

Native Vegetation Clearance

The Dunes, Port Hughes

Data Report

Clearance under the *Native Vegetation Regulations 2017*

19 July 2022

Prepared by – EBS Ecology (NVC Accredited Consultant)



Native Vegetation Clearance The Dunes, Port Hughes Data Report

19 July 2022

Version 4

Prepared by EBS Ecology for Metacap Developments Pty Ltd

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Cover photograph: *Acacia ligulata* shrubland over *Scaevola spinescens* (BAM site B1) within the Project Area.

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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) (Now DCCEEW)
DCCEEW	Department of Climate Change, Energy, the Environment and Water (Commonwealth) (Previously DAWE)
DEW	Department for Environment and Water (South Australia)
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)
Metacap Developments	Metacap Developments Pty Ltd
MNES	Matters of National Environmental Significance
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 DCCEEW)
Project	The proposed residential development
Project Area	The area proposed for the residential development at Lot 255, 256 and 259 Retallick Road, Kooroona (Port Hughes).
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
STSC	Subtropical and Temperate Coastal Saltmarsh TEC
TEC	Threatened Ecological Community
VA	Vegetation Association
var.	Variety (a taxonomic rank below that of species and subspecies, but above that of form)

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Attachments

Clearance NVC Scoresheets:

- BAM A1 Scoresheet (Excel file – Attachment 1)
- BAM A2 Scoresheet (Excel file – Attachment 2)
- BAM A3 Scoresheet (Excel file – Attachment 3)
- BAM B1 Scoresheet (Excel file – Attachment 4)
- BAM B2 Scoresheet (Excel file – Attachment 5)
- BAM B3 Scoresheet (Excel file – Attachment 6)
- BAM B4 Scoresheet (Excel file – Attachment 7)
- BAM B5 Scoresheet (Excel file – Attachment 8)
- BAM B6 Scoresheet (Excel file – Attachment 9)
- BAM B7 Scoresheet (Excel file – Attachment 10)
- BAM C1 Scoresheet (Excel file – Attachment 11)
- BAM C2 Scoresheet (Excel file – Attachment 12)
- BAM D1 Scoresheet (Excel file – Attachment 13)

Previous Reports:

- EBS Ecology (2022) (Pdf file – Attachment 14)
- EBS Ecology (2006) (Pdf file – Attachment 15)


1. Application information

Table 1. Application details.

Applicant:			
Key contact:			
Landowner:			
Site Address:	Lot 255, 256 and 259 Retallick Road, Kooroona (Port Hughes)		
Local Government Area:	Copper Coast Council	Hundred:	Wallaroo
Title ID:	CT/5838/358 (S256) CT/5799/321 (S255) CT/5836/468 (S259)	Parcel ID	H211100 S256 H211100 S255 H211100 S259

Table 2. Summary of the proposed clearance.

Purpose of clearance:	Clearance is required for the construction of a residential development.
Native Vegetation Regulation:	Regulation 12, Schedule 1; clause 35, Residential subdivision
Description of the vegetation under application:	<p>Coastal shrublands and grasslands on sandy dunes, dune swales and other low-lying areas in moderate to good condition.</p> <p>A total of 67.34 hectares (ha) of native vegetation is present within the 169.19 ha Project Area. The native vegetation consists of the following 13 vegetation associations:</p> <ul style="list-style-type: none"> - 10.61 ha of <i>Scaevola spinescens</i> +- <i>Threlkeldia diffusa</i> shrubland; - 28.04 ha of <i>Tecticornia pergranulata</i> ssp. <i>pergranulata</i> low closed shrubland; - 0.38 ha of <i>Austrostipa flavescens</i> and <i>Enneapogon nigricans</i> grassland; - 14.69 ha of <i>Acacia ligulata</i> shrubland over <i>Scaevola spinescens</i>; - 5.95 ha of <i>Melaleuca lanceolata</i> tall open shrubland over <i>Scaevola spinescens</i>; - 0.42 ha of <i>Acacia ligulata</i> low open shrubland over <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> and <i>Austrostipa flavescens</i>; - 0.18 ha of <i>Melaleuca lanceolata</i> tall shrubland over <i>Enchylaena tomentosa</i> var. <i>tomentosa</i>; - 0.38 ha of <i>Austrostipa flavescens</i> and <i>Enneapogon nigricans</i> +- <i>Geijera linearifolia</i> open grassland; - 1.89 ha of <i>Tecticornia halocnemoides</i> ssp. <i>halocnemoides</i> and <i>Tecticornia pergranulata</i> ssp. <i>pergranulata</i> low closed shrubland; - 1.60 ha of <i>Acacia ligulata</i> and <i>Geijera linearifolia</i> tall open shrubland over <i>Dianella brevicaulis</i> and <i>Gahnia lanigera</i>; - 0.64 ha of <i>Acacia ligulata</i> open shrubland over <i>Carpobrotus rossii</i> and <i>Austrostipa flavescens</i>; - 0.73 ha of <i>Enneapogon nigricans</i> and <i>Austrostipa flavescens</i> grassland; and - 1.82 ha of <i>Acacia ligulata</i> open shrubland over <i>Lomandra collina</i>.
Total proposed clearance – area (ha) and/or number of trees:	<p>17.10 ha of native vegetation is proposed to be cleared:</p> <ul style="list-style-type: none"> - 1.07 ha of <i>Scaevola spinescens</i> +- <i>Threlkeldia diffusa</i> shrubland; - 0.36 ha of <i>Tecticornia pergranulata</i> ssp. <i>pergranulata</i> low closed shrubland; - 0.36 ha of <i>Austrostipa flavescens</i> and <i>Enneapogon nigricans</i> grassland;

	<ul style="list-style-type: none"> - 7.53 ha of <i>Acacia ligulata</i> shrubland over <i>Scaevola spinescens</i>; - 3.02 ha of <i>Melaleuca lanceolata</i> tall open shrubland over <i>Scaevola spinescens</i>; - 0.42 ha of <i>Acacia ligulata</i> low open shrubland over <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> and <i>Austrostipa flavescens</i>; - 0.18 ha of <i>Melaleuca lanceolata</i> tall shrubland over <i>Enchylaena tomentosa</i> var. <i>tomentosa</i>; - 0.38 ha of <i>Austrostipa flavescens</i> and <i>Enneapogon nigricans</i> +/- <i>Geijera linearifolia</i> open grassland; - 0.20 ha of <i>Tecticornia halocnemoides</i> ssp. <i>halocnemoides</i> and <i>Tecticornia pergranulata</i> ssp. <i>pergranulata</i> low closed shrubland; - 0.39 ha of <i>Acacia ligulata</i> and <i>Geijera linearifolia</i> tall open shrubland over <i>Dianella brevicaulis</i> and <i>Gahnia lanigera</i>; - 0.64 ha of <i>Acacia ligulata</i> open shrubland over <i>Carpobrotus rossii</i> and <i>Austrostipa flavescens</i>; - 0.73 ha of <i>Enneapogon nigricans</i> and <i>Austrostipa flavescens</i> grassland; and - 1.82 ha of <i>Acacia ligulata</i> open shrubland over <i>Lomandra collina</i>.
Level of clearance:	Level 4
Overlay (Planning and Design Code):	Native Vegetation Overlay
Map of proposed clearance area:	
Mitigation Hierarchy:	<p>Avoidance – According to current subdivision designs (Figure 3, page 13), Metacap Developments Pty Ltd (Metacap Developments) intend to avoid 77.17 ha or 45.61% of the Project Area. Metacap Developments also intend on avoiding some of the area to the east of the Project Area (the salt lake area). A proposed Visitor Centre overlooking the salt lake area is the only impact on the existing Significant Environmental Benefit Offset Area. Metacap Developments intend on encouraging economic and tourist development in this area.</p> <p>There is also an area in the north western part of the Project Area that is proposed to be avoided and retained as a conservation area (see Figure 3).</p> <p>Minimization – Clearance in areas of high biodiversity value including the majority of Block A has been minimised with designs aiming to avoid these areas. By avoiding some of the area to the east of the Project Area (the salt lake area), clearance of intact vegetation around the salt lake, an area which could provide</p>

	<p>suitable habitat for fauna species, particularly migratory species, has been minimised. At detailed design, vegetation impacts will be minimised through design methods such as altering the development area or engineering solutions. Metacap Developments are considering utilising retaining walls to reduce impact as a result of earthworks within the Project Area.</p> <p>Rehabilitation or restoration – Vegetation that is planned to be removed is permanent land clearance that is unlikely to be rehabilitated or restored. However, Metacap Developments intend on identifying and developing a number of parks and reserves within subdivision stages which will enhance the biodiversity of the area. Weed control before, during and after construction is planned to minimise the intrusion of additional invasive species and control those species which are already present within the Project Area. The salt lake area to the east is intended to be used to accept some site stormwater if and only if stormwater is of an acceptable water quality and of lower salinity than what is present within the lake. Additional stormwater inflows and level fluctuations are unlikely to be detrimental to this area or impact vegetation dependant on existing groundwater. Inflow of stormwater may have a positive effect on native vegetation already present and or lead to the establishment of new species in the area, which could aid in the rehabilitation of the salt lake area. Furthermore, there is an area in the north western part of the Project Area that is proposed to be retained as a conservation area (see Figure 3).</p> <p>Offset - The SEB offset will be achieved in the form of a payment into the Native Vegetation Fund.</p>
SEB Offset proposal	Payment of \$689,914.20 which includes an administration fee of \$35,967.10 (including GST).

2. Purpose of clearance

2.1. Description

EBS Ecology (EBS) was engaged by Metacap Developments to undertake a native vegetation clearance assessment for clearance in relation to a proposed residential development at Lot 255, 256 and 259 Retallick Road, Kooroona (Port Hughes) (the Project). This clearance application relates only to the residential subdivision and associated works within the Project Area.

The Project involves the clearance of 17.10 ha of native vegetation.

Objective

The objectives of the native vegetation assessment were to:

- Undertake a desktop assessment of the likelihood of occurrence and status of threatened flora and fauna protected under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and State *National Parks and Wildlife Act 1972* (NPW Act);
- Assess native vegetation within the Project Area for clearance using the Native Vegetation Council (NVC) endorsed Bushland Assessment Method (BAM); and
- Calculate the Significant Environmental Benefit (SEB) offset requirements based on the impact footprint.

2.2. Background

Current and surrounding land use

The vegetation within the Project Area consists of several patches of native vegetation comprising coastal shrublands and grasslands on sandy dunes, dune swales and other low-lying areas. Declared weeds including *Euphorbia terracina* (False Caper), *Gazania linearis* (Gazania), *Lycium ferocissimum* (African Boxthorn) and *Marrubium vulgare* (Horehound) amongst others are scattered throughout the Project Area. The surrounding area is dominated by residential developments and farmland.

Administrative boundaries

The Project Area occurs within the Copper Coast Council area, the Northern and Yorke Landscapes Region, the Wallaroo Hundred and the Daly County. The Project Area is 169.19 ha in size.

Bioregions

The Interim Biogeographical Regionalisation of Australia (IBRA) identifies geographically distinct bioregions based on common climate, geology, landform, native vegetation and species information. The bioregions are further refined into subregions and environmental associations. The Project Area is located in the Eyre Yorke Block IBRA Bioregion, the St Vincent IBRA Subregion and the Weetulta IBRA Environmental Association.

Approximately 8% (87402 ha) of the St Vincent IBRA Subregion and approximately 10% (4763 ha) of the Weetulta IBRA Environmental Association is mapped as remnant vegetation. Of this, 5% (4732ha) and 1% (40ha) is formerly conserved and protected, respectively (DCCEE 2022a).

