

APPENDIX H

SUNSHINE SECTION MNES ASSESSMENT REPORT



MELBOURNE AIRPORT RAIL

SUNSHINE SECTION – ASSESSMENT OF MNES MAR-AJM-PWD-PWD-REP-XEV-NAP-0001983

6 September 2021
Revision E

[Prepared for Rail Projects Victoria](#)





Document Control Record

222 Exhibition Street
Melbourne VIC 3000

PO Box 23061
Docklands VIC 8012
Australia

Document Details						
Project Title	Melbourne Airport Rail					
Document Title	Sunshine SECTION – Assessment of MNES					
Document ID	MAR-AJM-PWD-PWD-REP-XEV-NAP-0001983			Contract No.	CMS450111	
File Path	https://geodocs.ajmjb.com/sites/vrip/WIPLibrary/MAR-AJM-PWD-PWD-REP-XEV-NAP-0001983.docx					
Client	Rail Projects Victoria			Client Contact	James Plant	
Rev	Date	Revision Details/Status	Prepared By	Author	Verifier	Approver
A	15/6/2021	Issued to RPV	Justin Sullivan	Justin Sullivan	Alicia Michael	Ruth Macdonald
B	04/08/2021	Issued to RPV	Justin Sullivan	Justin Sullivan	Alicia Michael	Ruth Macdonald
C	19/08/2021	Issued to RPV	Justin Sullivan	Justin Sullivan	Alicia Michael	Ruth Macdonald
D	01/09/2021	Issued to RPV	Justin Sullivan	Justin Sullivan	Alicia Michael	Ruth Macdonald
E	06/09/2021	Issued to RPV	Justin Sullivan	Justin Sullivan	Alicia Michael	Ruth Macdonald
Current Revision	E					

Approval			
Author Signature	Signed at AJM JV internal Verification and Approval process	Approver Signature	Signed at AJM JV internal Verification and Approval process
Name	Justin Sullivan	Name	Ruth Macdonald

© Copyright 2021 AJM Joint Venture. The concepts, data and information contained in this document are the property of AJM Joint Venture. No part of this document may be reproduced, used, copied, published or adapted for use except in accordance with the provisions of the Copyright Act 1968 or with the consent of AJM Joint Venture.

This document has been prepared on behalf of, and for the exclusive use of Rail Projects Victoria (“RPV”), and is subject to, and issued in accordance with, the provisions of the contract between AJM Joint Venture and RPV. AJM Joint Venture makes no representations and undertakes no duty to any third party who may use or rely upon this document, and accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this document by any third party. Any third party using and/or relying upon this document accepts sole responsibility and all risk for using and/or relying on this document for any purpose.

This document has been produced from information sourced from RPV and/or from other sources, relating to the dates and periods referred to in this document. Except as otherwise stated in the document, AJM Joint Venture has not attempted to verify the accuracy or completeness of any such information. If the information is subsequently determined to be false, inaccurate or incomplete then it is possible that our observations and conclusions as expressed in this document may change. The passage of time, manifestation of latent conditions or impacts of future events may require further examination of the project and subsequent data analysis, and reevaluation of the data, findings, observations and conclusions expressed in this document.

This document should be read in full and no excerpts are to be taken as representative of the findings.

Contents

Table of Abbreviations		1
1	Executive Summary	2
2	Introduction	4
2.1	Background to the MAR Project	4
2.2	Purpose	5
2.3	Project Scope	5
2.4	Key Assessment Areas	6
3	Methods	8
3.1	Desktop assessment	8
3.2	Site Assessment	8
3.3	Ecological Impact Assessment	13
3.4	Assumptions and Limitations	14
4	Results: Existing Conditions	15
4.1	Bioregion	16
4.2	Vegetation and Fauna Habitat	16
4.3	Wetlands and Waterways	17
4.4	Threatened Ecological Communities	17
4.5	Threatened Species	19
4.6	Migratory Species	24
5	Ecological Impact Assessment	25
5.1	Proposed Works and Potential Impacts	25
5.2	Mitigation Measures	25
5.3	Assessment of Impacts	27
5.4	Assessment Approach and Management Framework for Victorian Rail Infrastructure Program projects	31
5.5	Avoidance and minimisation of impacts	31
5.6	Summary of residual impacts to MNES	32
6	References	34

Appendices

Appendix A PMST Search

Appendix B MNES Targeted Surveys Methods and Results

Appendix C MNES Targeted Surveys Location Mapping

Appendix D Flora and Fauna Species Lists

Appendix E Threatened Species Likelihood of Occurrence

Appendix F List of No-Go Zones

Appendix G Assessment against EPBC Act Significant Impact Criteria



Table of Abbreviations

Abbreviation	Definition
CEMP	Construction Environmental Management Plan
DAWE	Commonwealth Department of Agriculture, Water and Environment
DBH	Diameter at breast height
DELWP	Victorian Department of Environment, Land, Water and Planning
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EVC	Ecological Vegetation Class
MAR	Melbourne Airport Rail
MNES	Matters of National Environmental Significance
NTGVVP	Natural Temperate Grassland of the Victorian Volcanic Plain, a threatened ecological community
PMST	Protected Matters Search Tool
SUN	Sunshine Package
TPZ	Tree Protection Zone
VBA	Victorian Biodiversity Atlas

1 Executive Summary

Aurecon Jacobs Mott Macdonald Joint Venture (AJM-JV) has been engaged by Rail Projects Victoria (RPV) to prepare a referral to the Commonwealth Minister for the Environment to outline any potential impacts to Matters of National Environmental Significance (MNES) listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) from the development and operation of the Sunshine Section of the Melbourne Airport Rail Project (MAR Project).

The MAR Project Land comprises both State and Commonwealth (Airport) Land. RPV together with representatives from the AJM-JV met with the Department of Agriculture, Water and the Environment (DAWE) on Friday 13 March 2020. It was agreed with DAWE that it would be advisable to submit a separate referral under the EPBC Act for Project works on State land that may impact on MNES, whilst Project works on Airport land would be assessed under a separate referral process.

AJM-JV initially prepared a detailed terrestrial ecological impact assessment for the MAR Project which assessed the State Land portion of the MAR project against relevant State and Commonwealth environmental legislation and policy (AJM-JV 2021a). This assessment found that the two sections of the larger MAR State Land either side of Barwon Avenue, Sunshine North (Chainage 14.670), present a different magnitude of potential impacts on MNES. Specifically:

- The Sunshine Section (defined as the Section of the larger MAR State Land Project that extends south-west from Barwon Avenue) is unlikely to result in a significant impact on any MNES due to the nature of the proposed works and with the implementation of no-go zones and mitigation measures; while
- The Corridor Section (defined as the Section of the larger MAR State Land Project that extends north-east from Barwon Avenue) has the potential to result in a significant impact on Striped Legless Lizard, Spiny Rice-flower and Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP).

As such, Rail Projects Victoria (RPV) is seeking assessment of the MAR Project Works on State Land through a separate referral for each geographic section (both separate to the referral for the Commonwealth land component at Melbourne Airport). A map of the larger MAR State Land Project showing both the Sunshine and Corridor Sections is included in Figure 2.1.

This MNES assessment report is relevant to the Sunshine Section of the MAR Project and is herein referred to as the Sunshine Section MNES Assessment. It has been prepared using the information provided in the impact assessment, and specifically addresses the impacts to MNES and implications under the EPBC Act in the Sunshine Section. The implications of the impact assessment relevant to State (Victorian) environmental legislation and policy are not detailed in this report.

A summary of the ecological values and residual impacts to values present within or adjacent to the Sunshine Section Project Land are summarised in Table 1.1.

Table 1.1 Summary of ecological values present within or adjacent to the Sunshine Section Project Land and residual impacts following avoidance and mitigation measures

MNES	Extent of MNES present in the Sunshine Section Project Land	Summary of Residual Impacts
Threatened Ecological Communities		
Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP)	2,144 hectares of NTGVVP recorded within Sunshine Section Project Land	No removal of NTGVVP. All NTGVVP in the Sunshine Section will be avoided through the implementation of no-go zones and mitigation measures.
Threatened Flora Species		
Spiny Rice-flower (<i>Pimelea spinescens</i> subsp. <i>spinescens</i>)	21 Spiny Rice-flower individuals within Sunshine Section Project Land	No removal or indirect impacts to any Spiny Rice-flower individuals. All Spiny Rice-flower plants in the Sunshine Section will be avoided through the implementation of no-go zones and mitigation measures.

MNES	Extent of MNES present in the Sunshine Section Project Land	Summary of Residual Impacts
Sunshine Diuris (<i>Diuris fragrantissima</i>)	No Sunshine Diuris occur within the Sunshine Section Project Land. Important population of Sunshine Diuris known to occur within the Sunshine Triangle Ecological Site (Outside the Sunshine Section Project Land).	No works within the Sunshine Triangle Ecological Site. Sunshine Diuris and associated habitat in the Sunshine Triangle Ecological Site will be avoided through the implementation of no-go zones and mitigation measures.
Large-headed Fireweed (<i>Senecio macrocarpus</i>)	No Large-headed Fireweed occur within the Sunshine Section Project Land. Population of Large-headed Fireweed confirmed to occur within Matthews Hill Reserve (Outside the Sunshine Section Project Land).	No works within the Matthews Hill Reserve. Large-headed Fireweed and associated habitat in the Matthews Hill Reserve will be avoided through the implementation of no-go zones and mitigation measures.
Threatened Fauna Species		
Striped Legless Lizard (<i>Delma impar</i>)	6.427 hectares of Striped Legless Lizard habitat identified in the Sunshine Section Project Land.	No removal of any Striped Legless Lizard habitat. All Striped Legless Lizard habitat in the Sunshine Section will be avoided through the implementation of no-go zones and mitigation measures.
Golden Sun Moth (<i>Synemon plana</i>)	0.575 hectares of potential habitat for Golden Sun Moth identified in Sunshine Section Project Land (in Luma Estate). Golden Sun Moth habitat also confirmed in Matthews Hill Reserve (Outside Sunshine Section Project Land).	No removal of any Golden Sun Moth habitat. All Golden Sun Moth habitat in the Sunshine Section will be avoided through the implementation of no-go zones and mitigation measures. No works within the Matthews Hill Reserve. Golden Sun Moth and associated habitat in the Matthews Hill Reserve will be avoided through the implementation of no-go zones and mitigation measures.

With the effective implementation of the Sunshine Section Threatened Species Management Plan (SSTSMP) which has been provided as Appendix E to the EPBC Act referral, the Sunshine Section Project Works are not expected to result in any direct or indirect impacts to MNES. Importantly, based on an assessment against the relevant EPBC Act Significant Impact Guidelines for all MNES present within or adjacent to the Sunshine Section Project Land, it has been concluded that the Sunshine Section Project Works will not result in a significant impact on any MNES.

Details of the no-go zones and mitigation measures to be adopted for the Sunshine Section are summarised in this report, and presented in detail in the SSTSMP.

2 Introduction

Aurecon Jacobs Mott Macdonald Joint Venture (AJM-JV) has been engaged by Rail Projects Victoria (RPV) to prepare a referral to the Commonwealth Minister for the Environment to outline any potential impacts to Matters of National Environmental Significance (MNES) listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) from the development and operation of the Sunshine Section of the Melbourne Airport Rail Project (MAR Project).

AJM-JV initially prepared a detailed terrestrial ecological impact assessment for the MAR Project which assessed the State Land portion of the MAR project against relevant State and Commonwealth environmental legislation and policy (AJM-JV 2021a). This assessment found that the two sections of the larger MAR State Land either side of Barwon Avenue, Sunshine North (Chainage 14.670), present a different magnitude of potential impacts on MNES. Specifically:

- The Sunshine Section (defined as the Section of the larger MAR State Land Project that extends south-west from Barwon Avenue) is unlikely to result in a significant impact on any MNES due to the nature of the proposed works and with the implementation of no-go zones and mitigation measures; while
- The Corridor Section (defined as the Section of the larger MAR State Land Project that extends north-east from Barwon Avenue) has the potential to result in a significant impact on Striped Legless Lizard, Spiny Rice-flower and Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP).

As such, Rail Projects Victoria (RPV) is seeking assessment of the MAR Project Works on State Land through a separate referral for each geographic section (both separate to the referral for the Commonwealth land component at Melbourne Airport). A map of the larger MAR State Land Project showing both the Sunshine and Corridor Sections is included in Figure 2.1.

This MNES assessment report is relevant to the Sunshine Section of the MAR Project. It has been prepared using the information provided in the impact assessment, and specifically addresses the impacts to MNES and implications under the EPBC Act in the Sunshine Section. The implications of the impact assessment relevant to State (Victorian) environmental legislation and policy are not detailed in this report.

The area of land associated with the development of this project is herein referred to as the 'Sunshine Section of the Project Land'. No works are proposed outside of the designated Project Land. Where known ecologically significant sites occur adjacent to the Sunshine Section of the Project Land (i.e. Sunshine Triangle Ecological Site and Matthews Hill Reserve), the potential for impacts to ecological values in these areas has been considered as part of this assessment.

2.1 Background to the MAR Project

The MAR Project (the Project) is a once-in-a-generation transformation of Victoria's transport network, connecting Melbourne Airport's Integrated Terminal Precinct with a rail service for the first time.

Melbourne Airport handled more than 37 million passenger movements in 2018-19¹ and by 2038, this figure is projected to almost double to more than 67 million², which is an average growth of 3.2% per annum. Transport connectivity from Melbourne Airport to Melbourne's Central Business District (CBD) is currently limited to the Tullamarine Freeway, and therefore, the Victorian Government is committed to delivering an efficient, competitive alternative to cater for the ongoing increase in passenger numbers at Melbourne Airport.

In 2002, the Victorian Government considered possible corridor and alignment options for a Melbourne Airport Rail Link, ultimately selecting the Sunshine route as the preferred option. At this time, land was reserved between the Albion-Jacana rail corridor and extending through to Sharps Road, Tullamarine for the construction of a rail link.

In 2018, the Victorian Government released the Melbourne Airport Rail Link Sunshine Route Strategic Appraisal, which confirmed that the Sunshine route remains the best solution for an airport rail link. The

¹ https://www.bitre.gov.au/publications/ongoing/airport_traffic_data

² <https://www.melbourneairport.com.au/Corporate/Planning-projects/Master-plan>

Sunshine route would provide superior connections to regional Victoria, Melbourne’s growth areas in the north and west and Melbourne’s south eastern suburbs and could be delivered sooner and at a significantly lower cost than other route options.

It is also noted that a previous referral under the EPBC Act (2001/197) was made to record the potential environmental impacts of the Melbourne Airport Link (MARL) Albion East and West routes (MAR is based on the Albion East route). On 2 April 2001, the Commonwealth Minister for the Environment found MARL to be a Controlled Action. A Decision to Approve the Taking of an Action subject to conditions was made on 16 November 2001, which will expire after 31 December 2051.

The conditions were specific to the protection of the Sunshine Diuris (*Diuris fragrantissima*), a listed endangered flora species only naturally found in a location within the railway reservation in Sunshine (in the area known as the Sunshine Triangle Ecological Site). The 2001/197 referral which is based on the Albion East route, covers a similar alignment to the MAR Project and the Sunshine Section Project Land. Despite this, the current MAR Project Works have changed since the 2001/197 referral and therefore it is considered that a new action and referral should be submitted to the Minister for the Environment under Part 3, Division 1 of the EPBC Act. Importantly, the works proposed in the rail corridor adjacent to the Sunshine Triangle Ecological Site as part of the current proposed MAR Project are limited to minor track works, cabling and signalling, and are located outside the Sunshine Triangle Ecological Site. The potential for indirect impacts to the Sunshine Diuris have been considered as part of this referral and supporting documentation, and specific mitigation measures have been outlined in the Sunshine Section Threatened Species Management Plan (SSTSMP) to avoid a significant impact on this species.

2.2 Purpose

The purpose of the Sunshine Section MNES Assessment is to identify the MNES that are likely to be impacted by the Sunshine Section of the MAR Project. This report has been prepared to support the EPBC Act referral for the Sunshine Section and includes:

- Information on the nature and extent of ecological values, namely MNES present within the Sunshine Section of the MAR Project
- An assessment of the likelihood of occurrence of MNES within the Sunshine Section of the MAR Project.
- An impact assessment for all MNES with moderate or high likelihood of occurrence in the Sunshine Section of the MAR Project. This includes consideration of initial potential impacts, and residual impacts with implementation of mitigation measures.

2.3 Project Scope

The Project will be delivered in two sections, the Sunshine Section and the Corridor Section which are summarised in Table 2.1. The Section defines the land within which the project components and construction activities are planned to be contained. This MNES assessment only addresses the Sunshine Section.

Table 2.1 MAR Project Section Descriptions

Section	Summary
Sunshine Section	The Sunshine Section (SUN) generally includes the existing rail corridor between Barwon Avenue, Sunshine North and Middle Footscray Station. The Sunshine Package also includes the Sunbury rail corridor to Ginifer Station and the Brooklyn freight corridor to Newport Station.
Corridor Section	The Corridor Section (COR) generally includes the Albion-Jacana rail corridor between Jacana Station and south of Barwon Avenue, Sunshine North, as well as land between Sharps Road, Tullamarine and the Albion-Jacana rail corridor.

The key elements of the Sunshine Section of the MAR Project are provided in Section 2.3.1 below.

2.3.1 Sunshine Section Summary

Key elements of the SUN Section of the MAR Project include:

- Construction of a new 1.5 kilometre (km) long MAR twin track viaduct structure, including associated Overhead Line Equipment (OHLE) and Combined Services Route (CSR) between Sunshine Station and the Albion-Jacana corridor, crossing Ballarat Road, the Sunbury rail corridor, St Albans Road and Stony Creek
- Signalling works, including the installation of trackside equipment along the length of the SUN package including along the Sunbury line towards Ginifer Station, along the Brooklyn freight corridor towards Newport Station, and along the western rail corridor to West Footscray Station
- Modifications to the western and eastern Albion Station forecourts and car parks
- Modifications to Sunshine Station, including modifications to platforms, the Sunshine Station western car park and the construction of a new concourse
- Modifications to the existing Sunshine and Sunshine West substations
- Diversion, relocation and protection of existing utilities and underground services.

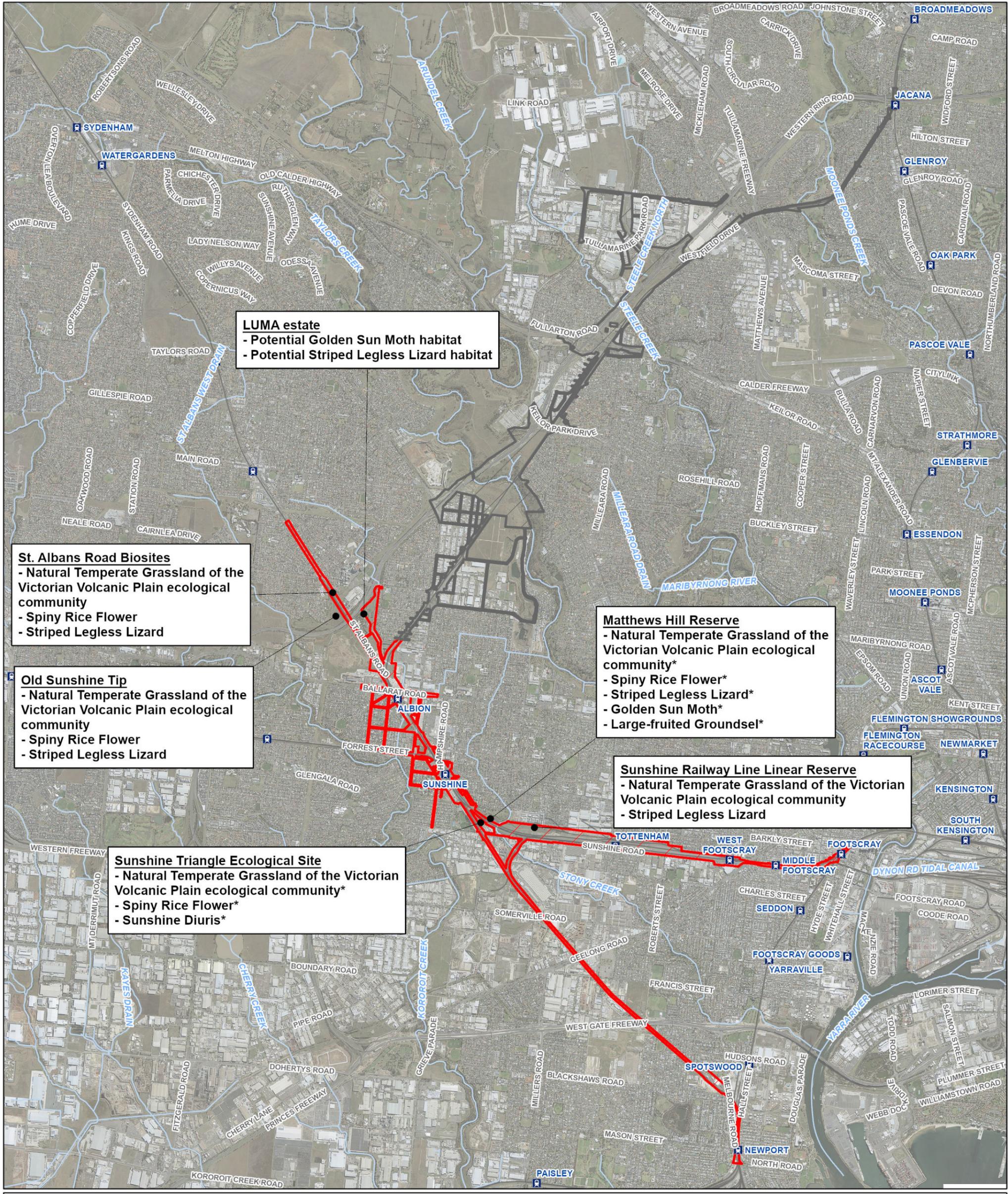
2.4 Key Assessment Areas

Located variously within, and adjacent to the Sunshine Section Project Land are key assessment areas that represent the main areas of ecological value. These areas are referred to in this report when addressing specific locations of ecological value and survey effort. The key assessment areas are mapped in Figure 2.1 and listed below:

- Sunshine Railway Line Linear Reserve
- Matthews Hill Reserve
- Sunshine Triangle Ecological Site
- Old Sunshine Tip Site
- St. Albans Road Biosites
- Luma Estate



Figure 2.1 Sunshine Section Project Land



LUMA estate
 - Potential Golden Sun Moth habitat
 - Potential Striped Legless Lizard habitat

St. Albans Road Biosites
 - Natural Temperate Grassland of the Victorian Volcanic Plain ecological community
 - Spiny Rice Flower
 - Striped Legless Lizard

Old Sunshine Tip
 - Natural Temperate Grassland of the Victorian Volcanic Plain ecological community
 - Spiny Rice Flower
 - Striped Legless Lizard

Matthews Hill Reserve
 - Natural Temperate Grassland of the Victorian Volcanic Plain ecological community*
 - Spiny Rice Flower*
 - Striped Legless Lizard*
 - Golden Sun Moth*
 - Large-fruited Groundsel*

Sunshine Railway Line Linear Reserve
 - Natural Temperate Grassland of the Victorian Volcanic Plain ecological community
 - Striped Legless Lizard

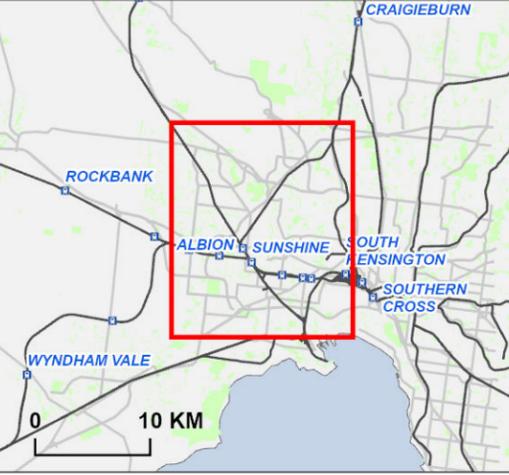
Sunshine Triangle Ecological Site
 - Natural Temperate Grassland of the Victorian Volcanic Plain ecological community*
 - Spiny Rice Flower*
 - Sunshine Diuris*

Rail station
 Rail
 Watercourse

Project Land
 Corridor Section
 Sunshine Section

* - Value present adjacent to, but not within the Project Land at this location

Map 1 of 1

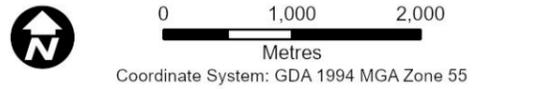


Data Sources:
 AJMV 2021
 VicTrack 2021
 Vicmap 2021
 Aerial photo: DELWP Apr. 2021

Melbourne Airport Rail Project Wide

MNES Overview - Sunshine Section

Drawing Number:		Revision:	
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490564		A.3	
Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	L. McComb	3/09/2021	A3



Coordinate System: GDA 1994 MGA Zone 55

3 Methods

Details of the methods provided throughout Section 3, unless otherwise specified, are relevant to the broader ecology assessment undertaken for the MAR Project State Land.

The preparation of the Impact Assessment included three discrete components: a desktop assessment, site assessments, and an ecological impact assessment. The methods utilised in undertaking each of these components are outlined below.

3.1 Desktop assessment

3.1.1 Database Searches

A review of the following government databases and associated documents was undertaken to provide information on ecological values previously recorded or modelled to occur in the vicinity of the MAR State Project Land and, therefore relevant to the Project. The following databases were utilised:

- **Commonwealth Department of Agriculture, Water and the Environment (DAWE) database:**
 - > **Protected Matters Search Tool** (DAWE 2020b): The Protected Matters Search Tool (PMST) highlights MNES relevant to the Commonwealth EPBC Act that are likely to occur within a 5 km buffer of the MAR State Project Land. The resulting PMST report for the entire State land of the MAR Project is included in Appendix A.
- **Victorian Department of Environment, Land, Water and Planning (DELWP) Biodiversity databases:**
 - > **Nature Kit** (DELWP 2020a): comprises spatial data of native vegetation across Victoria; including modelled distributions of Ecological Vegetation Classes (EVCs).
 - > **Victorian Biodiversity Atlas (VBA)** (DELWP 2020b): comprises historical spatial data records of flora and fauna species from across the State. Records are added opportunistically, as flora and fauna surveys are conducted within Victoria for a variety of purposes.

Available aerial imagery was also interpreted to inform the ecological assessment.

A 5 km search buffer around the entire MAR State Project Land was used to undertake these database searches. This was done in order to detect areas of significant vegetation or threatened species records that may occur nearby, indicating a potential for presence within the MAR State Project Land (e.g. mobile fauna species that have been recorded nearby that may move across the Project Land at times from known locations).

Only the threatened species recorded or likely to occur in or adjacent to the Sunshine Section Project Land are considered in the likelihood of occurrence assessment (See Section 3.2.3) and impact assessment (See Section 5.3) in this report.

3.2 Site Assessment

AJM-JV have undertaken numerous ecological site assessments across the broader MAR Project since 2018. This includes ecological assessment and targeted surveys across the broader MAR Project (State Land) as originally documented in:

- SUN Ecology Existing Conditions Assessment (AJM-JV 2020a)
- MAR Ecology Existing Conditions Assessment (AJM-JV 2020b)
- MAR State Land Terrestrial Ecology Impact Assessment (AJM-JV 2021a)
- MAR-Aquatic Ecology and Geomorphology Existing Conditions Report (AJM-JV 2020c)
- MAR State Land Aquatic Ecology and Geomorphology Impact Assessment (AJM-JV 2021b).

Consolidated survey methods and results from the above ecological assessments are provided in this report.

3.2.1 Vegetation assessment and fauna habitat assessment

Assessment of native vegetation and fauna habitat field assessment for the State Land of the MAR Project was undertaken by two AJM-JV ecologists. These assessments included preliminary field assessments to make high level determinations of the locations of high-quality native vegetation and potential threatened species habitat undertaken, followed by detailed field assessments.

Where access and program permitted, detailed field assessments were undertaken during the optimal spring survey window. Ecological field assessments for the Sunshine Section were completed on the following dates:

- Preliminary field assessments:
 - > 8th and 9th of November 2018 (areas between Stony Creek and Melbourne Airport, partly in Sunshine Section)
 - > 30th April 2019 (areas in the vicinity of Sunshine, Sunshine Section)
- Detailed field assessments:
 - > 23rd September 2019 (Sunshine Section)
 - > 18th September and 6th October 2020 (project land extent on the Sunbury line extending west of Albion Station, Sunshine Section)
 - > 11th June, and 2nd July 2021 (Luma Estate and adjacent Stony Creek easement)

Tasks undertaken during these assessments included:

- Mapping and assessment of native vegetation in accordance with the relevant Victorian *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017a)
- Assessment of the presence or potential habitat for threatened flora and fauna
- Assessing the presence of threatened communities in accordance with the listing advice for those communities.

3.2.2 Targeted surveys

Where suitable habitat was identified for MNES in the preliminary and detailed field assessments, targeted surveys for MNES were undertaken as detailed in the following sub-sections. Note targeted surveys for MNES were not undertaken within the Sunshine Triangle Ecological Site as the ecological significance of this area was identified early in the Project planning phase and this area was deemed outside of the Sunshine Section Project Land.

3.2.2.1 Spring/Summer Targeted Flora Surveys

Targeted flora surveys were undertaken between October and December 2019 and 2020 in patches of native vegetation that were considered potential habitat for EPBC Act listed threatened flora species. Areas of potential habitat were traversed on foot via transects approximately 5 metres (m) apart and any threatened flora species identified were recorded. These surveys mainly targeted threatened flora species in higher-quality patches of Plains Grassland.

