

MAY 2020

# Threatened Species Management Plan

Western Highway Project, Section 2B: Buangor to Ararat

For Spiny Rice-flower (*Pimelea spinescens* subsp. *spinescens*), Dwarf Galaxias (*Galaxiella pusilla*), Golden Sun Moth (*Synemon plana*), Button Wrinklewort (*Rutidosia leptorhynchoides*) and Brown Toadlet (*Pseudophryne bibronii*)



## Version Control

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2	March 2019	Amended to include Supplementary Ecological Assessment undertaken by EHP	C. Reeve
3	April 2019	Final Draft for Submission to DELWP	E. Mark
4	August 2019	Amended to reflect DELWP comments on previous draft	E.Skippington
5	September 2019	Amended to reflect DELWP comments on previous draft	C.Reeve
6	May 2020	Amended to reflect minor design modifications	C.Reeve E.Skippington

### Machinery of Government Changes

#### As of February 2019

*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. 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 MRPV are currently utilising on this project.*

*The Western Highway Project Section 2B will operate under the VicRoads' Environmental Management System according to the current Service Level Agreement (SLA) between MRPV and VicRoads.*

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# 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, 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. Currently, more than 5500 vehicles travel on the highway west of Ballarat each day, including 1500 trucks.

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

During the development of the Environment Effects Statement multiple options were developed with two options investigated in detail. Following assessment under the *Environmental 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.

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

## 1.2 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 kilometres west of Melbourne, Victoria and according to the DSE Biodiversity Interactive Map (DSE 2012), is located partly within the Central Victorian Uplands (CVU) bioregion and partly within the Victorian Volcanic Plains (VVP) bioregion.

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 project area is located within the City of Ararat and the eastern section within the Shire of Pyrenees. The entire project area is located within the Glenelg - Hopkins Catchment Management Authority area.

The project area 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.

## 1.3 Species

Previous assessments have recorded one flora species listed under the Federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Spiny Rice-flower), two ecological communities listed under the EPBC Act (Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP) and Grassy Eucalypt Woodland of the Victorian Volcanic Plain (GEVVVP), two flora species listed under the Victorian Department of Sustainability and Environment (DSE) Advisory List (Emerald-lip Greenhood and Golden Cowslips) and one species listed under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act) (Button Wrinklewort) present within the construction footprint.

Also present within the construction footprint are two fauna species listed under the EPBC Act (Dwarf Galaxias and Golden Sun Moth) and one species listed under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act) (Brown Toadlet).

## 1.4 Consultation Process

This Threatened Species Management Plan has been developed by MRPV / VicRoads, based on information provided by Clio Gates Foale (Senior Ecologist) and Robyn Giles (Senior Botanist) from Ecology and Heritage Partners. These suitably qualified practitioners have been extensively involved with all aspects of the Western Highway Project Section 2 including all field assessments, reporting and EES preparation.

## 1.5 Purpose of Document

The Threatened Species Management Plan forms part of the EPBC Approval Notice (EPBC/5741) issued by Department of Environment to VicRoads on 17 April 2014.

This plan has also been endorsed by Department of Environment, Land, Water and Planning (DELWP).

The purpose of the Threatened Species Management Plan is to outline the mitigation and preservation measures which will be undertaken throughout the Project. It also provides guidelines for the removal and relocation of threatened flora and fauna where required.

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

- WHP Section 2: Dwarf Galaxias Conservation Management Plan
- WHP Section 2B: Project Environmental Protection Strategy
- WHP Section 2B: Construction Environmental Management Plan
- WHP Section 2: Weed Management Plan
- WHP Section 2B: Native Vegetation Management Plan

## 1.6 Roles and Responsibilities

**Table 1 – Roles and Responsibilities**

ROLE	REPSIBILITY
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 the Energy and Environment	Responsible for <i>Environment Protection and Biodiversity Conservation Act 1999</i> matters
Department of Environment, Land, Water and Planning	Responsible for Flora and Fauna Guarantee Act 1988 matters
Suitably qualified ecologist	Responsible for providing expert advice to the Superintendent and/or Contractor including: <ul style="list-style-type: none"><li>• implementing threatened species no-go zones</li><li>• translocation of Spiny Rice-Flower</li><li>• Golden Sun Moth revegetation plan</li><li>• water quality monitoring</li></ul>
Contractor (including Project Manager and Personnel)	Responsible for the implementation of this plan (including maintaining no-go zones and implementing the Weed Management Plan)

