

Native Vegetation Clearance

4.3 Sturt Highway / Old Sturt Highway – Eastern Intersection upgrade

Data Report

Clearance under the *Native Vegetation Regulations 2017*

2 December 2021

Prepared by EBS Ecology



Native Vegetation Clearance 4.3 Sturt Highway / Old Sturt Highway – Eastern Intersection Upgrade Data Report

2 December 2021

Final version 6

Prepared by EBS Ecology for Tonkin Consulting Pty Ltd

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Cover photograph: Native vegetation within the Project Area at Block A (eastern intersection of Sturt Highway / Old Sturt Highway).

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Glossary and abbreviations

BAM	Bushland Assessment Method
BDBSA	Biological Database of South Australia (maintained by DEW)
DAWE	Department of Agriculture, Water and the Environment (Commonwealth)
DEW	Department for Environment and Water (South Australia)
DIT	Department for Infrastructure and Transport
EBS	Environment and Biodiversity Services Pty Ltd (trading as EBS Ecology)
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i>
ha	Hectare(s)
IBRA	Interim Biogeographical Regionalisation of Australia
km	Kilometre(s)
NatureMaps	Initiative of DEW that provides a common access point to maps and geographic information about South Australia's natural resources in an interactive online mapping format
NPW Act	<i>National Parks and Wildlife Act 1972</i>
NV Act	<i>Native Vegetation Act 1991</i>
NVC	Native Vegetation Council
PMST	Protected Matters Search Tool (under the EPBC Act; maintained by DAWE)
Project	Sturt Highway/Old Sturt Highway intersection upgrades
Project Area	Sturt Highway/Old Sturt Highway intersection
SA	South Australia(n)
Search Area	5 km buffer of the Project Area considered in the desktop assessment database searches
SEB	Significant Environmental Benefit
sp.	Species
spp.	Species (plural)
ssp.	Sub-species
TEC	Threatened Ecological Community
var.	Variety (a taxonomic rank below that of species and subspecies, but above that of form)

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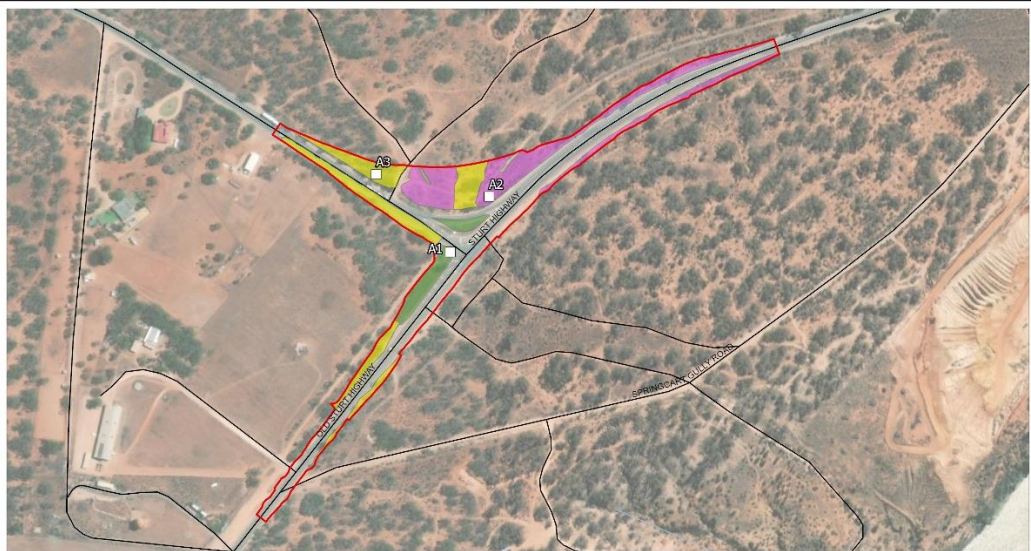
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1. Application information

Table 1. Application details.

Applicant:	Tonkin on behalf of the Department for Infrastructure and Transport (DIT)		
Key contact:	Ellen Tansell, Tonkin Consulting Pty Ltd		
Landowner:	The Crown		
Site Address:	Corner Sturt Highway and Old Sturt Highway: Intersection A – Eastern end. 3.5 km north east of Berri.		
Local Government Area:	Berri Barmera	Hundred:	N/A
Title ID:	Intersection A - CR/6051/111	Parcel ID	Intersection A - D82243 A15

Table 2. Summary of the proposed clearance.

Purpose of clearance:	Clearance required for upgrade of an intersection.
Native Vegetation Regulation:	Regulation 12, clause 32, Works on behalf of Commissioner of Highways
Description of the vegetation under application:	Intersection A – Eastern: 1.80 hectares of three vegetation associations A1 <i>Dissocarpus paradoxus</i> / <i>Maireana brevifolia</i> Low Shrubland over exotic grasses and forbs, A2 <i>Dodonaea viscosa</i> / <i>Maireana brevifolia</i> Low Open Shrubland over <i>Austrostipa</i> sp. And A3 <i>Eucalyptus oleosa</i> Low Open Mallee over <i>Maireana brevifolia</i> / <i>Dissocarpus paradoxus</i> .
Total proposed clearance – area (ha) and/or number of trees:	1.8 ha is proposed to be cleared.
Level of clearance:	Level 4
Overlay (Planning and Design Code):	N/A
Map of proposed clearance area:	 Produced by: EBS Ecology Imagery Source: ESRI Date Source: EBS, DIT Coordinate System: GDA 1984 MGA Zone 54 Date: 15/09/2021 Legend: - BAM Sites - Roads - Project Area - Sturt Hwy East intersection - Vegetation Association - A1: <i>Dissocarpus paradoxus</i> / <i>Maireana brevifolia</i> Low Shrubland over exotic grasses and forbs - A2: <i>Dodonaea viscosa</i> / <i>Maireana brevifolia</i> Low Open Shrubland over <i>Austrostipa</i> sp. - A3: <i>Eucalyptus oleosa</i> Low Open Mallee over <i>Maireana brevifolia</i> / <i>Dissocarpus paradoxus</i>. Copyright: Use or copying of this map in whole or in part without the written permission of EBS Ecology constitutes an infringement of copyright. This map has been prepared on behalf of and for the exclusive use of EBS Ecology's Client, and is subject to and issued in connection with the provisions of the agreement between EBS Ecology and its Client. EBS Ecology accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this map by any third party. Scale: 1:4,000 0 75 150 m Eastern intersection (Block A)