Surveys were conducted in all areas of potential habitat for threatened flora species as identified during native vegetation assessments, literature review, and analysis of VBA records. Threatened flora subject to targeted surveys, as well as their conservation status, known flowering times, and the dates and locations surveyed are listed below:

- Matted Flax-lily (*Dianella amoena*) (listed as Endangered under the EPBC Act; flowers November to January) and Button Wrinklewort (*Rutidosia leptorhynchoides*) (listed as Endangered under the EPBC Act; flowers November to January):

- > Sunshine Linear Railway Reserve (19th December 2019)
- > Matthews Hill Reserve (19th December 2019)
- > St. Albans Road Biosites (4th December 2020)
- > Old Sunshine Tip Site (4th December 2020)
- Small Golden Moths (*Diuris basaltica*) (listed as Endangered under the EPBC Act; flowers September to October) and Large-headed Fireweed (*Senecio macrocarpus*) (listed as Vulnerable under the EPBC Act; flowers August to October); targeted survey areas in the Sunshine Section include:
 - > Sunshine Railway Linear Reserve (23rd September 2019)
 - > Matthews Hill Reserve (23rd September 2019)
 - > St. Albans Road Biosites (18th September 2020)
 - > Old Sunshine Tip Site (18th September 2020).

3.2.2.2 Golden Sun Moth

Targeted surveys for Golden Sun Moth (*Synemon plana*), listed as Critically Endangered under the EPBC Act, were undertaken within all areas of suitable habitat identified within the State Project Land, except where specified below. Potential habitat for the species was identified during fauna habitat assessments, literature review, and analysis of VBA records. Surveys were conducted by two ecologists across two survey seasons, summer 2019-2020 and summer 2020-2021. The dates and locations of targeted surveys undertaken for Golden Sun Moth are outlined below:

- Sunshine Railway Linear Reserve
 - > 2019-2020 survey season (20th November 2019, 25th November 2019, 19th December 2019 and 9th January 2020)
- Matthews Hill Reserve
 - > Reserve proper surveyed 2019-2020 survey season (20th November 2019, 25th November 2019, 19th December 2019 and 9th January 2020)
 - > Rail corridor adjacent to reserve surveyed 2020-21 survey season (27th November 2020, 4th December 2020, 14th December 2020 and 8th January 2021)
- St. Albans Road Biosites
 - > 2020-21 survey season (27th November 2020, 4th December 2020, 14th December 2020 and 8th January 2021)
- The Old Sunshine Tip Site
 - > 2020-21 survey season (27th November 2020, 4th December 2020, 14th December 2020 and 8th January 2021).

Surveys were completed in accordance with the published survey guidelines for the species (DEWHA 2009a) and involved walking in transects no greater than 5 m apart with the intent of flushing Golden Sun Moth from the grass and observing them in flight. Surveys were undertaken when conditions were suitable for male flight (above 20°C, minimal cloud cover and wind). Surveys were conducted during the middle of the day, approximately between 10 am and 2 pm (See details in Appendix B). The surveys were spaced at least one week apart to capture any variation in emergence patterns. This level of survey effort was considered sufficient to achieve the objective of confirming presence/absence of Golden Sun Moth within the site.

Nearby reference sites were monitored for activity prior to undertaking surveys in the State Project Land, with Craigieburn Grassland Nature Conservation Reserve (NCR), and Broadmeadows Valley Park utilised in Summer 2019-2020, and Broadmeadows Valley Park utilised in Summer 2020-2021. Both of these reference sites support known Golden Sun Moth populations.



Complete weather data for Golden Sun Moth surveys is provided in Appendix B. Locations of Golden Sun Moth targeted surveys undertaken are shown in Appendix C.

Luma Estate has not been subject to targeted Golden Sun Moth survey. This area has been conservatively considered as potential habitat and will be avoided through implementation of a no-go zone.

3.2.2.3 Growling Grass Frog

Targeted surveys were undertaken for Growling Grass Frog (*Litoria raniformis*), listed as Vulnerable under the EPBC Act. Surveys were conducted by two ecologists across three survey seasons (2018, 2019 and 2020) across the broader MAR Project. The dates and locations of targeted surveys undertaken for Growling Grass Frog are outlined below:

- Stony Creek West
 - > 2018 survey season (5th December 2018 and 18th December 2018)
- Stony Creek East
 - > 2019 survey season (20th November 2019 and 25th November 2019).

These surveys were undertaken in accordance with the published survey guidelines for the species (DEWHA 2009b), after sunset, during suitable weather conditions (being warm and with little wind) (See details in Appendix B and mapping of survey locations in Appendix C). At the beginning of each survey, 10 minutes was spent listening for frog calls at the water's edge. Within the last five minutes of the listening period a pre-recorded Growling Grass Frog call was played. The perimeter of the wetlands were then systematically searched by two ecologists using spotlights. Survey results are provided in Appendix B.

3.2.2.4 Spiny Rice-flower

Targeted surveys for Spiny Rice-flower (*Pimelea spinescens* subsp. *spinescens*), listed as Critically Endangered under the EPBC Act, were undertaken within all areas of suitable habitat identified in the State Project Land, except where specified below. Potential habitat for Spiny Rice-flower was identified through undertaking field vegetation assessments, literature review, and analysis of VBA records. Surveys were undertaken by three ecologists in the 2019 survey season, and two ecologists during the 2020 survey season. Surveys were undertaken within the known flowering time of the Spiny Rice-flower which is April to August. The dates and locations of targeted surveys undertaken for Spiny Rice-flower are outlined below:

- Sunshine Railway Linear Reserve
 - > 2019 survey season (3rd and 4th June 2019)
- Matthews Hill Reserve and adjacent rail corridor
 - > 2019 survey season (3rd and 4th June 2019)
- St. Albans Road Biosites
 - > 26th July 2020
- Old Sunshine Tip Site
 - > 27th July 2020.

These surveys were undertaken in accordance with the published survey guidelines for the species (DEWHA 2009c). Areas of potential habitat identified within the State Project Land were surveyed by groups of either two or three ecologists walking parallel transects 5 m apart. Locations of Spiny Rice-flower were recorded, and the sex of individual plants was determined where possible (See details and results in Appendix B).

It is to be noted that the Sunshine Triangle ecological site and adjacent rail corridor were not subject to targeted survey for this species during the flowering period, however eight Spiny Rice-flower plants were recorded incidentally in the rail corridor adjacent to the Sunshine Triangle Ecological Site outside of flowering season. Surveying was not undertaken in the Sunshine Triangle Ecological Site as the ecological importance of this area was already well known and this area was not included as part of the Project Land.

3.2.2.5 Striped Legless Lizard

Targeted surveys for Striped Legless Lizard (*Delma impar*), listed as Vulnerable under the EPBC Act, were conducted in all areas of potential habitat identified for the species within the State Project Land. Suitable habitat was identified based on the fauna habitat assessment, literature review and analysis of VBA records. Targeted surveys were undertaken during the 2019-20, and 2020-21 survey seasons. The dates and locations of targeted surveys undertaken for Striped Legless Lizard are outlined below:

- 2019-20 survey season (12th September 2019 – 29th January 2020):
 - > Matthews Hill Reserve (two tile grids (MHE, MHW) were surveyed for this location)
- 2020-21 survey season (9th September 2020 – 17th February 2021):
 - > St Albans Road Biosites (three linear tile grids (G11a, G11b, G12) were surveyed in this location, with tiles spaced 5m apart)

The methods were conducted in accordance with the published survey guidelines (DSEWPaC 2011a) and included:

- Tile arrays were established prior to August 2019 for the 2019-2020 survey at Matthews Hill Reserve, and between the 7th and 12th of August 2020 for the 2020-2021 survey at St Albans Road Biosites. Tile arrays surveyed at the St. Albans Road Biosites (in the 2020-2021 survey season) were existing tile arrays that had been left in-situ by a third party from a previous survey season.
- Each grid or transect contained 50 artificial shelter sites (roofing tiles, 'French Terracotta' style with dimensions of 430 mm x 340 mm), used to provide temporary habitat for the species. Tiles were placed in 10 rows of five tiles or a single row of 50 placed at intervals of 5 m apart, labelled and their GPS location recorded. Details of tile grids, and dates surveyed are detailed in Appendix B and mapping of survey locations in Appendix C.
- Tile checks commenced as per the dates above, approximately one month after the tile arrays were established.
- Tiles were checked at an approximately fortnightly frequency for the Spring/Summer 2019-2020 surveys, resulting in 11 checks between September 2019 and January 2020. For the Spring/Summer 2020-2021 surveys, tiles were checked weekly to fortnightly between September and December, and then fortnightly until February, resulting in a total of 16 checks for each grid between September and February.
- Tile checks were typically undertaken in early to late morning, sometimes extending into the afternoon, depending upon the prevailing conditions. Checks were conducted during appropriate seasonal and daily climate conditions, during the known activity period of the species (DSEWPaC 2011a). The species is most active during morning and early afternoon on days typically with temperatures below 28 degrees where possible. Weather data was only collected at the start of the survey for the Spring/Summer 2019-2020 surveys as checks typically lasted less than half an hour. For the Spring/Summer 2020-2021 surveys weather was collected at the start and end of the day's tile checks. Further for the Spring/Summer 2019-2020 surveys, due to targeting specific ranges of temperature and weather conditions, tile grids could not all be checked on the same day, and were split across two to three days. Weather data for tile checks is presented in Appendix B.

The following areas were not subject to targeted survey for Striped Legless Lizard in the current assessment as detailed below:

- The Old Sunshine Tip Site was not subject to targeted survey for Striped Legless Lizard as this location supports a known population of the species (evidenced by recent records). This assessment therefore considers Striped Legless Lizard are present at the Old Sunshine Tip Site.

- An existing tile grid is in place within the Sunshine Railway Linear Reserve, and is checked annually by the relevant DELWP contractors who are responsible for the management of this site (AJM-JV 2020a). While not noted in the Victorian Biodiversity Atlas, the most recent record of Striped Legless Lizard in the Sunshine Railway Linear Reserve by DELWP is understood to be from 2016. Given this recent record, targeted surveys for the species were not undertaken in this area as part of the current investigation. Rather, it has been considered that Striped Legless Lizard has a moderate likelihood of occurrence in this location.
- Luma Estate has not been subject to targeted Striped Legless Lizard survey. This area has been conservatively considered as potential habitat and will be avoided through implementation of a no-go zone.

3.2.3 Threatened Species Likelihood of Occurrence Assessment

The likelihood of each threatened species listed under the EPBC Act occurring within the Sunshine Section Project Land was assessed on the basis of the species' history of occurrence and its habitat requirements. For each species, the presence of suitable habitat within the Sunshine Section Project Land was determined, along with the condition and approximate extent of suitable habitat within the Sunshine Section Project Land and the broader context of the surrounding landscape. This was coupled with how often and how recently each species or community had been recorded (if at all) in the vicinity of the Sunshine Section Project Land. Resources utilised to assist in determining likelihood of occurrences included VBA and PMST searches undertaken for the MAR State Project Land, previous reports for the MAR State Project Land, and all site assessments undertaken for the Impact Assessment to date including targeted surveys. The basis of the likelihood of occurrence of each threatened species or community is presented in Table 3.1.

Table 3.1 Threatened Species Likelihood of Occurrence Assessment Criteria

Likelihood of Occurrence	Criteria
Present / Confirmed	<ul style="list-style-type: none"> • Species recorded within the Sunshine Section Project Land by the present study.
High	<ul style="list-style-type: none"> • Recent records of the species in the vicinity, and/or; • The Sunshine Section Project Land contains areas of high-quality habitat for the species, and/or; • The species has been recorded recently within or in the vicinity of the Sunshine Section Project Land by recent studies by a third party.
Moderate	<ul style="list-style-type: none"> • Limited or historic records of the species in the vicinity of the Sunshine Section Project Land, and/or; • The Sunshine Section Project Land contains potential habitat for the species.
Low	<ul style="list-style-type: none"> • No previous records of the species in the vicinity, and/or; • The Sunshine Section Project Land contains limited or no suitable habitat for the species, and/or; • The species was not observed following appropriate survey effort, and/or, • The Sunshine Section Project Land lies outside the known geographic range of the species.

3.3 Ecological Impact Assessment

3.3.1 Native Vegetation Loss Calculation Methodology

Native vegetation was considered to be removed when the Project footprint intersected either a patch boundary, or the Tree Protection Zone (TPZ) of a mapped tree by more than 10%. The radius of the TPZ is calculated as 12 x the Diameter at Breast Height (DBH) of the relevant tree.

3.3.2 Threatened Values Impact Assessment Methodology

Impacts to threatened flora, threatened fauna and threatened ecological communities were determined by considering values with a moderate or higher likelihood of presence against:

- The construction footprint to determine 'direct removal' impacts upon the values themselves or their habitat
- Additional 'indirect' modes of impact both during the construction and operation phase of the Project including:
 - > The spread of noxious weeds
 - > Potential barriers to dispersal
 - > Erosion and sedimentation
 - > Release of construction effluent into waterways
 - > Changes to noise and light in the environment
 - > Dust impacts, particularly to the Sunshine Diuris.

3.4 Assumptions and Limitations

The following assumptions and limitations apply to the Impact Assessment:

- The Impact Assessment relates only to State land and does not include the Commonwealth (Airport) land part of the MAR Project
- The Impact Assessment is based on the scope of works as detailed in Section 2.3
- Information from the desktop assessment is only as reliable as the data available and in the case of the VBA the number of surveys previously undertaken (i.e. an area where many surveys have been taken in the past, will, most likely, have a more extensive list of species than areas where very little survey work has been undertaken). The accuracy of past surveys is also variable and point locations can be out by up to 1 km.
- In addition to the number of previous surveys undertaken, there are other reasons why species, including threatened species, may not have previously been recorded. For example, at the time of historical site visits some plant species may not have been visible above the ground or flowering and therefore not identified as being present within the area surveyed. Also, the data collected is likely to consist of opportunistic observations only, and, therefore, listed fauna species moving in and out of the area may not have been observed or recorded. Similarly, many fauna species are cryptic, nocturnal and well-hidden such that their presence can only be detected through detailed targeted assessment methods. Hence species that can be readily identified at any time, and can be heard or have distinctive signs such as tracks, scats or diggings, are those most likely to be recorded.
- The field surveys undertaken only recorded flora species evident and identifiable at the time of assessment. While, the flora recorded provides a good general representation of the values present it should not be considered an exhaustive list. Aside from targeted surveys, fauna species were not recorded.
- Assessment of impacts to ecological values undertaken within this report is on the basis that all mitigation measures detailed in Section 5.2 are implemented.
- The EPBC Act is undergoing a review. Any changes to the applicable legislation and agreements may affect the outcomes of this report.

4 Results: Existing Conditions

This section presents the synthesised findings of the desktop assessment and site assessments, detailing the ecological values with a moderate or higher likelihood of occurrence either within or adjacent to the Sunshine Section Project Land. These values are summarised in Table 4.1 below and are discussed in more detail in Sections 4.1 through 4.5.

Table 4.1 Summary of MNES with a moderate or higher likelihood of occurrence in Sunshine Section

MNES	Extent of MNES present in the Sunshine Section Project Land	Occurrence outside (adjacent to) Sunshine Section Project Land
Threatened Ecological Communities		
Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP)	Confirmed Total of 2.144 hectares of NTGVVP recorded within Sunshine Section Project Land.	High
Threatened Flora Species		
Spiny Rice-flower (<i>Pimelea spinescens</i> subsp. <i>spinescens</i>)	Confirmed 21 Spiny Rice-flower individuals within Sunshine Section Project Land	Confirmed Population of Spiny Rice-flower confirmed to occur in land immediately adjacent to Matthews Hill Reserve (Outside the Sunshine Section Project Land).
Sunshine Diuris (<i>Diuris fragrantissima</i>)	Low No Sunshine Diuris occur within the Sunshine Section Project Land.	Known Important population of Sunshine Diuris known to occur within the Sunshine Triangle Ecological Site (Outside the Sunshine Section Project Land).
Large-headed Fireweed (<i>Senecio macrocarpus</i>)	Low No Large-headed Fireweed occur within the Sunshine Section Project Land.	Confirmed Population of Large-headed Fireweed confirmed to occur within Matthews Hill Reserve (Outside the Sunshine Section Project Land).
Threatened Fauna Species		
Striped Legless Lizard (<i>Delma impar</i>)	Confirmed 6.427 hectares of Striped Legless Lizard habitat identified in the Sunshine Section Project Land.	High
Golden Sun Moth (<i>Synemon plana</i>)	Moderate 0.575 hectares of potential habitat for Golden Sun Moth identified in Sunshine Section Project Land (in Luma Estate).	Confirmed Golden Sun Moth habitat also confirmed in Matthews Hill Reserve (Outside Sunshine Section Project Land).

4.1 Bioregion

The Sunshine Section of the MAR Project Land almost entirely falls within the Victorian Volcanic Plain (VVP) bioregion (DELWP 2020a). The only exception occurs within the eastern 500 m of the linear Sunshine Section Project Land (including Footscray Station) which falls within the Gippsland Plain bioregion. These bioregions are largely defined by the underlying geology, namely the Upper Cainozoic (Quaternary) basalts (Newer Volcanics) of the VVP and the marine and non-marine Cainozoic alluvia, including the fluvial sands and gravels of the Gippsland Plain (RBGV 2021).

4.2 Vegetation and Fauna Habitat

The Sunshine Section of the MAR Project largely comprises disturbed rail reserves and road reserves that are devoid of ecological value, however discrete significant areas of native vegetation and habitat for threatened flora and fauna occur in key locations.

4.2.1 Native Vegetation

The field assessment identified a total of 3.723 hectares (ha) of native vegetation in the Sunshine Section Project Land.

A summary of EVCs mapped as vegetation patches in the Sunshine Section is provided in Table 4.2. Following this is a brief description of each EVC present and discussion of fauna habitat values provided by that EVC in the Sunshine Section. Patches of native vegetation recorded are shown in the appendices to the EPBC Act referral. A list of all flora species recorded is provided in Appendix D.

Table 4.2 Extent of patches of native vegetation within the Sunshine Section by EVC

EVC	Conservation Status	Occurrence within and adjacent to the Sunshine Section Project Land	Total Extent within the Sunshine Section Project Land (ha)
EVC 55: Plains Grassy Woodland	Endangered	Presence of EVC 55 within the Sunshine Section Project Land is limited to small patches north of Sunshine Road	0.711
EVC 125: Plains Grassy Wetland	Endangered	EVC 125 is restricted to linear depressions on the eastern side of the Jacana line rail corridor, between Stony Creek and Barwon Avenue, Sunshine North. These patches were dominated by Narrowleaf Cumbungi (<i>Typha domingensis</i>) and otherwise comprised weedy species. A higher quality example of this vegetation type occurs within the rail corridor adjacent to the Sunshine Triangle Ecological Site, fringing a patch of Tall Marsh.	0.170
EVC 132: Plains Grassland	Endangered	Several patches of Plains Grassland EVC were detected throughout the Sunshine Section Project Land, though the quality varied substantially. EVC 132 occurs in the following locations in the Sunshine Section Project Land: <ul style="list-style-type: none"> In long linear patches either side of the Sunbury Line rail corridor (between the M80 Ring Road and Furlong Road) In various quality and size, disjunct patches in the Sunshine Railway Line Linear Reserve in small degraded patches on the western side of the Jacana line rail corridor In small patches in the Luma Estate 	2.695 (Of this, 2.144 ha classifies as NTGVVP)
EVC 821: Tall Marsh		Tall Marsh occurs in the Old Sunshine Tip Site	0.147
Total extent of patches of native vegetation in the Sunshine Section Project Land (ha)			3.723

A total of 22 native scattered trees were also recorded in the Sunshine Section Project Land.

4.2.2 Other Vegetation

Outside patches of native vegetation, the Sunshine Section Project Land was found to be comprised of introduced vegetation, and plantings. Where relevant to this impact assessment (e.g. the provision of threatened fauna habitat), discussion of this vegetation is provided below.

4.2.2.1 Amenity Plantings

Given the highly urbanised context, the Sunshine Section Project Land features many plantings across its extent. Commonly recorded planted tree species included Sugar Gums (*Eucalyptus cladocalyx*), Southern Mahogany (*Eucalyptus botryoides*) and Spotted Gum (*Corymbia maculata*). Some plantings featured native vegetation such as River Red-gums. Other species included fruit trees and a variety of other garden plantings.

Flowering trees such as eucalypts provide foraging opportunities for nectivorous and insectivorous species. Fruit bearing trees offer potential foraging opportunities for frugivores such as the Grey-headed Flying Fox.

4.2.2.2 Exotic Tussock Grasslands

Exotic tussock grasslands, principally comprising Chilean Needle-grass and Serrated Tussock were identified at a number of locations in the Sunshine Section Project Land and were considered for their potential to support threatened fauna.

4.3 Wetlands and Waterways

4.3.1 Wetlands of International Significance

One wetland of international importance (Ramsar Wetland) was identified in the desktop phase as being potentially relevant to the Project: Port Phillip Bay (western shoreline) and Bellarine Peninsula (within 10 km of the Sunshine Section Project Land as modelled in the attached PMST report (Appendix A)). The potential for impacts on this Ramsar wetland is low due to how remote it is from the Sunshine Section Project Land where substantial earthworks are proposed to take place. The potential for impact on this Ramsar Wetland from the Sunshine Section is considered in Section 5.3.2.

4.3.2 Waterways

Stony Creek intersects the Sunshine Section of the MAR Project. Despite the low quality of this waterway, Stony Creek has been considered when assessing the potential for impacts to EPBC Act listed threatened aquatic species. Targeted surveys for Growling Grass Frog in Stony Creek did not record the species (See Appendix B for detailed targeted survey conditions and results). Stony Creek is not considered to support suitable habitat for any terrestrial or aquatic EPBC Act listed threatened flora or fauna species.

4.4 Threatened Ecological Communities

Six EPBC Act listed ecological communities were noted in the PMST search for the MAR Project. This included:

- Grassy Eucalypt Woodland of the Victorian Volcanic Plain
- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia
- Natural Damp Grassland of the Victorian Coastal Plains
- Natural Temperate Grassland of the Victorian Volcanic Plain
- Subtropical and Temperate Coastal Saltmarsh
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

An analysis of the presence/absence for each of these listed threatened ecological communities in the Sunshine Section of the MAR Project is provided in Table 4.3 below.

Table 4.3 Analysis of the occurrence of EPBC Act listed ecological communities

Threatened Ecological community	EPBC Act Status	Discussion	Conclusion
Matters of National Environmental Significance			
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	CR	The Sunshine Section supported limited woody vegetation. Specifically, no remnant woodlands were found to meet the size or quality criteria to be considered for this community.	Absent
Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	EN	The Sunshine Section did not support any patches of Grey Box dominated woodland.	Absent
Natural Damp Grassland of the Victorian Coastal Plains	CR	The Sunshine Section did not support any coastal grasslands. Patches of grassland within the Sunshine Section were found exclusively on the Victorian Volcanic Plain, making them ineligible for consideration as this community.	Absent
Natural Temperate Grassland of the Victorian Volcanic Plain	CR	A number of patches of remnant native grassland that meet the criteria for this community occur in and adjacent to the Sunshine Section Project Land.	Present – Recorded in multiple locations in the Sunshine Section
Subtropical and Temperate Coastal Saltmarsh	VU	The Sunshine Section did not support any saltmarsh vegetation.	Absent
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	CR	Only one of the three species that characterise this community, namely Yellow Box, was present within the Sunshine Section. However, where species only occurred as a component of plantings, none of which met the size and quality criteria to be classified as this community.	Absent

As detailed in Table 4.3, one EPBC Act listed ecological community, NTGVVP, was recorded within the Sunshine Section of the MAR Project. This community is discussed in more detail below in Section 4.4.1.

4.4.1 Natural Temperate Grassland of the Victorian Volcanic Plain

NTGVVP is listed as Critically Endangered under the EPBC Act. NTGVVP was identified when a patch of Plains Grassland was deemed to meet the following criteria as stipulated in the listing advice for the community (DEWHA 2011):

- Native vegetation cover was more than 50% of the ground cover and was therefore dominant;
- The patch was at least 0.05 ha in size; and
- The patch met one of the following thresholds:
 - > The total perennial tussock cover represented by the above mentioned four native grass genera was at least 50%; or
 - > Non-grass weed cover was less than 30% of ground cover across the patch; or
 - > Native forbs comprised at least 50% of total vegetation cover during spring-summer.

A total of 2.144 hectares of NTGVVP has been recorded in the Sunshine Section Project Land in the following locations:

- Sunshine Railway Linear Reserve (1.235 ha)

- St Albans Road Biosites (0.369 ha)
- Old Sunshine Tip Site (0.539 ha).

NTGVVP has also been recorded outside the Project Land in the following locations:

- Matthews Hill Reserve (outside Project Land)
- Sunshine Triangle Ecological Site (outside Project Land).

Mapping of NTGVVP in the Sunshine Section is provided in the appendices to the EPBC Act referral.

NTGVVP was associated with high quality patches of Plains Grassland (EVC 132). These areas were mainly dominated by Kangaroo grass (*Themeda triandra*) and included a diverse range of herbs interspersed amongst the tussocks, such as Lemon Beauty-heads (*Calocephalus citreus*) and Blushing Bindweed (*Convolvulus angustissimus subsp. angustissimus*). Other grasses present included Grey Tussock Grass (*Poa sieberiana*) and Windmill Grass (*Chloris truncata*).

All areas of NTGVVP in and adjacent to the Sunshine Section will be avoided through the implementation of mitigation measures, as discussed in Section 5.2.

4.5 Threatened Species

The Protected Matters Report (Appendix A) identified 66 EPBC Act listed threatened species that may occur within five kilometres of the MAR Project State Land. This includes 33 birds, four fish, one frog, one insect, six mammals, 15 plants, five reptiles and one shark. An analysis of the likelihood of occurrence of all EPBC Act listed threatened species listed in the PMST is provided in Appendix E. This analysis considered:

- The presence of any existing VBA records of the species from within five kilometres of the MAR Project
- The presence/absence of suitable habitat in the Sunshine Section of the MAR Project
- The results of relevant targeted surveys undertaken in the Sunshine Section for EPBC Act listed threatened species.

As detailed in Section 3.2.2, targeted surveys were undertaken in the Sunshine Section for a number of threatened species. A summary of the results of these surveys is provided below. Details of the results of targeted surveys is provided in Appendix B, with mapping of targeted survey locations shown in Appendix C.

- Matted Flax-lily, Small Golden-Moths, Button Wrinklewort, Growling Grass Frog:
 - > Not recorded during targeted surveys in all areas of potential habitat. Concluded to have a low likelihood of occurrence in the Sunshine Section and hence, not discussed further.
- Spiny Rice-flower:
 - > 21 individual Spiny Rice-flower plants have been recorded in the Sunshine Section Project Land in the following locations:
 - St Albans Road Biosites (8 plants)
 - Rail corridor adjacent to Sunshine Triangle Ecological Site (12 plants)
 - Old Sunshine Tip (1 plant)
 - > An additional 17 Spiny Rice-flower plants were also recorded during targeted surveys outside the Project Land in land adjacent to Matthews Hill Reserve.
- Striped Legless Lizard:
 - > A total of 6.427 hectares of Striped Legless Lizard habitat has been identified within the Sunshine Section Project Land in the following locations:
 - St Albans Road Biosites (0.770 ha) (Recorded during targeted surveys)
 - Old Sunshine Tip Site (0.897 ha) (Species known to occur)

- 
- Sunshine Railway Linear Reserve (4.185 ha) (Moderate habitat only, considered to potentially occur)
 - Luma Estate (0.575 ha) (Moderate habitat only, considered to potentially occur).
 - Golden Sun Moth:
 - > A total of 0.575 hectares of Golden Sun Moth habitat has been identified within the Sunshine Section Project Land in the following locations:
 - Luma Estate (0.575 ha) (Moderate habitat only, considered to potentially occur).
 - > Golden Sun Moth individuals were recorded during targeted surveys in the Matthews Hill Reserve (outside the Project Land). A total of 2.48 hectares of Golden Sun Moth habitat occurs in Matthews Hill Reserve.
 - Large-headed Fireweed:
 - > No Large-headed Fireweed were recorded during targeted surveys within the Sunshine Section Project Land, and the species is therefore considered to have a low likelihood of occurrence in the Sunshine Section Project Land.
 - > 28 Large-headed Fireweed plants were recorded during targeted surveys in Matthews Hill Reserve (outside the Sunshine Section Project Land). This species is considered further in the following sections regarding potential indirect impacts given its location in proximity to the Sunshine Section Project Land.

Based on the above, eight EPBC Act listed threatened species are considered to have a moderate or higher likelihood of occurrence within or adjacent to the Sunshine Section Project Land. These species are discussed below in Table 4.4.

Given the lack of key habitats in the Sunshine Section for the White-throated Needletail, Swift Parrot or the Grey-headed Flying-fox, as well as the high dispersal potential of these species, it is considered unlikely that these species would be subject to significant impacts by the proposed works (See Table 4.5). As such, they are not discussed further in this report and an assessment against the significant impact criteria has not been undertaken for these species.

Table 4.4 Threatened flora species with a moderate or higher likelihood of presence within the Sunshine Section

Species /Conservation Status ³	Likelihood of occurrence
<i>Matters of National Environmental Significance</i>	
<p><i>Diuris fragrantissima</i> Sunshine Diuris EN</p>	<ul style="list-style-type: none"> • Low likelihood of occurrence within the Sunshine Section Project Land • Known to occur adjacent to Sunshine Section Project Land <p>Species is known to occur adjacent to the Sunshine Section Project Land within the Sunshine Triangle Ecological Site. Although outside the Sunshine Section Project Land, the occurrence of this species adjacent to the Sunshine Section Project Land means that this species must be considered against potential project impacts.</p>
<p><i>Pimelea spinescens</i> subsp. <i>spinescens</i> Spiny Rice-flower CR</p>	<ul style="list-style-type: none"> • Confirmed in Sunshine Section Project Land <p>Targeted survey for this species was undertaken in areas of suitable habitat across the Sunshine Section Project Land. 21 individuals of Spiny Rice-flower were recorded across several locations in the Sunshine Section Project Land including the St Albans Road Biosites (8 plants), the rail corridor adjacent to Sunshine Triangle Ecological Site (12 plants) and the Old Sunshine Tip (1 plant).</p> <ul style="list-style-type: none"> • Known to occur adjacent to Sunshine Section Project Land <p>Spiny Rice-flower were also recorded outside the Project Land adjacent to Matthews Hill Reserve.</p>
<p><i>Senecio macrocarpus</i> Large-headed Fireweed VU</p>	<ul style="list-style-type: none"> • Low likelihood of occurrence within the Sunshine Section Project Land • Targeted surveys were undertaken within suitable grassland habitat for this species within the Sunshine Section Project Land, and the species was not recorded. • Known to occur adjacent to Sunshine Section Project Land <p>Large-headed Fireweed have been recorded within Matthews Hill Reserve, outside the Sunshine Section Project Land.</p>

³ Conservation status abbreviations include: CR (Critically endangered), EN (Endangered), VU (Vulnerable) under the EPBC Act

Table 4.5 Threatened fauna species with a moderate or higher likelihood of presence within the Sunshine Section

Species /Conservation Status ⁴	Likelihood of occurrence
<i>Matters of National Environmental Significance</i>	
Striped Legless Lizard <i>(Delma impar)</i> VU	<ul style="list-style-type: none"> • Confirmed in Sunshine Section Project Land Striped Legless Lizard populations were recorded in the St. Albans Road Biosites within the Sunshine Section Project Land through artificial shelter surveys. The adjacent Old Sunshine Tip Site supports a known population and hence was not subject to targeted surveys. Habitat likely to be utilised by the species has been mapped and is shown in the mapping provided with the EPBC Act referral. • Moderate likelihood of occurrence in Sunshine Section Project Land Recent record of Striped Legless Lizard is known from in the Sunshine Railway Linear Reserve (AJM-JV 2020a). Given the known recent record, targeted surveys for the species were not undertaken in this area as part of the current investigation. Rather, it has been considered that Striped Legless Lizard has a moderate likelihood of occurrence in this location. Moderate habitat for Striped Legless Lizard has also been recorded in the Luma Estate. Targeted surveys for Striped Legless Lizard have not been undertaken in this location. • Low likelihood of occurrence elsewhere within the Sunshine Section Project Land
Golden Sun Moth <i>(Synemon plana)</i> CR	<ul style="list-style-type: none"> • Moderate likelihood of occurrence within the Sunshine Section Project Land Moderate habitat for Golden Sun Moth has been recorded in the Luma Estate. Targeted surveys for Golden Sun Moth have not been undertaken in this location. • Low likelihood of occurrence elsewhere within the Sunshine Section Project Land Targeted surveys were undertaken in suitable grassland habitat for this species elsewhere within the Sunshine Section Project Land and the species was not recorded. • Known to occur adjacent to Sunshine Section Project Land Golden Sun Moth were recorded during targeted surveys in the Matthews Hill Reserve (outside the Project Land).
White-throated Needletail <i>(Hirundapus caudacutus)</i> VU	<ul style="list-style-type: none"> • Moderate likelihood of occurrence within the Sunshine Section; Negligible potential for impact The White-throated Needletails are non-breeding migrants in Australia. They occur in Australia only between late spring and early autumn, but mostly in summer. Breeding takes place in northern Asia (Birdlife Australia, 2021). This species is predominantly aerial. The species occasionally roosts in trees. This species has the potential to fly over the Sunshine Section sporadically. However, no core habitats for the species occur in the project area, and the species is unlikely to be reliant on the habitats in the project land. Considering the dispersed nature of this species' habitat, the mostly aerial nature and high dispersal potential of this species, it is unlikely that White-throated Needletail would be subject to impacts from the proposed works within the Sunshine Section.
Swift Parrot <i>(Lathamus discolor)</i> CR	<ul style="list-style-type: none"> • Moderate likelihood of occurrence within the Sunshine Section; Negligible potential for impact This species breeds in Tasmania and migrates to the mainland for the winter. In Victoria, the over-wintering habitat of the Swift Parrot is eucalypt forests and woodlands consisting primarily of the winter-flowering Grey Box (<i>Eucalyptus microcarpa</i>), Red Ironbark (<i>Eucalyptus tricarpa</i>), Mugga Ironbark (<i>Eucalyptus sideroxylon</i>) (far north-east Victoria), Yellow Gum (<i>Eucalyptus leucoxylon</i>) and White Box (<i>Eucalyptus albens</i>) (Action Statement no. 169, FFG Act, Swift Parrot). This species has the potential to sporadically utilise the planted eucalypts in the Sunshine Section for foraging and dispersal during its Victorian winter migration. However, no core habitats for the species occur in the project area, and the species is unlikely to be reliant on the habitats in the project land. Given the lack of habitat available in the Sunshine Section, high dispersal potential of the species and the transient nature of the species' presence in the area, it is unlikely that this species would be subject to impacts from the proposed works within the Sunshine Section.

⁴ Conservation status abbreviations include: CR (Critically endangered), EN (Endangered), VU (Vulnerable) under the EPBC Act

Species /Conservation Status ⁴	Likelihood of occurrence
<p>Grey-headed Flying-fox (<i>Pteropus poliocephalus</i>) VU</p>	<ul style="list-style-type: none"> • High likelihood of occurrence within the Sunshine Section; Negligible potential for impact Two camps of this species exist in the greater Melbourne region, at Yarra Bend Park in Kew and on the Dandenong Creek at Doveton, in Melbourne's east. The species breeds and sleeps at these two camp locations, and then forages broadly at night-time, being known to travel up to 50 km in a night. Considering the relative close proximity to the permanent Grey-headed Flying-fox camp at Yarra Bend (~15km), this species is likely to sporadically utilise the planted eucalypts in the Sunshine Section for foraging. However, given the dispersed nature of this species' habitat, high dispersal potential of this species and extensive foraging habitat outside the project, it is unlikely that this species would be subject to impacts from the proposed works within the Sunshine Section.

4.6 Migratory Species

The PMST Report (Appendix A) identified 58 EPBC Act listed migratory species that may occur within 5 km of the MAR State Project Land. This large number of migratory species being listed on the PMST can be explained as the 5 km radius search area extends into Port Phillip Bay. However, given the Sunshine Section of the MAR Project is inland, and occurs away from coastal and marine environments, most migratory species are unlikely to occur in or adjacent to the Sunshine Section Project Land.

This likelihood of occurrence of migratory species is summarised by species functional group in Table 4.6 below.

Two migratory species, White-throated Needletail and Latham's Snipe are considered to have a moderate likelihood of occurrence in the Sunshine Section Project Land. However, given the aerial nature of White-throated Needletail, and low quality of aquatic habitat in Stony Creek for Latham's Snipe, Sunshine Section Project Land is not considered to support important habitat as defined in the *Significant Impact Guidelines 1.1* for these species or are likely to support an ecologically significant proportion of the population, as such it is considered that no EPBC Act migratory species would be significantly impacted by the Project Works. As such, they are not considered further in this report.

Table 4.6 Likely utilisation of the MAR State Project Land by migratory species

Migratory species functional group	No. Species modelled as relevant to the MAR State Project Land	Likelihood of Utilisation of habitat within Sunshine Section Project Land	Important Habitat ⁵ within Sunshine Section Project Land
Migratory Marine Birds	18	Low: These species are almost exclusively marine, and the Sunshine Section Project Land does not impact on marine habitats.	No: Species unlikely to be present
Migratory Marine Species (incl whales, sharks, dolphins and turtles)	9	Low: The species are generally exclusively marine and the Sunshine Section Project Land does not impact on marine habitats.	No: Species unlikely to be present
Migratory Terrestrial Species	5	<p><u>White-throated Needletail</u> Moderate: This species has already been considered/discussed in Section 4.5.</p> <p><u>Black-faced Monarch, Yellow Wagtail, Satin Flycatcher, Rufous Fantail</u> Low: No preferred habitats for these terrestrial migratory birds occur in the Sunshine Section Project Land.</p>	No: The terrestrial areas within the Sunshine Section are not considered to be important habitat for migratory terrestrial birds due to their generally low quality, isolated and small size, and consequently small proportions of species they have the potential to support.
Migratory Wetland Species	26	<p><u>Latham's Snipe</u> Moderate: Sunshine Section Project Land supports limited area of low quality aquatic habitat in and adjacent to Stony Creek that may occasionally be visited by Latham's Snipe.</p> <p><u>All other EPBC Act listed Migratory Wetland species</u> Low: All other migratory wetland species are migratory shorebirds and are mainly utilise coastal and intertidal environs.</p>	No: The limited aquatic habitat within the Sunshine Section (ie along and adjacent to Stony Creek) is not considered important habitat.

⁵ Important habitat for migratory species assessed as per the Significant Impact Guidelines DoE (2013). *Matters of National Environmental Significance. Significant Impact Guidelines 1.1. Environmental Protection and Biodiversity Conservation Act 1999.* Department of the Environment, Government of Australia, Canberra.

5 Ecological Impact Assessment

This section of the report outlines potential impacts to ecological values from the Sunshine Section of the MAR Project, as well as outlining the relevant mitigation measures, and subsequent residual impacts.

5.1 Proposed Works and Potential Impacts

The proposed works for the Sunshine Section have been considered for the potential impacts they may have upon MNES within and adjacent to the Sunshine Section Project Land where there is potential for impact. These considerations include both impacts during the construction phase and operation phase as follows.

- Construction Phase Impacts:
 - > Direct removal and/or destruction of MNES or associated habitats from construction activities
 - > Facilitating the spread of noxious weeds, pest animals and pathogens through the transport of propagules, that would result in disturbance or degradation to MNES
 - > Temporary barriers to dispersal of MNES created by construction activities such as fences
 - > Impacts to water quality at Stony Creek through erosion or surface runoff that may impact MNES
 - > Increased light and noise that may impact MNES
 - > Dust impacts, particularly to the Sunshine Diuris.
- Operation Phase Impacts
 - > Permanent barriers to dispersal of MNES associated with new infrastructure or clearance of vegetation
 - > Ongoing absence of permanently removed vegetation causing a net reduction in available habitat for MNES
 - > Increased light and noise that may impact MNES.

5.2 Mitigation Measures

Potential impacts to ecological values protected under the EPBC Act have been reduced by following a process of avoiding impacts through design modifications to the Project. Mitigation measures are proposed to be implemented through the detailed design, construction and operation of the Project to further minimise impacts to MNES.

Mitigation measures to reduce potential impacts on MNES in the Sunshine Section are detailed below. The implementation of these mitigation measures have been considered as forming part of the action in the assessment of impacts.

Mitigation measures have been categorised as either Planning and design phase, Construction phase, or Operation phase as relevant.

- **Planning and design phase:** These measures are to be carried out prior to the finalisation of the construction footprint and commencement of works.
- **Construction phase:** These measures are to be carried out during the construction of the project.
- **Operation phase:** These measures are to be implemented following the completion of the project, and when MAR is operational.

Table 5.1 Mitigation measures aimed at reducing impacts to MNES in the Sunshine Section

Mitigation Measure	Description
Planning and Design Phase	
Avoid and minimise	Efforts to avoid and minimise impacts to ecological values will continue through the detailed design and construction phase, avoiding impacts to those values wherever opportunities to do so are identified.
Construction Phase	
Adherence to Project footprint	The Project footprint is to be adhered to through the construction process. Any deviations outside the Project footprint are subject to re-evaluation by a suitably qualified ecologist to ensure the findings of the impact assessment are unchanged.
No-go zones	<ul style="list-style-type: none"> No-go zones have been identified for the Project in areas that support MNES and other sensitive matters. The No-go zones identified in this report (listed in Appendix F and shown in the mapping provided with the EPBC Act referral) will be avoided by construction works, with no admittance to the areas. The value to be protected by the no-go zone will not be impacted. All No-go zones will be included on all site maps, including all Environmental Management Plans and related documentation (including the Construction Environment Management Plan (CEMP)). All No-go zones will be fenced with high-visibility safety bunting or temporary construction fencing (including erosion fencing if necessary). The area will be signed as a 'No-go zone'. Fencing should be erected in a way that still enables fauna to move through areas of habitat. Where a No-go zone is to be established to protect EPBC Act listed NTGVVP, additional solid construction fencing (e.g. geofabric, shade cloth or similar solid fabric) will be erected to prevent dust impacts. The erection of the fencing surrounding No-go zones for MNES will be supervised or reviewed by a qualified and experienced ecologist to ensure that the values supported within that No-go zone are not impacted. The fencing will be maintained for the duration of the works. The induction of all staff to the site will include a discussion of the importance of No-go zones and must clearly outline activities which are prohibited from these areas. No construction vehicles, machinery or equipment, lay down of materials or unauthorised personnel will be allowed within No-go zones. Foot access of personnel to No-go zones for the purpose of guiding bores will be accompanied by a qualified ecologist.
Sunshine Triangle – Specific mitigation measures (to be undertaken in addition to the protection and management measures already in place for this site)	<p>The following specific mitigation measures will be put in place to manage potential impacts on the Sunshine Diuris for works adjacent to the Sunshine Triangle Ecological Site.</p> <ul style="list-style-type: none"> No go zones will be clearly delineated on site using temporary construction fencing as required and signage (see above for further details under No-go zones). Management of dust will be undertaken through installation and maintenance of temporary construction fencing (e.g. geofabric, shade cloth or similar solid fabric) before undertaking any works adjacent to this area Further dust management will be undertaken by limiting construction activities adjacent to the Sunshine Triangle Ecological Site to outside the flowering period of the Sunshine Diuris (1 October – 31 December). Dust monitoring will be implemented to determine if additional protocols need to be enacted. Prior consultation with DELWP and DAWE is required prior to commencement if any major works are to occur within the flowering period. Prior to construction, an ecologist will assess the distribution of current weed species within the construction footprint adjacent to the no-go zone before construction commences to enable a post-construction weed assessment and comparison (within the construction area). Notify DELWP on any planned weed control measures adjacent to the site. Drainage will be kept intact around the Sunshine Triangle Ecological Site. If works require any alterations to drainage then additional drainage advice must be sought. Appropriate waste disposal measures will be put in place during construction to avoid any increase in the number of pest animals (particularly House Mouse) within and adjacent to the Sunshine Triangle Ecological Site
General Construction Measures	<ul style="list-style-type: none"> The spread of noxious weeds and pest animals will be minimised Weed spread into no-go zones will be avoided Where possible, all vehicles, machinery and equipment will move along formed/designated access tracks to prevent the spread and establishment of weeds and diseases. Vehicles and machinery

Mitigation Measure	Description
	<p>will access through defined entry and exit points. Additional measures to prevent the spread and establishment of weeds and disease will be provided within the CEMP.</p> <ul style="list-style-type: none"> Construction stockpiles, machinery, roads, and other infrastructure will be placed away from areas supporting native vegetation and waterways; and placed in previously cleared or hardstand areas.
Erosion and Sedimentation Controls	<ul style="list-style-type: none"> Environmental management for erosion and sediment control, in accordance with EPA Victoria construction guidelines (Publications 275, 480 and 960) will be implemented for works in the vicinity of Stony Creek.
Operating phase	
Revegetation along waterways	<ul style="list-style-type: none"> Where vegetation removal along Stony Creek is required to facilitate the Project Works revegetation of indigenous species will be undertaken.

5.3 Assessment of Impacts

The potential impacts of the Project Works highlighted in Section 5.1 have been considered against proposed mitigation measures in Section 5.2 to derive the residual impact of the project to native vegetation and MNES. Impacts are discussed below.

5.3.1 Native Vegetation Removal

A total of 0.710 hectares of native vegetation in patches will be removed in the Sunshine Section including:

- 0.328 ha of Plains Grassy Woodland (EVC 55)
- 0.144 ha of Plains Grassy Wetland (EVC 125)
- 0.156 ha of Plains Grassland (EVC 132)
- 0.082 ha of Tall Marsh (EVC 821)

No Plains Grassland that classifies as NTGVVP is to be removed within the Sunshine Section.

22 scattered trees will be removed from the Sunshine Section Project Land.

5.3.2 Residual Impacts to Wetlands and Waterways

Ramsar wetlands

One wetland of international importance, the Port Philip Bay (Western Shoreline) and Bellarine Peninsula Ramsar is noted within 10 kms in the PMST for the MAR State Project land. This Ramsar Wetland is comprised of six distinct areas, the closest to the Sunshine Section being at Point Cook/Cheetham Wetlands. Stony Creek is the only waterway that intersects the Sunshine Section. While this waterway is of low quality where it intersects the Project, it continues south east and outputs into the Yarra River at Fishermans Bend, and ultimately Port Philip Bay. Given the separation, it is unlikely that works at the Sunshine Section would result in a significant impact on the Ramsar site, though appropriate sediment controls will be implemented to protect Stony Creek from increased sediment or pollutant inputs. Assessment of significant impacts to the Ramsar wetland against the Significant Impact Criteria 1.1 (DoE 2013) is provided in Appendix G. This assessment shows that the Sunshine Section is unlikely to result in a significant impact on the Port Philip Bay Ramsar Wetland.

Waterways

Although minor fluctuations in water quality of Stony Creek are expected as part of the Project Works, adherence to impacts to water quality will be mitigated through the implementation of erosion and sedimentation controls, including adherence to best practice guidelines, EPA approvals and an approved CEMP. As such, impacts to water quality within Stony Creek within the Sunshine Section are expected to be negligible.

5.3.3 Residual Impacts to Threatened Ecological Communities

Residual impacts to threatened ecological communities are assessed against the EPBC Act Significant Impact Criteria in Appendix G and summarised below in Table 5.2.

Table 5.2 Summary of Residual impacts to threatened ecological communities

Threatened Ecological Community	Cons. Status	Potential Impacts	Mitigation Measures	Residual Impacts	Likelihood of a significant impact
Matters of National Environmental Significance					
NTGVVP	EN	<ul style="list-style-type: none"> Direct removal Fragmentation Habitat degradation through the spread of weeds 	<ul style="list-style-type: none"> No-go zones General construction measures 	<p>None</p> <p>No NTGVVP will be removed as part of the proposed works for the Sunshine Section. Areas of NTGVVP are to be protected through the implementation of no-go zones and other mitigation measures to ensure the community is not impacted.</p>	Unlikely

5.3.4 Residual Impacts to Threatened Species

Residual impacts to threatened and migratory species are assessed against the EPBC Act Significant Impact Criteria in Appendix G and summarised below in Table 5.3 and

Table 5.4.

Table 5.3 Summary of Residual Impacts to Threatened Flora

Species and Cons. Status	Potential impacts and Proposed Mitigation Measures	Residual Impacts	Likelihood of a significant impact
Matters of National Environmental Significance			

Species and Cons. Status	Potential impacts and Proposed Mitigation Measures	Residual Impacts	Likelihood of a significant impact
<p><i>Diuris fragrantissima</i> Sunshine Diuris EN</p>	<p>Potential Impacts</p> <ul style="list-style-type: none"> Minor works are proposed in the rail corridor adjacent to the Sunshine Triangle Ecological Site as part of the current proposed MAR Project. Works in this location are limited to minor track works, cabling and signalling, and are limited to outside the Sunshine Triangle Ecological Site. Habitat degradation through the spread of weed propagules and airborne construction particulate matter (dust) into the Sunshine Triangle Ecological Site from works adjacent to the site. <p>Proposed Mitigation Measures</p> <ul style="list-style-type: none"> Sunshine Diuris mitigation measures 	<p>None</p> <p>Management of dust will be undertaken through installation and maintenance of temporary construction fencing (e.g. geofabric, shade cloth or similar solid fabric) adjacent to the Sunshine Triangle Ecological Site before undertaking any works adjacent to this area. Additional temporary fencing would be outside of the permanent fencing already present at the Site. Further dust management will be undertaken by limiting construction activities adjacent to the Sunshine Triangle Ecological Site to outside the flowering period of the Sunshine Diuris (1 October – 31 December). Dust monitoring will be implemented to determine if additional protocols need to be enacted. Prior consultation with DELWP and DAWA will be undertaken prior to commencement if any major works are to occur within the flowering period. Best practice weed hygiene measures along with weed monitoring adjacent to the Sunshine Triangle Ecological Site will be enacted, with weed management to be conducted in consultation with DELWP as required. As such, the risk of weed propagules spreading into the site is low.</p> <p>With the drainage structures and rail formation sitting immediately adjacent to the triangle to be left intact, the risk of any further sources of impact are low.</p> <p>Appropriate waste disposal measures will also be put in place during construction to avoid any increase in the number of pest animals (specifically House Mouse) in areas that support MNES, including those adjacent to the Sunshine Section Project Land (i.e. Sunshine Triangle Ecological Site and Matthew Hill Reserve)</p>	<p>Unlikely</p>
<p><i>Pimelea spinescens</i> subsp. <i>spinescens</i> Spiny Rice-flower CR</p>	<p>Potential Impacts</p> <ul style="list-style-type: none"> Potential removal of Spiny Rice Flower plants Habitat degradation through the spread of weed propagules into the species' habitat <p>Proposed Mitigation Measures</p> <ul style="list-style-type: none"> Avoidance of Spiny Rice-flower through the implementation of no go zones 	<p>None</p> <p>No Spiny Rice-flower individuals will be removed in association with the works for the Sunshine Section. Spiny Rice-flower plants and adjacent habitat are to be protected through the implementation of No-go zones and other mitigation measures to ensure the plants and their habitat are not impacted.</p>	<p>Unlikely</p>
<p><i>Senecio macrocarpus</i> Large-headed Fireweed VU</p>	<p>Potential Impacts</p> <ul style="list-style-type: none"> Habitat degradation through the spread of weed propagules into the Matthews Hill Reserve <p>Proposed Mitigation Measures</p> <ul style="list-style-type: none"> Avoidance of impacts to Large-headed Fireweed through implementation of No go zones around Matthews Hill Reserve 	<p>None</p> <p>Best practice weed hygiene measures adjacent to the Matthews Hill Reserve will be enacted, with weed management to be conducted in consultation with DELWP as required. As such, the risk of weed propagules spreading into the site is low.</p>	<p>Unlikely</p>

Table 5.4 Summary of Residual Impacts to Threatened Fauna

Species and Cons. Status	Potential Impacts and Proposed Mitigation Measures	Residual Impacts	Likelihood of a significant impact
Matters of National Environmental Significance			
Striped Legless Lizard <i>(Delma impar)</i> VU	Potential Impacts <ul style="list-style-type: none"> • Direct removal of habitat through construction activities • Habitat fragmentation through construction activities Proposed Mitigation Measures <ul style="list-style-type: none"> • Avoidance of Striped Legless Lizard and associated habitat through the implementation of no-go zones 	None No Striped Legless Lizard or associated habitat areas will be removed in association with the works for the Sunshine Section. Striped Legless Lizard and associated habitat is to be protected through the implementation of no-go zones and other mitigation measures to ensure the species is not impacted.	Unlikely
Golden Sun Moth <i>(Synemon plana)</i> CR	Potential Impacts <ul style="list-style-type: none"> • Habitat degradation through the spread of weed propagules into the Matthews Hill Reserve Proposed Mitigation Measures <ul style="list-style-type: none"> • Avoidance of impacts to Golden Sun Moth through implementation of no-go zones around Matthews Hill Reserve 	None No Golden Sun Moth or associated habitat areas will be removed in association with the works for the Sunshine Section. Golden Sun Moth and associated habitat is to be protected through the implementation of no-go zones and other mitigation measures to ensure the species is not impacted. Best practice weed hygiene measures adjacent to the Matthews Hill Reserve will be enacted, with weed management to be conducted in consultation with DELWP as required. As such, the risk of weed propagules spreading into the site is low.	Unlikely

5.4 Assessment Approach and Management Framework for Victorian Rail Infrastructure Program projects

The RPV Environmental Management Governance Workflow, together with approval requirements under Commonwealth and State legislation, enable Victorian Rail Infrastructure projects, such as the MAR to avoid and minimise impacts to biodiversity and other environmental values, where possible. This assessment has been completed in accordance with this framework.

The RPV Environmental Management Governance Workflow includes a method of how environmental values, including biodiversity, are to be assessed and considered through the design, planning approvals and environmental processes, and construction processes for projects. The framework allows for the implementation of the following steps:

- Avoid and minimise impacts first
- Mitigate impacts where avoidance is not possible
- Offset where residual impacts cannot be avoided.

The process outlined in the RPV Environmental Management Governance Workflow (See Appendix B to Referral) used to determine the likely impacts and offset requirements for Victorian Rail Infrastructure Program projects, such as the MAR project.

5.5 Avoidance and minimisation of impacts

As detailed above, the planning process for the MAR Project has followed the RPV Environmental Management Governance Workflow framework which has adopted the principles of avoidance and minimisation of impacts on native vegetation, particularly those of higher value which have been identified to support MNES.

At a strategic level, the need for, and location of, a rail link to Melbourne Airport has been subject to considerable investigation by Victorian Governments with various planning studies and panel reports undertaken to inform possible corridors for the rail link. In 2001, the Department of Infrastructure released a Business Case for the proposed Melbourne Airport Rail Link, finding the Sunshine/Albion East Link to be the preferred long-term option. The current MAR Project follows a similar alignment, and was ultimately chosen as the best route to meet the objectives for the project. At a strategic level, the MAR Project shows adherence to the 'avoid and minimise' principles as a significant proportion of the MAR Project Land falls within or immediately adjacent to the existing rail corridor and urban road network. A large proportion of these areas are heavily disturbed and void of ecological value due to previous and existing use. By following the existing rail corridor (at least in part), the MAR Project avoids potential impacts to other less disturbed land in the region.

Detailed efforts to avoid and minimise impacts to native vegetation and other ecological values have been undertaken during the site level planning process. Following identification of the route alignment, extensive desktop and field based ecological assessment has been undertaken by AJM-JV to identify native vegetation and ecological values within and adjacent to the MAR State Project Land. Detailed ecological assessment (including native vegetation and habitat assessments, as well as various targeted surveys for threatened species) has been conducted throughout the MAR State Project Land between 2018 and 2021. This assessment resulted in the identification of various significant ecological values, including high quality native vegetation and the presence of state and Commonwealth listed threatened species and ecological communities. The identification of significant ecological values prompted the initial exclusion of particular key sites from the State Project Land (i.e. Matthews Hill Reserve and the Sunshine Triangle Ecological Site) as well as the early recommendation for establishment of no-go zones within the State Project Land. The recommendations for no-go zones has since been discussed in project workshops with designers, planners and ecologists, to allow incorporation of these no-go zones into the project design.

No-go zones have now been incorporated into the design in the Sunshine Section of the MAR State Project Land, and are summarised in Appendix F. The implementation of no-go zones has prioritised the avoidance

of impacts to native vegetation and/or habitat which has been identified to support threatened species or communities, particularly MNES listed under the Commonwealth EPBC Act.

In the Sunshine Section, the changes to the State Project Land and implementation of no-go zones (specifically No-go zones 1-6 and 22 [note No-go zones 7-21 fall within the Corridor Section]) has resulted in the avoidance of all MNES as well as the avoidance of a significant proportion of the native vegetation identified. Changes to the State Project Land and implementation of no-go zones in the Sunshine Section have resulted in the avoidance of the following ecological values:

- **Sunshine Railway Linear Reserve (No-go zone 1):**
 - > **MNES:** The implementation of no-go zone 1 results in the avoidance of two large patches of NTGVVP, as well as avoidance of extensive area of potential habitat for Striped Legless Lizard.
- **Matthews Hill Reserve and adjoining land (excluded from State Project Land):**
 - > **MNES:** Excluding this area from the Project Land results in the avoidance of impacts to Spiny Rice-flower in the rail corridor. It also provides an additional buffer from Matthews Hill Reserve which supports a population of Golden Sun Moth and Large-fruited Groundsel, as well as NTGVVP and potential habitat for Striped Legless Lizard.
- **Land south west of the Sunshine Triangle Ecological site (no-go zone 2):**
 - > **MNES:** The implementation of no-go zone 2 results in the avoidance of impacts to 12 Spiny Rice-flower plants which occur in the rail corridor in this location. It also provides an additional buffer from the Sunshine Triangle Ecological Site which supports an important population of Sunshine Diuris and other ecological values including habitat for threatened fauna and NTGVVP.
- **Old Sunshine tip site (west of rail line) (no-go zone 3):**
 - > **MNES:** The implementation of no-go zone 3 results in the avoidance of impacts to an extensive area of confirmed Striped Legless Lizard habitat and NTGVPP, as well as one Spiny Rice-flower.
- **St Albans Biosites (east of rail line) (no-go zones 4, 5 and 6):**
 - > **MNES:** The implementation of no-go zones 4, 5 and 6 result in the avoidance of impacts to an extensive area of confirmed Striped Legless Lizard habitat and NTGVPP, as well as eight Spiny Rice-flower plants.
- **Luma Estate (no-go zone 22):**
 - > **MNES:** The implementation of no-go zone 22 will result in the avoidance of any impacts on grassy habitat that has been identified as potential habitat for Striped Legless Lizard and Golden Sun Moth.

The above detail provided highlights how the project been designed to avoid and minimise impacts on native vegetation with the highest ecological value, often prioritising habitat for MNES.

5.6 Summary of residual impacts to MNES

A summary of the MNES and residual impacts to MNES in the Sunshine Section of the MAR Project is provided in Table 5.5. The proposed construction works within the Sunshine Section will not result in any direct impacts on MNES. Any potential impacts to MNES have been avoided by following a process of avoiding, minimising and mitigating potential impacts. The implementation of mitigation measures outlined in the SSTSMP and summarised in this report have been considered as forming part of the action in the assessment of impacts.

With the effective implementation of the SSTSMP (See Appendix E), the Sunshine Section Project Works are expected to result in no direct or indirect impacts to MNES. Importantly, based on an assessment against the relevant EPBC Act Significant Impact Guidelines for all MNES present within or adjacent to the Sunshine Section Project Land, it has been concluded that the Sunshine Section Project Works will not result in a significant impact on any MNES.

Table 5.5: Summary of ecological values present in and adjacent to the Sunshine Section and residual impacts following avoidance and mitigation measures

MNES	Extent of MNES present in the Sunshine Section Project Land	Summary of Residual Impacts
Threatened Ecological Communities		
Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP)	2.144 hectares of NTGVVP recorded within Sunshine Section Project Land	No removal of NTGVVP. All NTGVVP in the Sunshine Section will be avoided through the implementation of no-go zones and mitigation measures.
Threatened Flora Species		
Spiny Rice-flower (<i>Pimelea spinescens</i> subsp. <i>spinescens</i>)	21 Spiny Rice-flower individuals within Sunshine Section Project Land	No removal or indirect impacts to any Spiny Rice-flower individuals. All Spiny Rice-flower plants in the Sunshine Section will be avoided through the implementation of no-go zones and mitigation measures.
Sunshine Diuris (<i>Diuris fragrantissima</i>)	No Sunshine Diuris occur within the Sunshine Section Project Land. Important population of Sunshine Diuris known to occur within the Sunshine Triangle Ecological Site (Outside the Sunshine Section Project Land).	No works within the Sunshine Triangle Ecological Site. Sunshine Diuris and associated habitat in the Sunshine Triangle Ecological will be avoided through the implementation of no-go zones and mitigation measures.
Large-headed Fireweed (<i>Senecio macrocarpus</i>)	No Large-headed Fireweed occur within the Sunshine Section Project Land. Population of Large-headed Fireweed confirmed to occur within Matthews Hill Reserve (Outside the Sunshine Section Project Land).	No works within the Matthews Hill Reserve. Large-headed Fireweed and associated habitat in the Matthews Hill Reserve will be avoided through the implementation of no-go zones and mitigation measures.
Threatened Fauna Species		
Striped Legless Lizard (<i>Delma impar</i>)	6.427 hectares of Striped Legless Lizard habitat identified in the Sunshine Section Project Land.	No removal of any Striped Legless Lizard habitat. All Striped Legless Lizard habitat in the Sunshine Section will be avoided through the implementation of no-go zones and mitigation measures.
Golden Sun Moth (<i>Synemon plana</i>)	0.575 hectares of potential habitat for Golden Sun Moth identified in Sunshine Section Project Land (in Luma Estate). Golden Sun Moth habitat also confirmed in Matthews Hill Reserve (Outside Sunshine Section Project Land).	No removal of any Golden Sun Moth habitat. All Golden Sun Moth habitat in the Sunshine Section will be avoided through the implementation of no-go zones and mitigation measures. No works within the Matthews Hill Reserve. Golden Sun Moth and associated habitat in the Matthews Hill Reserve will be avoided through the implementation of no-go zones and mitigation measures.

6 References

ABZECO (2016). *Targeted Surveys Undertaken for the Striped Legless Lizard Delma impar at Solomon Heights, Sunshine North*. Melbourne.

AJM-JV (2020a). *SUN Ecology Existing Conditions Assessment Report (SUN-AJM-PWD-PWD-REP-XEV-NAP-0000246)*.

AJM-JV (2020b). *MAR Ecology Existing Conditions Assessment Report (ARL-AJM-PWD-PWD-REP-XEV-NAP-0000041)*.

AJM-JV (2020c). *MAR-Aquatic Ecology and Geomorphology Existing Conditions Report (ARL-AJM-PWD-PWD-REP-XEV-NAP-0000549)*

AJM-JV (2021a). *MAR State Land Terrestrial Ecology Impact Assessment, Rev A (MAR-AJM-PWD-PWD-REP-XEV-NAP-0001710)*

AJM-JV (2021b). *MAR State Land Aquatic Ecology and Geomorphology Impact Assessment (MAR-AJM-PWD-PWD-REP-XEV-NAP-0001711)*

Biosis (2016). *Solomon Heights Biodiversity Project*. Port Melbourne.

BLA (2018). *River Valley Estate, Sunshine North Stages 7E and 9 - Matters of National Environmental Significance*. B. L. a. A. P. Ltd, Melbourne.

Clemann, N. and G. R. Gillespie (2010). *National recovery plan for the southern bell frog Litoria raniformis. Melbourne, Vic.: Department of Sustainability and Environment*.

Cogger, H. (2014). *Reptiles and Amphibians of Australia*. CSIRO Publishing, Clayton.

DAWE (2020a). *Species Profile and Threats Database: Synemom plana - Golden Sun Moth*. Retrieved 9/3/2020, <<http://www.environment.gov.au/sprat>> Department of Agriculture, Water and the Environment, Government of Australia.

DAWE (2020b). *Protected Matters Search Tool*. <<http://www.environment.gov.au/epbc/protected-matters-search-tool>> Department of Agriculture, Water and the Environment, Government of Australia.

DAWE (2020c). *Australia's 15 National Biodiversity Hotspots*. Retrieved 25/03/2020, 2020, <<https://www.environment.gov.au/biodiversity/conservation/hotspots/national-biodiversity-hotspots>> DAWE.

DELWP (2017a). *Guidelines for the removal, destruction or lopping of native vegetation*. Department of Environment, Land, Water and Planning, Government of Victoria, Melbourne.

DELWP (2017b). *Victorian Wetland Inventory (Current) (WETLAND_CURRENT) GIS dataset*. <<https://www.data.vic.gov.au/data/dataset/victorian-wetland-inventory-current>> Department of Environment, Land, Water and Planning, Government of Victoria.

DELWP (2020a). *NatureKit*. Retrieved 2020, <<http://maps.biodiversity.vic.gov.au/viewer/?viewer=NatureKit>> Department of Environment, Land, Water and Planning, Government of Victoria.

DELWP (2020b). *Victorian Biodiversity Atlas*. <<https://www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas>> Department of Environment Land Water and Planning, Government of Victoria.

DELWP (2021). *Victorian Biodiversity Atlas*. <<https://www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas>> Department of Environment Land Water and Planning, Government of Victoria.

DEWHA (2009a). *Significant impact guidelines for the critically endangered golden sun moth (Synemon plana)*. Department of Environment, Water, Heritage and Arts, Government of Australia, Canberra.

DEWHA (2009b). *Significant impacts guidelines for the vulnerable Growling Grass Frog (Litoria raniformis)*. Department of the Environment, Water, Heritage and the Arts, Government of Australia, Canberra.

DEWHA (2009c). *Significant impact guidelines for the critically endangered spiny rice-flower (Pimelea spinescens subsp. spinescens)*. W. Department of the Environment, Heritage and the Arts, Commonwealth Government, ACT.

DEWHA (2009d). *Synemon plana in Species Profile and Threats Database*. Department of the Environment, Water, Heritage and the Arts, Government of Australia, Canberra.

DEWHA (2011). *Nationally Threatened Ecological Communities of the Victorian Volcanic Plain: Natural Temperate Grassland & Grassy Eucalypt Woodland. A guide to the identification, assessment and management of nationally threatened ecological communities Environment Protection and Biodiversity Conservation Act 1999*. Department of Sustainability, Environment, Water, Population and Communities, ACT.

DoE (2013). *Matters of National Environmental Significance. Significant Impact Guidelines 1.1. Environmental Protection and Biodiversity Conservation Act 1999*. Department of the Environment, Government of Australia, Canberra.

DSE (2002). *Victoria's Native Vegetation Management- A Framework for Action*. Department of Sustainability and Environment, Melbourne.

DSE (2004). *Vegetation quality assessment manual: Guidelines for applying the Habitat Hectares scoring method. Version 1.3*. Victorian Department of Sustainability and Environment, Melbourne.

DSEWPac (2011a). *Environment Protection and Biodiversity Conservation Act 1999 referral guidelines for the vulnerable striped legless lizard, Delma impar*. E. Department of Sustainability, Water, Planning and Communities, Commonwealth Government, ACT.

DSEWPac (2011b). *Hygiene protocols for the control of diseases in Australian frogs*. Department of Sustainability, Environment, Water, Population and Communities., Victoria.

DSEWPac (2011c). *Referral guidelines for the vulnerable striped legless lizard, Delma impar*. Commonwealth of Australia.

EHP (2016). *Targeted Surveys for Matted Flax-lily and Golden Sun Moth, Solomon Heights, Sunshine North, Victoria*. Ecology and Heritage Partners.

EHP (2020). *Habitat Hectare Assessment and Spiny Rice Flower Survey: Solomon Heights, Sunshine North, Victoria*. Ecology and Heritage Partners Pty Ltd, Melbourne.

Gray, M. and J. Knight (2001). *Flora of Melbourne: A guide to the indigneous plants of the Greater Melbourne Area*. Hyland House, Flemington.

Heard, G., M. Scroggie and N. Clemann (2010). *Guidelines for managing the endangered Growling Grass Frog in urbanising landscapes*. Arthur Rylah Institute for Environmental Research.

Pizzey, G. and F. Knight (2012). *The Field Guide to the Birds of Australia*. Harper Collins Australia, Sydney.

RBGV (2015). *Flora of Victoria Online (VicFlora)*. <<https://vicflora.rbq.vic.gov.au/>> Royal Botanic Gardens Victoria.

RBGV (2016). *Flora of Victoria Online (VicFlora)*. <<https://vicflora.rbg.vic.gov.au/>> Royal Botanic Gardens Victoria.

RBGV (2017). *Flora of Victoria Online (VicFlora)*. <<https://vicflora.rbg.vic.gov.au/>> Royal Botanic Gardens Victoria.

RBGV (2018). *Flora of Victoria Online (VicFlora)*. <<https://vicflora.rbg.vic.gov.au/>> Royal Botanic Gardens Victoria.

RBGV (2019). *Flora of Victoria Online (VicFlora)*. <<https://vicflora.rbg.vic.gov.au/>> Royal Botanic Gardens Victoria.

RBGV (2020). *Flora of Victoria Online (VicFlora)*. <<https://vicflora.rbg.vic.gov.au/>> Royal Botanic Gardens Victoria.

RBGV (2021). *Flora of Victoria Online (VicFlora)*. <<https://vicflora.rbg.vic.gov.au/>> Royal Botanic Gardens Victoria.

RRLA (2011). *Sunshine Diuris Construction Management Plan*. KBR Arup Joint Venture, Melbourne.

Van Dyck, S. and R. Strahan (2008). *The Mammals of Australia*. Reed New Holland, Sydney.

Walsh, N. and T. Entwisle (1994). *Flora of Victoria Volume 2: Ferns and Allied Plants, Conifers and Monocotyledons*. Inkata Press, Melbourne.

Walsh, N. and T. Entwisle (1996). *Flora of Victoria Volume 3: Dicotyledons; Winteraceae to Mytaceae*. Inkata Press, Melbourne.

Walsh, N. and T. Entwisle (1999). *Flora of Victoria Volume 4: Dicotyledons; Cornaceae to Asteraceae*. Inkata Press, Melbourne.

Wilson, S. and G. Swan (2008). *A Complete Guide to Reptiles of Australia - Second Edition*. Reed New Holland, Sydney.



APPENDIX A PMST SEARCH





Appendix A: PMST Search



EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 03/09/20 14:08:41

[Summary](#)

[Details](#)

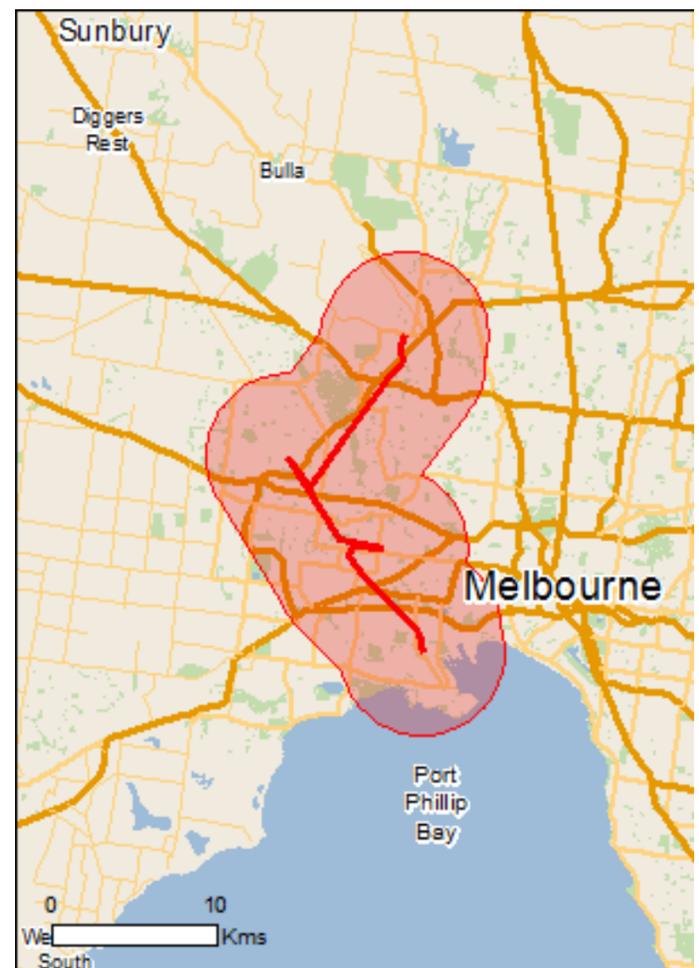
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

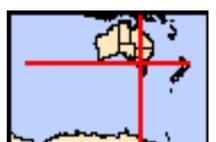
[Acknowledgements](#)



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

[Coordinates](#)

Buffer: 5.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	1
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	66
Listed Migratory Species:	58

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	8
Commonwealth Heritage Places:	3
Listed Marine Species:	68
Whales and Other Cetaceans:	7
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	3
Regional Forest Agreements:	1
Invasive Species:	47
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

National Heritage Properties		[Resource Information]
Name	State	Status
Historic		
Flemington Racecourse	VIC	Listed place

Wetlands of International Importance (Ramsar)		[Resource Information]
Name	Proximity	
Port phillip bay (western shoreline) and bellarine peninsula	Within 10km of Ramsar	

Listed Threatened Ecological Communities

[Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	Critically Endangered	Community known to occur within area
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community may occur within area
Natural Damp Grassland of the Victorian Coastal Plains	Critically Endangered	Community may occur within area
Natural Temperate Grassland of the Victorian Volcanic Plain	Critically Endangered	Community likely to occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area

Listed Threatened Species

[Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely

Name	Status	Type of Presence
Diomedea exulans Wandering Albatross [89223]	Vulnerable	to occur within area Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat likely to occur within area
Phoebastria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area

Name	Status	Type of Presence
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thinornis cucullatus cucullatus Hooded Plover (eastern), Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat likely to occur within area
Fish		
Galaxiella pusilla Eastern Dwarf Galaxias, Dwarf Galaxias [56790]	Vulnerable	Species or species habitat likely to occur within area
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat known to occur within area
Nannoperca obscura Yarra Pygmy Perch [26177]	Vulnerable	Species or species habitat likely to occur within area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat known to occur within area
Frogs		
Litoria raniformis Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat known to occur within area
Insects		
Synemon plana Golden Sun Moth [25234]	Critically Endangered	Species or species habitat known to occur within area
Mammals		
Antechinus minimus maritimus Swamp Antechinus (mainland) [83086]	Vulnerable	Species or species habitat may occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area

Name	Status	Type of Presence
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat may occur within area
Perameles gunnii Victorian subspecies Eastern Barred Bandicoot (Mainland) [88020]	Endangered	Translocated population known to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Plants		
Amphibromus fluitans River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat likely to occur within area
Dianella amoena Matted Flax-lily [64886]	Endangered	Species or species habitat known to occur within area
Diuris basaltica Small Golden Moths Orchid, Early Golden Moths [64654]	Endangered	Species or species habitat likely to occur within area
Diuris fragrantissima Sunshine Diuris, Fragrant Doubletail, White Diuris [21243]	Endangered	Species or species habitat likely to occur within area
Dodonaea procumbens Trailing Hop-bush [12149]	Vulnerable	Species or species habitat may occur within area
Glycine latrobeana Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat likely to occur within area
Lachnagrostis adamsonii Adamson's Blown-grass, Adamson's Blowngrass [76211]	Endangered	Species or species habitat likely to occur within area
Leucochrysum albicans subsp. tricolor Hoary Sunray, Grassland Paper-daisy [89104]	Endangered	Species or species habitat likely to occur within area
Pimelea spinescens subsp. spinescens Plains Rice-flower, Spiny Rice-flower, Prickly Pimelea [21980]	Critically Endangered	Species or species habitat known to occur within area
Prasophyllum frenchii Maroon Leek-orchid, Slaty Leek-orchid, Stout Leek-orchid, French's Leek-orchid, Swamp Leek-orchid [9704]	Endangered	Species or species habitat likely to occur within area
Pterostylis cucullata Leafy Greenhood [15459]	Vulnerable	Species or species habitat may occur within area
Rutidosis leptorhynchoides Button Wrinklewort [67251]	Endangered	Species or species habitat known to occur within area
Senecio macrocarpus Large-fruit Fireweed, Large-fruit Groundsel [16333]	Vulnerable	Species or species habitat likely to occur within area
Senecio psilocarpus Swamp Fireweed, Smooth-fruited Groundsel [64976]	Vulnerable	Species or species habitat likely to occur within area
Xerochrysum palustre Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Delma impar Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Typanocryptis pinguicolla Grassland Earless Dragon [66727]	Endangered	Species or species habitat known to occur within area

Sharks

Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
--	------------	---

Listed Migratory Species

[\[Resource Information \]](#)

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea Sooty Shearwater [82651]		Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area

Name	Threatened	Type of Presence
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Sternula albifrons Little Tern [82849]		Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Balaena glacialis australis Southern Right Whale [75529]	Endangered*	Species or species habitat known to occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat may occur within area
Migratory Terrestrial Species		
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur

Name	Threatened	Type of Presence within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris subminuta Long-toed Stint [861]		Roosting known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Roosting known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		Roosting known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area

Name	Threatened	Type of Presence
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Roosting known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land

[\[Resource Information \]](#)

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land - Defence - AIRTC FOOTSCRAY Defence - DSTO FISHERMANS BEND Defence - DSTO MARIBYRNONG Defence - FORT GELLIBRAND Defence - MARIBYRNONG COMPLEX Defence - RAAF TOTTENHAM 1SD Defence - SUNSHINE TRAINING DEPOT

Commonwealth Heritage Places

[\[Resource Information \]](#)

Name	State	Status
Historic		
Defence Explosive Factory Maribyrnong	VIC	Listed place
Essendon Airport Air Traffic Control Tower	VIC	Listed place
Fort Gellibrand Commonwealth Area	VIC	Listed place

Listed Marine Species

[\[Resource Information \]](#)

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris subminuta Long-toed Stint [861]		Roosting known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Roosting known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area

Name	Threatened	Type of Presence
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Roosting known to occur within area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		Roosting known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Roosting known to occur within area
Phoebastria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Foraging, feeding or related behaviour likely to occur within area
Puffinus griseus Sooty Shearwater [1024]		Species or species habitat may occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat known to occur within area
Sterna albifrons Little Tern [813]		Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche sp. nov. Pacific Albatross [66511]	Vulnerable*	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis rubricollis Hooded Plover (eastern) [66726]	Vulnerable*	Species or species habitat likely to occur within area
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area

Name	Threatened	Type of Presence
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Mammals		
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Whales and other Cetaceans		
		[Resource Information]
Name	Status	Type of Presence
Mammals		
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves [\[Resource Information \]](#)

Name	State
Cairnlea Estate N.C.R.	VIC
Derrimut Grassland N.C.R.	VIC
Jawbone F.F.R.	VIC

Regional Forest Agreements [\[Resource Information \]](#)

Note that all areas with completed RFAs have been included.

Name	State
West Victoria RFA	Victoria

Invasive Species [\[Resource Information \]](#)

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Carduelis chloris European Greenfinch [404]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Turdus philomelos Song Thrush [597]		Species or species

Name	Status	Type of Presence
habitat likely to occur within area		
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Carrichtera annua Ward's Weed [9511]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Dolichandra unguis-cati Cat's Claw Vine, Yellow Trumpet Vine, Cat's Claw Creeper, Funnel Creeper [85119]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista linifolia Flax-leaved Broom, Mediterranean Broom, Flax Broom [2800]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur within area
Olea europaea Olive, Common Olive [9160]		Species or species habitat may occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Solanum elaeagnifolium Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle, Prairie-berry, Satansbos, Silver-leaf Bitter-apple, Silverleaf-nettle, Trompillo [12323]		Species or species habitat likely to occur within area
Ulex europaeus Gorse, Furze [7693]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-37.843774 144.883678,-37.835165 144.882047,-37.809537 144.849431,-37.801874 144.84368,-37.798347 144.846513,-37.799704 144.863679,-37.795363 144.838616,-37.760019 144.810807,-37.772842 144.82248,-37.753843 144.840333,-37.727305 144.864709,-37.719429 144.873292,-37.713251 144.871661,-37.70809 144.874923,-37.70809 144.874923

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- [-Natural history museums of Australia](#)
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- [-Other groups and individuals](#)

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

APPENDIX B MNES TARGETED SURVEYS METHODS AND RESULTS



Appendix B: MNES Targeted Surveys Methods and Results

Golden Sun Moth Targeted Surveys

Golden Sun Moth (*Synemon plana*) is a medium sized, diurnal (day flying) moth with clubbed antennae (DEWHA 2009d). It is listed as Critically Endangered under the EPBC Act.

Targeted surveys were undertaken for Golden Sun Moth by two ecologists across two survey seasons, summer 2019-2020 and summer 2020-2021. Surveys were conducted in all areas of potential habitat for the species in the State Project Land as identified during fauna habitat assessments, literature review, and analysis of VBA records. Areas surveyed in the Sunshine Section included:

- Sunshine Railway Linear Reserve
 - > 2019-2020 survey season (20th November 2019, 25th November 2019, 19th December 2019 and 9th January 2020)
- Matthews Hill Reserve
 - > Reserve proper surveyed 2019-2020 survey season (20th November 2019, 25th November 2019, 19th December 2019 and 9th January 2020)
 - > Rail corridor adjacent to reserve surveyed 2020-21 survey season (27th November 2020, 4th December 2020, 14th December 2020 and 8th January 2021)
- St. Albans Road Biosites
 - > 2020-21 survey season (27th November 2020, 4th December 2020, 14th December 2020 and 8th January 2021)
- The Old Sunshine Tip Site
 - > 2020-21 survey season (27th November 2020, 4th December 2020, 14th December 2020 and 8th January 2021)

Targeted surveys were conducted within the associated time and weather conditions provided in Table B.1.

Table B.1: Targeted Golden Sun Moth Survey Conditions and Results

Site	Date	GSM recorded in assessment area	GSM Activity at Reference Site	Survey Start Time	Survey Finish Time	Temperature at start (°C)	Wind at start (km/h)	Humidity at start (%)	Cloud Cover at start (%)	Time since rainfall
Matthews Hill Reserve	20/11/2019	3 males	Yes - Craigieburn Grassland NCR	10:00	11:15	19	9	59	30	<48 hours
Matthews Hill Reserve	25/11/2019	1 male	Yes - Craigieburn Grassland NCR	11:00	12:00	32.3	1.8	12	30	<48 hours
Matthews Hill Reserve	19/12/2019	None	Yes - Craigieburn Grassland NCR	10:55	12:00	20.3	20	64	30	<48 hours
Matthews Hill Reserve	9/01/2020	None	Yes - Craigieburn Grassland NCR	12:30	13:30	26.8	15	20	30	<48 hours
Sunshine Railway Linear Reserve	20/11/2019	None	Yes - Craigieburn Grassland NCR	11:15	12:30	26	15	20	30	<48 hours
Sunshine Railway Linear Reserve	25/11/2019	None	Yes - Craigieburn Grassland NCR	12:00	12:45	34.2	4.2	12	30	<48 hours
Sunshine Railway Linear Reserve	19/12/2019	None	Yes - Craigieburn Grassland NCR	12:30	13:30	22.4	19	54	30	<48 hours
Sunshine Railway Linear Reserve	9/01/2020	None	Yes - Craigieburn Grassland NCR	13:30	14:30	27.5	17	45	0	<48 hours
Rail Corridor Adjacent to Matthews Hill Reserve	27/11/2020	None	Yes - Broadmeadows	11:08	11:27	28.8	3.6	54.1	5	>48 hours
Rail Corridor Adjacent to Matthews Hill Reserve	4/12/2020	None	Yes - Broadmeadows	11:05	11:23	23.1	2	41.5	10	>48 hours
Rail Corridor Adjacent to Matthews Hill Reserve	14/12/2020	None	Yes - Broadmeadows	11:37	11:50	30	5.4	33	0	>48 hours (0.2mm on 11/12)
Rail Corridor Adjacent to Matthews Hill Reserve	8/01/2021	None	Yes - Broadmeadows	11:23	11:43	24.1	0	50.7	0	>48 hours (0.6mm on 06/01)
St. Albans Road Biosites	27/11/2020	None	Yes - Broadmeadows	12:21	12:46	32.3	5.3	38.2	5	>48 hours
St. Albans Road Biosites	4/12/2020	None	Yes - Broadmeadows	12:30	13:30	25.5	4.7	34.8	5	>48 hours
St. Albans Road Biosites	14/12/2020	None	Yes - Broadmeadows	13:04	13:47	32.2	10.3	20.5	0	>48 hours (0.2mm on 11/12)
St. Albans Road Biosites	8/01/2021	None	Yes - Broadmeadows	12:37	13:40	24.2	9.9	45.4	0	>48 hours (0.6mm on 06/01)

Site	Date	GSM recorded in assessment area	GSM Activity at Reference Site	Survey Start Time	Survey Finish Time	Temperature at start (°C)	Wind at start (km/h)	Humidity at start (%)	Cloud Cover at start (%)	Time since rainfall
Old Sunshine Tip Site	27/11/2020	None	Yes - Broadmeadows	13:04	13:21	32.3	5.3	38.2	5	>48 hours
Old Sunshine Tip Site	4/12/2020	None	Yes - Broadmeadows	12:30	13:30	25.5	4.7	34.8	5	>48 hours
Old Sunshine Tip Site	14/12/2020	None	Yes - Broadmeadows	13:04	13:47	32.2	10.3	20.5	0	>48 hours (0.2mm on 11/12)
Old Sunshine Tip Site	8/01/2021	None	Yes - Broadmeadows	12:37	13:40	24.2	9.9	45.4	0	>48 hours (0.6mm on 06/01)

Growling Grass Frog Targeted Surveys

The Growling Grass Frog (*Litoria raniformis*) is a large frog, growing to 86 millimetres (mm) in length. It is listed as Vulnerable under the EPBC Act.

Targeted surveys were undertaken for Growling Grass Frog by two ecologists across three survey seasons 2018, 2019 and 2020 across the broader MAR Project. Areas surveyed in the Sunshine Section included:

- Stony Creek West
 - > 2018 survey season (5th December 2018 and 18th December 2018)
- Stony Creek East
 - > 2019 survey season (20th November 2019 and 25th November 2019)

Site descriptions and photos are shown in Table B-2. Targeted surveys were conducted with the associated time and weather conditions provided in Table B-3.

Table B.2: Habitat descriptions of areas of potential habitat identified and surveyed

Survey Location	Photo and Description
Stony Creek East	 <p>The site consists of a creek lined with River Red Gum (<i>Eucalyptus camaldulensis</i>) and exotic Willows (<i>Salix</i> spp.) and Ash (<i>Fraxinus</i> spp.) with largely exotic fringing and submergent wetland vegetation. Fringing native vegetation consisted of Narrowleaf Cumbungi (<i>Typha domingensis</i>), Slender Knotweed (<i>Persicaria decipens</i>) and Native Rush (<i>Juncus</i> spp.). The majority of fringing vegetation consisted of exotic Water Couch (<i>Paspalum distichum</i>), Toowoomba Canary Grass (<i>Phalaris aquatica</i>), Dock (<i>Rumex</i> spp.) and Sticky weed (<i>Galium aparine</i>). Submergent vegetation consisted of Water Couch and Canadian Pondweed (<i>Elodia canadensis</i>). The waterbody is permanent and was slow moving during the time of assessment. The area contained some rocks and some debris present.</p>



Survey Location	Photo and Description
Stony Creek West	 <p data-bbox="475 990 1394 1122">Fringing vegetation was present at the site, with the water way dominated by exotic species. The species included exotic species Toowoomba Canary-grass (<i>Phalaris aquatica</i>) Artichoke thistle (<i>Cynara cardunculus</i>), Fennel (<i>Foeniculum vulgare</i>) and Pepercross (<i>Brassica sp</i>). The waterbody was permanent and still. At the time of the assessment other frog species were calling.</p>

Table B.3: Survey Results and Weather Conditions during Targeted Growling Grass Frog Surveys in Sunshine Section

Site	Date	Survey Start Time and Duration	Weather at Start	Species Recorded
Stony Creek East	20/11/2019	8:23 pm – 10 pm	Temperature: 32.3 °C Wind: Ranged from 10 – 30 km/hr Humidity: 12% No rain in last 48 hour	Eastern Banjo Frog – <i>Limnodynastes dumerilii</i>
	25/11/2019	8:30 pm – 9 pm	Temperature: 24.8 °C Wind: 0.7 km/hr Humidity: 41% No rain in last 48 hours	Eastern Banjo Frog – <i>Limnodynastes dumerilii</i>
6: Stony Creek West	5/12/2018	12:55am – 1:27am	Temperature 15.8 ° Celsius Wind 9 km/hr WNW Humidity 78% No rain since 2/12/2018	Eastern Common Froglet – <i>Crinia signifera</i>
	18/12/2018	1:42am - 2am	Temperature 17.3 ° Celsius Wind 17 km/hr WSW Humidity 100% No rain since 17/12/2018	Eastern Common Froglet – <i>Crinia signifera</i> Spotted Marsh Frog – <i>Limnodynastes tasmaniensis</i>

Spiny Rice Flower Targeted Surveys

Spiny Rice-flower (*Pimelea spinescens* subsp. *spinescens*) is a small spreading perennial shrub. It is listed as Critically endangered under the EPBC Act.

Targeted surveys were undertaken for Spiny Rice-flower by three ecologists in the 2019 survey season, and two ecologists during the 2020 survey season. Survey was undertaken within all areas of suitable habitat for the species within state land. Potential habitat for Spiny Rice-flower was identified through undertaking field vegetation assessments, literature review, and analysis of VBA records. Areas surveyed in the Sunshine Section included:

- Sunshine Railway Linear Reserve
 - > 2019 survey season (3rd and 4th June 2019)
- Matthews Hill Reserve and adjacent land (outside Sunshine Section Project Land – originally included in investigation area)
 - > 2019 survey season (3rd and 4th June 2019)
- St. Albans Road Biosites
 - > 26th July 2020
- Old Sunshine Tip Site
 - > 27th July 2020

These surveys were undertaken in accordance with the published survey guidelines for the species (DEWHA 2009c). Areas of potential habitat identified within the State Project Land were surveyed by groups of either two or three ecologists walking parallel transects 5 m apart. Locations of Spiny Rice-flower were recorded, and the sex of individual plants was determined where possible (See details and results in Appendix B).

It is to be noted that the Sunshine Triangle ecological site and adjacent rail corridor were not subject to targeted survey for this species during the flowering period, however 8 Spiny Rice-flower plants were recorded incidentally in the rail corridor adjacent to the Sunshine Triangle Ecological Site outside of flowering season. Targeted survey results are provided below in Table B-4.

Table B.4: Results of targeted Spiny Rice-flower surveys

Site	Total individuals Recorded	Sex Ratio (M / F / H / U)
In Sunshine Section Project Land		
The rail corridor adjacent to the Sunshine Triangle Ecological Site	12	Unidentified: 8
St. Albans Road Biosites	8	Female: 2; Male: 1 Hermaphrodite: 3 Unidentified: 2
Old Sunshine Tip Site	1	Female: 1
Sunshine Railway Linear Reserve	0	
Total in Sunshine Section Project Land	21 plants	
Outside Sunshine Section Project Land		
Rail corridor adjacent to Matthews Hill Reserve (Recorded during surveys by AJM in 2019) (Outside Project Land)	17	Female: 7 Male: 8 Unidentified: 2

Striped Legless Lizard Targeted Surveys

The Striped Legless Lizard (*Delma impar*) is a long, thin-bodied lizard, which is listed as vulnerable under the EPBC Act.

Targeted surveys for Striped Legless Lizard were undertaken during the 2019-20, and 2020-21 survey seasons. Surveys were conducted in all areas of potential habitat identified for the species during the fauna habitat assessment, literature review, and analysis of VBA records. Areas surveyed in the Sunshine Section included:

- 2019-20 survey season (12th September 2019 – 29th January 2020):
 - > Matthews Hill Reserve (two tile grids (MHE, MHW) were surveyed for this location)
- 2020-21 survey season (9th September 2020 – 17th February 2021):
 - > St Albans Road Biosites (three linear tile grids (GI1a, GI1b, GI2) were surveyed in this location, with tiles spaced 5m apart)

The methods were conducted in accordance with the published survey guidelines (DSEWPaC 2011a) and included:

- Tile grids were laid within areas of potential habitat as per the locations shown in Appendix C. Each tile grid contained 50 artificial shelter sites (roofing tiles, 'French Terracotta' style with dimensions of 430 mm x 340 mm), used to provide temporary habitat for the species. Tiles were placed in 10 rows of five tiles or a single row of 50 placed at intervals of 5 m apart, labelled and their GPS location recorded. Details of tile grids, and dates surveyed are detailed in Appendix B and mapping of survey locations in Appendix C
- The surveys were conducted during appropriate seasonal and daily climate conditions, during the known activity period of the species (DSEWPaC 2011a). Surveys were undertaken from September until February (as indicated above). The species is most active during morning and early afternoon on days typically with temperatures below 28 degrees where possible.

Each season, weekly checks were conducted for the first three months between September and November and conducted fortnightly for the second three months between December and February.

The following areas were not subject to targeted survey for Striped Legless Lizard in the current assessment as detailed below:

- The Old Sunshine Tip Site was not subject to targeted survey for Striped Legless Lizard as this location supports a known population of the species (evidenced by recent records). This assessment therefore considers Striped Legless Lizard are present at the Old Sunshine Tip Site.
- An existing tile grid is in place within the Sunshine Railway Linear Reserve, and is checked annually by the relevant DELWP contractors who are responsible for the management of this site (AJM-JV 2020a). While not noted in the Victorian Biodiversity Atlas, the most recent record of Striped Legless Lizard in the Sunshine Railway Linear Reserve by DELWP is understood to be from 2016. Given this recent record, targeted surveys for the species were not undertaken in this area as part of the current investigation. Rather, it has been considered that Striped Legless Lizard has a moderate likelihood of occurrence in this location.

Targeted surveys were conducted within the associated time and weather conditions provided in Table B-5.



Table B.5: Survey Results and Weather Conditions during Targeted Striped Legless Lizard Surveys

Date	Time (approx)	Temp (°C)	Relative humidity	Wind avg (km/hr)	Cloud cover (%)	Grid	Key Assessment Area	Tile ID	Common Name	Count
9/09/2020	11:30	12.5	53	20	60	GI1	St. Albans Road Biosites	1.09	Striped Legless Lizard	1
9/09/2020	11:30	12.5	53	20	60	GI1	St. Albans Road Biosites	1.03	Tussock Skink	1
15/09/2020	12:30	14.2	58	22	10	GI1	St. Albans Road Biosites	1.14	Striped Legless Lizard	1
15/09/2020	12:30	14.2	58	22	10	GI1	St. Albans Road Biosites	1.30	Tussock Skink	1
9/10/2020	13:40	16.9	52	18.3	90	GI1	St. Albans Road Biosites	1.18	Tussock Skink	1
9/10/2020	14:30	17.5	50.1	18.3	90	GI1	St. Albans Road Biosites	1.32	Tussock Skink	1
9/10/2020	14:30	17.5	50.1	18.3	90	GI1	St. Albans Road Biosites	1.45	Tussock Skink	1
9/10/2020	14:30	17.5	50.1	18.3	90	GI1	St. Albans Road Biosites	1.47	Tussock Skink	1
9/10/2020	13:40	16.9	52	18.3	90	GI1	St. Albans Road Biosites	1.25	Striped Legless Lizard	1
9/10/2020	13:40	16.9	52	18.3	90	GI1	St. Albans Road Biosites	1.05	unidentified skink	1
9/10/2020	13:40	16.9	52	18.3	90	GI1	St. Albans Road Biosites	1.18	Striped Legless Lizard	2
9/10/2020	13:40	16.9	52	18.3	90	GI1	St. Albans Road Biosites	1.19	Striped Legless Lizard	1
9/10/2020	14:30	17.5	50.1	18.3	90	GI1	St. Albans Road Biosites	1.38	Eastern Blue-tongue	1
9/10/2020	14:30	17.5	50.1	18.3	90	GI1	St. Albans Road Biosites	1.23	unidentified skink	1
9/10/2020	14:30	17.5	50.1	18.3	90	GI1	St. Albans Road Biosites	1.27	unidentified skink	1
9/10/2020	14:30	17.5	50.1	18.3	90	GI1	St. Albans Road Biosites	1.41	Tiger Snake	1
9/10/2020	14:30	17.5	50.1	18.3	90	GI1	St. Albans Road Biosites	1.43	unidentified skink	1

Date	Time (approx)	Temp (°C)	Relative humidity	Wind avg (km/hr)	Cloud cover (%)	Grid	Key Assessment Area	Tile ID	Common Name	Count
9/10/2020	14:30	17.5	50.1	18.3	90	GI1	St. Albans Road Biosites	1.49	unidentified skink	1
13/10/2020	1:04	16.7	57.2	17	80	GI1	St. Albans Road Biosites	1.04	Tussock Skink	1
13/10/2020	1:04	16.7	57.2	17	80	GI1	St. Albans Road Biosites	1.26	Tussock Skink	1
13/10/2020	1:04	16.7	57.2	17	80	GI1	St. Albans Road Biosites	1.37	Tussock Skink	1
13/10/2020	1:04	16.7	57.2	17	80	GI1	St. Albans Road Biosites	1.15	Striped Legless Lizard	1
13/10/2020	1:04	16.7	57.2	17	80	GI1	St. Albans Road Biosites	1.25	Striped Legless Lizard	1
13/10/2020	1:04	16.7	57.2	17	80	GI1	St. Albans Road Biosites	1.30	Striped Legless Lizard	1
13/10/2020	1:04	16.7	57.2	17	80	GI1	St. Albans Road Biosites	1.41	Tiger Snake	1
13/10/2020	1:04	16.7	57.2	17	80	GI1	St. Albans Road Biosites	1.38	Eastern Blue-tongue	1
21/10/2020	9:30	24.3	64.3	0.7	Not recorded	GI1	St. Albans Road Biosites	1.15	Tussock Skink	1
21/10/2020	9:30	24.3	64.3	0.7	Not recorded	GI1	St. Albans Road Biosites	1.21	Tussock Skink	1
21/10/2020	9:30	24.3	64.3	0.7	Not recorded	GI1	St. Albans Road Biosites	1.31	Tussock Skink	1
21/10/2020	9:30	24.3	64.3	0.7	Not recorded	GI1	St. Albans Road Biosites	1.35	Tussock Skink	1
21/10/2020	9:30	24.3	64.3	0.7	Not recorded	GI1	St. Albans Road Biosites	1.39	Tussock Skink	1
21/10/2020	9:30	24.3	64.3	0.7	Not recorded	GI1	St. Albans Road Biosites	1.47	Tussock Skink	1
21/10/2020	9:30	24.3	64.3	0.7	Not recorded	GI1	St. Albans Road Biosites	1.49	Tussock Skink	1
21/10/2020	9:30	24.3	64.3	0.7	Not recorded	GI1	St. Albans Road Biosites	1.04	Striped Legless Lizard	1
21/10/2020	9:30	24.3	64.3	0.7	Not recorded	GI1	St. Albans Road Biosites	1.30	Striped Legless Lizard	1

Date	Time (approx)	Temp (°C)	Relative humidity	Wind avg (km/hr)	Cloud cover (%)	Grid	Key Assessment Area	Tile ID	Common Name	Count
21/10/2020	9:30	24.3	64.3	0.7	Not recorded	GI1	St. Albans Road Biosites	1.26	Striped Legless Lizard	1
21/10/2020	9:30	24.3	64.3	0.7	Not recorded	GI1	St. Albans Road Biosites	1.41	Tiger Snake	1
29/10/2020	10:25	23.8	45.7	7	0	GI1	St. Albans Road Biosites	1.05	Striped Legless Lizard	1
29/10/2020	10:25	23.8	45.7	7	0	GI1	St. Albans Road Biosites	1.02	Striped Legless Lizard	1
29/10/2020	10:25	23.8	45.7	7	0	GI1	St. Albans Road Biosites	1.26	Striped Legless Lizard	1
2/11/2020	12:10	25	47	20.5	0	GI1	St. Albans Road Biosites	None	-	n/a
2/11/2020	12:15	25	47	20.5	0	GI1	St. Albans Road Biosites	None	-	n/a
11/11/2020	9:27	25.1	38	9	100	GI1	St. Albans Road Biosites	None	-	n/a
17/11/2020	10:09	18.5	42.5	20	70	GI1	St. Albans Road Biosites	1.04	Striped Legless Lizard	1
24/11/2020	10:05	18.1	53.3	28	100	GI1	St. Albans Road Biosites	1.30	Striped Legless Lizard	1
24/11/2020	10:05	18.1	53.3	28	100	GI1	St. Albans Road Biosites	1.20	House Mouse	1
11/12/2020	9:50	15.5	53	19	Not recorded	GI1	St. Albans Road Biosites	None	-	n/a
11/01/2021	10:12	31	30	30	Not recorded	GI1	St. Albans Road Biosites	1.30	House Mouse	1
11/01/2021	10:12	31	30	30	Not recorded	GI1	St. Albans Road Biosites	1.40	Eastern Blue-tongue	1
15/01/2021	10:20	18.8	43	8	20	GI1	St. Albans Road Biosites	1.27	Eastern Blue-tongue	1
15/01/2021	10:20	18.8	43	8	20	GI1	St. Albans Road Biosites	1.49	Tiger Snake	1
21/01/2021	8:40	20.5	60.8	9	0	GI1	St. Albans Road Biosites	1.30	house mouse	1
3/02/2021	12:04	22.8	28.7	2.7	10	GI1	St. Albans Road Biosites	None	-	n/a

Date	Time (approx)	Temp (°C)	Relative humidity	Wind avg (km/hr)	Cloud cover (%)	Grid	Key Assessment Area	Tile ID	Common Name	Count
3/02/2021	12:08	22.8	28.7	2.7	10	GI1	St. Albans Road Biosites	1.31	House Mouse	1
17/02/2021	10:35	27.5	48	11	0	GI1	St. Albans Road Biosites	None	-	n/a
15/09/2020	12:30	14.2	58	22	10	GI2	St. Albans Road Biosites	2.19	Striped Legless Lizard	1
9/10/2020	13:00	16.6	53	18.3	90	GI2	St. Albans Road Biosites	2.24	Tussock Skink	1
9/10/2020	13:00	16.6	53	18.3	90	GI2	St. Albans Road Biosites	2.41	Tussock Skink	1
9/10/2020	13:00	16.6	53	18.3	90	GI2	St. Albans Road Biosites	2.05	unidentified skink	1
9/10/2020	13:00	16.6	53	18.3	90	GI2	St. Albans Road Biosites	2.06	Tiger Snake	1
9/10/2020	13:00	16.6	53	18.3	90	GI2	St. Albans Road Biosites	2.06	unidentified skink	1
9/10/2020	13:00	16.6	53	18.3	90	GI2	St. Albans Road Biosites	2.14	Striped Legless Lizard	1
9/10/2020	13:00	16.6	53	18.3	90	GI2	St. Albans Road Biosites	2.17	unidentified skink	1
9/10/2020	13:00	16.6	53	18.3	90	GI2	St. Albans Road Biosites	2.18	unidentified skink	1
9/10/2020	13:00	16.6	53	18.3	90	GI2	St. Albans Road Biosites	2.19	unidentified skink	1
9/10/2020	13:00	16.6	53	18.3	90	GI2	St. Albans Road Biosites	2.21	unidentified skink	1
9/10/2020	13:00	16.6	53	18.3	90	GI2	St. Albans Road Biosites	2.22	unidentified skink	1
9/10/2020	13:00	16.6	53	18.3	90	GI2	St. Albans Road Biosites	2.28	unidentified skink	1
9/10/2020	13:00	16.6	53	18.3	90	GI2	St. Albans Road Biosites	2.29	unidentified skink	1
9/10/2020	13:00	16.6	53	18.3	90	GI2	St. Albans Road Biosites	2.40	unidentified skink	1
9/10/2020	13:00	16.6	53	18.3	90	GI2	St. Albans Road Biosites	2.45	unidentified skink	1

Date	Time (approx)	Temp (°C)	Relative humidity	Wind avg (km/hr)	Cloud cover (%)	Grid	Key Assessment Area	Tile ID	Common Name	Count
13/10/2020	12:51	17.2	62.6	17	100	GI2	St. Albans Road Biosites	2.05	Tussock Skink	1
13/10/2020	12:51	17.2	62.6	17	100	GI2	St. Albans Road Biosites	2.08	Tussock Skink	1
13/10/2020	12:51	17.2	62.6	17	100	GI2	St. Albans Road Biosites	2.11	Tussock Skink	1
13/10/2020	12:51	17.2	62.6	17	100	GI2	St. Albans Road Biosites	2.12	Tussock Skink	1
13/10/2020	12:51	17.2	62.6	17	100	GI2	St. Albans Road Biosites	2.13	Tussock Skink	1
13/10/2020	12:51	17.2	62.6	17	100	GI2	St. Albans Road Biosites	2.19	Tussock Skink	1
13/10/2020	12:51	17.2	62.6	17	100	GI2	St. Albans Road Biosites	2.20	Tussock Skink	1
13/10/2020	12:51	17.2	62.6	17	100	GI2	St. Albans Road Biosites	2.16	Tussock Skink	1
13/10/2020	12:51	17.2	62.6	17	100	GI2	St. Albans Road Biosites	2.21	Tussock Skink	1
13/10/2020	12:51	17.2	62.6	17	100	GI2	St. Albans Road Biosites	2.30	Tussock Skink	1
13/10/2020	12:51	17.2	62.6	17	100	GI2	St. Albans Road Biosites	2.31	Tussock Skink	1
13/10/2020	12:51	17.2	62.6	17	100	GI2	St. Albans Road Biosites	2.35	Tussock Skink	1
13/10/2020	12:51	17.2	62.6	17	100	GI2	St. Albans Road Biosites	2.40	Tussock Skink	1
21/10/2020	8:30	22.5	44.8	1.2	Not recorded	GI2	St. Albans Road Biosites	2.45	Striped Legless Lizard	1
21/10/2020	8:30	22.5	44.8	1.2	Not recorded	GI2	St. Albans Road Biosites	2.14	Striped Legless Lizard	1
21/10/2020	8:30	22.5	44.8	1.2	Not recorded	GI2	St. Albans Road Biosites	2.31	unidentified skink	1
29/10/2020	10:07	23.8	45.7	7	0	GI2	St. Albans Road Biosites	2.45	Striped Legless Lizard	1
2/11/2020	11:58	25	47	20.4	0	GI2	St. Albans Road Biosites	None	-	n/a

Date	Time (approx)	Temp (°C)	Relative humidity	Wind avg (km/hr)	Cloud cover (%)	Grid	Key Assessment Area	Tile ID	Common Name	Count
11/11/2020	9:15	25.1	38	17	100	GI2	St. Albans Road Biosites	None	-	n/a
17/11/2020	9:56	18.5	42.5	20	70	GI2	St. Albans Road Biosites	2.47	House Mouse	1
24/11/2020	10:15	18.1	53.3	28	100	GI2	St. Albans Road Biosites	2.24	Tussock Skink	1
24/11/2020	10:15	18.1	53.3	28	100	GI2	St. Albans Road Biosites	2.11	Tussock Skink	1
24/11/2020	10:15	18.1	53.3	28	100	GI2	St. Albans Road Biosites	2.16	Striped Legless Lizard	1
11/12/2020	9:43	15.5	53	19	Not recorded	GI2	St. Albans Road Biosites	2.07	House mouse	1
11/12/2020	9:43	15.5	53	19	Not recorded	GI2	St. Albans Road Biosites	2.26	Eastern Blue-tongue	1
11/01/2021	10:05	31	30	30	Not recorded	GI2	St. Albans Road Biosites	2.41	House Mouse	1
15/01/2021	10:00	19.2	46	5.4	40	GI2	St. Albans Road Biosites	2.05	House Mouse	1
15/01/2021	10:00	19.2	46	5.4	40	GI2	St. Albans Road Biosites	2.31	Eastern Blue-tongue	1
21/01/2021	8:32	20.5	60.8	9	0	GI2	St. Albans Road Biosites	None	-	n/a
3/02/2021	11:57	22.2	51.6	2.5	10	GI2	St. Albans Road Biosites	2.30	House Mouse	1
3/02/2021	11:57	22.2	51.6	2.5	10	GI2	St. Albans Road Biosites	2.31	House Mouse	1
3/02/2021	11:57	22.2	51.6	2.5	10	GI2	St. Albans Road Biosites	2.49	House Mouse	1
12/09/2019	Not recorded	22.2	47.4	12.5	80	MHE	Matthews Hill Reserve	2.70	Grass Skink	1
9/10/2019	Not recorded	14.6	61.6	5.2	80	MHE	Matthews Hill Reserve	2.49	Grass Skink	1
21/10/2019	Not recorded	17	55	15	30	MHE	Matthews Hill Reserve	2.10	Brown Snake	1
21/11/2019	Not recorded	31.3	19	4.2	0	MHE	Matthews Hill Reserve	2.20	Blue Tongue Lizard	1

Date	Time (approx)	Temp (°C)	Relative humidity	Wind avg (km/hr)	Cloud cover (%)	Grid	Key Assessment Area	Tile ID	Common Name	Count
21/11/2019	Not recorded	31.3	19	4.2	0	MHE	Matthews Hill Reserve	2.44	Blue Tongue Lizard	1
27/11/2019	Not recorded	28.2	25	4.2	0	MHE	Matthews Hill Reserve	2.20	Blue Tongue Lizard	1
27/11/2019	Not recorded	28.2	25	4.2	0	MHE	Matthews Hill Reserve	2.44	Blue Tongue Lizard	1
4/12/2019	Not recorded	18	46.5	5.1	80	MHE	Matthews Hill Reserve	2.31	Whip Snake	1
4/12/2019	Not recorded	18	46.5	5.1	80	MHE	Matthews Hill Reserve	2.48	Whip Snake	11
16/12/2019	Not recorded	20.9	55	4.4	100	MHE	Matthews Hill Reserve	2.20	Blue Tongue Lizard	1
16/12/2019	Not recorded	20.9	55	4.4	100	MHE	Matthews Hill Reserve	2.44	Blue Tongue Lizard	1
29/01/2020	Not recorded	27.5	41	2.5	0	MHE	Matthews Hill Reserve	2.20	Blue Tongue Lizard	1
29/01/2020	Not recorded	27.5	41	2.5	0	MHE	Matthews Hill Reserve	2.44	Blue Tongue Lizard	1
26/09/2019	Not recorded	20.3	49.7	2.9	40	MHE; MHW	Matthews Hill Reserve	None	-	n/a
6/11/2019	Not recorded	26.5	27	25.5	40	MHE; MHW	Matthews Hill Reserve	None	-	
17/01/2020	Not recorded	20.5	64	3.8	100	MHE; MHW	Matthews Hill Reserve	None	-	n/a
21/10/2019	Not recorded	17	55	15	30	MHW	Matthews Hill Reserve	1.25	Brown Snake	1
21/10/2019	Not recorded	17	55	15	30	MHW	Matthews Hill Reserve	1.10	Tiger Snake	1
21/10/2019	Not recorded	17	55	15	30	MHW	Matthews Hill Reserve	1.16	Tiger Snake	1
21/11/2019	Not recorded	31.3	19	4.2	0	MHW	Matthews Hill Reserve	1.40	Blue Tongue Lizard	1
27/11/2019	Not recorded	28.2	25	4.2	0	MHW	Matthews Hill Reserve	1.40	Blue Tongue Lizard	1
16/12/2019	Not recorded	20.9	55	4.4	100	MHW	Matthews Hill Reserve	1.40	Blue Tongue Lizard	1

Date	Time (approx)	Temp (°C)	Relative humidity	Wind avg (km/hr)	Cloud cover (%)	Grid	Key Assessment Area	Tile ID	Common Name	Count
29/01/2020	Not recorded	27.5	41	2.5	0	MHW	Matthews Hill Reserve	1.40	Blue Tongue Lizard	1

APPENDIX C

MNES TARGETED SURVEYS

LOCATION MAPPING





Appendix C: MNES Targeted Surveys Location Mapping



- Rail
- Watercourse
- - - VicTrack Reserve Boundary
- ▭ Project Land (Sunshine Stage)
- ▭ Key Assessment Areas
- Native Vegetation**
- ▭ 132 Plains Grassland
- ▭ 55 Plains Grassy Woodland
- ▭ Golden Sun Moth Survey Area
- Growing Grass Frog Survey Location

Map 1 of 6

Data Sources:
 AJMJV 2021
 VicTrack 2021
 Vicmap 2021
 Aerial photo: DELWP Nov. 2020



**Melbourne Airport Rail
Sunshine**

Targeted Fauna Survey Locations - Sunshine Stage

Drawing Number:	Revision:		
MAR-AJM-SUN-MA7-MAP-XEV-SUN-0490626	A.3		
Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	L. McComb	3/09/2021	A3

0 70 140
Metres
Coordinate System: GDA 1994 MGA Zone 55



- Rail
- Watercourse
- VicTrack Reserve Boundary
- Project Land (Sunshine Stage)
- Key Assessment Areas
- Native Vegetation**
- 125 Plains Grassy Wetland
- 132 Plains Grassland
- 55 Plains Grassy Woodland
- 821 Tall Marsh
- Striped Legless Lizard Tile Array
- Golden Sun Moth Survey Area
- Growing Grass Frog Survey Location

Map 2 of 6

Data Sources:
 AJMJV 2021
 VicTrack 2021
 Vicmap 2021
 Aerial photo: DELWP Nov. 2020



RAIL PROJECTS VICTORIA

AJM Joint Venture

aurecon

JACOBS

MOTT MACDONALD

Melbourne Airport Rail Sunshine

Targeted Fauna Survey Locations - Sunshine Stage

Drawing Number:	MAR-AJM-SUN-MA7-MAP-XEV-SUN-0490626	Revision:	A.3
Drawn By:	J. Rivera	Approved By:	L. McComb
Date:	3/09/2021	Map Size:	A3

0 70 140 Metres

Coordinate System: GDA 1994 MGA Zone 55



- Rail
- Watercourse
- - - VicTrack Reserve Boundary
- ▭ Project Land (Sunshine Stage)
- Native Vegetation**
- ▭ 125 Plains Grassy Wetland
- ▭ 132 Plains Grassland
- ▭ 55 Plains Grassy Woodland
- Growling Grass Frog Survey Location

Map 3 of 6

Data Sources:
 AJMJV 2021
 VicTrack 2021
 Vicmap 2021
 Aerial photo: DELWP Nov. 2020



RAIL PROJECTS VICTORIA

AJM Joint Venture

aurecon JACOBS MOTT MACDONALD

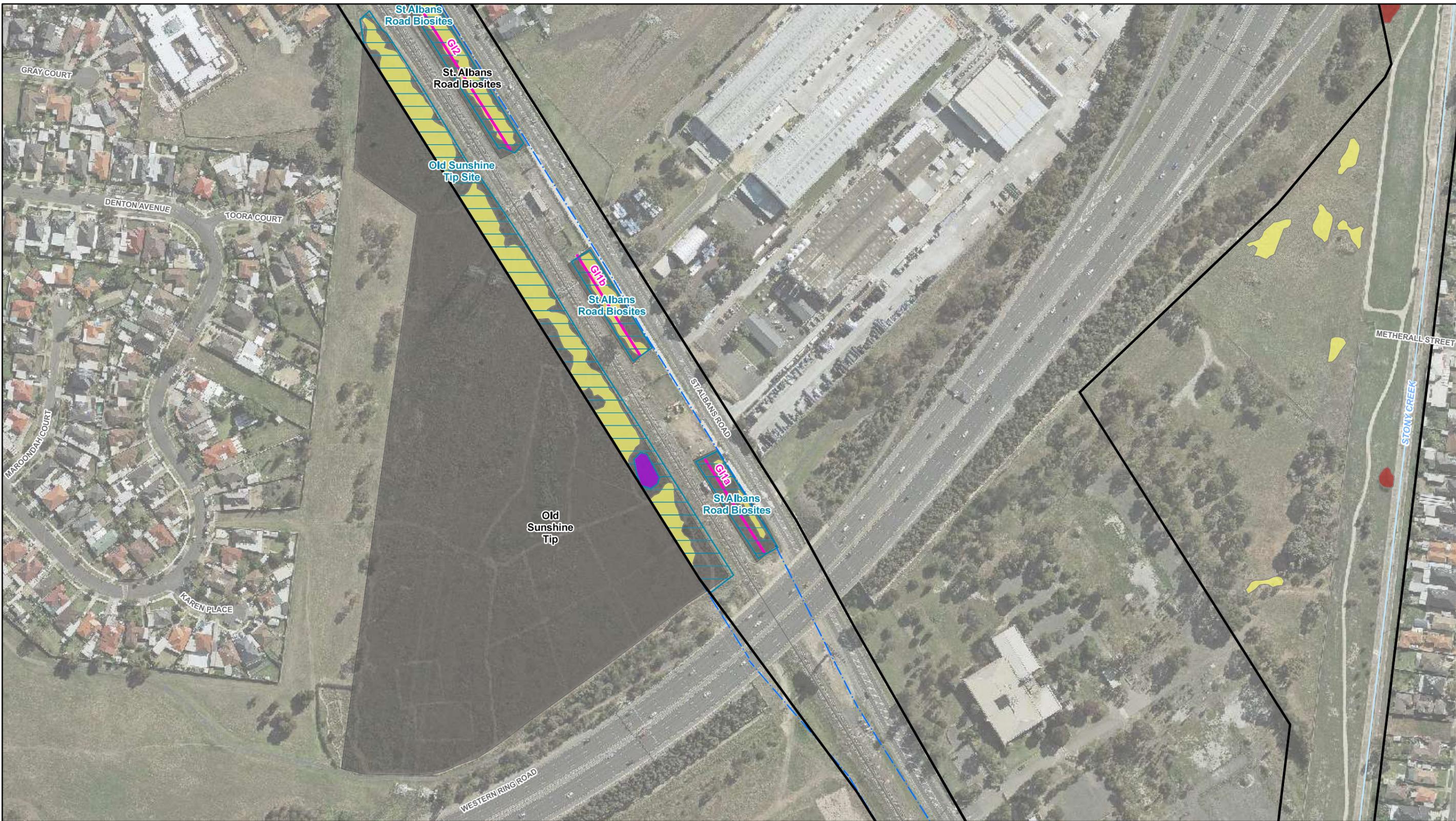
Melbourne Airport Rail Sunshine

Targeted Fauna Survey Locations - Sunshine Stage

Drawing Number:	Revision:		
MAR-AJM-SUN-MA7-MAP-XEV-SUN-0490626	A.3		
Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	L. McComb	3/09/2021	A3

0 70 140 Metres

Coordinate System: GDA 1994 MGA Zone 55



- Rail
- Watercourse
- - - VicTrack Reserve Boundary
- ▭ Project Land (Sunshine Stage)
- ▭ Key Assessment Areas
- Native Vegetation**
- ▭ 132 Plains Grassland
- ▭ 55 Plains Grassy Woodland
- ▭ 821 Tall Marsh
- ▭ Striped Legless Lizard Tile Array
- ▭ Golden Sun Moth Survey Area

Map 4 of 6

Data Sources:
 AJMJV 2021
 VicTrack 2021
 Vicmap 2021
 Aerial photo: DELWP Nov. 2020



**Melbourne Airport Rail
Sunshine**
 Targeted Fauna Survey Locations - Sunshine Stage

Drawing Number: MAR-AJM-SUN-MA7-MAP-XEV-SUN-0490626		Revision: A.3	
Drawn By: J. Rivera	Approved By: L. McComb	Date: 3/09/2021	Map Size: A3

0 70 140
 Metres
 Coordinate System: GDA 1994 MGA Zone 55



- Rail
- - - VicTrack Reserve Boundary
- ▭ Project Land (Sunshine Stage)
- ▭ Key Assessment Areas
- Native Vegetation**
- ▭ 132 Plains Grassland
- ▭ Striped Legless Lizard Tile Array
- ▭ Golden Sun Moth Survey Area

Map 5 of 6

Data Sources:
 AJMJV 2021
 VicTrack 2021
 Vicmap 2021
 Aerial photo: DELWP Nov. 2020



RAIL PROJECTS VICTORIA

AJM Joint Venture

aurecon JACOBS

MOTT MACDONALD

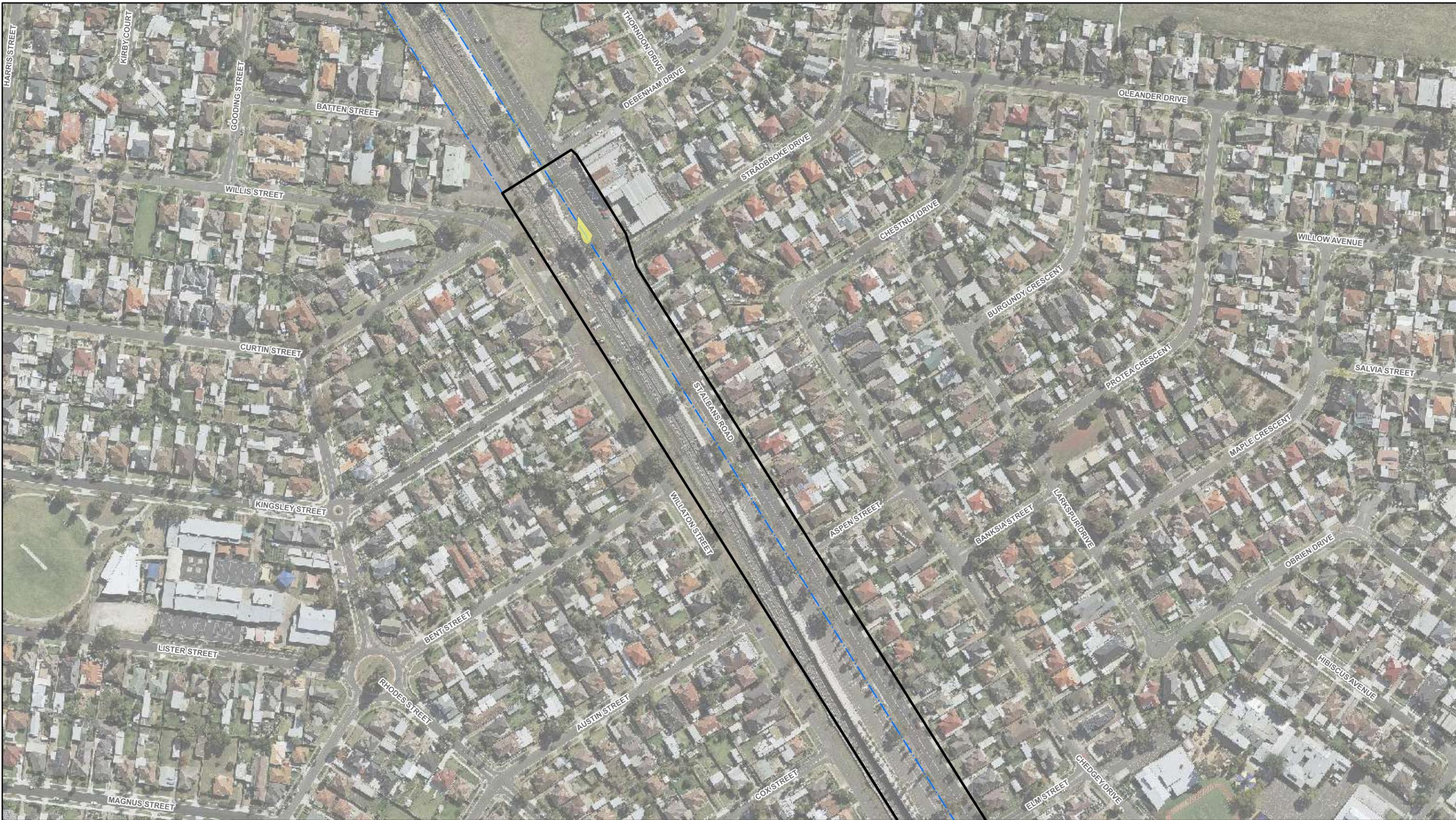
Melbourne Airport Rail Sunshine

Targeted Fauna Survey Locations - Sunshine Stage

Drawing Number:	Revision:		
MAR-AJM-SUN-MA7-MAP-XEV-SUN-0490626	A.3		
Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	L. McComb	3/09/2021	A3

0 70 140 Metres

Coordinate System: GDA 1994 MGA Zone 55



- Rail
- - - VicTrack Reserve Boundary
- ▭ Project Land (Sunshine Stage)
- Native Vegetation**
- 132 Plains Grassland

Map 6 of 6

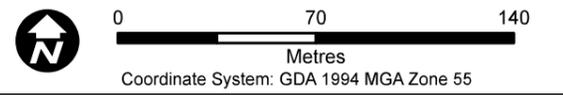
Data Sources:
 AJMJV 2021
 VicTrack 2021
 Vicmap 2021
 Aerial photo: DELWP Nov. 2020



**Melbourne Airport Rail
 Sunshine**

Targeted Fauna Survey Locations - Sunshine Stage

Drawing Number:		Revision:	
MAR-AJM-SUN-MA7-MAP-XEV-SUN-0490626		A.3	
Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	L. McComb	3/09/2021	A3



APPENDIX D FLORA AND FAUNA SPECIES LISTS



Appendix D: Flora and fauna species lists for MAR Project State Land

Summary of the flora species recorded in the MAR Project State Land (across both SUN and COR Sections) during surveys between August 2020 – February 2021.

Key:

CR – EPBC Act listed Critically Endangered

- native species occurring beyond its natural range

* - introduced

Table D.1 Flora Species list

Species Name	Common Name	EPBC Act Status	Origin
<i>Acacia baileyana</i>	Cootamundra Wattle		#
<i>Acacia dealbata</i>	Silver Wattle		
<i>Acacia mearnsii</i>	Black Wattle		
<i>Acacia melanoxylon</i>	Blackwood		
<i>Acacia paradoxa</i>	Hedge Wattle		
<i>Acacia retinodes s.l.</i>	Wirilda		
<i>Acacia saligna</i>	Golden Wreath Wattle		#
<i>Acaena echinata</i>	Sheep's Burr		
<i>Agapanthus praecox subsp. orientalis</i>	Agapanthus		*
<i>Agrostis capillaris</i>	Brown-top Bent		*
<i>Allocasuarina verticillata</i>	Drooping Sheoak		
<i>Aloe arborescens</i>	Tree Aloe		*
<i>Alternanthera denticulata s.s.</i>	Lesser Joyweed		
<i>Amaranthus albus</i>	Stiff Tumbleweed		*
<i>Amyema spp.</i>	Mistletoe		
<i>Anthosachne scabra s.s.</i>	Common Wheat-grass		
<i>Anthoxanthum odoratum</i>	Sweet Vernal Grass		*
<i>Araujia sericifera</i>	White Bladder-flower		*
<i>Arctotheca calendula</i>	Cape weed		*
<i>Arthropodium minus</i>	Small Vanilla-lily		
<i>Asperula conferta</i>	Common Woodruff		
<i>Aster subulatus</i>	Aster-weed		*
<i>Atriplex semibaccata</i>	Berry Saltbush		
<i>Austrostipa bigeniculata</i>	Kneed Spear-grass		
<i>Austrostipa elegantissima</i>	Feather Spear-grass		
<i>Austrostipa rudis</i>	Veined Spear-grass		
<i>Austrostipa scabra subsp. falcata</i>	Rough Spear-grass		
<i>Avena barbata</i>	Bearded Oat		*

Species Name	Common Name	EPBC Act Status	Origin
<i>Avena fatua</i>	Wild Oat		*
<i>Berkheya rigida</i>	African Thistle		*
<i>Bothriochloa macra</i>	Red-leg Grass		
<i>Brachyscome basaltica</i> var. <i>gracilis</i>	Woodland Swamp-daisy		
<i>Brachyscome dentata</i>	Lobe-seed Daisy		
<i>Brassica fruticulosa</i>	Twiggy Turnip		*
<i>Briza maxima</i>	Large Quaking-grass		*
<i>Bromus alopecuroides</i>	Mediterranean Brome		*
<i>Bromus catharticus</i>	Prairie Grass		*
<i>Bromus diandrus</i>	Great Brome		*
<i>Bromus hordeaceus</i>	Soft Brome		*
<i>Bursaria spinosa</i>	Sweet Bursaria		
<i>Caesia calliantha</i>	Blue Grass-lily		
<i>Callistemon sieberi</i>	River Bottlebrush		
<i>Calocephalus citreus</i>	Lemon Beauty-heads		
<i>Calystegia sepium</i>	Large Bindweed		
<i>Carduus tenuiflorus</i>	Winged Slender-thistle		*
<i>Carex bichenoviana</i>	Plains Sedge		
<i>Carex breviculmis</i>	Common Grass-sedge		
<i>Carex inversa</i>	Knob Sedge		
<i>Carex tereticaulis</i>	Poong'ort		
<i>Carpobrotus rossii</i>	Karkalla		
<i>Cassinia arcuata</i>	Drooping Cassinia		
<i>Cenchrus clandestinus</i>	Kikuyu		*
<i>Centaurium erythraea</i>	Common Centaury		*
<i>Cerastium glomeratum</i> s.s.	Sticky Mouse-ear Chickweed		*
<i>Cheilanthes austrotenuifolia</i>	Green Rock-fern		
<i>Cheilanthes sieberi</i>	Narrow Rock-fern		
<i>Chenopodium murale</i>	Sowbane		*
<i>Chloris truncata</i>	Windmill Grass		
<i>Chrysanthemoides monilifera</i>	Boneseed		*
<i>Chrysocephalum</i> sp. 1	Plains Everlasting		
<i>Cirsium vulgare</i>	Spear Thistle		*
<i>Clematis microphylla</i> s.s.	Small-leaved Clematis		
<i>Convolvulus angustissimus</i> subsp. <i>angustissimus</i>	Blushing Bindweed		
<i>Conyza bonariensis</i>	Flaxleaf Fleabane		*
<i>Cortaderia selloana</i>	Pampas Grass		*
<i>Crassula decumbens</i> var. <i>decumbens</i>	Spreading Crassula		
<i>Crassula sieberiana</i> s.s.	Sieber Crassula		
<i>Crataegus monogyna</i>	Hawthorn		*

Species Name	Common Name	EPBC Act Status	Origin
<i>Cymbonotus preissianus</i>	Austral Bear's-ear		
<i>Cynara cardunculus subsp. flavescens</i>	Artichoke Thistle		*
<i>Cynodon dactylon var. dactylon</i>	Couch		*
<i>Cyperus eragrostis</i>	Drain Flat-sedge		*
<i>Dactylis glomerata</i>	Cocksfoot		*
<i>Desmodium gunnii</i>	Southern Tick-trefoil		
<i>Dianella longifolia var. grandis</i>	Arching Flax-lily		
<i>Dianella revoluta s.l.</i>	Black-anther Flax-lily		
<i>Dichanthium sericeum subsp. sericeum</i>	Silky Blue-grass		
<i>Dichelachne crinita</i>	Long-hair Plume-grass		
<i>Dichondra repens</i>	Kidney-weed		
<i>Dittrichia graveolens</i>	Stinkwort		*
<i>Drosera aberrans</i>	Scented Sundew		
<i>Duma florulenta</i>	Tangled Lignum		
<i>Echium plantagineum</i>	Paterson's Curse		*
<i>Ehrharta erecta var. erecta</i>	Panic Veldt-grass		*
<i>Ehrharta longiflora</i>	Annual Veldt-grass		*
<i>Einadia nutans</i>	Nodding Saltbush		
<i>Eleocharis acuta</i>	Common Spike-sedge		
<i>Enchylaena tomentosa var. tomentosa</i>	Ruby Saltbush		
<i>Epilobium billardioreanum</i>	Variable Willow-herb		
<i>Erodium botrys</i>	Big Heron's-bill		*
<i>Erodium moschatum</i>	Musky Heron's-bill		*
<i>Eryngium ovinum</i>	Blue Devil		
<i>Eucalyptus camaldulensis</i>	River Red-gum		
<i>Eucalyptus cladocalyx</i>	Sugar Gum		*
<i>Eucalyptus leucoxylon subsp. leucoxylon</i>	Yellow Gum		
<i>Euphorbia drummondii</i>	Flat Spurge		
<i>Foeniculum vulgare</i>	Fennel		*
<i>Fraxinus angustifolia</i>	Desert Ash		*
<i>Fumaria muralis Wall Fumitory</i>	Wall Fumitory		*
<i>Galenia pubescens var. pubescens</i>	Galenia		*
<i>Galium aparine</i>	Cleavers		*
<i>Galium murale</i>	Small Goosegrass		*
<i>Genista linifolia</i>	Flax-leaf Broom		*
<i>Genista monspessulana</i>	Montpellier Broom		*
<i>Geranium retrorsum s.s.</i>	Grassland Crane's-bill		
<i>Glycine tabacina</i>	Variable Glycine		
<i>Goodenia pinnatifida</i>	Cut-leaf Goodenia		
<i>Haloragis heterophylla</i>	Varied Raspwort		

Species Name	Common Name	EPBC Act Status	Origin
<i>Helminthotheca echioides</i>	Ox-tongue		*
<i>Holcus lanatus</i>	Yorkshire Fog		*
<i>Hordeum hystrix</i>	Barley-grass		*
<i>Hordeum leporinum</i>	Barley-grass		*
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort		
<i>Hypochaeris glabra</i>	Smooth Cats-ear		*
<i>Hypochaeris radicata</i>	Flatweed		*
<i>Hypoxis glabella</i>	Tiny Star		
<i>Juncus acutus</i>	Spiny Rush		*
<i>Juncus australis</i>	Austral Rush		
<i>Juncus pallidus</i>	Pale Rush		
<i>Juncus subsecundus</i>	Finger Rush		
<i>Lachnagrostis filiformis</i>	Common Blown-grass		
<i>Lagurus ovatus</i>	Hare's-tail Grass		*
<i>Leontodon taraxacoides</i> subsp. <i>taraxacoides</i>	Hairy Hawkbit		*
<i>Lepidium africanum</i>	Common Peppercross		*
<i>Leptospermum lanigerum</i>	Woolly Tea-tree		
<i>Linum marginale</i>	Native Flax		
<i>Lobelia pratioides</i>	Poison Lobelia		
<i>Lolium rigidum</i>	Wimmera Rye-grass		*
<i>Lomandra filiformis</i>	Wattle Mat-rush		
<i>Lomandra micrantha</i>	Small-flower Mat-rush		
<i>Lomandra nana</i>	Dwarf Mat-rush		
<i>Lycium ferocissimum</i>	African Box-thorn		*
<i>Lysimachia arvensis</i>	Pimpernel		*
<i>Lythrum hyssopifolia</i>	Common loosestrife		
<i>Maireana decalvans</i>	Black Cotton-bush		
<i>Maireana enchylaenoides</i>	Wingless Bluebush		
<i>Malva nicaeensis</i>	Mallow of Nice		*
<i>Marrubium vulgare</i>	Horehound		*
<i>Melicytus dentatus</i>	Tree Violet		
<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass		
<i>Modiola caroliniana</i>	Red-flower Mallow		*
<i>Muellerina eucalyptoides</i>	Creeping Mistletoe		
<i>Nassella hyalina</i>	Cane Needle-grass		*
<i>Nassella neesiana</i>	Chilean Needle-grass		*
<i>Nassella trichotoma</i>	Serrated Tussock		*
<i>Nicotiana suaveolens</i>	Austral Tobacco		
<i>Opuntia</i> spp.	Prickly pear		*
<i>Oxalis perennans</i>	Grassland Wood-sorrel		

Species Name	Common Name	EPBC Act Status	Origin
<i>Oxalis pes-caprae</i>	Soursob		*
<i>Panicum effusum</i>	Hairy Panic		
<i>Paspalum dilatatum</i>	Paspalum		*
<i>Paspalum distichum</i>	Water Couch		*
<i>Petrorhagia nanteuillii</i>	Childling Pink		*
<i>Phalaris aquatica</i>	Toowoomba Canary-grass		*
<i>Phragmites australis</i>	Common Reed		
<i>Pimelea glauca</i>	Smooth Rice-flower		
<i>Pimelea humilis</i>	Common Rice-flower		
<i>Pimelea spinescens subsp. spinescens</i>	Spiny Rice-flower	CR	
<i>Pittosporum undulatum</i>	Sweet Pittosporum		*
<i>Plantago coronopus</i>	Buck's-horn Plantain		*
<i>Plantago gaudichaudii</i>	Narrow Plantain		
<i>Plantago lanceolata</i>	Ribwort		*
<i>Poa annua</i>	Annual Meadow-grass		*
<i>Poa labillardierei</i>	Common Tussock-grass		
<i>Poa morrisii</i>	Soft Tussock-grass		
<i>Poa sieberiana var. sieberiana</i>	Grey Tussock-grass		
<i>Polycarpon tetraphyllum</i>	Four-leaved Allseed		*
<i>Rapistrum rugosum</i>	Giant Mustard		*
<i>Rhagodia parabolica</i>	Fragrant Saltbush		
<i>Romulea minutiflora</i>	Small-flower Onion Grass		*
<i>Romulea rosea</i>	Onion Grass		*
<i>Rosa rubiginosa</i>	Sweet Briar		*
<i>Rubus fruticosus spp. agg.</i>	Blackberry		*
<i>Rubus parvifolius</i>	Small-leaf Bramble		
<i>Rumex conglomeratus</i>	Clustered Dock		*
<i>Rumex dumosus</i>	Wiry Dock		
<i>Rumex bidens</i>	Mud Dock		
<i>Rumex brownii</i>	Slender Dock		
<i>Rumex crispus</i>	Curled Dock		*
<i>Rytidosperma caespitosum</i>	Common Wallaby-grass		
<i>Rytidosperma duttonianum</i>	Brown-back Wallaby-grass		
<i>Rytidosperma fulvum</i>	Copper-awned Wallaby-grass		
<i>Rytidosperma geniculatum</i>	Kneed Wallaby-grass		
<i>Rytidosperma racemosum var. racemosum</i>	Slender Wallaby-grass		
<i>Rytidosperma setaceum</i>	Bristly Wallaby-grass		
<i>Rytidosperma spp.</i>	Wallaby Grass		
<i>Salsola tragus</i>	Prickly Saltwort		
<i>Salvia verbenaca</i>	Wild Sage		*

Species Name	Common Name	EPBC Act Status	Origin
<i>Schinus molle</i>	Pepper Tree		*
<i>Schoenoplectus tabernaemontani</i>	River Club-sedge		
<i>Schoenus apogon</i>	Common Bog-sedge		
<i>Senecio quadridentatus</i>	Cotton Fireweed		
<i>Senecio tenuiflorus</i> spp. agg.	Slender Fireweed		
<i>Sherardia arvensis</i>	Field Madder		*
<i>Solanum laciniatum</i>	Large Kangaroo Apple		
<i>Solanum nigrum</i>	Black Nightshade		*
<i>Solanum pseudocapsicum</i>	Madeira Winter-cherry		*
<i>Solenogyne dominii</i>	Smooth Solenogyne		
<i>Sonchus asper</i>	Rough Sow-thistle		*
<i>Sonchus oleraceus</i>	Common Sow-thistle		*
<i>Sporobolus africanus</i>	Rat-tail Grass		*
<i>Stellaria media</i>	Chickweed		*
<i>Themeda triandra</i>	Kangaroo Grass		
<i>Tradescantia fluminalis</i>	Wandering Jew		*
<i>Tricoryne elatior</i>	Yellow Rush-lily		
<i>Trifolium angustifolium</i> var. <i>angustifolium</i>	Narrow-leaf Clover		*
<i>Trifolium</i> spp.	Clover		*
<i>Typha orientalis</i>	Broad-leaf Cumbungi		
<i>Ulex europaeus</i>	Gorse		*
<i>Velleia paradoxa</i>	Spur Velleia		
<i>Verbena bonariensis</i>	Purple-top		*
<i>Veronica gracilis</i>	Slender Speedwell		
<i>Veronica plebeia</i>	Trailing Speedwell		
<i>Vicia sativa</i> subsp. <i>sativa</i>	Common Vetch		*
<i>Vinca major</i>	Blue Periwinkle		*
<i>Vulpia</i> spp.	Fescue		*
<i>Wahlenbergia communis</i>	Tufted Bluebell		
<i>Wahlenbergia luteola</i>	Bronze Bluebell		
<i>Walwhalleya proluta</i>	Rigid Panic		
<i>Watsonia meriana</i> var. <i>bulbillifera</i>	Bulbil Watsonia		*

Summary of the fauna species recorded in the MAR Project State Land (across both SUN and COR Sections) during surveys between August 2020 – February 2021

Key:

V – EPBC Act listed Vulnerable

* – Introduced

Table D.2 Fauna Species list

Common and Species Name	EPBC Act Status	Origin	Survey Method
Australian Magpie (<i>Cracticus tibicen</i>)			Incidental
Australian White Ibis (<i>Threskiornis molucca</i>)			Incidental
Australian Wood Duck (<i>Chenonetta jubata</i>)			Incidental
Australasian Grebe (<i>Tachybaptus novaehollandiae</i>)			Incidental
Bell Miner (<i>Manorina melanophrys</i>)			Incidental
Black Kite (<i>Milvus migrans</i>)			Incidental
Brown Falcon (<i>Falco berigora</i>)			Incidental
Crested Pigeon (<i>Ocyphaps lophotes</i>)			Incidental
Delicate Skink (<i>Lampropholis delicata</i>)			SLL Survey
Dusky Woodswallow (<i>Artamus cyanopterus</i>)			Incidental
Eastern Blue-tongue Lizard (<i>Tiliqua scincoides scincoides</i>)			SLL Survey
Eastern Common Froglet (<i>Crinia signifera</i>)			GGF Survey
Eastern Grey Kangaroo (<i>Macropus giganteus</i>)			Incidental
Eastern Rosella (<i>Platycercus eximius</i>)			Incidental
Eurasian Coot (<i>Fulica atra</i>)			Incidental
European Hare (<i>Lepus europaeus</i>)		*	Incidental
European Rabbit (<i>Oryctolagus cuniculus</i>)		*	Incidental
Indian Myna (<i>Acridotheres tristis</i>)		*	Incidental
Golden Sun Moth (<i>Synemon plana</i>)	CE		GSM Survey
Growling Grass Frog (<i>Litoria raniformis</i>)	V		GGF Survey (Note – recorded in the COR Section only. Not recorded in SUN Section)
Little Raven (<i>Corvus mellori</i>)			Incidental
Lowland Copperhead (<i>Austrelaps superbus</i>)			SLL Survey
Magpie-lark (<i>Grallina cyanoleuca</i>)			Incidental
New Holland Honeyeater (<i>Phylidonyris novaehollandiae</i>)			Incidental
Noisy Miner (<i>Manorina melanocephala</i>)			Incidental
Pacific Black Duck (<i>Anas superciliosa</i>)			Incidental
Pobblebonk (<i>Limnodynastes dumerilii</i>)			GGF Survey
Purple Swamphen (<i>Porphyrio porphyrio</i>)			Incidental
Rainbow Lorikeet (<i>Trichoglossus moluccanus</i>)			Incidental



Common and Species Name	EPBC Act Status	Origin	Survey Method
Robust Striped Skink (<i>Ctenotus robustus</i>)			SLL Survey
Shingleback (<i>Tiliqua rugosa</i>)			SLL Survey
Spotted Marsh Frog (<i>Limnodynastes tasmaniensis</i>)			GGF Survey
Superb Fairy-wren (<i>Malurus cyaneus</i>)			Incidental
Striated Pardalote (<i>Pardalotus striatus</i>)			Incidental
Striped Legless Lizard (<i>Delma impar</i>)	V		SLL Survey
Striped Marsh Frog (<i>Limnodynastes peronii</i>)			GGF Survey
Tiger Snake (<i>Notechis scutatus</i>)			SLL Survey
Tussock Skink (<i>Pseudemoia pagenstecheri</i>)			SLL Survey
Weasel Skink (<i>Saproscincus mustelinus</i>)			SLL Survey
Welcome Swallow (<i>Hirundo neoxena</i>)			Incidental
Whistling Kite (<i>Haliastur sphenurus</i>)			Incidental
White-faced Heron (<i>Egretta novaehollandiae</i>)			Incidental
White-plumed Honeyeater (<i>Ptilotula penicillatus</i>)			Incidental
Willie Wagtail (<i>Rhipidura leucophrys</i>)			Incidental

APPENDIX E THREATENED SPECIES LIKELIHOOD OF OCCURENCE



Appendix E: Threatened Species Likelihood of Occurrence

Table E.1 Likelihood of presence of EPBC Act listed flora within or adjacent to the Sunshine Section Project Land

Species	EPBC Act Status	Habitat/Distribution	Modelled Presence	Last Record	No. Recs	Likelihood of Presence
<i>Amphibromus fluitans</i> River Swamp Wallaby-grass	VU	Largely confined to permanent swamps, principally along the Murray River between Wodonga and Echuca, uncommon to rare in the south (e.g. Casterton, Moe, Yarram), probably due to historic drainage of wetlands (RBGV 2016). Largely restricted in greater Melbourne to seasonal wetlands and mudflats of River Red Gum swamps of the Lower Yarra and Plenty/Merri volcanic plains north of Melbourne (Cam Beardsell pers. comm.).	PMST	-	0	Low: Limited suitable habitat for this species within the Sunshine Section Project Land. The lone wetland considered as potential habitat for this species (within the Sunshine Triangle Ecological Site) was determined to support only one <i>Amphibromus</i> species, Common Swamp Wallaby-grass (<i>Amphibromus nervosus</i>). Further, this species has not been recorded within 5 km of the MAR State Project Land within the last 30 years.
<i>Dianella amoena</i> Matted Flax-lily	EN	Largely confined to drier grassy woodland and grassland communities south of the Dividing Range and now much depleted through its range (RBGV 2017).	PMST	2019	54	Low: Targeted spring/ summer flora surveys within areas of suitable habitat in the Sunshine Section Project Land did not record this species.
<i>Diuris basaltica</i> Small Golden Moths	EN	Plains Grassland on Victorian Basalt Plains. Known from records in Laverton and Altona. Flowers Sep.-Oct (Gray and Knight 2001).	PMST	1996	1	Low: Targeted spring/summer flora surveys within areas of suitable habitat in the Sunshine Section Project Land did not record this species. Not recorded within the Sunshine Section Project Land within the last 30 years.
<i>Diuris fragrantissima</i> Sunshine Diuris	EN	Restricted to remnant plains grasslands west of Sunshine (Walsh and Entwisle 1994).	PMST	2018	5	Known to occur adjacent to Sunshine Section Project Land: Species known to occur adjacent to the Sunshine Section Project Land, specifically within the Sunshine Triangle Ecological Site.
<i>Dodonaea procumbens</i> Trailing Hop-bush	VU	Grows in low-lying, often winter-wet areas in woodland, low open-forest and grassland on sands and clays (Walsh and Entwisle 1996).	PMST	-	0	Low: No records within 5 km of the Sunshine Section Project Land within the last 30 years.
<i>Glycine latrobeana</i> Clover Glycine	VU	Widespread but of sporadic occurrence and rarely encountered. Grows mainly in grasslands and grassy woodlands (Walsh and Entwisle 1996).	PMST	-	0	Low: Species not recorded within 5 km of the Sunshine Section Project Land within the last 30 years.
<i>Lachnagrostis adamsonii</i> Adamson's Blown-grass	EN	Occurs in and around saline depressions on the Volcanic Plain where recorded from Portarlinton west almost to the South Australian border (RBGV 2015).	PMST	-	0	Low: Outside the geographic range of this species.
<i>Lepidium hyssopifolium</i> s.s. Basalt Peppercross	EN	Collected from scattered sites on the volcanic plain, but now much reduced from its former range and recorded recently only from e.g. Moorabool, Winchelsea, Bacchus Marsh, Woodend, Trentham. Most recent collections are	-	2018	5	Low: Despite recent records within 5 km of the Sunshine Section Project Land, this species is unlikely to occur due to limited remnant grassy

Species	EPBC Act Status	Habitat/Distribution	Modelled Presence	Last Record	No. Recs	Likelihood of Presence
		from disturbed, rather weedy sites. One collection from near Port Fairy is noteworthy for its occurrence in a slightly saline estuary amongst saltmarsh and fringing sedgeland. Flowers mostly summer-autumn (RBGV 2019).				woodland habitat present within the Sunshine Section Project Land.
<i>Leucochrysum albicans subsp. tricolor</i> White Sunray	EN	Very rare in Victoria, the only recent collections from volcanic grassland remnants in the Wickliffe, Willaura, Streatham, Inverleigh and Creswick districts. All other Victorian collections were made last century, from e.g. Mt Cole, the Grampians and the Port Fairy district. Collections from the Victorian alps have been attributed to this subspecies, but they may be the result of hybridisation between <i>Leucochrysum alpinum</i> and <i>Leucochrysum albicans subsp. albicans</i> . Flowers Nov.-Dec (RBGV 2017).	PMST	-	0	Low: No records of this species from within 5 km of the Sunshine Section Project Land within the last 30 years.
<i>Pimelea spinescens subsp. spinescens</i> Spiny Rice-flower	CR	Grows in grassland, open shrubland and occasionally woodland, often on basalt-derived soils. Mostly west of Melbourne (to near Horsham), but extending as far north as Echuca (RBGV 2017).	PMST	2020	513	Confirmed: This species occurs in several locations within and adjacent to the Sunshine Section Project Land. Locations of Spiny Rice-flower recorded within the Sunshine Section Project Land include the rail corridor adjacent to the Sunshine Triangle Ecological Site, the St. Albans Road Biosites and the Old Sunshine Tip. Spiny Rice-flower were also recorded in the rail corridor adjacent to the Matthews Hill Reserve (outside the Project Land), The location of Spiny Rice-flower recorded are mapped in Appendix I.
<i>Prasophyllum frenchii</i> Maroon Leek-orchid	EN	Widespread across southern Victoria, but rare. Occurs in grassland, heathland and open forest on well-drained or water-retentive sand or clay loams (RBGV 2018).	PMST	-	0	Low: No records of this species within 5 km of the Sunshine Section Project Land within the last 30 years.
<i>Pterostylis cucullata</i> Leafy Greenhood	VU	Widely distributed but disjunct, mostly occurring in small groups in coastal areas, sometimes near inland watercourses. Two subspecies have been assigned to this species: subsp. <i>cucullata</i> is scattered in near coastal scrub, often on sand dunes and subsp. <i>sylvicola</i> is known from East Gippsland where it occurs along water courses among shrubs in tall forests, on rich loamy soils (RBGV 2019).	PMST	-	0	Low: No records of this species within 5 km of the Sunshine Section Project Land within the last 30 years. No suitable habitat within the Sunshine Section Project Land.
<i>Rutidosia leptorhynchoides</i> Button Wrinklewort	EN	In Victoria confined to basaltic grasslands between Rokewood and Melbourne where endangered due to loss of habitat (formerly occurring as far west as Casterton, and on the Gippsland Plain near Newry) (RBGV 2015).	PMST	2015	16	Low: Targeted spring/ summer flora surveys within areas of suitable habitat in the Sunshine Section Project Land did not record this species.
<i>Senecio macrocarpus</i>	VU	In Victoria largely confined to remnant Themeda grasslands on loamy clay soils derived from basalt from	PMST	2015	8	Known to occur adjacent to Sunshine Section Project Land: Targeted survey for Large-headed

Species	EPBC Act Status	Habitat/Distribution	Modelled Presence	Last Record	No. Recs	Likelihood of Presence
Large-headed Fireweed		near Melbourne west to Skipton area. Also known from auriferous ground near Stawell. Formerly recorded from near Horsham and Casterton, but apparently long extinct from these areas (Walsh and Entwisle 1999).				Fireweed recorded this species in Matthews Hill Reserve, adjacent to the Sunshine Section Project Land. Targeted surveys within areas of suitable habitat in the Sunshine Section Project Land did not record this species.
<i>Senecio psilocarpus</i> Swamp Fireweed	VU	Rare, restricted in Victoria to a few herb-rich winter-wet swamps throughout the south of the state, west from Sale, growing on volcanic clays or peaty soils (RBGV 2017).	PMST	-	0	Low: Not recorded within 5 km of the Sunshine Section Project Land in the last 30 years.
<i>Xerochrysum palustre</i> Swamp Everlasting	VU	Occurs in lowland swamps, usually on black cracking clay soils, scattered from near the South Australian border north-west of Portland to Bairnsdale district, but rare due to habitat depletion (RBGV 2018).	PMST	-	0	Low: Not recorded within 5 km of the Sunshine Section Project Land in the last 30 years.

EPBC Act status: CR = Critically endangered; EN = Endangered; VU = Vulnerable

Table E.2 Likelihood of presence of threatened fauna within and adjacent to the Sunshine Section Project Land

Species	EPBC Act Status	Habitat/Distribution	Modelled Presence	Last Record	No. Recs	Likelihood of Presence
Birds						
<i>Anthochaera Phrygia</i> Regent Honeyeater	CR	Dry open forest, woodlands, or red ironbark, yellow box, white and yellow gum, mistletoe on river she-oaks, trees in farmlands, streets, gardens (Pizzey and Knight 2012).	PMST	-	0	Low: No suitable habitat within the Sunshine Section Project Land.
<i>Botaurus poiciloptilus</i> Australasian Bittern	EN	Narrow habitat preferences, preferring shallow, vegetated freshwater or brackish swamps (Pizzey and Knight 2012).	PMST	2017	2	Low: No suitable habitat within the Sunshine Section Project Land.
<i>Calidris canutus</i> Red Knot	EN, M	Tidal mudflats, sandflats, beaches, saltmarshes, flooded pastures, ploughed lands (Pizzey and Knight 2012).	PMST	2000	2	Low: No suitable habitat within the Sunshine Section Project Land
<i>Calidris ferruginea</i> Curlew Sandpiper	CR, M	Tidal mudflats; saltmarsh, saltfields; fresh, brackish or saline wetlands; sewage ponds (Pizzey and Knight 2012).	PMST	2019	29	Low: Limited suitable wetland habitat within the Sunshine Section Project Land
<i>Calidris tenuirostris</i> Great Knot	CR, M	Tidal mudflats, sandy ocean and bay shores, estuaries, shallow saline and freshwater wetlands (Pizzey and Knight 2012).	PMST	-	0	Low: No suitable habitat within the Sunshine Section Project Land

Species	EPBC Act Status	Habitat/Distribution	Modelled Presence	Last Record	No. Recs	Likelihood of Presence
<i>Diomedea antipodensis</i> New Zealand Wandering Albatross	VU, M	Outside breeding season ranges extensively over south Pacific, including to south Australian waters (Pizzey and Knight 2012).	PMST	-	0	Low: Project Land is inland. No habitat for marine fauna in Project land.
<i>Diomedea epomophora</i> Southern Royal Albatross	VU, M	Wide, possibly circumpolar distribution when not breeding. Moderately common all months, mostly in Victoria, SE NSW and Tasmania (Pizzey and Knight 2012).	PMST	-	0	Low: Project Land is inland. No habitat for marine fauna in Project land.
<i>Diomedea exulans</i> Wandering Albatross	VU, M	Breeds at high latitudes in south Indian and south Atlantic Oceans. Regular visitor to eastern and southern Australian open ocean and slope waters, less common over shelf (Pizzey and Knight 2012).	PMST	-	0	Low: Project Land is inland. No habitat for marine fauna in Project land.
<i>Diomedea sanfordi</i> Northern Royal Albatross	EN, M	Breeds NZ, outside breeding period circumpolar in sub-Antarctic and subtropical seas. Regular visitor to offshore waters of southern Australia, mostly May-Sept (Pizzey and Knight 2012).	PMST	-	0	Low: Project Land is inland. No habitat for marine fauna in Project land.
<i>Falco hypoleucos</i> Grey Falcon	VU	Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast (Birdlife Australia 2021).	PMST	-	0	Low: Closest record is from eastern Melbourne in 1977. Most records in Victoria are from northern part of the state. No preferred habitats in the Project Land.
<i>Grantiella picta</i> Painted Honeyeater	VU	Mistletoes in eucalypt forests/woodlands; black box on watercourses; box-ironbark-yellow gum woodlands; paperbarks, Casuarinas; mulga, other acacias; trees on farmland; gardens (Pizzey and Knight 2012).	PMST	-	0	Low: No suitable habitat within the Sunshine Section Project Land.
<i>Hirundapus caudacutus</i> White-throated Needletail	VU, M	Airspace over forests, woodlands, farmlands, plains, lakes, coasts, towns, feeding companies frequency patrol back and forward along favoured hilltops and timbered ranges (Pizzey and Knight 2012).	PMST	2019	7	Moderate: This species has the potential to fly over the Sunshine Section Project Land sporadically for foraging and dispersal purposes. However, no core habitats for the species occur in the project area. Furthermore, the species is largely aerial in nature and is not considered to be reliant on the habitats in the Sunshine Section Project Land.
<i>Lathamus discolor</i> Swift Parrot	CR	Open grassy woodland, with dead trees, near permanent water and forested hills, coastal heaths, pastures with exotic grasses, weeds, roadsides, orchards (Pizzey and Knight 2012). Swift Parrot breeds in Tasmania and migrates to Victoria in winter to forage in large, mature flowering eucalypt species.	PMST	2020	21	Moderate: This species has the potential to sporadically utilise the planted eucalypts in the Sunshine Section for foraging and dispersal during its Victorian winter migration. However, no core habitats for the species occur in the project area, and the species is unlikely to be reliant on the habitats in the project land.

Species	EPBC Act Status	Habitat/Distribution	Modelled Presence	Last Record	No. Recs	Likelihood of Presence
<i>Limosa lapponica baueri</i> Bar-tailed Godwit	VU, M	The Bar-tailed Godwit breeds in the Northern Hemisphere and moves south for the Northern Hemisphere winter. Two subspecies occur in Australia: <i>baueri</i> : migrates to south-east Australia from breeding grounds in Siberia and Alaska;- <i>menzbieri</i> : frequents north-west Australia and breeds mostly in central north Siberia.;In Australia the Bar-tailed Godwit occurs mostly on coasts, but undertakes regular inland passage. It utilises tidal mudflats, estuaries, sewage ponds, shallow river margins, brackish or saline inland lakes, flooded pastures and airfields (Pizzey and Knight 2012, DAWE 2020a).	PMST	2000	7	Low: No coastal or intertidal habitats occur in the Project land. Species has low likelihood of occurrence of using the aquatic habitats in the Project land.
<i>Limosa lapponica menzbieri</i> Northern Siberian Bar-tailed Godwit	CE, M		PMST			
<i>Macronectes giganteus</i> Southern Giant-Petrel	EN, M	Marine, over open seas and inshore waters; favours edge of continental shelf and edge of pack-ice (Pizzey and Knight 2012).	PMST	-	0	Low: Project Land is inland. No habitat for marine fauna in Project land.
<i>Macronectes halli</i> Northern Giant-Petrel	VU, M	Wide circumpolar range generally n. of Antarctic convergence (Pizzey and Knight 2012).	PMST	-	0	Low: Project Land is inland. No habitat for marine fauna in Project land.
<i>Neophema chrysogaster</i> Orange-bellied Parrot	CR	On mainland prefers small islands, peninsulas in coastal areas; with saltmarsh plants; coastal pastures, golf courses, crops of millet and sunflowers; dunes, beaches. Tasmania prefers button-grass; sedges on wet peat plains and eucalypt woodland on margin (Pizzey and Knight 2012).	PMST	-	0	Low: No suitable habitat for this species within the Sunshine Section Project Land.
<i>Numenius madagascariensis</i> Eastern Curlew	CR, M	Estuaries, tidal mudflats, sandspits, saltmarshes, mangroves; occasionally fresh or brackish lakes; bare grasslands near water (Pizzey and Knight 2012).	PMST	2017	3	Low: No coastal or intertidal habitats occur in the Project land. Species has low likelihood of occurrence of using the aquatic habitats in the Project land.
<i>Pachyptila turtur subantarctica</i> Fairy Prion	VU	Offshore waters.	PMST	-	0	Low: Project Land is inland. No habitat for marine fauna in Project land.
<i>Pedionomus torquatus</i> Plains-wanderer	CR	Sparse, treeless, lightly grazed native grasslands/herbfields with bare ground, old cereal crops, short Lucerne, sparse saltbush, low shrubland (Pizzey and Knight 2012).	PMST	-	0	Low: Not recorded within 5 km of the Sunshine Section Project Land within the last 30 years.
<i>Phoebastria fusca</i> Sooty Albatross	VU, M	Breeds sub-Antarctic islands in south Atlantic and south Indian Oceans, dispersing mainly between 60°S and 30°S, with eastern extension to Australian offshore waters, most	PMST	-	0	Low: Project Land is inland. No habitat for marine fauna in Project land.

Species	EPBC Act Status	Habitat/Distribution	Modelled Presence	Last Record	No. Recs	Likelihood of Presence
		common in Bass Strait and south of Tasmania (Pizzey and Knight 2012).				
<i>Pterodroma leucoptera</i> Gould's Petrel	EN	Breeds on Cabbage Tree Island and islands off nearby Port Stephens (NSW) (subspecies <i>calendonica</i>) breeds New Calendonina). Non-breeding (June-Sept) birds of both races disperse from breeding grounds throughout Tasman Sea and across to east Pacific Ocean; offshore waters from south Queensland to eastern South Australia (Pizzey and Knight 2012).	PMST	-	0	Low: Project Land is inland. No habitat for marine fauna in Project land.
<i>Rostratula australis</i> Australian Painted-snipe	EN	Well-vegetated shallows and margins of wetlands, dams, sewage ponds; wet pastures, marshy areas, irrigation systems, lignum, tea-tree scrub, open timber (Pizzey and Knight 2012).	PMST	-	0	Low: Lack of suitable wetland habitat and lack of records of this species within 5 km of the Sunshine Section Project Land within the last 30 years.
<i>Sternula nereis nereis</i> Australian Fairy Tern	VU	Coastal waters, bays, inlets, saline or brackish lakes, saltfields, sewerage ponds near coast. Breeds Sept-Jan in single pairs to large colonies on beaches, islands, rock platforms from north of Broome to eastern Victoria/NSW border; much lesser numbers in south (Pizzey and Knight 2012).	PMST	2018	2	Low: No suitable habitat within the Sunshine Section Project Land.
<i>Thalassarche bulleri</i> Buller's Albatross	VU, M	Buller's Albatross are marine and pelagic, inhabiting subtropical and subantarctic waters of the southern Pacific Ocean (DAWE 2020a).	PMST	-	0	Low: Project Land is inland. No habitat for marine fauna in Project land.
<i>Thalassarche bulleri platei</i> Pacific Albatross	VU	The Pacific Albatross is a marine, pelagic species. It occurs in subtropical and subantarctic waters of the South Pacific Ocean (DAWE 2020a).	PMST	-	0	Low: Project Land is inland. No habitat for marine fauna in Project land.
<i>Thalassarche cauta</i> Shy Albatross	VU, M	The only Albatross with Australian breeding stations: on Albatross Rock, Bass Strait. Common all months (but mostly winter) on coasts of Vic, Tas, NSW and SA; uncommon in S.E. Qld and WA to Carnarvon (Pizzey and Knight 2012).	PMST	-	0	Low: Project Land is inland. No habitat for marine fauna in Project land.
<i>Thalassarche impavida</i> Campbell Albatross	VU, M	The Campbell Albatross breed on Campbell Island (Marchant & Higgins 1990). They make their nests on tussock-covered ledges and terraces of cliffs, slopes and hills, overlooking the sea or valleys, and on the summits of rocky islets (DAWE 2020a).	PMST	-	0	Low: Project Land is inland. No habitat for marine fauna in Project land.
<i>Thalassarche melanophris</i> Black-browed Albatross	VU, M	Visits offshore south east Australia in winter (Pizzey and Knight 2012).	PMST	-	0	Low: Project Land is inland. No habitat for marine fauna in Project land.

Species	EPBC Act Status	Habitat/Distribution	Modelled Presence	Last Record	No. Recs	Likelihood of Presence
<i>Thalassarche salvini</i> Salvin's Albatross	VU, M	During the non-breeding season, the species occurs over continental shelves around continents. It occurs both inshore and offshore and enters harbours and bays. Salvin's Albatross is scarce in pelagic waters. Salvin's Albatross nest's on level or gently sloping ledges, summits, slopes and caves of rocky islets and stacks, usually in broken terrain with little soil and vegetation (DAWE 2020a).	PMST	-	0	Low: Project Land is inland. No habitat for marine fauna in Project land.
<i>Thalassarche steadi</i> White-capped Albatross	VU, M	The White-capped Albatross is a marine species and occurs in subantarctic and subtropical waters. The White-capped Albatross is probably common off the coast of south-east Australia throughout the year (DAWE 2020a).	PMST	-	0	Low: Project Land is inland. No habitat for marine fauna in Project land.
<i>Thinornis cucullatus cucullatus</i> Hooded Plover	VU	A small Australian beach nesting bird. It mainly occurs on wide beaches backed by dunes with large amounts of seaweed and jetsam, creek mouths and inlet entrances. Nests are found above the high water mark on flat beaches, on stony terraces, or on sparsely vegetated dunes (DAWE 2020a).	PMST	-	0	Low: Project Land is inland, and away from coastal habitats. No habitat for this coastal bird species exists in the Project land.
Fish						
<i>Galaxiella pusilla</i> Dwarf Galaxias	VU	Slow flowing, still shallow permanent and temporary freshwater habitats.	PMST	-	0	Low: No records and no suitable habitat present.
<i>Maccullochella peelii</i> Murray Cod	VU	Murray Cod are associated with deep holes in rivers which support cover such as logs, stumps, boulders and undercut banks (Lintermans 2009). Species is introduced and not indigenous to the Melbourne region.	PMST/ VBA	1981		Low: Last recorded in the Maribyrnong River in the vicinity of the proposed crossing in 1981. Likely to be translocated / stocked individuals. No previous records of Murray Cod in Stony Creek.
<i>Nannoperca obscura</i> Yarra Pygmy Perch	VU	Distributed from Dandenong Creek in Victoria through to Lake Alexandrina near the mouth of the Murray River in South Australia.	PMST	-	0	Low: No previous records in Stony Creek or within 5kms
<i>Prototroctes maraena</i> Australian Grayling	VU	Occurs in streams and rivers on the eastern and southern flanks of the Great Dividing Range, from Sydney, southwards to the Otway Ranges of Victoria and in Tasmania. The species is found in fresh and brackish waters of coastal lagoons.	PMST / VBA	2015		Low: No records and no suitable habitat present in Sunshine Section. (Note: 2015 record of Aust Grayling is from Maribyrnong River, in Corridor Section of MAR Project).
Frogs						
<i>Litoria raniformis</i>	VU	A largely aquatic species found among vegetation within or at the edges of permanent water – streams, swamps, lagoons, farm dams and ornamental ponds. Often found	PMST	2018	101	Low: There are no records of the species from within Stony Creek, which is the only waterway that intersects the Sunshine Section of the MAR Project.

Species	EPBC Act Status	Habitat/Distribution	Modelled Presence	Last Record	No. Recs	Likelihood of Presence
Growling Grass Frog		under debris on low, often flooded river flats. Frequently active by day (Cogger 2014).				Stony Creek is a highly degraded urban stream, lacking suitable breeding habitat for this species. No other suitable aquatic habitats for Growling Grass Frog occur in the Sunshine Section. (NOTE: Growling Grass Frog occurs within the Corridor Section of the MAR Project in both high value (Maribyrnong River and Moonee Ponds Creek) and low value reaches (Steeles Creek). The presence and potential impacts on Growling Grass Frog are considered in the Corridor Section referral and supporting documentation).
Insects						
<i>Synemon plana</i> Golden Sun Moth	CR	Native temperate grassland and open grassy woodlands, may also be found in degraded grasslands dominated by exotic Chilean Needlegrass (DAWE 2020c).	PMST	2019	2255	Moderate: Potential Golden Sun Moth has been identified in the Luma Estate. Golden Sun Moth has been recorded during targeted surveys in the Matthews Hill Reserve (outside the Sunshine Section Project Land).
Mammals						
<i>Antechinus minimus maritimus</i> Swamp Antechinus	VU	Dense wet heathlands, tussock grasslands, sedgeland, damp gullies, swamps and some shrubby woodlands (DAWE 2020a).	PMST	-	0	Low: This species has not been recorded within 5 km of the Sunshine Section Project Land in the last 30 years.
<i>Dasyurus maculatus maculatus</i> Spot-tailed Quoll	EN	Has a wide range of habitats, including rainforest, open forest, woodland, coastal heathland and inland riparian forest (Van Dyck and Strahan 2008).	PMST	-	0	Low: No suitable habitat within Sunshine Section Project Land. No records within 5 km in the last 30 years.
<i>Eubalaena australis</i> Southern Right Whale	EN, M	Marine environments (irrelevant to this investigation).	PMST	N/A	N/A	Low: Project Land is inland. No habitat for marine fauna in Project land.
<i>Megaptera novaeangliae</i> Humpback Whale	VU	Marine environments (irrelevant to this investigation).	PMST	N/A	N/A	Low: Project Land is inland. No habitat for marine fauna in Project land.
<i>Perameles gunnii</i> Eastern Barred Bandicoot	VU	Extinct in the wild and occurs in small reintroduced populations in southern Victoria. Previously it occurred across the Victorian Volcanic Plains. During the day it rests in a grass nest. It feeds on earthworms, insects, bulbs, tubers and fungi throughout the night (DAWE 2020a).	PMST	2003	7	Low: Species extinct in the wild in Victoria.

Species	EPBC Act Status	Habitat/Distribution	Modelled Presence	Last Record	No. Recs	Likelihood of Presence
<i>Pteropus poliocephalus</i> Grey-headed Flying-fox	VU	Closest permanent camps of this species are at Yarra Bend and Doveton. The species travels outwards across greater Melbourne from these camp sites every night to forage from flowering eucalypts and planted fruit trees.	PMST	2019	18	High: Considering the relative close proximity to the permanent Grey-headed Flying-fox camp at Yarra Bend (~15km), this species is likely to occasionally utilise large mature eucalypts (remnant and planted) within the Sunshine Section Project Land for foraging.
Reptiles						
<i>Caretta caretta</i> Loggerhead Turtle	EN, M	Marine environments (irrelevant to this investigation).	PMST	N/A	N/A	Low: Project Land is inland. No habitat for marine fauna in Project land.
<i>Chelonia mydas</i> Green Turtle	VU, M	Marine environments (irrelevant to this investigation).	PMST	N/A	N/A	Low: Project Land is inland. No habitat for marine fauna in Project land.
<i>Delma impar</i> Striped Legless Lizard	VU	A grassland specialist, potential habitat for the Striped Legless Lizard includes all areas which have, or once had, native grasslands or grassy woodlands (including derived grasslands) across the historical range of the species, provided that area retains suitable tussock structure, the soil is of appropriate type and structure, and the site has not had major disturbance such as ploughing (DAWE 2020a).	PMST	2020	338	Confirmed: Striped Legless Lizards occur at a number of locations within the Sunshine Section Project Land including the St. Albans Road Biosites and Old Sunshine Tip Site. Additionally, records are known from Sunshine Railway Linear Reserve adjacent to the Sunshine Section Project Land. Potential habitat has also been recorded at Luma Estate.
<i>Dermochelys coriacea</i> Leatherback Turtle	EN, M	Marine environments (irrelevant to this investigation).	PMST	N/A	N/A	Low: Project Land is inland. No habitat for marine fauna in Project land.
<i>Tympanocryptis pinguicollis</i> Grassland Earless Dragon	EN	Found in naturally treeless native tussock grassland preferring unglazed or lightly grazed grasslands on gentle slopes (Cogger 2014).	PMST	-	0	Low: Species thought to be locally extinct in Victoria.
Sharks						
<i>Carcharodon carcharias</i> Great White Shark	VU, M	Marine environments (irrelevant to this investigation).	PMST	N/A	N/A	Low: Project Land is inland. No habitat for marine fauna in Project land.

EPBC Act status: CR = Critically endangered; EN = Endangered; VU = Vulnerable; M = Migratory

APPENDIX F

LIST OF NO-GO ZONES



Appendix F: List of no-go zones for Sunshine Section

No-Go Zone Number	Location	MNES
1	Sunshine Railway Line Linear Reserve	<ul style="list-style-type: none"> • NTGVVP Threatened Ecological Community • Striped Legless Lizard habitat
2	Rail corridor adjacent to (west of) Sunshine Triangle Ecological Site	<ul style="list-style-type: none"> • Sunshine Diuris (in adjacent Sunshine Triangle Ecological Site) • Spiny Rice-flower
3	Old Sunshine Tip Site	<ul style="list-style-type: none"> • NTGVVP Threatened Ecological Community • Striped Legless Lizard habitat • Spiny Rice-flower
4	St Albans Road Biosites	<ul style="list-style-type: none"> • Striped Legless Lizard habitat
5	St Albans Road Biosites	<ul style="list-style-type: none"> • NTGVVP Threatened Ecological Community • Striped Legless Lizard habitat • Spiny Rice-flower
6	St Albans Road Biosites	<ul style="list-style-type: none"> • NTGVVP Threatened Ecological Community • Striped Legless Lizard habitat • Spiny Rice-flower
22	Luma Estate	<ul style="list-style-type: none"> • Potential Golden Sun Moth habitat • Potential Striped Legless Lizard Habitat

* Note that No-go zones 7-21 fall within the Corridor Section of the MAR Project and are not detailed here.

APPENDIX G ASSESSMENT AGAINST EPBC ACT SIGNIFICANT IMPACT CRITERIA





Appendix G: Self-Assessment of EPBC Act Significant Impact Criteria

Below are the significant impact criteria for the relevant MNES listed under the EPBC Act. The criteria are addressed below for MNES that have been confirmed as occurring within or adjacent to the Sunshine Section Project Land, and/or were initially considered to have the potential for impacts:

Vulnerable (VU) listed species

- Large-headed Fireweed (*Senecio macrocarpus*)
- Striped Legless Lizard (*Delma impar*)

Endangered (EN) listed species

- Sunshine Diuris (*Diuris fragrantissima*)

Critically Endangered (CR) listed species and ecological communities

- Natural Temperate Grasslands of the Victorian Volcanic Plain (NTGVVP) Threatened Ecological Community
- Golden Sun Moth (*Synemon plana*) and
- Spiny Rice-flower (*Pimelea spinescens* subsp. *spinescens*)

Ramsar Wetlands

- Port Philip Bay (western shoreline) and Bellarine Peninsula

Migratory species (Terrestrial and Wetland species as functional groups)

NB – What is an important population of a species?

An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- Key source populations either for breeding or dispersal
- Populations that are necessary for maintaining genetic diversity, and/or

Populations that are near the limit of the species' range

Table G.1 Significant impact assessment for the Large-headed Fireweed (Vulnerable)

Significant impact criterion	Specific mitigation measures (See Section 5.2)	Residual risk to MNES with mitigation measures applied	Likelihood of a Significant Impact (with mitigation measures implemented)
Lead to a long-term decrease in the size of an important population of a species	<p>General Construction Measures</p> <ul style="list-style-type: none"> The spread of noxious weeds and pest animals must be controlled in accordance with the CaLP Act. Where possible, all vehicles, machinery and equipment will move along formed/designated access tracks to prevent the spread and establishment of weeds and diseases. Vehicles and machinery will access the Sunshine Section Project Land through defined entry and exit points. Additional measures to prevent the spread and establishment of weeds and disease must be provided within the Construction Environmental Management Plan (CEMP). Construction stockpiles, machinery, roads, and other infrastructure should be placed away from areas supporting native vegetation and waterways; and placed in previously cleared or hardstand areas <p>No-go zones</p> <ul style="list-style-type: none"> The No-go zones identified in this report (listed in Appendix F, and in the Appendices to the EPBC Act referral) are to be avoided by construction works, with no admittance to the areas. The No-go zones are to be included on all site maps, including all Environmental Management Plans and related documentation (including the CEMP). The No-go zone must be fenced with high-visibility safety bunting or temporary construction fencing (including erosion fencing if necessary). The area is to be signed as a 'No-go zone'. fencing should enable fauna to move through areas of habitat <p>Erosion and Sedimentation Controls</p> <p>Environmental management for erosion and sediment control, in accordance with EPA Victoria construction guidelines (Publications 275, 480 and 960) will be implemented for works in the vicinity of</p>	<p>Large-headed Fireweed have been recorded at Matthews Hill Reserve which occurs entirely outside of the Sunshine Section Project Land.</p> <p>Potential indirect impacts include degradation of this species habitat through spread of noxious weeds, though this would be unlikely to result in the loss of an important population.</p> <p>Implementation of mitigation measures will reduce the risk to this species.</p>	Unlikely
Reduce the area of occupancy of an important population of the species		<p>As above, given works are outside Matthews Hill Reserve, the Project is unlikely to result in reduction of area for an important population. Implementation of mitigation measures will further reduce the risk to this species.</p>	Unlikely
Fragment an existing population into two or more populations		<p>The Project is unlikely to cause fragmentation of populations of this species. Implementation of mitigation measures will further reduce the risk to this species.</p>	Unlikely
Adversely affect habitat critical to the survival of a species		<p>The Project is unlikely to adversely affecting habitat critical to the survival of the species. Implementation of mitigation measures will further reduce the risk to this species.</p>	Unlikely
Disrupt the breeding cycle of an important population		<p>The Project is unlikely to disrupt the breeding cycle of an important population. Implementation of mitigation measures will further reduce the risk to this species.</p>	Unlikely
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline		<p>The construction phase of the Project has the potential to result in decreased quality of habitat through indirect spread of noxious weeds. Following the implementation of mitigation measures (general construction measures, no-go zones, and erosion and sedimentation controls), there is a low likelihood of noxious weeds becoming established in Matthews Hill Reserve and causing decreased quality of the habitat.</p>	Unlikely
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat		<p>The construction phase of the Project has the potential to result in spread of noxious weeds into Matthews Hill Reserve. Following the implementation of mitigation measures (general construction measures, no-go zones, and erosion and sedimentation controls), there is a low</p>	Unlikely



Significant impact criterion	Specific mitigation measures (See Section 5.2)	Residual risk to MNES with mitigation measures applied	Likelihood of a Significant Impact (with mitigation measures implemented)
	<p>waterways and wetlands such that Water quality of wetlands within and adjacent to the Sunshine Section Project Land and watercourses that intersect the Sunshine Section Project Land is to be maintained at pre-construction levels.</p>	<p>likelihood of invasive species becoming established in Matthews Hill Reserve.</p>	
<p>Introduce disease that may cause the species to decline</p>		<p>There is the potential for diseases to be spread during and after the construction phase of the project. Following the implementation of mitigation measures (general construction measures, no-go zones, and erosion and sedimentation controls), there is a low likelihood of introducing diseases that may cause the species to decline.</p>	<p>Unlikely</p>
<p>Interfere with the recovery of the species</p>		<p>Habitat for Large-headed Fireweed is limited to outside the Sunshine Section Project Land. The Project is therefore unlikely to interfere with the species recovery. Implementation of mitigation measures will further reduce the risk to this species.</p>	<p>Unlikely</p>

Table G.2 Significant impact assessment for Striped Legless Lizard (listed Vulnerable under EPBC Act)

Significant impact criterion	Specific mitigation measures (See Section 5.2)	Residual risk to MNES with mitigation measures applied	Likelihood of a Significant Impact (with mitigation measures implemented)
Lead to a long-term decrease in the size of an important population of a species	<p>General Construction Measures</p> <ul style="list-style-type: none"> The spread of noxious weeds and pest animals must be controlled in accordance with the CaLP Act. Where possible, all vehicles, machinery and equipment will move along formed/designated access tracks to prevent the spread and establishment of weeds and diseases. Vehicles and machinery will access the Sunshine Section Project Land through defined entry and exit points. Additional measures to prevent the spread and establishment of weeds and disease must be provided within the Construction Environmental Management Plan (CEMP). Construction stockpiles, machinery, roads, and other infrastructure should be placed away from areas supporting native vegetation and waterways; and placed in previously cleared or hardstand areas <p>No-go zones</p>	<p>The Sunshine Section Project Land includes high-quality Striped Legless Lizard habitat at the Old Sunshine Tip Site and the St Albans Road Biosites. Striped Legless Lizard habitat is also considered to occur at Sunshine Railway Linear Reserve and Luma Estate. These areas are considered to be habitat for important populations as they are >0.5 ha, support tussock-forming grass species (native and non-native) and are likely to be viable over the long term (DSEWPaC 2011a).</p> <p>No Striped Legless Lizard or associated habitat areas will be removed in association with the works for the Sunshine Section. Striped Legless Lizard and associated habitat is to be protected through the implementation of No-go zones and other mitigation measures to ensure the species is not impacted.</p> <p>Following the implementation of mitigation measures (general construction measures, no-go zones, erosion and sedimentation controls, and contingency for fauna salvage and relocation), it is unlikely the Project will lead to the long-term decrease in the size of an important population of the species.</p>	Unlikely
Reduce the area of occupancy of an important population of the species	<ul style="list-style-type: none"> The No-go zones identified in this report (listed in Appendix F, and in the Appendices to the EPBC Act referral) are to be avoided by construction works, with no admittance to the areas. The No-go zones are to be included on all site maps, including all Environmental Management Plans and related documentation (including the CEMP). 	<p>Following the implementation of mitigation measures (general construction measures, no-go zones, erosion and sedimentation controls, and contingency for fauna salvage and relocation), works in the Sunshine Section are unlikely to reduce the area of occupancy for an important population of the species.</p>	Unlikely
Fragment an existing population into two or more populations	<ul style="list-style-type: none"> The No-go zone must be fenced with high-visibility safety bunting or temporary construction fencing (including erosion fencing if necessary). The area is to be signed as a 'No-go zone'. fencing should enable fauna to move through areas of habitat 	<p>Following the implementation of mitigation measures (general construction measures, no-go zones, erosion and sedimentation controls, and contingency for fauna salvage and relocation), works in the Sunshine Section are unlikely to fragment a population given their locations adjacent the rail corridor.</p>	Unlikely
Adversely affect habitat critical to the survival of a species	<p>Contingencies for fauna salvage and relocation</p> <ul style="list-style-type: none"> A contingency plan must be in place for salvage and translocation of any Striped Legless Lizard in the event that any individuals are recorded during construction. 	<p>Critical habitat has been assessed as occurring at the Old Sunshine Tip Site and the St Albans Road Biosites.</p> <p>Following the implementation of mitigation measures (general construction measures, no-go zones, erosion and sedimentation controls, and contingency for fauna salvage and relocation), works in the Sunshine Section are unlikely to adversely affect habitat critical to the survival of the species.</p>	Unlikely

Significant impact criterion	Specific mitigation measures (See Section 5.2)	Residual risk to MNES with mitigation measures applied	Likelihood of a Significant Impact (with mitigation measures implemented)
Disrupt the breeding cycle of an important population	<ul style="list-style-type: none"> Any interaction with wildlife through habitat clearing activities must be undertaken by a person holding a Section 28A Wildlife Act 1975 authorisation. <p>Erosion and Sedimentation Controls</p> <ul style="list-style-type: none"> Environmental management for erosion and sediment control, in accordance with EPA Victoria construction guidelines (Publications 275, 480 and 960) will be implemented for works in the vicinity of waterways and wetlands such that Water quality of wetlands within and adjacent to the Sunshine Section Project Land and watercourses that intersect the Sunshine Section Project Land is to be maintained at pre-construction levels. 	Important populations occur at Old Sunshine Tip Site and the St Albans Road Biosites. Following the implementation of mitigation measures (general construction measures, no-go zones, erosion and sedimentation controls, and contingency for fauna salvage and relocation), works in the Sunshine Section are unlikely to disrupt the breeding cycle of an important population.	Unlikely
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline		Following the implementation of mitigation measures (general construction measures, no-go zones, erosion and sedimentation controls, and contingency for fauna salvage and relocation), works in the Sunshine Section are unlikely to decrease the quality of habitat for the species in areas of critical habitat (Old Sunshine Tip Site and the St Albans Road Biosites).	Unlikely
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat		Invasive plants have the potential to become more established in areas of identified habitat following construction. Following the implementation of mitigation measures (general construction measures, no-go zones, erosion and sedimentation controls, and contingency for fauna salvage and relocation), works in the Sunshine Section are unlikely to result in invasive species that are harmful to Striped Legless Lizard becoming established.	Unlikely
Introduce disease that may cause the species to decline		There is the potential for diseases to be spread during and after the construction phase of the project. However, following the implementation of mitigation measures (general construction measures, no-go zones, erosion and sedimentation controls, and contingency for fauna salvage and relocation), works in the Sunshine Section are unlikely to meet this criterion.	Unlikely
Interfere with the recovery of the species		Following the implementation of mitigation measures (general construction measures, no-go zones, erosion and sedimentation controls, and contingency for fauna salvage and relocation), works in the Sunshine Section are unlikely to interfere with the recovery of the species due to the loss of critical habitat and populations at the Old Sunshine Tip Site and the St Albans Road Biosites.	Unlikely

Table G.3 Significant impact assessment for Sunshine Diuris (listed Endangered under EPBC Act)

Significant impact criterion	Specific mitigation measures (See Section 5.2)	Residual risk to MNES with mitigation measures applied	Likelihood of a Significant Impact (with mitigation measures implemented)
Lead to a long-term decrease in the size of a population	<p>General Construction Measures (See Section 5.2)</p> <p>No-go zones (See Section 5.2)</p> <p>Erosion and Sedimentation Controls (See Section 5.2)</p> <p>Sunshine Triangle mitigation measures. The following specific mitigation measures will be put in place to manage potential impacts on the Sunshine Diuris for works adjacent to the Sunshine Triangle Ecological Site.</p>	<p>The Sunshine Section Project Land and construction footprint are immediately adjacent to the Sunshine Triangle Ecological Site, where a known Sunshine Diuris population occurs.</p> <p>No direct impacts will occur in this area as it falls outside the Project Land, though the potential for indirect impacts including dust impacts and degradation of habitat through weed invasion have been considered.</p> <p>Following the implementation of mitigation measures (general construction measures, no-go zones, erosion and sedimentation controls and Sunshine Triangle mitigation measures), there is a low likelihood of leading to a long-term decrease in the size of a population at the adjacent Sunshine Triangle Ecological Site.</p>	Unlikely
Reduce the area of occupancy of the species	<ul style="list-style-type: none"> No go zones must be clearly delineated on site using temporary fencing as required and signage (see above for further details under No-go zones). The works proposed in the rail corridor adjacent to the Sunshine Triangle Ecological Site as part of the current proposed MAR Project are limited to minor track works, cabling and signalling, and are located outside the Sunshine Triangle Ecological Site. 	<p>Following the strict implementation of mitigation measures (general construction measures, no-go zones, erosion and sedimentation controls and Sunshine Triangle mitigation measures), there is a low likelihood of reducing the area of occupancy of the species at the adjacent Sunshine Triangle Ecological Site.</p>	Unlikely
Fragment an existing population into two or more populations	<ul style="list-style-type: none"> Management of dust is to be undertaken through installation and maintenance of temporary construction fencing (e.g. geofabric, shadecloth or similar solid fabric) before undertaking any works adjacent to this area 	<p>Following the strict implementation of mitigation measures (general construction measures, no-go zones, erosion and sedimentation controls and Sunshine Triangle mitigation measures), there is a low likelihood of fragmenting an existing population into two or more populations at the adjacent Sunshine Triangle Ecological Site.</p>	Unlikely
Adversely affect habitat critical for the survival of a species	<ul style="list-style-type: none"> Further dust management is to be undertaken by limiting construction activities adjacent to the Sunshine Triangle Ecological Site to outside the flowering period of the Sunshine Diuris (1 October – 31 December). Dust monitoring must be implemented to determine if additional protocols need to be enacted. Prior consultation with DELWP and DAWE is required prior to commencement if any major works are to occur within the flowering period. 	<p>Following the strict implementation of mitigation measures (general construction measures, no-go zones, erosion and sedimentation controls and Sunshine Triangle mitigation measures), there is a low likelihood of adversely affecting habitat critical to its survival at the adjacent Sunshine Triangle Ecological Site.</p>	Unlikely
Disrupt the breeding cycle of a population	<ul style="list-style-type: none"> Prior to construction, an ecologist is required to assess the distribution of current weed species 	<p>Following the strict implementation of mitigation measures (general construction measures, no-go zones, erosion and sedimentation controls and Sunshine Triangle mitigation measures), there is a low likelihood of disrupting the breeding cycle of a population at the adjacent Sunshine Triangle Ecological Site.</p>	Unlikely
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	<ul style="list-style-type: none"> Prior to construction, an ecologist is required to assess the distribution of current weed species 	<p>Following the strict implementation of mitigation measures (general construction measures, no-go zones, erosion and sedimentation controls and Sunshine Triangle mitigation measures), there is a low likelihood of decreasing the availability or quality of habitat to the</p>	Unlikely

Significant impact criterion	Specific mitigation measures (See Section 5.2)	Residual risk to MNES with mitigation measures applied	Likelihood of a Significant Impact (with mitigation measures implemented)
		extent the species is likely to decline at the adjacent Sunshine Triangle Ecological Site.	
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	<p>within the construction footprint adjacent to the no-go zone before construction commences to enable a post-construction weed assessment and comparison (within the construction area). Notify DELWP on any planned weed control measures adjacent to the site.</p> <ul style="list-style-type: none"> • Drainage must be kept intact around the Sunshine Triangle Ecological Site. If works require any alterations to drainage then additional drainage advice must be sought. 	Following the strict implementation of mitigation measures (general construction measures, no-go zones, erosion and sedimentation controls and Sunshine Triangle mitigation measures), there is a low likelihood of invasive plants becoming more established in areas of identified habitat following construction at the adjacent Sunshine Triangle Ecological Site.	Unlikely
Introduce disease that may cause the species to decline	<ul style="list-style-type: none"> • Appropriate waste disposal measures must be put in place during construction to avoid any increase in the number of pest animals (particularly House Mouse) within and adjacent to the Sunshine Triangle Ecological Site 	Following the implementation of mitigation measures (general construction measures, no-go zones and erosion and sedimentation controls), there is a low likelihood of introducing diseases that may cause the species to decline at the adjacent Sunshine Triangle Ecological Site.	Unlikely
Interfere with the recovery of the species		Following the strict implementation of mitigation measures (general construction measures, no-go zones, erosion and sedimentation controls and Sunshine Triangle mitigation measures), there is a low likelihood of interfering with the recovery of the species at the adjacent Sunshine Triangle Ecological Site.	Unlikely

Table G.4 Significant impact assessment for NTGVVP Threatened Ecological Community

Significant impact criterion	Specific mitigation measures (See Section 5.2)	Residual risk to MNES with mitigation measures applied	Likelihood of a Significant Impact (with mitigation measures implemented)
Reduce the extent of an ecological community	<p>General Construction Measures</p> <ul style="list-style-type: none"> The spread of noxious weeds and pest animals must be controlled in accordance with the CaLP Act. Where possible, all vehicles, machinery and equipment will move along formed/designated access tracks to prevent the spread and establishment of weeds and diseases. Vehicles and machinery will access the Sunshine Section Project Land through defined entry and exit points. Additional measures to prevent the spread and establishment of weeds and disease must be provided within the Construction Environmental Management Plan (CEMP). Construction stockpiles, machinery, roads, and other infrastructure should be placed away from areas supporting native vegetation and waterways; and placed in previously cleared or hardstand areas <p>No-go zones</p> <ul style="list-style-type: none"> The No-go zones identified in this report (listed in Appendix F, and in the Appendices to the EPBC Act referral) are to be avoided by construction works, with no admittance to the areas. The No-go zones are to be included on all site maps, including all Environmental Management Plans and related documentation (including the CEMP). The No-go zone must be fenced with high-visibility safety bunting or temporary construction fencing (including erosion fencing if necessary). The area is to be signed as a 'No-go zone'. fencing should enable fauna to move through areas of habitat Where the No-go zone has been established to protect EPBC listed NTGVVP, additional construction fencing (e.g. geofabric, shadecloth or similar solid fabric) is required to be erected to prevent dust impacts. <p>Erosion and Sedimentation Controls</p>	<p>NTGVVP occurs in a number of locations within the Sunshine Section Project Land (Sunshine Railway Linear Reserve, St Albans Road Biosites, Old Sunshine Tip Site).</p> <p>No NTGVVP will be removed as part of the proposed works for the Sunshine Section. Areas of NTGVVP are to be protected through the implementation of No-go zones and other mitigation measures to ensure the community is not impacted.</p> <p>Following the implementation of mitigation measures (general construction measures, no-go zones and erosion and sedimentation controls), the Project will not result in the reduction of extent of the ecological community.</p>	Unlikely
Fragment or increase fragmentation of an ecological community		<p>Following the implementation of mitigation measures (general construction measures, no-go zones and erosion and sedimentation controls), the Project will not result in the fragmentation of the ecological community.</p>	Unlikely
Adversely affect habitat critical to the survival of an ecological community		<p>Following the implementation of mitigation measures (general construction measures, no-go zones and erosion and sedimentation controls), the Project will not result in adverse affects to habitat critical to the survival of this ecological community.</p>	Unlikely
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns		<p>Following the implementation of mitigation measures (general construction measures, no-go zones and erosion and sedimentation controls), the Project will not modify abiotic factors (surface water drainage patterns or light/shade impacts)</p>	Unlikely
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting.		<p>Following the implementation of mitigation measures (general construction measures, no-go zones and erosion and sedimentation controls), there is a low likelihood of causing a substantial change in the species composition of an occurrence of the ecological community.</p>	Unlikely
Cause a substantial reduction in the quality or integrity of an		<p>Following the implementation of mitigation measures (general construction measures, no-go zones and erosion and sedimentation</p>	Unlikely

Significant impact criterion	Specific mitigation measures (See Section 5.2)	Residual risk to MNES with mitigation measures applied	Likelihood of a Significant Impact (with mitigation measures implemented)
<p>occurrence of an ecological community, including, but not limited to:</p> <ul style="list-style-type: none"> assisting invasive species, that are harmful to the listed ecological community, to become established causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community 	<ul style="list-style-type: none"> Environmental management for erosion and sediment control, in accordance with EPA Victoria construction guidelines (Publications 275, 480 and 960) will be implemented for works in the vicinity of waterways and wetlands such that Water quality of wetlands within and adjacent to the Sunshine Section Project Land and watercourses that intersect the Sunshine Section Project Land is to be maintained at pre-construction levels. 	<p>controls), there is a low likelihood of causing a substantial reduction in the quality of integrity of an occurrence of the ecological community</p>	<p>Unlikely</p>
<p>Interfere with the recovery of an ecological community</p>		<p>Following the implementation of mitigation measures (general construction measures, no-go zones and erosion and sedimentation controls), there is a low likelihood for the potential to interfere with the recovery of the ecological community.</p>	

Table G.5 Significant impact assessment for Golden Sun Moth (listed Critically Endangered under EPBC Act)

Significant impact criterion	Specific mitigation measures (See Section 5.2)	Residual risk to MNES with mitigation measures applied	Likelihood of a Significant Impact (with mitigation measures implemented)	
Habitat loss, degradation or fragmentation >0.5 ha from a large (>10ha) area of habitat	<p>General Construction Measures</p> <ul style="list-style-type: none"> The spread of noxious weeds and pest animals must be controlled in accordance with the CaLP Act. Where possible, all vehicles, machinery and equipment will move along formed/designated access tracks to prevent the spread and establishment of weeds and diseases. Vehicles and machinery will access the Sunshine Section Project Land through defined entry and exit points. Additional measures to prevent the spread and establishment of weeds and disease must be provided within the Construction Environmental Management Plan (CEMP). Construction stockpiles, machinery, roads, and other infrastructure should be placed away from areas supporting native vegetation and waterways; and placed in previously cleared or hardstand areas <p>No-go zones</p> <ul style="list-style-type: none"> The No-go zones identified in this report (listed in Appendix F, and in the Appendices to the EPBC Act referral) are to be avoided by construction works, with no admittance to the areas. The No-go zones are to be included on all site maps, including all Environmental Management Plans and related documentation (including the CEMP). The No-go zone must be fenced with high-visibility safety bunting or temporary construction fencing (including erosion fencing if necessary). The area is to be signed as a 'No-go zone'. fencing should enable fauna to move through areas of habitat <p>Erosion and Sedimentation Controls</p> <ul style="list-style-type: none"> Environmental management for erosion and sediment control, in accordance with EPA Victoria construction guidelines (Publications 275, 480 and 960) will be implemented for works in the vicinity of waterways and wetlands such that Water quality of wetlands within and adjacent to the Sunshine Section Project Land and watercourses that intersect the Sunshine Section Project Land is to be maintained at pre-construction levels. 	No areas of Golden Sun Moth habitat >10 ha occur within or immediately adjacent to the Sunshine Section.	Unlikely	
Any habitat loss, degradation or fragmentation of a small or fragmented habitat area (<10 ha)			Golden Sun Moth habitat in the Luma Estate and Matthews Hill Reserve represents an area of continuous habitat <10ha. Following the implementation of mitigation measures (general construction measures, no-go zones and erosion and sedimentation controls), it is unlikely that any habitat for the species will be lost or degraded.	Unlikely
Fragmentation of a population through the introduction of a barrier to dispersal			<p>Golden Sun Moth habitat in the Luma Estate will be avoided in a no-go zone.</p> <p>Golden Sun Moth habitat within Matthews Hill Reserve is outside the Project Land therefore the Project has no potential to fragment the population through the introduction of a barrier to dispersal.</p> <p>Mitigation measures reduce the already low likelihood of fragmenting an existing population into two or more populations.</p>	Unlikely

Table G.6 Significant impact assessment for Spiny Rice-flower (listed Critically Endangered under EPBC Act)

Significant impact criterion	Specific mitigation measures (See Section 5.2)	Residual risk to MNES with mitigation measures applied	Likelihood of a Significant Impact (with mitigation measures implemented)
Any fragmentation of a population (Contiguous habitat area)	<p>General Construction Measures</p> <ul style="list-style-type: none"> The spread of noxious weeds and pest animals must be controlled in accordance with the CaLP Act. Where possible, all vehicles, machinery and equipment will move along formed/designated access tracks to prevent the spread and establishment of weeds and diseases. Vehicles and machinery will access the Sunshine Section Project Land through defined entry and exit points. Additional measures to prevent the spread and establishment of weeds and disease must be provided within the Construction Environmental Management Plan (CEMP). Construction stockpiles, machinery, roads, and other infrastructure should be placed away from areas supporting native vegetation and waterways; and placed in previously cleared or hardstand areas <p>No-go zones</p>	<p>21 Spiny Rice-flower plants occur within the Sunshine Section Project Land (including in the rail corridor adjacent to the Sunshine Triangle Ecological site, St Albans Road Biosites and the Old Sunshine Tip). Spiny Rice-flower also occur in the rail corridor adjacent to the Matthews Hill Reserve (outside the Project Land).</p> <p>No Spiny Rice-flower individuals will be removed in association with the works for the Sunshine Section. Spiny Rice-flower plants and adjacent habitat are to be protected through the implementation of No-go zones and other mitigation measures to ensure the plants and their habitat are not impacted. No fragmentation of Spiny Rice-flower population will occur</p>	Unlikely
Loss of >5 individuals (Population viability, medium to long-term)	<ul style="list-style-type: none"> The No-go zones identified in this report (listed in Appendix F, and in the Appendices to the EPBC Act referral) are to be avoided by construction works, with no admittance to the areas. The No-go zones are to be included on all site maps, including all Environmental Management Plans and related documentation (including the CEMP). 	Following the implementation of no-go zones and other mitigation measures there will be no direct removal of any Spiny Rice-flower in the Sunshine Section.	Unlikely
Any loss of individuals from any population which occurs on the edge of the spiny rice-flower's current known distribution (Extent of occurrence)	<ul style="list-style-type: none"> The No-go zone must be fenced with high-visibility safety bunting or temporary construction fencing (including erosion fencing if necessary). The area is to be signed as a 'No-go zone'. fencing should enable fauna to move through areas of habitat <p>Erosion and Sedimentation Controls</p> <ul style="list-style-type: none"> Environmental management for erosion and sediment control, in accordance with EPA Victoria construction guidelines (Publications 275, 480 and 960) will be implemented for works in the vicinity of waterways and wetlands such that Water quality of wetlands within and adjacent to the Sunshine Section Project Land and watercourses that intersect the Sunshine Section Project Land is to be maintained at pre-construction levels. 	<p>Individuals within the Sunshine Section Project Land are considered at the edge (eastern end) of the species range.</p> <p>Following the implementation of no-go zones and other mitigation measures there will be no direct removal of any Spiny Rice-flower in the Sunshine Section.</p>	Unlikely

Table G.7 Significant impact assessment for Port Phillip Bay (western shoreline) and Bellarine Peninsula (listed Ramsar Wetlands under EPBC Act)

Significant impact criterion	Specific mitigation measures (See Section 5.2)	Residual risk to MNES with mitigation measures applied	Likelihood of a Significant Impact (with mitigation measures implemented)
Areas of the wetland being destroyed or substantially modified	<p>General Construction Measures</p> <ul style="list-style-type: none"> The spread of noxious weeds and pest animals must be controlled in accordance with the CaLP Act. Where possible, all vehicles, machinery and equipment will move along formed/designated access tracks to prevent the spread and establishment of weeds and diseases. Vehicles and machinery will access the Sunshine Section Project Land through defined entry and exit points. Additional measures to prevent the spread and establishment of weeds and disease must be provided within the Construction Environmental Management Plan (CEMP). Construction stockpiles, machinery, roads, and other infrastructure should be placed away from areas supporting native vegetation and waterways; and placed in previously cleared or hardstand areas <p>Erosion and Sedimentation Controls</p> <ul style="list-style-type: none"> Environmental management for erosion and sediment control, in accordance with EPA Victoria construction guidelines (Publications 275, 480 and 960) will be implemented for works in the vicinity of waterways and wetlands such that Water quality of wetlands within and adjacent to the Sunshine Section Project Land and watercourses that intersect the Sunshine Section Project Land is to be maintained at pre-construction levels. 	Stony Creek which flows through the Sunshine Section Project Land, flows into Port Phillip Bay and has the potential to flow into the Port Phillip Bay (western shoreline) and Bellarine Peninsula Ramsar Wetlands. Following the implementation of mitigation measures (general construction measures, no-go zones and erosion and sedimentation controls), there is a low likelihood of substantially modifying the Ramsar wetland.	Unlikely
A substantial and measurable change in the hydrological regime of the wetland, for example, a substantial change to the volume, timing, duration and frequency of ground and surface water flows to and within the wetland		Following the implementation of mitigation measures (general construction measures, no-go zones and erosion and sedimentation controls), there is a low likelihood of causing a substantial and measurable change in the hydrological regime of the Ramsar Wetland.	Unlikely
The habitat or lifecycle of native species, including invertebrate fauna and fish species, dependant upon the wetland being seriously affected		Following the implementation of mitigation measures (general construction measures, no-go zones and erosion and sedimentation controls), there is a low likelihood of seriously affecting the habitat or lifecycle of native species.	Unlikely
A substantial and measurable change in the water quality of the wetland – for example: a substantial change in the level of salinity, pollutants, or nutrients in the wetland, or water temperature which may adversely impact on biodiversity, ecological integrity, social amenity or human health.		Following the implementation of mitigation measures (general construction measures, no-go zones and erosion and sedimentation controls), there is a low likelihood of causing a substantial change in salinity, pollutants or nutrient levels in the wetlands.	Unlikely
A substantial and measurable change in the water quality of the wetland – for example: An invasive species that is harmful to the ecological character of the wetland being established (or an existing invasive species being spread) in the wetland.		Following the implementation of mitigation measures (general construction measures, no-go zones and erosion and sedimentation controls), there is a low likelihood of resulting in a substantial and measurable change that an invasive species becomes established in the wetlands.	Unlikely

Table G.8 Significant impact assessment for listed migratory birds (under EPBC Act)

Significant impact criterion	Specific mitigation measures (See Section 5.2)	Residual risk to MNES with mitigation measures applied	Likelihood of a Significant Impact (with mitigation measures implemented)
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	<p>General Construction Measures</p> <ul style="list-style-type: none"> The spread of noxious weeds and pest animals must be controlled in accordance with the CaLP Act. Where possible, all vehicles, machinery and equipment will move along formed/designated access tracks to prevent the spread and establishment of weeds and diseases. Vehicles and machinery will access the Sunshine Section Project Land through defined entry and exit points. Additional measures to prevent the spread and establishment of weeds and disease must be provided within the Construction Environmental Management Plan (CEMP). Construction stockpiles, machinery, roads, and other infrastructure should be placed away from areas supporting native vegetation and waterways; and placed in previously cleared or hardstand areas <p>Erosion and Sedimentation Controls</p> <ul style="list-style-type: none"> Environmental management for erosion and sediment control, in accordance with EPA Victoria construction guidelines (Publications 275, 480 and 960) will be implemented for works in the vicinity of waterways and wetlands such that Water quality of wetlands within and adjacent to the Sunshine Section Project Land and watercourses that intersect the Sunshine Section Project Land is to be maintained at pre-construction levels. 	White-throated Needletail and Latham’s Snipe were the only EPBC Act listed migratory species that were considered to have a moderate likelihood of occurrence within the Sunshine Section. Regardless, habitats in the Sunshine Section are not considered to support important habitat for any migratory wetland birds.	Unlikely
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species		The Sunshine Section Project Land is highly urbanised and would already be frequented by invasive predators such as feral cats and foxes. The Sunshine Section Project Land is not considered to support any areas of important habitat for migratory species.	Unlikely
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species		The Sunshine Section Project Land is not considered to support an ecologically significant proportion of the population of a migratory species. Construction works are unlikely to seriously disrupt the lifecycle of an ecologically significant proportion of the population.	Unlikely



AURECON | JACOBS | MOTT MACDONALD

222 Exhibition Street
Melbourne VIC 3000

PO Box 23061
Docklands VIC 8012
Australia