Previous Clearance Applications

An SEB Offset Area of 34.5644 ha is located within the Project Area. This SEB Offset Area has three previous clearance applications associated with it, where a condition of each application was to permanently set aside an area (the SEB Offset Area) containing a minimum of 30 ha for the growth of native vegetation and for no other purpose (Figure 1). The three previous native vegetation clearance applications are not associated with the current landowner and are:

- **2007/2066/340** (registered 29 October 2007 and involved clearance of native vegetation over a canopy area of approximately 0.9 ha).
- **2007/2067/340** (registered 29 October 2007 and involved clearance of native vegetation over a canopy area of approximately 2.0 ha (excluding samphire areas) and clearance of samphire areas over an unknown canopy area).
- **2008/2010/340** (registered 15 February 2008 and involved clearance of native vegetation over a canopy area of approximately 0.29 ha)



Figure 1. The previous 'Set aside area' or SEB Offset Area that was established within the Project Area from three previous clearance applications.

2.3. General location map



Figure 2. Location of the Project Area at Lot 255, 256 and 259 Retallick Road, Kooroona (Port Hughes), South Australia.

2.4. Details of the proposal

The proposed residential development involves the creation of a number of allotments and reserves. The layout of the proposed residential development is illustrated in Figure 3.



Figure 3. Proposed subdivision design plans (as provided to EBS on 14/07/2022).

2.5. Approvals required or obtained

Environment Protection and Biodiversity Conservation Act 1999 – No approval required.

Native Vegetation Act 1991 – This clearance data report is supplied in support of the application.

National Parks and Wildlife Act 1972 – EBS has the required flora collection permit (K25613-20).

Landscape South Australia Act 2019 – A Water Affecting Activity Permit may be required for this Project; A permit to transport declared weeds on a public road may be required for this Project.

Planning, Development and Infrastructure Act 2016 – Approval is required for this Project.

Aboriginal Heritage Act 1988 - Approval will be required if any sites, objects or remains are uncovered during the works.

2.6. Native Vegetation Regulation

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(35)—Residential subdivision

- (1) Clearance of vegetation in connection with the division of land for use for residential purposes (including clearance for the construction of roads and other infrastructure), provided that—
 - (a) any development authorisation for the division of the land and for the use of the land for residential purposes required by or under *the Planning, Development and Infrastructure Act 2016* has been obtained; and
 - (b) the Native Vegetation Council has been given written notification of the full extent of the clearance expected to occur in connection with the division of the land.
- (2) Subclause (1) does not apply to—
 - (a) clearance of vegetation established in accordance with a condition of a consent for clearance of vegetation; or
 - (b) clearance that would be contrary to—
 - (i) a condition of a consent for clearance of vegetation; or
 - (ii) a condition imposed in connection with clearance of vegetation permitted under these [native vegetation] regulations; or a condition in respect of clearance permitted under the revoked [native vegetation] regulations.

3. Method

3.1. Flora assessment

The flora assessment was undertaken by ecologists H. Merigot and N. Piscioneri on 6 and 7 April 2022 in accordance with the Bushland Assessment Method (BAM) (NVC 2020).

3.1.1. Bushland Assessment Method

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

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

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

3.2. Desktop assessment

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, a desktop assessment was undertaken. This was undertaken using a 5 km buffer in database searches, as described below.

3.2.1. PMST report

A Protected Matters Search Tool (PMST) report was generated on 2 February 2022 to identify nationally threatened flora and fauna, migratory fauna and TECs under the EPBC Act relevant to the Project Area (DCCEEW 2022b). 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.

3.2.2. BDBSA data extract

A data extract from the BDBSA was obtained on 8 February 2022 to identify flora and fauna species that have been recorded within 5 km of the Project Area (data extracted 08/02/2022; DEW 2022). This data has been sourced from the South Australian Department for Environment and Water (DEW) Biological Database of SA, Recordset number DEWNRBDBSA220208-1.

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 DEWs standards for data quality, integrity and maintenance. Only species with records since 1995 and a spatial reliability of less than 1 km were assessed for their likelihood of occurrence.

3.2.3. 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.
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.

3.3. Fauna assessment

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.

3.4. Previous surveys

An initial ecological assessment of the Project Area was undertaken in 2006 by EBS Ecology (EBS 2006). A review of this initial ecological assessment was undertaken in 2022 by EBS Ecology (EBS 2022). See attachments 14 and 15 for more details.

3.5. Limitations

The assessment was made of the extent of the Project Area as known at the time of writing this report. No allowance has been made for any future changes in design that might increase or change the area of the impact footprint. The findings and conclusions expressed by EBS are based solely upon information in existence at the time of the assessment.

Threatened species records include only those that were returned based on the database searches at the time of the assessment and may include records that have not been adequately verified or may not include all species that could occur in the Project Area. Furthermore, limitations exist with the PMST and BDBSA data collection methods and so the type of presence that can be determined from the data is indicated in general terms. Consider the following limitations:

- BDBSA only includes verified flora and fauna records submitted to DEW or partner organisation, and it is recognised that knowledge is often poorly captured, and the presence of species may not be adequately represented by database records.
- Records were filtered to a spatial reliability of less than 1 km and records since 1995, however spatial reliability of BDBSA data ranges from 0-5 to over 100 km, and therefore additional species may occur, but have been discounted due to unreliable data collection.
- DEW gives no warranty that the data is accurate or fit for any particular purpose of the user or any other person to whom the user discloses the information.

Fauna records were limited to opportunistic observations at the time of the survey, and may not have been undertaken within the optimal survey time for species of interest (i.e., dawn / dusk for birds). Therefore, species additional to those recorded during the field survey are likely to occur within the Project Area, and the likelihood of occurrence of species identified in the desktop assessment is based on vegetation and habitat features assessed in the vegetation assessment.

4. Assessment outcomes

4.1. Vegetation assessment

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

The vegetation at the location of the proposed residential development consists of several patches of native vegetation comprising coastal shrublands and grasslands on sandy dunes, dune swales and other low-lying areas. Native vegetation across the Project Area is in moderate to good condition and includes *Acacia ligulata* (Umbrella Bush), *Austrostipa spp.* (Spear-grass), *Lomandra spp.* (Mat-rush) and *Dianella spp.* (Flax-lily) in a number of areas amongst others. There was a high presence of Declared weeds including *Euphorbia terracina* (False Caper), *Gazania linearis* (Gazania) and *Lycium ferocissimum* (African Boxthorn) amongst other weeds scattered throughout the Project Area. The surrounding area is dominated by residential developments and farmland.

A total of 115 flora species (83 native and 32 introduced) were observed within the Project Area during the field survey. Flora observed during the field survey is provided in [Appendix 1](#). One NPW Act listed Rare species was observed within the Project Area:

- *Maireana rohrlachii* (Rohrlach's Bluebush) (NPW Act: R).

Maireana rohrlachii was observed on the north eastern edge of the Project Area adjacent to the existing salt lake area (Figure 4). Approximately 16 plants were observed, one of which can be seen in Figure 5.



Figure 4. The location of *Maireana rohrlachii*, observed on the north eastern edge of the Project Area adjacent to the existing salt lake area.



Figure 5. *Maireana rohrlachii* observed on the north eastern edge of the Project Area adjacent to the existing salt lake area.

A total of 25 fauna species were observed within the Project Area during the field survey. None of the fauna species observed were threatened. Fauna observed during the field survey is provided in [Appendix 2](#).

4.1.2. Vegetation associations

13 vegetation associations (VAs) were mapped and assessed for clearance within the Project Area (Table 4).

A summary of each vegetation association is presented in Table 5 to Table 17.

Table 4. The 13 vegetation associations assessed for clearance within the Project Area.

Vegetation Association (VA)	Name	VA Area (ha)	Area Impacted (ha)	Total Biodiversity Score
A1	<i>Scaevola spinescens</i> +- <i>Threlkeldia diffusa</i> shrubland	39.04	1.07	102.30
A2	<i>Tecticornia pergranulata</i> ssp. <i>pergranulata</i> low closed shrubland		0.36	22.50
A3	<i>Austrostipa flavescens</i> and <i>Enneapogon nigricans</i> grassland		0.36	12.58
B1	<i>Acacia ligulata</i> shrubland over <i>Scaevola spinescens</i>	25.11	7.53	572.59
B2	<i>Melaleuca lanceolata</i> tall open shrubland over <i>Scaevola spinescens</i>		3.02	202.75
B3	<i>Acacia ligulata</i> low open shrubland over <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> and <i>Austrostipa flavescens</i> ;		0.42	17.79
B4	<i>Melaleuca lanceolata</i> tall shrubland over <i>Enchylaena tomentosa</i> var. <i>tomentosa</i>		0.18	9.58
B5	<i>Austrostipa flavescens</i> and <i>Enneapogon nigricans</i> +- <i>Geijera linearifolia</i> open grassland;		0.38	18.54
B6	<i>Tecticornia halocnemoides</i> ssp. <i>halocnemoides</i> and <i>Tecticornia pergranulata</i> ssp. <i>pergranulata</i> low closed shrubland;		0.20	12.74

Vegetation Association (VA)	Name	VA Area (ha)	Area Impacted (ha)	Total Biodiversity Score
B7	<i>Acacia ligulata</i> and <i>Geijera linearifolia</i> tall open shrubland over <i>Dianella brevicaulis</i> and <i>Gahnia lanigera</i>		0.39	31.64
C1	<i>Acacia ligulata</i> open shrubland over <i>Carpobrotus rossii</i> and <i>Austrostipa flavescens</i>	1.37	0.64	39.59
C2	<i>Enneapogon nigricans</i> and <i>Austrostipa flavescens</i> grassland		0.73	40.54
D1	<i>Acacia ligulata</i> open shrubland over <i>Lomandra collina</i>	1.82	1.82	138.05
Total		67.34	17.10	1221.19

Table 5. Summary of VA A1.


Vegetation Association	A1: <i>Scaevola spinescens</i> +- <i>Threlkeldia diffusa</i> shrubland				
					
General description	Shrubland dominated by <i>Scaevola spinescens</i> with <i>Threlkeldia diffusa</i> codominant in some areas. Vegetation was in very good condition with a low coverage of weeds including <i>Avena barbata</i> (Beared Oat) and <i>Lycium ferocissimum</i> (African Boxthorn) amongst others.				
Threatened species or community	<p>The following fauna species listed under the EPBC Act and/or NPW Act were determined as possible to occur in the Project Area.</p> <ul style="list-style-type: none"> • <i>Falco peregrinus macropus</i> (Peregrine Falcon) (SA: R); • <i>Haliaeetus leucogaster</i> (White-bellied Sea Eagle) (Com: Ma; SA: E); • <i>Hieraetus morphnoides</i> (Little Eagle) (SA: V); and • <i>Neophema petrophila zietzi</i> (Rock Parrot) (SA: R). <p>15 additional fauna species listed under the EPBC Act and/or NPW Act may occur as flyover or utilise the salt lake area in the Project Area but will not be impacted by the proposed clearance.</p> <p>No flora, fauna or Threatened Ecological Communities listed under the EPBC Act were recorded in the Project Area.</p> <p>One NPW Act listed threatened flora species was observed:</p> <ul style="list-style-type: none"> • <i>Maireana rohrlachii</i> (Rohrlach's Bluebush) (NPW Act: R). 				
Landscape context score	1.18	Vegetation Condition Score	71.22	Conservation significance score	1.14
Unit biodiversity Score	95.80	Area (ha)	1.07	Total biodiversity Score	102.30

Table 6. Summary of VA A2.


Vegetation Association	A2: <i>Tecticornia pergranulata</i> ssp. <i>pergranulata</i> low closed shrubland				
					
General description	Low closed shrubland dominated by <i>Tecticornia pergranulata</i> ssp. <i>pergranulata</i> with other <i>Tecticornia</i> spp. Vegetation was in very good condition with a very low coverage of <i>Mesembryanthemum crystallinum</i> (Common Iceplant).				
Threatened species or community	<p>The following fauna species listed under the EPBC Act and/or NPW Act were determined as possible to occur in the Project Area.</p> <ul style="list-style-type: none"> • <i>Falco peregrinus macropus</i> (Peregrine Falcon) (SA: R); • <i>Haliaeetus leucogaster</i> (White-bellied Sea Eagle) (Com: Ma; SA: E); • <i>Hieraetus morphnoides</i> (Little Eagle) (SA: V); and • <i>Neophema petrophila zietzi</i> (Rock Parrot) (SA: R). <p>15 additional fauna species listed under the EPBC Act and/or NPW Act may occur as flyover or utilise the salt lake area in the Project Area but will not be impacted by the proposed clearance.</p> <p>No flora, fauna or Threatened Ecological Communities listed under the EPBC Act were recorded in the Project Area.</p>				
Landscape context score	1.18	Vegetation Condition Score	48.41	Conservation significance score	1.10
Unit biodiversity Score	62.83	Area (ha)	0.36	Total biodiversity Score	22.50

Table 7. Summary of VA A3.


Vegetation Association	A3: <i>Austrostipa flavescens</i> and <i>Enneapogon nigricans</i> grassland				
					
General description	Grassland dominated by <i>Austrostipa flavescens</i> and <i>Enneapogon nigricans</i> . Vegetation was in good condition with a moderate coverage of weeds including <i>Gazania linearis</i> (Gazania), <i>Euphorbia terracina</i> (False Caper) and <i>Asphodelus fistulosus</i> (Onion Weed) amongst others.				
Threatened species or community	<p>The following fauna species listed under the EPBC Act and/or NPW Act were determined as possible to occur in the Project Area.</p> <ul style="list-style-type: none"> • <i>Falco peregrinus macropus</i> (Peregrine Falcon) (SA: R); • <i>Haliaeetus leucogaster</i> (White-bellied Sea Eagle) (Com: Ma; SA: E); • <i>Hieraaetus morphnoides</i> (Little Eagle) (SA: V); and • <i>Neophema petrophila zietzi</i> (Rock Parrot) (SA: R). <p>15 additional fauna species listed under the EPBC Act and/or NPW Act may occur as flyover or utilise the salt lake area in the Project Area but will not be impacted by the proposed clearance.</p> <p>No flora, fauna or Threatened Ecological Communities listed under the EPBC Act were recorded in the Project Area.</p>				
Landscape context score	1.18	Vegetation Condition Score	27.30	Conservation significance score	1.10
Unit biodiversity Score	35.44	Area (ha)	0.36	Total biodiversity Score	12.58

Table 8. Summary of VA B1.


Vegetation Association	B1: <i>Acacia ligulata</i> shrubland over <i>Scaevola spinescens</i>				
					
General description	Shrubland dominated by <i>Acacia ligulata</i> over <i>Scaevola spinescens</i> . Vegetation was in good condition with a low coverage of weeds including <i>Marrubium vulgare</i> (Horehound), <i>Lycium ferocissimum</i> (African Boxthorn) and <i>Asphodelus fistulosus</i> (Onion Weed) amongst others.				
Threatened species or community	<p>The following fauna species listed under the EPBC Act and/or NPW Act were determined as possible to occur in the Project Area.</p> <ul style="list-style-type: none"> • <i>Falco peregrinus macropus</i> (Peregrine Falcon) (SA: R); • <i>Haliaeetus leucogaster</i> (White-bellied Sea Eagle) (Com: Ma; SA: E); • <i>Hieraetus morphnoides</i> (Little Eagle) (SA: V); and • <i>Neophema petrophila zietzi</i> (Rock Parrot) (SA: R). <p>No flora, fauna or Threatened Ecological Communities listed under the EPBC Act were recorded in the Project Area.</p>				
Landscape context score	1.13	Vegetation Condition Score	61.21	Conservation significance score	1.10
Unit biodiversity Score	76.08	Area (ha)	7.53	Total biodiversity Score	572.59

Table 9. Summary of VA B2.


Vegetation Association	B2: <i>Melaleuca lanceolata</i> tall open shrubland over <i>Scaevola spinescens</i>				
					
General description	Tall open shrubland dominated by <i>Melaleuca lanceolata</i> over <i>Scaevola spinescens</i> . Vegetation was in good condition with a low to moderate coverage of weeds including <i>Lycium ferocissimum</i> (African Boxthorn), <i>Asphodelus fistulosus</i> (Onion Weed) and <i>Reichardia tingitana</i> (False Sowthistle) amongst others.				
Threatened species or community	<p>The following fauna species listed under the EPBC Act and/or NPW Act were determined as possible to occur in the Project Area.</p> <ul style="list-style-type: none"> • <i>Falco peregrinus macropus</i> (Peregrine Falcon) (SA: R); • <i>Haliaeetus leucogaster</i> (White-bellied Sea Eagle) (Com: Ma; SA: E); • <i>Hieraaetus morphnoides</i> (Little Eagle) (SA: V); and • <i>Neophema petrophila zietzi</i> (Rock Parrot) (SA: R). <p>No flora, fauna or Threatened Ecological Communities listed under the EPBC Act were recorded in the Project Area.</p>				
Landscape context score	1.13	Vegetation Condition Score	53.99	Conservation significance score	1.10
Unit biodiversity Score	67.11	Area (ha)	3.02	Total biodiversity Score	202.75

Table 10. Summary of VA B3.


Vegetation Association	B3: <i>Acacia ligulata</i> low open shrubland over <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> and <i>Austrostipa flavescens</i>				
					
General description	Low open shrubland dominated by <i>Acacia ligulata</i> over <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> and <i>Austrostipa flavescens</i> . Vegetation was in poor condition with a moderate coverage of weeds including <i>Lycium ferocissimum</i> (African Boxthorn), <i>Asphodelus fistulosus</i> (Onion Weed) and <i>Reichardia tingitana</i> (False Sowthistle) amongst others.				
Threatened species or community	<p>The following fauna species listed under the EPBC Act and/or NPW Act were determined as possible to occur in the Project Area.</p> <ul style="list-style-type: none"> • <i>Falco peregrinus macropus</i> (Peregrine Falcon) (SA: R); • <i>Haliaeetus leucogaster</i> (White-bellied Sea Eagle) (Com: Ma; SA: E); • <i>Hieraetus morphnoides</i> (Little Eagle) (SA: V); and • <i>Neophema petrophila zietzi</i> (Rock Parrot) (SA: R). <p>No flora, fauna or Threatened Ecological Communities listed under the EPBC Act were recorded in the Project Area.</p>				
Landscape context score	1.13	Vegetation Condition Score	33.76	Conservation significance score	1.10
Unit biodiversity Score	41.01	Area (ha)	0.42	Total biodiversity Score	17.79

Table 11. Summary of VA B4.


Vegetation Association	B4: <i>Melaleuca lanceolata</i> tall shrubland over <i>Enchylaena tomentosa</i> var. <i>tomentosa</i>				
					
General description	Tall shrubland dominated by <i>Melaleuca lanceolata</i> over <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> . Vegetation was in good condition with a low to moderate coverage of weeds including <i>Gazania linearis</i> (Gazania), <i>Lycium ferocissimum</i> (African Boxthorn) and <i>Eucalyptus platypus</i> ssp. <i>platypus</i> (Round-leaved Moort).				
Threatened species or community	The following fauna species listed under the EPBC Act and/or NPW Act were determined as possible to occur in the Project Area. <ul style="list-style-type: none"> • <i>Falco peregrinus macropus</i> (Peregrine Falcon) (SA: R); • <i>Haliaeetus leucogaster</i> (White-bellied Sea Eagle) (Com: Ma; SA: E); • <i>Hieraaetus morphnoides</i> (Little Eagle) (SA: V); and • <i>Neophema petrophila zietzi</i> (Rock Parrot) (SA: R). No flora, fauna or Threatened Ecological Communities listed under the EPBC Act were recorded in the Project Area.				
Landscape context score	1.13	Vegetation Condition Score	41.80	Conservation significance score	1.10
Unit biodiversity Score	48.78	Area (ha)	0.18	Total biodiversity Score	9.58

Table 12. Summary of VA B5.


Vegetation Association	B5: <i>Austrostipa flavescens</i> and <i>Enneapogon nigricans</i> +- <i>Geijera linearifolia</i> open grassland +- <i>Geijera linearifolia</i> open grassland				
					
General description	Open grassland dominated by <i>Austrostipa flavescens</i> and <i>Enneapogon nigricans</i> with <i>Geijera linearifolia</i> codominant in some areas. Vegetation was in poor condition with a moderate coverage of weeds including <i>Oxalis pes-caprae</i> (Soursob), <i>Asphodelus fistulosus</i> (Onion Weed) and <i>Reichardia tingitana</i> (False Sowthistle) amongst others.				
Threatened species or community	<p>The following fauna species listed under the EPBC Act and/or NPW Act were determined as possible to occur in the Project Area.</p> <ul style="list-style-type: none"> • <i>Falco peregrinus macropus</i> (Peregrine Falcon) (SA: R); • <i>Haliaeetus leucogaster</i> (White-bellied Sea Eagle) (Com: Ma; SA: E); • <i>Hieraaetus morphnoides</i> (Little Eagle) (SA: V); and • <i>Neophema petrophila zietzi</i> (Rock Parrot) (SA: R). <p>No flora, fauna or Threatened Ecological Communities listed under the EPBC Act were recorded in the Project Area.</p>				
Landscape context score	1.13	Vegetation Condition Score	39.34	Conservation significance score	1.10
Unit biodiversity Score	47.86	Area (ha)	0.38	Total biodiversity Score	18.54

Table 13. Summary of VA B6.


Vegetation Association	B6: <i>Tecticornia halocnemoides ssp. halocnemoides</i> and <i>Tecticornia pergranulata ssp. pergranulata</i> low closed shrubland				
					
General description	Low closed shrubland dominated by <i>Tecticornia halocnemoides ssp. halocnemoides</i> and <i>Tecticornia pergranulata ssp. pergranulata</i> . Vegetation was in good condition with a low to moderate coverage of weeds including <i>Limonium sp.</i> (Sea-lavender) <i>Reichardia tingitana</i> (False Sowthistle) and <i>Acacia cyclops</i> (Western Coastal Wattle) amongst others.				
Threatened species or community	<p>The following fauna species listed under the EPBC Act and/or NPW Act were determined as possible to occur in the Project Area.</p> <ul style="list-style-type: none"> • <i>Falco peregrinus macropus</i> (Peregrine Falcon) (SA: R); • <i>Haliaeetus leucogaster</i> (White-bellied Sea Eagle) (Com: Ma; SA: E); • <i>Hieraaetus morphnoides</i> (Little Eagle) (SA: V); and • <i>Neophema petrophila zietzi</i> (Rock Parrot) (SA: R). <p>No flora, fauna or Threatened Ecological Communities listed under the EPBC Act were recorded in the Project Area.</p>				
Landscape context score	1.13	Vegetation Condition Score	51.08	Conservation significance score	1.10
Unit biodiversity Score	63.50	Area (ha)	0.20	Total biodiversity Score	12.74

Table 14. Summary of VA B7.