Mitigation Hierarchy:	Given that the location of the major road alignments is already set by the location of the T-Junction, it is unlikely that clearance associated with the proposed intersection upgrade can be avoided or located elsewhere. Some initial concept designs that were undertaken during the planning study included grade separated arrangements and different roundabout configurations that impacted a much larger footprint at each location. The roundabout option chosen had a much smaller impact and integrated better to the existing road alignment. Some further alterations to design have been adopted to minimise the footprint as follows: (i) Use of a mountable annulus for the roundabout to accommodate large vehicles rather than a larger diameter. (ii) Maximum superelevation is used on free flow lane curves to reduce the radius and minimise the footprint. (iii) Extent of swales and drainage reduced where possible. (iv) Matching into existing alignments as soon as possible to minimise extent of works. (v) Steepening of batters where possible to minimise extent of works. These options were considered to either avoid impacting the existing vegetation or minimising the impact.
SEB Offset proposal	Payment of \$32,759.59 (inc admin fee)

2. Purpose of clearance

2.1. Description

At the intersection (A) (eastern intersection) approximately 1.80 hectares of native vegetation is proposed to be cleared to upgrade the intersection of the Sturt Highway and Old Sturt Highway 3.5 kilometres (km) north east of Berri.

2.2. Background

In response to the COVID-19 pandemic, the Department for Infrastructure and Transport (DIT) responded to the South Australian economic conditions by releasing packages of planning and design work to the consulting industry. The two intersection upgrades at Sturt Highway and Old Sturt Highway (project 4.3) are part of a package of four projects along the Sturt Highway. The two intersections were split into two separate reports in November 2021 with this report addressing the eastern intersection A only, as per Figure 1 below.

2.3. General location map

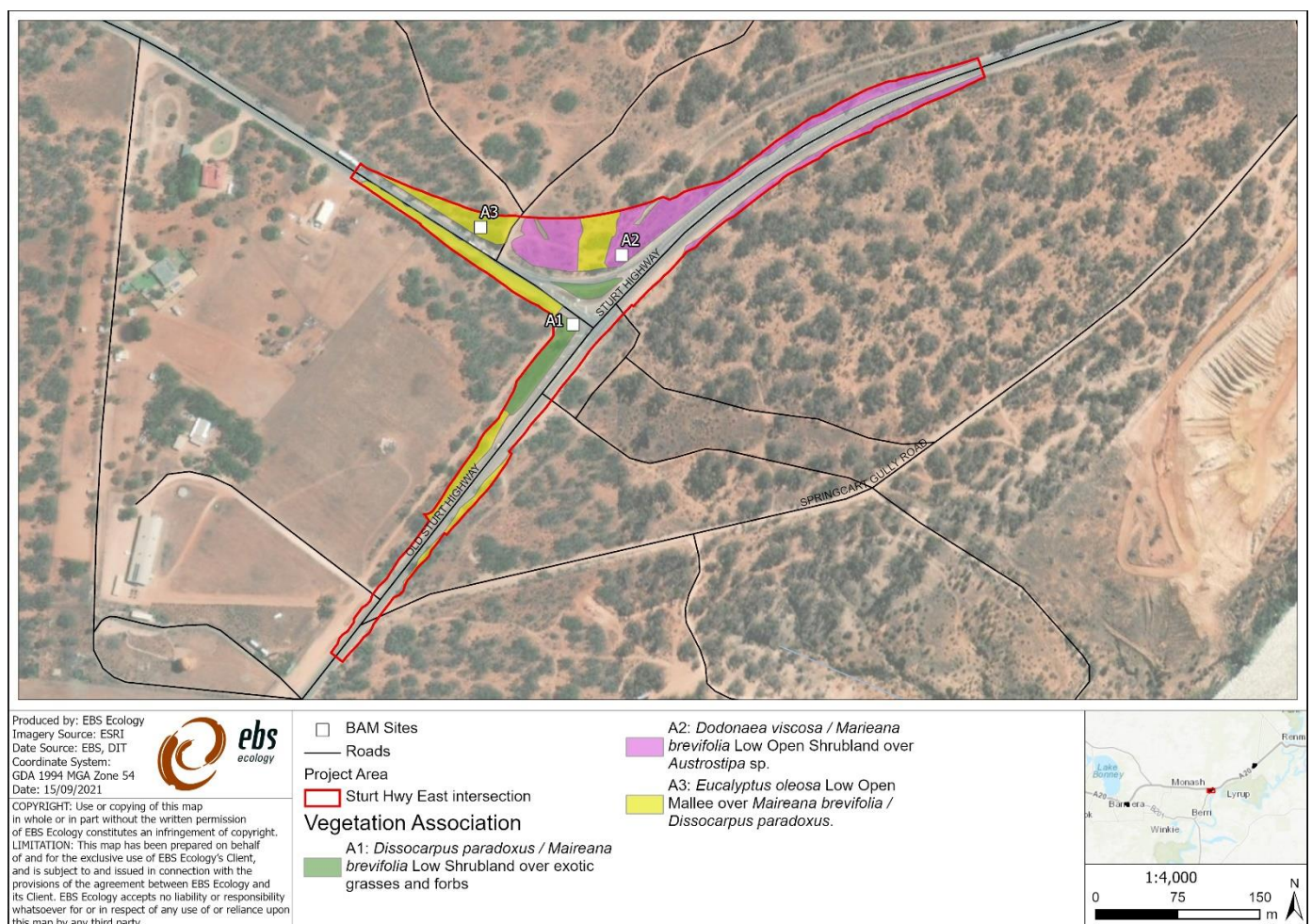


Figure 1: Sturt Highway / Old Sturt Highway eastern end (Block A) native vegetation patches and BAM sites.

