBSA search in the Project Area (DCCEEW 2022b; DEW 2022b).

Scientific name	Common name	Conservation status		Source	PMST likelihood/ Year of last record	Likelihood of occurrence within the Project Area
		Aus	SA			
Apus pacificus	Fork-tailed Swift	Mi (Ma)		1	Likely	**Possible**
Gallinago hardwickii	Latham's Snipe	Mi (W)	R	1	Likely	**Unlikely**
Myiagra cyanoleuca	Satin Flycatcher	Mi (T)	E	1, 2	Likely / 2005	**Possible**
Rhipidura rufifrons	Rufous Fantail	Mi (T)		1	Known	**Unlikely**
Tringa nebularia	Common Greenshank	Mi (T)		1	Likely	**Unlikely**

Conservation status: Aus: Australia (EPBC Act). SA: South Australia (NPW Act).
Conservation Codes: CE: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare. ssp.: the conservation status applies at the sub-species level. Mi: listed as migratory under the EPBC Act. Mi (W): listed as a Migratory Wetland species under the EPBC Act. Mi (Ma): listed as a Migratory Marine species under the EPBC Act.
PMST result: Likelihood of species or species habitat to occur within 5 km of the Project Area.
Source of Information:
1: PMST (DCCEEW 2022b) – 5 km buffer applied to Project Area;
2: BDBSA (DEW 2022b) – 5 km buffer applied to Project Area;

7 DISCUSSION

7.1 Vegetation

Vegetation assessed within the Project Area consisted of the following:

- Pockets of remnant native vegetation categorised into one of two VAs:
    - Vegetation Association A1 – *Eucalyptus viminalis ssp. viminalis* and *Eucalyptus obliqua* woodland over *Acacia melanoxylon*.
    - Vegetation Association A1b – *Eucalyptus viminalis ssp. viminalis* and *Eucalyptus obliqua* woodland over *Acacia melanoxylon* and degraded understorey.
- Scattered trees of species *Acacia melanoxylon* (Blackwood), *Eucalyptus obliqua* (Messmate Stringybark) or *Eucalyptus viminalis ssp. viminalis* (Manna Gum).
- Exotic vegetation associated with the golf course including any fairways, greens and planted vegetation directly surrounding most buildings but as defined in Figure 4.

7.2 Threatened flora

No flora species listed as threatened under the EPBC Act were recorded during the field survey.

One flora species listed under the NPW Act as Rare was recorded in the Project Area:

- *Eucalyptus viminalis ssp. viminalis* (Manna Gum)

This species was present in large numbers throughout the Project area in remnant patches of native vegetation and as scattered trees.

The PMST identified 11 flora species listed as threatened under the EPBC Act as known or likely to occur within 5 km of the Project Area (Table 5). None of the species were assessed as potentially occurring within the Project Area based on recent records and suitable habitat.

A BDBSA search identified 73 additional State listed flora species, that have records within 5 km of the Project Area, with <1 km reliability (Table 5), which did not appear on the PMST. A total of seven of the species were assessed as known / highly likely or likely to occur within the Project Area based on recent records and suitable habitat.

7.3 Nationally threatened fauna

None of the fauna species recorded within the Project Area were listed as threatened under the EPBC Act

One fauna species listed under the NPW Act as Rare was recorded in the Project Area:

- Common Brushtail Possum (*Trichosurus vulpecula*).

Nationally threatened fauna species that were assessed as likely to occur within the Project Area are discussed below.

7.3.1 Bassian Thrush (Zoothera lunulata halmaturina)

The Bassian Thrush is nationally listed as Endangered, and State listed as Rare. Based upon the desktop assessment this species was considered likely to be present in the Project Area.

Bassian Thrush occur on Kangaroo Island and the adjacent mainland, in the southern Flinders Ranges and in the Mount Lofty Ranges (DAWE 2022). They mostly inhabit damp eucalypt forest or woodland usually with a thick canopy and understorey of trees, shrubs, and leaf litter (Garnett and Baker 2021; Higgins et al. 2006).

The species is described as shy and secretive which makes it difficult to detect and inconspicuous in leaf litter. Within South Australia (except for Kangaroo Island) the main threats to Bassian Thrush include habitat clearing, inappropriate fire regimes and habitat modification due to reduced natural water flow (DAWE 2022).

Damp eucalypt forest or woodland with a thick canopy and understorey of trees, shrubs and leaf litter was present in some areas of the Project Area. However, given these areas were often degraded by the presence of introduced flora species and fragmented from more intact remnant native vegetation, they may only be used by the Bassian Thrush as corridors to better quality vegetation. As such, the Project is likely to have a negligible impact on this species due to the large amount of suitable habitat located outside of the Project Area, in MGCP for instance.

7.3.2 Chestnut-rumped Heathwren (Hylacola pyrrhopygia parkeri)

The Chestnut-rumped Heathwren is nationally, and State listed as Endangered and based upon the desktop assessment was considered likely to be present in the Project Area.

Chestnut-rumped Heathwren are confined to the Fleurieu Peninsula and southern Mount Lofty Ranges where they are generally confined to several conservation and national parks in South Australia (Wilson and Bignall 2009). They mostly inhabit heath and dense undergrowth within Eucalypt forests and woodlands. The vegetation type does vary in which they occur, but a dense understorey is a key characteristic of their habitat (Pickett 2007).

Like Bassian Thrush, the Chestnut-rumped Heathwren are described as shy, secretive and tend to remain amongst cover (Wilson and Bignall 2009). Most of the suitable habitat for this species has been cleared within the Mounty Lofty Ranges and remaining habitat is fragmented and degraded in areas (Garnett and Baker 2021).

Heath and dense undergrowth within Eucalypt forests and woodlands was present in some areas of the Project Area. However, as previously mentioned, these areas were often degraded by the presence of introduced flora species and fragmented from more intact remnant native vegetation. Similar to the Bassian Thrush, the Chestnut-rumped Heathwren may only use these areas as corridors to better quality vegetation. As such, the Project is likely to have a negligible impact on this species due to the large amount of suitable habitat located outside of the Project Area, in MGCP for instance.

7.3.3 Grey-headed Flying-fox (Pteropus poliocephalus)

The Grey-headed Flying-fox is nationally listed as Vulnerable, and State listed as Rare. Based upon the desktop assessment this species was considered likely to be present in the Project Area.

In South Australia, there are two Grey-headed Flying-fox colonies (as of 2019), which are located at Botanic Park in Adelaide (25,000 individuals in 2021) and Millicent in the State's southeast (DEW 2022c). Grey-headed Flying-fox forage over a wide area, with individuals capable of travelling 40 km between their roost and feeding sites in a night (Eby and Law 2008). They consume fleshy fruits and blossoms, and within the Botanic Park area have been observed feeding on the fruits of the Morton Bay Fig (*Ficus macrophylla*) and the blossoms of eucalypts (*Eucalyptus spp.*) (Van Weenen 2015). All scattered tree species that were recorded within the Project Area can be classified as potential food sources for the Grey-headed Flying-fox (Eby and Law 2008).

Whilst the Project Area contained significantly large remnant *Eucalyptus* species including *E. viminalis ssp. viminalis* and *E. obliqua*, there were no roosts recorded within the Project Area. The location of the Project is 15 km southeast of the Botanic Park roost (Eby and Law 2008) and foraging is less likely to occur with increasing distance away from the known roosts (McDonald-Madden *et al.* 2005). As such, the Project is likely to have a negligible impact on this species due to the large amount of suitable foraging habitat outside of the Project Area and the distance away from the nearest roost.

7.3.4 Southern Brown Bandicoot (Isoodon obesulus obesulus)

The Southern Brown Bandicoot is nationally listed as Endangered, and State listed as Vulnerable. Based upon the desktop assessment this species was considered likely to be present in the Project Area.

Southern Brown Bandicoot occur in the Mount Lofty Ranges, Fleurieu Peninsula, and on Kangaroo Island in South Australia. This species prefers dense ground cover, tall grass and low shrubbery. They live near swamps and rivers as well as in thick scrub in drier areas (TSSC 2016b). Additionally, this species is known to inhabit dense, thick weed species such as Blackberry (*Rubus sp.*) and Gorse (*Ulex europaeus*) (Bruce et al. 2022). Predation by invasive species such as foxes and cats as well as habitat loss and degradation remain the primary threats to this species persistence (TSSC 2016b).

Dense ground cover was present in some areas of the Project Area, but many areas were degraded by the presence of introduced flora species and fragmented from more intact remnant native vegetation. The Southern Brown Bandicoot has previously been recorded in areas of dense, thick weed species (Bruce et al. 2022) and areas that are generally degraded. Areas of thick weeds species such as *Rubus spp.* were present in some areas of the Project Area but did not form large dense thickets suitable for the Southern Brown Bandicoot. As the Project Area is adjacent MGCP and other areas of more intact vegetation, fragmented vegetation present in the Project Area is not likely to be preferred by this species and as such the Project is likely to have a negligible impact on their persistence in the general area.

7.4 State threatened fauna

A total of 11 State listed fauna species that have records within 5 km of the Project Area were assessed as highly likely / known or likely to occur within the Project Area as highlighted in Section 6.3.1.

A number of these species are woodlands bird species, such as the State listed Rare Jacky Winter (*Microeca fascinans fascinans*) and State listed Rare Scarlet Robin (*Petroica boodang boodang*). Many of these species prefer to nest in dense, intact foliage (Birdlife Australia 2022) which exists in fragmented pockets throughout the Project Area. The Project is likely to have a negligible impact on these species due to the large amount of suitable habitat located outside of the Project Area in MGCP and adjacent reserves for example.

The Common Brushtail Possum is State listed as Rare and based upon the desktop assessment was considered highly likely / known to be present in the Project Area. The scat of this species was observed in vegetation association A1 directly adjacent to the main building of the Golf Club. This species is an arboreal animal with a diet consisting mainly of leaves, flowers, and fruit. This species prefers to nest in the hollows of Eucalypt or Sheoak trees. However, they also prefer dark, dense vegetation and confined spaces. This species is extremely territorial, and relocation of this species may cause severe stress and even death (Strahan & van Dyck 2008). It is likely that the Common Brushtail Possum uses vegetation within the Project Area, due to the presence of scat and large number of suitable habitat trees for nesting and foraging purposes. Furthermore, there were a total of 25 scattered trees that were recorded within the Project Area that contained hollows suitable for use by the Common Brushtail Possum.

There are four State listed fauna species that were assessed as likely to occur within the Project Area, primarily as flyover only:

- Little Eagle (*Hieraaetus morphnoides*) – State Vulnerable;
- Peregrine Falcon (*Falco peregrinus macropus*) – State Rare;
- Square-tailed Kite (*Lophoictinia isura*) – State Endangered;
- Yellow-tailed Black Cockatoo (*Zanda funerea whiteae*) – State Vulnerable.

These species are likely to fly over the Project Area and may utilise large remnant scattered trees for perching or roosting.

7.5 Potential impacts to flora and fauna

The Project Area is largely comprised of pockets of remnant native vegetation, scattered trees and planted (amenity) vegetation associated with the golf course. MGCP is directly adjacent to the Project Area and supports a large assemblage of both nationally and State listed flora and fauna (DEH 2006). Few patches of naturally occurring native or remnant vegetation remain in the landscape, and those that do are generally impacted at some level by weed invasion and lacking an intact understorey. Regardless, vegetation that remains in the Project Area is of high habitat value as it provides a corridor for movement to better quality vegetation. Additionally, the remaining remnant scattered trees contain a significant number of hollows, likely to be utilised by less conspicuous or nocturnal species and utilised for nesting, either by birds or other fauna.

7.6 Legislative compliance

7.6.1 Assessment under the NV Act

Clearing of native vegetation is believed to be covered by the following regulation:

Regulation 12(27) —Major projects

This pathway will need to be verified by the NVC.

8 RECOMMENDATIONS AND CONSIDERATIONS

The following broad recommendations and considerations should be taken into account for the proposed Project:

- Retain high value vegetation where possible, particularly those areas assessed as having high fauna habitat value (in particular trees/vegetation with a high biodiversity score and trees with hollows) and consider Project design that avoids this constraint.
- Utilise existing disturbed areas including areas defined as exotic vegetation for Project infrastructure where possible. See Appendix 10 for a map and photographs of suggested areas and routes that EBS recommends in order to avoid impact to native vegetation.
- Ensure infrastructure is a sufficiently located away from large remnant trees (i.e., a minimum of 10 metres away but preferably outside of the Tree Protection Zone (TPZ) of trees).
- Ensure that the design and construction methods minimise impacts to all vegetation, as much as possible, including impacts to the TPZ of large remnant trees.
- Vegetation clearing required for the Project outside the parameters of maintenance activities would require approval under the *Native Vegetation Act 1991* (NV Act). This would require a Clearance Data Report and a Clearing Application lodged with the Native Vegetation Council. The completion of additional field work may also be required.
- If native flora species that provide suitable resting, foraging and breeding areas for some fauna species are impacted by works then a suitably qualified fauna spotter (or the likes) needs to assess the presence of fauna prior to any flora removal.
- Collate additional information to determine if a referral under the EPBC Act (i.e., undertake an EPBC Self-assessment of MNES, conduct targeted threatened species surveys), is required.
- Develop a Construction Environmental Management Plan (CEMP) for the construction phase of the project that includes detailed strategies for the management of native vegetation and fauna. This should include the management of Declared and Environmental weeds across the Project Area to prevent their spread into surrounding areas as well as Phytophthora risk.

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10 APPENDICES

Appendix 1. Species listed as threatened under the NPW Act recorded previously in the Search Area

Scientific name	Common name	Conservation status		Year of last record	Data Source
		EPBC Act	NPW Act		
Flora					
Acacia gunnii	Ploughshare Wattle	-	R	2022	1
Acacia iteaphylla	Flinders Ranges Wattle	-	R	2022	1
Acacia stricta	Hop Wattle	-	R	2005	1
Amphibromus archeri	Pointed Swamp Wallaby-grass	-	R	2018	1
Anogramma leptophylla	Annual Fern	-	R	1990	1
Austrostipa densiflora	Fox-tail Spear-grass	-	R	1992	1
Austrostipa multispiculis	Many-flowered Spear-grass	-	R	1998	1
Austrostipa tenuifolia		-	R	2018	1
Baloskion tetraphyllum ssp. tetraphyllum	Tassel Cord-rush	-	V	2012	1
Bauera rubioides	Wiry Bauera	-	R	2011	1
Blechnum nudum	Fishbone Water-fern	-	R	2022	1
Blechnum wattsii	Hard Water-fern	-	R	2010	1
Boronia nana var. hyssopifolia	Dwarf Boronia	-	R	2022	1
Boronia parviflora	Swamp Boronia	-	R	2018	1
Caladenia leptochila ssp.	Narrow-lip Spider-orchid	-	R	2020	1
Caladenia necrophylla	Late Spider-orchid	-	R	2008	1
Caladenia pusilla	Pigmy Caladenia	-	R	2013	1
Caladenia reticulata	Veined Spider-orchid	-	R	1950	1
Caladenia vulgaris	Plain Caladenia	-	R	1991	1
Caleana major	Large Duck-orchid	-	V	2000	1
Callistemon brachyandrus	Prickly Bottlebrush	-	R	2019	1
Cardamine paucijuga	Annual Bitter-cress	-	R	2011	1
Carex gunniana	Mountain Sedge	-	R	1987	1
Cladium procerum	Leafy Twig-rush	-	R	1904	1
Coronidium gunnianum	Pale Everlasting	-	E	2006	1
Daviesia benthamii ssp. humilis	Mallee Bitter-pea	-	R	1982	1
Deyeuxia densa	Heath Bent-grass	-	R	2021	1
Deyeuxia minor	Small Bent-grass	-	V	2020	1
Dianella longifolia var. grandis	Pale Flax-lily	-	R	2019	1
Dicksonia antarctica	Soft Tree-fern	-	E	2020	1
Dipodium pardalinum	Leopard Hyacinth-orchid	-	V	2012	1
Dipodium punctatum		-	E	1972	1
Diuris behrii	Behr's Cowslip Orchid	-	V	2015	1
Diuris brevifolia	Short-leaf Donkey-orchid	-	E	1917	1
Diuris chryseopsis	Cowslip Orchid	-	E	1998	1
Drosera binata	Forked Sundew	-	R	2017	1
Drosera stricticaulis	Erect Sundew	-	V	1998	1