Vegetation Association	B7: <i>Acacia ligulata</i> and <i>Geijera linearifolia</i> tall open shrubland over <i>Dianella brevicaulis</i> and <i>Gahnia lanigera</i>				
					
General description	Tall open shrubland dominated by <i>Acacia ligulata</i> and <i>Geijera linearifolia</i> over <i>Dianella brevicaulis</i> and <i>Gahnia lanigera</i> . Vegetation was in good condition with a low to moderate coverage of weeds including <i>Lycium ferocissimum</i> (African Boxthorn), <i>Asphodelus fistulosus</i> (Onion Weed) and <i>Euphorbia terracina</i> (False Caper) amongst others.				
Threatened species or community	The following fauna species listed under the EPBC Act and/or NPW Act were determined as possible to occur in the Project Area. <ul style="list-style-type: none"> • <i>Falco peregrinus macropus</i> (Peregrine Falcon) (SA: R); • <i>Haliaeetus leucogaster</i> (White-bellied Sea Eagle) (Com: Ma; SA: E); • <i>Hieraetus morphnoides</i> (Little Eagle) (SA: V); and • <i>Neophema petrophila zietzi</i> (Rock Parrot) (SA: R). No flora, fauna or Threatened Ecological Communities listed under the EPBC Act were recorded in the Project Area.				
Landscape context score	1.13	Vegetation Condition Score	64.69	Conservation significance score	1.10
Unit biodiversity Score	80.41	Area (ha)	0.39	Total biodiversity Score	31.64

Table 15. Summary of VA C1.


Vegetation Association	C1: <i>Acacia ligulata</i> open shrubland over <i>Carpobrotus rossii</i> and <i>Austrostipa flavescens</i>				
					
General description	Open shrubland dominated by <i>Acacia ligulata</i> over <i>Carpobrotus rossii</i> and <i>Austrostipa flavescens</i> . Vegetation was in poor condition with a moderate coverage of weeds including <i>Lycium ferocissimum</i> (African Boxthorn), <i>Asphodelus fistulosus</i> (Onion Weed) and <i>Euphorbia Terracina</i> (False Caper) amongst others.				
Threatened species or community	<p>The following fauna species listed under the EPBC Act and/or NPW Act were determined as possible to occur in the Project Area.</p> <ul style="list-style-type: none"> • <i>Falco peregrinus macropus</i> (Peregrine Falcon) (SA: R); • <i>Haliaeetus leucogaster</i> (White-bellied Sea Eagle) (Com: Ma; SA: E); • <i>Hieraetus morphnoides</i> (Little Eagle) (SA: V); and • <i>Neophema petrophila zietzi</i> (Rock Parrot) (SA: R). <p>No flora, fauna or Threatened Ecological Communities listed under the EPBC Act were recorded in the Project Area.</p>				
Landscape context score	1.13	Vegetation Condition Score	49.51	Conservation significance score	1.10
Unit biodiversity Score	61.54	Area (ha)	0.64	Total biodiversity Score	39.59

Table 16. Summary of VA C2.



Vegetation Association	C2: <i>Enneapogon nigricans</i> and <i>Austrostipa flavescens</i> grassland				
					
General description	Grassland dominated by <i>Enneapogon nigricans</i> and <i>Austrostipa flavescens</i> . Vegetation was in good condition with a low to moderate coverage of weeds including <i>Asphodelus fistulosus</i> (Onion Weed), <i>Euphorbia terracina</i> (False Caper) and <i>Reichardia tingitana</i> (False Sowthistle) amongst others.				
Threatened species or community	The following fauna species listed under the EPBC Act and/or NPW Act were determined as possible to occur in the Project Area. <ul style="list-style-type: none"> • <i>Falco peregrinus macropus</i> (Peregrine Falcon) (SA: R); • <i>Haliaeetus leucogaster</i> (White-bellied Sea Eagle) (Com: Ma; SA: E); • <i>Hieraetus morphnoides</i> (Little Eagle) (SA: V); and • <i>Neophema petrophila zietzi</i> (Rock Parrot) (SA: R). No flora, fauna or Threatened Ecological Communities listed under the EPBC Act were recorded in the Project Area.				
Landscape context score	1.13	Vegetation Condition Score	44.70	Conservation significance score	1.10
Unit biodiversity Score	55.56	Area (ha)	0.73	Total biodiversity Score	40.54

Table 17. Summary of VA D1.

Vegetation Association	D1: <i>Acacia ligulata</i> open shrubland over <i>Lomandra collina</i>				
					
General description	Open shrubland dominated by <i>Acacia ligulata</i> over <i>Lomandra collina</i> . Vegetation was in good condition with a low to moderate coverage of weeds including <i>Acacia Cyclops</i> (Western Coastal Wattle), <i>Asphodelus fistulosus</i> (Onion Weed) and <i>Pinus radiata</i> (Radiata Pine) amongst others.				
Threatened species or community	<p>The following fauna species listed under the EPBC Act and/or NPW Act were determined as possible to occur in the Project Area.</p> <ul style="list-style-type: none"> • <i>Falco peregrinus macropus</i> (Peregrine Falcon) (SA: R); • <i>Haliaeetus leucogaster</i> (White-bellied Sea Eagle) (Com: Ma; SA: E); • <i>Hieraetus morphnoides</i> (Little Eagle) (SA: V); and • <i>Neophema petrophila zietzi</i> (Rock Parrot) (SA: R). <p>No flora, fauna or Threatened Ecological Communities listed under the EPBC Act were recorded in the Project Area.</p>				
Landscape context score	1.13	Vegetation Condition Score	60.95	Conservation significance score	1.10
Unit biodiversity Score	75.76	Area (ha)	1.82	Total biodiversity Score	138.05

4.1.3. Site maps showing areas of proposed impact

The location of VAs within the Project Area is provided in Figure 6.

A map of the proposed impact areas and associated VAs in the Project Area is provided in Figure 7. A3 copies of both maps are provided in [Appendix 3](#).



Figure 6. Location of vegetation associations (VAs) in the Project Area. Areas not mapped are farmland/cropping land.



Figure 7. Location of proposed impact areas and associated vegetation associations (VAs) in the Project Area.

4.2. Threatened species assessment

A PMST search identified several Matters of National Environmental Significance (MNES) relevant to the Project Area including:

- One TEC, Subtropical and Temperate Coastal Saltmarsh;
- 43 listed migratory species; and
- 47 listed threatened species (including nine flora species and 38 fauna species).

4.2.1. Threatened Ecological Communities

A PMST search identified that the Subtropical and Temperate Coastal Saltmarsh TEC is likely to occur within the Project Area. However, the Subtropical and Temperate Coastal Saltmarsh TEC does not occur within the Project Area itself. The Project Area is not under regular or intermittent tidal influence and/or associated with an estuarine environment.

4.2.2. Threatened flora

Of the nine listed threatened flora species identified in the PMST search, four were listed as 'known' or 'likely' to occur. A data extract from the BDBSA found one nationally listed flora species with records within 5 km of the Project Area – *Olearia pannosa ssp. pannosa* (Silver Daisy-bush). One additional state threatened flora species was found to have records within 5 km of the Project Area and was therefore assessed as possible to occur within the Project Area:

- *Myoporum parvifolium* (Creeping Boobialla) (NPW Act: R)

The likelihood of occurrence assessment for each flora species identified in the desktop search is provided in [Appendix 4](#). BDBSA threatened flora record located within 5 km of the Project Area is provided in [Appendix 5](#).

4.2.3. Threatened and Migratory fauna species

Of the 81 nationally listed threatened and migratory fauna species identified in the PMST search, 47 were listed as 'known' or 'likely' to occur within 5 km of the Project Area. 21 of these species are marine species and are not discussed any further due to the terrestrial nature of The Project.

Based on known distributions, records, and suitability of habitat, 10 nationally listed fauna species are considered to possibly occur within the Project Area:

- *Arenaria interpres* (Ruddy Turnstone) (EPBC Act: Mi (W));
- *Calidris acuminata* (Sharp-tailed Sandpiper) (EPBC Act: Mi (W));
- *Calidris alba* (Sanderling) (EPBC Act: Mi (W));
- *Calidris canutus* (Red Knot) (EPBC Act: EN, Mi (W));
- *Calidris ferruginea* (Curley Sandpiper) (EPBC Act: CE, Mi (W); NPW Act: E);
- *Calidris ruficollis* (Red-necked Stint) (EPBC Act: Mi (W));
- *Charadrius leschenaultii* (Greater Sand Plover) (EPBC Act: VU, Mi (W));
- *Numenius madagascariensis* (Eastern Curlew) (EPBC Act: CE, Mi (W); NPW Act: E);
- *Thinornis cucullatus* (Eastern Hooded Plover) (EPBC Act: VU; NPW Act: V); and
- *Tringa nebularia* (Common Greenshank) (EPBC Act: Mi (W)).

A BDBSA search identified an additional 9 State listed threatened fauna species with records within 5 km of the Project Area since 1995. Based on known distributions, records, and suitability of habitat, all 9 of these species are considered to possibly occur within the Project Area:

- *Egretta garzetta nigripes* (Little Egret) (NPW Act: R);
- *Egretta sacra sacra* (Pacific Reef Heron) (NPW Act: R);
- *Falco peregrinus macropus* (Peregrine Falcon) (NPW Act: R);
- *Haematopus fuliginosus fuliginosus* (Sooty Oystercatcher) (NPW Act: R);
- *Haematopus longirostris* (Pied Oystercatcher) (NPW Act: R);
- *Haliaeetus leucogaster* (White-bellied Sea Eagle) (NPW Act: E);
- *Hieraaetus morphnoides* (Little Eagle) (NPW Act: V);
- *Neophema petrophila zietzi* (Rock Parrot) (NPW Act: R); and
- *Tringa brevipes* (Grey-tailed Tattler) (NPW Act: R).

The likelihood of occurrence assessment for each fauna species identified in the desktop search is provided in [Appendix 4](#). BDBSA threatened fauna record located within 5 km of the Project Area is provided in [Appendix 6](#).

4.3. Cumulative impacts

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

Direct impacts of the proposal include the complete removal of native vegetation (up to 17.10 ha).

All construction access and earthworks fall within the works extent of the Project Area.

Potential indirect impacts of the proposal include:

- Dust generation during construction, which may impact surrounding vegetation;
- Noise generation, both during construction and from traffic, which may impact fauna species in the area; and
- Changes to flow regimes, which may impact surrounding vegetation.

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 NP&W Act.

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

According to current subdivision designs (Figure 3, page 13), Metacap Developments Pty Ltd (Metacap Developments) intend to avoid 77.17 ha or 45.61% of the Project Area. Metacap Developments also intend on avoiding some of the area to the east of the Project Area (the salt lake area). A proposed Visitor Centre overlooking the salt lake area is the only impact on the existing Significant Environmental Benefit Offset Area. Metacap Developments intend on encouraging economic and tourist development in this area.

There is also an area in the north western part of the Project Area that is proposed to be avoided and retained as a conservation area (see Figure 3).

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).

Clearance in areas of high biodiversity value including the majority of Block A has been minimised with designs aiming to avoid these areas. By avoiding some of the area to the east of the Project Area (the salt lake area), clearance of intact vegetation around the salt lake, an area which could provide suitable habitat for fauna species, particularly migratory species, has been minimised. At detailed design, vegetation impacts will be minimised through design methods such as altering the development area or engineering solutions. Metacap Developments are considering utilising retaining walls to reduce impact as a result of earthworks within the Project Area.

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.