EBS Ecology (EBS) received an updated design for the Eastern intersection (Block A) on 26 August 2021, including spatial data, and have updated the report to reflect this. Below is the overall design (Figure 2) with following images indicating trees to be removed. Figure 3 to Figure 7 show the updated design in detail.



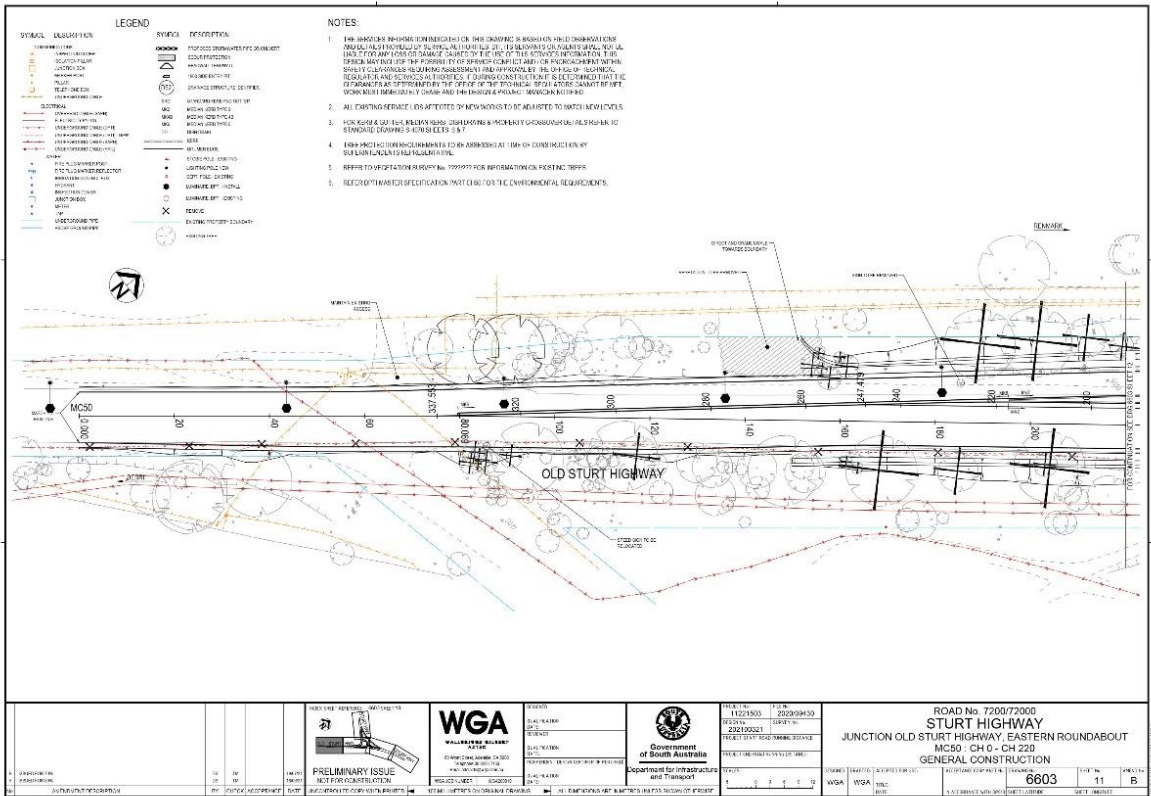


Figure 3. Updated design of eastern intersection 1 of 5.