## 1.7 Definitions and Acronyms

Table 2 – Definitions

DESCRIPTION	DEFINITION
<b>Brown Toadlet</b>	The native frog species <i>Pseudophryne bibronii</i> , protected under the FFG Act
<b>Button Wrinklewort</b>	The native plant species <i>Rutidosis leptorhynchoides</i> , protected under the EPBC Act
<b>Button Wrinklewort patch(s)</b>	The patch(s) of approximately 1.7ha <sup>1</sup> of habitat for the Button Wrinklewort located adjacent to the project area, as defined in Appendix B (Map 1), for the ongoing in situ management of the population of Button Wrinklewort
<b>Construction activities</b>	All works associated with changes within the project area; 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
<b>Construction Environment Management Plan (CEMP)</b>	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
<b>Construction footprint</b>	The footprint area where the proposed action and impact will occur, as defined in Appendix B
<b>Department of Environment, Land, Water and Planning (DELWP)</b>	The Department responsible for the <i>Flora and Fauna Guarantee Act 1988</i> and Victorian State planning (Victoria)
<b>Department of the Agriculture, Water and the Environment (DAWE) (formerly Department of the Environment and Energy)</b>	The department responsible for the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)
<b>Dwarf Galaxias</b>	The native fish species <i>Galaxiella pusilla</i> , protected under the EPBC Act
<b>EPBC Act</b>	The Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)
<b>FFG Act</b>	The Flora and Fauna Guarantee Act 1988 (Victoria)
<b>Golden Sun Moth</b>	The native moth species <i>Synemon plana</i> , protected under the EPBC Act
<b>Golden Sun Moth habitat</b>	The patches of approximately 70.6ha <sup>2</sup> of habitat for the Golden Sun Moth located adjacent to the entire project

DESCRIPTION	DEFINITION
	area, as defined in Appendix B for the ongoing in situ management of the population of Golden Sun Moth
<b>Impact(ing)</b>	Adverse impact by cutting down, felling, thinning, logging, removing, killing, destroying, smothering, poisoning, ringbarking, uprooting or burning
<b>No-go zone(s)</b>	Clearly delineated area(s) of conservation value, to be avoided by construction related activities, including machinery, vehicles and personnel
<b>Project area</b>	This includes all existing road reserve and areas subject to a Public Acquisition overlay, as defined within Appendix B
<b>Project location</b>	The location of the project as defined in Appendix A
<b>Spiny Rice- flower</b>	The native flora species <i>Pimelea spinescens subsp. spinescens</i> , protected under the EPBC Act
<b>Spiny Rice- flower patch(s)</b>	The patch(s) of approximately 3.8ha <sup>3</sup> of habitat for the Spiny Rice flower located adjacent to the project area, as defined in Appendix B for the ongoing in situ management of the population of Spiny Rice Flower.
<b>Suitably qualified ecologist</b>	Practicing ecologist with tertiary qualifications from a recognised institute with at least three years of field experience undertaking flora and fauna surveys
<b>Threatened Species Management Plan</b>	This document entitled Threatened Species Management Plan, Western Highway Project, Section 2B: Buangor to Ararat, prepared in compliance with the Victorian condition of approval for this proposal
<b>Weed Management Plan</b>	The document titled final report Weed Management Plan, Western Highway Duplication Project - Section 2, Beaufort to Ararat, Victoria, dated June 2013.

<sup>1</sup> Based on survey data obtained in April 2014 and March 2019

<sup>2</sup> Based on survey data obtained in April 2014



**Table 3 – Acronyms**

<b>ACRONYM</b>	<b>DEFINITION</b>
<b>BW</b>	Button Wrinklewort
<b>CVU</b>	Central Victorians Uplands Bioregion
<b>CFA</b>	Country Fire Authority (Victoria)
<b>EMP</b>	Environmental Management Plan
<b>EPA</b>	Environmental Protection Agency
<b>EES</b>	Environment Effects Statement
<b>DAWE</b>	Department of Agriculture, Water and the Environment (formerly Department of the Environment and Energy)
<b>DELWP</b>	Department of Environment, Land, Water and Planning (formerly Department of Environment and Primary Industries, and Department of Sustainability and Environment)
<b>DEPI</b>	Department of Environment and Primary Industries (currently Department of Environment, