VIDA Roads

March 2026

Threatened Species Management Plan

Western Highway Project, Section 2B: Buangor to Ararat

For Spiny Rice-flower (*Pimelea spinescens* subsp. *spinescens*), Golden Sun Moth (*Synemon plana*), Button Wrinklewort (*Rutidosis leptorrhynchoides*)

BIG BUILD ROADS · NORTH EAST LINK · WEST GATE TUNNEL PROJECT · VICTORIAN INFRASTRUCTURE DELIVERY AUTHORITY · VICTORIA'S BIG BUILD · VICTORIA State Government

Version Control

Issue No.	Issue Date	Description of Amendment	Prepared By
1	Endorsed Version March 2018 Reference: SBR009481	N/A	VicRoads
2	March 2019	Amended to include Supplementary Ecological Assessment undertaken by EHP	MRPV
3	April 2019	Final Draft for Submission to DELWP	MRPV
4	August 2019	Amended to reflect DELWP comments on previous draft	MRPV
5	September 2019	Amended to reflect DELWP comments on previous draft	MRPV
6	May 2020	Amended to reflect minor design modifications	MRPV
7	March 2026	Amended to reflect design changes, Machinery of Government changes and updates	VIDA Roads

Machinery of Government Changes

As of March 2026

The Western Highway Project Section 2B commenced under the governance of VicRoads. When the Major Road Projects Authority (MRPA) was formed in 2018, the Project was moved from VicRoads to MRPA. MRPA became Major Road Projects Victoria (MRPV) on 1 January 2019. Due to further Machinery of Government changes within the Victoria State Government, the Project is being delivered by VIDA Roads. As the project was commenced under VicRoads, and works are already underway, the project is currently being managed on site utilising VicRoads monitoring, compliance and reporting systems and processes. As such, unless otherwise specified in this document, any reference to VicRoads processes and procedures refers also to the processes and procedures VIDA Roads is currently utilising on this project.

Contents

1. Introduction

1.1 Project Description

The Western Highway (A8) is being progressively upgraded to a four-lane divided highway for 110 kilometres (km) between Ballarat and Stawell, Victoria, referred to as the Western Highway Project. As the principal road link between Melbourne and Adelaide, the Western Highway serves interstate trade between Victoria and South Australia and is the key corridor through Victoria's west, supporting farming, grain production, tourism and a range of manufacturing and service activities. Section 2 of the Western Highway Project consists of four sub-sections:

- Beaufort to Buangor (Section 2A)
- Buangor Bypass
- Buangor to Warrayatkin Road (Section 2B)
- Warrayatkin Road to Ararat

1.2 Environmental Approvals for the Project

Section 2 of the Western Highway Project was subject to an Environment Effects Statement (EES). The Commonwealth Minister for the Environment determined the project is a controlled action that requires approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), due to impacts on matters of national environmental significance (MNES). Under the bilateral agreement between the Commonwealth and Victorian governments, the EES process served as the accredited process for the assessment purposes of the EPBC Act. During the development of the EES multiple options were developed with two options investigated in detail. Following assessment under the *Environment Effects Act 1978*, Option 1 was recommended by the Planning Panel and approved by the Minister for Planning for implementation in accordance with the Inquiry Report dated May 2013.

Condition 4 of EPBC Approval (2010/5741) issued by Department of Environment (DoE) to VicRoads on 17 April 2014, requires a Threatened Species Management Plan for the conservation and enhancement of:

- Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens*
- Button Wrinklewort *Rutidosis leptorrhynchoides*
- Golden Sun Moth *Synemon plana* habitat.

Clause 4.2.6 of the Western Highway Project Section 2B (Buangor to Ararat) Incorporated Document, gazetted June 2017, also requires a Threatened Species Management Plan for Spiny Rice-flower, Button Wrinklewort and Golden Sun Moth. This plan must be prepared in consultation with Department of Environment, Land, Water and Planning (now Department of Energy, Environment and Climate Action (DEECA)) and Department of Energy and Environment (now Department of Climate Change, Energy, the Environment and Water (DCCEEW)) and submitted to and endorsed by the Secretary to DELWP (now DEECA).

This plan relates only to Section 2B (shown in Appendix A) between Buangor and Warrayatkin Road.

1.3 Purpose of this Document

The purpose of the plan is to outline the mitigation and preservation measures which will be undertaken throughout the Project to protect the threatened species listed above. It also provides guidelines for the removal and relocation of threatened flora and fauna if required.

Implementation of this plan will minimise the potential impact on Spiny Rice- flower, Golden Sun Moth and Button Wrinklewort, and should be considered in conjunction with the following documents:

- WHP Section 2B: Environmental Management Framework
- WHP Section 2B: Construction Environmental Management Plan

- WHP Section 2: Weed Management Plan
- WHP Section 2B: Native Vegetation Management Plan

1.4 Description of the Environment

The project is located between Beaufort and Ararat and consists primarily of road reserve and private properties on either side of the Western Highway. It is situated 170 km west of Melbourne, Victoria and is located partly within the Central Victorian Uplands (CVU) and partly within the Victorian Volcanic Plains (VVP) bioregions (DEECA 2025).

The CVU bioregion extends from Stawell in the west to Bright in the east and from Glenrowan in the north-east to Meredith in the south. The VVP bioregion extends from Portland in the west to Craigieburn in the east and from Clunes in the north to Colac in the south. The western section of the Development footprint is located within the City of Ararat and the eastern section within the Shire of Pyrenees. The entire Development footprint is located within the Glenelg - Hopkins Catchment Management Authority area.

The Development footprint is characterised by native and exotic grassland vegetation, with scattered areas of remnant indigenous vegetation consisting of forest, grassland and wetland communities. The existing highway intersects Cemetery Creek, Green Hill Creek, Hopkins River, Billy Billy Creek, Middle Creek, Fiery Creek and several smaller drainage lines along its length.

1.5 Species and Communities

The following EPBC Act listed species and communities have been recorded within and adjacent to the Development footprint.

Table 1 EPBC Act listed species and communities recorded within and adjacent to the Development footprint

Common name	Species name	EPBC Act listing
Spiny Rice-flower	*Pimelea spinescens* subsp. *spinescens*	Critically Endangered
Button Wrinklewort	*Rutidosis leptorhynchoides*	Endangered
Golden Sun Moth	*Synemon plana*	Vulnerable
EPBC Act listed Communities		
Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP)	NA	Critically Endangered
Grassy Eucalypt Woodland of the Victorian Volcanic Plain (GEWVVP)	NA	Critically Endangered

1.6 Preparation

This plan was developed by VIDA Roads / VicRoads, in conjunction with suitably qualified external ecological consultants. The ecological consultants have been extensively involved with all aspects of the Western Highway Project Section 2 including all field assessments, reporting and EES preparation.

1.7 Roles and Responsibilities

Table 2 Roles and Responsibilities

ROLE	RESPONSIBILITY
Superintendent (or Representative)	Responsible for ensuring the Contractor complies with the specification, requirements of this plan and satisfying reporting requirements of the EPBC Approval Notice 2010/5741
Department of Climate Change, Energy, the Environment and Water	Responsible for administering *Environment Protection and Biodiversity Conservation Act 1999* matters
Suitably qualified ecologist	Responsible for providing expert advice to the Superintendent and/or Contractor including: • implementing threatened species, No-go Zones (NGZ) (if required) • translocation of Spiny Rice-flower (if required) • Golden Sun Moth revegetation plan • water quality monitoring (if required)
Contractor	Responsible for the implementation of this plan (including maintaining NGZs and implementing the Weed Management Plan)
VIDA Roads	Responsible for: • Submitting baseline data to DCCEEW and DEECA • Monitoring health of Button Wrinklewort • Annual EPBC Compliance reporting

1.8 Definitions and Acronyms

Table 3 Definitions

DESCRIPTION	DEFINITION
Button Wrinklewort	The native plant species *Rutidosis leptorhynchoides*, protected under the EPBC Act and FFG Act.
Button Wrinklewort quantity	47[1] Button Wrinklewort located within the Development footprint, as defined in Appendix B (Map 1), for the ongoing in situ management of the population of Button Wrinklewort.
Construction activities	All works associated with changes within the Development footprint; including impacting native vegetation, the erection of any onsite temporary structures, the use of heavy-duty equipment for the purpose of breaking the ground for buildings or infrastructure, grading land for flood mitigation and ancillary works. Construction activities do not include the maintenance and use of existing access tracks or works to prepare the land for revegetation.