Scientific name	Common name	Conservation status		Year of last record	Data Source
		EPBC Act	NPW Act		
Eryngium ovinum	Blue Devil	-	V	2013	1
Eryngium vesiculosum	Prostrate Blue Devil	-	R	2010	1
Eucalyptus dalrympleana ssp. dalrympleana	Candlebark Gum	-	R	2022	1
Eucalyptus fasciculosa	Pink Gum	-	R	2021	1
Eucalyptus viminalis ssp. viminalis	Manna Gum	-	R	2022	1
Gastrodia sesamoides	Potato Orchid	-	R	2021	1
Gleichenia microphylla	Coral Fern	-	R	2022	1
Gonocarpus micranthus ssp. micranthus	Creeping Raspwort	-	R	2018	1
Goodenia brunnea		-	R	2018	1
Grevillea aquifolium	Prickly Grevillea	-	R	1997	1
Haloragis myriocarpa		-	R	1991	1
Histiopteris incisa	Bat's-wing Fern	-	E	1980	1
Hypericum japonicum	Matted St John's Wort	-	R	1990	1
Hypolepis rugosula	Ruddy Ground-fern	-	R	2022	1
Juncus amabilis		-	V	2009	1
Juncus australis	Austral Rush	-	R	1990	1
Juncus prismatocarpus	Branching Rush	-	E	1982	1
Lagenophora sublyrata	Slender Bottle-daisy	-	V	2019	1
Leionema hillebrandii	Mount Lofty Phebalium	-	R	2022	1
Logania saxatilis	Rock Logania	-	R	1996	1
Luzula flaccida	Pale Wood-rush	-	V	2020	1
Luzula ovata	Clustered Wood-rush	-	R	1996	1
Lycopodiella lateralis	Slender Clubmoss	-	R	2017	1
Lycopodium deuterodensum	Bushy Clubmoss	-	E	2009	1
Machaerina gunnii	Slender Twig-rush	-	R	2018	1
Melaleuca armillaris ssp. akineta	Needle-leaf Honey-myrtle	-	R	2008	1
Mentha diemenica	Slender Mint	-	R	2011	1
Microtis atrata	Yellow Onion-orchid	-	R	1917	1
Montia fontana ssp. chondrosperma	Waterblinks	-	V	1997	1
Myriophyllum amphibium	Broad Milfoil	-	R	1990	1
Myriophyllum papillosum	Robust Milfoil	-	R	1981	1
Nymphoides crenata	Wavy Marshwort	-	R	1995	1
Oreomyrrhis eriopoda	Australian Carraway	-	E	1990	1
Philotheca angustifolia ssp. angustifolia	Narrow-leaf Wax-flower	-	R	1917	1
Poa umbricola	Shade Tussock-grass	-	R	2018	1
Potamogeton ochreatus	Blunt Pondweed	-	R	1990	1
Prasophyllum australe	Austral Leek-orchid	-	R	1908	1
Prasophyllum constrictum	Tawny Leek-orchid	-	R	1980	1
Pterostylis curta	Blunt Greenhood	-	R	1942	1
Pterostylis setifera	Bristly Greenhood	-	E	2018	1
Pultenaea graveolens	Scented Bush-pea	-	R	2022	1
Pultenaea kraehenbuehlii	Tothill Bush-pea	-	R	2018	1

Scientific name	Common name	Conservation status		Year of last record	Data Source
		EPBC Act	NPW Act		
Ranunculus glabrifolius	Shining Buttercup	-	V	2000	1
Rytidosperma laeve	Smooth Wallaby-grass	-	R	2017	1
Rytidosperma tenuius	Short-awn Wallaby-grass	-	R	2022	1
Schizaea fistulosa	Narrow Comb-fern	-	V	2008	1
Schoenus latelaminatus	Medusa Bog-rush	-	V	2012	1
Schoenus lepidosperma ssp. lepidosperma	Slender Bog-rush	-	R	2018	1
Scutellaria humilis	Dwarf Skullcap	-	R	2021	1
Senecio pinnatifolius var. pinnatifolius		-	R	2015	1
Sphaerolobium minus	Leafless Globe-pea	-	R	2008	1
Sprengelia incarnata	Pink Swamp-heath	-	R	2017	1
Swainsona behriana	Behr's Swainson-pea	-	V	1925	1
Thelymitra aristata	Great Sun-orchid	-	E	2008	1
Thelymitra batesii		-	R	2021	1
Thelymitra circumsepta	Naked Sun-orchid	-	E	2018	1
Thelymitra grandiflora	Great Sun-orchid	-	R	2019	1
Thelymitra holmesii	Blue Star Sun-orchid	-	V	1990	1
Thelymitra inflata	Plum Sun-orchid	-	V	2001	1
Thelymitra ixioides	Spotted Sun-orchid	-	E	2013	1
Thelymitra latifolia	Blue Star Sun-orchid	-	V	2004	1
Thelymitra mucida	Plum Sun-orchid	-	R	1998	1
Thysanotus tenellus	Grassy Fringe-lily	-	R	2015	1
Todea barbara	King Fern	-	E	2018	1
Utricularia lateriflora	Small Bladderwort	-	V	1970	1
Veronica gracilis	Slender Speedwell	-	V	1947	1
Viminaria juncea	Native Broom	-	R	1992	1
Viola betonicifolia ssp. betonicifolia	Showy Violet	-	E	1900	1
Xanthosia tasmanica	Southern Xanthosia	-	R	2015	1
Xyris operculata	Tall Yellow-eye	-	R	2008	1
Fauna					
Anhinga novaehollandiae novaehollandiae	Australasian Darter	-	R	2018	1, 2
Antechinus agilis	Agile Antechinus	-	E	2021	1
Antechinus flavipes	Yellow-footed Antechinus	-	V	2021	1
Biziura lobata menziesi	Musk Duck	-	R	2015	1, 2
Cereopsis novaehollandiae novaehollandiae	Cape Barren Goose	-	R	2009	2
Climacteris affinis	White-browed Treecreeper	-	R	2021	1
Corcorax melanorhamphos	White-winged Chough	-	R	2020	1, 2
Egernia cunninghami	Cunningham's Skink	-	E	2022	1
Falco peregrinus macropus	Peregrine Falcon	-	R	2020	1, 2
Falcunculus frontatus frontatus	Eastern Shriketit	-	R	2013	1, 2
Gerygone olivacea olivacea	White-throated Gerygone	-	R	2007	2
Hieraaetus morphnoides	Little Eagle	-	V	2019	1
Hylacola cauta	Shy Heathwren	-	R	1998	2

Scientific name	Common name	Conservation status		Year of last record	Data Source
		EPBC Act	NPW Act		
Lewinia pectoralis pectoralis	Lewin's Rail	-	V	2010	1
Lophoictinia isura	Square-tailed Kite	-	E	2019	1, 2
Melithreptus gularis	Black-chinned Honeyeater	-	V	2000	2
Microeca fascinans fascinans	Jacky Winter	-	R	2018	1
Myiagra cyanoleuca	Satin Flycatcher	-	E	2005	1
Myiagra inquieta	Restless Flycatcher	-	R	1978	1
Neophema elegans elegans	Elegant Parrot	-	R	2021	1
Oriolus sagittatus sagittatus	Olive-backed Oriole	-	R	1985	1
Ornithorhynchus anatinus	Platypus	-	E	1990	1
Oxyura australis	Blue-billed Duck	-	R	2018	2
Pachycephala inornata	Gilbert's Whistler	-	R	2007	2
Petroica boodang boodang	Scarlet Robin	-	R	2022	1, 2
Petroica phoenicea	Flame Robin	-	V	2007	1, 2
Phascogale tapoatafa	Brush-tailed Phascogale	-	E	1928	1
Plectorhyncha lanceolata	Striped Honeyeater	-	R	2020	1
Pseudophryne bibronii	Brown Toadlet	-	R	2009	1
Stagonopleura bella	Beautiful Firetail	-	R	2020	2
Stagonopleura guttata	Diamond Firetail	-	V	2007	2
Stictonetta naevosa	Freckled Duck	-	V	2014	2
Trichosurus vulpecula	Common Brushtail Possum	-	R	2022	1
Turnix varius varius	Painted Buttonquail	-	R	2012	1
Varanus rosenbergi	Heath Goanna	-	V	2014	1
Varanus varius	Lace Monitor	-	R	2013	1
Zanda funerea whiteae	Yellow-tailed Black Cockatoo	-	V	2022	1, 2
Zapornia tabuensis	Spotless Crake	-	R	2010	1

Conservation status (EPBC Act/NPW Act): CE = Critically Endangered. EN/E = Endangered. VU/V = Vulnerable. R = Rare. Mi = Migratory.
Presence Type: As identified in the PMST report.
Year of last record: Historical records within 5 km of the Project Area, obtained from the *BDBSA* and *Bird Life Australia – Bird Atlas Database*.
Data source: 1 = BDBSA, 2 = Bird Life Australia – Bird Atlas Database.

Appendix 2. Flora species recorded within the Project Area

Scientific Name	Common Name	EPBC Act	NPW Act
*Acacia mearnsii**	Black Wattle		
Acacia melanoxylon	Blackwood		
Acaena echinata	Sheep's Burr		
Acrotriche serrulata	Cushion Ground-berry		
*Agapanthus praecox ssp. orientalis**			
*Anagallis sp.**			
*Asphodelus fistulosus**	Onion Weed		
Astroloma humifusum	Cranberry Heath		
Banksia marginata	Silver Banksia		
*Briza maxima**	Large Quaking-grass		
Bursaria spinosa ssp. spinosa	Sweet Bursaria		
Cassytha sp.	Dodder-laurel		
*Cenchrus clandestinus**	Kikuyu		
*Cytisus scoparius**	English Broom		
*Dactylis glomerata**	Cocksfoot		
Dianella revoluta var. revoluta	Black-anther Flax-lily		
Dichondra repens	Kidney Weed		
Drosera whittakeri	Scented Sundew		
Epacris impressa	Common Heath		
Eucalyptus obliqua	Messmate Stringybark		
Eucalyptus viminalis ssp. viminalis	Manna Gum		R
Exocarpos cupressiformis	Native Cherry		
*Freesia cultivar**	Freesia		
*Fumaria capreolata**	White-flower Fumitory		
*Galium aparine**	Cleavers		
*Genista monspessulana**	Montpellier Broom		
Geranium sp.	Geranium		
Gonocarpus sp.	Raspwort		
*Hakea sp.**	Hakea/Needlewood		
*Hedera helix**	English Ivy		
*Hypochaeris glabra**	Smooth Cat's Ear		
*Iris sp.**	Iris		
Kennedia prostrata	Scarlet Runner		
Lepidosperma semiteres	Wire Rapier-sedge		
Leptospermum continentale	Prickly Tea-tree		
Lomandra juncea	Desert Mat-rush		
Lomandra micrantha ssp. micrantha	Small-flower Mat-rush		
Lomandra multiflora ssp.	Many-flower Mat-rush		
Luzula meridionalis	Common Wood-rush		
*Narcissus sp.**			
Oxalis perennans	Native Sorrel		
*Oxalis pes-caprae**	Soursob		
*Oxalis purpurea**	One-o'clock		

Scientific Name	Common Name	EPBC Act	NPW Act
*Pinus radiata**	Radiata Pine		
*Pittosporum undulatum**	Sweet Pittosporum		
*Plantago lanceolata var.**	Ribwort		
Platylobium obtusangulum	Holly Flat-pea		
Pteridium esculentum ssp. esculentum	Bracken Fern		
Pterostylis nutans	Nodding Greenhood		
Pultenaea daphnoides	Large-leaf Bush Pea		
*Quercus ilex**			
*Rhamnus alaternus**	Blowfly Bush		
*Romulea sp.**	Onion-grass		
*Rubus fruticosus aggregate**	Blackberry		
*Senecio pterophorus**	African Daisy		
*Sonchus sp.**	Sow-thistle		
*Sporobolus africanus**	Rat-tail Grass		
Themeda triandra	Kangaroo Grass		
*Ulex europaeus**	Gorse		
*Vinca major**	Blue Periwinkle		

Conservation status:
Aus: Australia (EPBC Act). SA: South Australia (NPW Act). Conservation Codes: CE: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare. ssp.: the conservation status applies at the sub-species level. Mi: listed as migratory under the EPBC Act. Mi (W): listed as a Migratory Wetland species under the EPBC Act. Mi (T): listed as a Migratory Terrestrial species under the EPBC Act. Mi (Ma): listed as a Migratory Marine species under the EPBC Act.
*** indicates an introduced species.**

Appendix 3. Fauna species recorded within the Project Area

Scientific Name	Common Name	EPBC Act	NPW Act	Number of individuals
AVES				
Acanthiza lineata	Striated Thornbill			3
Acanthorhynchus tenuirostris	Eastern Spinebill			2
Anthochaera carunculata	Red Wattlebird			1
Cacatua sanguinea sanguinea	Little Corella			1+
Caligavis chrysops	Yellow-faced Honeyeater			2
Chenonetta jubata	Maned Duck			1+
Colluricincla harmonica	Grey Shrikethrush			1
Cormobates leucophaea	White-throated Treecreeper			2
Corvus mellori	Little Raven			1
Dacelo novaeguineae	Laughing Kookaburra			3
Dicaeum hirundinaceum	Mistletoebird			1
Egretta novaehollandiae	White-faced Heron			1 (flying over)
Gymnorhina tibicen	Australian Magpie			1+
Malurus cyaneus	Superb Fairywren			1+
Phaps chalcoptera	Common Bronzewing			1
Platycercus elegans	Crimson Rosella			2
Rhipidura albiscapa	Grey Fantail			1
Smicrornis brevirostris	Weebill			1+
Trichoglossus haematodus	Rainbow Lorikeet			2
*Turdus merula**	Common Blackbird			1+
MAMMLIA				
MACROPODIDAE	Kangaroos			1
Trichosurus vulpecula	Common Brushtail Possum		R	scat observed only

Conservation status:
Aus: Australia (EPBC Act). SA: South Australia (NPW Act). Conservation Codes: CE: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare. ssp.: the conservation status applies at the sub-species level. Mi: listed as migratory under the EPBC Act. Mi (W): listed as a Migratory Wetland species under the EPBC Act. Mi (T): listed as a Migratory Terrestrial species under the EPBC Act. Mi (Ma): listed as a Migratory Marine species under the EPBC Act.
*** indicates an introduced species.**

Appendix 4. BDBSA flora record within 5 km of the Project Area

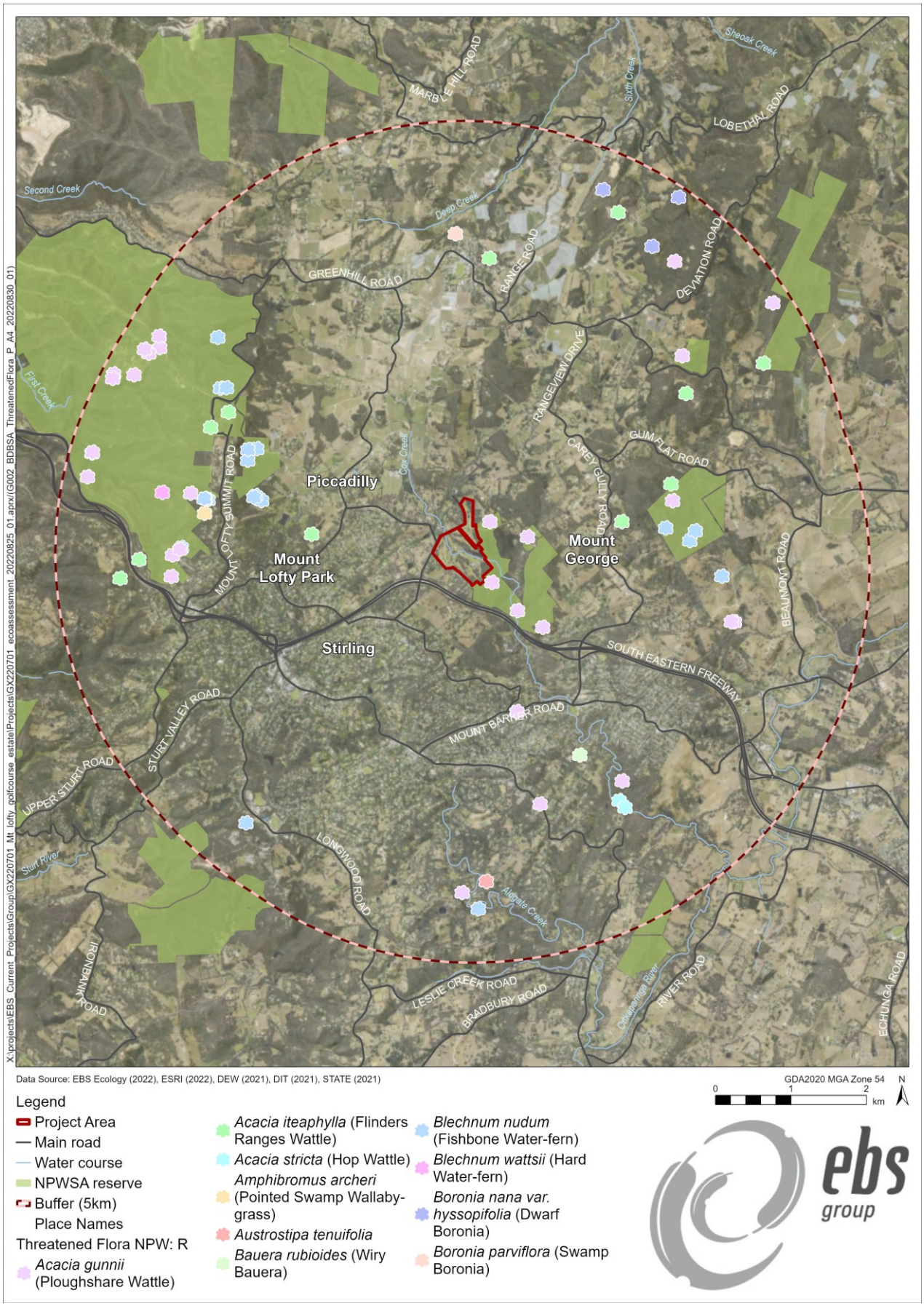

Figure 6. BDBSA flora record for State listed Rare species, located within 5 km of the Project Area (Map 1 of 5).

