succession ecology

Native Vegetation Clearance

Spring Hut Creek

Data Report

Clearance under the *Native Vegetation Regulations 2017*

19 December 2024

Prepared by Nicholas Congedi, Jessica Lynch, and Doreen Marchesan

Document Specification

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1	19/12/2024	Nicholas Congedi, Jessica Lynch, Doreen Marchesan	Dr C. E. Timothy Paine	Draft
2	19/12/2024	Nicholas Congedi, Jessica Lynch, Doreen Marchesan	Dr C. E. Timothy Paine	Final

ACKNOWLEDGEMENT OF COUNTRY

Succession Ecology acknowledges and pays respect to the past, present and future Traditional Custodians and Elders of this nation and the continuation of cultural, spiritual and educational practices of Aboriginal and Torres Strait Islander peoples.

Glossary

AoLA	Atlas of Living Australia
BAM	Bushland Assessment Method
BDBSA	Biological Database of South Australia (maintained by DEW)
DCCEEW	Department of Climate Change, Energy, the Environment and Water (Commonwealth)
DEW	Department of Environment and Water (South Australia)
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999*
ha	Hectare
IBRA	Interim Biogeographical Regionalisation of Australia
MDBSA	Murray Darling Basin – South Australia (BCM Region)
MDJV	McConnell Dowell Diona Joint Venture
MNES	Matters of National Environmental Significance
NVC	Native Vegetation Council
PMST	Protected Matters Tool
RAM	Rangelands Assessment Methodology
SAM	Scattered Tree Assessment Methodology
SEB	Significant Environmental Benefits
TEC	Threatened Ecological Community
VA	Vegetation Association

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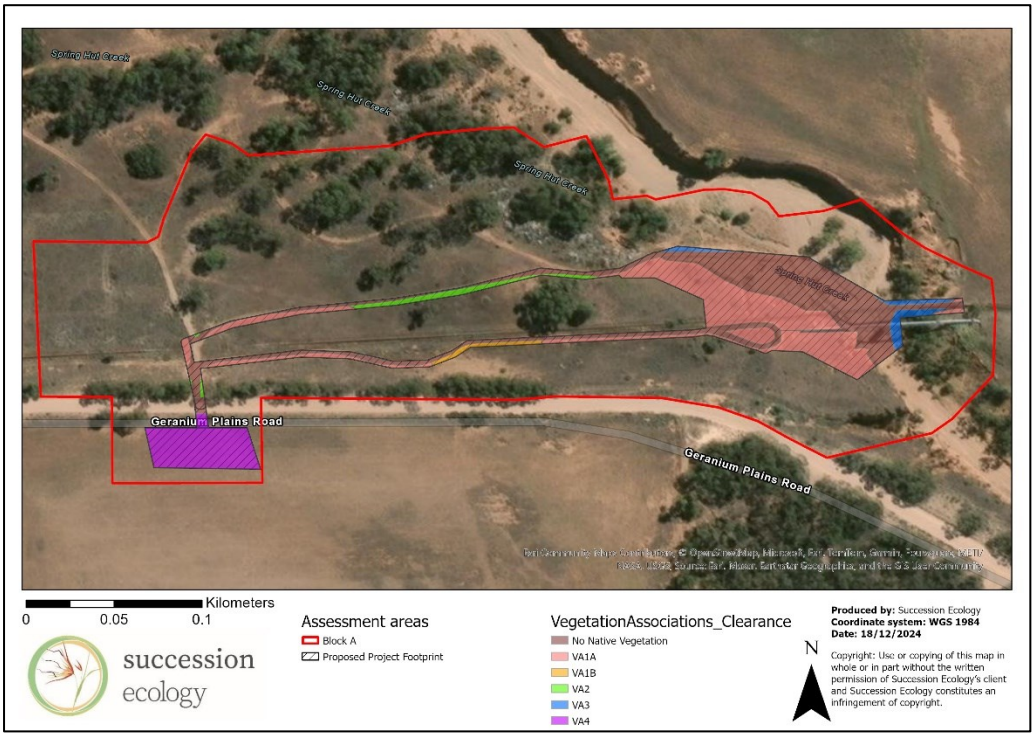
1. Application information

1.1 Application details

Applicant:	SA Water		
Key contact:			
Landowner:	Phone: Mobile:		
Site Address:	Lot 11 Lower Bright Road, Geranium Plains 762 Geranium Plains Road, Geranium Plains		
Local Government Area:	The Regional Council of Goyder	**Hundred:**	Bright
Title ID:	CT5427/171 CT5968/173	**Parcel ID:**	H200300SE11 H120800SE348

1.2 Summary of proposed clearance

Purpose of clearance	SA Water's Morgan to Whyalla pipeline crosses Spring Hut Creek east of Robertstown, SA. This pipe-bridge requires repairs where it crosses the creek. It is lead painted, hence there is a need for abrasive blasting, which will in turn require scaffolding in the creek bed to access the bridge. An access track will be required to enter the creek line below the bridge, and there will need to be erosion remediation on selected batters adjacent to the bridge.
Native Vegetation Regulation	Regulation 12, Schedule 1, clause 34, Infrastructure
Description of the vegetation under application	The vegetation to be cleared consists of four vegetation associations: VA1A - Chenopod open shrubland dominated by *Atriplex stipitata* and emergent *Eremophila longifolia* VA1B - Low chenopod shrubland with sparse *Sclerolaena obliquicuspis*, *Atriplex stipitata* and other chenopods VA2 - Open Mallee Woodland with *Eucalyptus oleosa*, *Eucalyptus brachycalyx*, and *Eucalyptus gracilis* and mixed chenopod understorey VA3 - *Eucalyptus porosa* riparian woodland with chenopod understorey VA4 - Low open chenopod shrubland dominated by *Atriplex stipitata* and *Sclerolaena obliquicuspis*, with significant *Carrichtera annua* cover

Total proposed clearance – area (ha)	The proposed clearance is **0.537 ha** of bushland
Level of clearance	Level 4
Overlay (Planning and Design Code)	Rural Murray-Darling Basin Native Vegetation Water Resources
Map of proposed Clearance Area	
Mitigation hierarchy	<u>Avoidance</u> The proposed clearance is for upgrades to the pipe-bridge infrastructure and associated maintenance areas. These works are required to improve safety for workers at the site and as such there is not an option to avoid all impacts. The majority of works have been designed to fit within already cleared areas or areas that do not consist of native vegetation such as some parts of the creekline. During the planning process for the Project, two options were explored to access the creek. A second option located about 500 m to the southeast was investigated as an option to avoid impacts to the Mallee Woodland. The second access option was not pursued however as it resulted in greater impacts to the creekline and posed significant logistical challenges, with heavy machinery having to drive along the creekline for over 500 metres increasing the risk of causing erosion damage and putting workers and machinery at greater risk of flash floods. Access from the eastern side of the bridge was deemed infeasible as the banks are too steep. <u>Minimisation</u>

	The proponent has undertaken a detailed site assessment of the proposed clearance area as well as surrounding properties and incorporated in the planning of infrastructure works to ensure the minimum amount of vegetation disturbance. The proponent has minimised the area of clearance required for access tracks by reducing the design width from the originally proposed 8 m to 4 m and located them along already existing access tracks about 2.5 m wide. This was possible by planning for vehicle movement along these routes to move only as one-way traffic rather than two-way traffic. In this way, the proponent has reduced clearance of vegetation within VA1A, VA1B, VA2 and VA3 by over half of the currently planned 0.127 ha. The proponent has also selected a site for material and equipment laydown in more degraded vegetation (VA4) that is subject to grazing and cropping across Geranium Plains Road rather than the other option explored along the creek access track in VA1A. <u>Restoration</u> The proponent has committed to the implementation of restoration works (as a subsection to an Environmental Management Plan) for areas that are not required to remain cleared following the completion of works including the laydown area across Geranium Plains Road and other areas within the creek that are not required to maintain access for maintenance works on the bridge. The proponent will also ensure weed control within these areas is carried out in accordance with their SEP and Construction Environmental Management Plan, to improve the condition of vegetation remaining in the area.
SEB Offset proposal	The proponent will contribute a payment into the fund of **$10,914.17** (including admin. fee)

2. Purpose of clearance

2.1 Description

SA Water and McConnell Dowell Diona Joint Venture (MDJV) propose to upgrade the pipe-bridge where the Morgan to Whyalla Pipeline crosses Spring Hut Creek along Geranium Plains Road near Robertstown SA. Upgrade works will require the clearance of vegetation to allow access for machinery to the top of the bridge, and through Spring Hut Creek to access the bottom of the bridge. Works to upgrade the bridge will involve abrasive blasting to remove the lead coating on the existing structure and this will involve minor noise and vibration impacts for the duration of those works. The Project will consist of the clearance of 0.537 ha of bushland vegetation including Mallee woodland, chenopod shrubland, and riparian woodland.

2.2 General location

The Project area is situated on a property adjacent to Geranium Plains Road, approximately 8 km east of Robertstown in SA. A map of the geographic context of the Project is shown in Figure 1 and proposed Project footprint and impacted vegetation associations is shown in Figure 2.

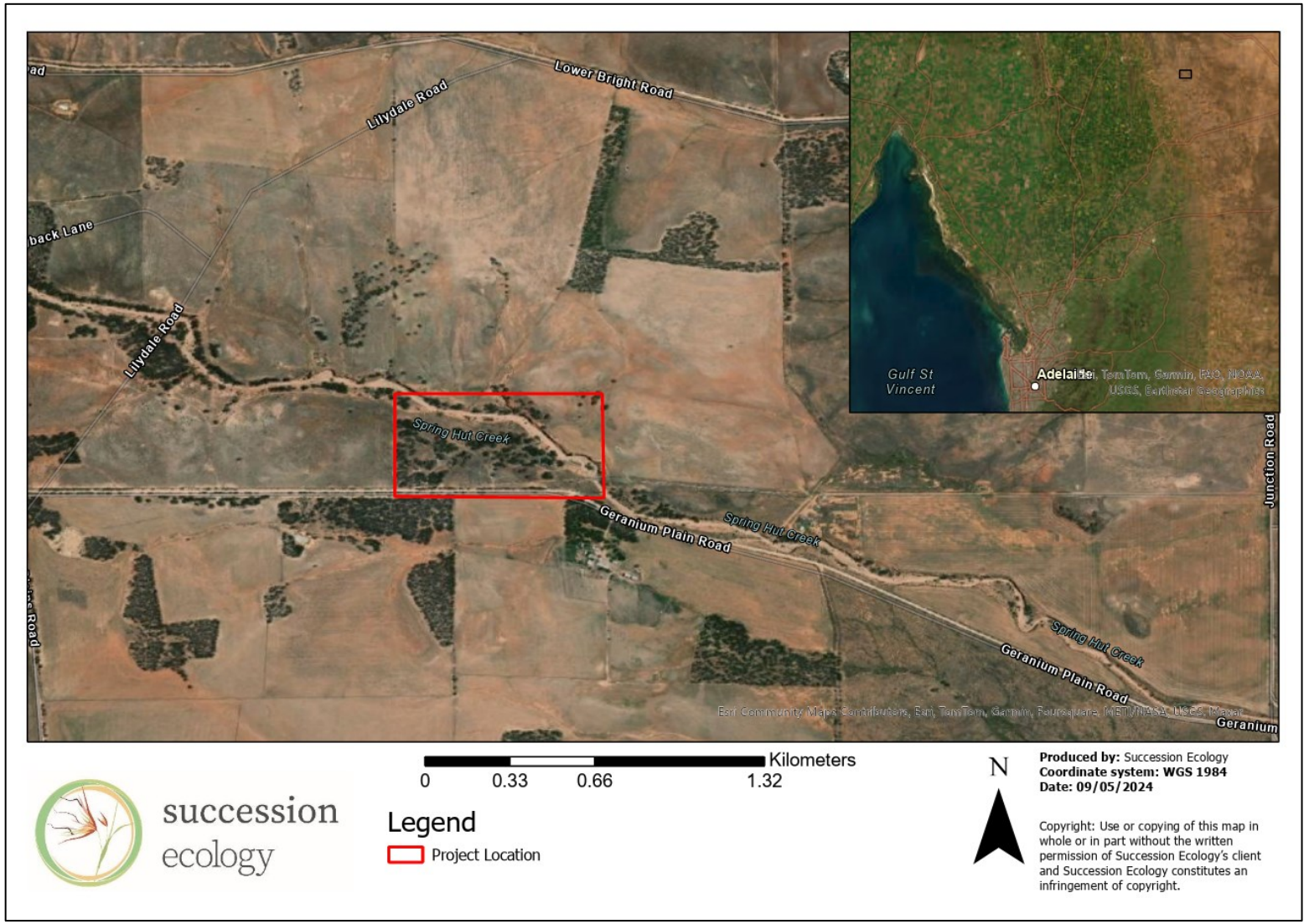


Figure 1: The general Project area for the Spring Hut Creek pipe-bridge upgrade.

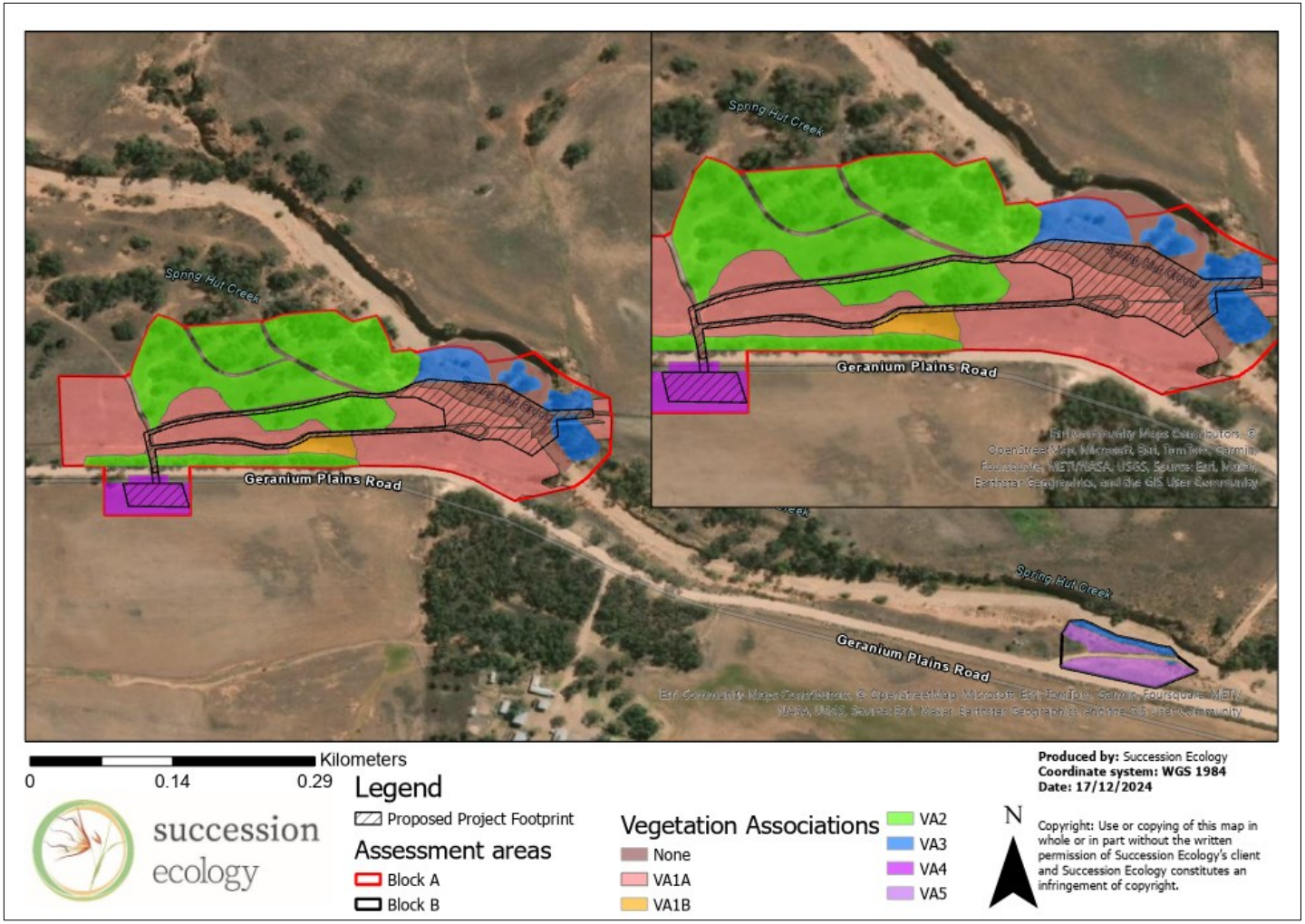


Figure 2: Location of the proposed development at Spring Hut Creek. Areas assessed by Succession Ecology in April 2024 are shown by Red and Black outlines. The final proposed footprint (black hash) only impacts vegetation associations within Block A (inset map). Areas of native vegetation are shown in red, orange, green, blue and purple. Areas of clearance where no native vegetation is present are shown in brown VA 5, which occurs only in Block B, will not be impacted.

2.3 Background

2.3.1 Administrative Boundaries

The Project is situated within the Regional Council of Goyder and close to the border of the Northern and Yorke Landscape Board and Murraylands and Riverland Landscape Board. It is located within the Murray Darling Depression Interim Biogeographic Regionalisation for Australian (IBRA) Region, the Murray Mallee Sub-region and the Sutherlands Association

2.3.2 Local and Regional Land Use

The Morgan to Whyalla pipeline bridge across Spring Hut Creek is located ~8 km from the township of Robertstown. Some of the surrounding areas consist of remnant bushland but predominant zoning and land uses in the surrounding area are agricultural land, rural-residential land and livestock grazing areas. Mimbara Conservation Park is the nearest reserve to the site, located 12.5 km to the north.

2.3.3 Native Vegetation Remnancy

The local area contains a low level of remnant vegetation, with only 12 % remnancy mapped within 5 km of the proposed action area (statistics derived from NatureMaps). The Sutherlands association contains 47 % remnancy, while the Burra Hill association, which the site is situated near the border of, contains a similar 45 % (Native Vegetation Council 2024). However, it is estimated that only 20 % of all mallee habitat that existed prior to European colonisation remains (DAWE 2021) and only 4.22 per cent of remnant vegetation is protected within the Murray Mallee IBRA Subregion (DCCEEW 2022).

2.3.4 Associated Development

There are no further stages to the planned development.

2.4 Details of the proposal

The works associated with the bridge repair and upgrade will consist of the clearing of vegetation for widening of existing access tracks from ~2.5 m to 4 m to allow the movement of one-way heavy vehicle traffic. Vegetation will also be cleared surrounding the site of the bridge for the movement of vehicles, erecting scaffolding underneath the existing bridge and controlling erosion and run off along the top of the creek bank southwest of the bridge where it poses a risk to the infrastructure. A complete summary of equipment and activities is found in Table 1, a breakdown of clearance areas for each component of the Project is found in Table 2, and designs of the Project are found in Figures 3 and 4.

Table 1: A summary of machinery to be used during the Project and the proposed construction activities to complete the bridge upgrade.

Machinery to be used for the Project	• Slew Crane • Franna Crane • Earthmoving Machinery (excavator, skidsteer, etc.) • Concrete Boom Pump
Project construction activities	• Widening and construction of improved access track to the top of the pipe-bridge through chenopod shrubland and mallee woodland to a width of 4 m (including existing track) • Installation of a bund wall to divert surface run-off away from rock wall in the creek. • Widening and resurfacing the access track (4 m width) to the bottom of the pipe-bridge through Spring Hut Creek to the north, through chenopod shrubland and open mallee woodland. • Installation of a platform in Spring Hut Creek to enable establishment of scaffolding underneath the pipe-bridge and enclosure of the structure. • Removal of loose material and some vegetation on the eastern end of the bridge to expose sound rock to support scaffolding. • Conducting abrasive blasting of the structure to remove the lead coating within an enclosing structure. • Any by-product from abrasive blasting is pumped out to be transported offsite, avoiding any pollution of the lead waste product. • Installation of new steel members (walkway and handrails) to ensure bridge meets current standards. • Painting of new structure within enclosure to ensure infrastructure longevity. • Removal of enclosing structure and scaffolding.

Table 2: Breakdown of clearance associated with each component of infrastructure.