DESCRIPTION	DEFINITION
Construction Environment Management Plan (CEMP)	The document(s) to be developed to ensure that appropriate environmental management practices are followed during the construction phase of the project. CEMPs will be developed specifically for each stage of construction.
Department of Energy, Environment and Climate Action (DEECA)	The Department responsible for the *Flora and Fauna Guarantee Act 1988* and other acts related to energy, environment, climate action, wildlife and land management.
Department of Climate Change, Energy, the Environment and Water (DCCEEW)	The department responsible for the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth).
Development footprint	Development footprint means the location where clearing and construction will be undertaken from the date this instrument is signed, represented in Annexure 1 of EPBC Act Approval 2010/5741 by the zones enclosed by the red lines designated 'Development footprint'. As shown in Appendix B
EPBC Act	*The Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
FFG Act	*The Flora and Fauna Guarantee Act 1988* (Victoria)
Golden Sun Moth	The native moth species *Synemon plana*, protected under the EPBC Act and FFG Act
Golden Sun Moth habitat	The patches of approximately 93.74 ha[1] of habitat for the Golden Sun Moth within the Development footprint, as defined in Appendix B for the ongoing in situ management of the population of Golden Sun Moth.
Impact(ing)	Adverse impact by cutting down, felling, thinning, logging, removing, killing, destroying, smothering, poisoning, ringbarking, uprooting or burning.
Incorporated Document	The Western Highway Project Section 2B (Buangor to Ararat) Incorporated Document, gazetted June 2017 or any subsequent amended document that provides approval for the Project under the *Planning and Environment Act 1987* (Victoria).
No-go zone(s)	Clearly delineated area(s) of conservation value, to be avoided by construction related activities, including machinery, vehicles and personnel.
Project location	The location of the project as defined in Appendix A
Practical completion	When all construction activities for the Project have been completed.
Pre-construction phase	Site-specific preparatory activities undertaken prior to the commencement of construction works within the development footprint.
Spiny Rice-flower	The native flora species *Pimelea spinescens* subsp. *spinescens*, protected under the EPBC Act and FFG Act

DESCRIPTION	DEFINITION
Spiny Rice-flower quantity	No Spiny Rice-flower are located within the Development footprint as defined in Appendix B
Suitably qualified ecologist	Practicing ecologist with tertiary qualifications from a recognised institute with at least three years of field experience undertaking flora and fauna surveys.
Threatened Species Management Plan	This document entitled Threatened Species Management Plan, Western Highway Project, Section 2B: Buangor to Ararat, prepared in compliance with EPBC Approval 2010/5741 and associated Incorporated Document.
Weed Management Plan	The document titled final report Weed Management Plan, Western Highway Duplication Project - Section 2, Beaufort to Ararat, Victoria, dated June 2013 or a subsequent version approved by the Minister.

1 Based on survey data last obtained in January 2026

Table 4 Acronyms

ACRONYM	DEFINITION
BW	Button Wrinklewort *Rutidosis leptorhynchoides*
CFA	Country Fire Authority (Victoria)
CVU	Central Victorian Uplands Bioregion
DCCEEW (formerly DAWE)	Department of Agriculture, Water and the Environment (formerly Department of the Environment and Energy, now Department of Climate Change, Energy, the Environment and Water (DCCEEW))
DEECA (formerly DELWP)	Department of Environment, Land, Water and Planning (DELWP), (formerly Department of Environment and Primary Industries (DEPI), and Department of Sustainability and Environment (DSE) now the Department of Energy, Environment and Climate Action (DEECA))
DEPI	Department of Environment and Primary Industries (now DEECA)
DSE	Department of Sustainability and Environment (now DEECA)
DTP	Department of Transport and Planning
DTPLI	Department of Transport, Planning and Local Infrastructure (now DEECA and DTP)
EES	Environment Effects Statement
EMP	Environmental Management Plan

ACRONYM	DEFINITION
EPA	Environment Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
FFG Act	*Flora and Fauna Guarantee Act 1988*
GIS	Geographical Information System
GPS	Global Positioning System
GSM	Golden Sun Moth *Synemon plana*
KPI	Key Performance Indicator
MRPV	Major Road Projects Victoria (now VIDA Roads)
NGZ	No-go Zone(s)
PEPS	Project Environmental Protection Strategy (now Environmental Management Framework (EMF))
ROW	Right of Way
SRF	Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens*
TSMP	Threatened Species Management Plan
VIDA Roads	Victorian Infrastructure Delivery Authority – Roads
VVP	Victorian Volcanic Plains Bioregion
WHP	Western Highway Project

2. Baseline Information

2.1 Baseline Information

Appendix C outlines the preliminary assessments and targeted surveys that were undertaken for the EES to provide baseline data for threatened species present within the Development footprint. All surveys were undertaken by suitably qualified ecologists. Additional information relating to survey methodology, additional targeted surveys undertaken, limitations and site conditions can be found in the EES and supporting technical appendices.

Where baseline surveys have not been completed, further baseline information for the Spiny Rice-flower, Button Wrinklewort and known populations of Golden Sun Moth will be collected prior to construction works commencing within 100 m of the species within the Development footprint. This will be submitted to DEECA and DCCEEW within 14 calendar days of commencing works within 100 m of the species within the Development footprint and used as a basis for monitoring the species during construction.

3. Spiny Rice-flower

EPBC Act Status	Critically Endangered
FFG Act Status	Critically Endangered

3.1 Description

Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens* is listed as Critically Endangered under the EPBC and FFG Acts.

Spiny Rice-flower is a small spreading shrub growing to 30 cm in height, with partly herbaceous stems. It has narrow, green, hairless, oval-shaped leaves 2-10 mm long and 1- 3 mm wide, that grow from spine-tipped stems. Up to 12 small, unisexual, hairless pale-yellow flowers form the inflorescences. Flowering occurs from April to August (Carter & Walsh 2006).

Spiny Rice-flower is endemic to Victoria where it occurs in grassland or open shrub land on basalt-derived soils in the central west of the State. Most populations occur within the EPBC Act listed Natural Temperate Grassland of the Victorian Volcanic Plain vegetation community.

3.1.1 Baseline Conditions

Plants were recorded within high quality vegetation (vegetation quality as per Habitat Hectare Assessment from EES Technical Appendices). Cohorts from multiple age classes were recorded and plants were actively reproducing.

An important population of Spiny Rice-flower plants were recorded adjacent to the Development footprint with a total of 574 plants identified during targeted surveys completed during the development of the EES. All plants were recorded within the ecological vegetation class (EVC) EVC 132 Plains Grassland within the road reserve between the Ararat Airport entrance/Service Centre and Warrayatkin Road. All plants were recorded on the north side of the Western Highway; west of the Development footprint; between the road and rail reserve, except for one plant which was recorded on the south side of the Western Highway.

Where baseline surveys have not been completed, additional baseline information for the species will be collected before construction works begin within 100 m of the known records in the road reserve.

- Location of individuals
- Total number of individuals
- Total area occupied by Spiny Rice-flower (ha's) within the area which may be directly or indirectly impacted

- Age cohort
- KPIs (% weed cover and % biomass)
- Quality of habitat (% weed cover, % native vegetation)

This will be submitted to DEECA and DCCEEW within 14 calendar days of commencing works within 100 m of the species within the Project Area and used as a basis for monitoring the species during construction and post-construction.

3.1.2 Impacts

Spiny Rice-flower is not located within the Development footprint for Section 2B and is not anticipated to be impacted by the project. Should the Development footprint extend to within 100 m of the population of Spiny Rice-flower, a management approach will be submitted to DEECA and DCCEEW for consideration and endorsement prior to works commencing within this area.

4. Button Wrinklewort

EPBC Act Status	Endangered
FFG Act Status	Endangered

4.1 Description

Button Wrinklewort *Rutidosis leptorhynchoides* is listed as endangered under the EPBC and FFG Acts.

Button Wrinklewort is a perennial forb which produces multiple flowering stems 15 to 30 cm high during spring and summer. Stems are hairless in the upper part, becoming woolly towards the base. Leaves are mostly stem-clasping at their base, linear, usually 1.5-3.5 cm long, 0.5-1.5 mm wide, hairless and have their edges slightly rolled under. In Victoria the species flowers from October to February (NSW Office of Environment and Heritage 2012).

Button Wrinklewort occurs in south-eastern Australia, from Goulburn in the Southern Tablelands of NSW to Wickliffe on the plains west of Melbourne. In Victoria the species occurred across the Victorian Volcanic Plain but is now restricted to tiny populations in the south-west and is generally found growing in Plains Grassland and Grassy Woodland vegetation (Walsh and Entwistle 1994).

4.1.1 Distribution

There are 233 documented records of Button Wrinklewort in Victoria, with several records located close to the project alignment around the Hopkins River at Dobie.

4.1.2 Baseline Conditions

Eighty-eight Button Wrinklewort plants were recorded within the study area of Section 2B during the targeted surveys. Most plants (83 in total) were recorded within EVC 67 Alluvial Terraces Herb-rich Woodland within the road reserve east of Warrayatkin Road on the north side of the Western Highway.

No Button Wrinklewort are anticipated to be impacted by the project. Where baseline surveys have not been completed, additional baseline information for the species will be collected before construction works begin within 100 m of the known records in the road reserve.

Baseline information will include at a minimum:

- Location of individuals
- Total number of individuals and or total area occupied by Button Wrinklewort (ha's) within the area which may be directly or indirectly impacted KPIs (% weed cover and % biomass)
- Quality of habitat (% weed cover, % native vegetation)

This will be submitted to DEECA and DCCEEW within 14 calendar days of commencing works within 100 m of the known records within the Project Area and used as a basis for monitoring the species during construction.

4.1.3 Impacts

Button Wrinklewort is located within and adjacent to the Development footprint within the rail/road reserve east of Warrayatkin Road, Ararat. During the EES development process the alignment was adjusted and management actions developed (Table 5) to avoid impact to the species.