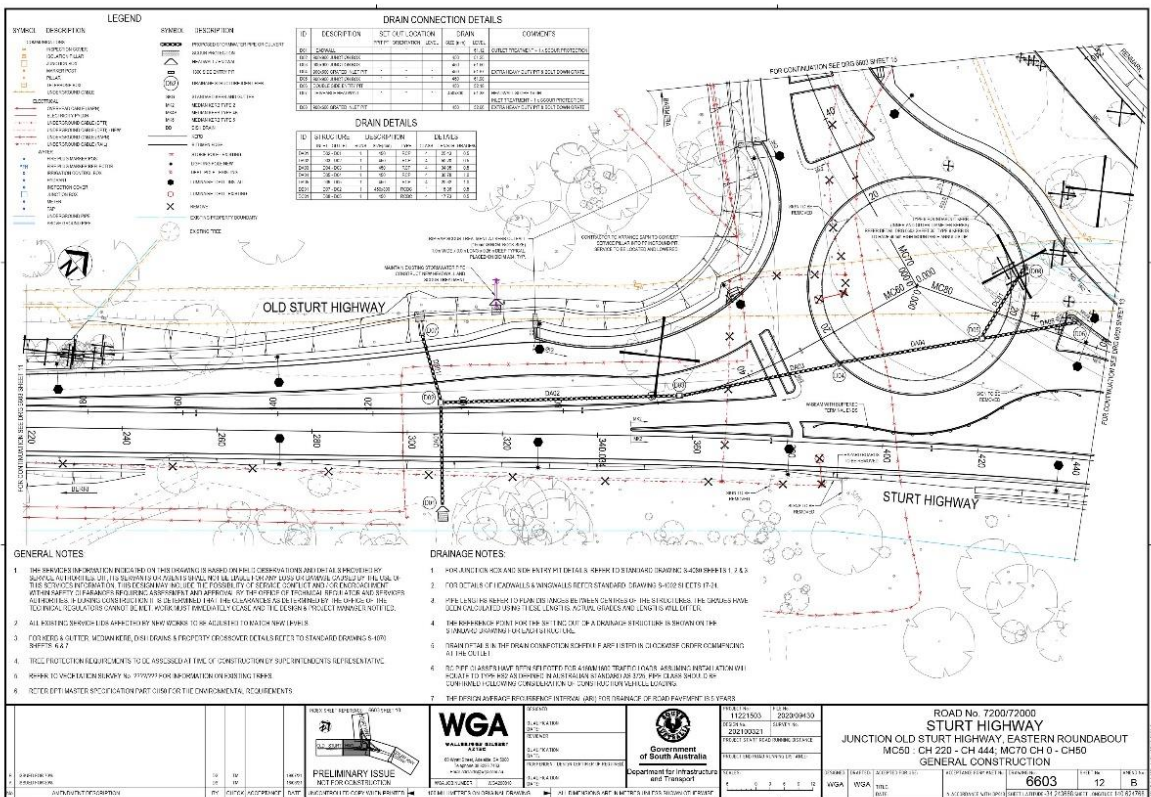


Figure 4. Updated design of eastern intersection 2 of 5.

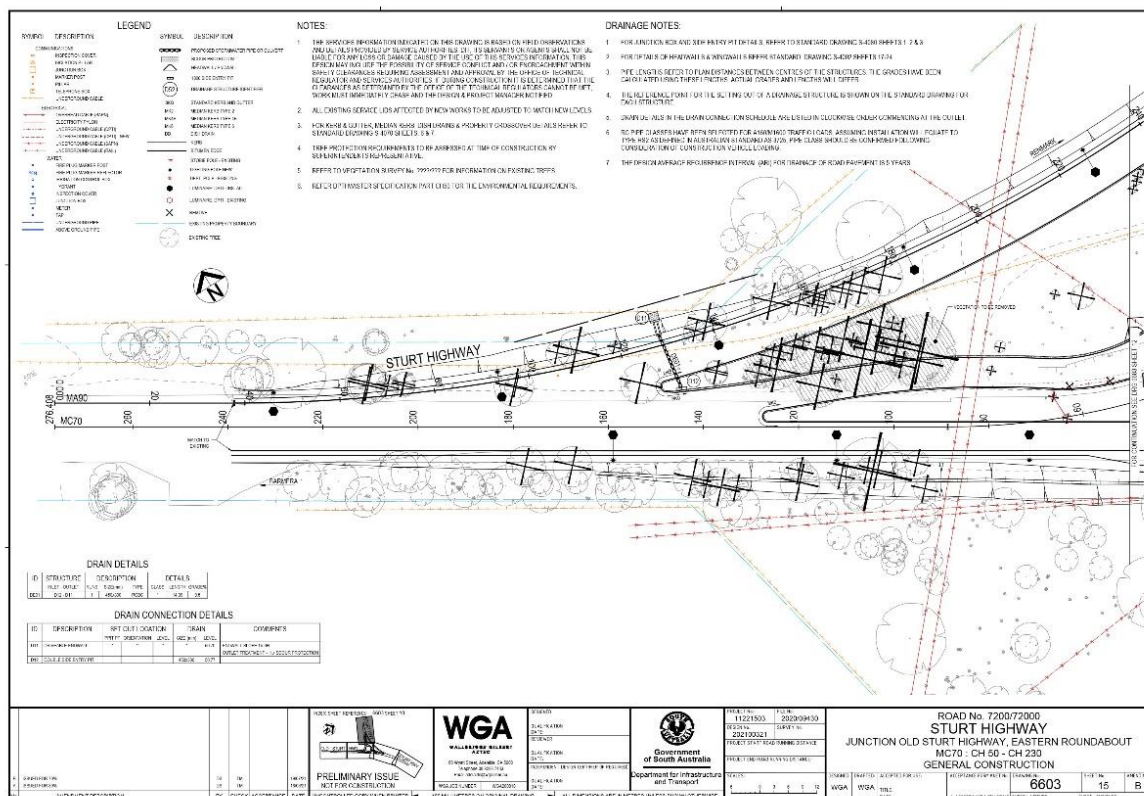


Figure 7. Updated design of eastern intersection 5 of 5.

2.5. Approvals required or obtained

Examples of other potential approvals include:

- transport of declared weeds under the *Landscapes South Australia Act 2019*, and
- *Aboriginal heritage Act* if any sites, objects or remains are uncovered during the works.

Other legislative approvals may be required.

Planning, Development and Infrastructure Act 2016 (provide Development Application number/s)- N/A

2.6. Native Vegetation Regulation

An assessment against the Principles of Clearance under the *Native Vegetation Act 1991* is not required as the clearance associated with the Project is in accordance with Division 5 of the *Native Vegetation Regulations 2017*, which allows for the clearance of native vegetation in relation to specific activities as set out in Schedule 1, Parts 4, 5 or 6 of the Regulations. The Project is considered to be permitted under the following regulation:

Regulation 12(32)—Works on behalf of Commissioner of Highways

- Clearance of vegetation incidental to work being undertaken by or on behalf of the Commissioner of Highways (other than repair or maintenance work of a kind referred to in Part 1 clause 2).

2.7. Development Application information (if applicable)

N/A.

3. Method

3.1. Desktop assessment

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

3.1.1. PMST report

A Protected Matters Search Tool (PMST) report was generated on 12 August 2020 to identify Nationally threatened flora and fauna, migratory fauna and TECs under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) relevant to the Project Area (DAWE 2020). Only species and TECs identified in the PMST report that are likely or known to occur within the Search Area were assessed for their likelihood of occurrence within the Project Area.