Infrastructure component	**Clearance area (ha)**
Access tracks	0.127
Construction areas for bridge repairs (machinery movement areas, scaffolding)	0.291
Equipment laydown areas	0.119
Total	**0.537**

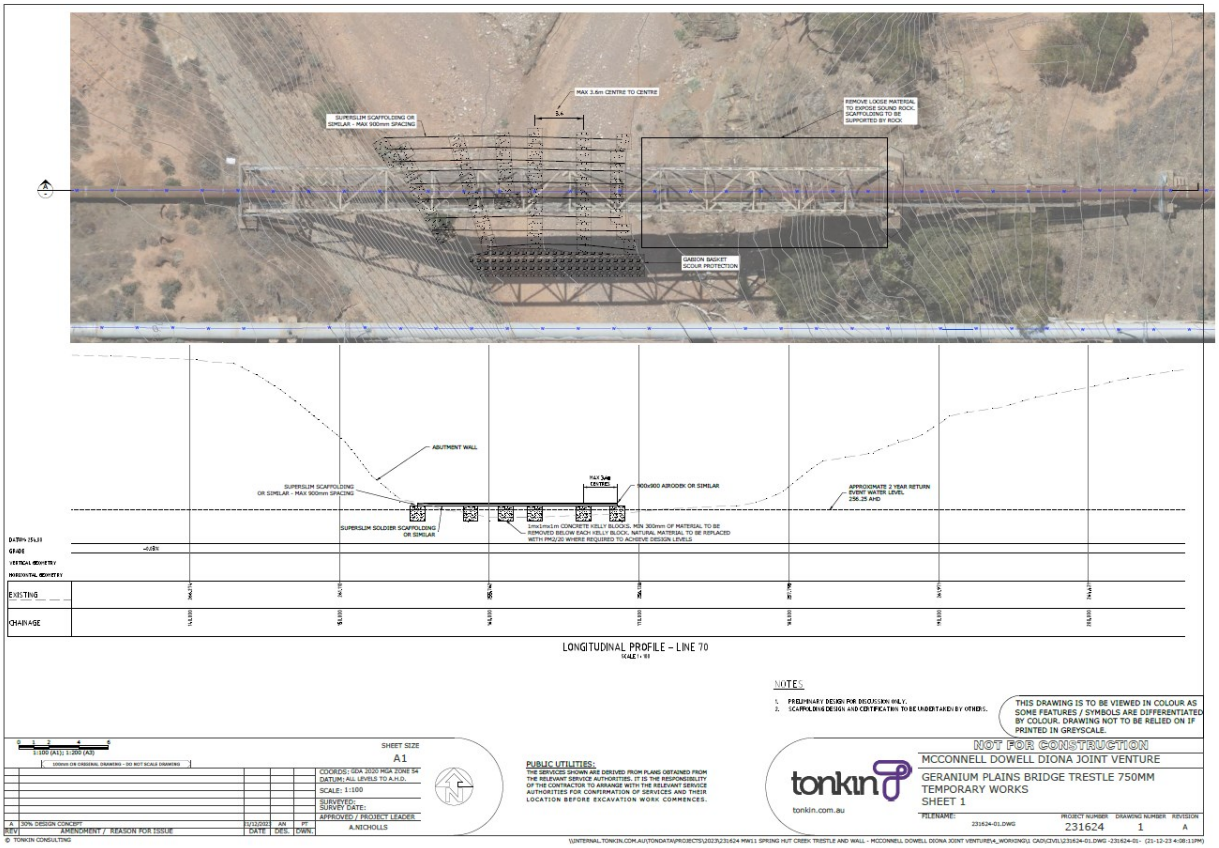


Figure 3: Preliminary layout of bridge upgrade components for the proposed action by SA Water and McConnell Dowell Diona Joint Venture.

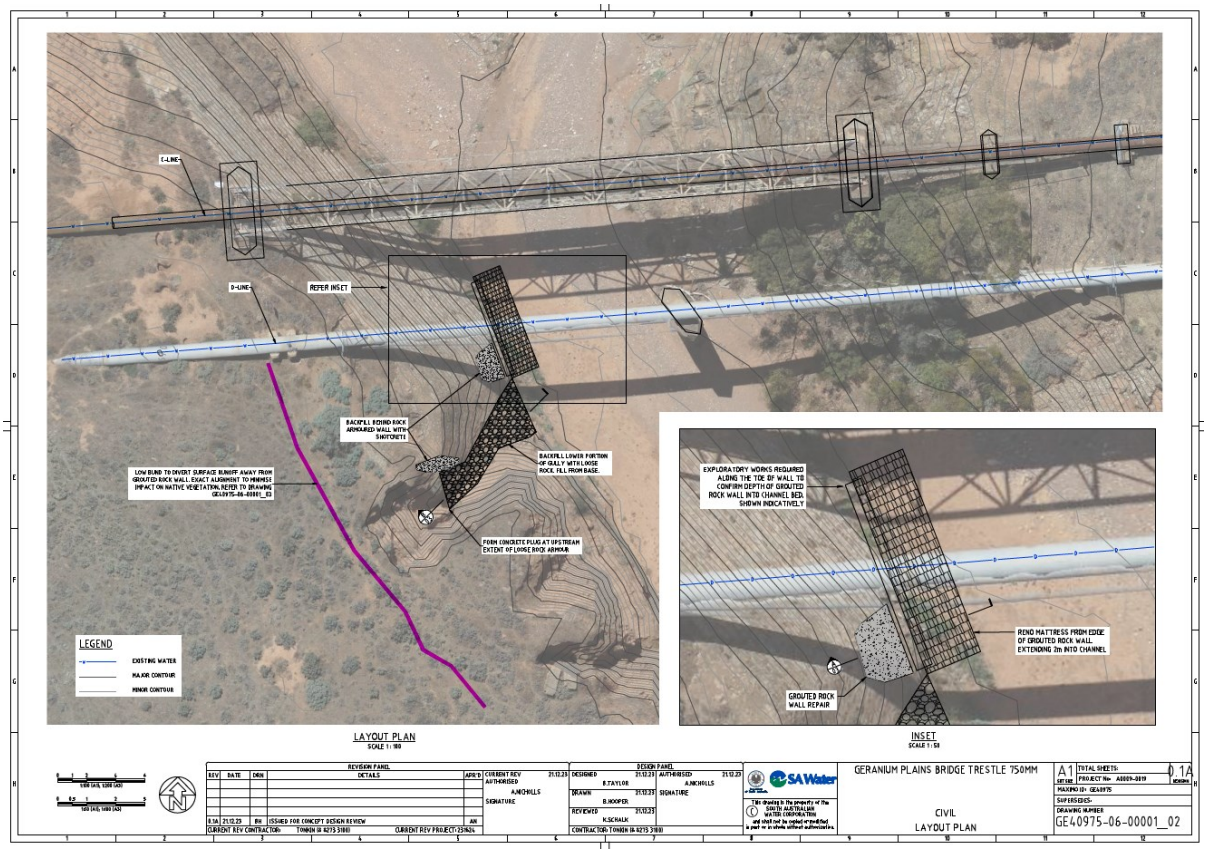


Figure 4: Preliminary layout of the erosion remediation components for the proposed action by SA Water and McConnell Dowell Diona Joint Venture.

2.5 Approvals required or obtained

- The Project is subject to the *Planning, Development and Infrastructure Act 2016* (*PDI Act)* with a planning submission currently being developed for assessment by the South Australian Planning Commission (SCAP).
- The Project requires a water affecting activity permit in accordance with the Landscape South Australia Act 2019, Subdivision 3 - Control of Activities, Section 104 - Water affecting activities.
- Under the Aboriginal Heritage Act 1988, any impacts to aboriginal heritage need to be assessed, the client should engage a suitable consultant for this assessment.
- An *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)* Self-assessment has been undertaken for the Project, in which it was assessed that the Project will **not** result in any significant impacts to Matters of National Environmental Significance, and as such will **not** require referral under the *EPBC Act*.

2.6 Native vegetation regulation

The proposed clearance will be assessed under Regulation 12, Schedule 1, clause 34, Infrastructure.

2.7 Development Application Information

The Project is situated within the Rural Zone and within the Native Vegetation Overlay.

3. Method

3.1 Flora and Fauna assessment

3.1.1 Desktop assessment

A desktop assessment was conducted to undertake preliminary mapping of native vegetation protected under the *NV Act 1991* via the NatureMaps tool. This mapping was used to plan the assessment and inform the field methodology.

The desktop assessment was also undertaken to determine the threatened ecological communities, flora species, and fauna species that potentially occur in the area. Communities and species were evaluated as threatened if they were listed under the *National Parks and Wildlife (NPW) Act 1972* and/or the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*, as outlined below:

- ***NPW Act 1972***
  - Schedule 7 – Endangered Species
  - Schedule 8 – Vulnerable Species
  - Schedule 9 – Rare Species
- ***EPBC Act 1999***

Part 13 – Species and communities – Division 1- Listed threatened species and ecological communities – Subdivision A – Listing – 178 Listings of threatened Species

  - Section 178 (c) – Critically Endangered
  - Section 178 (d) – Endangered
  - Section 178 (e) – Vulnerable

Threatened communities and species were evaluated if they had been recorded within 5 km of the Project site since 1995 or were considered 'known' to occur within the search area via the Protected Matters Search Tool.

Databases searched during the desktop assessment included:

- Protected Matters Search Tool (PMST): to identify Matters of National Environmental Significance (MNES) under the *EPBC Act 1999,* including nationally threatened species and ecological communities, 'known' to occur in the search area.
- NatureMaps: to identify records of threatened flora and fauna listed under either the *NPW Act 1972* or *EPBC Act 1999*, recorded since 1995 within the search area.
- Atlas of Living Australia (AoLA): to identify threatened flora and fauna listed under either the *NPW Act 1972* or *EPBC Act 1999*, recorded since 1995 within the search area. Records from 'citizen science' initiatives are excluded from results.
- Appendices in the NVC Bushland and Scattered Tree Assessment Manuals: to determine scattered trees species that provide suitable habitat for threatened fauna and threatened ecological communities protected under *NPW Act 1972*.
- DEH (in progress) unpublished and provisional list of Threatened Ecosystems: to identify threatened and rare ecosystems.

A likelihood of occurrence/habitat use assessment was carried out for threatened communities, fauna and flora species identified during the Desktop Assessment. The likelihood of these species using the site following the metric described in Table 3.

The distribution of vegetation associations were assessed using satellite imagery and vegetation community data obtained through NatureMaps. All maps were generated using ArcGIS Pro.

Table 3: Criteria for the likelihood of occurrence/habitat use of species within the survey area.

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

3.1.2 Field Survey

A vegetation survey was conducted on 22 April 2024. Ground truthing of vegetation communities identified in the desktop assessment was carried out and the vegetation subject to clearance was surveyed using the Bushland Assessment Methodology (Native Vegetation Council 2024). Careful inspection was undertaken to identify any threatened flora and threatened fauna species known to occur in the region.

As a Level 4 assessment Succession Ecology consulted with the Native Vegetation Branch on the fauna survey requirements for this Project, proposing targeted bird surveys for threatened bird species of 1 hour in each VA, morning and evening. Correspondence from Graham Carpenter on 21 November 2024 indicated that the proposed bird surveys were acceptable (with particular interest in Southern Whiteface distribution in the area) and would satisfy the fauna survey requirements for the Project. Further detail on surveys conducted at the site are below:

Wombat surveys and management

The presence of Southern Hairy-nosed Wombat activity including active warrens (burrow networks), scats and recent digging was observed within the proposed Project area during the vegetation survey. This prompted SA Water to engage Succession Ecology and Dr Glenn Shimmin (Shimmin Consultants) to prepare a Wombat Management Plan (WMP) for the site to guide SA Water and MDJV on ways to avoid Wombat-Project interactions that could impact SHNW or the Project. The aim of wombat management is to reduce risks to infrastructure, personnel safety, Project delivery, and ensure the humane and ethical treatment of wombats, in line with relevant legislation. As the faunal emblem of South Australia, Wombats are protected under state legislation (*NPW Act*) and an appropriate permit will be necessary prior to the implementation of any lethal methods of control. The WMP provides a thorough options analysis of the methods that can be used to remove wombats from high-risk areas.

Bird Surveys

Targeted bird surveys were conducted from the 16 to 17 December 2024 to determine the presence of threatened species within the Project area.

These threatened species fall into three overlapping categories:

- Species protected under *NPW Act*: South-eastern Hooded Robin, White-winged Chough, Little Eagle.

- Species protected under *EPBC Act*: Southern Whiteface, South-eastern Hooded Robin and Diamond Firetail.
- Species associated with the Mallee Bird Community of the Murray Darling Depression Bioregion (MDD) Threatened Ecological Community (TEC), protected under the *EPBC Act*: (Table 9).

The Project impacts five Vegetation Associations, however as some of these patches are small (about 0.1 ha) they were lumped into three main vegetation types for the purpose of the bird surveys. This included Mallee woodland (VA2), Chenopod shrubland (VA1A, VA1B and VA4) and riparian woodland vegetation (VA3). Observers conducted 30-minute surveys in pairs across the three lumped VAs, within three hours of sunset and sunrise. As the Project area is relatively small, bird surveys were extended into adjacent patches of mallee woodland, and creek line vegetation within the broader area. This was done to better represent species diversity, as birds within the area are highly likely to move between these patches. For the purpose of this report, these areas were assigned as VA2 and VA3 respectively, as their vegetation was consistent with those found in the Project area, however no formal vegetation assessment was done in these patches.

In line with the approved ethics permit (Project number 20/2024 *Robertstown East Solar Farm targeted reptile surveys),* a maximum of two call-playbacks were used per survey to verify the presence of Southern Whiteface, Jacky Winter, South-eastern Hooded Robin, and Diamond Firetail. For White-winged Chough, Little Eagle and species of the Mallee Bird Community TEC, presence was verified via direct observation or identification of bird call or song. Observers also recorded opportunistic observations of non-threatened species.

4. Assessment outcomes

4.1 Vegetation assessment

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

IBRA Regions

The Project area is located within the Murray Darling Depression IBRA Region (Table 4), the Murray Mallee Subregion and the Sutherlands Association.

Table 4: Characteristics of the Murray Darling Depression IBRA Bioregion.

Murray Darling Depression IBRA Region	
The Murray–Darling Depression bioregion is characterised by extensive undulating plains, linear and parabolic dunes, and lakes. The Darling and Murray Rivers flow through the bioregion. The vegetation consists mainly of mallee shrublands with a chenopod shrub understorey, rosewood–belah open woodlands and bluebush chenopod shrublands. Leasehold grazing is the major tenure in rangeland areas, and small freehold blocks exist on the interface with the cropping zone. Irrigated and dryland cropping, sheep grazing, horticulture and mining are all important to the regional economy. Ivanhoe, Dareton and Gol Gol are the major population centres.	
Land type	Depositional or Bare rock.
Landscape	Depositional plain.
Landform	Plains with variable dune cover, from dune formations with relatively small plains between to plains with isolated tracts of dunes. Claypans, saline soils, swamps, and intermittent lakes in low-lying areas.
Geology	Exposed caliche & crusty loamy soils; colluvial sand, silt, clay & gravel along footslopes of Olay Spur. Evaporite deposits; gypsum & halite.
Soil	Brown calcareous earths, highly calcareous loamy earths, Cracking clays, yellow grey, hard setting loamy soils with red clayey subsoils.
Vegetation	Mallee woodland and shrubland.
Climate	E6: Semi-arid climate that is too dry to support field crops. Soil moisture tends to be greatest in winter.

The site is very close to the border with the Flinders Lofty Block IBRA Region (Table 5) and more specifically the Broughton subregion and the Burra Hill association. As such, the site has characteristics of both regions. The context of the site within these IBRA regions is shown in Figure 5.

Table 5: Characteristics of the Flinders Lofty Block IBRA Bioregion.

Flinders Lofty Block IBRA Region
The Flinders Lofty Block bioregion has a general pattern of mountain ranges, ridges and wide, flat plains. Vegetation types are related to landforms, with eucalypts on hills and ranges that receive higher rainfall, mulga in the drier areas, and sparse low shrubs or spinifex on stony areas. The area is mainly used for sheep and cattle grazing. Conservation reserves and associated tourism

are also important. Coal is mined at Leigh Creek and there is limited dryland agriculture in the south and east. Major population centres are Olary, Hawker, Quorn, and Leigh Creek.	
Land type	Erosional/Depositional.
Landscape	Low hills.
Landform	Ranges and hills with extensive rock outcrop and shallow soils; stony pediments and small basin plains; some remnants of stony downs; narrow valleys, some with gorges. Ranges and hills in form of hogback ridges in quartzite.
Geology	Bare rock; some alluvium & colluvium (sand, silt & clay); less common dune sand & some sand mantles. Calcreted gravels derived from silcreted deposits & probably equate with Ripon Calcrete. Younger Telford gravels (Middle Pleistocene).
Soil	Loamy soils with weak pedologic development, crusty loamy soils with red clayey subsoils.
Vegetation	Chenopod Shrub, Samphire Shrub and Forbland.
Climate	E6: Semi-arid climate that is too dry to support field crops. Soil moisture tends to be greatest in winter.

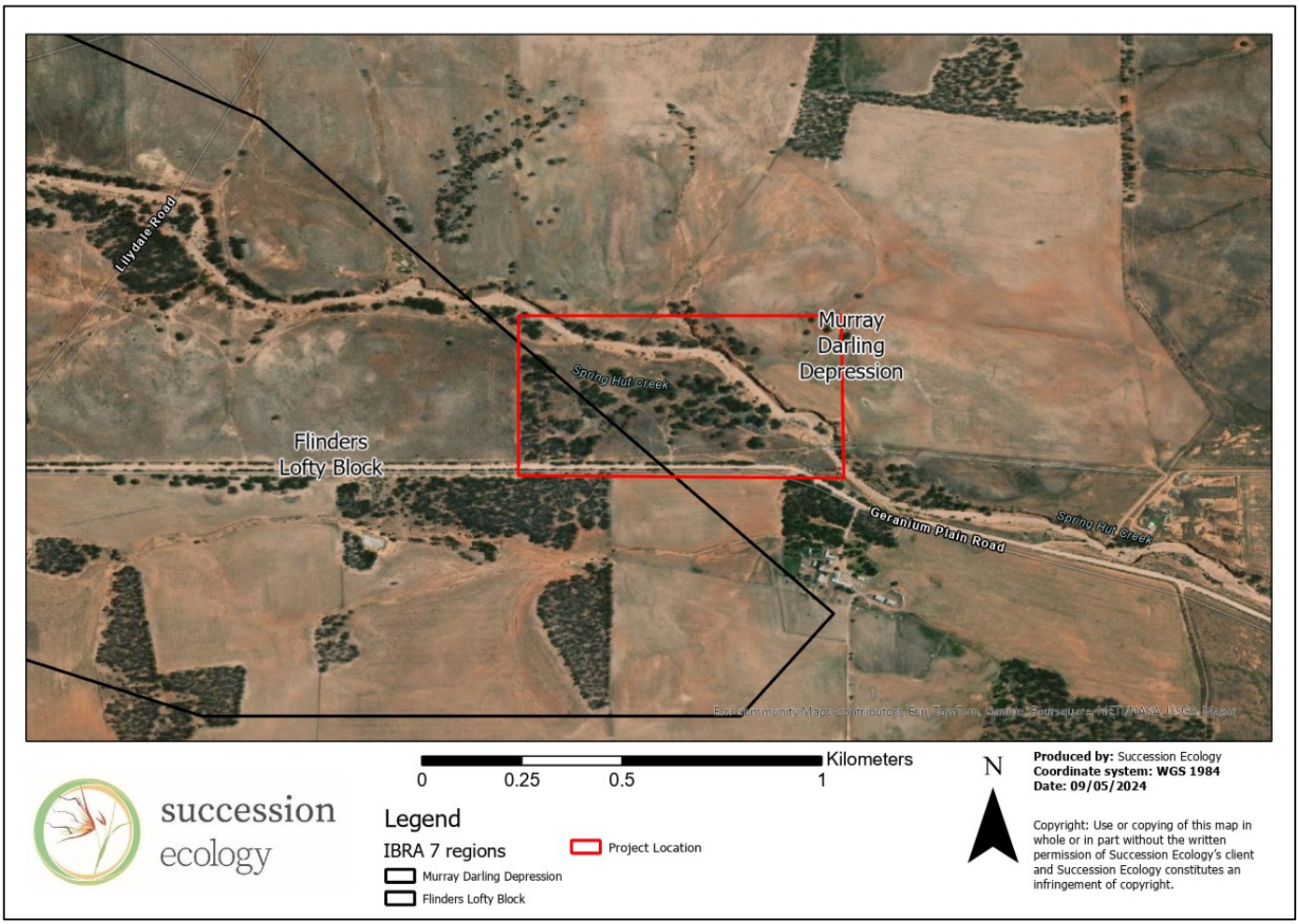


Figure 5: General site location for the Spring Hut Creek development in the context of relevant IBRA regions.

Vegetation Overview

The vegetation assessed during the field survey consists of six vegetation associations (Table 6). Refinements to the design have resulted in only five of these vegetation associations being impacted. The Project area has significant variation, ranging from sparse shrubland to mallee woodland, to sparse wooded riparian areas. Chenopod (Amaranthaceae) species are most prevalent across the landscape and are generally dominant in most VAs, however VA2 has an overstorey of *Eucalyptus* species and other larger non-chenopod shrubs. VA1A and VA1B are open chenopod shrublands of differing condition based on native species diversity, vegetation cover, vegetation height and prevalence of weeds. VA2 has a mallee eucalypt overstorey with a greater diversity of understorey plants than in the shrublands. This VA has been identified to present key diagnostic features of the Mallee Bird Community of the Murray Darling Depression Bioregion. VA3 is a sparsely wooded erosional creekline system with *Eucalyptus porosa* as the dominant overstorey species and a mainly chenopod understorey. VA4 consists of a low chenopod shrubland persisting in the paddock across Geranium Plains Road and is subject to cropping and grazing regimes as per previous land use cycles. VA5 is a chenopod open shrubland with lower diversity than other shrublands found within the Project area and strongly dominated by *Maireana pyramidata*. In the final designs, there are no impacts to this vegetation association, as such it has not been included in Section 4.1.2. A full list of species identified during the field survey is presented in Appendix A.

Table 6: Summary of vegetation associations identified at the Spring Hut Creek Project area.