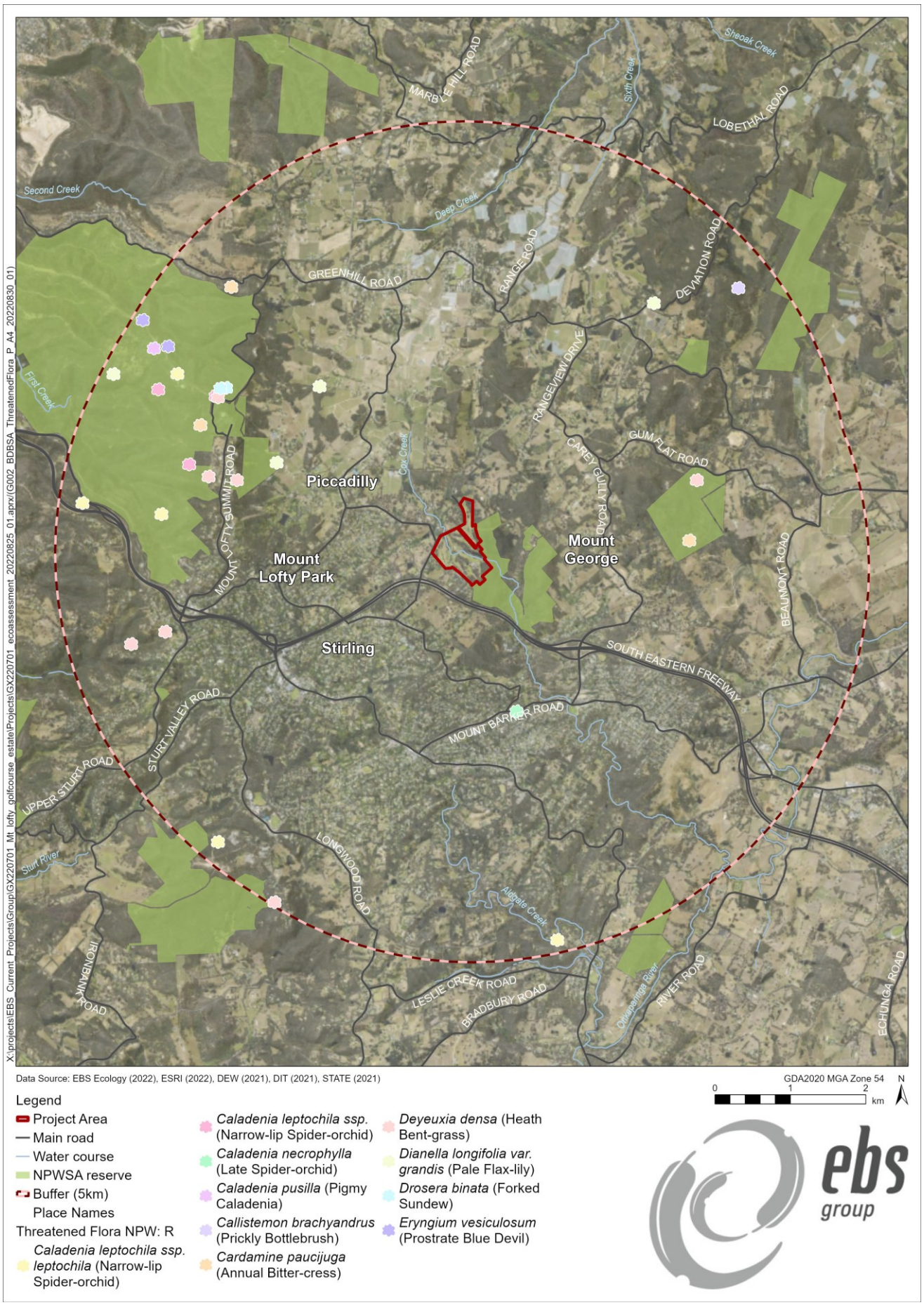

Figure 7. BDBSA flora record for State listed Rare species, located within 5 km of the Project Area (Map 2 of 5).

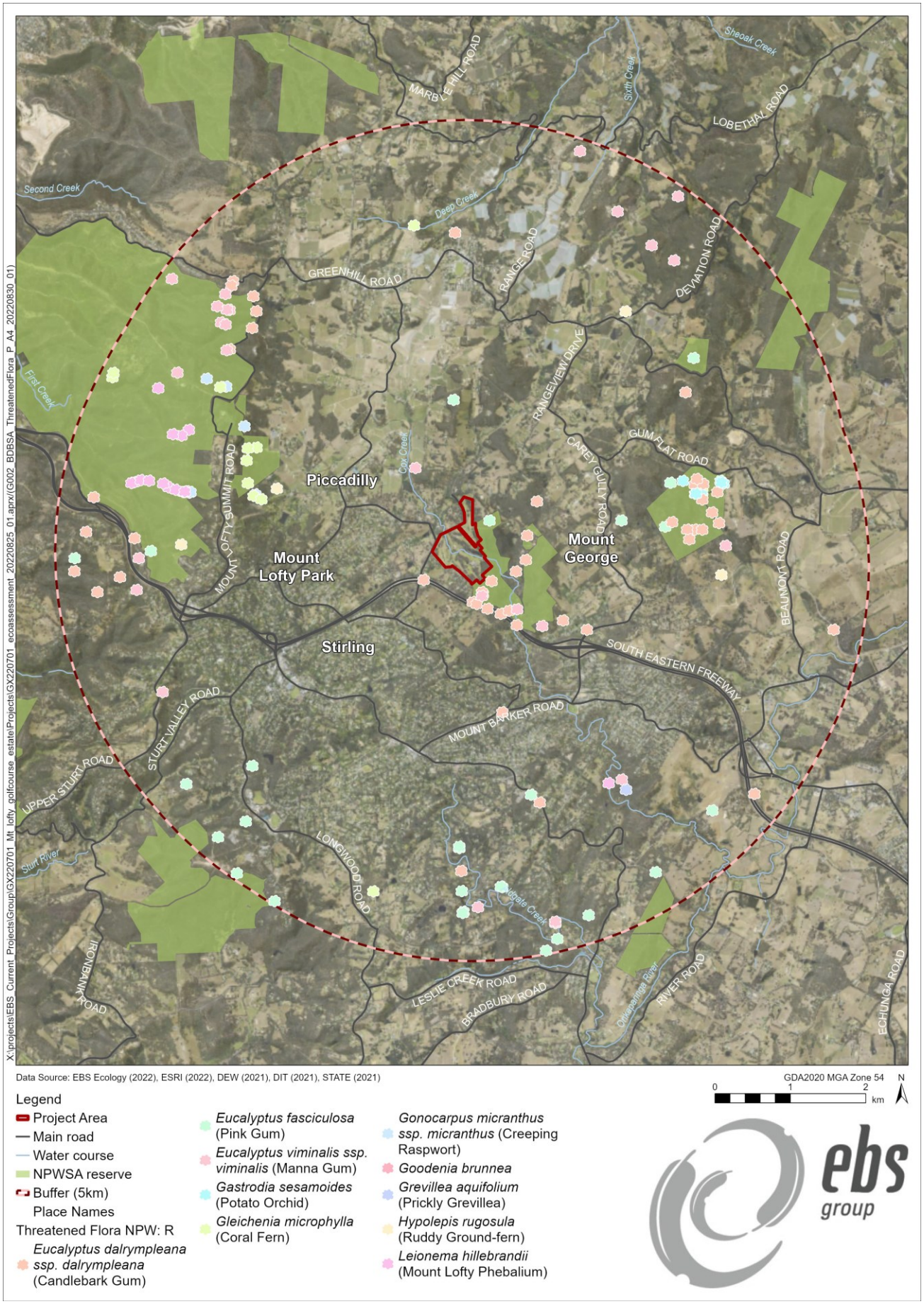

Figure 8. BDBSA flora record for State listed Rare species, located within 5 km of the Project Area (Map 3 of 5).

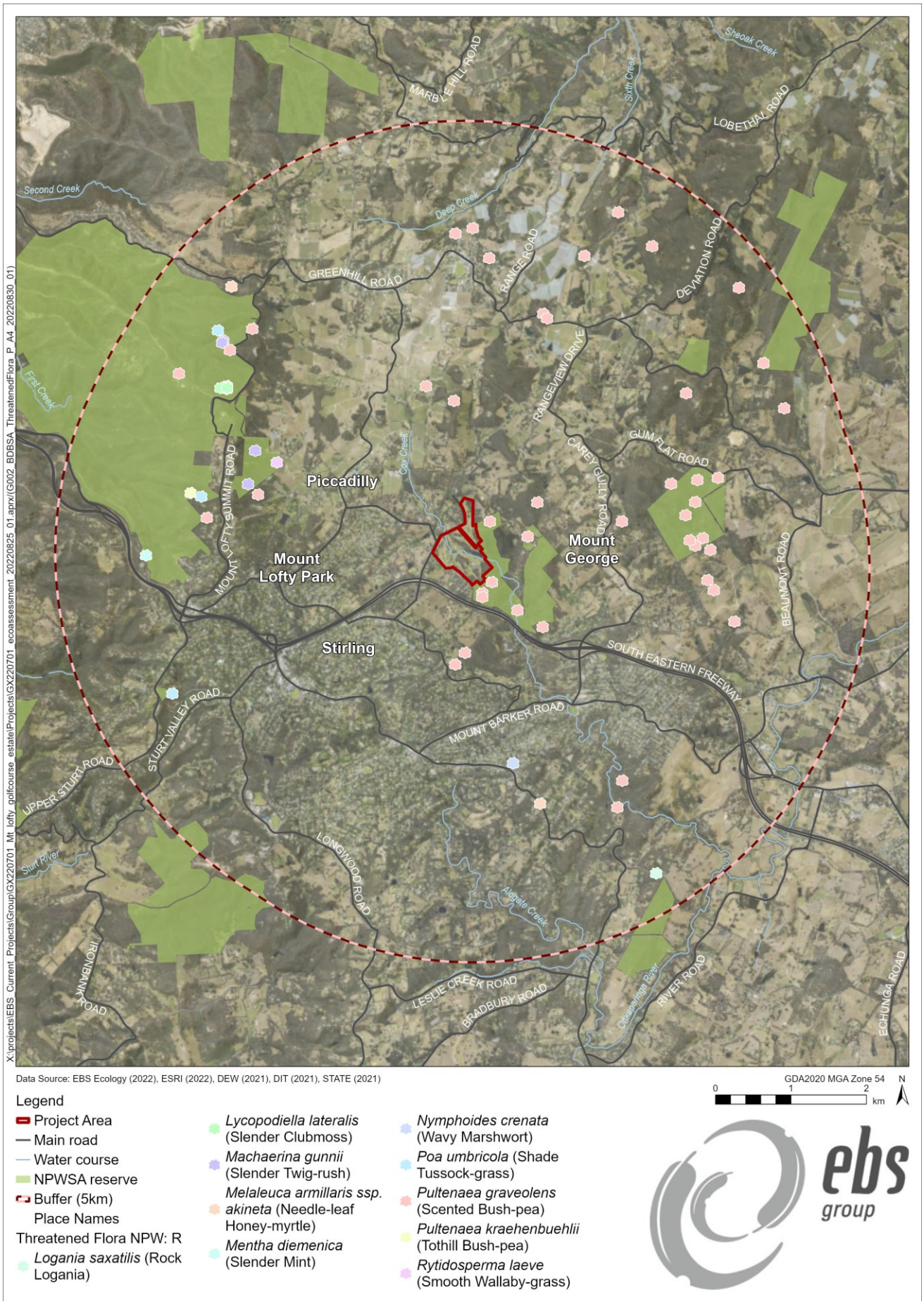

Figure 9. BDBSA flora record for State listed Rare species, located within 5 km of the Project Area (Map 4 of 5).

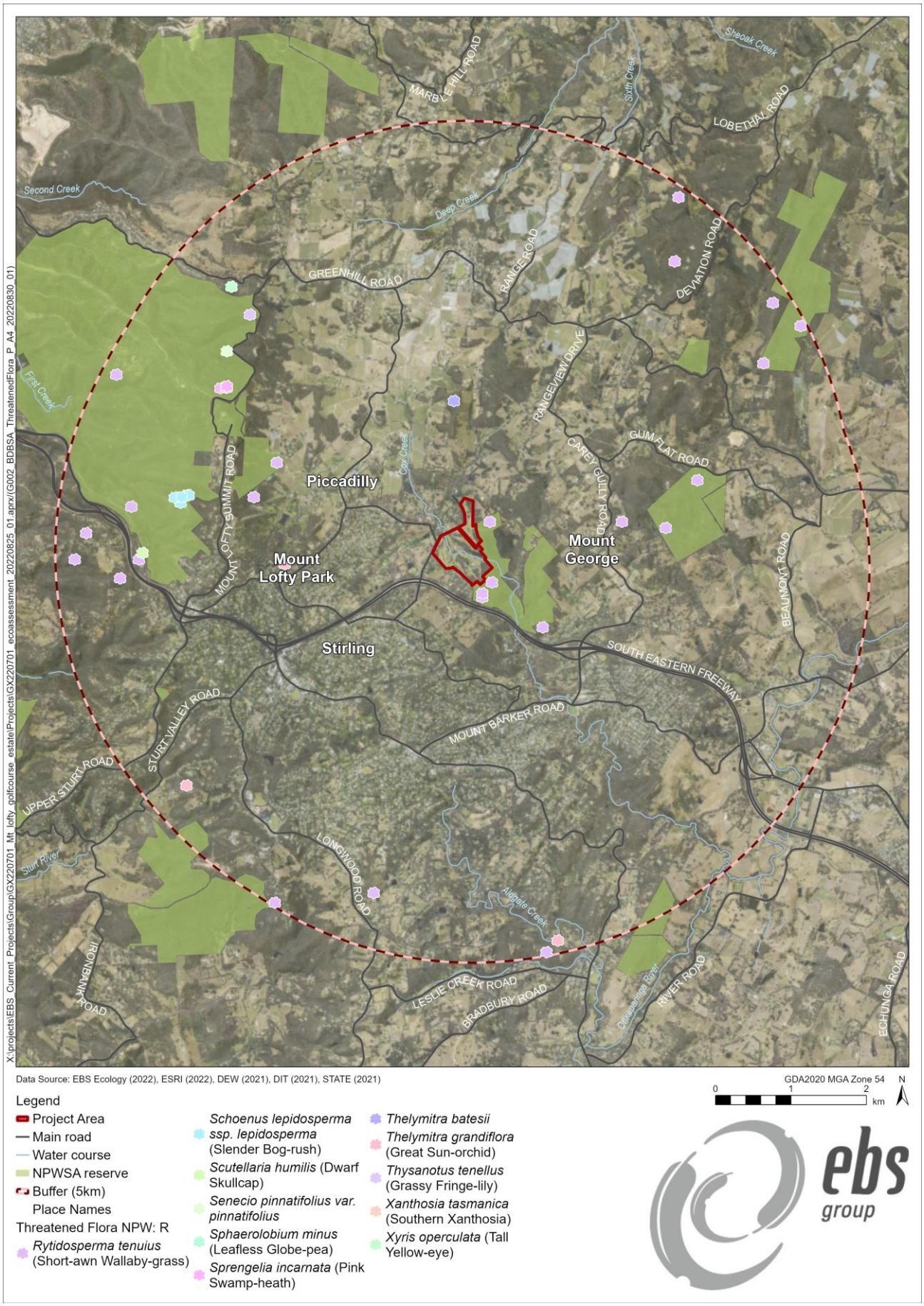

Figure 10. BDBSA flora record for State listed Rare species, located within 5 km of the Project Area (Map 5 of 5).

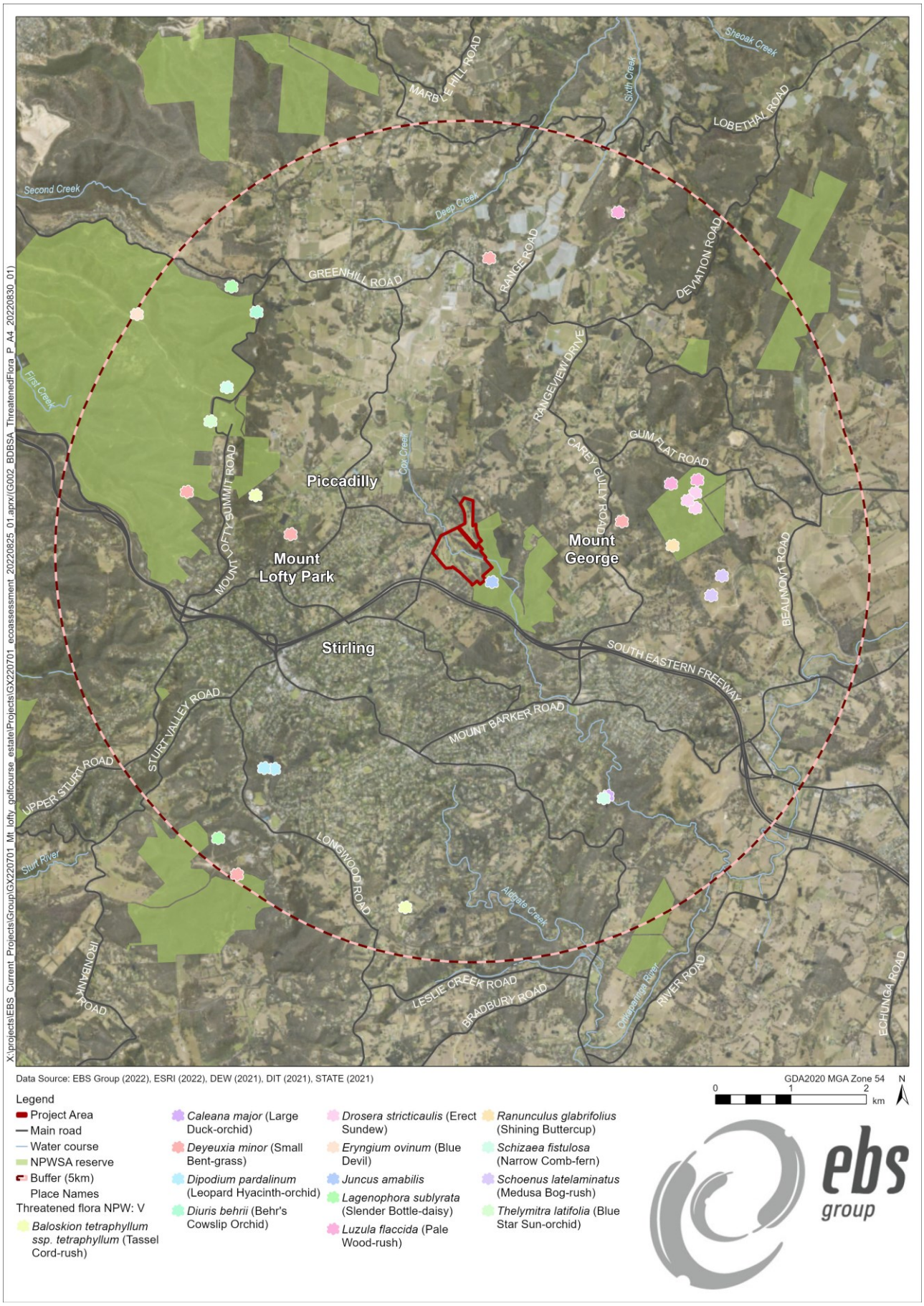

Figure 11. BDBSA flora record for State listed Vulnerable species, located within 5 km of the Project Area.