3.1.2. BDBSA data extract

A data extract (Supertable) from the Biological Database of South Australia (BDBSA) was obtained from NatureMaps on 21 August 2020 to identify State threatened flora and fauna species listed under the *National Parks and Wildlife Act 1972* (NPW Act) that have been recorded within 5 km of the Project Area (DEW 2020). The Naturemaps Supertable does not always include records of sensitive species. The reason for non-disclosure is that some species may be highly threatened by disturbance/exploitation/disease or other identifiable threats, and even general locality information may threaten the taxon. The BDBSA is comprised of an integrated collection of species records from the South Australian Museum, conservation organisations, private consultancies, Birds SA, Birdlife Australia and the Australasian Wader Study Group, which meet the Department for Environment and Water's (DEW) standards for data quality, integrity and maintenance. Only species with records since 1995 and a spatial reliability of less than 1 km were assessed for their likelihood of occurrence.

3.1.3. Likelihood of occurrence

The criteria for the likelihood of occurrence of threatened species within the Project Area are described in Table 3.

Table 3. Criteria for the likelihood of occurrence of threatened species within the Project Area.

Likelihood	Criteria
Highly Likely/Known	Recorded in the last 10 years, the species does not have highly specific niche requirements, the habitat is present and falls within the known range of the species distribution or; The species was recorded as part of field surveys.
Likely	Recorded within the previous 20 years, the area falls within the known distribution of the species and the area provides habitat or feeding resources for the species.
Possible	Recorded within the previous 20 years, the area falls inside the known distribution of the species, but the area provides limited habitat or feeding resources for the species. Recorded within 20 -40 years, survey effort is considered adequate, habitat and feeding resources present, and species of similar habitat needs have been recorded in the area.

Likelihood	Criteria
Unlikely	Recorded within the previous 20 years, but the area provides no habitat or feeding resources for the species, including perching, roosting or nesting opportunities, corridor for movement or shelter. Recorded within 20 -40 years; however, suitable habitat does not occur, and species of similar habitat requirements have not been recorded in the area. No records despite adequate survey effort.

3.2. Flora assessment

Database searches were performed as described in Section 3.1.

The flora assessment was undertaken by EBS, by two Native Vegetation Council (NVC) Accredited Consultants on 25 February 2021 in accordance with the Bushland Assessment Method (BAM (NVC 2020a).

3.2.1. Bushland Assessment Method

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

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

The Conservation Significance Scores were calculated from direct observations of flora and direct and historical observations of fauna species of conservation significance. All fauna identified as known to occur in the PMST, and fauna with BDBSA records since 1995 and with a spatial reliability of less than 1 km, within 5 km of the Project Area, were included in the BAM scoresheet A1 (Small BAM), A2 and A3. Species determined as unlikely to occur within the Project Area will be removed by the Native Vegetation Branch if the finding is supported. Marine and/or wetland species were omitted from the scoresheets given the Project Area is terrestrial.

3.3. Fauna assessment

Database searches were performed as described in section 3.1. Fauna surveys were conducted in conjunction with the flora assessments along the site. All native and exotic fauna species opportunistically encountered (directly observed, or tracks, scats, burrows, nests and other signs of presence) during the native vegetation assessment were recorded. Potential fauna refuge sites, such as hollows, were noted as an indication of availability of suitable habitat. Particular attention was paid to identifying habitat for threatened species. For each opportunistic fauna observation, the species, number of individuals, GPS location, detection methodology (sight, sound or sign) and habitat were recorded.

4. Assessment outcomes

4.1. Vegetation assessment

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

Eastern intersection (A):

- The eastern highway intersection is on red sandy soil on raised ground and is not likely to flood.
- It is 650 metres from the River Murray and is not in a prescribed area.
- The field assessment recorded three vegetation associations (A1, A2 and A3). A1 was under 0.5 hectares in size in the final design so was assessed using the small BAM scoresheet. A2 and A3 total area were greater than 0.5 ha in the final design so they were assessed using the general BAM scoresheet.
- The intersection is a disturbed area connected to large patches of native vegetation.

4.1.2. Details of the vegetation associates/scattered trees proposed to be impacted

Table 4. Summary of A1.

Vegetation Association	Vegetation Association A1; <i>Dissocarpus paradoxus</i> / <i>Maireana brevifolia</i> Low Shrubland over exotic grasses and forbs.
	
Facing north east	

GPS coordinate Zone 54 Easting 465360.87 Northing 6210677.69.					
General description	Dominant species were <i>Dissocarpus paradoxus</i> (Ball Bindyi), <i>Maireana brevifolia</i> (Short-leaf Bluebush) and <i>Enchylaena tomentosa</i> (Ruby Saltbush). The site was disturbed and in poor condition. One tree was remaining in the upper storey (<i>Eucalyptus oleosa</i>).				
Threatened species or community	No threatened species or communities were recorded at the site during the field assessment in February 2021. Sixteen (16) threatened fauna have been recorded within 5km since 1995.				
Landscape context score	1.10	Vegetation Condition Score	28.82	Conservation significance score	1.10
Unit biodiversity Score	34.87	Area (ha)	0.218	Total biodiversity Score	7.60

Table 5. Summary of A2.

Vegetation Association	Vegetation Association A2; <i>Dodonaea viscosa</i> / <i>Marieana brevifolia</i> Low Open Shrubland over <i>Austrostipa</i> sp.
	
Facing south west. GPS coordinate Zone 54 Easting 465559.66 Northing 6210885.	
General description	Similar to A1 but less degraded. <i>Dodonaea viscosa</i> and <i>Maireana brevifolia</i> (Short-leaf Bluebush) in poor condition.
Threatened species or community	No threatened species or communities were recorded at the site during the field assessment in February 2021. Sixteen (16) threatened fauna have been recorded within 5 km since 1995.