Vegetation Association	**Clearance area (ha)**
VA1A - Chenopod open shrubland dominated by *Atriplex stipitata and* emergent *Eremophila longifolia*	0.334
VA1B - Low chenopod shrubland with sparse *Sclerolaena obliquicuspis, Atriplex stipitata* and other chenopods	0.013
VA2 - Open Mallee Woodland with *Eucalyptus oleosa, Eucalyptus brachycalyx*, and *Eucalyptus gracilis* and mixed chenopod understorey	0.032
VA3 - *Eucalyptus porosa* riparian woodland with chenopod understorey	0.033
VA4 - Low open chenopod shrublands dominated by *Atriplex stipitata* and *Sclerolaena obliquicuspis*, with significant *Carrichtera annua* cover	0.124
VA5 - Chenopod open shrubland dominated by *Maireana pyramidata*	0.000
No native vegetation (including previously cleared tracks)	0.392
Total Project Footprint (vegetation clearance and already cleared areas)	**0.929**
Total Native Vegetation Clearance	**0.537**

Landscape context

The surrounding landscape features gently undulating plains, mostly cleared for grazing or cropping with areas of remnant mallee woodland and shrubland in between. Deep ephemeral watercourses are common throughout the area including Spring Hut Creek, which the pipeline crosses. These watercourses are seasonal in nature and commonly dry throughout the hotter period of the year. The sides of these watercourses are steep erosion cliffs, particularly on the bends of the river. The climate in the Project area is semi-arid with mean annual rainfall of 312 mm (data sourced from NatureMaps).

4.1.2 Details of the vegetation associations proposed to be impacted

Vegetation Association	VA1A: Chenopod open shrubland dominated by *Atriplex stipitata and* emergent *Eremophila longifolia*

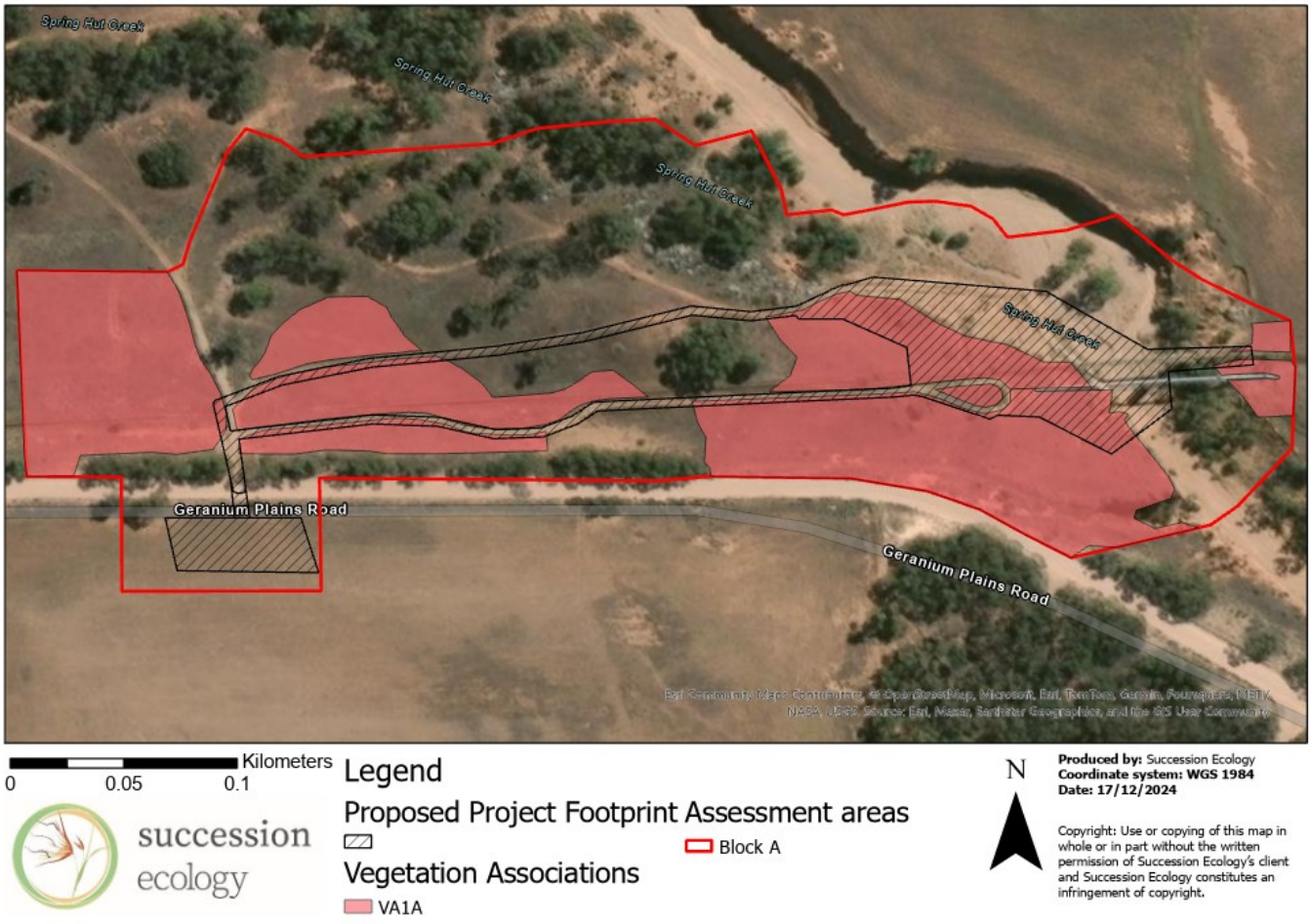


Figure 6: Bushland Assessment area for VA1A showing the overlap with the Project footprint

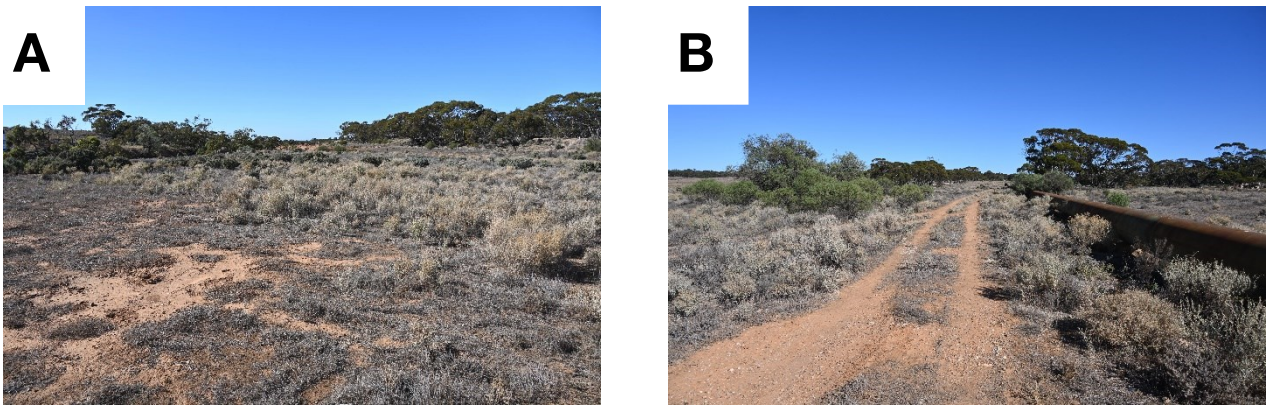


Figure 7: The chenopod shrubland within VA1A including mostly low shrubs (A) the existing track through the shrubland and emergent Eremophila longifolia *(B).*

Vegetation Association	**VA1A: Chenopod open shrubland dominated by *Atriplex stipitata and* emergent *Eremophila longifolia***

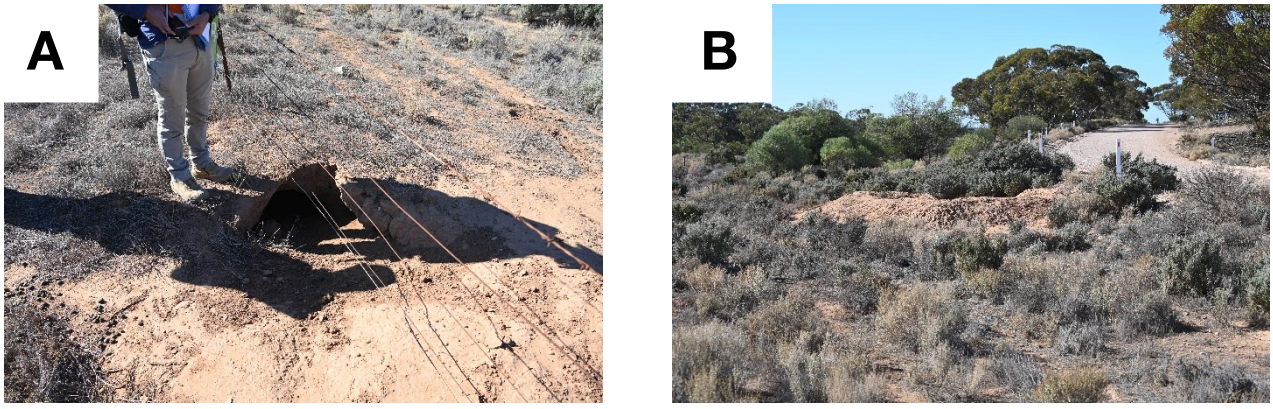


Figure 8: Wombat burrows identified within the VA1A vegetation association along a fenceline (A) and near Geranium Plains Road (B).

General description	This vegetation association has been scored against BCM Community MDBSA 2.2: Chenopod Open Shrublands. Vegetation at this site is in moderate to good condition. This vegetation association is dominated by *Atriplex stipitata*. Other prevalent species include *Maireana brevifolia, Sclerolaena obliquicuspis, Dissocarpus paradoxus* and *Maireana pyramidata*. A notable feature of this VA is emergent *Eremophila longifolia* shrubs that are the tallest vegetation in the association. Many Southern Hairy Nosed Wombat burrows were observed on site, with varying evidence of activity. These are at risk of sustaining impacts from the Project. In addition, they pose a risk to the Project works and associated infrastructure by destabilising soil around the pipeline 'chairs' or supports, as well as along the edges of the creek. Burrows are present within areas where workers will need to walk and where tracks will need to be upgraded and widened.
Threatened species or community	**Threatened Ecological Communities** One Threatened Ecological Community (TEC) under the *EPBC Act,* Mallee Bird Community of the Murray Darling Depression Bioregion (Mallee Bird TEC) was identified as known to occur within 5 km of the Project area during the desktop assessment. The field survey and desktop assessment identified that this TEC was not present within VA1A, however it is present in the adjacent VA2. **Threatened Fauna** The desktop search identified 23 threatened fauna species listed under the *EPBC Act* and *NPW Act* as previously recorded within the search area. Of these, five are considered Possible, Likely, Highly Likely or Known to occur within VA1A. They include: • *Aphelocephala leucopsis* (Southern Whiteface) *EPBC Act* (VU) – **Likely** • *Corcorax melanorhamphos* (White-winged Chough) *NPW Act* (R) – **Known** • *Hieraaetus morphnoides* (Little Eagle) *NPW Act* (V) – **Likely** • *Melanodryas cucullata cucullata* (South-eastern Hooded Robin) *EPBC Act* (EN), *NPW Act* (R) • *Merops ornatus* (Rainbow Bee-eater) *EPBC Act* (Listed Overfly Marine) – **Known** These species are discussed further in section 4.2.2. The Rainbow Bee-eater was identified during a site visit in December 2023 by SA Water and in the targeted bird survey in December 2024 by Succession Ecology. White-winged Chough was identified in adjacent vegetation in the December 2024 survey. No other threatened fauna species were identified at the site.

<table>
<tr><td>Vegetation Association</td><td colspan="5">VA1A: Chenopod open shrubland dominated by Atriplex stipitata and emergent Eremophila longifolia</td></tr>
<tr><td></td><td colspan="5">Threatened Flora

A desktop search identified two threatened flora species listed under the EPBC Act and NPW Act as previously recorded within the search area. Neither of these species are considered Likely, Highly Likely or Known to occur within VA1A and none were observed during the field survey.</td></tr>
<tr><td>Landscape context score</td><td>1.15</td><td>Vegetation Condition Score</td><td>51.15</td><td>Conservation significance score</td><td>1.10</td></tr>
<tr><td>Unit biodiversity Score</td><td>64.70</td><td>Area (ha)</td><td>0.334</td><td>Total biodiversity Score</td><td>21.61</td></tr>
<tr><td colspan="6">NPW Act; E= Endangered, V = Vulnerable, R= Rare

EPBC Act; Ex = Extinct, CR = Critically endangered, EN = Endangered; VU = Vulnerable</td></tr>
</table>

Vegetation Association	VA1B: Low chenopod shrubland with sparse *Sclerolaena obliquicuspis, Atriplex stipitata* and other chenopods

Figure 9: Bushland Assessment area for VA1B showing the overlap with the Project footprint.

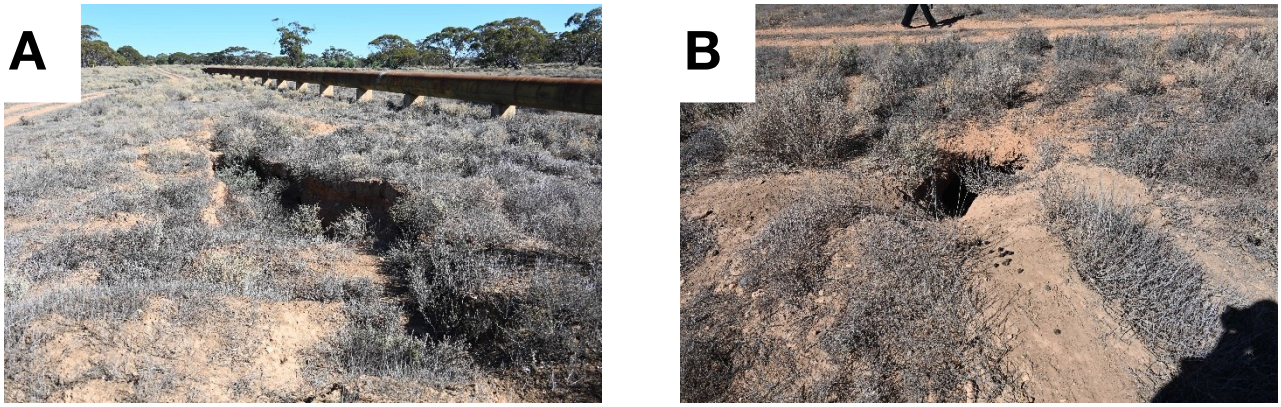


Figure 10: Examples of the degraded vegetation within VA1B.

Vegetation Association	**VA1B: Low chenopod shrubland with sparse *Sclerolaena obliquicuspis, Atriplex stipitata* and other chenopods**				
General description	This vegetation association has been scored against BCM Community MDBSA 2.2: Chenopod Open Shrublands. This vegetation association is dominated by introduced species including *Carrichtera annua* and *Mesembryanthemum nodiflorum*. Dominant native species include *Sclerolaena obliquicuspis, Atriplex stipitata,* and *Maireana brevifolia*. The general condition of this VA is considered low due to the lack of native species diversity and heavy invasion by weeds including the Declared plant *Marrubium vulgare*.				
Threatened species or community	**Threatened Ecological Communities** One Threatened Ecological Community (TEC) under the *EPBC Act,* Mallee Bird Community of the Murray Darling Depression Bioregion (Mallee Bird TEC) was identified as known to occur within 5 km of the Project area during the desktop assessment. The field survey and desktop assessment identified that this TEC was not present within VA1B, however it is present in the adjacent VA2. **Threatened Fauna** The desktop search identified 23 threatened fauna species listed under the *EPBC Act* and *NPW Act* as previously recorded within the search area. Of these, five are considered Possible, Likely, Highly Likely or Known to occur within VA1BA. They include: • *Aphelocephala leucopsis* (Southern Whiteface) *EPBC Act* (VU) – **Likely** • *Corcorax melanorhamphos* (White-winged Chough) *NPW Act* (R) – **Known** • *Hieraaetus morphnoides* (Little Eagle) *NPW Act* (V) – **Likely** • *Melanodryas cucullata cucullata* (South-eastern Hooded Robin) *EPBC Act* (EN), *NPW Act* (R) • *Merops ornatus* (Rainbow Bee-eater) *EPBC Act* (Listed Overfly Marine) – **Known** These species are discussed further in section 4.2.2. The Rainbow Bee-eater was identified during a site visit in December 2023 by SA Water and in the targeted bird survey in December 2024 by Succession Ecology. White-winged Chough was identified in adjacent vegetation in the December 2024 survey. No other threatened fauna species were identified at the site. **Threatened Flora** A desktop search identified two threatened flora species listed under the *EPBC Act* and *NPW Act* as previously recorded within the search area. None of these species are considered Likely, Highly Likely or Known to occur within VA1B and none were observed during the field survey.				
Landscape context score	1.15	**Vegetation Condition Score**	17.74	**Conservation significance score**	1.10
Unit biodiversity Score	22.44	**Area (ha)**	0.013	**Total biodiversity Score**	0.29
NPW Act; E= Endangered, V = Vulnerable, R= Rare EPBC Act; Ex = Extinct, CR = Critically endangered, EN = Endangered; VU = Vulnerable					

Vegetation Association	**VA2: Open Mallee Woodland with *Eucalyptus oleosa, Eucalyptus brachycalyx*, and *Eucalyptus gracilis* and mixed chenopod understorey**

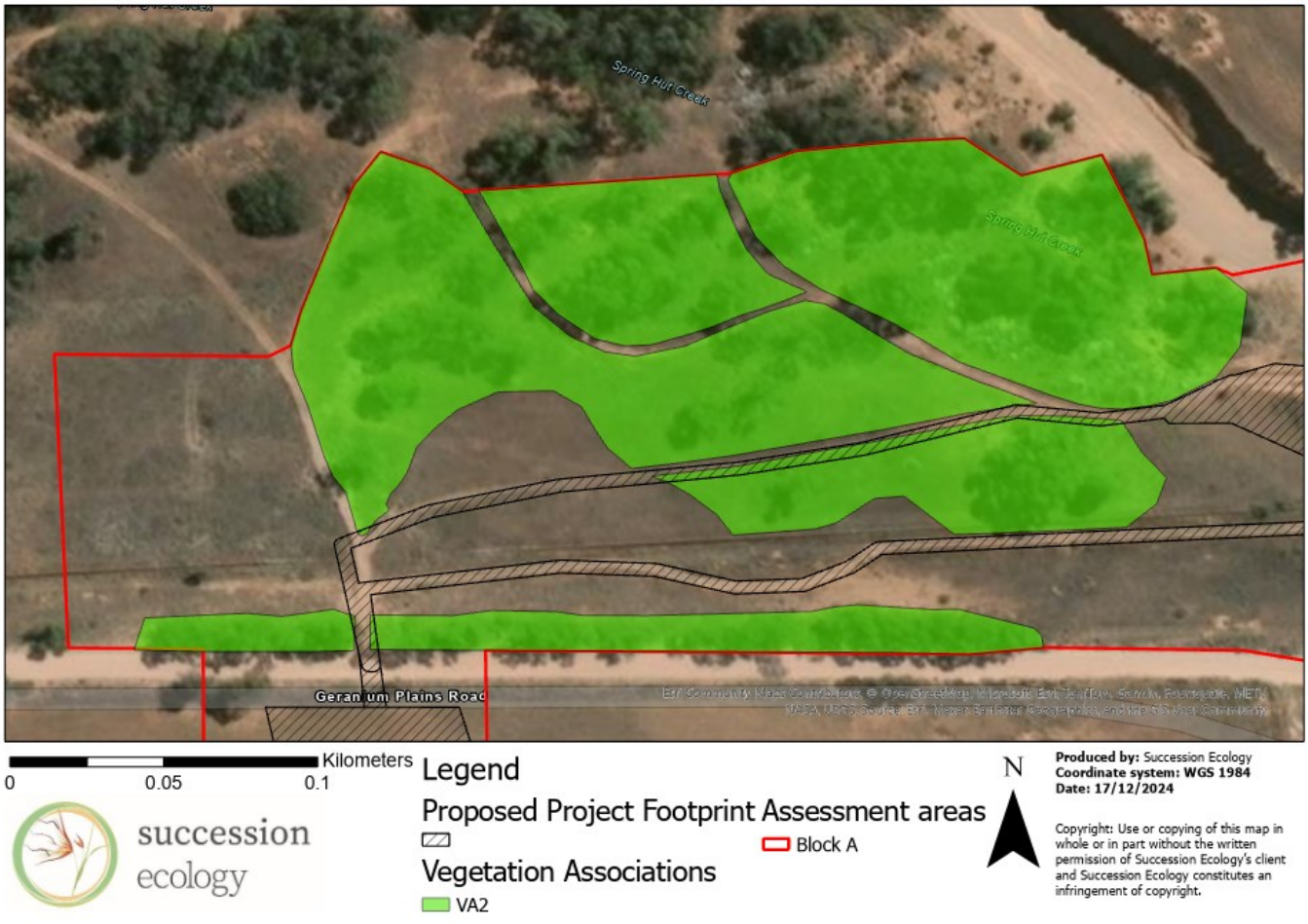


Figure 11: Bushland Assessment area for VA2 showing the overlap with the Project footprint.