4.1.4 Management Approach

In accordance with the National Recovery Plan for the Button Wrinklewort (NSW Office of Environment and Heritage 2012) this management plan aims to:

- Protect known populations within the Development footprint from changes to land use.
- Limit grazing on sites within the Development footprint.
- Undertake weed control at sites within the Development footprint in in accordance with the approved WHP Section 2 Weed Management Plan.
- Facilitate the marking of sites and potential habitat on maps used for planning road works.
- Facilitate the installation and maintenance of signage onsite to alert maintenance staff to the habitat.
- Facilitate the search for new populations in potential habitat within the Development footprint.
- Avoid physical alteration to Button Wrinklewort habitat within the Development footprint.
- Control use of nutrients, biocides and other chemicals for any vegetation clearing adjacent to Button Wrinklewort habitat.

Table 5 Button Wrinklewort Management

REF	MANAGEMENT APPROACH	MANAGEMENT ACTIONS	PERFORMANCE INDICATOR	MONITORING TIMING	CORRECTIVE ACTION
BW 1.1	Preclearance surveys	Development footprint containing Button Wrinklewort to be surveyed up to 100 m either side of existing patches (within the limits of the road reserve). Baseline condition to be determined (including no. of individuals, % weed cover & % biomass)	Prior to commencing construction within 100 m of Button Wrinklewort patches within the limit of the road reserve	Surveys to be conducted between October and February.	DEECA and DCCEEW to be notified to determine best course of action if additional Button Wrinklewort patches are located within the Development footprint and are proposed to be impacted
BW 1.2	Control weed invasion	Implement spraying as per approved WHP Section 2 Weed Management Plan within Development footprint	Performance indicator as per approved WHP Section 2 Weed Management Plan	Monitoring timing as per approved WHP Section 2 Weed Management Plan	Additional spraying as per approved WHP Section 2 Weed Management Plan
BW 1.3a	Restrict access	Install temporary fencing and signage to identify the sensitive area shown in Appendix B	Prior to commencing construction within 100 m of Button Wrinklewort patches within Development footprint	Monitoring of signage to occur monthly during construction of Section 2B	Repair fallen signs within 24 hours of being identified
BW 1.3b		Install NGZs in accordance with Section 7	Prior to commencing construction within 100 m of Button Wrinklewort patches within Development footprint	Monitoring of NGZs to occur weekly	Repair incorrectly installed or damaged NGZs within 24 hours

REF	MANAGEMENT APPROACH	MANAGEMENT ACTIONS	PERFORMANCE INDICATOR	MONITORING TIMING	CORRECTIVE ACTION
BW 1.4	Ongoing Health Monitoring	Qualified personnel to document the health of Button Wrinklewort populations retained in-situ within the Development footprint and undertake appropriate management techniques (i.e. weed control, burning, maintenance of fencing) to ensure survival. Monitoring of the effectiveness will be conducted concurrently with weed control program.	Maintenance of current population numbers within Development footprint and a reduction in exotic biomass to help reduce competition and create open space for Button Wrinklewort populations to survive and reproduce. Ensure translocation (if required) is undertaken based on actions and protocols outlined Section 4.2.3	Annually until practical completion	If a qualified ecologist determines that the exotic biomass and weed cover is not maintained or improved, then DEECA and DCCEEW must be consulted with to determine corrective action
BW 1.5	Manage Grazing	Restrict access to domestic stock	No stock to access the road reserve within the Development footprint containing Button Wrinklewort. Ensure boundaries within close proximity of Button Wrinklewort patches are secure	Existing ROW fencing to be monitored annually until practical completion	Temporary fences to be repaired within 21 days of defect being identified
BW 1.6	Rubbish	Ensure rubbish or litter in and around retained Button Wrinklewort populations within the Development footprint is managed	Rubbish and litter removed to ensure species survival	At least once per year until practical completion	

4.2 Mitigation Measures

4.2.1 Pre-clearance Surveys

Prior to undertaking construction activities within 100 m of the Button Wrinklewort within the Development footprint, a suitably qualified ecologist will undertake a pre-clearance survey (within the limits of the road reserve) to identify any unknown individuals.

4.2.2 No-go Zones

Prior to undertaking construction activities within 100 m of the Button Wrinklewort within the Development footprint, the suitably qualified ecologist must establish NGZs as per Section 7 around the Button Wrinklewort patches identified Appendix B.

Prior to construction works occurring within 100 m, temporary fencing will be constructed around the population immediately east of Warrayatkin Road (Appendix B) within the Development footprint. The fencing must be monitored weekly during construction in line with NGZ fencing requirements until practical completion. Fencing to be repaired within 21 days of defects being identified.

4.2.3 Salvage and Translocation

Salvage and translocation for Button Wrinklewort is not required as the current alignment avoids all impacts to the species. Further survey undertaken in April 2014 and November 2016 did not identify any Button Wrinklewort individuals within the Development footprint. In the event that further Button Wrinklewort is identified prior to or during construction and are proposed to be impacted VIDA Roads must consult with DEECA and DCCEEW to determine the most appropriate course of action.

4.3 Monitoring

NGZs must be regularly monitored and maintained throughout the construction phase to ensure compliance with this plan. Table 5 above also outlines the monitoring actions required for the retained populations of Button Wrinklewort including the responsible agents and reporting requirements.

The areas containing the populations of Button Wrinklewort are known to and monitored by regional DEECA and VIDA Roads staff and any changes to population health or removal of individuals that may potentially occur to these populations will be identified during construction.

4.4 Corrective Action

Prior to construction works occurring within 100 m, temporary fencing will be constructed around the population immediately east of Warrayatkin Road (Appendix B). The temporary fencing must be monitored weekly during construction in line with NGZ fencing requirements until practical completion.

Corrective actions will be initiated where monitoring identifies that performance indicators are not being met, where management measures have not been implemented as required, or where unanticipated impacts to Button Wrinklewort are identified. As outlined in Table 5, corrective actions include:

- Additional weed control spraying as per approved WHP Section 2 Weed Management Plan if required
- Repair fallen signs within 24 hours of being identified
- Repair incorrectly installed or damaged NGZs within 24 hours
- Consult with DEECA and DCCEEW should a qualified ecologist determine that exotic biomass and weed cover is not maintained or improved
- Repair temporary fences within 21 days of defect being identified

5. Golden Sun Moth

EPBC Act Status	Vulnerable
FFG Act Status	Vulnerable

5.1 Description

The Golden Sun Moth *Synemon plana* is listed as Vulnerable under the EPBC Act and FFG Act. In previous iterations of this Plan, Golden Sun Moth was identified as Critically Endangered under the EPBC Act and considered Critically Endangered under the DSE Advisory List.

The Golden Sun Moth is a medium-sized, day-flying moth. The wingspan of females and males is about 3.1 cm and 3.4 cm respectively. The smaller wingspan of the female is unique within the *Synemon* genus (Edwards 1991). The upper-side of the forewing is dark grey with patterns of paler grey scales on female moths, and the hindwing is golden yellow with black spots along the edges of the wings. The underside of both wings is white with small black spots along the edge of the wings. In the male, the upper-side of the forewing is dark brown with patterns of pale grey scales and the hindwing is bronze/brown with dark brown patches. The underside of both wings is pale grey with dark brown spots. Both males and females have clubbed antennae. The female has a long extensible ovipositor, which is an elongated organ extending from the posterior abdomen, used to lay eggs.

Adult moths survive between one and four days after pupal emergence and are unable to feed because they lack functional mouthparts (Clarke & O'Dwyer 2000; O'Dwyer & Attiwill 1999). Males spend their adult life patrolling approximately 1 m above the grass in search of females for breeding. Females have reduced hind wings and are reluctant to fly and will only do so when disturbed (Edwards 1991).

The Golden Sun Moth typically occurs in native grassland and grassy woodland dominated by greater than 40% cover of Wallaby grass *Rytidosperma* spp. (formerly *Austrodanthonia*) (DSE 2004) but is also known to inhabit areas dominated by Kangaroo Grass (Endersby & Koehler 2006) and introduced species such as Chilean Needle-grass (DEWHA 2009).

5.1.1 Distribution

Prior to the Golden Sun Moth targeted surveys conducted for this project (2011, 2012, 2016) there were six records of Golden Sun Moth from the local area, the most recent being from 1906 (DSE 2010). Known locations of Golden Sun Moth within the Development footprint are shown in Appendix B.

5.1.2 Baseline Conditions

The majority of Golden Sun Moth habitat within and surrounding the Development footprint comprises grassland areas that do not qualify as a remnant patch due to a native species cover of less than 25%, and with a high cover of weed species. These areas do, however, support scattered tussocks of Wallaby grass *Rytidosperma* spp., a preferred food source for Golden Sun Moth.

Approximately 93.74 ha of habitat for the Golden Sun Moth is within the Development footprint. VIDA Roads will ensure construction activities do not compromise the quality of this habitat within NGZs within the Development footprint, however it is possible that habitat identified on private land adjacent to the project may be compromised due to existing land use by private landowners.

Completed surveys on 16, 22, 29 December 2011 and 13 January 2012 identified 145 individuals within or adjacent to the Development footprint west of Pope Road (Appendix B).

Where baseline surveys have not been completed ,further baseline information for known populations of Golden Sun Moth will be collected prior to construction works commencing within 100 m of the species (see further discussion under impacts below).

Baseline information will include at a minimum:

- Number of individuals identified
- Total hectares of Golden Sun Moth habitat that may be directly or indirectly impacted
- KPIs (% weed cover and % biomass)
- Quality of habitat (e.g., % weed cover, % native vegetation,)

This will be submitted to DEECA and DCCEEW within 14 calendar days of commencing works and used as a basis for monitoring the species during construction and post-construction.

5.1.3 Targeted Surveys

Golden Sun Moth was recorded during targeted surveys at several sites spread between Buangor-Ben Nevis Road and Langi Ghiran Picnic Ground Road, with numerous individuals recorded in paddocks to the east and west of Pope Road (Appendix B). Surveys were undertaken on 16, 22 and 29 December 2011 and 13 January 2012 with 40, 17, 86 and 2 Golden Sun Moth individuals recorded respectively. Further surveys were undertaken on 12, 13, 19 December 2016 where the species was confirmed to still be present at the sites where the species had previously been detected in 2011 and 2012.

5.1.4 Pre-clearance Surveys

Pre-clearance surveys for Golden Sun Moth were undertaken on 6, 11, 12 and 19 December 2018, 10 January 2019 and the summer of 2025/26. Surveys concentrated in areas identified as supporting indigenous grassland, namely those supporting Wallaby grass which is a known food source for Golden Sun Moth and areas within 100 m of known Golden Sun Moth populations.

Areas of suitable habitat were walked or driven by qualified zoologists over a minimum of four separate days during the known flight season (i.e. November to early January). Surveys were undertaken at a time which is considered suitable for detecting the species (i.e. when adult males are flying), and when Golden Sun Moth was observed flying at nearby locations. The male of this species generally flies between 11 am and 3 pm on calm, warm (over 20°C), sunny days. All surveys were conducted in accordance with the recommended survey methodology outlined in the Commonwealth Significant Impact Guidelines for the Golden Sun Moth (DEWHA 2009).

Large numbers of Golden Sun Moths were detected during the targeted surveys within the Right of Way. The majority of Golden Sun Moth recorded during the surveys were also found in close proximity to areas where Golden

Sun Moth had previously been recorded, with the largest population being located between Pope Road and the Ballarat-Ararat rail corridor. However, small numbers of Golden Sun Moth were also found in areas where they were previously unrecorded.

5.1.5 Impacts

Detailed analysis has estimated the construction footprint of Section 2 will impact approximately 60.005 hectares with potential to impact up to 63.9 hectares of Golden Sun Moth habitat following detailed design.

VIDA Roads has approval under the EPBC Act to remove no more than 63.9 hectares of known Golden Sun Moth habitat within the overall Development footprint for Section 2 of the Western Highway Duplication Project (EPBC Approval 2010/5741).

5.1.6 Management Approach

In accordance with Significant Impact Guidelines for the Critically Endangered Golden Sun Moth (*Synemon plana*) and Golden Sun Moth *Synemon plana*, Action Statement No 106, this management plan aims to:

- Minimise the loss and degradation of Wallaby grass-dominated native temperate grasslands within the species historical range.
- Minimise the loss and degradation of open grassy woodlands where the ground layer is dominated by Wallaby grass.
- Minimise soil disturbance at extant Golden Sun Moth sites.

Table 6 Golden Sun Moth Management

REF	MANAGEMENT APPROACH	MANAGEMENT ACTIONS	PERFORMANCE INDICATOR	MONITORING TIMING	CORRECTIVE ACTION
GSM 1.1	Implement Offset Management Plan	Refer to EPBC Approval 2010/5741			
GSM 1.2	Refine detailed design	Where possible, refine detailed design of Section 2B to further avoid GSM population at Pope Road	N/A	N/A	N/A
GSM 1.3	Pre-clearance surveys	This baseline information will include survey data containing the number of identified individuals, condition of the habitat as well as the total hectares of Golden Sun Moth habitat within the area	Prior to commencing construction within 100 m of known Golden Sun Moth populations within the Development footprint	Surveys to be conducted between November and January.	Pre-clearance surveys submitted to DEECA and DCCEEW within 14 days of commencing works
GSM 1.4	Control weed invasion	Implement spraying as per approved WHP	Performance indicator as per	Monitoring timing as per approved	Additional spraying as per

REF	MANAGEMENT APPROACH	MANAGEMENT ACTIONS	PERFORMANCE INDICATOR	MONITORING TIMING	CORRECTIVE ACTION
		Section 2 Weed Management Plan within the Development footprint	approved WHP Section 2 Weed Management Plan	WHP Section 2 Weed Management Plan	approved WHP Section 2 Weed Management Plan
GSM 1.5	Restrict access	Install NGZs in accordance with Section 7	Prior to commencing construction within 100 m of Golden Sun Moth population within the Development footprint	Monitoring of NGZs to occur weekly	Repair incorrectly installed or damaged NGZs within 24 hours
GSM 1.6	Revegetation Area	Refer to Section 5.2.2			
GSM 1.7	Ongoing Monitoring of Revegetation Area	Refer to Section 5.3			

5.2 Mitigation Measures

5.2.1 No-go Zones

Prior to undertaking construction activities within 100 m of Golden Sun-Moth habitat within the Development footprint, the suitably qualified ecologist must establish NGZs as per Section 7 around the Golden Sun-Moth habitat identified Appendix B.

5.2.2 Revegetation Plan

A revised and updated plan to revegetate disturbed areas of Golden Sun Moth habitat is currently being prepared by suitably qualified ecologists. The plan will focus on revegetating disturbed areas within the Development footprint that are adjacent to known Golden Sun Moth populations or as agreed by DCCEEW. Revegetation will prioritise the use of grassland species favoured as a food source by Golden Sun Moth. The plan will be developed in consultation with DEECA and DCCEEW and provided to DCCEEW for comment and approval at least 6 months prior to undertaking any revegetation works. As a minimum the plan will include:

- Site preparation guidance
- Pest (plant and animal) management
- Plant selection and provenance guidance
- Planting design
- Planting timing and methods
- Maintenance
- Monitoring and performance targets
- Adaptive management
- Reporting

The Revegetation Plan will also include adaptive management measures and corrective actions to be implemented where monitoring identifies degradation of habitat condition or where performance measures are not achieved.

5.3 Monitoring

Monitoring is to be undertaken with two areas of focus:

- assessing the condition of Golden Sun Moth habitat within the Development footprint
- assessing the outcomes of revegetation for Golden Sun Moth once revegetation works have occurred.

To this end, surveys will be undertaken in select areas of known Golden Sun Moth habitat within the Development footprint and where habitat has been re-established within the road reserve, contiguous with areas of known or historic Golden Sun Moth records, or in areas as agreed by DCCEEW.

Surveys will focus on the condition of known or re-established Golden Sun Moth habitat and include assessment of:

- Vegetation composition including:
    - richness
    - diversity
    - percentage cover of:
        - host plants (such as Wallaby grasses, Spear grasses)
        - weeds
        - other vegetation
        - inter tussock space
        - rock
    - biomass
        - Estimated non-destructively and categorized using height and density
- The suitability of adjoining grassland habitats which are also known to support Golden Sun Moth
- Presence of pollutants, rubbish and other threatening processes
- General commentary

Golden Sun Moth habitat within the Development footprint

The following survey schedule (Table 7) will apply for select areas of known Golden Sun Moth habitat within the Development footprint. Areas for survey will be determined following the completion of detailed design and will provide a sample of Golden Sun Moth habitat from within the Development footprint and are not intended to assess all Golden Sun Moth habitat within the Development footprint.

Table 7 Golden Sun Moth habitat survey schedule

SURVEY YEAR	SURVEY TIMING	SURVEY TYPE
Post Practical Completion Year 1	During October - January	Habitat survey
Post Practical Completion Year 2	During October - January	Habitat survey

Revegetation

Following the establishment of habitat, surveys for Golden Sun Moth are to be conducted in accordance with the methods outlined in the Golden Sun-Moth survey guidelines EPBC Act Policy Statement 3.12 - Significant Impact Guidelines for the Critically Endangered Golden Sun Moth (*Synemon plana*) (Australian Government, 2009). These surveys are required to determine if Golden Sun Moth has re-established or persisted in grassland areas to ensure that management actions and habitats are suitable for a viable Golden Sun Moth population.

In summary, surveys will encompass the following:

- Survey will be carried out by qualified ecologists in areas identified in the revegetation plan following the establishment of habitat.
- The surveys will be undertaken during optimal conditions suitable for detecting species. The male of this species generally flies between 11am and 3 pm on calm, warm (over 20°C), sunny days, emerging between October and early January; and
- All transects, and Golden Sun Moths observed during the surveys will be marked with a hand-held GPS (accuracy of at least +/- 5 meters).

The following survey schedule (Table 8) will apply for areas of revegetation. Surveys are to be undertaken until at least two years following practical completion. Surveys may cease prior to this timeframe in areas where Golden Sun Moth has been detected.

Table 8 Golden Sun Moth habitat revegetation and Golden Sun Moth survey schedule

SURVEY YEAR	SURVEY TIMING	SURVEY TYPE
Within 1st year of direct seeding/tubestock planting	During October – January	Habitat survey
Post Practical Completion (following at least 1 year direct seeding/tubestock planting)	During October - January	Habitat survey Golden Sun Moth Survey
Post Practical Completion (following at least 2 years direct seeding/tubestock planting)	During October - January	Habitat survey Golden Sun Moth Survey

VIDA Roads is in the process of securing Golden Sun Moth habitat to offset against the impacts of Western Highway Project, Section 2- Beaufort to Ararat in accordance with the requirements of EPBC Approval 2010/5741.

5.4 Corrective Action

Following habitat surveys corrective actions will be associated with ongoing weed management, informed by the Weed Management Plan.

Corrective actions will be initiated where monitoring identifies that performance indicators are not being met, where management measures have not been implemented as required, or where unanticipated impacts to Golden Sun Moth habitat or populations are identified. As outlined in Table 6, corrective actions include:

- Implementation of additional weed control measures in accordance with the approved WHP Section 2 Weed Management Plan where monitoring indicates increased weed cover or biomass within Golden Sun Moth habitat
- Repair or reinstatement of No-Go Zones (NGZs) where incorrectly installed or damaged, or where unauthorised access has occurred
- Review and refinement of management measures, including habitat protection and revegetation approaches, where monitoring indicates that habitat condition or revegetation outcomes are not being achieved
- Implementation of additional or modified revegetation measures where monitoring indicates that performance measures identified in the GSM Revegetation Plan are not being met, to improve habitat suitability
- Consultation with DEECA and DCCEEW to determine appropriate management responses where monitoring indicates declining habitat condition or failure to meet performance outcomes

In addition, VIDA Roads will secure Golden Sun Moth habitat offsets in accordance with the requirements of EPBC Act Approval 2010/5741.

6. Protection of Threatened Species During Construction

6.1 Erosion and Sediment Control

6.1.1 General

All sediment and pollution control protocols are implemented, in accordance with EPA Publication 1834.2 Civil Construction, Building and Demolition Guide (EPA 2025) and any other relevant 'best practice' EPA publications and guidelines that supersede or partially supersedes current EPA publications.

All exposed surfaces shall be free of or treated to minimise erosion. Erosion and sediment controls shall include but are not limited to:

- minimising the amount of exposed erodible surfaces during construction including the staging of works;
- prompt temporary and/or permanent progressive revegetation of the site as work proceeds;
- prompt covering of exposed surfaces (including batters and stockpiles) that would otherwise remain bare for more than 28 days. Cover may include mulch, erosion control mat or seeding with sterile grass;
- installation, stabilisation and maintenance of catch and diversion drains that segregate water runoff from catchments outside of the construction site from water exposed to the construction site;
- installation and maintenance of erosion and sedimentation controls established in accordance with EPA best practice guidelines for the treatment of sediment laden run-off resulting from construction activities;
- adequately control and route runoff within the construction site to the appropriate sedimentation controls; and
- where trees are required to be removed more than two months in advance of any construction works, remove only that part of the tree that is above ground level and where possible allow the roots to remain intact beneath the ground surface to assist with erosion control.

6.1.2 Works in / near Waterways

Works shall be programmed and managed to avoid work in waters. Where work in waters is unavoidable, procedures shall be developed and implemented to satisfy the requirements of the specification and as required by any permits from the responsible authority(s).

Where construction activities are undertaken in, near or over waters, Construction Environmental Management Plan (CEMP) shall be prepared to protect beneficial uses in accordance with any permit(s) issued under the *Water Act 1988* (Vic).

6.1.3 Sediment Basins

Sedimentation basins shall be utilised as the primary sediment control for the works unless the Contractor can demonstrate to the Superintendent's satisfaction that the implementation of a sedimentation basin is not technically feasible for the works.

Where sedimentation basins are proposed as control measures, basins shall be designed to contain flows from a rainfall event having an Average Recurrence Interval of not less than two years and six-hour duration when allowing for a 30% reduction in capacity as a result of sediment accumulation.

Sedimentation basins shall be modelled and sized to manage rainfall intensities and soil characteristics specific to the region. The sizing and modelling of sedimentation basin(s) shall consider the expected works and associated area of disturbance within catchment area(s) within the site.

The sizing and modelling of temporary sedimentation basins shall be undertaken using recognised 'best practice' modelling techniques.

Spillways or bypass systems (installations that divert all clean surface flows around a works site) shall be designed for an event having an Average Recurrence Interval of five years.

An independent hydraulic consultant who has demonstrated competence and suitable experience in the design of temporary sedimentation basins shall complete and sign a declaration. The declaration shall accompany submission of the sedimentation basin designs to the Superintendent.

The Contractor shall submit to the Superintendent the sedimentation designs and the associated independent verification declarations not less than two weeks prior to the commencement of construction of the temporary sedimentation basin.

Sedimentation basins shall be cleaned out whenever the accumulated sediment has reduced the capacity of the basin by 30% or more, or whenever the sediment has built up to a point where it is less than 500 mm below the spillway crest, whichever occurs earlier.

6.1.4 Stockpiles

Where soil or granular material is stockpiled on site, such stockpiles shall be located to provide a clearance of not less than 10m from waterways.

6.1.5 Monitoring

The Contractor shall inspect the whole site for instances of soil erosion or scour and the effectiveness of erosion and sedimentation controls in accordance with the following:

- at intervals not more than seven calendar days;
- immediately after rainfall when the Construction Area are deemed safe to enter.

Any defects and/or deficiencies in control measures identified by monitoring undertaken shall be rectified immediately and these control measures shall be cleaned, repaired and augmented as required to ensure effective control.

6.2 Fuels and Chemicals

6.2.1 General

Any leakage or spillage of any fuels or chemicals shall not have a detrimental environmental impact.

The CEMP shall include specific procedures to mitigate the effect on the environment from fuels and chemicals, including herbicides and pesticides. Such procedures shall include but not be limited to:

- nominated fuel and chemical storage areas that comply with Environmental Law, including but not limited to *the Dangerous Goods (Storage and Handling) Regulations 2012* (Vic) and EPA Publication 1698 - *Liquid storage and handling guidelines* including signing of compounds and bulk storage containers;
- nominated points for the refuelling and fluid top up of vehicles and plant which shall be undertaken in a designated area, at least 20 m from any drainage point or waterways;
- stockpiling of chemicals and fuels do not occur within 100 m of a waterway

- provision of readily accessible and maintained spill kits for the purpose of cleaning up chemical, oil and fuel spillages on the site at all times;
- ensuring that personnel trained in the efficient deployment of the spill kits are readily available in the event of spillages; and
- a contingency plan that shall address the containment, treatment and disposal of any spill.

6.2.2 Monitoring

Fuel and chemical storages and equipment fill areas shall be monitored by the contractor for compliance at intervals of not more than 7 calendar days.

6.3 Air Quality

6.3.1 General

All work under the Contract shall comply with the following requirements:

- emissions of odorous substances or particulates shall not create or be likely to create objectionable conditions for the public;
- burning must not be used to dispose of any type of materials;
- material that may create a hazard or nuisance dust shall be covered during transport; and
- dust generated from road construction activities shall not create a hazard or nuisance to the public, shall not disperse from the site or across roadways, nor interfere with crops, stock or dust-sensitive receptors.

6.3.2 Plant and Equipment

All work under the Contract shall comply with the following requirements:

- emissions of visible smoke to the atmosphere from construction plant and equipment shall not be for periods greater than 10 consecutive seconds.
- where practicable all heavy-duty diesel engines must be fitted with Selective Catalytic Reduction (SCR) and diesel particulate filters.

6.3.3 Mitigation Measures

6.3.3.1 General

Monitoring shall comply with the following requirements:

- weather monitoring stations, which record hourly wind direction, wind speed and rainfall and which must be maintained for the duration of the delivery activities;
- a daily visual assessment of the construction area for airborne dust and vehicle emissions to determine where and when dust and emissions are being generated and leaving the construction areas; and
- continuous monitoring using a portable laser light scattering instrument in accordance with the General Specifications;
- no less than one portable laser light scattering instruments shall be operational daily while undertaking construction activities;
- the portable light scattering instrument shall be calibrated and maintained in accordance with manufacturer's instructions with calibration and maintenance records retained and made available to the Superintendent upon request. Daily records shall include checks of instrument zero and flow rate; and

6.3.3.2 Locations of Monitoring Equipment

Dust deposit gauges and directional dust gauges shall be established in accordance with the requirements of the General Specifications.

In the event of linear sites or multiple site locations the Contractor must determine the need for additional weather stations to ensure accurate data for all construction areas.

The location of portable laser light scattering instrument(s) shall be adaptive to changes in wind direction or construction activity.

Portable laser light scattering instrument(s) shall be located downwind of road construction activities or adjacent to a sensitive receptor when in proximity to the works.

All monitoring stations to be located such that they are secure from vandalism and tampering at all times.

6.3.3.3 Results

The Contractor's records must include:

- daily results of continuous monitoring including the location(s) of the instrument;
- daily site diaries noting dust and emissions monitoring must be kept on site;
- hourly wind speed and wind direction data that correlates to the construction area location; and
- all exceedances or the requirements of the General Specifications, together with the management response.

6.4 Contaminated Soil and Materials

6.4.1 General

All work under the Contract shall comply with the following requirements:

- soils or materials shall not be contaminated as a consequence of work under the Contract;
- materials imported to the site shall be free from contamination;
- contaminated materials shall only be reused on site following approval from the Superintendent, EPA and relevant Third Party;
- Contaminated Materials to be reused on-site as part of the Delivery Activities must be stored and managed in accordance with Environmental Law to minimise any impact on the Construction Areas or surrounding environment;
- the importing, transport and disposal of Contaminated Materials on-site must be undertaken in accordance with Environmental Law, including the Environment Reference Standard; and
- disposal of Contaminated Materials off-site (where required) must be undertaken in accordance with Environmental Law, including the Environment Reference Standard.

6.4.2 Discovery of Contaminated Materials

The discovery of contaminated material on the site during works shall be managed in accordance with Environmental Law and guidance from the Superintendent. If contaminated material is encountered on the site, the Contractor shall:

- notify the Superintendent and where applicable EPA in accordance with the duty to notify in the Environmental Law;
- undertake comprehensive sampling and analysis to determine the type, levels and extent of contamination in accordance with Environmental Law and guidance from the Superintendent;

- investigate the opportunity to reuse the Contaminated Material as a fill material on-site; and
- ensure that any proposed reuse and disposal methods are approved by the EPA, the Superintendent, and any other relevant Authority

6.4.3 Monitoring

The Contractor shall undertake a visual assessment of the site for contaminated soils and materials daily when stripping, during excavations and when importing filling material.

6.5 Waste and Resource Use

6.5.1 General

The generation of waste materials shall be managed in accordance with the EPA waste hierarchy, to avoid, reuse, recycle or dispose of waste material. The Contractor shall be responsible for the management of any waste produced in performing the work under the Contract.

All work under the Contract shall comply with the following requirements:

- the nature of wastes generated as a consequence of works under the Contract shall be identified;
- wastes shall be stored prior to reuse or disposal to minimise any impact on the site or surrounding environment;
- where approval is granted to incorporate recycled materials into the works, the Contractor shall maintain appropriate records of the type of material and its location. In particular, records shall include the tonnage of recycled crumbed rubber used in asphalt pavements and chip seal works and all recycled crushed concrete used in pavement construction;
- vehicles transporting waste shall be covered and appropriately licensed.

Unless otherwise approved by the Superintendent and where recycling facilities are available, the materials shall be managed in accordance with Table 9 below.

Table 9 Resource Management Requirements

MATERIAL	WASTE MANGEMENT APPROACH
Asbestos	EPA licensed landfill
Asphalt	Recycle or reuse - not to landfill
Concrete and concrete	Recycle or reuse - not to landfill
Contaminated soil	Recycle or reuse on site if opportunity exists. If removed from site, transported by an EPA licensed contractor and disposed in accordance with EPA regulations
Felled woody vegetation (except fragments of noxious or environmental weeds capable	Mulched for reuse, or used for habitat logs
Woody weed fragments capable of regeneration	Burial on site (deeper than 500 mm and not in fill, pavement or other critical areas), composting, or disposal

MATERIAL	WASTE MANGEMENT APPROACH
Formwork	Reuse or dispose to landfill
Plastics (Recycle Nos. 1, 2,	Recycling facility - not to landfill
Metal	Recycle or reuse - not to landfill
Oil containers and lead acid	Recycling facility - not to landfill
Packaging materials	Recycle where possible or dispose to landfill
Empty paint tins	Recycling facility - not to landfill
Petroleum products from spills (absorbed in spill kit material or contaminated soil)	Recycle or reuse with rehabilitation of contaminated soils if opportunity exists. Transported by an EPA licensed contractor and disposed in accordance with EPA
Timber (untreated)	Recycle - not to landfill
Litter	Recycle or dispose to landfill
Office waste	Recycle where possible or dispose to landfill
Other waste excluding the above wastes	Recycle or reuse if opportunity exists

6.5.2 Monitoring

The Contractor shall monitor the whole site for instances of inappropriate waste management or disposal at intervals of not more than 7 calendar days.

7. Establishing and Maintaining No-go Zones

7.1 Procedure for Establishing and Maintaining No-go Zones

No work will occur outside the Development footprint . As per the Western Highway Project Section 2 EES, Threatened Species habitat within the Development footprint will be protected using NGZs as described in this plan and shown in Appendix B.

NGZs will:

- be installed using a GPS device based on the mapping shown in Appendix B;
- be star picket or timber posts with a minimum of one wire strand and have a high visibility component or appropriate treatment;
- include signage at intervals no more than 20 m apart; and
- maintained for the duration of construction or as directed by VIDA Roads.

The size of the NGZ area for the Project is approximately 51.66 hectares. All NGZs will be reviewed and maintained weekly at a minimum. If a NGZ is damaged, repairs will be undertaken as soon as practicable once reported to the Contractor.

Where NGZs compromise safety, control measures which balance safety and environment outcomes will be utilised.

Temporary access to, or minor alterations within NGZs may be permitted where there will be no direct impact on protected values or threatened species. In some instances, personnel may need to enter an NGZ to undertake activities such as weed control or the maintenance of environmental controls. Where this occurs, access will be limited to the minimum number of personnel required to safely complete the task, and activities will be undertaken in a manner that avoids disturbance, removal, or loss of protected values or threatened species. Any access will be temporary and carefully managed to prevent impacts.

An example of permitted temporary access to an NGZ may include undertaking tree remediation works (e.g. weed control or a single irrigation event). This would mean the no go zone fencing would be temporarily altered to allow the watering of the tree and the removal of weeds. In such instances, temporary adjustment of NGZ fencing may be required solely to enable access to the tree. Any such access will be minor, temporary, and carefully managed to ensure no disturbance, removal, or loss of protected values or threatened species occurs. Upon completion of the activity, NGZ fencing will be fully reinstated in accordance with this TSMP.

Prior to any such access, the contractor must consult with suitably qualified and experienced personnel to review the proposed activity, confirm that impacts to protected values will be avoided, and confirm that no additional approvals are required under the relevant approval conditions prior to any access of the NGZs.

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8. Procedure for Reporting

An annual summary statement or report will be prepared to inform DEECA and DCCEEW of relevant ecological issues, milestones and threats. In addition to the annual report, other reporting will be undertaken in accordance with Appendix D and Section 9 Contingencies.

The annual report will report on the financial year and must be provided by 30 September each year.

This statement/report will include:

- The progress of development
- Any measures implemented in accordance with this plan
- Any incidents which may have impacted any MNES or other listed species
- Any mitigation measures implemented
- Progress of management actions (e.g. weed removal, salvage and translocation works)
- Any significant findings resulting from monitoring activities

A template for the annual reporting requirements can be found in Appendix E.

9. Contingencies

If design amendments have the potential to result in impacts beyond those approved, works will not proceed until DCCEEW and DEECA have been notified and any required approvals or variations have been obtained.

In the event that construction activities inadvertently result in impacts to Threatened Species outside the approved limits, DCCEEW and DEECA will be notified within five (5) business days, including details of the impact and proposed corrective actions.

Notification must include:

- Justification for the additional impact
- Measures undertaken to avoid and minimise impact
- Assessment and quantification of impacts, including the calculation of offsets or commensurate outcomes (if permitted)
- Review of the impact against project approvals

Design amendments must not be implemented until written approval is received from DEECA or DCCEEW (as appropriate).

In addition to the contingency measures outlined in this section, species-specific corrective actions are incorporated throughout the TSMP. These are detailed within the management measures and corrective action requirements for each species (refer to Sections 4 and 5, including Tables 5 and 6).

These corrective actions address potential risks to threatened species and their habitat, including the identification of additional individuals, changes in habitat condition (e.g. weed invasion or increased biomass), and the failure or degradation of protection measures such as no-go zones or fencing.

Where monitoring identifies that performance indicators are not being met, or where unanticipated impacts occur, the relevant corrective actions outlined in these sections will be implemented in consultation with DEECA and DCCEEW.

10. References

Commonwealth Conservation Advice for Synemon plana (Golden Sun Moth) (Threatened Species Scientific Committee, 2013)

Dangerous Goods (Storage and Handling) Regulations 2012 S.R. No. 132/2012

Department of Sustainability and Environment (2006) Native Vegetation Revegetation planting standards – Guidelines for establishing native vegetation for net gain accounting.

Department of the Environment, Water, Heritage and the Arts (2009) Background Paper to EPBC Act Policy Statement 3.12 – Nationally Threatened Species and Ecological Communities – Significant Impact Guidelines for the Critically Endangered Golden Sun Moth (*Synemon plana*)

Ecological Assessment: Western Highway Project, Section 2B (Ecology and Heritage Partners, 2017)

EPA, 1992. Bunding Guidelines (EPA Publication No. 347, 1992)

EPBC Act Policy Statement 3.11 - Significant Impact Guidelines for the Critically Endangered Spiny Rice-flower (Pimelea *spinescens* subsp. *spinescens*) Australian Government,2009);

EPBC Act Policy Statement 3.12 - Significant Impact Guidelines for the Critically Endangered Golden Sun Moth (*Synemon plana*) (Department of the Environment, Water, Heritage and the Arts (DEWHA), 2009);

Flora & Fauna Action Statement #28 - Button Wrinklewort - *Rutidosis leptorrhynchoides*

Flora and Fauna Guarantee Action Statement 132 Revised 2008 - Spiny Rice-flower

Genetic variability and population structure of the endangered golden sun moth, *Synemon plana* (Clark & O'Dwyer, 2000)

Golden Sun Moth Pre-clearance Survey: Western Highway Project, Section 2B (Ecology and Heritage Partners, January 2019)

Golden Sun Moth *Synemon plana*, Action Statement No 106

Golden Sun Moth *Synemon plana*; discovery of new populations around Melbourne (Endersby & Koehler, 2006)

Guidelines for the translocation of threatened plants in Australia. Second edition (Australian Network for Plant Conservation, Canberra) (Vallee et al, 2004)

Hygiene protocol for the control of disease in frogs (NSW National Parks and Wildlife Service, 2001)

National Recovery Plan for Button Wrinklewort (*Rutidosis leptorhynchoides*) (NSW Office of Environment and Heritage, 2012)

National Recovery Plan for the Spiny Rice-flower (*Pimelea spinescens* subsp. *spinescens*) (Carter, O. & N. Walsh, 2006)

O'Dwyer, C., and Attiwill, P.M. (1999) A comparative study of habitats of the Golden Sun Moth *Synemon plana* Walker (Lepidoptera: Castniidae): implications for restoration. Biological Conservation, 89:2, pg. 131-141.

Pimelea spinescens subsp. *spinescens* (DSE, 2003)

Preconstruction Significant Species Surveys for the Western Highway Project, Section 2B (Ecology and Heritage Partners, 2017)

Roadside Conservation Management Plan: Western Highway, East of Ararat (Hopkins River to the 196.0 km post). (University Ballarat, 2006)

Significant impact guidelines for the critically endangered spiny rice-flower (*Pimelea spinescens* subsp. *spinescens*)- Nationally threatened species and ecology communities EPBC Act policy statement 3.11.

State Environment Protection Policy (Waters of Victoria) *Synemon plana* - A grassland case history (Edwards, 1991)

Supplementary Ecological Assessment: Western Highway Project, Section 2B (Ecology and Heritage Partners, April 2020)

Western Highway Project: Section 2: Beaufort to Ararat Environment Effects Statement and Draft Planning Scheme Amendment (VicRoads, 2012)

Appendices

Appendix A- Project Location

WARRAYATKIN ROAD

HOPKINS RIVER

LANGI GHIRAN PICNIC GROUND ROAD

LANGI GHIRAN
STATE PARK

HOPKINS RIVER

BALLARAT-ARARAT LINE

WESTERN HIGHWAY

COLONIAL ROAD

GEELONG ROAD

HILLSIDE ROAD

WESTERN HIGHWAY

NOTE: BOUNDARIES ON THE PLAN ARE APPROXIMATE
AND SUBJECT TO VERIFICATION BY GROUND SURVEY.

Legend

Project Boundary

GDA2020
MGA Zone 54

ORIGINAL SHEET SIZE A3
SCALE: 1:40,000

0 500 1,000
metres

PREPARED BY VIDA ROADS
(VICTORIAN INFRASTRUCTURE DELIVERY AUTHORITY)

SECTION 2B OF THE WESTERN HIGHWAY DUPLICATION PROJECT (BETWEEN BUANGOR AND ARARAT)

PROJECT AREA

WHP_S2B_1EGL.aprx - Inc Doc 8/01/2026

Appendix B- Threatened Species Management Plan Map

Legend

- Development footprint

EPBC Act Listed Fauna Species

- Golden Sun Moth
- Golden Sun Moth habitat

EPBC Act Listed Flora

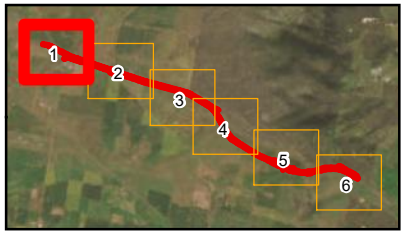
- Button Wrinklewort
- Spiny Rice-flower

EPBC Act Listed Communities

- Grassy Eucalypt Woodland of the VVP
- Natural Temperate Grassland of the VVP

Mitigation Actions

- No Go Zones
- Water Quality Monitoring: Three upstream and four downstream sites will be established prior to construction and clearly marked for on-going monitoring.



Map 1

Threatened Species Management Plan

Western Highway Duplication - Section 2B, Beaufort to Ararat

Issue Date: 11/03/2026

N

0 160 320

Metres

Map created by Ecology & Heritage Partners with ecological data sourced from Ecology & Heritage Partners fieldwork.

Legend

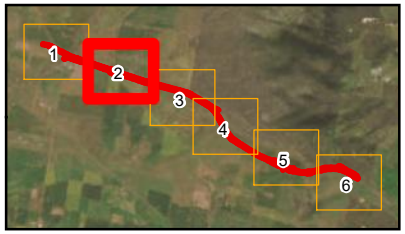
- Development footprint
- Golden Sun Moth habitat

EPBC Act Listed Communities

- Grassy Eucalypt Woodland of the VVP

Mitigation Actions

- No Go Zones



Map 2

Threatened Species Management Plan

Western Highway Duplication - Section 2B, Beaufort to Ararat

Issue Date: 11/03/2026

N

0 160 320

Metres

Map created by Ecology & Heritage Partners with ecological data sourced from Ecology & Heritage Partners fieldwork.

Legend

Development footprint

EPBC Act Listed Fauna Species

Golden Sun Moth

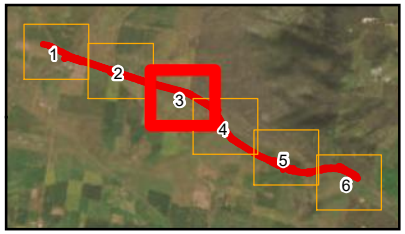
Golden Sun Moth habitat

EPBC Act Listed Communities

Grassy Eucalypt Woodland of the VVP

Mitigation Actions

No Go Zones



Map 3

Threatened Species Management Plan

Western Highway Duplication - Section 2B, Beaufort to Ararat

Issue Date: 11/03/2026

N

0 160 320

Metres

Map created by Ecology & Heritage Partners with ecological data sourced from Ecology & Heritage Partners fieldwork.

Legend

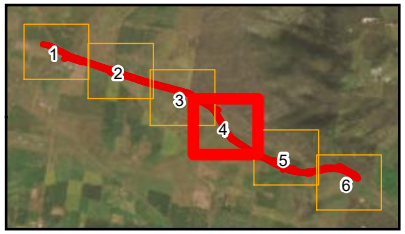
- Development footprint

EPBC Act Listed Fauna Species

- Golden Sun Moth
- Golden Sun Moth habitat

Mitigation Actions

- No Go Zones



Map 4

Threatened Species Management Plan

Western Highway Duplication - Section 2B, Beaufort to Ararat

Issue Date: 11/03/2026

N

0 160 320

Metres

Map created by Ecology & Heritage Partners with ecological data sourced from Ecology & Heritage Partners fieldwork.

Legend

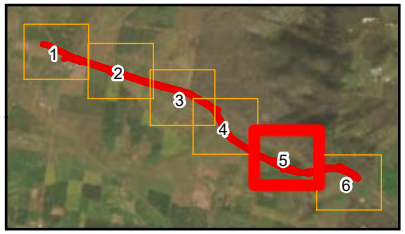
- Development footprint

EPBC Act Listed Fauna Species

- Golden Sun Moth
- Golden Sun Moth habitat

Mitigation Actions

- No Go Zones



Map 5

Threatened Species Management Plan

Western Highway Duplication - Section 2B, Beaufort to Ararat

Issue Date: 11/03/2026

N

0 160 320

Metres

Map created by Ecology & Heritage Partners with ecological data sourced from Ecology & Heritage Partners fieldwork.

Legend

Development footprint

EPBC Act Listed Fauna Species

Golden Sun Moth

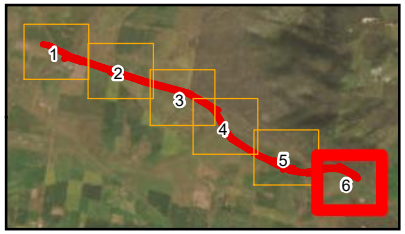
Golden Sun Moth habitat

EPBC Act Listed Communities

Grassy Eucalypt Woodland of the VVP

Mitigation Actions

No Go Zones



Map 6

Threatened Species Management Plan

Western Highway Duplication - Section 2B, Beaufort to Ararat

Issue Date: 11/03/2026

N

0 160 320

Metres

Map created by Ecology & Heritage Partners with ecological data sourced from Ecology & Heritage Partners fieldwork.

Appendix C- Surveys

Table 10 Surveys undertaken for Matters of National Environmental Significance baseline

SURVEY	SURVEY AREA	DATE(S) COMPLETED	SEASON	RESULT	HABITAT DESCRIPTION
Preliminary flora assessment	The Development footprint	20-22 October, 26- 30 October, 3-5 November 2010	Spring	As per EES Technical Appendices	NA
Preliminary fauna assessment	The Development footprint	20-22 October 2010	Spring	As per EES Technical Appendices	NA
Targeted flora and fauna surveys					
Langi Ghiran Grevillea	Areas within and surrounding the Development footprint that support suitable habitat for this species	14 February 2011	Summer	No plants recorded	NA
Spiny Rice-flower	Areas within and surrounding the Development footprint that support suitable habitat for this species	2 August, 29-31 August 2010 18 August 2016	Winter	575 plants recorded	Plants recorded within high quality vegetation (vegetation quality as per Habitat Hectare Assessment from EES Technical Appendices). Cohorts from multiple age classes were recorded and plants were actively reproducing.
Button Wrinklewort	Areas within and surrounding the Development footprint that	8-11 November 2011	Spring	88 plants recorded	Plants recorded within high quality vegetation (vegetation quality as per Habitat Hectare Assessment from EES Technical Appendices). Cohorts from multiple

SURVEY	SURVEY AREA	DATE(S) COMPLETED	SEASON	RESULT	HABITAT DESCRIPTION
	support suitable habitat for this species	18 November 2016			age classes were recorded and plants were actively reproducing
Button Wrinklewort	Areas of know habitat within the current Development footprint (west of Hopkins River)	24 September and 17 December 2025	Spring and summer	47 plants recorded (noting additional plants also present within the flagged No-go Zone outside the Development footprint)	
Large- headed Fireweed	Areas within and surrounding the Development footprint that support suitable habitat for this species	8-11 November 2011	Spring	No plants recorded	NA
Tawny Spider Orchid	Areas within and surrounding the Development footprint that support suitable habitat for this species	8-11 November 2011	Spring	No plants recorded	NA
Targeted Growling Grass Frog surveys	21 sites within and surrounding the Development footprint that support suitable habitat for the species	16 and 17 February 2011 3 March 2011	Summer Autumn	No individuals recorded	NA
Targeted Southern Brown Bandicoot surveys	Areas within and surrounding the Development footprint that support suitable habitat for	15 February to 2 March 2010	Summer Autumn	No individuals recorded	NA

SURVEY	SURVEY AREA	DATE(S) COMPLETED	SEASON	RESULT	HABITAT DESCRIPTION
Targeted Golden Sun Moth surveys	All remnant patches of Plains Grassland and areas of Modified Treeless Vegetation that supported >25% cover of Wallaby grass spp. within and surrounding the Development footprint	16, 22, 29 December 2011 13 January 2012 12, 13, 19 December 2016	Summer	145 individuals and 70.6 ha habitat recorded	The majority of Golden Sun Moth habitat within and surrounding the Development footprint comprises grassland areas that do not qualify as a remnant patch due to a native species cover of less than 25%, and with a high cover of weed species. These areas do, however, support scattered tussocks of Wallaby grass *Rytidosperma* spp., a preferred food source for Golden Sun Moth.
Pre-clearance Golden Sun Moth survey	All remnant patches of Plains Grassland and areas of Modified Treeless Vegetation that supported >25% cover of Wallaby grass spp. within and surrounding the Development footprint	6, 11, 12 and 19 December 2018, and 10 January 2019	Summer	221 individuals recorded, up to 31.56 ha of Golden Sun Moth habitat to be impacted	The majority of Golden Sun Moth habitat within and surrounding the Development footprint comprises grassland areas that do not qualify as a remnant patch due to a native species cover of less than 25%, and with a high cover of weed species. These areas do, however, support scattered tussocks of wallaby grass *Rytidosperma* spp., a preferred food source for Golden Sun Moth.
Pre-clearance Golden Sun Moth survey	Additional Development footprint	4, 12, 17 December 2025, and 6 January 2026	Summer	Up to 63.9 ha of Golden Sun Moth habitat to be impacted	Remnant vegetation including Grassy Woodland and Alluvial Terraces Herb-rich Woodland.
The Development footprint	20-22 October 2010	Spring	As per EES Technical Appendices	NA	
The Development footprint	19-20 January 2012	Summer	As per EES Technical Appendices	NA	

Appendix D- Schedule of Management Actions (EPBC Matters)

Table 11 Schedule of Management Actions (EPBC Matters)

Project Phase	REF NO.	SECTION 2B	MANAGEMENT ACTIONS	TIMING	RESPONSIBLE AGENT	PERFORMANCE INDICATOR	DATE COMPLETED: COMPLETION SUPERVISED BY: RELEVANT DOCUMENTATION:
Pre-construction phase							
Pre-construction phase	NA	Y	EPBC Approval Notice and Threatened Species Management Plan	Prior to commencing construction	VIDA Roads	VIDA Roads to issue contractor a copy of the TSMP and relevant EPBC approval conditions	
Pre-construction phase	BW 1.2, GSM 1.4	Y	Weed Management Plan (WMP) within Development footprint	Implement prior to commencing construction during pre-construction phase	Contractor	Refer to WMP	
Pre-construction phase	GSM 1.1 Offset Management Plan (s)	Y	As specified in relevant Offset Management Plan (s)	As specified in relevant Offset Management Plan (s)	VIDA Roads	As specified in relevant Offset Management Plan (s)	
Pre-construction phase	GSM 1.2	Y	Refine detailed design	Prior to commencement of construction for Section 2B	VIDA Roads	N/A (may not be possible)	
Pre-construction phase	BW 1.1 GSM 1.3	Y	Pre-clearance surveys within Development footprint	Prior to commencing construction within 100 m of BW or GSM patches or habitat within Development footprint	VIDA Roads	Pre-clearance surveys submitted t o DEECA and DCCEEW within 14 days of commencing works	

Project Phase	REF NO.	SECTION 2B	MANAGEMENT ACTIONS	TIMING	RESPONSIBLE AGENT	PERFORMANCE INDICATOR	DATE COMPLETED: COMPLETION SUPERVISED BY: RELEVANT DOCUMENTATION:
Construction and post practical completion phase							
Button Wrinklewort							
Construction-phase	BW 1.1	Y	Pre-clearance surveys- Button Wrinklewort within Development footprint	Prior to commencing construction within 100 m of BW patches within the limit of the road reserve	VIDA Roads	Pre-clearance surveys submitted to DEECA and DCCEEW within 14 days of commencing works	
Construction phase	BW 1.2	Y	Implement spraying as per approved WHP Section 2 Weed Management Plan within Development footprint	Implement during construction phase	Contractor	Refer to WMP	
Construction-phase	BW 1.3a	Y	Temporary Fencing- Button Wrinklewort	Prior to commencing construction within 100 m of BW patches within Development footprint	Contractor	Fencing installed	
Construction-phase	BW 1.3b	Y	NGZs- Button Wrinklewort	Prior to commencing construction within 100 m of BW patches within Development footprint	Contractor	NGZs complete	
Construction-phase	BW 1.4	Y	Ongoing Health Monitoring- Button Wrinklewort within Development footprint	Between October and February	VIDA Roads	Ongoing monitoring completed as per Section 4.1.4.	

Project Phase	REF NO.	SECTION 2B	MANAGEMENT ACTIONS	TIMING	RESPONSIBLE AGENT	PERFORMANCE INDICATOR	DATE COMPLETED: COMPLETION SUPERVISED BY: RELEVANT DOCUMENTATION:
						No additional loss of individuals has occurred.	
Construction-phase	BW 1.5	Y	Manage Grazing – Button Wrinklewort within Development footprint	Between October and February	VIDA Roads	Fencing repaired (if required) No domestic stock access ensuring no grazing occurs	
Construction-phase	BW 1.6	Y	Manage Rubbish – Button Wrinklewort within Development footprint	At least once per year	Contractor	Rubbish removed	
Golden Sun Moth							
As specified in relevant Offset Management Plan (s)	GSM 1.1 Offset Management Plan (s)	Y	As specified in relevant Offset Management Plan (s)	As specified in relevant Offset Management Plan (s)	VIDA Roads	As specified in relevant Offset Management Plan (s)	
Construction phase	GSM 1.3	Y	Pre-clearance surveys within Development footprint	Prior to commencing construction within 100 m of Golden Sun Moth patches within Development footprint	VIDA Roads	Pre-clearance submitted to DEECA and DCCEEW within 14 days of commencing works	
Construction phase	GSM 1.4	Y	Implement spraying as per approved WHP Section 2 Weed Management Plan (WMP) within Development footprint	Implement during construction phase	Contractor	Refer to WMP	

Project Phase	REF NO.	SECTION 2B	MANAGEMENT ACTIONS	TIMING	RESPONSIBLE AGENT	PERFORMANCE INDICATOR	DATE COMPLETED: COMPLETION SUPERVISED BY: RELEVANT DOCUMENTATION:
Construction phase	GSM 1.5	Y	NGZs- Golden Sun Moth	Prior to commencing construction within 100 m of Golden Sun Moth patches within Development footprint	Contractor	NGZs complete	
As per section 5.2.2	GSM 1.6	Y	Golden Sun Moth Revegetation Area	Finalised and submitted to DCCEEW 6 months prior to commencing landscaping works	VIDA Roads	DCCEEW Approval of Revegetation Plan	
As per section 5.3	GSM 1.7	Y	On-going Monitoring of Revegetation Area	As per section 5.3	VIDA Roads	As per section 5.3	

Appendix E- Annual Report Template

Table 12 Annual Report Template

Project name:			
EPBC Act ref. no.:		Date:	
Person preparing report	Name:	Position:	Organisation:
Completed Management Action Table (Appendix D) provided? Yes / No			
Current stage of development			
Measures implemented in accordance with TSMP			
Monitoring activities undertaken (summarise significant findings)			
Salvage and translocation activities undertaken (summarise significant findings)			
Incidents which may have impacted any matters of NES or other listed species			
Mitigation measures or corrective actions implemented			
Access and alterations to No-Go Zones			

Relevant reports attached	e.g. Golden Sun Moth monitoring report, 2014 Water quality monitoring report, 2014 Salvage and translocation activities, 2014 Copy of schedule of management actions with completion dates column filled in