Landscape context score	1.11	Vegetation Condition Score	33.10	Conservation significance score	1.10
Unit biodiversity Score	40.42	Area (ha)	0.846	Total biodiversity Score	34.19

Table 6. Summary of A3.

Vegetation Association	Vegetation Association A3; <i>Eucalyptus oleosa</i> Low Open Mallee over <i>Maireana brevifolia</i> / <i>Dissocarpus paradoxus</i> .				
					
Facing north west GPS coordinate Zone 54 Easting 465367.21 Northing 6210830.1.					
General description	<i>Eucalyptus oleosa</i> , Low Open Mallee over <i>Maireana brevifolia</i> / <i>Dissocarpus paradoxus</i> . Disturbed and in moderate condition.				
Threatened species or community	No threatened species or communities were recorded at the site during the field assessment in February 2021. Sixteen (16) threatened fauna have been recorded within 5 km since 1995.				
Landscape context score	1.11	Vegetation Condition Score	49.50	Conservation significance score	1.10
Unit biodiversity Score	60.44	Area (ha)	0.732	Total biodiversity Score	44.24

4.1.3. Site map showing areas of proposed impact

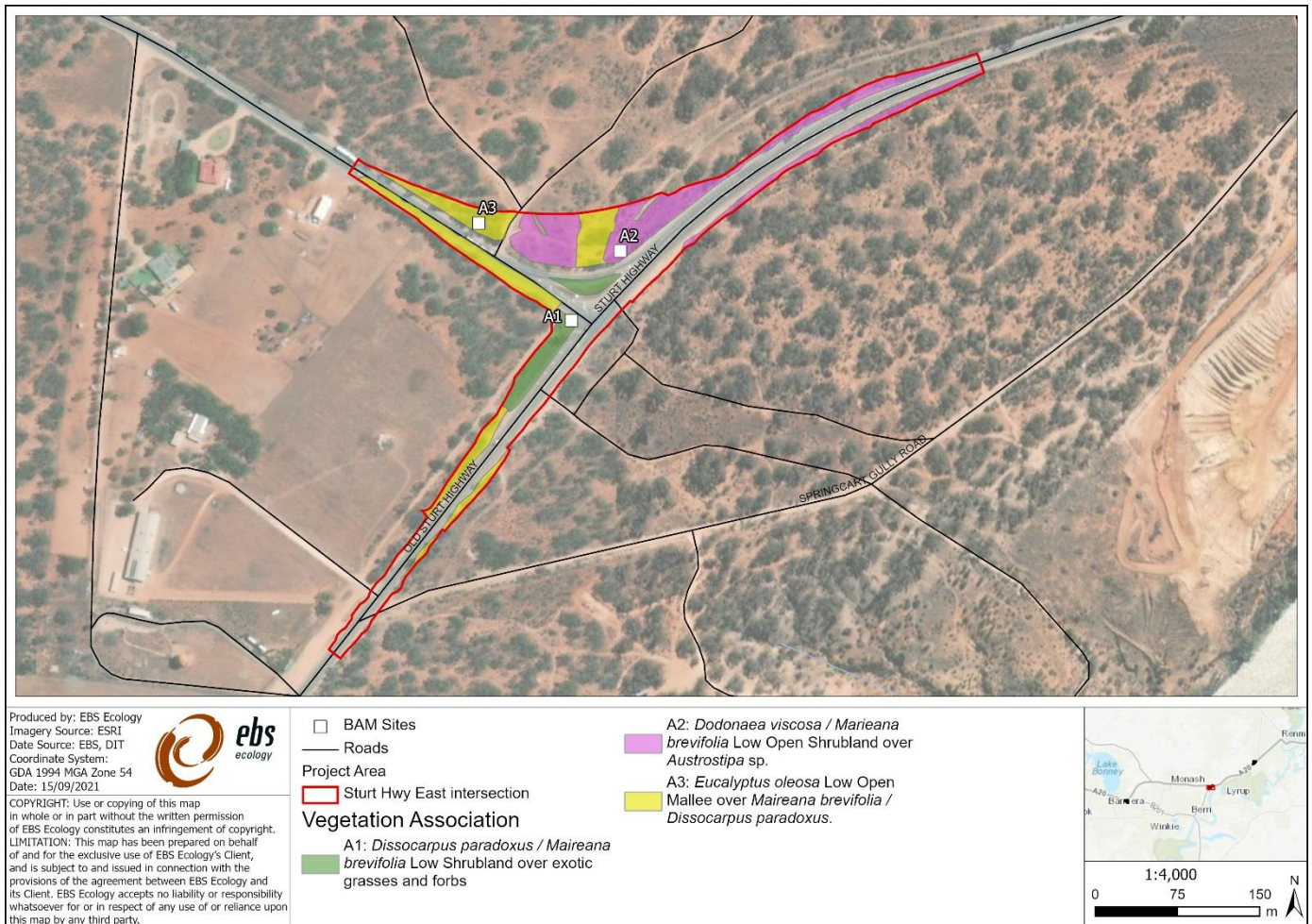


Figure 8. Sturt Highway / Old Sturt Highway eastern end (Block A) native vegetation patches and BAM sites.

4.1.4. Photo log

See photos in Table 4 to Table 6.

4.2. Threatened species assessment

Matters of national environmental significance

Five matters of national environmental significance were identified by the PMST report as occurring within 5 km of the Project Area, three Wetlands of International Importance and two listed Threatened Ecological Communities:

Wetlands of International Importance:

- Banrock Station wetland complex;
- Riverland; and
- the Coorong and Lake Alexandra and Albert Wetland.

Listed Threatened Ecological Communities:

- Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions
- River Murray and associated wetlands, floodplains and groundwater systems, from the junction with the Darling River to the sea.

These vegetation communities and wetlands of international importance are not present in the area or adjacent to the Project Area as indicated by the SA vegetation mapping (NatureMaps 2021) and therefore, the project is unlikely to impact on these communities.