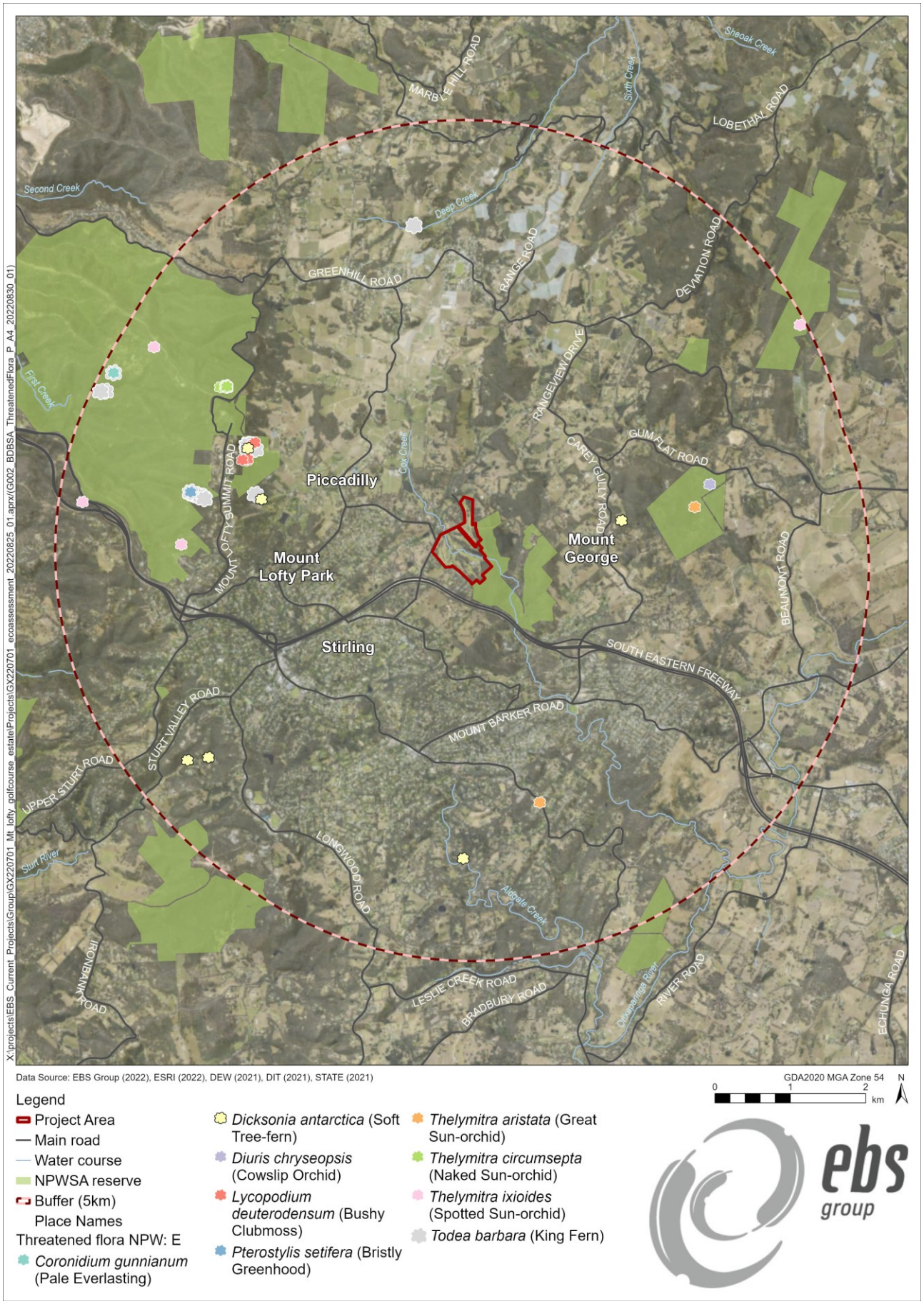

Figure 12. BDBSA flora record for State listed Endangered species, located within 5 km of the Project Area.

Appendix 5. Assessment of likelihood of national (EPBC Act) and State (NPW Act) listed threatened flora identified by the PMST (DCCEEW 2022b) and BDBSA (DEW 2022b) to occur in the Project Area

Scientific name	Common name	Conservation status		Source	PMST result / Latest sighting (year)	Distribution and habitat preferences	Likelihood of occurrence within the Project Area
		Aus	SA				
Acacia gunnii	Ploughshare Wattle		R	2	2022	Usually on rocky hillsides and amongst rocky outcrops in open forest, associated with *Eucalyptus obliqua* and *Eucalyptus baxteri* (SSCC 2018).	**Likely** – Some suitable habitat within the Project Area and *E obliqua* observed during the field survey.
Acacia iteaphylla	Flinders Ranges Wattle		R	2	2022	Naturally occurs in the Flinders Ranges, across to the Gawler Ranges, and on the Eyre Peninsula. Naturalised beyond its native range in some parts of south-eastern and southern SA (SSCC 2018).	**Possible** – Some suitable within the Project Area. Although widely planted, regeneration of this species is likely.
Acacia stricta	Hop Wattle		R	2	2005	Found primarily in small, localised areas in the southeast of SA between Millicent and Mount Gambier in association with *Eucalyptus baxteri* over a heathy understorey, often in damp areas (SSCC 2018).	**Unlikely** – Despite recent records, this species is generally confined to the southeast of SA.
Amphibromus archeri	Pointed Swamp Wallaby-grass		R	2	2018	Grows in damp areas such as lagoons, waterholes, and swamps, often on predominantly sandy soils. Found in KI, in the Mount Lofty Ranges and in the southeast of SA (SSCC 2018).	**Possible** – Recent records and some suitable habitat including water sources are present in the Project Area, though not within proposed areas of impact.
Austrostipa tenuifolia			R	2	2018	Found on the Eyre Peninsula, Mount Lofty Ranges, the Murray, and the upper South-east in South Australia, growing sandy soils in grassland or grassy woodland associated with *Callitris* or *Allocasuarina* (SSCC 2018).	**Possible** – Recent records, though associated vegetation community is not present in Project Area.
Baloskion tetraphyllum ssp. tetraphyllum	Tassel Cord-rush		V	2	2012	Very limited occurrences in the lower South-east of South Australia, between Millicent and Mount Gambier, usually in swamping areas (SSCC 2018).	**Unlikely** – Despite recent records, this species is generally confined to the southeast of SA.
Bauera rubioides	Wiry Bauera		R	2	2011	Found on Kangaroo Island and in the southern Mount Lofty Ranges in South Australia, growing in damp heathland and heathy forests (SSCC 2018).	**Unlikely** – Despite recent records, this species is generally confined to Kangaroo Island.

Scientific name	Common name	Conservation status		Source	PMST result / Latest sighting (year)	Distribution and habitat preferences	Likelihood of occurrence within the Project Area
		Aus	SA				
Blechnum nudum	Fishbone Water-fern		R	2	2022	Found on Kangaroo Island and southern Mount Lofty Ranges in South Australia, growing along stream banks in shaded gullies (SSCC 2018).	**Unlikely** – Some suitable habitat within the Project Area including water sources, though not within areas of proposed impact.
Blechnum wattsii	Hard Water-fern		R	2	2010	SA: SL KI SE. The habitat of this species is usually identical to those of *Blechnum minus* and *Blechnum nudum*. These three species always co-occur and are often intermingled within the same clump. Grows in wet forest types such as rainforest, wet eucalypt forest and riparian vegetation where it can form the dominant groundcover. Grows in great profusion in permanently damp areas and is most abundant on stream banks and near waterfalls. It can sometimes form extensive colonies on flatter sites or in gully bottoms.	**Unlikely** – Some suitable habitat within the Project Area including water sources, though not within areas of proposed impact.
Boronia nana var. hyssopifolia	Dwarf Boronia		R	2	2022	Occurs in the SE region of SA. Growing in sandy heath with *Eucalyptus obliqua, Leptospermum continentale, Stylidium graminifolium, Thelionema caespitosum* and dune crests with *Eucalyptus baxteri* association.	**Possible** – Some suitable habitat within the Project Area including *Eucalyptus spp.*
Boronia parviflora	Swamp Boronia		R	2	2018	Found on the western end of Kangaroo Island, southern Mount Lofty Ranges and the lower South-east in South Australia growing in wet heath and swampy areas (SSCC 2018).	**Unlikely** – Minimal suitable swampy habitat in Project Area. Isolated nearby record not positively identified.
Caladenia argocalla	White-beauty Spider-orchid	EN	E	1	Species or species habitat likely to occur within area	Endemic to the Mount Lofty Ranges Region of SA. Occurs in intact grassy woodlands often with *E. leucoxylon* (South Australian Blue Gum) and *Allocasuarina verticillata* (Drooping Sheoak). Usually grows on a gentle slope with a southerly aspect and in clay loam soils. Flowering from late September to October (Quarmby 2010).	**Unlikely** – No recent records despite some suitable habitat within the Project Area.
Caladenia behrii	Pink-lipped Spider-orchid	EN	E	1	Species or species habitat likely to occur within area	Occurs on the Fleurieu Peninsula of SA. Grows in fertile, shallow loams, amongst *Eucalyptus goniocalyx* / *E. fasciculosa* woodland and amongst *E. obliqua* / *E. microcarpa* / *E. leucoxylon* woodland. The understorey is usually open and shrubby. Also recorded amongst *E. fasciculosa* & *Xanthorrhoea semiplana*. Generally found in quartzite-derived soils on steep south facing slopes but also on ridge tops and occasionally near creek beds. Often grows alongside bushwalking paths, vehicle tracks or roads due to the openness of these locations (TSSC 2021).	**Unlikely** – No recent records despite some suitable habitat within the Project Area.

Scientific name	Common name	Conservation status		Source	PMST result / Latest sighting (year)	Distribution and habitat preferences	Likelihood of occurrence within the Project Area
		Aus	SA				
Caladenia gladiolata	Bayonet Spider-orchid	EN	E	1	Species or species habitat likely to occur within area	Occurs singly or in small groups in shrubby or grassy woodland and forest in well-drained soils dominated by *Eucalyptus leucoxylon, Eucalyptus cladocalyx* or *Eucalyptus fasciculosa*. Only known from a few populations (Quarmby 2010).	**Unlikely** – No recent records despite some suitable habitat within the Project Area.
Caladenia leptochila ssp. leptochila	Narrow-lip Spider-orchid		R	2	2020	Found growing in clay or gravelly soils in shrubby forest in the Mount Lofty Ranges (Jones, 2006).	**Possible** – Recent records and some suitable habitat is present in the Project Area.
Caladenia necrophylla	Late Spider-orchid		R	2	2008	Mainly occurs in the south-east region of SA but has also been found in EP, KI, MU regions. Grows in heathy open forest, coastal shrub, heathland, tea-tree scrub.	**Unlikely** – Despite recent records, this species is generally confined to the southeast of SA.
Caladenia pusilla	Pigmy Caladenia		R	2	2013	SA: FR EP SL KI SE. Within the Eyre Peninsula region grows in Koppio Hills and Blue gum woodland. On KI, grows on mounds near river, sandy clay in heath. Within the Southern Lofty region, grows in stringybark scrub.	**Possible** – Some suitable habitat within the Project Area including stringybark scrub.
Caladenia rigida	Stiff White Spider-orchid	EN	E	1	Species or species habitat likely to occur within area	Inhabits ridge tops and hillslopes in grey-brown loam often associated with coarse quartzite gravel or sandstone pebbles. Vegetation is usually an open-forest with a relatively open understorey of low shrubs and sedges (Quarmby 2010).	**Unlikely** – No recent records despite some suitable habitat within the Project Area.
Caleana major	Large Duck-orchid		V	2	2000	Usually found in Eucalyptus woodland, coastal or swampy shrubland and heathland. Forms small colonies in white sands in open *Eucalyptus baxteri* forest and often associated with *Banksia ornata* (ALA 2022).	**Unlikely** – No recent records despite some suitable habitat within the Project Area.
Callistemon brachyandrus	Prickly Bottlebrush		R	2	2019	Found along the Murray River in South Australia mainly between Swan Reach and Waikerie growing in the sandy soils of alluvial flats (SSCC 2018).	**Unlikely** – Despite recent records, this species is generally confined to the mid-Murray region of SA.
Cardamine paucijuga	Annual Bitter-cress		R	2	2011	Found on Kangaroo Island, southern Mount Lofty Ranges and the lower South-east in South Australia, growing in rich soils in moist to dry habitats (SSCC 2018).	**Possible** – Some suitable habitat within the Project Area.
Coronidium gunnianum	Pale Everlasting		E	2	2006	Found in the southern Mount Lofty Ranges, Burra Gorge and a single record from the lower South-east in South Australia, growing in grasslands and riverine woodlands on soils that are prone to inundation (SSCC 2018).	**Possible** – Some suitable habitat within the Project Area.

Scientific name	Common name	Conservation status		Source	PMST result / Latest sighting (year)	Distribution and habitat preferences	Likelihood of occurrence within the Project Area
		Aus	SA				
Deyeuxia densa	Heath Bent-grass		R	2	2021	Commonly in heaths, sedgelands and in stream banks in damp, open to lightly shaded sites.	**Likely** – Some suitable habitat within the Project Area and recent records.
Deyeuxia minor	Small Bent-grass		V	2	2020	Found on Kangaroo Island, southern Mount Lofty Ranges and the lower-South-east growing in damp areas under light eucalypt cover or margins of wet sclerophyll forest (SSCC 2018).	**Likely** – Some suitable habitat within the Project Area and recent records.
Dianella longifolia var. grandis	Pale Flax-lily		R	2	2019	Occurs under a variety of overstorey Eucalypt species but is a grassy woodland specialist, e.g., Blue Gum, Candlebark, Manna Gum, Stringybark and Grey Box.	**Likely** – Some suitable habitat within the Project Area and recent records.
Dicksonia antarctica	Soft Tree-fern		E	2	2020	SA: SL SE. Grows in numerous types of plant communities and is particularly abundant in wet forest communities. It occurs in forest types ranging from rainforest to sheltered gullies within dry sclerophyll forest and subalpine forest.	**Unlikely** – Some suitable habitat within the Project Area including water sources, though not within areas of proposed impact.
Dipodium pardalinum	Leopard Hyacinth-orchid		V	2	2012	Occurs from Naracoorte on the Victorian border to the Mount Lofty Ranges. In the Adelaide-Mount Lofty region the species is found in *Eucalyptus obliqua* woodland growing in association with *Acacia myrtifolia, Xanthorrhoea semiplana ssp. tateana* and *Pteridium esculentum* (Willson and Bignall 2009).	**Possible** – Recent records and some suitable habitat is present in the Project Area including *Eucalyptus obliqua,* though associated understorey species not present.
Diuris behrii	Behr's Cowslip Orchid		V	2	2015	Found in the southern Flinders Ranges and the Mount Lofty Ranges with a few records from Eyre Peninsula growing in native grassland, open woodland and grassy forest; grows on more fertile soils, especially amongst *Themeda sp*. (Kangaroo Grass) and *Triodia* on gentle slopes and flats (SSCC 2018).	**Possible** – Recent records and some suitable habitat is present in the Project Area.
Diuris chryseopsis	Cowslip Orchid		E	2	1998	Presumed extinct in the Mt Lofty Ranges (but may have been rediscovered in Kuitpo Native Forest Reserve) and found only between Naracoorte and Mount Gambier in South Australia, growing in damper grassy patches in woodland around waterholes, along creeks, on cooler slopes in rich, moist soils (SSCC 2018).	**Unlikely** – No recent records and this species is generally confined to the southeast of SA.
Drosera binata	Forked Sundew		R	2	2017	Found in the southern Mount Lofty Ranges, on the western end on Kangaroo Island and in the lower South-east in South Australia, growing in wet sand and sandy peat in swamps, on creek banks and seepage lines in rock-faces (SSCC 2018).	**Possible** – Recent records and some suitable habitat is present in the Project Area.

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		Aus	SA				
Drosera stricticaulis	Erect Sundew		V	2	1998	Found on southern Eyre Peninsula and on Dutchmans Stern in the Flinders Ranges in South Australia, growing on sandy clay-loam along watercourses and granite outcrops (SSCC 2018).	**Unlikely** – No recent records and this species is generally confined to the Eyre Peninsula in SA.
Eryngium ovinum	Blue Devil		V	2	2013	Found in the wetter parts of the Mount Lofty Ranges and a few sites in the lower South-East in South Australia, growing in open woodland on damp clay and sandy soils (SSCC 2018).	**Possible** – Recent records and some suitable habitat is present in the Project Area.
Eryngium vesiculosum	Prostrate Blue Devil		R	2	2010	Found scattered in South Australia, from the Lake Eyre region to the lower South-east, growing in sandy flats in low-lying damp areas (SSCC 2018).	**Possible** – Recent records and some suitable habitat is present in the Project Area.
Eucalyptus dalrympleana ssp. dalrympleana	Candlebark Gum		R	2	2022	Often in poorer sandy soils, in woodland or as an emergent in low shrublands. Commonly associated with *E. baxteri, E. cosmophylla, E. diversifolia, E. leptophylla and E. leucoxylon* (Nicolle, 2013).	**Possible** – Very recent records, some suitable habitat and associated species are present within the Project Area.
Eucalyptus fasciculosa	Pink Gum		R	2	2021	Grows on moist, well-drained alluvial soils near watercourses but also grows on drier sites at higher altitudes. Tolerates snow and some flooding (Nicolle, 2013).	**Possible** – Very recent records and some suitable habitat is present within the Project Area.
Eucalyptus viminalis ssp. viminalis	Manna Gum		R	2	2022	Generally recorded as growing in mallee scrubland but has also been found growing in coastal heathlands, sclerophyll forests and woodlands. It is also found in heathy openings in wet sclerophyll forest and in a swamp at Mt Compass (Nicolle, 2013).	**Known / Highly Likely** – Recorded within the Project Area.
Euphrasia collina subsp. osbornii	Osborn's Eyebright	EN	E	1	Species or species habitat known to occur within area	Confined to SA. Has been collected in the Upper SE (Yumali-Meningie Road), on eastern KI. (Dudley Peninsula-W of Cape Willoughby), Eyre Peninsula (Venus Bay), Yorke Peninsula, Northern Lofty region (Clare, Burra), Southern Lofty region (inc. Fleurieu Peninsula and Mt Compass) and the Flinders Ranges. Generally recorded as growing in mallee scrubland but has also been found growing in coastal heathlands, sclerophyll forests and woodlands. It is also found in heathy openings in wet sclerophyll forest and in a swamp at Mt Compass (Moritz and Bickerton 2010).	**Unlikely** – No recent records despite some suitable habitat within the Project Area.
Gastrodia sesamoides	Potato Orchid		R	2	2021	Found in the southern Mount Lofty Ranges, Kangaroo Island and the lower South-east in South Australia, growing in areas of high rainfall in wet sclerophyll forests, dry sclerophyll forests, woodlands and riparian areas (SSCC 2018).	**Likely** – Some suitable habitat within the Project Area and recent records.

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		Aus	SA				
Gleichenia microphylla	Coral Fern		R	2	2022	Found southern Mount Lofty and the lower South- East in South Australia, growing in sunny damp sites around swamps and at bases of cliffs in open forest (SSCC 2018).	**Unlikely** – Some suitable habitat within the Project Area including water sources, though not within areas of proposed impact.
Glycine latrobeana	Clover Glycine	VU	V	1	Species or species habitat likely to occur within area	Inhabits native grasslands, dry sclerophyll forests, woodlands and low open woodlands, typically with a grassy ground layer, and growing on undulating plains. Prefers gentle south-west facing ridge slopes and lower south facing river valley slopes (Carter and Sutter 2010).	**Unlikely** – No recent records despite some suitable habitat within the Project Area.
Gonocarpus micranthus ssp. micranthus	Creeping Raspwort		R	2	2018	Found on Kangaroo Island, southern Mount Lofty Ranges and the lower South-east in South Australia, growing on wet, peaty soils and is generally confined to damp or boggy situations (SSCC 2018).	**Possible** – Recent records and some suitable habitat is present in the Project Area.
Goodenia brunnea			R	2	2018	This goodenia grows in rocky situations and near watercourses primarily in the far north-west of South Australia.	**Unlikely** – No recent records and this species is generally confined to the far northwest of SA.
Grevillea aquifolium	Prickly Grevillea		R	2	1997	On calcareous sand in sclerophyllous woodland, and in heath on sands, limestone pavements and sandstone outcrops.	**Unlikely** – No recent records despite some suitable habitat within the Project Area.
Hypolepis rugosula	Ruddy Ground-fern		R	2	2022	Found on Kangaroo Island, southern Mount Lofty Ranges and the lower South-east in South Australia, growing along shady streams or open wetter areas. Where it forms dense thickets. It is frequently in ditches or on embankments beside tracks (SSCC 2018).	**Unlikely** – Some suitable habitat within the Project Area including water sources, though not within areas of proposed impact.
Juncus amabilis			V	2	2009	Found in the southern Mount Lofty Ranges and the South-east in South Australia, growing damp sites.	**Unlikely** – Some suitable habitat within the Project Area including water sources, though not within areas of proposed impact.
Lagenophora sublyrata	Slender Bottle-daisy		V	2	2019	Found on Kangaroo Island, southern Mount Lofty Ranges and lower South-east in South Australia, growing in moist gullies and near water (SSCC 2018).	**Possible** – Recent records and some suitable habitat is present in the Project Area.
Leionema hillebrandii	Mount Lofty Phebalium		R	2	2022	Found in heathy woodland and forest gullies. Often in open rocky habitat along steep gullies.	**Possible** – Very recent records and some suitable habitat is present in the Project Area.

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		Aus	SA				
Logania saxatilis	Rock Logania		R	2	1996	Occurs in the FR, NL, MU, SL regions of SA. Associated with Grassy Woodlands in the foothills and hills face of the Southern Lofty Ranges.	**Unlikely** – No recent records despite some suitable habitat within the Project Area.
Luzula flaccida	Pale Wood-rush		V	2	2020	Found in the southern Mount Lofty Ranges and the lower South-east in South Australia, growing in moist rather shady sites in grassy woodland or open grassland (SSCC 2018).	**Possible** – Very recent records and some suitable habitat is present in the Project Area.
Lycopodiella lateralis	Slender Clubmoss		R	2	2017	The species occurs in scattered swampy places in the vicinity of Mt Compass, Mt Lofty and on KI.	**Unlikely** – Recent records nearby and some suitable habitat within the Project Area but Project impact area does not incorporate creek / watercourse.
Lycopodium deuterodensum	Bushy Clubmoss		E	2	2009	Found in one location in the southern Mount Lofty Ranges in South Australia, growing on steep hill slopes over sandstone and quartzite on the edge of a gully swamp within open stringybark forest with a dense understorey of bracken, sedges, shrubs, herbs and grasses (SSCC 2018).	**Unlikely** – No recent records despite some suitable habitat within the Project Area.
Machaerina gunnii	Slender Twig-rush		R	2	2018	Found on Kangaroo Island, southern Mount Lofty Ranges and the lower South-east in South Australia, growing in wet heathlands and swampy woodlands (SSCC 2018).	**Unlikely** – No recent records nearby despite some suitable habitat within the Project Area.
Melaleuca armillaris ssp. akineta	Needle-leaf Honey-myrtle		R	2	2008	Found primarily in the Gawler Ranges of South Australia, where it grows on ridges and granite outcrops (Brophy et al. 2013).	**Unlikely** – No very recent records and this species is generally confined to the Gawler Ranges in SA.
Mentha diemenica	Slender Mint		R	2	2011	This species is scattered throughout *Eucalyptus ovata* dominated woodland.	**Possible** – Recent records and some suitable habitat is present in the Project Area.
Nymphoides crenata	Wavy Marshwort		R	2	1995	Fresh water to 1.5 m deep in swamps, lagoons, channels and streams; also frequent in temporarily inundated depressions.	**Unlikely** – No recent records nearby despite some suitable habitat within the Project Area.
Poa umbricola	Shade Tussock-grass		R	2	2018	Associated with woodland communities where it is often straggling among rocks.	**Unlikely** – Despite recent records, rocky outcrops in which this species requires are not present.

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		Aus	SA				
Prasophyllum pallidum	Pale Leek-orchid	VU	R	1	Species or species habitat likely to occur within area	Pale Leek-orchid is known singly or in groups in better soils of woodland and grassy open forest. Recorded in woodlands and forests dominated by *Eucalyptus leucoxylon, E. goniocalyx, E. fasciculosa, E. microcarpa, Callitris gracilis/Eucalyptus fasciculosa*, and *Allocasuarina verticillata* (Bates 2009).	**Unlikely** – No recent records despite some suitable habitat within the Project Area.
Prasophyllum pruinosum	Plum Leek-orchid	EN	E	1	Species or species habitat known to occur within area	It has been recorded in the Adelaide and MLR region from eight geographically isolated and distinct locations, which extend from the Barossa Valley to Belair NP. Preferred habitat includes open woodland and grassy forest, in the open or in the shelter of broom-like shrub growing in fertile loams, usually with other leek-orchids (Bates, 2009).	**Unlikely** – No recent records despite some suitable habitat within the Project Area.
Pterostylis cucullata	Leafy Greenhood	VU	E	1	Species or species habitat likely to occur within area	There are two subspecies of *Pterostylis cucullata. One is a* coastal ssp. that occurs in stabilised coastal sand dunes, on open ground but under a scrub layer. The other ssp. is a montane variety which occurs on riverbanks or protected alluvial flood plains (TSSC 2016a).	**Unlikely** – No recent records despite some suitable habitat within the Project Area.
Pterostylis setifera	Bristly Greenhood		E	2	2018	Found in a variety of habitats, in SA in open areas of mallee type vegetation and small red sand dune areas covered with *Callitris.*	**Unlikely** – Despite recent records no mallee habitat is present within the Project Area.
Pultenaea graveolens	Scented Bush-pea		R	2	2022	Found in the southern Flinders Range and the southern Mount Lofty Ranges in South Australia, with a single record from Kangaroo Island, growing in dry sclerophyll woodland (SSCC 2018).	**Possible** – Very recent record and some suitable habitat within the Project Area.
Pultenaea kraehenbuehlii	Tothill Bush-pea		R	2	2018	Endemic to South Australia and found only in the Tothill Range except for one record from Cleland National Park, growing in open grassland to open low woodland sometime dominated by *Allocasuarina verticillata* (SSCC 2018).	**Unlikely** – Project Area not within known isolated population, and no suitable habitat occurs.
Ranunculus glabrifolius	Shining Buttercup		V	2	2000	Found only in Mount George Conservation Park in SA where it occurs in damp ground in depressions or beside watercourses.	**Possible** – Recent records and only found in Mount George Conservation Park which is adjacent to the Project Area. Project impact area does not incorporate creek / watercourse.

Scientific name	Common name	Conservation status		Source	PMST result / Latest sighting (year)	Distribution and habitat preferences	Likelihood of occurrence within the Project Area
		Aus	SA				
Rytidosperma laeve	Smooth Wallaby-grass		*R*	2	2017	Ecologically variable, from alpine moorland to open grassland or light woodland, often in seasonally damp habitats (Sharp and Simon 2022).	**Possible** – Recent records and some suitable habitat is present in the Project Area.
Rytidosperma tenuius	Short-awn Wallaby-grass		R	2	2022	Grows in altitudes between 5–750 m, on Tablelands usually in somewhat damp habitats, rarely dominant; along the coastal shelf a very common constituent of disturbed road verges.	**Likely** – Very recent records and some suitable habitat is present in the Project Area.
Schizaea fistulosa	Narrow Comb-fern		V	2	2008	In SA this species is usually found on raised soil mounds in swamps or under scrub in moist situations. It is often found associated with *S. bifida*. There appear to be intermediate forms between these two species in SA.	**Unlikely** – Some suitable habitat within the Project Area including water sources, though not within areas of proposed impact.
Schoenus latelaminatus	Medusa Bog-rush		V	2	2012	Grows in seasonally wet areas along creek beds and in marshy paddocks.	**Unlikely** – Some suitable habitat within the Project Area including water sources, though not within areas of proposed impact.
Schoenus lepidosperma ssp. lepidosperma	Slender Bog-rush		R	2	2018	Grows in damp areas in heath or woodland in sandy soils.	**Unlikely** – Some suitable habitat within the Project Area including water sources, though not within areas of proposed impact.
Scutellaria humilis	Dwarf Skullcap		R	2	2021	Grows in various habitats, often in moist sheltered areas, particularly along creeks or gullies, widespread from coastal to inland districts. Single isolated record from Cleland National Park, most records further south on Fleurieu Peninsula.	**Unlikely** – Despite recent records the Project Area is outside of its typical distribution.
Senecio pinnatifolius var. pinnatifolius			R	2	2015	Commonly found in moist gullies where they are locally widespread. Predominantly occurs in areas of moderate to high rainfall.	**Possible** – Recent records and some suitable habitat is present in the Project Area.
Sphaerolobium minus	Leafless Globe-pea		R	2	2008	Scattered mainly across higher rainfall areas in sclerophyll forests, woodlands and heathlands.	**Unlikely** – No recent records nearby despite some suitable habitat within the Project Area.

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		Aus	SA				
Sprengelia incarnata	Pink Swamp-heath		R	2	2017	Found on Kangaroo Island, southern Mount Lofty Ranges and the lower South-east in South Australia, growing in wet heathland, sedgeland and other swampy vegetation on peaty or sandy soils (SSCC 2018).	**Unlikely** – Despite recent records, Cleland National Park is the closest area that this species occurs in. It is unlikely to occur in the Project Area.
Thelymitra aristata	Great Sun-orchid		E	2	2008	Found primarily in the south-east in South Australia, north of Mt Gambier, growing in clay or gravel soils in forest or scrubland around swamp margins in damp sands (SSCC 2018). Past records from Mount George Conservation Park adjacent the Project Area.	**Possible** – Recent records and some suitable habitat is present in the Project Area.
Thelymitra batesii			R	2	2021	Endemic to South Australia and found in the southern Flinders Ranges and the Mount Lofty Ranges, growing in heathy woodlands and heathy open forest on sandy and gravelly clay loam soils (SSCC 2018).	**Possible** – Very recent records and some suitable habitat is present in the Project Area.
Thelymitra circumsepta	Naked Sun-orchid		E	2	2018	Occurs in the SL region of SA. Found among low shrubs in open forest or in open rocky sites on well-drained and moisture retentive soils.	**Unlikely** – despite recent records, no suitable rocky or open forest sites occur in Project Area.
Thelymitra grandiflora	Great Sun-orchid		R	2	2019	Occurs singly or as small clumps of plants in forest clearings, woodland and scrub in well drained gravelly clay soils which may be laterite or podsols, or mixed with sand, extending to dry rocky ridges in better soils (Bates 2009).	**Possible** – Very recent records and some suitable habitat is present in the Project Area.
Thelymitra ixioides	Spotted Sun-orchid		E	2	2013	Found in the southern Mount Lofty Ranges and the lower South-east in South Australia, growing in woodland or swampy ground (SSCC 2018).	**Possible** – Recent records and some suitable habitat is present in the Project Area.
Thelymitra latifolia	Blue Star Sun-orchid		V	2	2004	In SA found from the southern Flinders Ranges southward through the Mount Lofty Ranges to the South-east. Found in woodlands in various soil types from leached pale sands to yellow gravelly clays and may occur near swamps.	**Possible** – Recent records and some suitable habitat is present in the Project Area.

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		Aus	SA				
Thelymitra matthewsii	Spiral Sun-orchid	VU	E	1	Species or species habitat likely to occur within area	Currently known to occur in Vic., SA and NZ. Favours open forests and woodlands in well-drained sand and clay loams. It is a post-disturbance coloniser that is usually found in open areas around old quarries and gravel pits, on road verges, disused tracks and animal trails. In SA, it is known from three fairly old collections from KI and SW of Keith. It has recently been found to occur south of Meningie, and on western KI. Widely but sporadically distributed in Vic and SA. Grows in heathy open forest and woodlands on well-drained sand, gravel and clay loams, especially where there has been soil disturbance. Open ground layer is common (Duncan 2010).	**Unlikely** – No recent records despite some suitable habitat within the Project Area.
Thysanotus tenellus	Grassy Fringe-lily		R	2	2015	Perennial Fringed lily species located in SA where it prefers *Eucalyptus* woodlands, *Lomandra effusa* Open Sedgelands, *Dodonaea lobulata* shrublands and Bluebush shrublands (Sirisena 2010).	**Unlikely** – No recent records nearby despite some suitable habitat within the Project Area.
Todea barbara	King Fern		E	2	2018	Occurs in the MLR where it occurs in swamps, swampy gullies and creek beds. All extant populations occur adjacent to permanent water, springs or soaks.	**Unlikely** – Recent records nearby and some suitable habitat within the Project Area but Project impact area does not incorporate creek / watercourse.
Veronica derwentiana subsp. homalodonta	Mount Lofty Speedwell	CE	E	1	Species or species habitat likely to occur within area	Occurs in moist areas, gullies, creeklines and high rainfall areas. Largely occurs in *Eucalyptus obliqua* Forests with or without additional overstorey species (such as *Eucalyptus fasciculosa, Eucalyptus viminalis ssp. cygnetensis* & *Eucalyptus leucoxylon*) (TSSC 2009).	**Unlikely** – No recent records despite some suitable habitat within the Project Area.
Xanthosia tasmanica	Southern Xanthosia		R	2	2015	Found on Kangaroo Island and the southern Mount Lofty Ranges in South Australia, growing in shallow sand on rocky coastal heath and in woodland SSCC 2018).	**Possible** – Recent records and some suitable habitat is present in the Project Area.
Xyris operculata	Tall Yellow-eye		R	2	2008	Found on Kangaroo Island, southern Mount Lofty Ranges and the lower South-east in South Australia, growing in wet heathlands and swampy areas (SSCC 2018).	**Unlikely** – No recent records and this species is generally confined to the areas around Mount Compass and on Kangaroo Island.

Conservation status:

Aus: Australia (EPBC Act). SA: South Australia (NPW Act). Conservation Codes: CE: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare. ssp.: the conservation status applies at the sub-species level. Mi: listed as migratory under the EPBC Act. Mi (W): listed as a Migratory Wetland species under the EPBC Act. Mi (Ma): listed as a Migratory Marine species under the EPBC Act.

PMST result: Likelihood of species or species habitat to occur within 5 km of the Project Area.
Source of Information:
1: PMST (DCCEEW 2022b) – 5 km buffer applied to Project Area;
2: BDBSA (DEW 2022b) – 5 km buffer applied to Project Area;
Abbreviations within Distribution and preferred habitat:
EP: Eyre Peninsula; FP: Fleurieu Peninsula; FR: Flinders Ranges; KI: Kangaroo Island; MLR: Mount Lofty Ranges; MU: Murraylands; NL: Northern Lofty; NP: National Park; NSW: New South Wales QLD: Queensland; SL: Southern Lofty; SE: Southeast / South-Eastern; SW: South-Western; Tas: Tasmania; Vic: Victoria; WA: Western Australia; YP: Yorke Peninsula.

Appendix 6. BDBSA fauna record within 5 km of the Project Area

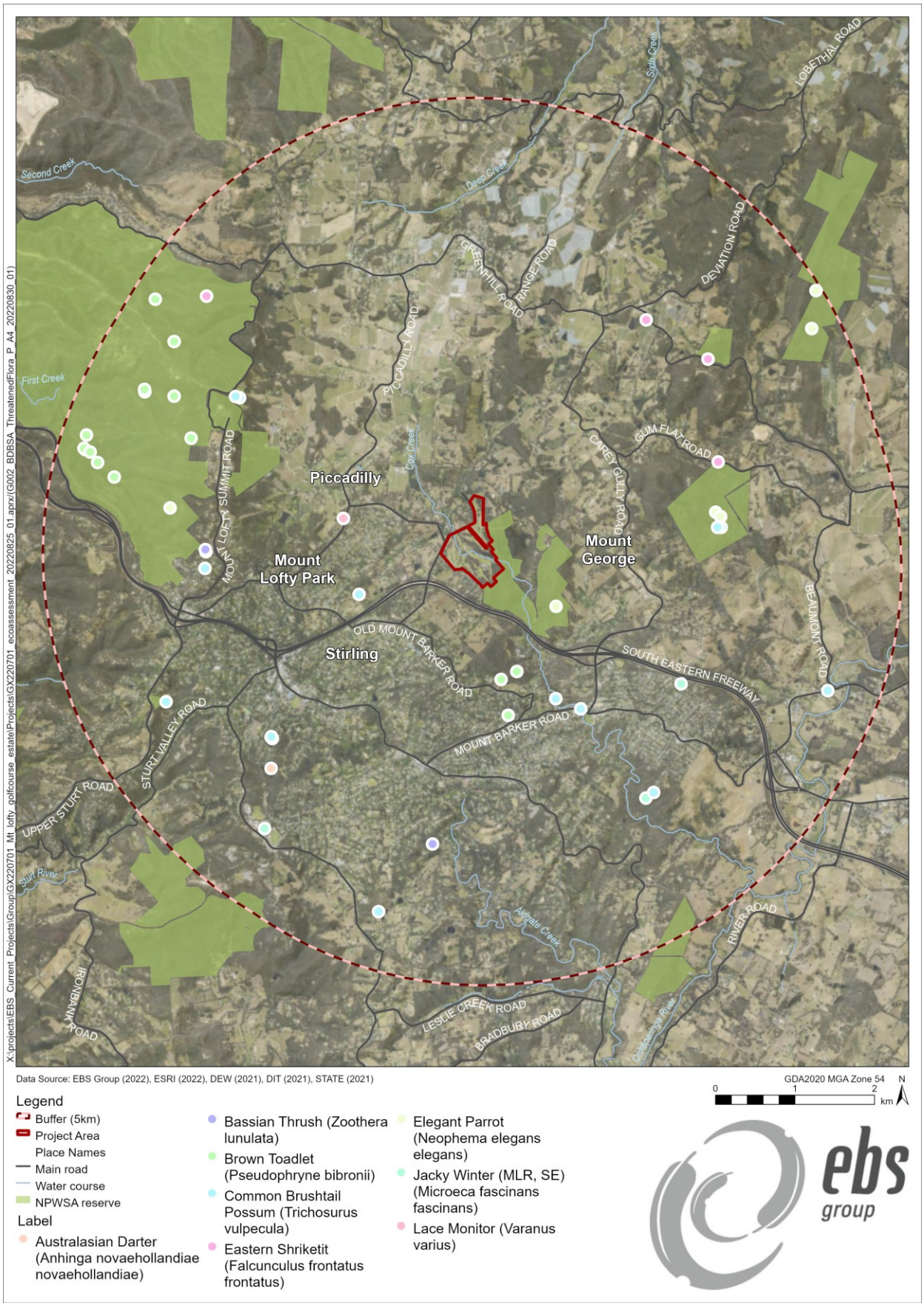

Figure 13. BDBSA fauna record for State listed Rare species, located within 5 km of the Project Area (Map 1 of 2).

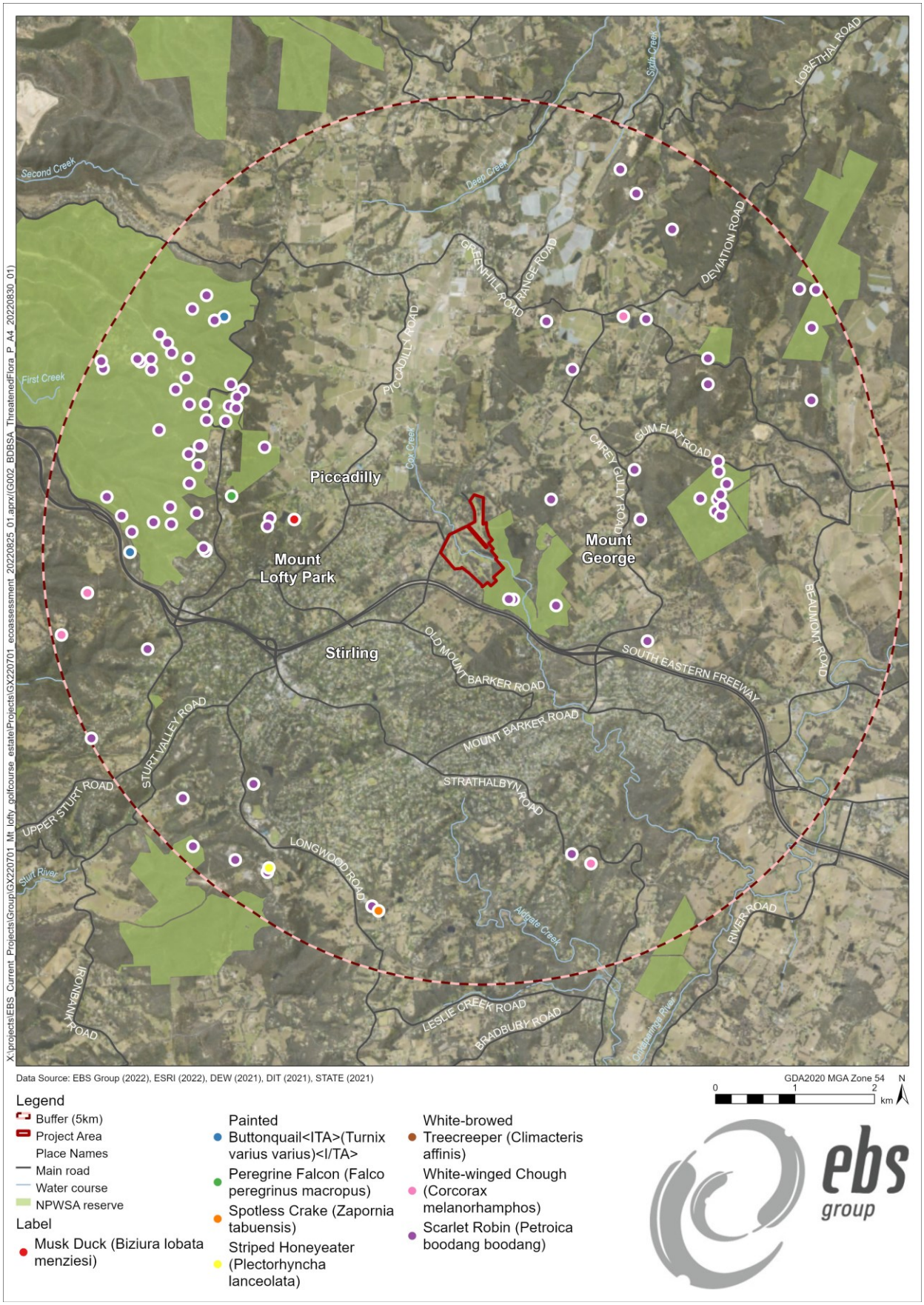

Figure 14. BDBSA fauna record for State listed Rare species, located within 5 km of the Project Area (Map 2 of 2).

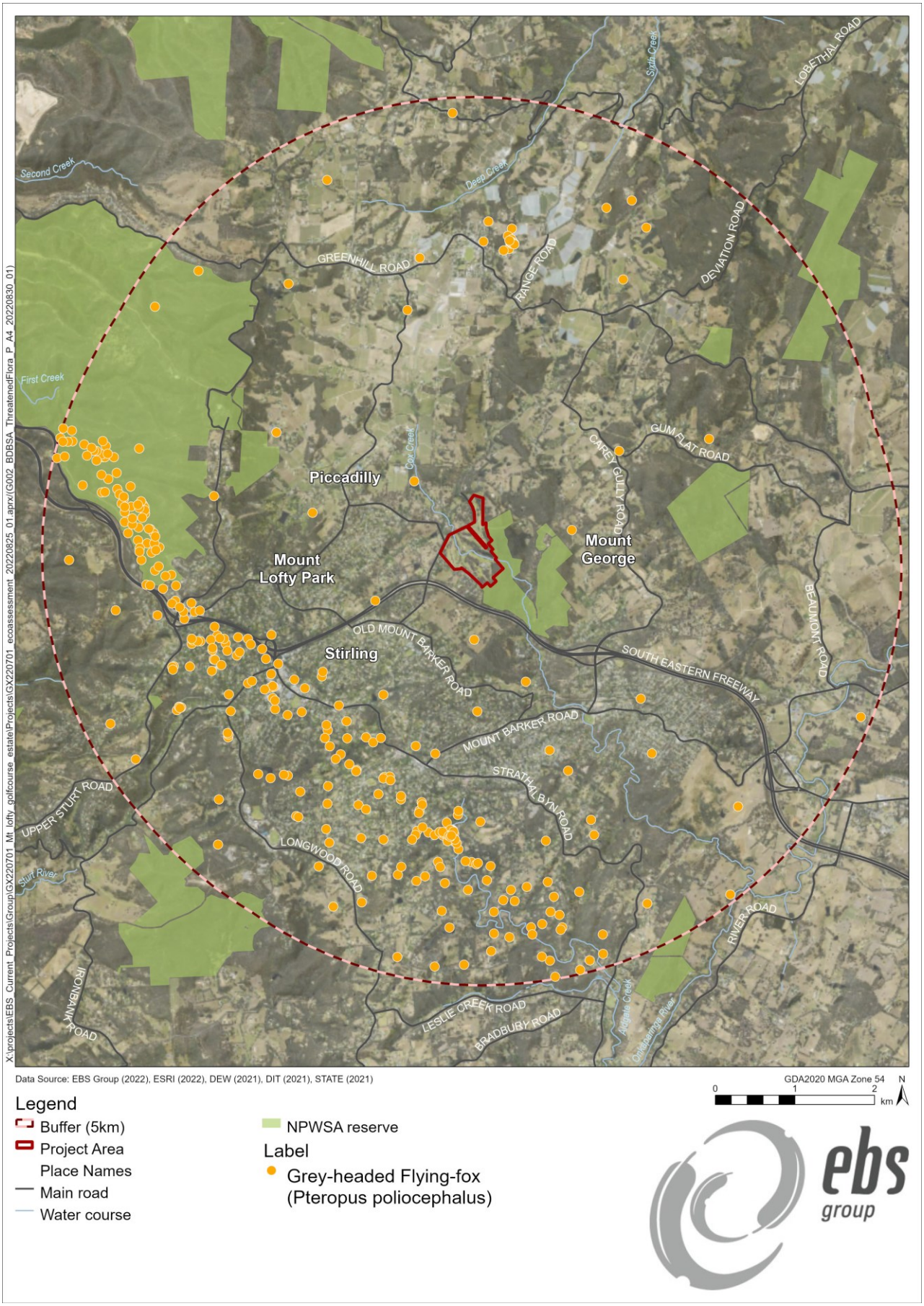

Figure 15. BDBSA fauna record for *Pteropus poliocephalus* (Grey-headed Flying-fox), located within 5 km of the Project Area.

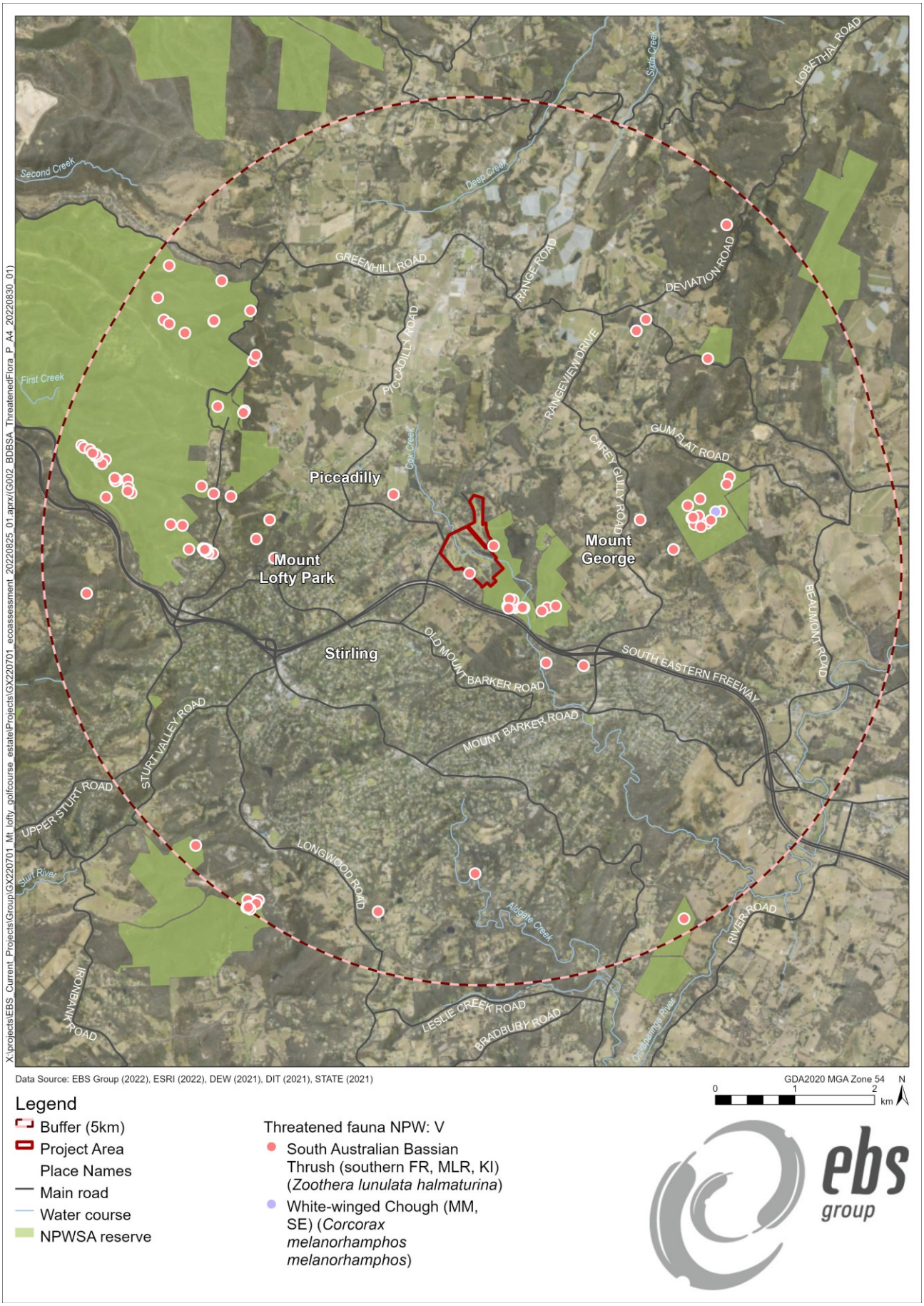

Figure 16. BDBSA fauna record for State listed Vulnerable species, located within 5 km of the Project Area.

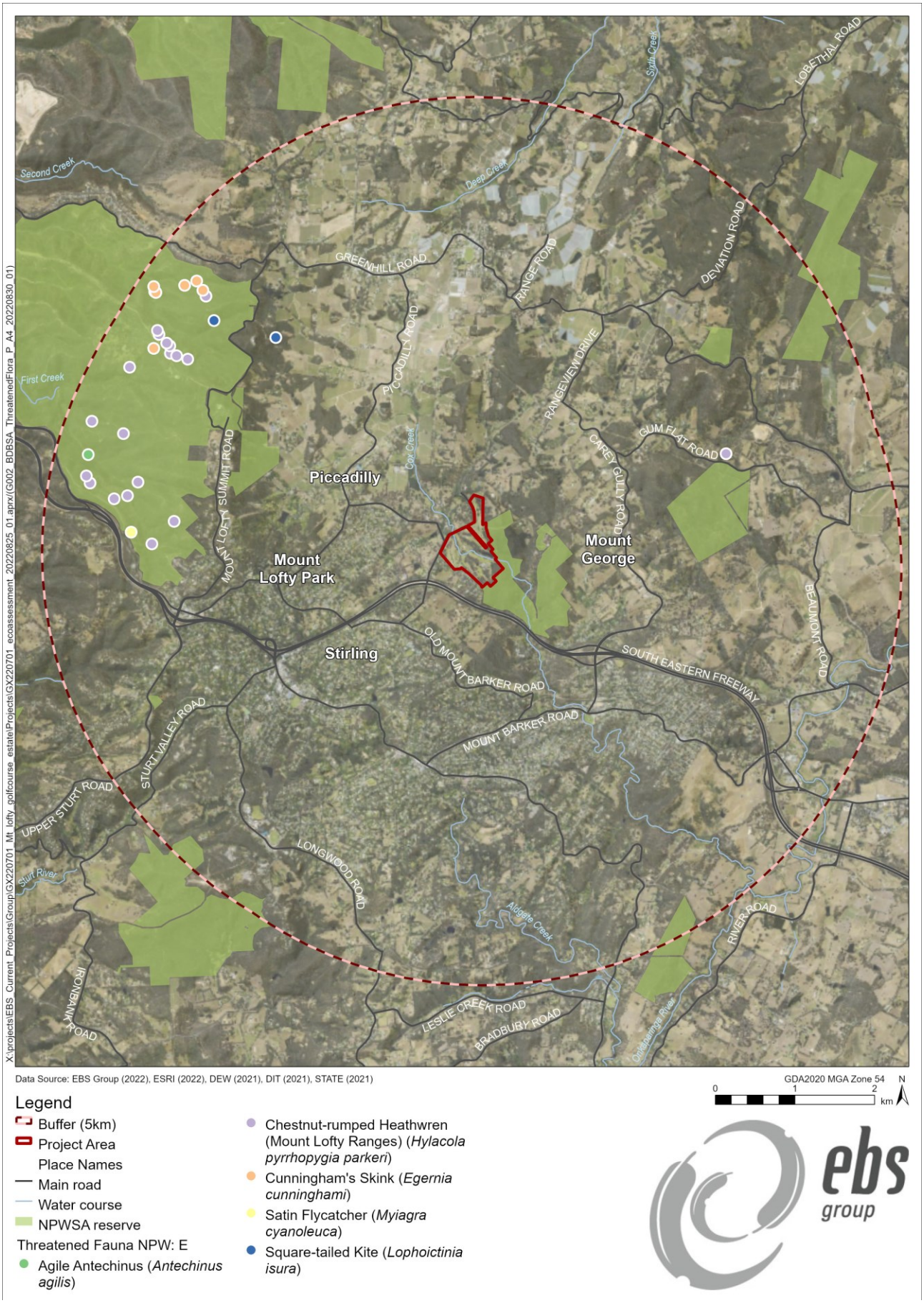

Figure 17. BDBSA fauna record for State listed Endangered species, located within 5 km of the Project Area.

Appendix 7. BDBSA Birdlife record within 5 km of the Project Area

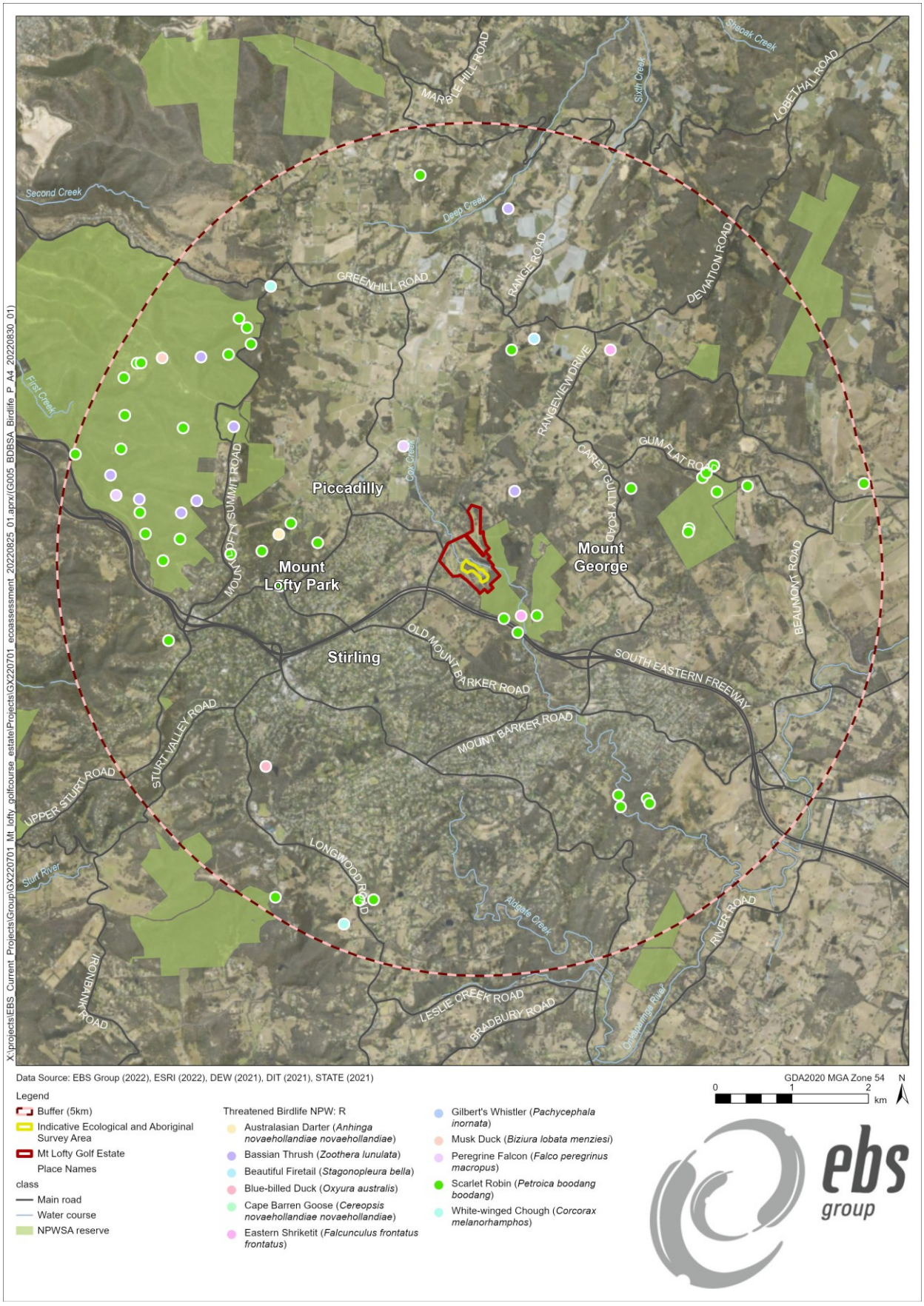

Figure 18. BDBSA Birdlife record for State listed Rare species, located within 5 km of the Project Area.

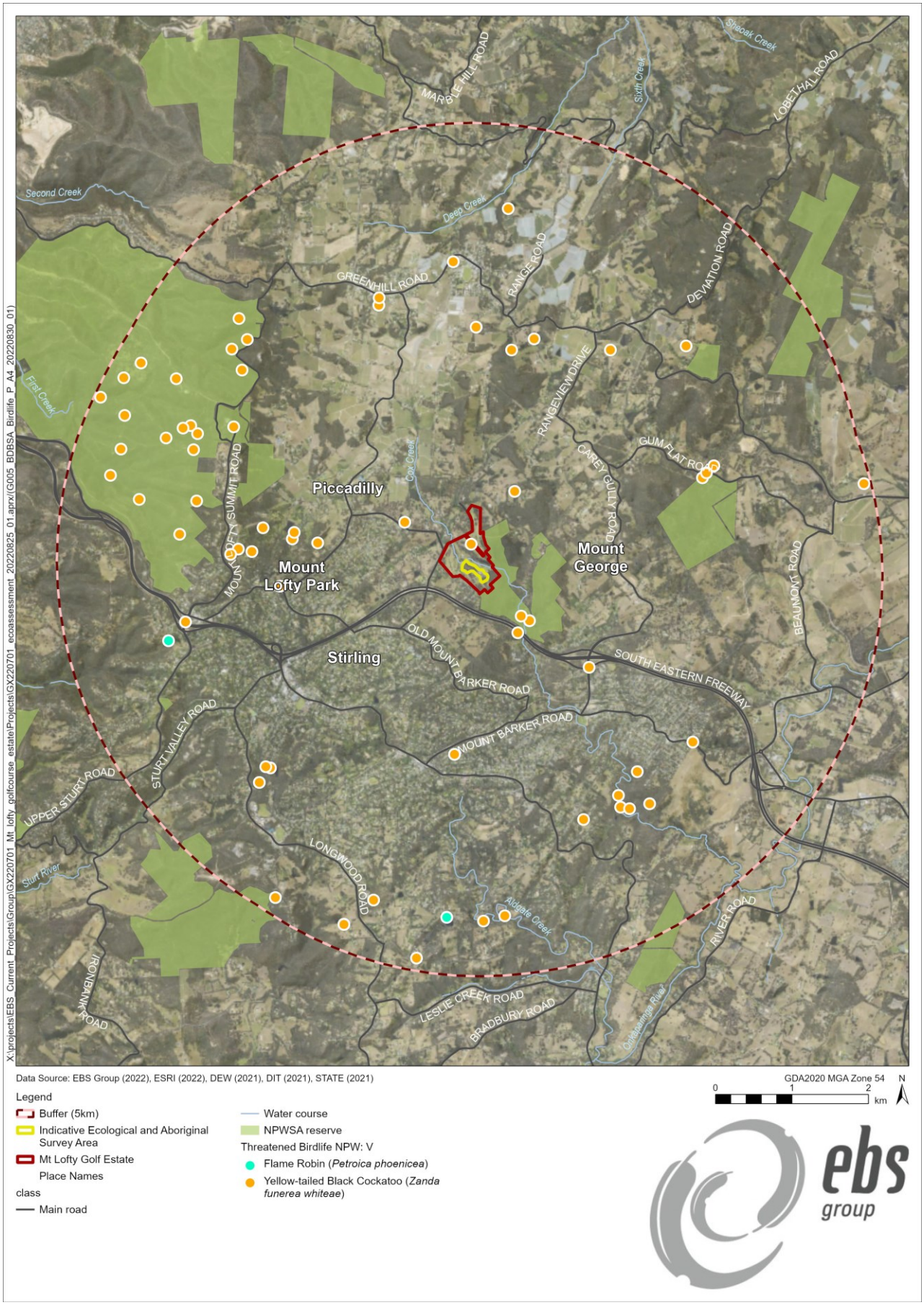

Figure 19. BDBSA Birdlife record for State listed Vulnerable species, located within 5 km of the Project Area.

Appendix 8. Assessment of likelihood of national (EPBC Act) and State (NPW Act) listed threatened fauna identified by the PMST (DCCEEW 2022b) and BDBSA (DEW 2022b) to occur in the Project Area (exclusively marine species have been omitted).

Scientific name	Common name	Conservation status		Source	PMST result / Latest sighting (year)	Distribution and habitat preferences	Likelihood of occurrence within the Project Area
		Aus	SA				
AMPHIBIA (AMPHIBIANS)							
Pseudophryne bibronii	Brown Toadlet		R	2	2009	In SA, it occurs in the SE, KI, MLR and FR regions. Found in damp areas with cover provided by logs and stones. Occupies forests, heathlands and grasslands. Occasionally utilizes small temporary dams and vegetated roadside drainage lines and ditches which are characterized by leaf litter and grassy debris (Wilson and Bignall 2009).	**Possible** – Some suitable habitat within the Project Area including water sources, most recent nearby record over 10 years old.
AVES (BIRDS)							
Anhinga novaehollandiae novaehollandiae	Australasian Darter		R	2, 3	2018 / 2018	Habitat is lakes, rivers, swamps; rarely coastal (Pizzey and Knight 2013).	**Possible** – Some suitable habitat within the Project Area including water sources.
Biziura lobata menziesi	Musk Duck		R	2, 3	2015 / 2002	Lakes, reservoirs and wetlands including well-vegetated swamps and fresh and brackish habitats (Pizzey and Knight 2013).	**Possible** – Some suitable habitat within the Project Area including permanent water sources.
Botaurus poiciloptilus	Australasian Bittern	EN	E	1	Species or species habitat known to occur within area	Freshwater wetlands and rarely in estuaries or tidal wetlands, favouring wetlands dominated by sedges, rushes and reeds growing over a muddy or peaty substrate (Pizzey and Knight 2013).	**Unlikely** – No recent records despite suitable habitat present.
Cereopsis novaehollandiae novaehollandiae	Cape Barren Goose		R	3	2009	Mostly inhabits small, windswept and generally uninhabited offshore islands, but ventures to adjacent mainland farming areas in search of food in summer (Birdlife Australia 2022).	**Possible** – Some suitable habitat within the Project Area including water sources and open grassy areas.

Scientific name	Common name	Conservation status		Source	PMST result / Latest sighting (year)	Distribution and habitat preferences	Likelihood of occurrence within the Project Area
		Aus	SA				
Charadrius mongolus	Lesser Sand Plover	EN	E	3	2002	Likes tidal mudflats, sand flats and shelly beaches, salt marshes and mangroves (Pizzey and Knight 2013).	**Unlikely** – No suitable habitat, migratory species which does not depend on vegetation present in the Project Area
Climacteris affinis	White-browed Treecreeper		R	2	2021	Distributed across southern arid and semi-arid areas of Australia, from Western Australia, through South Australia, New South Wales and into north-western Victoria. Habitat is Acacia woodlands, belah and Callitris.	**Possible** – Some suitable habitat within the Project Area but vagrant species to general area.
Corcorax melanorhamphos	White-winged Chough		R	2, 3	2020 / 2020	Prefers drier forests, woodlands of *Eucalyptus sp.*, crops and pastures (Pizzey and Knight 2013).	**Likely** – Some suitable habitat within the Project Area and recent records.
Falco hypoleucos	Grey Falcon	VU	R	1	Species or species habitat likely to occur within area	The species is mainly found where annual rainfall is less than 500 mm and is essentially always confined to the arid and semi-arid zones. 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 (Schoenjahn et al. 2020).	**Unlikely** – No recent records and habitat within the Project Area is unsuitable.
Falco peregrinus macropus	Peregrine Falcon		R	2, 3	2015 / 2020	Found everywhere from woodlands to open grasslands and coastal cliffs – though less frequently in desert regions. This species prefers open habitats such as grasslands, tundra and meadows and nests on cliff faces and in crevices (Pizzey and Knight 2013).	**Likely** – Some suitable habitat within the Project Area. Likely to occur as flyover only.
Falcunculus frontatus frontatus	Eastern Shriketit		R	2, 3	2006 / 2006	Eucalyptus woodlands and forest, within a wide range of woodland/forest communities. Prefers dense grasslands, often on the edges of open forests, and bracken (Birdlife Australia 2022).	**Possible** – Some suitable habitat within the Project Area, most recent nearby record over 15 years old.

Scientific name	Common name	Conservation status		Source	PMST result / Latest sighting (year)	Distribution and habitat preferences	Likelihood of occurrence within the Project Area
		Aus	SA				
Grantiella picta	Painted Honeyeater	VU	R	1	Species or species habitat likely to occur within area	Forest, woodland, dry scrub, often with abundant mistletoe. Dependent on mistletoe berries (DAWE 2021a).	**Unlikely** – No recent records despite some suitable habitat.
Hieraaetus morphnoides	Little Eagle		V	2	2019	Occurs in sparse populations in eastern South Australia where it prefers grasslands and grassy woodlands but will inhabit a range of habitats from coastal, sub-coastal and inland areas, right through to semi-arid zones (Birdlife Australia 2022).	**Likely** – Some suitable habitat within the Project Area. Likely to occur as flyover only.
Hirundapus caudacutus	White-throated Needletail	VU, Mi (T)	V	1	Species or species habitat likely to occur within area	Almost exclusively aerial in Australia, recorded most commonly above wooded areas (Pizzey and Knight 2013).	**Possible** – Some suitable habitat present. Possible to occur as flyover only.
Hylacola cauta cauta	Shy Heathwren		R	3	1998	Prefers dense shrubby or heath understorey in mallee woodland, mallee shrubland or mallee heath in coastal and semi-arid regions, often where spinifex (*Triodia*) occurs and with dense shrubs such as Banksia, Hakea and Grevillea, also tea-tree (*Leptospermum*) and cypress pine (*Callitris*) (Gregory, 2020).	**Possible** – Some suitable habitat within the Project Area. Very suitable habitat adjacent to the Project Area in Mount George Conservation Park.
Hylacola pyrrhopygia parkeri	Chestnut-rumped Heathwren	EN	E	1, 2, 3	Species or species habitat known to occur within area / 2020 / 2020	Inhabits heaths of coastal, mountain and hinterland areas, dense undergrowth of forests and woodlands. Found in South-eastern Australia. In SA occurs in the SE, Adelaide Mount Lofty Ranges and Northern Yorke districts (Wilson and Bignall 2009).	**Likely –** known to occur in adjacent Mount Gorge CP, may utilise Project Area fringe from time to time, though unlikely to be core habitat as the understorey vegetation was open, disturbed and weedy in most places.

Scientific name	Common name	Conservation status		Source	PMST result / Latest sighting (year)	Distribution and habitat preferences	Likelihood of occurrence within the Project Area
		Aus	SA				
Leipoa ocellata	Malleefowl	VU	V	1	Species or species habitat likely to occur within area	In South Australia, the Malleefowl is distributed from the south-east, north to the Murray-Mallee region and west to Streaky Bay, south of 32°S. The species also occurs west of the Eyre Peninsula. Occupies shrublands and low woodlands that are dominated by mallee vegetation. It also occurs in other habitat types including eucalypt or native pine Callitris woodlands, acacia shrublands, Broombush Melaleuca uncinata vegetation or coastal heathlands (Benshemesh 2007).	**Unlikely** – No recent records and no mallee habitat within the Project Area.
Lewinia pectoralis pectoralis	Lewin's Rail		V	2	2010	Swamp woodlands; ruches, reeds, rank grass in swamps, creeks paddocks; wet heaths, tree ferns; samphire in saltmarsh.	**Possible** – Some suitable habitat within the Project Area including water sources.
Lophoictinia isura	Square-tailed Kite		E	2	2019	The Square-tailed Kite ranges along coastal and subcoastal areas from south-western to northern Australia, Queensland, NSW and Victoria. Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses (Pizzey and Knight 2013).	**Likely** – Some suitable habitat within the Project Area. Likely to occur as flyover only.
Melithreptus gularis gularis	Black-chinned Honeyeater		V	2, 3	2002 / 2000	The Black-chinned Honeyeater is found in the upper levels of open eucalypt forests and woodlands dominated by box and ironbark eucalypts. It is often found along waterways, especially in arid and semi-arid areas and in northern Australia. It is occasionally seen in gardens and street trees (Birdlife Australia 2022).	**Possible** – Some suitable habitat within the Project Area.
Microeca fascinans fascinans	Jacky Winter		R	2, 3	2018 / 2001	Widely distributed throughout mainland Australia. Prefer open woodland (Eucalypt and mallee) with an open shrub layer and bare ground. Often seen in farmland and parks (Morcombe, 2021).	**Likely** – Some suitable habitat within the Project Area. Very suitable habitat adjacent to the Project Area in Mount George Conservation Park.