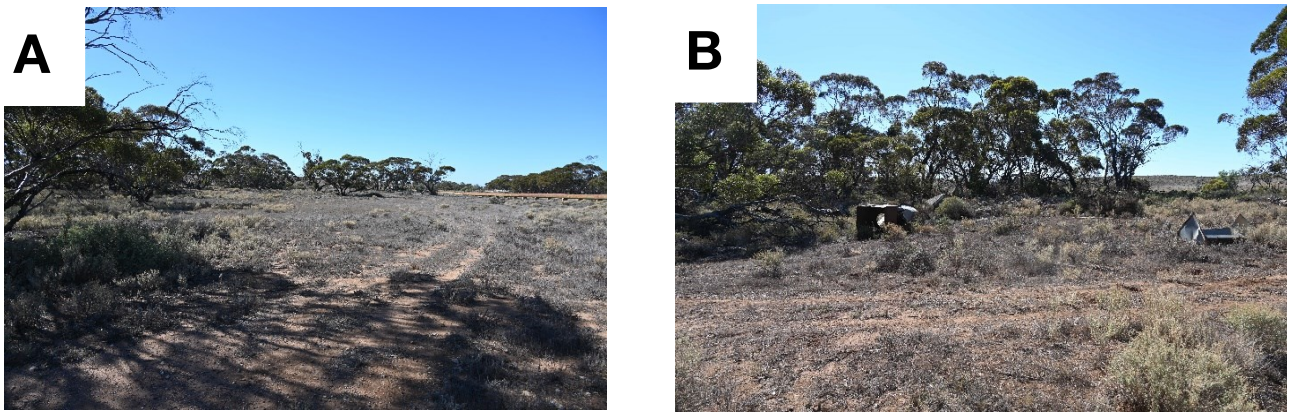


Figure 12: Examples of the Mallee Woodland vegetation within VA2, with an example of discarded rubbish shown in photo B.

<table>
<tr><td>Vegetation Association</td><td colspan="5">VA2: Open Mallee Woodland with Eucalyptus oleosa, Eucalyptus brachycalyx, and Eucalyptus gracilis and mixed chenopod understorey</td></tr>
<tr><td>General description</td><td colspan="5">This vegetation association has been scored against BCM Community MDBSA 2.1: Open Mallee/Low Open Woodland with Chenopod Shrub Understorey. This vegetation is considered to be in moderate to good condition with high native species diversity. Some disturbance can be found in the form of rubbish dumping in a localised area and some weed invasion. African Boxthorn is present at the site, but evidence of control efforts was observed. This vegetation association is dominated by overstorey species of Eucalyptus oleosa, E. brachycalyx, and E. gracilis. In the understorey, various chenopod species are present including Maireana brevifolia, Atriplex stipitata, Dissocarpus paradoxus, Rhagodia spinescens, and Nitraria billardierei. Other species of note include Acacia oswaldii, Geijera linearifolia, and Roepera aurantiaca ssp. aurantiaca.</td></tr>
<tr><td>Threatened species or community</td><td colspan="5">Threatened Ecological Communities

One Threatened Ecological Community (TEC) under the EPBC Act, Mallee Bird Community of the Murray Darling Depression Bioregion (Mallee Bird TEC) was identified as known to occur within 5 km of the Project area during the desktop assessment. The field survey and desktop assessment identified that this TEC was present within VA2 – Open Mallee Woodland when assessed against the criteria.

Threatened Fauna

The desktop search identified 23 threatened fauna species listed under the EPBC Act and NPW Act as previously recorded within the search area. Of these, five are considered Possible, Likely, Highly Likely or Known to occur within VA1BA. They include:

• Aphelocephala leucopsis (Southern Whiteface) EPBC Act (VU) – Likely
• Corcorax melanorhamphos (White-winged Chough) NPW Act (R) – Known
• Hieraaetus morphnoides (Little Eagle) NPW Act (V) – Likely
• Melanodryas cucullata cucullata (South-eastern Hooded Robin) EPBC Act (EN), NPW Act (R)
• Merops ornatus (Rainbow Bee-eater) EPBC Act (Listed Overfly Marine) – Known

These species are discussed further in section 4.2.2. The Rainbow Bee-eater was identified during a site visit in December 2023 by SA Water and in the targeted bird survey in December 2024 by Succession Ecology. White-winged Chough was identified in adjacent vegetation in the December 2024 survey. No other threatened fauna species were identified at the site.

Threatened Flora

A desktop search identified two threatened flora species listed under the EPBC Act and NPW Act as previously recorded within the search area. None of these species are considered Likely, Highly Likely or Known to occur within VA2 and none were observed during the field survey.</td></tr>
<tr><td>Landscape context score</td><td>1.15</td><td>Vegetation Condition Score</td><td>49.46</td><td>Conservation significance score</td><td>1.50</td></tr>
<tr><td>Unit biodiversity Score</td><td>85.32</td><td>Area (ha)</td><td>0.032</td><td>Total biodiversity Score</td><td>2.73</td></tr>
<tr><td colspan="6">NPW Act; E= Endangered, V = Vulnerable, R= Rare

EPBC Act; Ex = Extinct, CR = Critically endangered, EN = Endangered; VU = Vulnerable</td></tr>
</table>

Vegetation Association	**VA3: *Eucalyptus porosa* riparian woodland with chenopod understorey**

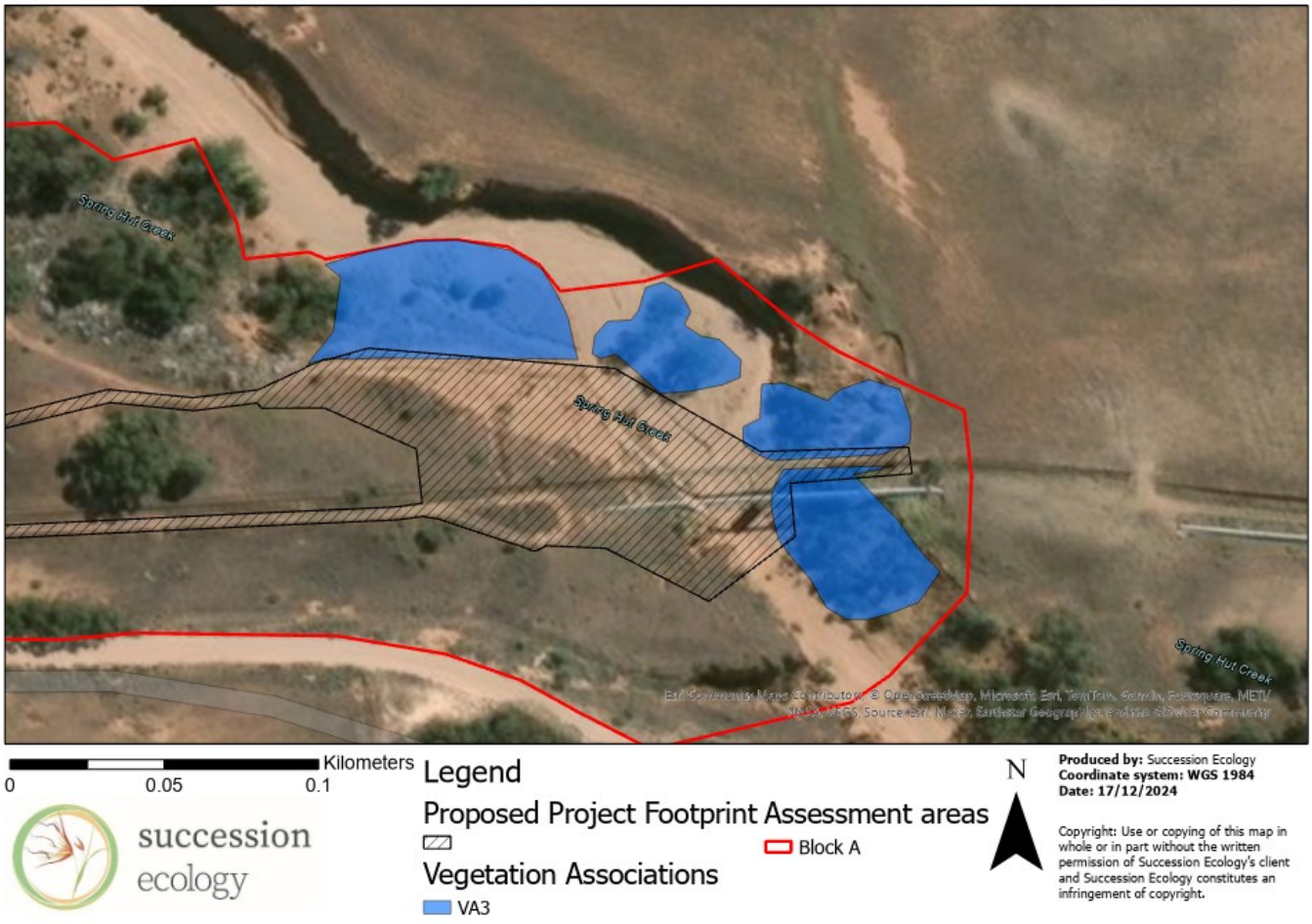


Figure 13: Bushland Assessment area for VA3 showing the overlap with the Project footprint.

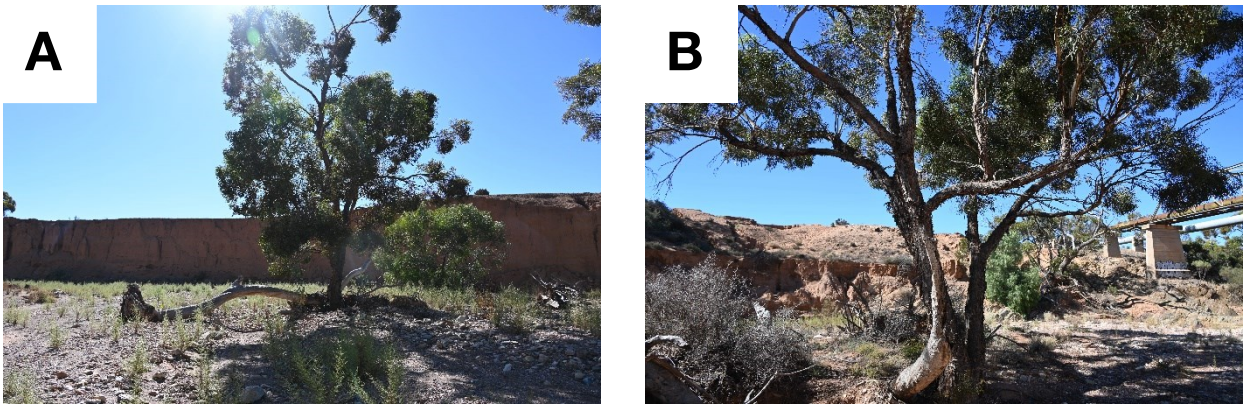


Figure 14: Representative photos of the Riparian woodland vegetation within VA3

Vegetation Association	**VA3: *Eucalyptus porosa* riparian woodland with chenopod understorey**

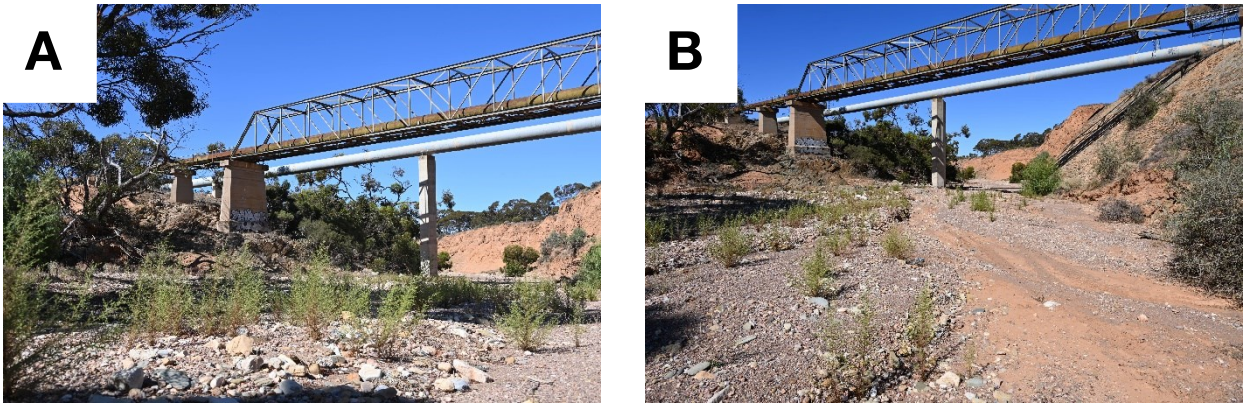


Figure 15: The riparian woodland growing around the western end of the Spring Hut Creek bridge.

General description	This vegetation association has been scored against BCM Community NA 7.1: Riparian Woodlands. The vegetation is considered to be in moderate to good condition with moderate native species diversity. Some disturbance can be found including introduced weed presence. This includes declared weeds *Lycium ferocissimum, Marrubium vulgare, Cynara cardunculus,* and *Echium plantagineum* as well as other environmental weeds *Dittrichia graveolens, Centaurea calcitrapa* and *Schinus molle*. This vegetation association is dominated in the overstorey by *Eucalyptus porosa* and in the understorey, by various chenopod species including *Maireana brevifolia, Atriplex stipitata, Maireana pyramidata* and *Rhagodia spinescens*. Other species of note include *Acacia calamifolia, Alectryon oleifolius,* and *Myoporum platycarpum*.
Threatened species or community	**Threatened Ecological Communities** One Threatened Ecological Community (TEC) under the *EPBC Act,* Mallee Bird Community of the Murray Darling Depression Bioregion (Mallee Bird TEC) was identified as known to occur within 5 km of the Project area during the desktop assessment. The field survey and desktop assessment identified that this TEC was not present in VA3 but is present in the adjacent VA2. **Threatened Fauna** The desktop search identified 23 threatened fauna species listed under the *EPBC Act* and *NPW Act* as previously recorded within the search area. Of these, five are considered Possible, Likely, Highly Likely or Known to occur within VA1BA. They include: • *Aphelocephala leucopsis* (Southern Whiteface) *EPBC Act* (VU) – **Likely** • *Corcorax melanorhamphos* (White-winged Chough) *NPW Act* (R) – **Known** • *Hieraaetus morphnoides* (Little Eagle) *NPW Act* (V) – **Likely** • *Melanodryas cucullata cucullata* (South-eastern Hooded Robin) *EPBC Act* (EN), *NPW Act* (R) • *Merops ornatus* (Rainbow Bee-eater) *EPBC Act* (Listed Overfly Marine) – **Known** These species are discussed further in section 4.2.2. The Rainbow Bee-eater was identified during a site visit in December 2023 by SA Water and in the targeted bird survey in December 2024 by Succession Ecology. White-winged Chough was identified in adjacent vegetation in the December 2024 survey. No other threatened fauna species were identified at the site.

Vegetation Association	**VA3: *Eucalyptus porosa* riparian woodland with chenopod understorey**				
	Threatened Flora A desktop search identified two threatened flora species listed under the *EPBC Act* and *NPW Act* as previously recorded within the search area. None of these species are considered Likely, Highly Likely or Known to occur within VA3 and none were observed during the field survey.				
Landscape context score	1.18	**Vegetation Condition Score**	37.05	**Conservation significance score**	1.10
Unit biodiversity Score	48.09	**Area (ha)**	0.033	**Total biodiversity Score**	1.59
NPW Act; E= Endangered, V = Vulnerable, R= Rare EPBC Act; Ex = Extinct, CR = Critically endangered, EN = Endangered; VU = Vulnerable					

Vegetation Association	**VA4: Low open chenopod shrubland dominated by *Atriplex stipitata* and *Sclerolaena obliquicuspis*, with significant *Carrichtera annua* invasion**

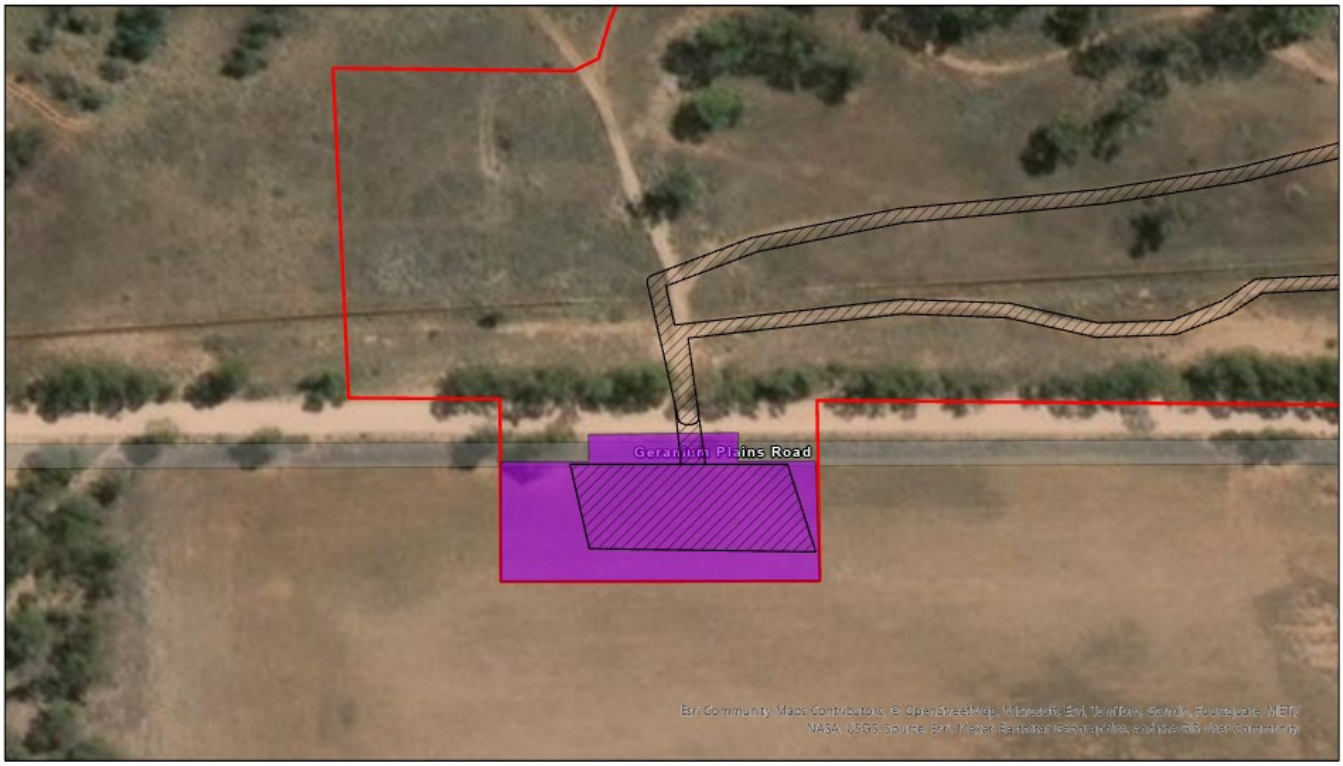


Figure 16: Bushland Assessment area for VA4 showing the overlap with the Project footprint.

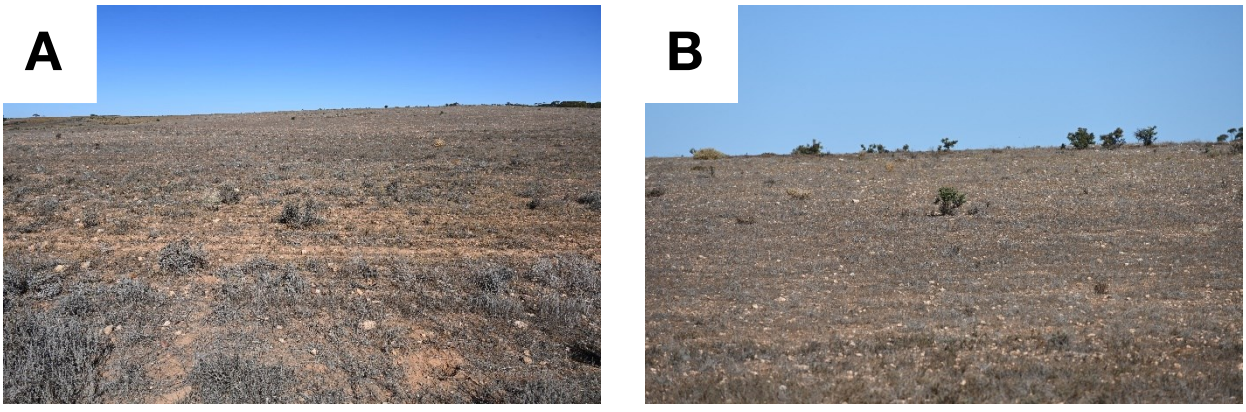


Figure 17: Examples of the chenopod shrubland vegetation within VA4.

Vegetation Association	**VA4: Low open chenopod shrubland dominated by *Atriplex stipitata* and *Sclerolaena obliquicuspis*, with significant *Carrichtera annua* invasion**

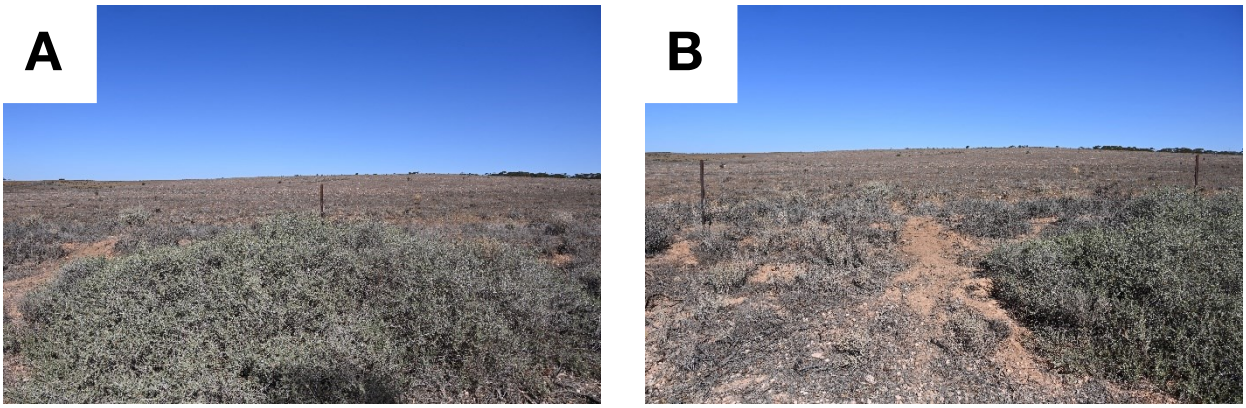


Figure 18: Vegetation within VA4 between Geranium Plains Road and the farmer's fenceline.

General description	This vegetation association has been scored against BCM Community MDBSA 2.2: Chenopod Open Shrublands. This vegetation is considered to be in poor to moderate condition with less diversity than expected for a chenopod shrubland and mostly low growing and sparse native vegetation with weeds being dominant. Disturbance within this vegetation association is expected to be due to grazing in this paddock and invasion of weeds including *Carrichtera annua* and *Heliotropium europaeum*. Dominant native species include *Atriplex stipitata, Sclerolaena obliquicuspis, Nitraria billardierei,* and *Salsola australis*.
Threatened species or community	**Threatened Ecological Communities** One Threatened Ecological Community (TEC) under the *EPBC Act,* Mallee Bird Community of the Murray Darling Depression Bioregion (Mallee Bird TEC) was identified as known to occur within 5 km of the Project area during the desktop assessment. The field survey and desktop assessment identified that this TEC was not present in VA4 but is present in the nearby VA2 and other surrounding areas of Mallee Woodland. **Threatened Fauna** The desktop search identified 23 threatened fauna species listed under the *EPBC Act* and *NPW Act* as previously recorded within the search area. Of these, five are considered Possible, Likely, Highly Likely or Known to occur within VA1BA. They include: • *Aphelocephala leucopsis* (Southern Whiteface) *EPBC Act* (VU) – **Likely** • *Corcorax melanorhamphos* (White-winged Chough) *NPW Act* (R) – **Known** • *Hieraaetus morphnoides* (Little Eagle) *NPW Act* (V) – **Likely** • *Melanodryas cucullata cucullata* (South-eastern Hooded Robin) *EPBC Act* (EN), *NPW Act* (R) • *Merops ornatus* (Rainbow Bee-eater) *EPBC Act* (Listed Overfly Marine) – **Known** These species are discussed further in section 4.2.2. The Rainbow Bee-eater was identified during a site visit in December 2023 by SA Water and in the targeted bird survey in December 2024 by Succession Ecology. White-winged Chough was identified in adjacent vegetation in the December 2024 survey. No other threatened fauna species were identified at the site.

Vegetation Association	**VA4: Low open chenopod shrubland dominated by *Atriplex stipitata* and *Sclerolaena obliquicuspis*, with significant *Carrichtera annua* invasion**				
	Threatened Flora A desktop search identified two threatened flora species listed under the *EPBC Act* and *NPW Act* as previously recorded within the search area. None of these species are considered Likely, Highly Likely or Known to occur within VA4 and none were observed during the field survey.				
Landscape context score	1.15	**Vegetation Condition Score**	25.54	**Conservation significance score**	1.10
Unit biodiversity Score	32.31	**Area (ha)**	0.124	**Total biodiversity Score**	4.01
NPW Act; E= Endangered, V = Vulnerable, R= Rare EPBC Act; Ex = Extinct, CR = Critically endangered, EN = Endangered; VU = Vulnerable					

Photo log

Photos of the Vegetation Associations are provided in the descriptions above with additional photos provided within Appendix B.

4.2 Threatened species assessment

4.2.1 Threatened ecological communities.

A Protected Matters search identified three Threatened Ecological Communities (TEC) as likely to occur within 5 km of the Project area in the desktop assessment (Table 7). The field survey and desktop assessment of these communities identified that one TEC, the Mallee Bird Community of the Murray Darling Depression Bioregion (Mallee Bird Community TEC) is present in the Project area and has been assessed to be impacted by the proposed action.

Table 7: Threatened ecological communities identified in the desktop assessment as likely to occur with 5 km of the Project area.

Threatened Ecological Community	Details	Likelihood of presence
Iron-grass Natural Temperate Grassland of South Australia	Critically Endangered Likely to occur	None. This TEC occurs in the region, but no *Lomandra* species were found within the proposed action area, nor was the TEC identified after a thorough field survey. Therefore, this TEC is not expected to be impacted by the proposed development.
Mallee Bird Community of the Murray Darling Depression Bioregion	Endangered Likely to occur	**Certain.** One of the vegetation associations (VA2) presented key diagnostic features associated with this TEC (DCCEEW 2023) including: Location within the MDD bioregion The size of the native vegetation patch Presence of particular mallee communities Suitable bird assemblage A detailed summary is provided in Table 8.
Peppermint Box (*Eucalyptus odorata*) Grassy Woodland of South Australia	Critically Endangered Likely to occur	None. The EPBC listing map shows this TEC as 'Likely to Occur' within the 10 km search area. However, the field survey of Spring Hut Creek conducted by Succession Ecology did not locate any *Eucalyptus odorata* within the proposed action area, nor any areas of this TEC within the area. Therefore, this TEC is not expected to be impacted by the proposed development.

The Mallee Bird Community TEC is considered to be present within VA2 (Open Mallee Woodland), based on criteria within the conservation advice (DAWE 2021) provided for determining the presence of the TEC (Table 8). The overlap between the Project area and the estimated local extent of the Mallee Bird Community TEC is shown in Figure 19. Because of the detection of this TEC, it has been included in the BAM Scoresheet for VA2 and impacts discussed below.

Table 8: Determination of the presence of the Mallee Bird Community TEC within the proposed action area at Spring Hut Creek.

Criteria	Description	Site
Location	*Is the area of proposed development within the Murray Darling Depression IBRA region?*	Yes
Connecting patch size	*Is a patch of native vegetation of at least 10 hectares present?*	Yes
Suitable mallee habitat	*Does the patch of native vegetation contain an area or areas of at least 5 hectares dominated by mallee?*	Yes

Bird Assemblage	*How many species of the Mallee Bird Community have been recorded from current bird surveys and/or from existing bird observation records within 20 km of the site and within the last 10 years?*	Records for eight species of mallee specialist or dependant birds within 20 km in the last 10 years.
TEC present		**Yes**
Category		**A**

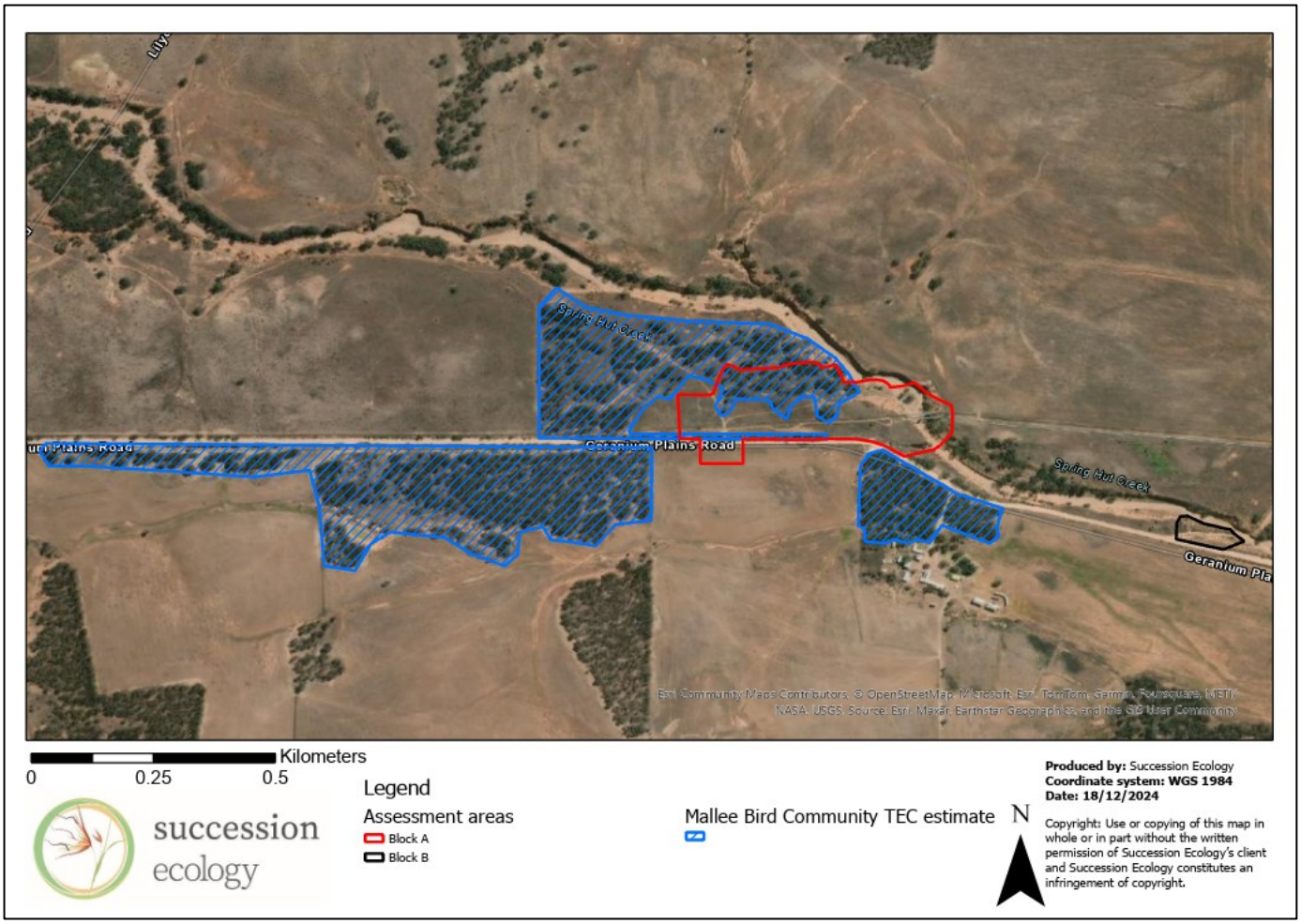


Figure 19: Overlap of the assessment areas for the proposed action at Spring Hut Creek and an estimate of the Mallee Bird Community extent in the local area.

The Mallee Bird Community of the Murray Darling Depression Bioregion is a faunal community found in the Murray Darling Depression bioregion. It is an assemblage of bird species that are dependent on the mallee vegetation that characterises this bioregion.

Mallee Ecosystems

Mallee ecosystems occur in the drier parts of Australia, and within South Australia they are located south of the arid zone but north of the temperate zone. These ecosystems face severe summer water deficits, nutritional poverty, and fire regimes that govern their responses and traits. Within south-eastern Australia, mallee is generally associated with unconsolidated aeolian sands in low rainfall zones, typically within the 200-350 mm annual rainfall range.

The Mallee Bird Community

The Mallee Bird Community is an assemblage of 20 bird species that rely on mallee habitats for their continued persistence within the MDD bioregion. The assemblage represents 11 families, the most common being honeyeaters

and wrens. Thirteen species are individually listed as threatened by at least one jurisdiction, and six are listed as nationally threatened. The species are divided into *Mallee specialists* – those found almost exclusively in mallee habitats especially within the MDD bioregion; and *Mallee dependents* – those species that are dependent on mallee where it is present but have a wider range extending into non-mallee woodland and shrubland habitats that intergrade with mallee vegetation. Key traits of the Mallee Bird Assemblage are as follows:

- The assemblage has a high proportion of small birds, with sixteen species weighing under 60 g, eleven of which are very small, weighing under 30 g. Only two species are large, reaching over 100 g: the Regent Parrot and the Malleefowl.
- Most species nest in a supported location i.e. where the base rests on standing vegetation, while only a few are ground nesters. The two parrot species are hollow-nesters.
- Most species prefer feeding on invertebrates, however the six honeyeater species favour nectar and pollen in addition to invertebrate prey. Eleven species also include seeds and/or fruit in their diets, and the two parrot species feed only on seeds, fruit or foliage and do not include invertebrates in their diet.
- Most species in the assemblage have a maximum lifespan of ten years or less and reach reproductive age within their first one to two years.

Threats to this community include altered fire regimes, fragmentation (mostly as a result of past clearing), some ongoing clearing of habitat for agricultural practices, climate change, pest animals, grazing and weed invasion.

It is identified in the conservation advice that "clearing of smaller remnant patches will not lead to an appreciable permanent loss of mallee birds, though could further reduce connectivity for the bird assemblage that remains in these areas". As the mallee habitat within the proposed action area is a smaller isolated patch, it is unlikely to provide connectivity to larger, more valued patches or harbour a source population of any mallee birds that would allow expansion of the range.

Based on the diagnostic criteria in the conservation advice for this TEC, this area of mallee is categorised as "Category A: High number of MBC species". This is due to the presence of eight species from the assemblage recorded within 20 km of the proposed action area from the past 10 years (Table 9).

Table 9: Details of species in the Mallee Bird Community assemblage and their presence near the proposed action area.

Common Name	**Species Name**	**EPBC status**	**Recorded within 20 km of the Project area in the past 10 years**
Mallee specialists			
Black-eared Miner	*Manorina melanotis*	Endangered	No
Chestnut Quail-thrush	*Cinclosoma castanotum*	-	**Yes**
Mallee Emu-wren	*Stipiturus mallee*	Endangered	No
Malleefowl	*Leipoa ocellata*	Vulnerable	No
Red-lored Whistler	*Pachycephala rufogularis*	Vulnerable	No
Scarlet-chested Parrot	*Neophema splendida*	-	No
Striated Grasswren	*Amytornis striatus*	-	No
Mallee Western Whipbird	*Psophodes nigrogularis*	Vulnerable	No
Mallee dependents			
Crested Bellbird	*Oreoica gutturalis*	-	**Yes**
Grey-fronted Honeyeater	*Ptilotula plumula*	-	No
Jacky Winter	*Microeca fascinans*	-	**Yes**
Purple-gaped Honeyeater	*Lichenostomus cratitius*	-	No

Common Name	Species Name	EPBC status	Recorded within 20 km of the Project area in the past 10 years
Regent Parrot	*Polytelis anthopeplus*	Vulnerable	No
Shy Heathwren	*Hylacola cauta*	-	No
Southern Scrub-robin	*Drymodes brunneopygia*	-	No
Splendid Fairywren	*Malurus splendens*	-	**Yes**
Spotted Pardalote	*Pardalotus punctatus*	-	**Yes**
White-eared Honeyeater	*Nesoptilotis leucotis*	-	**Yes**
White-fronted Honeyeater	*Purnella albifrons*	-	**Yes**
Yellow-plumed Honeyeater	*Ptilotula ornata*	-	**Yes**

As a result of the proposed action, a small amount of land clearance will occur within the relevant vegetation association, VA2 (Open Mallee Woodland). This will be a narrow strip along the edge of an existing cleared access track of up to 0.032 ha. It will also be along the edge of the patch of mallee vegetation, not bisecting the patch into smaller patches. Clearance may also be able to restrict impacts to the trees within the woodland to trimming, as they are sparsely scattered in some areas providing only 10-25 % crown canopy coverage. This would mean that most of the clearance within this VA is of the chenopod understorey surrounding the mallee trees. Any clearance of litter, bark, branches or trunks would involve retaining those structural components within the woodland for continued use by fauna living within the habitat.

4.2.2 Threatened fauna

The desktop search identified a total of seven threatened fauna species within the search area. A total of five listed under the *EPBC Act 1999* and two further fauna listed as threatened under the *NPW Act 1972*. An additional species, Rainbow Bee-eater (*Merops ornatus*; EPBC Act, Listed Marine) has been considered due to observations in December 2023 made by SA Water totalling eight species of consideration. Of these species, five have been included in the likelihood of use assessment (Table 10). They have been assessed on their likelihood of using the Project area following the metric described in Table 3. Two of these species have been observed at the site including Rainbow Bee-eater (December 2023 and December 2024) and White-winged Chough (December 2024). Other species identified but not considered relevant to this assessment are presented in Appendix C, due to the habitat being deemed completely unsuitable, or the threatened species being a subspecies that is absent from the area.

Table 10: A summary of the fauna species observed on site or recorded within 5 km of the application area since 1995, or those listed as known to occur in the PMST.

Species (common name)	NPW Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments	Site(s)
AVES							
Aphelocephala leucopsis (Southern Whiteface)		VU	5, 2	2011	A wide range of open woodlands and shrublands where there is an understorey of grasses or shrubs, or both. These areas are usually in habitats dominated by *Acacia* or *Eucalyptus* on ranges, foothills and lowlands, and plains (Birdlife Australia 2023).	**Likely** The nearest record is ~2.6 km from the Project area from 2010. This species was not observed in the targeted survey using call playback.	VA1A, VA2, VA3, VA5
Corcorax melanorhamphos (White-winged Chough)	R		3, 2	2024	Woodland and tall mallee, with a preference for wetter areas with leaf-litter for feeding and mud for building nests (Birdlife Australia 2024).	**Known** The Project area is considered to provide ample suitable habitat for this species. There is a record along Geranium Plains Road just outside the Project area from 2014 and This species was observed in Mallee Woodland south of Geranium Plains Road in December 2024.	VA2
Hieraaetus morphnoides (Little Eagle)	V		3	2010	Seen over woodland, forested land and open country. Avoids heavy forest (Birdlife Australia 2021).	**Likely** This species does not have specific habitat requirements and as such may flyover all VAs within the Project area. The nearest record is 2.6 km away from 2010.	All
Melanodryas cucullata cucullata	R	EN	5, 3	2010	*Eucalyptus* woodland and mallee and *Acacia* shrubland.	Possible	VA2

Species (common name)	NPW Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments	Site(s)
(South-eastern Hooded Robin)					Nomadic, inhabits a wide range of habitats from dry sclerophyll forests, to forested wetlands, grassy woodlands and heathlands (DCCEEW 2023a).	Some suitable habitat is present at the site including mallee woodland and shrublands. This species was not observed in the targeted survey using call playback.	
Merops ornatus (Rainbow Bee-eater)		Listed – Overfly Marine	6	2023	Occurs mainly in open forests and woodlands, shrublands, and in various cleared or semi-cleared habitats, including farmland and areas of human habitation. It usually occurs in open, cleared or lightly timbered areas that are often, but not always, located in close proximity to permanent water (Higgins 1999).	**Known** This species has been observed at the site by SA Water in December 2023 and at least four individuals were observed in the December 2024 targeted bird survey.	VA3
Source; 1- BDBSA, 2 - AoLA, 3 – NatureMaps, 4 – Observed/recorded in the field, 5 - Protected matters search tool, 6 – others NPW Act; E= Endangered, V = Vulnerable, R= Rare EPBC Act; Ex = Extinct, CR = Critically endangered, EN = Endangered; VU = Vulnerable							

Results from Targeted Bird Survey

The targeted bird surveys across Spring Hut Creek recorded 22 Rainbow Bee-eater (Marine: *EPBC Act*) and ten White-winged Chough (Rare: *NPW Act*). Of the Rainbow Bee-eater observations, effort was made to not count the same individual across multiple observations within the evening or morning surveys. However, repeat observations cannot be ruled out as the species were extremely mobile across the site. The maximum observed in one instance was three birds, but with the abundance of food and suitable nesting habitat it can be assumed that this species occurs in larger numbers within the area. It is also worth noting that the Rainbow Bee-eaters were seen successfully foraging for and catching insects but were never observed to consume their prey. Instead, the bird would perch on an open branch, holding the live insect in their beak, before flying off towards the Creekline or patches of mallee (Appendix B). This behaviour indicates that the food may have been intended to feed young, and active nests may be nearby. Along the creek line in the soft soil of the bank there was a high number of potentially suitable Rainbow Bee-eater nests (Appendix B), however no direct confirmation of an individual entering or exiting a nest was made. White-winged Chough were observed as a single group consisting of nine adults and one juvenile (refer to Appendix B for photographs), within a healthy patch of mallee south-east of the Project area (Figure 20).

No South-eastern Hooded Robin, Jacky Winter, Little Eagle, Southern Whiteface, or Diamond Firetail were identified on site. The targeted survey identified 26 native bird species, with a total of 28 species observed throughout all field surveys. Refer to Appendix A for the complete species list.

No additional observations of species consistent with the Mallee Bird Community of the Murray Darling Depression Bioregion were recorded at Spring Hut Creek. However, Succession Ecology has recently observed Jacky Winter, Yellow-plumed Honeyeater and White-fronted Honeyeater within approximately 2 km of the Project area in similar vegetation.

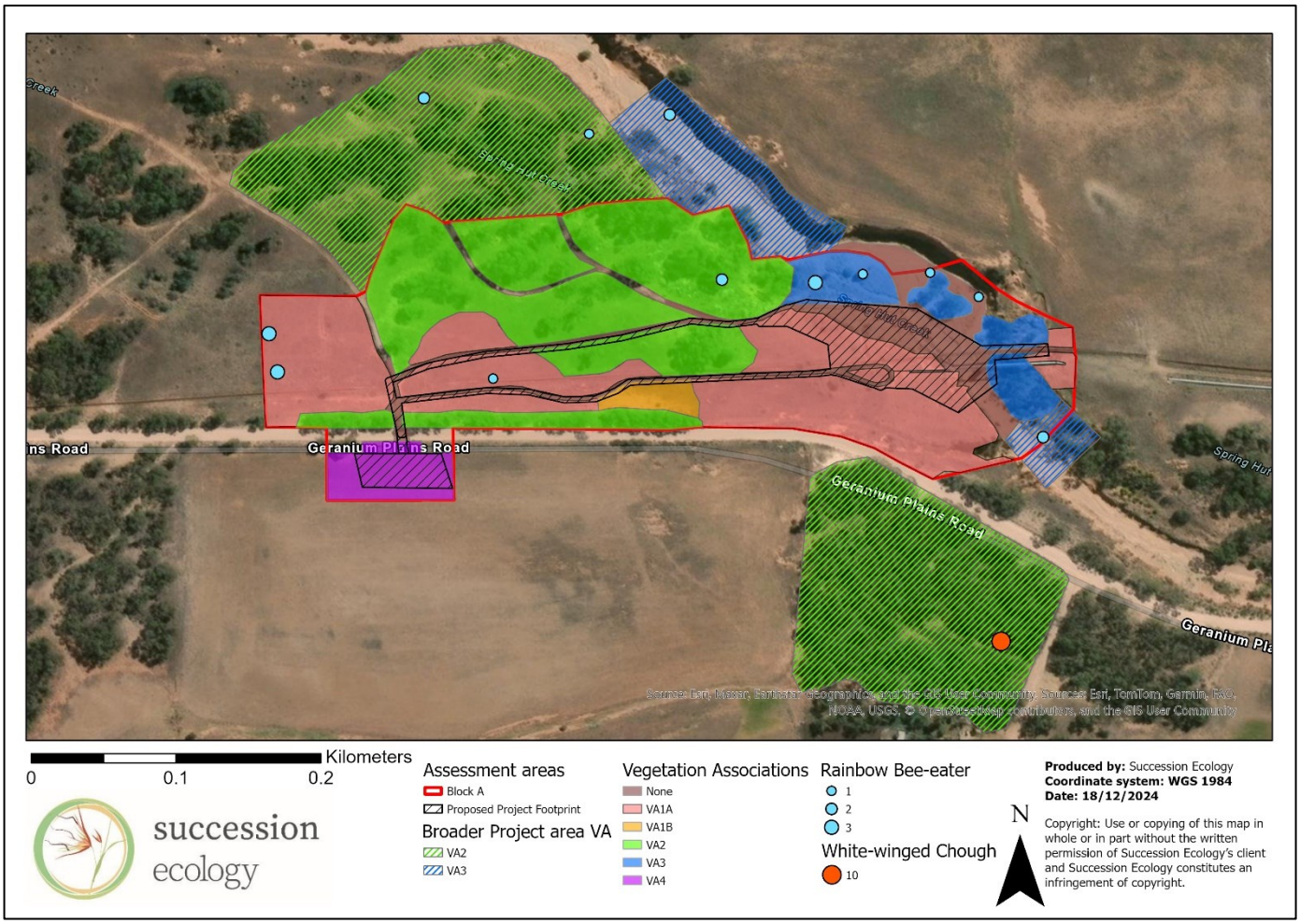


Figure 20: Locations of threatened bird species identified across each VA in the Project area. With the assumed VA extensions within the broader Project area displayed as hatching.

Southern Hairy-nosed Wombat

The Spring Hut Creek site was surveyed for Wombat burrows in April 2024 by Succession Ecology and a further visit accompanied by Dr Glenn Shimmin was undertaken in August 2024. Wombat burrows identified in the Project area during these surveys are shown in Figure 21. These surveys informed the Spring Hut Creek Wombat Management Plan prepared for SA Water to guide the Project in mitigation of impacts to wombats and impacts to the Project. The pre-construction stage of the Project will require the strategic collapse of a number of at-risk wombat burrows under supervision from Dr Glenn Shimmin, ensuring compliance under the *Animal Welfare Act 1985* and the *NPW Act.*

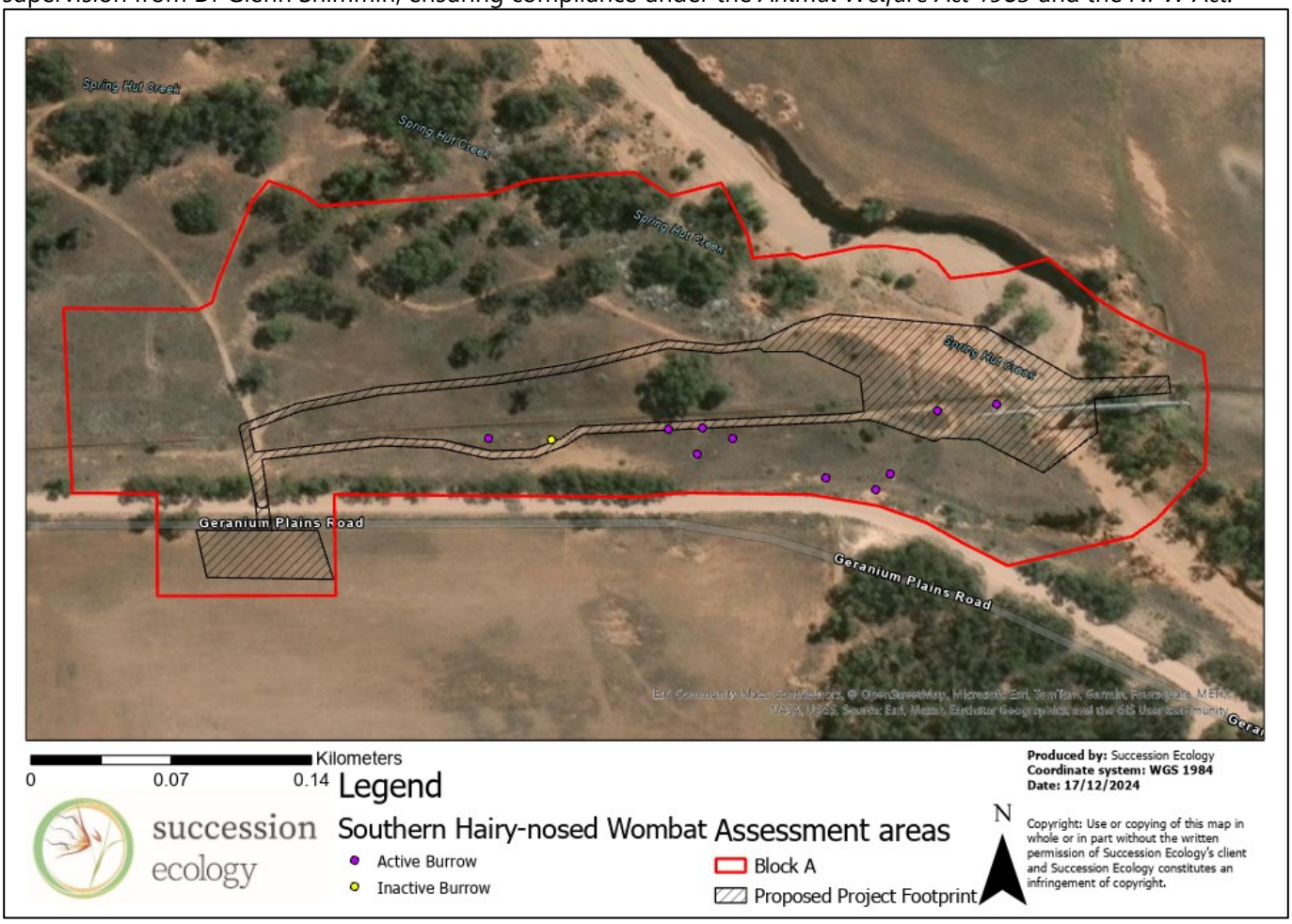


*Figure 21: Locations of Southern Hairy Nosed Wombat (*Lasiorhinus latifrons*) burrows identified within the Project area*

Species profiles

Previous records of threatened species with a likelihood of occurrence as 'Likely' or above are shown in Figure 22 and are discussed below.

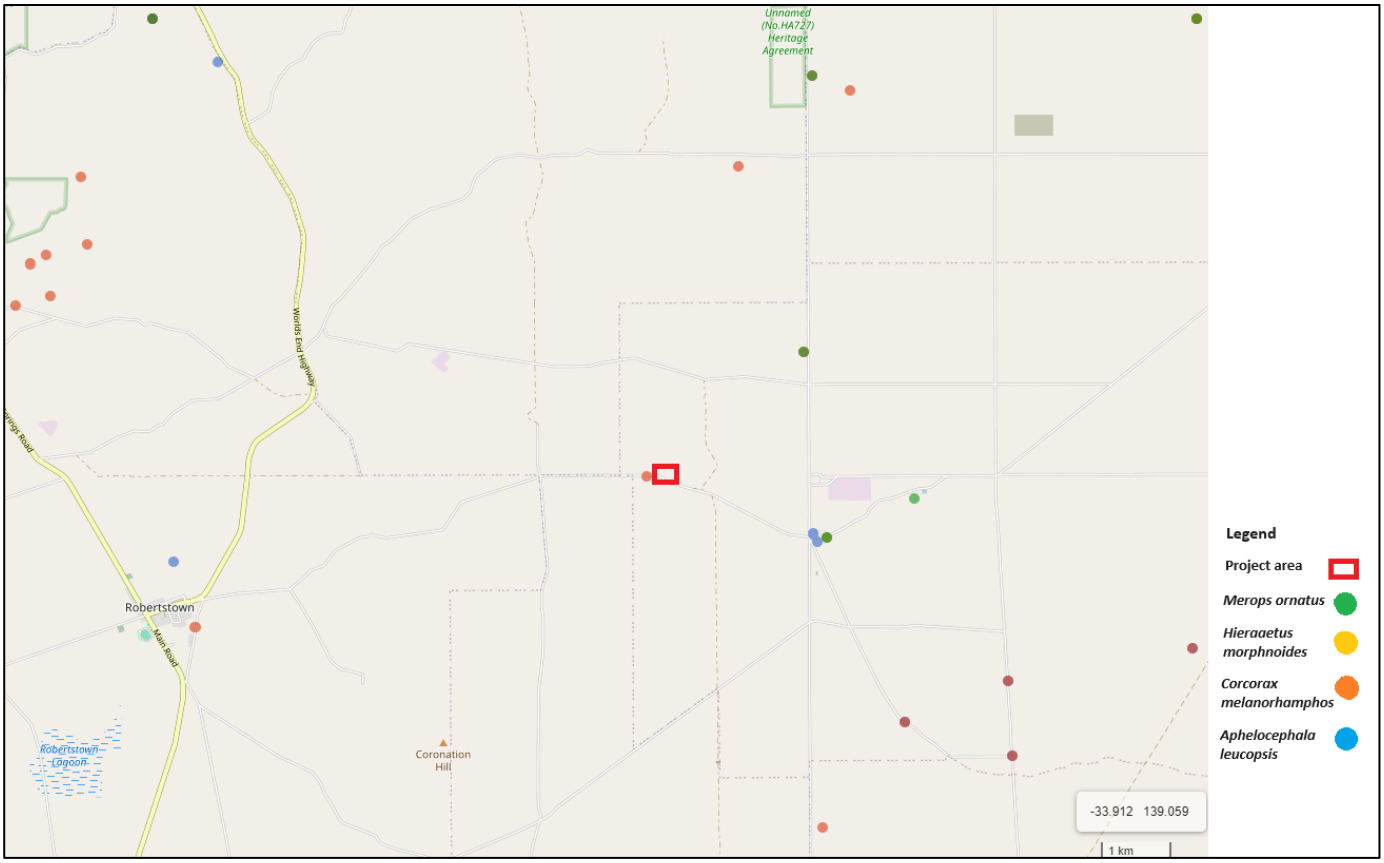


Figure 22: The distribution of threatened species assessed as 'Likely', 'Highly Likely' or 'Known' to occur around the Spring Hut Creek development area. Sourced from Atlas of Living Australia (accessed 9 May 2024).

***Aphelocephala leucopsis* (Southern Whiteface) *EPBC Act* (VU) - Likely**

Southern Whiteface (*Aphelocephala leucopsis leucopsis*) is one of two subspecies of *A. leucopsis*, which occurs throughout south-eastern and central Australia. The other subspecies, *A. l. castaneiventris*, is found in central and southern parts of Western Australia. Since March 2023, the species as a whole has been listed under the *EPBC Act* as Vulnerable.

Southern Whiteface is currently not classed as severely fragmented (DCCEEW 2023b). The species is known to occur in a wide range of open woodlands and shrublands where there is an understorey of grasses or shrubs, or both, normally dominated by Acacia or Eucalyptus. They occur on ranges, foothills and lowlands and plains. At present, the estimated number of Southern Whiteface mature individuals is approximately 477,000 nationwide, but substantially declining in number, largely attributed to habitat loss and fragmentation for intensive agriculture. Southern Whiteface is sedentary, although there is some evidence to suggest that they move into wetter areas, outside of their usual range, in years of drought (DCCEEW 2023b). They forage almost exclusively on the ground, and favour habitat with low tree densities and herbaceous understorey and litter cover. They feed on insects, spiders, and seeds, typically in groups of 2-8. Breeding usually takes place from July to October, but it can be affected by rainfall. They will build large bulky nest of grass, bark, and roots, usually in a hollow or sometimes in low bushes. While periods of incubation are unknown, young chicks fledge approximately between 14 and 19 days after hatching (Higgins and Peter 2002).

Threats

Key threats to Southern Whiteface include habitat loss and fragmentation, degradation caused by grazing, drought, and the increased likelihood of extreme weather events. Critical habitat for this species includes areas of relatively undisturbed open woodlands and shrublands with an understorey of grasses or shrubs or both, habitat with low tree

densities, living and dead trees with hollows and crevices for roosting and nesting. The conservation advice for the species specifies that all such habitat should not be cleared, fragmented, or degraded and any known or likely habitat should be considered as habitat critical to the survival of the species (DCCEEW 2023).

Local populations

Neither the field survey in April 2024, nor the targeted survey using playback in December 2024 recorded Southern Whiteface individuals at the site. Records exist of this species just 2.6 km away from the Project area. Suitable habitat for this species to be cleared by the proposed development includes the areas of intact chenopod shrubland (VA1A) as well as the open mallee woodland (VA2) and *Eucalyptus porosa* riparian woodland (VA3). A total of 0.399 ha of suitable habitat out of 5.09 ha assessed within the entire Project area will be removed. The proponent has committed to clearance works for construction of access tracks to occur outside of Southern Whiteface breeding season (July to October) in order to avoid any potential impacts to this species. It is considered unlikely that the proposed action will have a significant impact on this species, given that individuals are able to move away from disturbance readily.

Corcorax melanorhamphos* (White-winged Chough) *NPW Act (R) – Known

White-Winged Chough (*Corcorax melanorhamphos*) is one of only two members of the Australian mud-nest builders' family, Corcoracidae, and is the only member of the genus *Corcorax*. The White-Winged Chough typically inhabits woodland and tall mallee, with a preference for wetter areas with leaf-litter for feeding and mud for building nests. These birds spend most of their time on the ground and walk and run strongly.

The Project area is likely to provide suitable habitat for this species, and previous surveys in an adjacent property less than 1 km to the direct west of the site revealed a nest on site.

White Winged Choughs are large, black birds with a distinctive curved beak, a red eye and a large white wing patch which is seen when the bird is in flight. The species often occurs in flocks of up to 20 birds, being a strongly social species. Flocks can comprise breeding adults as well as non-breeding helpers, which can be young from previous years broods. The species is widespread within its range across the east and southeast of Australia (Figure 23). They inhabit woodland areas including mallee and prefer areas with leaf litter where they forage for insects, suitable native shrubs with seeds for feeding as well as mud for nest building

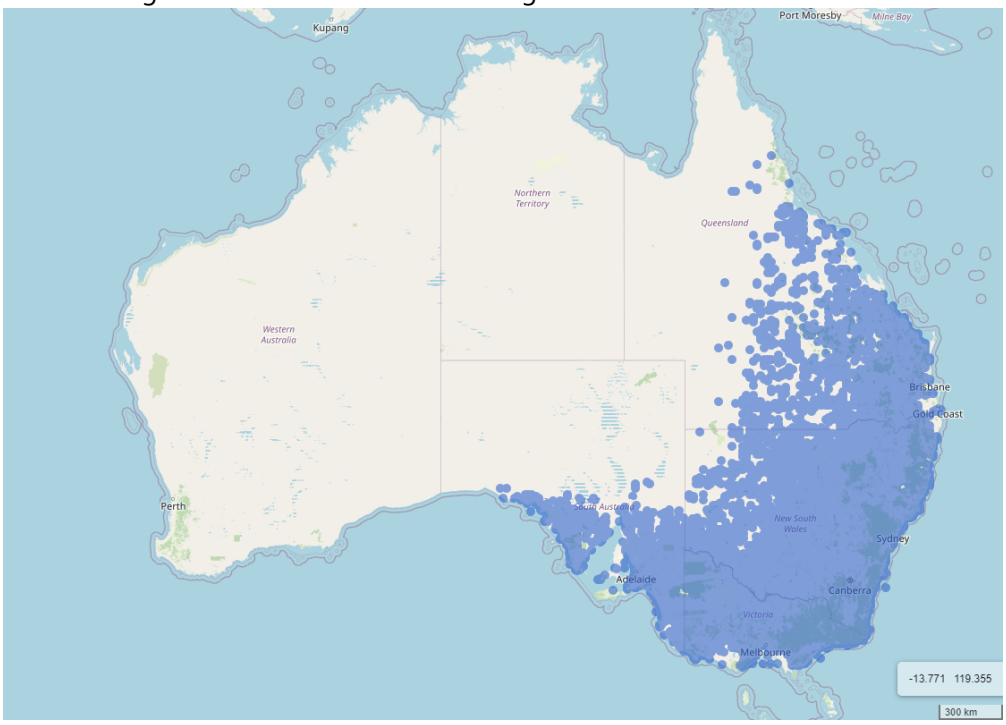


Figure 23: Distribution of White-winged Chough records across Australia. Records obtained from Atlas of Living Australia (accessed 13/09/2024).

Threats

The White-winged Chough is threatened by predation from invasive predators as well as removal of habitat and feeding resources. The species persists in remnant woodland areas within a farmland matrix, indicating that the species is capable of dispersing across open areas. However, there is little to no research on the interaction between this species and infrastructure developments.

Local populations

This species was not observed on site in April 2024 however it is was detected in vegetation adjacent to the site during the targeted surveys in December 2024. No nests have been observed within the Project area despite thorough surveys. This species is commonly found in Mallee Woodland areas surrounding Robertstown. There is a record from 2014 from within the Project area (Figure 22). It is not expected that the Project works will have a significant impact upon this species, as they can relocate away from disturbance readily. Ample suitable habitat can be found in surrounding areas in the form of remnant Mallee Patches and open chenopods shrublands for foraging.

***Hieraaetus morphnoides* (Little Eagle) *NPW Act* (VU) – Likely**

Little Eagle is a small, stocky eagle with a moderately long tail and heavily feathered legs. When perched it has a short crest. Plumage varies from light to dark brown. The species can be mistaken for a Whistling Kite which it is similar in size but can be distinguished by a pale M-shaped band on the underwing and distinctive flight pattern, soaring in tight circles with wings flat. Little Eagle is sparsely distributed across most of mainland Australia preferring open forest to more cleared areas where visibility improves hunting success. It will avoid more densely forested areas (Figure 24).

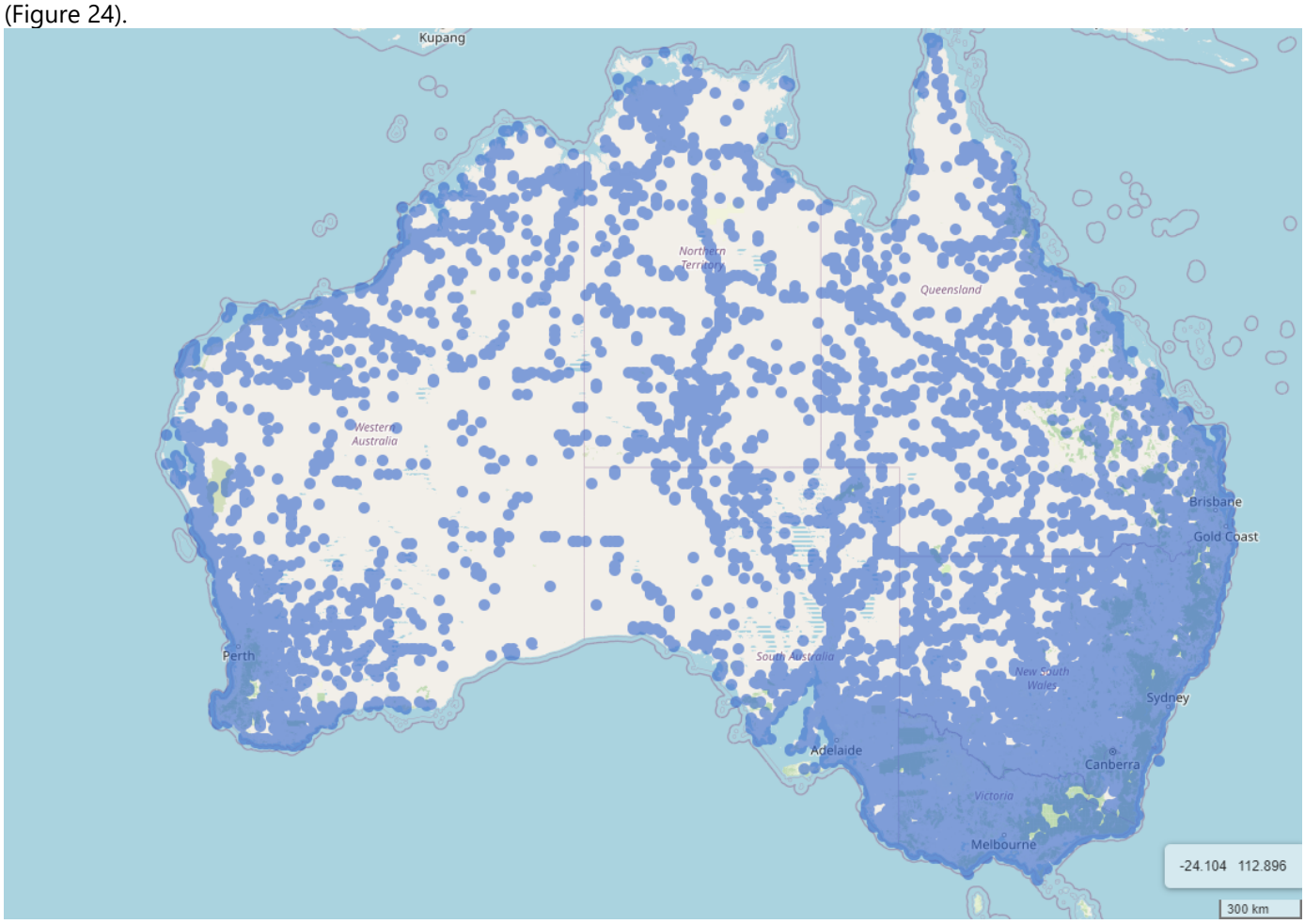


Figure 24: Distribution of Little Eagle records across Australia. Records obtained from Atlas of Living Australia (accessed 13/09/2024).