Threatened Flora and Fauna

The following threatened species have been recorded within 5km of the application area since 1995, or the vegetation is considered to provide suitable habitat.

The PMST report and NatureMaps search identified two EPBC listed threatened bird species, *Leipoa ocellata* (Malleefowl) and *Polytelis anthopeplus monarchoides* (Regent Parrot) that have been observed within 5 km of the Project Area (Table 7). Thirteen State threatened bird species and one threatened reptile species were also observed since 1995 within 5 km of the Project Area. The PMST report and NatureMaps search identified no EPBC listed threatened flora species and no State listed Threatened flora species within 5 km of the Project Area.

Table 7. Likelihood of occurrence of threatened species identified in the desktop assessment. The data source and threat levels are described in the table footer.

Species (common name)	NPW Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
<i>Burhinus grallarius</i> (Bush Stonecurlew)	R		3	2006	Usually inhabits open woodland, lightly timbered country, mallee and mulga – anywhere with groundcover of small sparse shrubs, grass or litter of twigs. Avoids dense forest and closed canopy habitats (Morcombe 2011).	Possible – habitat may be suitable in A3 only.
<i>Cinclosoma castanotum</i> (Chestnut Quailthrush/Chestnut-backed Quailthrush)	R		3	2015	Open semi-arid woodland of eucalypt or cypress pine, mallee or mulga, with sparse shrub layer and litter debris (Morcombe 2011).	Possible. Habitat broadly suitable.
<i>Corcorax melanorhamphos</i> (White-winged Chough)	R		3	2014	Woodland, open forest, mallee, mulga, timbered watercourse margins, and cypress. Highly social species (Morcombe 2011).	Possible. Suitable habitat exists.
<i>Entomyzon cyanotis cyanotis</i> (Blue-faced Honeyeater)	R		3	2016	Found in northern and eastern mainland Australia, from the Kimberley region, Western Australia to near Adelaide, South Australia, being more common in the north of its range. Occurs in tropical, sub-tropical and wetter temperate or semi-arid zones. It is mostly found in open forests and	Unlikely – intersection patches may be too far from water.

Species (common name)	NPW Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
					woodlands close to water, as well as monsoon forests, mangroves and coastal heathlands. It is often seen in banana plantations, orchards, farm lands and in urban parks, gardens and golf courses (Birds in Backyards, 2020).	
<i>Falco peregrinus</i> (Peregrine Falcon)	R		3	1997	This species prefers open habitats such as grasslands, tundra and meadows and nests on cliff faces and in crevices. It has an extremely large range and is found world-wide except for rainforests and cold, dry Arctic regions. This species has increasingly been observed inhabiting urban areas (Department for Environment and Heritage, 2008).	Possible – Habitat may be suitable although being small it is not likely to be important habitat. May fly over occasionally.
<i>Hieraaetus morphnoides</i> (Little Eagle)	V		3	2017	Widespread over diverse habitats; forest, woodland, open scrub, tree-lined watercourses of interior Australia such as the Murray River. Prefers areas where open country intermixes with wooded or forested hills, as in farmland, irrigated land (Morcombe, 2011).	Possible – Habitat may be suitable although being small it is not likely to be important habitat. May fly over occasionally.
<i>Leipoa ocellata</i> (Malleefowl)	V	VU	3	2007	Inhabits semi-arid regions of southern Australia. Occupies shrublands and low woodlands that are dominated by mallee vegetation. It also occurs in other habitat types including eucalypt or native pine Callitris woodlands, acacia shrublands, Broombush Melaleuca uncinata vegetation or coastal heathlands (Northern	Unlikely – habitat unsuitable and unlikely that such a conspicuous bird inhabits the intersections without being detected.

Species (common name)	NPW Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
					Agricultural Catchments Council, 2017).	
<i>Melanodryas cucullata</i> (Hooded Robin)	R		3	2016	Woodland of eucalypt, mallee, mulga; heath, inland and drier parts of the coast; semi-cleared farmland (Morcombe, 2011).	Possible. Habitat broadly suitable.
<i>Morelia spilota</i> (Carpet Python)	R		3	2009	Prefers riparian vegetation groups, and dry sclerophyll forest with ground cover and logs. Lives in hollows of large River Red Gums and north-facing cliffs along the Murray River (Department for Environment and Heritage, 2006).	Unlikely – habitat not favourable.
<i>Myiagra inquieta</i> (Restless Flycatcher)	R		3	2018	Open forests, woodlands, farmland, and inland scrub (Morcombe, 2011). Often forages near or over water (Birdlife 2021).	Unlikely – whilst habitat is broadly suitable, the Restless Flycatcher is more likely to occur nearer to water.
<i>Oriolus sagittatus</i> (Olive-backed Oriole)	R		3	2014	Occurs across coastal regions of northern and eastern Australia from the Kimberley region in Western Australia, right around the east coast to Adelaide in South Australia. Inhabits forests, woodlands and rainforests, as well as well-treed urban areas, particularly parks and golf courses (Birds in Backyards, n.d.).	Unlikely – prefers greener, denser habitat.
<i>Pachycephala inornata</i> (Gilbert's Whistler)	R		3	2014	Sparsely distributed over much of the arid and semi-arid zone of inland southern Australia, from the western slopes of NSW to the Western Australian wheatbelt (OEH 2017). Habitat is shrubby woodland and mallee (Simpson & Day, 1993).	Possible – habitat broadly suitable.

Species (common name)	NPW Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
<i>Philemon citreogularis</i> (Little Friarbird)	R		3	2019	Open forests and woodlands dominated by eucalypts, river edges, swampy woodlands, mangroves. Extends into arid zones along waterways (Morcombe, 2011).	Unlikely – habitat not close enough to watercourse.
<i>Plectorhyncha lanceolata</i> (Striped Honeyeater)	R		3	2017	Drier open forest, woodland, mallee, mulga, heath and mangroves (Morcombe, 2011).	Possible. Habitat broadly suitable.
<i>Polytelis anthopeplus monarchoides</i> (Regent Parrot)	V	VU	3	2013	Found in the Murray Mallee region of SA in River Red Gum (<i>Eucalyptus camaldulensis</i>), floodplain, woodland and mallee (DAWE, 2020b).	Possible. Habitat broadly suitable.
<i>Varanus varius</i> (Lace Monitor)	R		3	1999	This species is a large arboreal lizard which is found in eastern and southeastern Australia from Cape York Peninsula (Queensland) to south-eastern South Australia. Lace Monitors occur in well-timbered areas from dry woodlands to cool temperate forests in southern Australia (Cogger, 2000).	Possible. Habitat broadly suitable.
Source; 3 – NatureMaps (BDBSA Supertable), 5 - PMST NPW Act; E= Endangered, V = Vulnerable, R= Rare EPBC Act; Ex = Extinct, CR = Critically endangered, EN = Endangered; VU = Vulnerable						

4.3. Cumulative impacts

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

The cumulative impacts are likely to include the following;

- indirect impacts to native vegetation that may occur as a result of the development (e.g. dust generation smothering vegetation, altered hydrology inundating or drying vegetation, impacting on tree root zones (the application of fill) impacting on tree health).

4.4. Addressing the Mitigation Hierarchy

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

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

Given that the location of the major road alignments is already set by the location of each T-Junction, it is unlikely that clearance associated with the proposed intersection upgrades can be avoided or located elsewhere.

Some initial concept designs at each location that were undertaken during the planning study included grade separated arrangements and different roundabout configurations that impacted a much larger footprint at each location. The roundabout options chosen had a much smaller impact and integrated better to the existing road alignment. Some further alterations to design have been adopted to minimise the footprint as follows:

- (vi) Use of a mountable annulus for the roundabout to accommodate large vehicles rather than a larger diameter.
- (vii) Maximum superelevation is used on free flow lane curves to reduce the radius and minimise the footprint.
- (viii) Extent of swales and drainage reduced where possible.
- (ix) Matching into existing alignments as soon as possible to minimise extent of works.
- (x) Steepening of batters where possible to minimise extent of works.

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 location and length of the intersection has been designed to the minimum possible length to allow for safe vehicle movement, while also minimising impacts to vegetation. The extent is minimised by adopting some of the measures mentioned in (a) above.

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

Rehabilitation of the cleared area is not possible as it will be a roundabout.

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

Any adverse impact on native vegetation or ecosystems that cannot be avoided or minimised will be offset by implementing an SEB that outweighs that impact.

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

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

The below table summarises the 3 BAMS at the eastern intersection (A).

Table 8. Assessment against the Principles of Clearance.

Principle of clearance	Relevant information	Assessment against the principles	Moderating factors that may be considered by the NVC
Principle 1(b) – significance as a habitat for wildlife	No threatened species were recorded at Block A however 16 threatened fauna species have been recorded within 5 km since 1995. Patches; Threatened Fauna Score 0.1 for all sites and blocks. Unit biodiversity Score (average of 45.24 for Block A).	<u>Seriously at Variance</u> A1, A2, A3	The intersections are unlikely to provide important breeding, feeding, perching habitat, refuge or a corridor for the threatened species historically recorded within 5 km that possibly occur. The Project Area is small and already disturbed by the existing intersection, therefore the Project should be moderated to At Variance.
Principle 1(c) – plants of a Rare, Vulnerable or Endangered species	No threatened flora species were found during the field assessment at Block A. Threatened Flora Score 0	<u>Not at Variance</u>	
Principle 1(d) – the vegetation comprises the whole or part of a plant community that is Rare, Vulnerable or Endangered	No threatened communities were found during the field assessment of Block A. Threatened Community Score 1	<u>Not at Variance</u>	

4.6. Risk assessment

The level of risk associated with the application

Table 9. Summary of the level of risk associated with the application.

Total clearance	No. of trees	0
	Area (ha)	1.8
	Total biodiversity Score	86.03
Seriously at variance with principle 1(b), 1(c) or 1 (d)		1(b)
Risk assessment outcome		Level 4

4.7. NVC guidelines

Other information that demonstrates that the clearance complies with any relevant NVC guidelines related to the activity

N/A

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	1	30	1	0	0.1	34.87	0.218	7.60	1			7.98	\$2,743.55	\$150.90
A	2	30	1	0	0.1	40.42	0.846	34.19	1			35.90	\$12,341.02	\$678.76
A	3	28	1	0	0.1	60.44	0.732	44.24	1			46.45	\$15,967.17	\$878.19
						Total	1.796	86.03				90.33	\$31,051.74	\$1,707.85

Totals summary table

	Total Biodiversity score	Total SEB points required	SEB Payment	Admin Fee	Total Payment
Application	86.03	90.33	\$31,051.74	\$1,707.85	\$32,759.59

Economies of Scale Factor	0.5
Rainfall (mm)	249

6. Significant Environmental Benefit

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

ACHIEVING AN SEB

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

- ☐ Establish a new SEB Area on land owned by the proponent.
- ☐ Use SEB Credit that the proponent has established.
- ☐ Apply to have SEB Credit assigned from another person or body.
- ☐ Apply to have an SEB to be delivered by a Third Party.
- ☒ Pay into the Native Vegetation Fund.

PAYMENT SEB

The applicant proposes to achieve the SEB by paying into the Native Vegetation Fund. The total SEB payment required for the clearance of 1.8 ha of native vegetation is **\$32,759.59** which includes an administration fee of **\$1,707.85** (including GST).

7. References

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8. Appendices

Appendix 1. Bushland Assessment Scoresheets associated with the proposed clearance and SEB Area (submitted in Excel format)



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