Vegetation that is planned to be removed is permanent land clearance that is unlikely to be rehabilitated or restored. However, Metacap Developments intend on identifying and developing a number of parks and reserves within subdivision stages which will enhance the biodiversity of the area. Weed control before, during and after construction is planned to minimise the intrusion of additional invasive species and control those species which are already present

within the Project Area. The salt lake area to the east is intended to be used to accept some site stormwater if and only if stormwater is of an acceptable water quality and of lower salinity than what is present within the lake. Additional stormwater inflows and level fluctuations are unlikely to be detrimental to this area or impact vegetation dependant on existing groundwater. Inflow of stormwater may have a positive effect on native vegetation already present and or lead to the establishment of new species in the area, which could aid in the rehabilitation of the salt lake area. Furthermore, there is an area in the north western part of the Project Area that is proposed to be retained as a conservation area (see Figure 3).

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.

The NVC will only consider an offset once avoidance, minimization and restoration have been documented and fulfilled. The SEB Policy explains the biodiversity offsetting principles that must be met.

The SEB offset will be achieved in the form of a payment into the Native Vegetation Fund.

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

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

Table 18. Assessment against the Principles of Clearance.

Principle of clearance	Considerations
<p>Principle 1(a) – it comprises a high level of diversity of plant species</p>	<p><u>Relevant information</u> A total of 115 flora species (83 native and 32 introduced) were observed within the Project Area during the field survey:</p> <ul style="list-style-type: none"> • A1 – 55 flora species (43 native and 12 introduced species); • A2 – 10 flora species (nine native and one introduced species); • A3 – 36 flora species (21 native and 15 introduced species); • B1 – 37 flora species (25 native and 12 introduced species); • B2 – 28 flora species (22 native and six introduced species); • B3 – 29 flora species (17 native and 12 introduced species); • B4 – 21 flora species (17 native and four introduced species); • B5 – 28 flora species (17 native and 11 introduced species); • B6 – 16 flora species (12 native and four introduced species); • B7 – 52 flora species (37 native and 15 introduced species); • C1 – 30 flora species (14 native and 16 introduced species); • C2 – 22 flora species (14 native and eight introduced species); and • D1 – 35 flora species (26 native and nine introduced species). <p>Native Plant Species Diversity Scores: 30 (A1), 26 (A2), 24 (A3), 26 (B1), 24 (B2), 21 (B3), 24 (B4), 21 (B5), 30 (B6), 30 (B7), 20 (C1), 18 (C2), 28 (D1)</p>

Principle of clearance	Considerations
	<p><u>Assessment against the principles</u> <u>Seriously at Variance</u> - A1, A2, A3, B1, B2, B3, B4, B5, B6, B7, D1</p> <p><u>At Variance</u> - C1, C2</p> <p><u>Moderating factors that may be considered by the NVC</u> There is a substantial amount of native vegetation within the Project Area and or local vicinity comprising a number of native species.</p>
<p>Principle 1(b) – significance as a habitat for wildlife</p>	<p><u>Relevant information</u></p> <p>The vegetation at the location of the proposed residential development consists of several patches of native vegetation comprising coastal shrublands and grasslands on sandy dunes, dune swales and other low-lying areas. Native vegetation across the Project Area is in moderate to good condition and includes <i>Acacia ligulata</i> (Umbrella Bush), <i>Austrostipa spp.</i> (Spear-grass), <i>Lomandra spp.</i> (Mat-rush) and <i>Dianella spp.</i> (Flax-lily) in a number of areas amongst others. There was a high presence of Declared weeds including <i>Euphorbia terracina</i> (False Caper), <i>Gazania linearis</i> (Gazania) and <i>Lycium ferocissimum</i> (African Boxthorn) amongst other weeds scattered throughout the Project Area.</p> <p>A total of 19 native fauna species were recorded in the Project Area during the fauna assessment. No EPBC or NPW Act listed threatened fauna species were observed within the Project Area.</p> <p>A number of EPBC Act and NPW Act listed fauna species were assessed as possibly occurring in the Project Area based on known distributions, and suitability of habitat and / or presence of recent records within 5km of the Project Area:</p> <p>Possible:</p> <ul style="list-style-type: none"> • <i>Arenaria interpres</i> (Ruddy Turnstone) (EPBC Act: Mi (W)); • <i>Calidris acuminata</i> (Sharp-tailed Sandpiper) (EPBC Act: Mi (W)); • <i>Calidris alba</i> (Sanderling) (EPBC Act: Mi (W)); • <i>Calidris canutus</i> (Red Knot) (EPBC Act: EN, Mi (W)); • <i>Calidris ferruginea</i> (Curley Sandpiper) (EPBC Act: CE, Mi (W); NPW Act: E); • <i>Calidris ruficollis</i> (Red-necked Stint) (EPBC Act: Mi (W)); • <i>Charadrius leschenaultii</i> (Greater Sand Plover) (EPBC Act: VU, Mi (W)); • <i>Egretta garzetta nigripes</i> (Little Egret) (NPW Act: R); • <i>Egretta sacra sacra</i> (Pacific Reef Heron) (NPW Act: R); • <i>Falco peregrinus macropus</i> (Peregrine Falcon) (NPW Act: R); • <i>Haematopus fuliginosus fuliginosus</i> (Sooty Oystercatcher) (NPW Act: R); • <i>Haematopus longirostris</i> (Pied Oystercatcher) (NPW Act: R); • <i>Haliaeetus leucogaster</i> (White-bellied Sea Eagle) (NPW Act: E); • <i>Hieraaetus morphnoides</i> (Little Eagle) (NPW Act: V); • <i>Neophema petrophila zietzi</i> (Rock Parrot) (NPW Act: R); • <i>Numenius madagascariensis</i> (Eastern Curlew) (EPBC Act: CE, Mi (W); NPW Act: E); • <i>Thinornis cucullatus</i> (Eastern Hooded Plover) (EPBC Act: VU; NPW Act: V); • <i>Tringa brevipes</i> (Grey-tailed Tattler) (NPW Act: R); and

Principle of clearance	Considerations
	<ul style="list-style-type: none"> <i>Tringa nebularia</i> (Common Greenshank) (EPBC Act: Mi (W)). <p>Vegetation Associations Threatened Fauna score: 0.1 Unit Biodiversity score: 93.36 (A1), 62.83 (A2), 35.44 (A3), 76.08 (B1), 67.11 (B2), 41.01 (B3), 48.78 (B4), 47.86 (B5), 63.50 (B6), 80.41 (B7), 61.54 (C1), 55.56 (C2), 75.76 (D1)</p> <p><u>Assessment against the principles</u> <u>Seriously at Variance</u> - A1, A2, A3, B1, B2, B3, B4, B5, B6, B7, C1, C2, D1</p> <p><u>Moderating factors that may be considered by the NVC</u> The removal of 17.10 ha of native vegetation in the Project Area is considered unlikely to impact habitat critical to the survival of threatened fauna species. The coastal shrublands and grasslands in the Project Area may provide suitable habitat for some fauna species that use the Project Area as a flyover path. Given the fragmented nature of surrounding vegetation adjacent to the Project Area, clearance is unlikely to fragment populations of threatened fauna species. The condition of the vegetation proposed to be cleared in the Project Area is in moderate to good condition and is not habitat critical to the survival of threatened species. A number of invasive species are already present within the Project Area which do not currently interfere with the presence of these species.</p> <p>Furthermore, as Metacap Developments intend on avoiding some of the area to the east of the Project Area (the salt lake area), threatened migratory species that utilise this area at certain times of the year will not be impacted.</p>
<p>Principle 1(c) – plants of a rare, vulnerable or endangered species</p>	<p><u>Relevant information</u> Though a PMST search and BDBSA search found flora species with potential to occur within the Project Area, survey within the Project Area was considered adequate to detect these species if they were present. Accordingly, one NPW Act listed threatened flora species was found to occur in the Project Area:</p> <p><i>Maireana rohrlachii</i> (Rohrlach’s Bluebush) (NPW Act: R)</p> <p>No EPBC Act listed threatened species were observed within the Project Area.</p> <p>Vegetation Associations Threatened Flora Score: 0.04 (A1), 0 (A2, A3, B1, B2, B3, B4, B5, B6, B7, C1, C2, D1)</p> <p><u>Assessment against the principles</u></p> <p><u>At Variance</u> - A1</p> <p><u>Not at Variance</u> - A2, A3, B1, B2, B3, B4, B5, B6, B7, C1, C2, D1</p> <p><u>Moderating factors that may be considered by the NVC</u> <i>Maireana rohrlachii</i> was observed on the north eastern edge of the Project Area adjacent to the existing salt lake area (Figure 4). Given the size and location of the proposed clearance footprint</p>

Principle of clearance	Considerations
	<p>within the Project Area, clearance is unlikely to reduce the occupancy or lead to the fragmentation of this flora species. Additionally, as this species was found adjacent to native vegetation around the salt lake, some of which is proposed to be retained, it is unlikely that clearance will significantly impact this species.</p>
<p>Principle 1(d) – the vegetation comprises the whole or part of a plant community that is Rare, Vulnerable or endangered</p>	<p><u>Relevant information</u> No threatened communities under the EPBC Act or threatened ecosystems under the DEW Provisional list of threatened ecosystems are considered present within the area proposed for clearance.</p> <p>Threatened Community Score: 1</p>
	<p><u>Assessment against the principles</u></p> <p>Not at Variance</p>
	<p><u>Moderating factors that may be considered by the NVC</u> N/A</p>
<p>Principle 1(e) – it is significant as a remnant of vegetation in an area which has been extensively cleared</p>	<p><u>Relevant information</u> % native vegetation remaining in IBRA Association (Weetulta): 10 % native vegetation remaining in IBRA Subregion (St Vincent): 8</p> <p>The remnant vegetation patches within the Project Area are mostly in moderate to good health. They are likely to persist and represent a type of vegetation that has been extensively cleared in the surrounding land.</p> <p>Total Biodiversity Score – 1221.19</p>
	<p><u>Assessment against the principles</u></p> <p>Seriously at Variance</p>
	<p><u>Moderating factors that may be considered by the NVC</u> Native vegetation in the Weetulta IBRA Association has been extensively cleared in some areas. Given the surrounding area is dominated by residential developments and farmland, coastal shrublands and grasslands in the Project Area represent vegetation that has been cleared in this area. However, species within the Project Area have not been selectively removed within the Weetulta IBRA Association and as such are not underrepresented in the vegetation that remains. As The Project aims to retain a number of significant areas of native vegetation (including some of the native vegetation surrounding the salt lake to the east of the Project Area), remnants are likely to persist and remain in good condition.</p>
<p>Principle 1(f) – it is growing in, or in association with, a wetland environment</p>	<p><u>Relevant information</u> There is a salt lake that is present in the eastern part of the Project Area that is surrounded by native vegetation (see Figure 6, page 33).</p>
	<p><u>Assessment against the principles</u></p> <p><u>Seriously at Variance</u> - A1, A2, A3</p>

Principle of clearance	Considerations
	<p><u>Moderating factors that may be considered by the NVC</u></p> <p>The salt lake and some of the surrounding vegetation is proposed to be retained and will not be removed or substantially modified by The Project. It is anticipated that changes in the hydrological regime and other impacts such as the introduction of additional invasive species will not occur. This area is intended to be used to accept some site stormwater if and only if stormwater is of an acceptable water quality and of lower salinity than what is present within the lake. Additional flows and level fluctuations are unlikely to be detrimental to this area or impact vegetation dependant on existing groundwater. Inflow of stormwater may have a positive effect on native vegetation already present and or lead to the establishment of new species in the area, potentially helping to rehabilitate the salt lake area.</p>
Principle 1(g) – it contributes significantly to the amenity of the area in which it is growing or is situated	<p><u>Relevant information</u></p> <p>The broader landscape surrounding the Project Area consists of residential developments and farmland. The vegetation within the Project Area consists of patches of native vegetation and roadside native vegetation. As such any vegetation within the area would contribute to the amenity of the area.</p>
	<p>N/A</p>
	<p><u>Moderating factors that may be considered by the NVC</u></p> <p>Given a large portion of the Project Area is farmland and according to current subdivision designs (Figure 3), Metacap Developments intend on avoiding 77.17 ha or 45.61% of native vegetation within the Project Area. The amenity of the area will not be drastically modified.</p>

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

4.6. Risk assessment

The level of risk associated with the application

Table 19. Summary of the level of risk associated with the application.

Total clearance	Area (ha)	17.10
	Total biodiversity Score	1221.19
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 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	0.04	0.1	95.80	1.07	102.30	1	1	214.83	\$99,411.78	\$5,467.65
A	2	26	1	0	0.1	62.83	0.36	22.50	1	1	47.26	\$21,868.25	\$1,202.75
A	3	24	1	0	0.1	35.44	0.36	12.58	1	1	26.42	\$12,190.50	\$670.48
B	1	26	1	0	0.1	76.08	7.53	572.59	1		601.22	\$275,803.32	\$15,169.18
B	2	24	1	0	0.1	67.11	3.02	202.75	1		212.89	\$97,377.56	\$5,355.77
B	3	21	1	0	0.1	41.01	0.42	17.79	1		18.68	\$8,646.31	\$475.55
B	4	24	1	0	0.1	48.78	0.18	9.58	1		10.06	\$4,654.20	\$255.98
B	5	21	1	0	0.1	47.86	0.38	18.54	1		19.46	\$8,876.00	\$488.18
B	6	30	1	0	0.1	63.50	0.20	12.74	1		13.38	\$6,065.74	\$333.62
B	7	30	1	0	0.1	80.41	0.39	31.64	1		33.22	\$15,017.92	\$825.99
C	1	20	1	0	0.1	61.54	0.64	39.59	1		41.57	\$18,901.17	\$1,039.56
C	2	18	1	0	0.1	55.56	0.73	40.54	1		42.57	\$19,412.64	\$1,067.70
D	1	28	1	0	0.1	75.76	1.82	138.05	1		144.96	\$65,721.70	\$3,614.69
						Total	17.10	1221.19			1426.52	\$653,947.09	\$35,967.10

Totals summary table

	Total Biodiversity score	Total SEB points required	SEB Payment	Admin Fee	Total Payment
Application	1221.19	1426.52	\$653,947.09	\$35,967.10	\$689,914.20

Economies of Scale Factor	0.5
Rainfall (mm)	339 - 346

6. Significant Environmental Benefit

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

ACHIEVING AN SEB

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

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

PAYMENT SEB

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

The total SEB offset required for the clearance of 17.10 ha of native vegetation is 1426.52 SEB points or **\$689,914.20**, which includes a \$35,967.10 administration fee.

7. References

- Croft S.J., Pedler J.A., Milne T.I. (2007). Bushland Condition Monitoring Manual – Northern Agricultural & Yorke Peninsula Regions. Nature Conservation Society of South Australia, Adelaide.
- Croft S.J., Pedler J.A., Milne T.I. (2008a). Bushland Condition Monitoring Manual – Eyre Peninsula Region. Nature Conservation Society of South Australia, Adelaide.
- Croft S.J., Pedler J.A., Milne T.I. (2008b). Bushland Condition Monitoring Manual – Southern Mt Lofty Ranges Region. Nature Conservation Society of South Australia, Adelaide.
- Croft S.J., Pedler J.A., Milne T.I. (2009). Bushland Condition Monitoring Manual – Murray Darling Basin Region. Nature Conservation Society of South Australia, Adelaide.
- Department for Environment and Water (DEW) (2022). Database extract sourced from the South Australian Biological Database of South Australia. *Data Licence number 2785 Recordset number DEWNRBDBSA220208-1*. [Obtained 08 February 2022].
- Department of Climate Change, Energy, the Environment and Water (DCCEEW) (Previously DAWE) (2022a) Australia's bioregions (IBRA). Available at: <https://environment.gov.au/land/nrs/science/ibra> [Accessed 02/02/2022].
- Department of Climate Change, Energy, the Environment and Water (DCCEEW) (Previously DAWE) (2022b). *EPBC Act Protected Matters Report - report created 02/02/2022*. Department of Agriculture, Water and the Environment.
- Department of the Environment, Water, Heritage and Arts (DEWHA) (2008). *Approved Conservation Advice for Caladenia conferta*. <http://www.environment.gov.au/biodiversity/threatened/species/pubs/55000-conservation-advice.pdf>. [Accessed 02/02/2022]
- Department of the Environment, Water, Heritage and Arts (DEWHA) (2021). *Approved Conservation Advice for Pterostylis lepida*. <http://www.environment.gov.au/biodiversity/threatened/species/pubs/86227-conservation-advice-29092021.pdf>. [Accessed 02/02/2022].
- Department of the Environment (DOE) (2013). *Approved Conservation Advice for Olearia pannosa subsp. Pannosa (silver daisy-bush)*. <http://www.environment.gov.au/biodiversity/threatened/species/pubs/12348-conservation-advice.pdf>. [Accessed 02/02/2022].
- Department of the Environment (DOE) (2014). *Rostratula australis* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: <http://www.environment.gov.au/sprat>. [Accessed Fri, 12 Sep 2014 10:25:06 +1000].
- EBS Ecology (2006) *Ecological assessment of a proposed golf course development near Port Hughes, Yorke Peninsula July 2006*. Report to Parsons Brinckerhoff. EBS Ecology, Adelaide.
- EBS Ecology (2022) *Ecological Desktop Assessment – The Dunes Port Hughes*. Report to Metacap Developments Pty Ltd. EBS Ecology, Adelaide.

- eFloraSA (2022). Electronic Flora of South Australia species Fact Sheet. eFloraSA.. URL: <http://www.flora.sa.gov.au/census.shtml>. [Accessed 11/02/2022].
- Milne T.I., Croft T. (2012). Bushland Condition Monitoring Manual – Benchmark Communities of the South East. Nature Conservation Society of South Australia, Adelaide.
- Milne T.I., McCallum B. (2012). Bushland Condition Monitoring Manual – Benchmark Communities of Kangaroo Island. Nature Conservation Society of South Australia, Adelaide.
- Morcombe, M. (2021). Field guide to Australian birds. Archerfield, Queensland: Steve Parish.
- Native Vegetation Council (NVC) (2020). Bushland Assessment Manual July 2020. Native Vegetation Council, Adelaide. Available at: <https://www.environment.sa.gov.au/topics/native-vegetation/clearing/vegetation-assessments>.
- Pizzey, G., & Knight, F. (2007). Field Guide to Australian Birds. – Eighth Edition. Harper Collins Australia.
- Pobke, K. (2007). Draft recovery plan for 23 threatened flora taxa on Eyre Peninsula, South Australia 2007-2012. *Department for Environment and Heritage, South Australia*.
- Todd, J.A. (2000). Recovery Plan for twelve threatened Spider-orchid *Caladenia* taxa (Orchidaceae: Caladeniinae) of Victoria and South Australia 2000 - 2004. Department of Natural Resources and Environment, Melbourne.

8. Appendices

Appendix 1. List of flora species observed in the Project Area

Species name	Common name	EPBC Act	NPW Act
<i>Acacia cyclops</i> *	Western Coastal Wattle		
<i>Acacia ligulata</i>	Umbrella Bush		
<i>Acacia longifolia ssp. sophorae</i>	Coastal Wattle		
<i>Acacia sp.</i>	Wattle		
<i>Acrotriche cordata</i>	Blunt-leaf Ground-berry		
<i>Acrotriche patula</i>	Prickly Ground-berry		
<i>Ajuga iva</i> *	Bugle		
<i>Allocasuarina verticillata</i>	Drooping Sheoak		
<i>Alyxia buxifolia</i>	Sea Box		
<i>Asphodelus fistulosus</i> *	Onion Weed		
<i>Asteriscus spinosus</i> *	Golden Pallensis		
<i>Atriplex cinerea</i>	Coast Saltbush		
<i>Atriplex nummularia ssp. nummularia</i>	Old-man Saltbush		
<i>Austrostipa elegantissima</i>	Feather Spear-grass		
<i>Austrostipa flavescens</i>	Coast Spear-grass		
<i>Austrostipa platychaeta</i>	Flat-awn Spear-grass		
<i>Austrostipa sp.</i>	Spear-grass		
<i>Avena barbata</i> *	Bearded Oat		
<i>Beyeria lechenaultii</i>	Pale Turpentine Bush		
<i>Blennospora drummondii</i>	Dwarf Button-flower		
<i>Brassica sp.*</i>			
<i>Bromus diandrus</i> *	Great Brome		
<i>Bromus sp.*</i>	Brome		
<i>Bursaria spinosa ssp. spinosa</i>	Sweet Bursaria		
<i>Cakile maritima ssp. Maritima</i> *	Two-horned Sea Rocket		
<i>Callitris gracilis</i>	Southern Cypress Pine		
<i>Carpobrotus rossii</i>	Native Pigface		
<i>Carrichtera annua</i> *	Ward's Weed		
<i>Carthamus lanatus</i> *	Saffron Thistle		
<i>Cassytha sp.</i>	Dodder-laurel		
<i>Cenchrus clandestinus</i> *	Kikuyu		
<i>Chondrilla juncea</i> *	Skeleton Weed		
<i>Chrysocephalum baxteri</i>	White Everlasting		
<i>Chrysocephalum sp.</i>	Everlasting		

Species name	Common name	EPBC Act	NPW Act
<i>Clematis microphylla</i>	Old Man's Beard		
<i>Convolvulus remotus</i>	Grassy Bindweed		
<i>Cryptandra</i> sp. <i>Floriferous</i> (W.R. Barker 4131)	Pretty Cryptandra		
<i>Cucumis myriocarpus</i> ssp. <i>Myriocarpus</i> *	Paddy Melon		
<i>Cynodon dactylon</i> var.*	Couch		
<i>Dampiera rosmarinifolia</i>	Rosemary Dampiera		
<i>Dianella brevicaulis</i>	Short-stem Flax-lily		
<i>Dianella revoluta</i> var. <i>revoluta</i>	Black-anther Flax-lily		
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	Ruby Saltbush		
<i>Enneapogon nigricans</i>	Black-head Grass		
<i>Erodium</i> sp.*	Heron's-bill/Crowfoot		
<i>Eucalyptus gracilis</i>	Yorrell		
<i>Eucalyptus oleosa</i> ssp. <i>ampliata</i>	Red Mallee		
<i>Eucalyptus platypus</i> ssp. <i>platypus</i> *	Round-leaved Moort		
<i>Euphorbia paralias</i> *	Sea Spurge		
<i>Euphorbia terracina</i> *	False Caper		
<i>Exocarpos aphyllus</i>	Leafless Cherry		
<i>Frankenia sessilis</i>	Small-leaf Sea-heath		
<i>Gahnia lanigera</i>	Black Grass Saw-sedge		
<i>Gazania linearis</i> *	Gazania		
<i>Geijera linearifolia</i>	Sheep Bush		
<i>Glycine rubiginosa</i>	Twining Glycine		
<i>Goodenia willisiana</i>	Silver Goodenia		
<i>Grevillea huegelii</i>	Comb Grevillea		
<i>Haloragis acutangula</i> f. <i>acutangula</i>	Smooth Raspwort		
<i>Helichrysum leucopsideum</i>	Satin Everlasting		
<i>Kunzea pomifera</i>	Muntries		
<i>Lagurus ovatus</i> *	Hare's Tail Grass		
<i>Lepidosperma viscidum</i>	Sticky Sword-sedge		
<i>Limonium</i> sp.*	Sea-lavender		
<i>Linum marginale</i>	Native Flax		
<i>Lomandra collina</i>	Sand Mat-rush		
<i>Lomandra effusa</i>	Scented Mat-rush		
<i>Lomandra leucocephala</i> ssp. <i>robusta</i>	Woolly Mat-rush		
<i>Lomandra multiflora</i> ssp. <i>dura</i>	Hard Mat-rush		
<i>Lycium ferocissimum</i> *	African Boxthorn		
<i>Maireana brevifolia</i>	Short-leaf Bluebush		
<i>Maireana rohrlachii</i>	Rohrlach's Bluebush		R
<i>Marrubium vulgare</i> *	Horehound		

Species name	Common name	EPBC Act	NPW Act
<i>Medicago sp.*</i>	Medic		
<i>Melaleuca acuminata ssp. acuminata</i>	Mallee Honey-myrtle		
<i>Melaleuca lanceolata</i>	Dryland Tea-tree		
<i>Mesembryanthemum crystallinum*</i>	Common Iceplant		
<i>Muehlenbeckia gunnii</i>	Coastal Climbing Lignum		
<i>Myoporum insulare</i>	Common Boobiolla		
<i>Nitraria billardierei</i>	Nitre-bush		
<i>Olea europaea ssp.*</i>	Olive		
<i>Olearia axillaris</i>	Coast Daisy-bush		
<i>Oxalis pes-caprae*</i>	Soursob		
<i>Panicum sp.</i>	Panic/Millet		
<i>Pimelea glauca</i>	Smooth Riceflower		
<i>Pimelea micrantha</i>	Silky Riceflower		
<i>Pimelea serpyllifolia ssp. serpyllifolia</i>	Thyme Riceflower		
<i>Pinus radiata*</i>	Radiata Pine		
<i>Pittosporum angustifolium</i>	Native Apricot		
<i>Pomaderris paniculosa ssp. paniculosa</i>	Mallee Pomaderris		
<i>Reichardia tingitana*</i>	False Sowthistle		
<i>Rhagodia candolleana ssp. candolleana</i>	Sea-berry Saltbush		
<i>Roepera aurantiaca ssp. aurantiaca</i>	Shrubby Twinleaf		
<i>Rytidosperma sp.</i>	Wallaby-grass		
<i>Salicornia quinqueflora ssp. quinqueflora</i>	Beaded Samphire		
<i>Salsola australis</i>	Buckbush		
<i>Salvia verbenaca var.*</i>	Wild Sage		
<i>Santalum acuminatum</i>	Quandong		
<i>Scaevola crassifolia</i>	Cushion Fanflower		
<i>Scaevola spinescens</i>	Spiny Fanflower		
<i>Sclerolaena uniflora</i>	Small-spine Bindyi		
<i>Senna artemisioides ssp. petiolaris</i>			
<i>Senna artemisioides ssp. X coriacea</i>	Broad-leaf Desert Senna		
<i>Sisymbrium sp.*</i>	Wild Mustard		
<i>Sonchus oleraceus*</i>	Common Sow-thistle		
<i>Spinifex hirsutus</i>	Rolling Spinifex		
<i>Tecticornia halocnemoides ssp. halocnemoides</i>	Grey Samphire		
<i>Tecticornia pergranulata ssp. pergranulata</i>	Black-seed Samphire		
<i>Tecticornia sp.</i>	Samphire		
<i>Tetragonia implexicoma</i>	Bower Spinach		
<i>Threlkeldia diffusa</i>	Coast Bonefruit		

Species name	Common name	EPBC Act	NPW Act
<i>Vittadinia cervicalis</i> var. <i>circularis</i>	Waisted New Holland Daisy		
<i>Vittadinia cuneata</i> var. <i>cuneata</i>	Fuzzy New Holland Daisy		
<i>Vulpia</i> sp.*	Fescue		
<i>Westringia rigida</i>	Stiff Westringia		

National Parks and Wildlife Act 1972 (NPW Act) conservation listing: R = Rare

*introduced species.

Appendix 2. List of fauna species observed in the Project Area

Species name	Common name
<i>Alauda arvensis</i> *	Eurasian Skylark
<i>Anthochaera carunculata</i>	Red Wattlebird
<i>Anthus australis</i>	Australian Pipit
<i>Charadrius ruficapillus</i>	Red-capped Plover
<i>Chroicocephalus novaehollandiae</i>	Silver Gull
<i>Corvus coronoides</i>	Australian Raven
<i>Corvus mellori</i>	Little Raven
<i>Ctenotus sp.</i>	
<i>Falco cenchroides</i>	Nankeen Kestrel
<i>Gavicalis virescens</i>	Singing Honeyeater
<i>Grallina cyanoleuca</i>	Magpielark
MACROPODIDAE sp.	kangaroos
<i>Malurus cyaneus</i>	Superb Fairywren
<i>Manorina melanocephala</i>	Noisy Miner
<i>Milvus migrans</i>	Black Kite
<i>Ocyphaps lophotes</i>	Crested Pigeon
<i>Oryctolagus cuniculus</i> *	Rabbit (European Rabbit)
<i>Pomatostomus superciliosus</i>	White-browed Babbler
<i>Rhipidura leucophrys</i>	Willie Wagtail
<i>Spilopelia chinensis</i> *	Spotted Dove
<i>Sturnus vulgaris</i> *	Common Starling
<i>Turdus merula</i> *	Common Blackbird
<i>Vanellus miles</i>	Masked Lapwing
<i>Vulpes vulpes</i> *	Fox (Red Fox)
<i>Zosterops lateralis</i>	Silvereye

*introduced species.

Appendix 3. Site maps showing areas of proposed impact (A3)



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Data Source: EBS Ecology (2022), ESRI (2022), DEW (2021), DIT (2021)



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- Legend**
- █ Project Area
 - Local road
 - Impacted vegetation association
 - █ A1: *Scaevola spinescens* +/- *Threlkeldia diffusa* shrubland
 - █ A2: *Tecticornia pergranulata* ssp. *pergranulata* low closed shrubland
 - █ A3: *Austrostipa flavescens* and *Enneapogon nigricans* grassland
 - █ B1: *Acacia ligulata* shrubland over *Scaevola spinescens*
 - █ B2: *Melaleuca lanceolata* tall open shrubland over *Scaevola spinescens*
 - █ B3: *Acacia ligulata* low open shrubland over *Enchylaena tomentosa* var. *tomentosa* and *Austrostipa flavescens*
 - █ B4: *Melaleuca lanceolata* tall shrubland over *Enchylaena tomentosa* var. *tomentosa*
 - █ B5: *Austrostipa flavescens* and *Enneapogon nigricans* +/- *Geijera linearifolia* open grassland
 - █ B6: *Tecticornia halocnemoides* ssp. *halocnemoides* and *Tecticornia pergranulata* ssp. *pergranulata* low closed shrubland
 - █ B7: *Acacia ligulata* and *Geijera linearifolia* tall open shrubland over *Dianella brevicaulis* and *Gahnia lanigera*
 - █ C1: *Acacia ligulata* open shrubland over *Carpobrotus rossii* and *Austrostipa flavescens*
 - █ C2: *Enneapogon nigricans* and *Austrostipa flavescens* grassland
 - █ D1: *Acacia ligulata* open shrubland over *Lomandra collina*

Data Source: EBS Ecology (2022), ESRI (2022), DEW (2021), DIT (2021)



Appendix 4. Likelihood of occurrence of threatened species identified in the desktop assessment.

Table 20. Likelihood of occurrence of threatened flora and fauna species identified in the desktop assessment. The data source and threat levels are described in the table footer.

Species (common name)	NP&W Act	EPBC Act	Data source	Date of last record/PMST likelihood	Species known habitat preferences	Likelihood of use for habitat – Comments
Flora						
<i>Caladenia brumalis</i> (Winter Spider-orchid)	V	VU	1, 2, 4	2006 / Known	Found exclusively on the EP in hard, mottled duplex soils within low open forests amongst Eucalyptus sp., Allocasuarina verticillata and Melaleuca uncinata (Pobke 2007).	Unlikely – Although recent records, no suitable habitat within Project Area
<i>Caladenia conferta</i> (Coast Spider-orchid)	E	EN	1	Likely	Occurs in mallee woodlands or in Melaleuca uncinata scrub in terra-rosa soils over limestone. Only four populations are known at two disjunct locations (DEWHA 2008).	Unlikely – no recent records and suitable habitat within Project Area is not preferred
<i>Caladenia Tensa</i> (Greencomb Spider-orchid)		EN	1, 4	Likely	Various habitats have been described including Cypress Pine (Family: Cupressaceae) / Yellow Gum Woodland, Pine / Box woodland, mallee-heath sites, healthy woodland and mallee woodland, generally with rock outcrops (Todd 2000).	Unlikely – no recent records and suitable habitat within Project Area is not preferred
<i>Myoporum parvifolium</i> (Creeping Boobiella)	R		2, 4	1997	Subpopulations scattered throughout the EP and also throughout southern SA and Vic. Occurs in sandy coastal areas, Red Gum woodlands, Melaleuca halmaturorum (Swamp Teatree) very low open forests and dune swales (eFloraSA 2022).	Possible – recent records and suitable habitat within Project Area is preferred

Species (common name)	NP&W Act	EPBC Act	Data source	Date of last record/PMST likelihood	Species known habitat preferences	Likelihood of use for habitat – Comments
<i>Olearia pannosa ssp. pannosa</i> (Silver Daisy-bush)	V	VU	2, 4	2009	Found in woodland and mallee habitats. Associated overstorey species include Eucalyptus phenax, E. rugosa, E. odorata and E. fasciculosa (DOE 2013).	Unlikely – recent records but no suitable mallee habitat within Project Area
<i>Pterostylis lepida</i> (Halbury Greenhood)	E	EN	1	Known	Endemic to SA occurring in two main sub populations. Occurs in association with Callitris gracilis and Eucalyptus sp. with a dense shrub layer dominated by Alyxia buxifolia. (DEWHA 2021).	Unlikely – no recent records and suitable habitat within Project Area is not preferred
Fauna						
<i>Arenaria interpres</i> (Ruddy Turnstone)		Mi (W)	1, 3, 4	2000 / Likely	Inhabits tidal reefs and pools, sandy shores with seaweed and mudflats and occasionally commercial salt fields. (Pizzey and Knight 2007).	Possible – may occur as flyover or utilise the salt lake area that will not be impacted by the proposed clearance
<i>Calidris acuminata</i> (Sharp-tailed Sandpiper)		Mi (W)	1, 4	Known	Inhabits tidal mudflats, salt marshes and shallow fresh, brackish or saline wetlands and flood waters. (Pizzey and Knight 2007).	Possible – may occur as flyover or utilise the salt lake area that will not be impacted by the proposed clearance
<i>Calidris alba</i> (Sanderling)		Mi (W)	1, 4	Likely	Utilises broad ocean beaches with firm sand. Often near tidal mudflats, river mouths and lagoons. (Pizzey and Knight 2007).	Possible – may occur as flyover or utilise the salt lake area that will not be impacted by the proposed clearance
<i>Calidris canutus</i> (Red Knot)		EN; Mi (W)	1, 3, 4	2000 / Known	Occurs on tidal mudflats, salt marshes and flooded pastures or ploughed lands. (Pizzey and Knight 2007).	Possible – may occur as flyover or utilise the salt lake area that will not be impacted by the proposed clearance