Threats

This species is threatened by urbanisation causing losses and disturbance of breeding habitat and nests. This reduction of suitable habitat has led to increased competition with Wedge-tailed Eagles. The species responds well to clearing in farmland areas where it can have improved hunting success in open areas. Other threats include accidental secondary poisoning from the use of pindone to control rabbits, vehicle collisions, shooting and accidental trapping.

Local Populations

This species was not observed during the field survey, however the species is widespread but sparsely distributed, meaning that sightings are rare. Little Eagle records exist within 3 km of the site from as recently as 2010 (Figure 22). While it is possible that individuals of this species may be impacted by the proposed works, it is not expected that these impacts will be significant, as this species is far-ranging, and any impacts are likely to be isolated to individuals.

***Merops ornatus* (Rainbow Bee-eater) *EPBC Act* (Listed Overfly Marine) – Known**

The Rainbow Bee-eater is a medium sized bird, and the only species of Bee-eater in Australia. Adults have multiple distinct colours including green or blue-green on the back, forehead and wings, black stripes across the eye and on the tail and yellow to chestnut patches on the chin and cheeks. Adult males and females are similar in appearance but can be distinguished by differences in the length of tail-streamers. Juveniles can be distinguished from adults by their dull colouring and the absence of tail-streamers. The species is usually seen either in pairs or small flocks although when migrating they can occur in groups of 500 birds or more. They nest in loose colonies that may contain up to about 50 pairs, occasionally nesting solitarily (DCCEEW 2024a).

The Rainbow Bee-eater is distributed across much of mainland Australia, although the extent of occurrence within Australia has not been accurately estimated. The concept of discrete locations of populations of this species is difficult to apply to the Rainbow Bee-eater because of its widespread distribution and its ability to undertake long-distance movements. The preferred habitat of the Rainbow Bee-eater is in open forests and woodlands, shrublands, and in various cleared or semi-cleared habitats including farmland and areas of human habitation. The habitats preferred by this species are usually open, partially clear of trees, and located in close proximity to a permanent water source. Woodlands and shrublands where this species occur are generally dominated by eucalypts, and especially in arid or semi-arid areas, in riparian, floodplain or wetland vegetation assemblages. The Rainbow Bee-eater is also common in cleared and semi-cleared habitats including farmland, orchards, vineyards, roadside vegetation, quarries, mines, or gravel pits where they have even been found to breed. The Rainbow Bee-eater is estimated to be capable of living up to 24 months in the wild. They breed in socially monogamous pairs and nest in flat or sloping ground in the banks of rivers, creeks or dams, or in cliff-faces. Nesting areas are often re-used between seasons and the locations consist of concentrated loose colonies of nests. The breeding season for this species extends from August to January in Australia (DCCEEW 2024a).

This species has been identified within the Project area in both December 2023 and December 2024. Records from the desktop search on Atlas of Living Australia exist as close as 2.5 km away (Figure 22) Within the proposed action area, this species may utilise the steep erosion banks of the creekline as nesting habitat, although evidence of past nesting was difficult to determine. These banks are expected to only experience minor impacts from the proposed works and any existing nesting habitat is unlikely to be impacted. Nearby vegetation may also be used for roosting and feeding. However, the broad diversity of habitats that this species occurs in, including disturbed habitats, indicates that the disturbance associated with these works is unlikely to cause significant disruption to a population. Some clearance of suitable foraging habitat within the VA1A, VA2 and VA3 will occur of up to 0.399 ha. Within the assessment area, over 5 ha of habitat will remain unimpacted, with ~936 ha of native vegetation also remaining within 5 km (12 %). It is expected that minor impacts to individuals may occur through removal of feeding habitat, noise disruption and vibrations but this species is easily capable of dispersal away from impacts of this nature.

4.2.3 Threatened flora

The desktop search identified two threatened flora species within the search area; both listed as Endangered under the *EPBC Act 1999.* One of these species, Peep Hill Hop-bush, is also listed as Endangered under the *NPW Act 1972*. Both of these species have been included in the likelihood of use assessment (Table 11). They have been assessed on their likelihood of using the site following the metric described in Table 3. None of the threatened flora species identified within the desktop search were identified within the Project area.

Table 11: A summary of the flora species observed on site or recorded within 5 km of the application area since 1995, or those listed as known to occur in the PMST.

Species (common name)	NPW Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat	Site(s)
Acacia spilleriana (Spiller's Wattle)		EN	5	2008	Rocky hills, commonly along watercourses and roadsides. Restricted to the northern Mt Lofty Ranges between Tarlee and Burra (DCCEEW 2009).	Possible This species has been identified along Geranium Plains Road further to the west of the Project area by Succession Ecology. The most recent records on ALA are from 2008, ~11 km from the Project area. No observations of the species were made on site.	VA1A, VA2
Dodonaea subglandulifera (Peep Hill Hop-bush)	E	EN	5, 3, 2	2007	Found on the east side of the Mount Lofty Ranges and on Yorke Peninsula, growing on low hills on loamy soils associated with rocky outcrops in open woodland, open shrubland and mallee (DCCEEW 2024b).	Unlikely Suitable habitat for this species was not identified in the Project area, lacking any rocky outcrops. The nearest record is 2.8 km from the Project area from 2000.	-
Source; 1- BDBSA, 2 - AoLA, 3 – NatureMaps, 4 – Observed/recorded in the field, 5 - Protected matters search tool, 6 – others NPW Act; E= Endangered, V = Vulnerable, R= Rare EPBC Act; Ex = Extinct, CR = Critically endangered, EN = Endangered; VU = Vulnerable							

Neither of the threatened plant species were assessed as having a likelihood of occurrence above possible. Nor were they identified on site. As such, they are not discussed further.

4.3 Cumulative impact

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

The cumulative impact of clearing is the gradual reduction of remnants in the area, a loss of connectivity between remnant patches and reduction of available habitat to threatened flora and fauna. Patches of remnant vegetation provide important habitat for native flora and fauna and are at high risk of degradation from clearance and other impacts such as weed incursion. The vegetation remnancy in the region is low, with approximately 12 % of native vegetation remaining with 5 km of the proposed site. Only 4.22 % of the native vegetation within the Murray Mallee IBRA subregion is protected. This data report considers all sources of impact to native vegetation posed by the Project. This includes the widening of existing access tracks from ~2.5 metres to 4 metres width to access the top and bottom of the pipe-bridge, construction of scaffolding and enclosing the pipe-bridge, abrasive blasting, construction of a low bund wall to reduce erosion risk to the south of the pipe-bridge. The upgrades to access tracks and the pipe-bridge infrastructure are the only planned developments for the Project area at this stage.

Direct impacts

One source of direct impacts on native vegetation from the proposed Project stems from the widening of access tracks to allow machinery to access the top and bottom of the pipe-bridge. 0.127 ha of vegetation (VA1A, VA1B, VA2 and VA3) will be removed because of these works. An additional 0.119 ha will be removed in degraded chenopod shrubland (VA4) for a material laydown across Geranium Plains Road. Finally, a further 0.291 ha of vegetation (VA1A, and VA3) will be removed in the vicinity of the pipe-bridge for works associated with scaffolding, repairs to the bridge and erosion control. Overall, a total of 0.537 ha of native vegetation will be cleared. There is around 12 % of native vegetation remaining within 5 km of the site which is equal to approximately 942 hectares. The total Project clearance accounts for only 0.057 % of the remaining vegetation within a 5 km radius.

The clearance within woodlands will mostly avoid the removal of trees, however they may still sustain indirect impacts (discussed below). Other direct impacts could include an increased risk of erosion caused by Project works along the banks of the river during construction works, erecting scaffolding, and conducting bridge repairs. Clearance proposed along the banks of the creek could cause them to become unstable due to the increase in activity associated with the works, increasing sediment run-off into the river. Risks to this will be mitigated through the construction of a bund wall on the southwestern side of the bridge along with actions in the Sediment Erosion and Deposition Management Plan (SEDMP), Construction Environmental Management Plan (CEMP) and Site Environmental Plan (SEP) to be developed for the Project.

Indirect impacts

Potential indirect or offsite impacts of infrastructure construction projects can include the alteration of hydrological processes, weed invasion or spread, dust impacts on neighbouring vegetation, and contamination from waste. Potential offsite and indirect impacts stemming from the proposed action are considered limited for the proposed action.

Hydrological impacts are a particular risk for this Project, being situated within and adjacent to the confines of Spring Hut Creek. There is a low risk of the works altering flows within this watercourse, since works will be conducted during low rainfall seasons, but mitigation measures will be required to reduce potential pollution of the system and concentrated run-off into the channel.

Clearing of vegetation and the movement of vehicles along tracks has the potential to increase the spread of weed species and introduced pest species around the Project area and off-site. Given that much of the site already has moderate amounts of weed incursion, it is not expected that impacts will be significant. The development will also offer the opportunity for SA Water to manage declared weeds within the Project area such as Artichoke Thistle and African Boxthorn. Management actions, as outlined in the SEP will be implemented to ensure no new weed infestations occur within the Project area, and Project activities do not cause a spread of weeds to neighbouring habitat.

An increase in dust levels in the local area can be caused by earthworks and vehicular travel on un-surfaced tracks. Dust can coat vegetation, potentially interfering with plant growth and reproduction. Dust production is a particular concern in this project, which involves abrasive blasting to remove lead-based paints from the pipe-bridge. Dust emissions will be confined to construction activities only, and as such any impacts will be temporary. Waste generated by the Project works will be contained within the enclosure and securely removed from site via a sealed vessel. Furthermore, dust-suppression activities will be employed during all stages of construction limit dust impacts on neighbouring vegetation.

The construction of access tracks within open mallee woodland along the northern access route will involve the application of fill which has the potential to impact tree health through both the heat island effect (removal of surrounding vegetation increasing heat on the earth surface) and by impacting the permeability of soil within tree root zones.

4.4 Address the mitigation hierarchy

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

The following paragraphs describes how the Project has addressed the mitigation hierarchy with reference to the NV Regulations Section 5 – Mitigation hierarchy (a) – (d):

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

The proposed clearance is for upgrades to the pipe-bridge infrastructure and associated maintenance areas. These works are required to improve safety for workers at the site and as such there is not an option to avoid all impacts. The majority of works have been designed to fit within already cleared areas or areas that do not consist of native vegetation such as some parts of the creekline. For example, the access tracks are to be constructed along existing farm and maintenance tracks, which will need widening from ~2.5 m to 4 m so that required machinery can access the pipe-bridge. Siting the access tracks along these routes avoids the need to clear the full width of the required access routes.

Two threatened species (White-winged Chough and Rainbow Bee-eater) were recorded within or adjacent to the impacted sites. Additionally, VA2 - Open Mallee Woodland was identified as the Mallee Bird TEC. Impacts to these species and this VA and the Mallee Bird TEC have been avoided wherever possible and isolated to a narrow strip along the existing access track that is required for access into the creekline.

During the planning process for the Project, two options were explored to access the creek (Figure 25). The other option, located about 500 m to the southeast was investigated as an option to avoid impacts to the Mallee Woodland. The second access option was not pursued however as it resulted in greater impacts to the creekline and posed significant logistical challenges, with heavy machinery having to drive along the creekline for over 500 metres increasing the risk of causing erosion damage and putting workers and machinery at greater risk of flash floods. Access from the eastern side of the bridge was deemed infeasible as the banks are too steep.

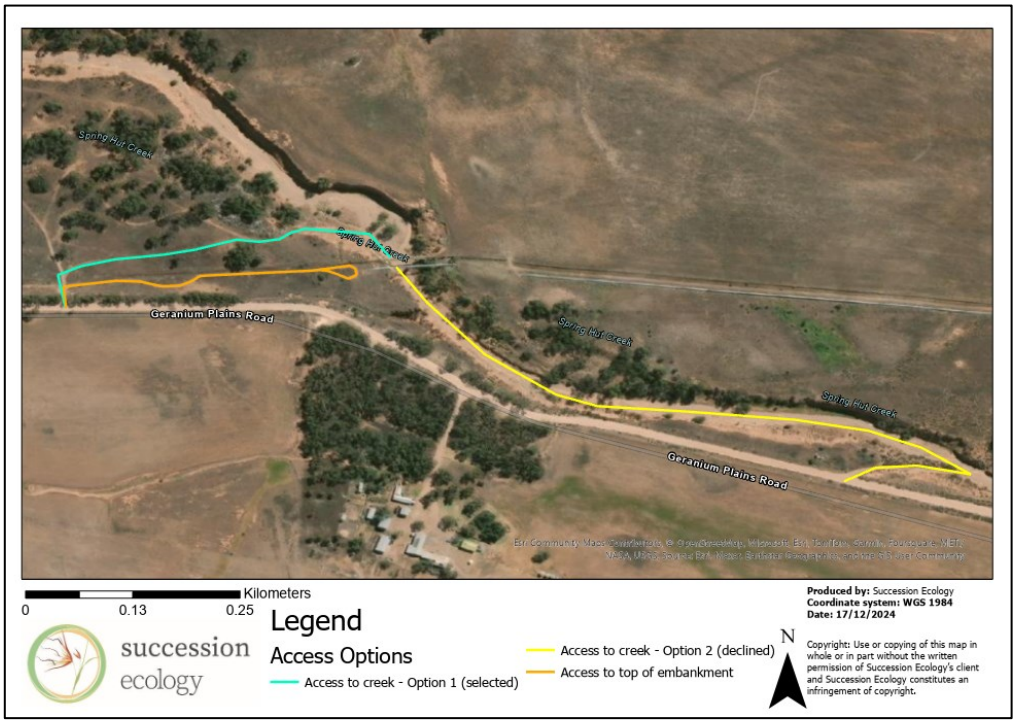


Figure 25: Access options for the Spring Hut Creek Project. Access to the top of the bridge (orange) and into the creek from the north (blue) were selected. The access option into the creek from the south (yellow) was not chosen due to the length, as well as safety, logistical and environmental issues with driving heavy machinery along the creek bed.

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

The proponent has undertaken a detailed site assessment of the proposed clearance area as well as surrounding properties and incorporated in the planning of infrastructure works to ensure the minimum amount of vegetation disturbance. The proponent has minimised the area of clearance required for access tracks by reducing the design width from the originally proposed 8 m to 4 m. This was possible by planning for vehicle movement along these routes to move only as one-way traffic rather than two-way traffic. In this way, the proponent has reduced clearance of vegetation within VA1A, VA1B, VA2 and VA3 by over half of the currently planned 0.127 ha.

The proponent has also selected a site for material and equipment laydown in more degraded vegetation (VA4) that is subject to grazing and cropping across Geranium Plains Road rather than the other option explored along the creek access track in VA1A (Figure 26).

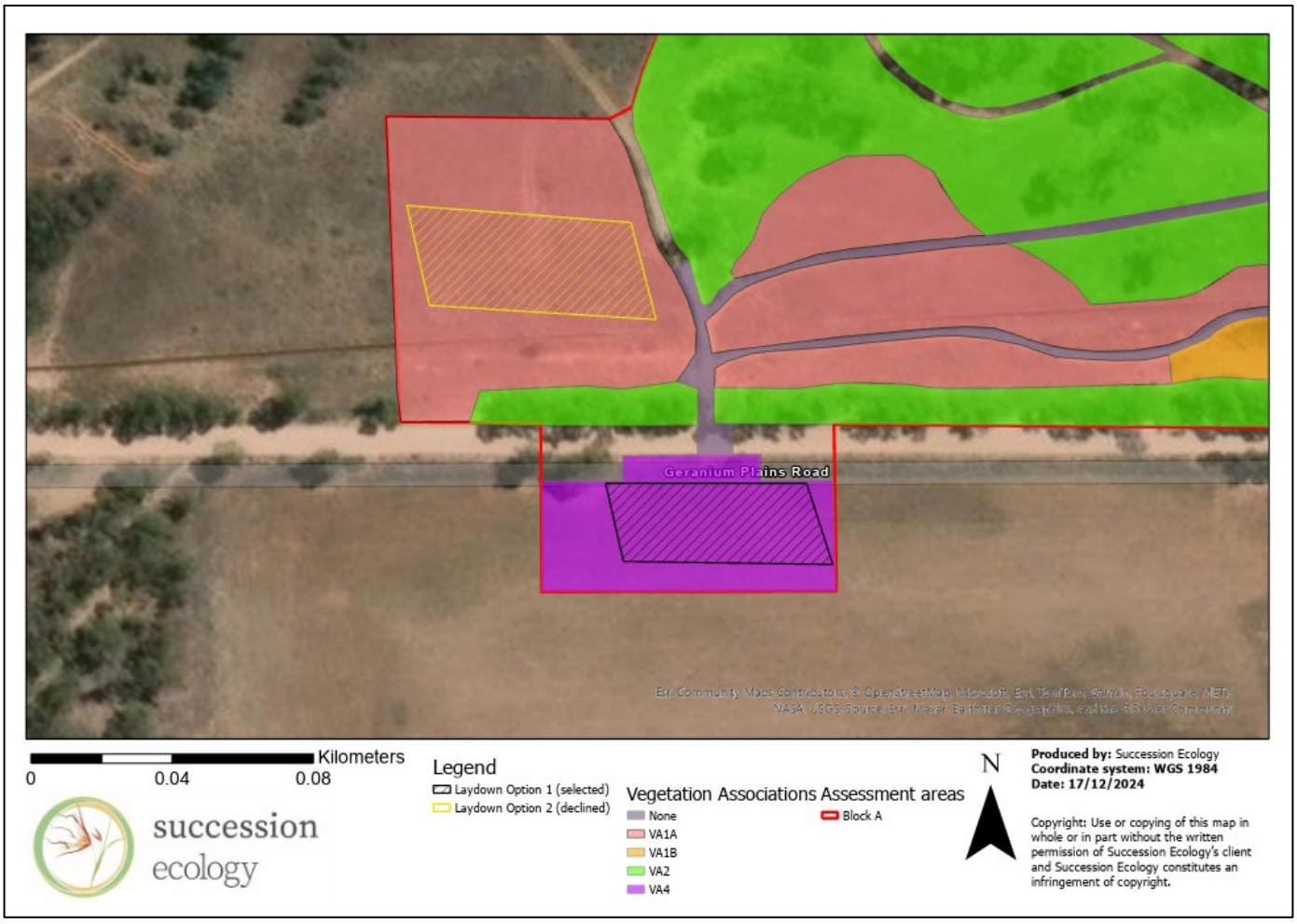


Figure 26: Laydown areas considered for the Spring Hut Creek Project. The selected laydown area (black hash) was chosen rather than the declined laydown area (yellow) resulting in impacts to the more degraded VA4 (purple) rather than VA1A (red)

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

The proponent has committed to the implementation of restoration works (as a subsection to an Environmental Management Plan) for areas that are not required to remain cleared following the completion of works. This includes the laydown area across Geranium Plains Road and other areas within the creek that are not required to maintain access for maintenance works on the bridge. SA Water and MDJV will also ensure weed control within these areas is

carried out in accordance with their SEP and Construction Environmental Management Plan, which will improve the condition of vegetation remaining in the area.

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

SA Water will contribute an SEB payment into the Native Vegetation fund to support restoration and conservation works in the region.

The NVC will only consider an offset once avoidance, minimization and restoration have been documented and fulfilled. The NVC *Policy for Significant Environmental Benefit* (Native Vegetation Council 2020) explains the biodiversity offsetting principles that must be met.

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

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

Principle of clearance	Considerations
Principle 1(a) - it comprises a high level of diversity of plant species	Relevant information – The number of native and introduced flora species for each vegetation association VA1A – 19 native, 9 introduced VA1B – 9 native, 6 introduced VA2 – 20 native, 6 introduced VA3 – 24 native, 12 introduced VA4 – 9 native 1 introduced Bushland Plant Diversity Score VA1A - 30 VA1B – 16 VA2 - 28 VA3 - 22 VA4 - 16
	Assessment against the principles Seriously at Variance VA1A VA2 VA3 At Variance – VA1B VA4
	Moderating factors that may be considered by the NVC There is around 12 % of native vegetation remaining within 5 km of the site, which is equal to approximately 942 hectares. The total clearance proposed for the works is 0.537 hectares which accounts for only 0.057 % of this remnant vegetation. This may justify reducing the impact level from 'Seriously at variance' for VA1A, VA2 and VA3 to 'At variance', and from 'At variance' for VA1B and VA4 to 'Not at variance'.
Principle 1(b) - significance as a habitat for wildlife	Relevant information Threatened fauna species that have been identified with potential to use the vegetation within the proposed impact area include: Southern Whiteface (*Aphelocephala leucopsis*) – *EPBC Act;* Vulnerable - **Likely** White-winged Chough (*Corcorax melanorhamphos*) – *NPW Act;* Rare - **Known** Little Eagle (*Hieraaetus morphnoides*) – *NPW Act;* Vulnerable - **Likely** South-eastern Hooded Robin (*Melanodryas cucullata cucullata*) – *EPBC Act;* Endangered/*NPW Act;* Rare – **Possible** Rainbow Bee-eater (*Merops ornatus*) – *EPBC Act;* Listed Marine - **Known** The vegetation at the site is considered significant as a corridor of habitat providing movement between other areas of native vegetation considering the heavily cleared nature of the surrounding landscape. Due to this and the potential presence of threatened species it may have significance.

	The site was identified to have a moderate diversity of animal species with 31 native species identified during the two field surveys, which included a Targeted bird survey expected to detect most bird species on-site. Vegetation Associations: VA1A Threatened Fauna Score – 0.1 Unit biodiversity Score – 64.70 VA1B Threatened Fauna Score – 0.1 Unit biodiversity Score – 22.44 VA2 Threatened Fauna Score – 0.1 Unit biodiversity Score – 85.32 VA3 Threatened Fauna Score – 0.1 Unit biodiversity Score – 47.68 VA4 Threatened Fauna Score – 0.1 Unit biodiversity Score – 32.31
	Assessment against the principles Seriously at Variance All vegetation associations
	Moderating factors that may be considered by the NVC The habitat found at the site is considered non-essential for all the threatened species identified in the species search. Species such as Southern Whiteface, South-eastern Hooded Robin, and Little Eagle were not recorded at the site despite a targeted survey in December 2024. As such, while they may still occur, the site is not deemed likely to be essential habitat for those species. For White-winged Chough and Rainbow Bee-eater which were identified at the site, the small amount of clearance, particularly in their favoured Mallee Woodland and Riparian Woodland habitats respectively, is not expected to result in any significant impacts to these species aside from minor disturbance. Other common species identified within the Project area are capable of easily relocating away from sources of disturbance, generally being highly mobile species.
Principle 1(c) - plants of a rare, vulnerable or endangered species	Relevant information List threatened flora species that were recorded for the site: No threatened flora species identified in the desktop assessment were recorded at the site during surveys. Threatened Flora Score(s): VA1A – 0 VA1B – 0 VA2 – 0 VA3 – 0 VA4 – 0
	Assessment against the principles Not at variance All vegetation associations

	Moderating factors that may be considered by the NVC NA
***Principle 1(d) - the vegetation comprises the whole or part of a plant community that is Rare, Vulnerable or endangered*:**	Relevant information VA2 – Mallee Open Woodland has been identified to meet the criteria for the Mallee Bird Community of the Murray Darling Depression Bioregion listed as Endangered under the *EPBC Act.* Threatened Community Score: VA1A – 1 VA1B – 1 VA2 – 1.4 VA3 – 1 VA4 – 1
	Assessment against the principles Seriously at Variance VA2 Not at variance VA1A VA1B VA3 VA4
	Moderating factors that may be considered by the NVC The total amount of clearance to be undertaken within VA2 is 0.032 hectares, making up only 0.08 % of the remaining Mallee Woodland within 1 km (about 39 ha). This ensures the clearance of Mallee Woodland for the Project is less than 1 % of the remaining area of this TEC within the immediate area. The NVC may consider this justification to lower the assessment of VA2 against this principle from 'Seriously at variance' to 'At variance'.
Principle 1(e) - it is significant as a remnant of vegetation in an area which has been extensively cleared.	Relevant information The remnancy figures for the Murray Mallee IBRA subregion and Sutherlands IBRA Association are as follows: Murray Mallee – 21 % native vegetation remaining Sutherlands – 47 % native vegetation remaining Generally, the health of the remnant vegetation found within the proposed Project area is moderate to good (UBS scores of 47.68 to 85.32) while one VA is found to be poor (UBS score 22.44) Total Biodiversity Score: Whole site – 30.21
	Assessment against the principles At Variance All vegetation associations
	Moderating factors that may be considered by the NVC The majority of the clearance for the Project is within chenopod shrubland vegetation (0.471 ha/ 0.537 ha, which is not a vegetation community that has been selectively removed or is underrepresented within either the Murray Mallee subregion or the Sutherlands association. The clearance within Mallee Woodland (0.032 ha) and Riparian Woodland (0.033 ha) respectively makes up only a tiny portion of these habitats within a 1 km radius (less than 0.1 %). Within the Mallee Woodland, the clearance along already existing tracks will not result in the complete removal of any trees, instead just requiring trimming of branches. In the Riparian Woodland, vegetation removal is in the immediate surroundings of the existing bridge and the removal of large trees is unlikely to be required.

Principle 1(f) – it is growing in, or in association with, a wetland environment.	Relevant information VA3 - *Eucalyptus porosa* riparian woodland with chenopod understorey is considered vegetation growing in association with a wetland environment. Spring Hut Creek is a large ephemeral creekline occasionally experiences large volumes of water. A portion of the works for this Project will take place within the creekline underneath the pipe-bridge and some of the vegetation within the riparian woodland will be cleared. While this vegetation is considered to be in association with the riparian zone and wetland, it does not itself contain species considered to be dependent on water and is more closely associated with terrestrial ecosystems.
	Assessment against the principles Seriously at variance VA3 Not at variance VA1A VA1B VA2 VA4
	Moderating factors that may be considered by the NVC The Project works may not be considered to cause a significant impact to the wetland because the activities are not likely to: • *Destroy any parts of the wetland or alter the hydrological regime* – machinery will move upon the dry creek bed to erect scaffolding to access the bridge. This will require the removal of some vegetation; however, the works are not expected to impact the structure of the creek banks or alter the natural flow of water. Further, a Sediment Erosion and Deposition Management Plan (SEDMP) will guide the implementation of erosion control works and diversion of run-off to improve and protect the structural integrity of the bridge, supporting rock wall and pipe, ensuring it does not impact the wetland. • *Seriously affect the habitat or lifecycle of native species dependent upon the wetland* – no native species were identified within the proposed clearance areas that are dependent on the wetland. • *Cause a substantial or measurable change in the physio-chemical status of the wetland* – The Project works will involve the removal via abrasive blasting of a lead coating from the existing bridge structure. This will be done inside a sealed system and as per the Project's Waste Management Protocol any harmful by-product will be pumped out to be transported offsite, avoiding any pollution of the system from the waste product. • *Introduce invasive species* – The Project will work under a Construction Environmental Management Plan (CEMP), Site Environmental Plan (SEP) and involve restoration works (as a subsection to one of these plans) to ensure that no invasive species are introduced to the Project area. The NVC may consider the above moderating factors to justify lowering the clearance within VA3 from 'Seriously at variance' to 'At variance'.
Principle 1(g) - it contributes significantly to the amenity of the area in which it is growing or is situated.	Relevant information The Project site is situated along Geranium Plains Road, which is not a thoroughfare or a highly trafficked road. The clearance at the site is situated along already cleared tracks and alongside already existing infrastructure. Thus, it is not expected that the further clearance will have any negative impacts on the amenity of the area. Spring Hut Creek is likely to hold value as an important site of natural history, however the proposed Project works are not expected to cause any impact to the landscape or landscape character beyond what has already been caused by the original bridge and pipe construction.
	Not at variance All vegetation associations

	Moderating factors that may be considered by the NVC NA

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

4.6 Risk assessment

Determine the level of risk associated with the application

Total clearance	No. of trees	None
	Area (ha)	0.537
	Total biodiversity Score	30.23
Seriously at variance with principle 1(b), 1(c) or 1 (d)		1(b) – All vegetation associations 1(c) - None 1(d) – VA2
Risk assessment outcome		Level 4

4.7 NVC guidelines

Provide any other information that demonstrates that the clearance complies with any relevant NVC guidelines related to the activity.

NA

5. Clearance summary

Clearance area(s) summary table

Block	Site	Species diversity score	Threatened Ecological community Score	Threatened plant score	Threatened fauna score	UBS	Area (ha)	Total Biodiversity score	Loss factor	Loadings	Reductions	SEB Points required	SEB payment	Admin Fee
A	VA1A	30	1	0	0.1	64.70	0.334	21.61	1.0	0	0	22.69	$7,396.50	$406.81
A	VA1B	16	1	0	0.1	22.44	0.013	0.29	1.0	0	0	0.31	$99.83	$5.49
A	VA2	28	1.4	0	0.1	85.32	0.032	2.73	1.0	0	0	2.87	$934.42	$51.39
A	VA3	22	1	0	0.1	48.09	0.033	1.59	1.0	0	0	1.67	$543.17	$29.87
A	VA4	16	1	0	0.1	32.31	0.124	4.01	1.0	0	0	4.21	$1,371.27	$75.42
						Total	**0.537**	**30.23**				**31.75**	**$10,345.19**	**$568.98**

Total summary table

Economies of Scale Factor	0.35
Rainfall (mm) Factor	312

	Total Biodiversity score	Total SEB points required	SEB Payment	Admin Fee	Total Payment
Application	30.23	31.75	$10,345.19	$568.98	$10,914.17

NOTE: The minimum payment for this clearance will be $500.

6. Significant Environmental Benefit

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

1.1. Achieving an SEB

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

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

☐ Use SEB Credit that the proponent has established. Provide the SEB Credit Ref. No. _____

☐ Apply to have SEB Credit assigned from another person or body. The application form needs to be submitted with this Data Report.

☐ Apply to have a SEB to be delivered by a Third Party. The application form needs to be submitted with this Data Report.

☒ Pay into the Native Vegetation Fund.

1.2. Payment SEB

1.2.1. Investigation into On-ground SEB

The SEB Policy states that if a SEB is required as a result of an approved activity undertaken under the Regulations, the applicant has a choice of either providing an on-ground SEB or a Payment SEB. However, if a proposed clearance will have an offset obligation of greater than 150 SEB Points required, the NVC will first request that a reasonable attempt be made to identify an on-ground SEB before a payment will be accepted. As the offset obligation for the proposed clearance is 31.75 SEB points, the proponent has identified that they would prefer to satisfy the SEB through a payment.

1.2.2. Payment SEB

Payment amount required: **$10,914.17** (including admin. fee)

7. References

Birdlife Australia. 2021. Species Profile: Hieraaetus morphnoides, Little Eagle.

Birdlife Australia. 2023. Southern Whiteface.

Birdlife Australia. 2024. Species Profile: White-winged Chough (Corcorax melanorhamphos). https://birdlife.org.au/bird-profiles/white-winged-chough/?srsltid=AfmBOoqK0JQaiVZYh3ehdhYaoyipqjwsYLCb5jIBmfUVpcQ5n0XUwehD.

DAWE. 2021. Approved Conservation Advice for the Mallee Bird Community of the Murray Darling Depression Bioregion.

DCCEEW. 2009. Acacia spilleriana — Spiller's Wattle. jurisdiction=Commonwealth of Australia; corporateName=Department of the Environment. https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=34123.

DCCEEW. 2023a. Conservation Advice for Melanodryas cucullata cucullata (hooded robin (south-eastern)).

DCCEEW. 2023b. Conservation Advice for Aphelocephala leucopsis (southern whiteface).

DCCEEW. 2024a. Merops ornatus — Rainbow Bee-eater. jurisdiction=Commonwealth of Australia; corporateName=Department of the Environment. https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=670.

DCCEEW. 2024b. Dodonaea subglandulifera — Peep Hill Hop-bush. jurisdiction=Commonwealth of Australia; corporateName=Department of the Environment. https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=11956.

Higgins, P. J. 1999. Handbook of Australian, New Zealand and Antarctic Birds. Volume 4: Parrots to Dollarbird. Oxford University Press, Melbourne.

Higgins, P., and J. Peter. 2002. Handbook of Australian, New Zealand and Antarctic Birds. Volume 6: Pardalotes to Shrike-thrushes. Oxford University Press.

Native Vegetation Council. 2020, July. Policy for a Significant Environmental Benefit under the Native Vegetation Act 1991 and Native Vegetation Regulations 2017.

Native Vegetation Council. 2024. Native Vegetation Council Bushland Assessment Manual.

8. Appendices & Attachments

Appendices

Appendix A: Complete species lists of species recorded during field surveys.

Appendix B: Additional site photos.

Appendix C: Threatened fauna and flora species excluded from assessment

Attachments

Attachment 1: Bushland scoresheets associated with the proposed clearance

Attachment 2: Site maps as shape files

Appendix A – Complete list of flora and fauna species identified within the Project area.

SPECIES	COMMON NAME
Native Fauna	
AVES	
Acanthagenys rufogularis	Spiny-cheeked Honeyeater
Acanthiza chrysorrhoa	Yellow-rumped Thornbill
Acanthiza Sp.	Thornbill Sp.
Acanthiza uropygialis	Chestnut-rumped Thornbill
Accipiter cirrocephalus	Collared Sparrowhawk
Aquila audax	Wedge-tailed Eagle
Barnardius zonarius barnardi	Mallee Ringneck
Climacteris picumnus	Brown Treecreeper
Colluricincla harmonica	Grey Shrike-thrush
Coracina maxima	Ground Cuckoo-shrike
Corcorax melanorhamphos	White-winged Chough
Corvus coronoides	Australian Raven
Cracticus torquatus	Gray Butcherbird
Eolophus roseicapilla	Galah
Falco cenchroides	Nankeen Kestrel
Gavicalis virescens	Singing Honeyeater
Gymnorhina tibicen	Australian Magpie
Lasiorhinus latifrons	Southern Hairy-nosed Wombat
Malurus assimilis	Purple-backed Fairywren
Merops ornatus	Rainbow Bee-eater
Ocyphaps lophotes	Crested Pigeon
Pardalotus striatus	Striated pardalote
Phylidonyris novaehollandiae	New Holland Honeyeater
Platycercus elegans	Crimson Rosella
Pomatostomus ruficeps	Chestnut-crowned Babbler
Pomatostomus superciliosus	White-browed Babbler
Pseudonaja textilis	Eastern Brown Snake
Ptilotula penicillata	White-plumed Honeyeater
Rhipidura leucophrys	Willie Wagtail
Smicrornis brevirostris	Weebill
Tiliqua rugosa	Shingleback
Exotic Fauna	
Passer domesticus	House Sparrow
Vulpes vulpes	European Red Fox

SPECIES	COMMON NAME	SITE				
Native Flora		**VA1A**	**VA1B**	**VA2**	**VA3**	**VA4**
Acacia calamifolia	Wallowa				✓	
Acacia oswaldii	Umbrella Wattle			✓		
Acacia pycnantha	Golden Wattle				✓	
Alectryon oleifolius ssp. canescens	Bullock Bush				✓	

SPECIES	COMMON NAME					
Atriplex stipitata	Bitter Saltbush	✓	✓	✓	✓	✓
Austrostipa sp.	Spear-grass				✓	✓
Boerhavia dominii	Tar-vine	✓	✓		✓	
Bursaria spinosa ssp.	Bursaria				✓	
Compositae sp.	Daisy Family	✓			✓	
Dissocarpus paradoxus	Ball Bindyi	✓		✓		✓
Enchylaena tomentosa var.	Ruby Saltbush	✓	✓	✓	✓	
Eremophila longifolia	Weeping Emubush	✓				
Eucalyptus brachycalyx	Gilja			✓		
Eucalyptus gracilis	Yorrell			✓		
Eucalyptus oleosa ssp.	Red Mallee			✓		
Eucalyptus porosa	Mallee Box				✓	
Euphorbia drummondii group		✓				
Geijera linearifolia	Sheep Bush			✓		
Hakea leucoptera ssp. leucoptera	Silver Needlewood	✓				
Heliotropium europaeum	Common Heliotrope	✓	✓	✓	✓	✓
Lysiana exocarpi ssp. exocarpi	Harlequin Mistletoe	✓				
Maireana brevifolia	Short-leaf Bluebush	✓	✓	✓	✓	✓
Maireana pyramidata	Black Bluebush	✓	✓	✓	✓	
Maireana sp.	Bluebush/ Fissure-plant					✓
Melaleuca lanceolata	Dryland Tea-tree				✓	
Myoporum platycarpum ssp.	False Sandalwood				✓	
Nitraria billardierei	Nitre-bush	✓		✓	✓	✓
Osteocarpum sp.	Bonefruit	✓	✓	✓	✓	
Pittosporum angustifolium	Native Apricot			✓		
Rhagodia parabolica	Mealy Saltbush	✓		✓	✓	
Rhagodia preissii ssp. preissii	Mallee Saltbush			✓	✓	
Rhagodia spinescens	Spiny Saltbush	✓		✓	✓	
Roepera aurantiaca ssp. aurantiaca	Shrubby Twinleaf	✓		✓	✓	
Salsola australis	Buck bush	✓	✓	✓		✓
Scaevola spinescens	Spiny Fanflower			✓		
Sclerolaena obliquicuspis	Oblique-spined Bindyi	✓	✓	✓	✓	✓
Senna artemisioides ssp. artemisioides x ssp. coriacea	Desert Senna				✓	
Senna artemisioides ssp. petiolaris	Woody Cassia				✓	
Exotic Flora		**VA1A**	**VA1B**	**VA2**	**VA3**	**VA4**
Asphodelus fistulosus	Onion Weed	✓			✓	
Avena barbata/fatua	Wild Oat		✓			
Bromus madritensis	Compact Brome		✓	✓		
Bromus rubens	Red Brome	✓	✓	✓		
Carrichtera annua	Ward's Weed	✓	✓	✓	✓	✓
Carthamus lanatus	Saffron Thistle	✓				
Centaurea calcitrapa	Star Thistle				✓	
Cucumis myriocarpus ssp. myriocarpus	Paddy Melon	✓				
*Cynara cardunculus ssp. flavescens**	Artichoke Thistle				✓	
Dittrichia graveolens	Stinkweed	✓			✓	
*Echium plantagineum**	Salvation Jane				✓	

SPECIES	COMMON NAME					
*Lycium ferocissimum**	African Boxthorn			✓	✓	
*Marrubium vulgare**	Horehound	✓	✓	✓	✓	
Mesembryanthemum nodiflorum	Slender Ice plant	✓	✓			
Nicotiana glauca	Tree Tobacco				✓	
Reichardia tingitana	False Sow-thistle	✓				
*Reseda lutea**	Cut -leaf Mignonette				✓	
Salvia verbenaca var.	Wild Sage				✓	
Schinus molle	Pepper-tree			✓	✓	

**Declared Plants listed under the Landscape South Australia Act 2019*

Appendix B – Additional site photos.

A

B

C

D

E

F

Photo Log

A. Rainbow Bee-eaters perching on dead branches within the creek line
B. White-winged Chough adult and juvenile perching in mallee woodland, southeast of the Project area
C. Group of White-winged Choughs, (not pictured: four additional individuals foraging on the ground)
D. Existing pipeline within chenopod shrubland vegetation, outside of the Project area, on the northeast side of the creek line
E. European Red Fox observed on the northeast side of the creek line, opposite the Project area
F. Shingleback lizard observed within the Project area in chenopod shrubland

G

H

I

J

K

L

Photo Log

G. Juvenile Eastern Brown Snake within chenopod shrubland vegetation under the existing pipeline in the Project area
H. Proposed access area to the site off Geranium Plains Road, with mallee woodland vegetation on either side
I. Example of assumed Rainbow Bee-eater nest on the southwest bank of the creek line within the Project area
J. Additional example of potential Rainbow Bee-eater and other species nesting sites in the southwest bank of the creek line within the Project area. Existing pipeline and associated infrastructure shown on the right

K. Example of vegetation and erosion along the creek line within the Project area.
L. Creekline immediately north of the Project area, with nests of various sizes shown in the bank (right)

Appendix C – Threatened fauna and flora species excluded from assessment

Three species which were identified in the threatened fauna species search have been excluded from assessment here, as the habitat under application was considered completely unsuitable and would not support the species, or the threatened subspecies does not occur within the vicinity of the application area. These species are:

- *Manorina melanotis* (Black-eared Miner) – *EPBC Act,* Endangered
    - This subspecies of the Yellow-throated Miner is known to be restricted to patches of protected vegetation over 50 km to the east of the Project site.
- *Platycercus elegans melanopterus* (Kangaroo Island Crimson Rosella) – *EPBC Act,* Vulnerable
    - This is a subspecies of the mainland Crimson Rosella.
- *Tachyglossus aculeatus multiaculeatus* (Kangaroo Island Echidna) – *EPBC Act,* Endangered
    - This is a subspecies of the mainland Echidna.

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