Scientific name	Common name	Conservation status		Source	PMST result / Latest sighting (year)	Distribution and habitat preferences	Likelihood of occurrence within the Project Area
		Aus	SA				
Neophema elegans elegans	Elegant Parrot		R	2	2021	Wide variety of habitats, including grasslands, shrublands, mallee, woodlands and thickets, bluebush plains, heathlands, saltmarsh and farmland (Pizzey and Knight 2013).	**Likely** – Some suitable habitat within the Project Area. Very suitable habitat adjacent to the Project Area in Mount George Conservation Park.
Oxyura australis	Blue-billed Duck		R	3	2018	Habitat is permanent swamps with dense vegetation. Large open lakes, tidal inlets and bays (Pizzey and Knight 2013).	**Possible** – Some suitable habitat within the Project Area including permanent water sources.
Pachycephala inornata	Gilbert's Whistler		R	3	2007	Usually inhabit semi-arid mallee or box–ironbark eucalypt, acacia, cypress-pine or Belah shrublands and woodlands (Birdlife Australia 2022).	**Possible** – Some suitable habitat within the Project Area.
Petroica boodang boodang	Scarlet Robin		R	2, 3	2022 / 2020	This species occurs in foothill forests, woodlands and watercourses. In autumn-winter, they occur in more open habitats such as river red gum woodlands, golf courses, parks, orchards and gardens (Birdlife Australia 2022).	**Likely** – Some suitable habitat within the Project Area. Very suitable habitat adjacent to the Project Area in Mount George Conservation Park.
Petroica phoenicea	Flame Robin		V	3	2003	Endemic to south-eastern Australia, and ranges from near the Queensland border to southeast South Australia and also in Tasmania. Breeds in eucalypt forests and woodlands, with access to open areas, such as subalpine woodland, recently burnt forest, recently logged forest and pine plantations (Birdlife Australia 2022).	**Possible** – Some suitable habitat within the Project Area.

Scientific name	Common name	Conservation status		Source	PMST result / Latest sighting (year)	Distribution and habitat preferences	Likelihood of occurrence within the Project Area
		Aus	SA				
Plectorhyncha lanceolata	Striped Honeyeater		R	2	2020	The Striped Honeyeater is found in eastern Australia, mainly inland, from the Yorke Peninsula, South Australia to the coast of New South Wales, around 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 (Birdlife Australia 2022).	**Possible** – Some suitable habitat within the Project Area but vagrant species to general area.
Polytelis anthopeplus monarchoides	Regent Parrot	VU	V	2	1996	The Regent Parrot (eastern) is confined primarily to the semi-arid interior of south-eastern mainland Australia. It inhabits riparian or littoral River Red Gum (*Eucalyptus camaldulensis*) forests or woodlands and adjacent Black Box (*E. largiflorens*) woodlands (Baker-Gabb and Hurley 2011).	**Unlikely** – No very recent records despite some suitable habitat.
Rostratula australis	Australian Painted Snipe	EN	E	1	Species or species habitat likely to occur within area	The Australian Painted Snipe inhabits many different types of shallow, brackish or freshwater terrestrial wetlands, especially temporary ones which have muddy margins and small, low-lying islands. Suitable wetlands usually support a mosaic of low, patchy vegetation, as well as lignum and Canegrass (Birdlife Australia 2022).	**Unlikely** – No recent records despite some suitable habitat.
Stagonopleura bella	Beautiful Firetail		R	3	2020	Occurs in the AMLR/Eyre Peninsula region of SA where it resides in a wide range of Eucalypt dominated vegetation communities that have a grassy understorey, including woodland, forest and mallee. Only small pockets have been observed near the coast (Birdlife Australia 2022).	**Likely** – Some suitable habitat within the Project Area. Very suitable habitat adjacent to the Project Area in Mount George Conservation Park.
Turnix varius varius	Painted Buttonquail		R	2	2012	These birds range almost continuously, in appropriate habitat, from about the Atherton Tableland in Qld, round the coast to the EP and north to the southern Flinders Ranges in SA, avoiding only the driest regions of Qld and NSW. Temperate and eastern tropical forests and woodlands form the habitats of this species (Morcombe 2021).	**Possible** – Some suitable habitat within the Project Area.

Scientific name	Common name	Conservation status		Source	PMST result / Latest sighting (year)	Distribution and habitat preferences	Likelihood of occurrence within the Project Area
		Aus	SA				
Zanda funerea whiteae	Yellow-tailed Black Cockatoo		V	2, 3	2022 / 2020	Eucalyptus forests and woodlands. Plantations of Eucalyptus and introduced Pinus sp. (Pizzey and Knight 2013)	**Likely** – Some suitable habitat within the Project Area. Likely to occur as flyover only.
Zapornia tabuensis	Spotless Crake		R	2	2010	Mostly found in well vegetated freshwater wetlands with rushes and reeds. Will also frequent muddy areas, reedbeds or wetlands.	**Possible** – Some suitable habitat within the Project Area including water sources.
Zoothera lunulata halmaturina	Bassian Thrush	EN	R	1, 2, 3	Species or species habitat known to occur within area / 2022 / 2018	Damp, densely forested areas and gullies are favoured by the Bassian Thrush, usually with a thick canopy overhead and leaf-litter below (DAWE 2022).	**Likely** – Some suitable habitat within the Project Area. Very suitable habitat adjacent to the Project Area in Mount George Conservation Park.
MAMMALIA (MAMMALS)							
Antechinus agilis	Agile Antechinus		E	2	2021	Forests in the south-eastern corner of Australia. Prefers areas with dense ground cover and hiding places such as fallen logs.	**Possible** – Some suitable habitat within the Project Area generally confined to the far southeast of SA.
Antechinus flavipes	Yellow-footed Antechinus		V	2	2021	Inhabits dry forests on the inland side of the Great Dividing Range, Australia (Kelly et al. 2008).	**Likely** – Some suitable habitat within the Project Area. Very suitable habitat adjacent to the Project Area in Mount George Conservation Park.

Scientific name	Common name	Conservation status		Source	PMST result / Latest sighting (year)	Distribution and habitat preferences	Likelihood of occurrence within the Project Area
		Aus	SA				
Isoodon obesulus obesulus	Southern Brown Bandicoot	EN	V	1, 2	Species or species habitat known to occur within area / 2021	This species prefers dense ground cover, tall grass and low shrubbery. They live near swamps and rivers as well as in thick scrub in drier areas. They make their nests on the ground and in logs. The nests consist of sticks, leaves, grass, and soil (TSSC 2016b).	**Likely** – Some suitable habitat within the Project Area. Very suitable habitat adjacent to the Project Area in Mount George Conservation Park.
Pteropus poliocephalus	Grey-headed Flying-fox	VU	R	1, 2	Foraging, feeding or related behaviour likely to occur within area / 2020	Grey-headed Flying-foxes forage up to 40 km from their roost at Botanic Park each night. Food plants are typically planted trees, both native and exotic, that provide fruit or a rich source of nectar (DAWE 2021b). This species may occur within the Project Area; however, they would only be expected to visit for short periods if suitable flower or fruit resources are available.	**Likely** – Some suitable foraging habitat within the Project Area. Project Area is less than 50 km from nearest camp at Botanic Park in Adelaide
Trichosurus vulpecula	Common Brushtail Possum		R	2	2022	Utilises various woodland habitats and suburban environs. Feeds on flowers, fruit, buds and leaves of native vegetation. Requires hollows (within dead or alive tree) or on ground for daytime nesting (Strahan & van Dyck 2008).	**Highly Likely / Known** – Some suitable habitat including hollows within the Project Area. Scat from this species was observed within the Project Area.
REPTILIA (REPTILES)							
Egernia cunninghami	Cunningham's Skink		E	2	2022	Occurs in forests and rock outcrops where they bask on top of outcrops and will scurry between rock ledges to shelter.	**Unlikely** – despite very recent records, no rock outcrops are present in the Project Area for shelter.

Scientific name	Common name	Conservation status		Source	PMST result / Latest sighting (year)	Distribution and habitat preferences	Likelihood of occurrence within the Project Area
		Aus	SA				
Varanus rosenbergi	Heath Goanna		V	2	2014	Habitat across southern Australia includes coastal heaths, humid woodlands, and wet and dry sclerophyll forests (Cogger 2014).	**Possible –** recent records within 10 years. Species occupies large ranges which incorporate heath, wet and dry forest, and woodlands, such as those found in the Project Area. No termite mounds observed in Project Area but may occur nearby.
Varanus varius	Lace Monitor		R	2	2013	This species is a large arboreal lizard which is found in eastern and south-eastern Australia from Cape York Peninsula (Queensland) to south-eastern South Australia. Lace Monitors occur in well-timbered areas from dry woodlands to cool temperate forests in southern Australia (Cogger, 2014). Restricted distribution in SA, occurring in upper reaches of the SA Murray Darling Basin and isolated population in the southern Flinders Ranges.	**Unlikely** – outside of known distribution. Nearby record is isolated and thought to be escapee from Cleland Wildlife Park.

Conservation status:
Aus: Australia (EPBC Act). SA: South Australia (NPW Act). Conservation Codes: CE: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare. ssp.: the conservation status applies at the sub-species level. Mi: listed as migratory under the EPBC Act. Mi (W): listed as a Migratory Wetland species under the EPBC Act. Mi (Ma): listed as a Migratory Marine species under the EPBC Act.
PMST result: Likelihood of species or species habitat to occur within 5 km of the Project Area.
Source of Information:
1: PMST (DCCEEW 2022b) – 5 km buffer applied to Project Area;
2: BDBSA (DEW 2022b) – 5 km buffer applied to Project Area;
3: Birdlife Australia (DEW 2022b) – 5 km buffer applied to Project Area.
Abbreviations within Distribution and preferred habitat:
EP: Eyre Peninsula; FP: Fleurieu Peninsula; FR: Flinders Ranges; KI: Kangaroo Island; MLR: Mount Lofty Ranges; MU: Murraylands; NL: Northern Lofty; NP: National Park; NSW: New South Wales QLD: Queensland; SL: Southern Lofty; SE: Southeast / South-Eastern; SW: South-Western; Tas: Tasmania; Vic: Victoria; WA: Western Australia; YP: Yorke Peninsula.

Appendix 9. Assessment of likelihood of nationally (EPBC Act) listed migratory species identified by the PMST (DCCEEW 2022b) and BDBSA (DEW 2022b) to occur in the Project Area (exclusively marine species have been omitted).

Scientific name	Common name	Conservation status		Source	PMST result / Latest sighting (year)	Distribution and habitat preferences	Likelihood of occurrence within the Project Area
		Aus	SA				
AVES (BIRDS)							
Apus pacificus	Fork-tailed Swift	Mi (Ma)		1	Species or species habitat likely to occur within area	Widespread but almost exclusively aerial. Mostly occur over inland plains and dry or open habitats.	**Possible** – Some suitable habitat present. Possible to occur as flyover only.
Gallinago hardwickii	Latham's Snipe	Mi (W)	R	1	Species or species habitat likely to occur within area	This is a wetland species which prefers shallow water dominated by tussocks, sedges, rushes and reeds (Pizzey and Knight 2013).	**Unlikely** – No recent records despite some suitable habitat.
Myiagra cyanoleuca	Satin Flycatcher	Mi (T)	E	1, 2	Species or species habitat likely to occur within area / 2005	Known inhabitant of forest, woodland, mangroves and coastal heath scrub. Prefers dense, wet gullies of heavy eucalypt forest in breeding season (Morcombe, 2021).	**Possible** – Some suitable habitat within the Project Area.
Rhipidura rufifrons	Rufous Fantail	Mi (T)		1	Species or species habitat known to occur within area	Occur in moist eucalypt forests and rainforests, where they usually inhabit the dense, shady undergrowth of gullies (Birdlife Australia 2022).	**Unlikely** – No recent records and habitat within the Project Area is unsuitable.
Tringa nebularia	Common Greenshank	Mi (T)		1	Species or species habitat likely to occur within area	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 (Morcombe 2021).	**Unlikely** – No recent records despite some suitable habitat.

Conservation status:
Aus: Australia (EPBC Act). SA: South Australia (NPW Act). Conservation Codes: CE: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare. ssp.: the conservation status applies at the sub-species level. Mi: listed as migratory under the EPBC Act. Mi (W): listed as a Migratory Wetland species under the EPBC Act. Mi (T): listed as a Migratory Terrestrial species under the EPBC Act. Mi (Ma): listed as a Migratory Marine species under the EPBC Act.
PMST result: Likelihood of species or species habitat to occur within 5 km of the Project Area.
Source of Information:
1: PMST (DCCEEW 2022b) – 5 km buffer applied to Project Area;
2: BDBSA (DEW 2022b) – 5 km buffer applied to Project Area;
Abbreviations within Distribution and preferred habitat:
EP: Eyre Peninsula; FP: Fleurieu Peninsula; FR: Flinders Ranges; KI: Kangaroo Island; MLR: Mount Lofty Ranges; MU: Murraylands; NL: Northern Lofty; NP: National Park; NSW: New South Wales QLD: Queensland; SL: Southern Lofty; SE: Southeast / South-Eastern; SW: South-Western; Tas: Tasmania; Vic: Victoria; WA: Western Australia; YP: Yorke Peninsula.

Appendix 10. Suggested areas and routes that EBS recommends in order to avoid native vegetation.

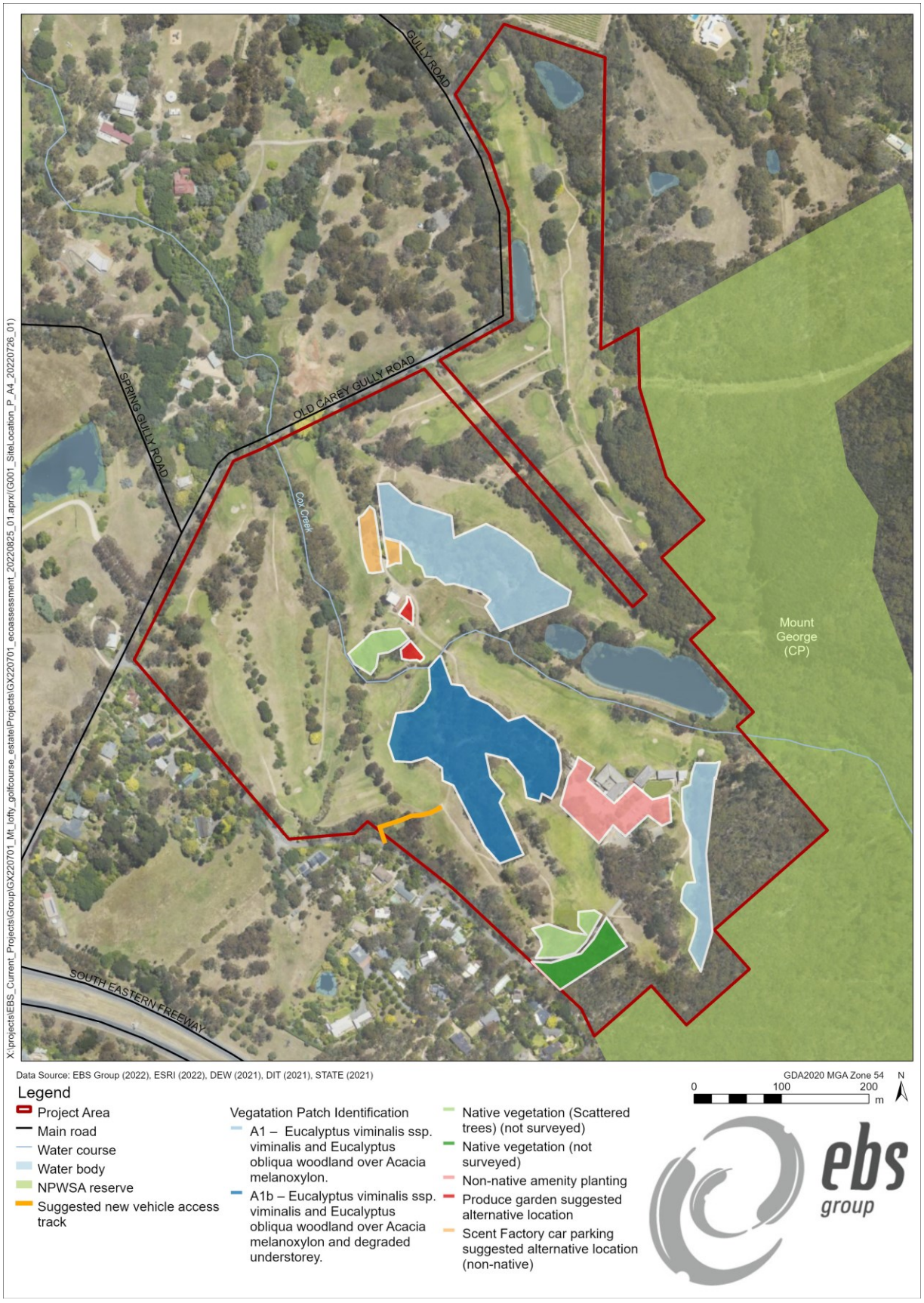

Figure 20. Vegetation and suggested areas that EBS recommends be used for associated infrastructure and roads.

Figure 21. Scent Factory car parking suggested alternative location (1 of 2).

Figure 22. Scent Factory car parking suggested alternative location (2 of 2).

Figure 23. Produce garden suggested alternative location (1 of 2).

Figure 24. Produce garden suggested alternative location (2 of 2).

Figure 25. New vehicle access suggestion (see Figure 20 for suggested route).

Figure 26. Large, scattered trees (Significant and Regulated) with a non-native understorey, adjacent the main access road.

Figure 27. Native vegetation (not surveyed) adjacent the main access road.

EBS Ecology
112 Hayward Avenue
Torrensville, SA 5031
www.ebsecology.com.au
t. 08 7127 5607