Species (common name)	NP&W Act	EPBC Act	Data source	Date of last record/PMST likelihood	Species known habitat preferences	Likelihood of use for habitat – Comments
<i>Calidris ferruginea</i> (Curlew Sandpiper)	E	CE; Mi (W)	1, 3, 4	2000 / Known	Migratory species which prefers tidal mudflats, saltmarsh, salt fields and fresh, brackish or saline wetlands. (Pizzey and Knight 2007)	Possible – may occur as flyover or utilise the salt lake area that will not be impacted by the proposed clearance
<i>Calidris ruficollis</i> (Red-necked Stint)		Mi (W)	1, 4	Likely	Inhabits tidal mudflats, salt marshes and sandy or shelly beaches and salt fields. (Pizzey and Knight 2007).	Possible – may occur as flyover or utilise the salt lake area that will not be impacted by the proposed clearance
<i>Charadrius leschenaultii</i> (Greater Sand Plover)		VU; Mi (W)	1, 4	Likely	Occupies wide, sandy or shelly beaches, tidal mudflats, salt marsh; seldom far inland. (Pizzey and Knight 2007).	Possible – may occur as flyover or utilise the salt lake area that will not be impacted by the proposed clearance
<i>Egretta garzetta nigripes</i> (Little Egret)	R		3	2018	Found in tidal mudflats, saltmarshes, mangroves and freshwater wetlands (Pizzey and Knight 2007).	Possible – may occur as flyover or utilise the salt lake area that will not be impacted by the proposed clearance
<i>Egretta sacra sacra</i> (Pacific Reef Heron)	R		3, 4	2008	Inhabits shorelines of coasts and islands, estuarine mudflats, inshore reefs (Morcombe 2021).	Possible – may occur as flyover or utilise the salt lake area that will not be impacted by the proposed clearance
<i>Falco hypoleucos</i> (Grey Falcon)	R	VU	1, 4	Likely	The species occurs in arid and semi-arid Australia, including the Murray-Darling Basin, Eyre Basin, central Australia and WA. Preferred habitat includes lightly treed inland plains, sand ridges and pastoral plains. (Pizzey and Knight 2007)	Unlikely – no recent records and habitat within Project Area is not preferred

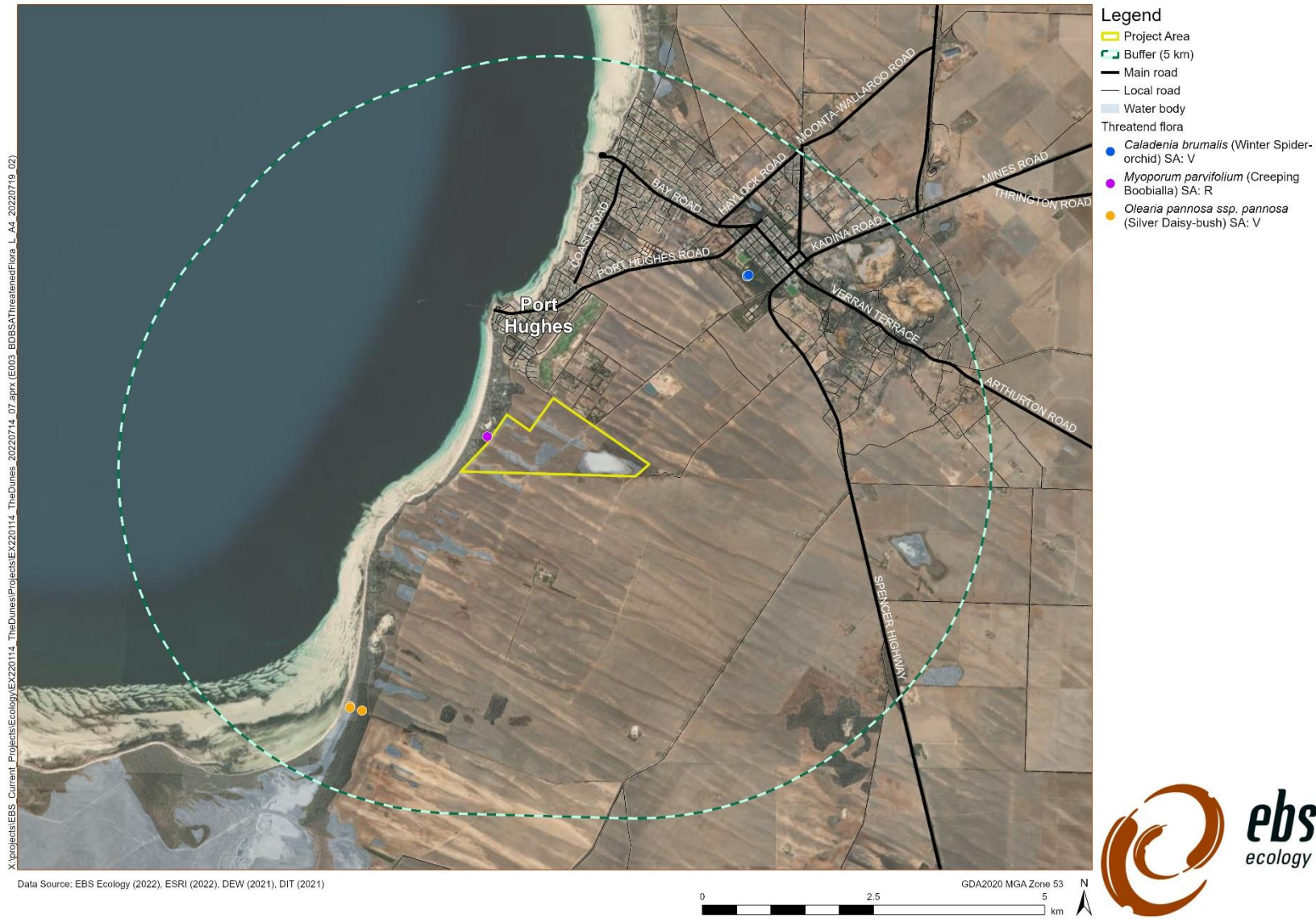
Species (common name)	NP&W Act	EPBC Act	Data source	Date of last record/PMST likelihood	Species known habitat preferences	Likelihood of use for habitat – Comments
<i>Falco peregrinus macropus</i> (Peregrine Falcon)	R		3, 4	2000	Found everywhere from woodlands to open grasslands and coastal cliffs – though less frequently in desert regions. This species prefers open habitats such as grasslands, tundra and meadows and nests on cliff faces and in crevices (Pizzey and Knight 2007).	Possible – may occur as fly-over only, some suitable habitat nearby
<i>Haematopus fuliginosus fuliginosus</i> (Sooty Oystercatcher)	R		2, 3	2012, 2020	Occurs on intertidal rocky and coral reefs, ocean shores and occasionally frequents sandspits and tidal mudflats (Pizzey and Knight 2007).	Possible – may occur as flyover or utilise the salt lake area that will not be impacted by the proposed clearance
<i>Haematopus longirostris</i> (Pied Oystercatcher)	R		2, 3	2014, 2018	Frequents undisturbed sandy or pebble beaches, sandspits, mudflats and occasionally brackish or saline wetlands and salt lakes (Pizzey and Knight 2007).	Possible – may occur as flyover or utilise the salt lake area that will not be impacted by the proposed clearance
<i>Haliaeetus leucogaster</i> (White-bellied Sea Eagle)	E		3, 4	2000	Found in coastal habitats (especially those close to the sea-shore) and around terrestrial wetlands in tropical and temperate regions of mainland Australia and its offshore islands.	Possible – may occur as fly-over only, some suitable habitat nearby
<i>Hieraaetus morphnoides</i> (Little Eagle)	V		3, 4	2000	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, 2021).	Possible – may occur as fly-over only, some suitable habitat nearby
<i>Neophema petrophila zietzi</i> (Rock Parrot)	R		3, 4	2004	Occurs along the coast, adjacent or on rocky islands, sandy beaches often near	Possible – some vegetation within the

Species (common name)	NP&W Act	EPBC Act	Data source	Date of last record/PMST likelihood	Species known habitat preferences	Likelihood of use for habitat – Comments
					cliffs and headlands (Pizzey and Knight 2007).	Project Area may be suitable
<i>Numenius madagascariensis</i> (Eastern Curlew)	E	CE; Mi (W)	1	Known	Found in estuaries, tidal mudflats, salt marshes and occasionally fresh or brackish lakes. (Pizzey and Knight 2007).	Possible – may occur as flyover or utilise the salt lake area that will not be impacted by the proposed clearance
<i>Pachyptila turtur subantarctica</i> (Fairy Prion)		VU	1	Likely	Prefers offshore areas and breeds primarily occurs on Macquarie Island and subantarctic islands outside of Australia. (Pizzey and Knight 2007)	Unlikely – no recent records and habitat within Project Area is not preferred
<i>Pandion haliaetus</i> (Osprey)		Mi (W)	1	Likely	Found along coastlines, estuaries, bays and inlets. Ascends larger rivers particularly in northern Australia. (Pizzey and Knight 2007).	Unlikely – no recent records and habitat within Project Area is not preferred
<i>Rostratula australis</i> (Australian Painted-snipe)	E	EN	1, 4	Likely	Generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. Found within rank emergent tussocks of grass, sedges, rushes or reeds, or samphire; often with scattered clumps of lignum <i>Muehlenbeckia</i> , or Canegrass (DOE 2014)	Unlikely – no recent records and habitat within Project Area is not preferred
<i>Sternula nereis nereis</i> (Australian Fairy Tern)	E	VU	1, 3, 4	Known, 2018	Habitat is coasts, estuaries; breeds on sandy beaches and sand spits. Occurs along coastlines in all States except for NT, QLD and NSW (Pizzey and Knight 2007).	Unlikely – recent records but habitat within Project Area is not preferred
<i>Thinornis cucullatus</i> (Eastern Hooded Plover)	V	VU	1, 2, 3, 4	Known, 2014, 2020	The hooded plover (eastern) is a small Australian beach nesting bird. It mainly	Possible – may occur as flyover or utilise the salt

Species (common name)	NP&W Act	EPBC Act	Data source	Date of last record/PMST likelihood	Species known habitat preferences	Likelihood of use for habitat – Comments
					occurs on wide beaches backed by dunes with large amounts of seaweed and jetsam, creek mouths and inlet entrances. (Pizzey and Knight 2007).	lake area that will not be impacted by the proposed clearance
<i>Tringa brevipes</i> (Grey-tailed Tattler)	R		3	2000	Inhabits estuaries, tidal mudflats, mangroves and shallow river margins both coastal and inland (Pizzey and Knight 2007).	Possible – may occur as flyover or utilise the salt lake area that will not be impacted by the proposed clearance
<i>Tringa nebularia</i> (Common Greenshank)		Mi (W)	1, 4	Likely	Inhabits mudflats, estuaries, salt marshes, wetlands as well as fresh and saline salt fields. (Pizzey and Knight 2007).	Possible – may occur as flyover or utilise the salt lake area that will not be impacted by the proposed clearance

Source; 1 – Protected matters search tool (DCCEEW 2022b, accessed 02/02/2022) – 5 km buffer applied to the Project Area;
2 – BDBSA (DEW 2022, obtained 08/02/2022, record set number DEWNRBDBSA220208-1) – 5 km buffer applied to the Project Area;
3 – Birdlife (DEW 2022, obtained 08/02/2022) – 5 km buffer applied to the Project Area;
4 – EBS Ecology (2006).
NPW Act; E= Endangered, V = Vulnerable, R= Rare
EPBC Act; Ex = Extinct, CR = Critically endangered, EN = Endangered; VU = Vulnerable; MA = Marine Species; Mi (W) = Migratory Wetland Species.

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



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



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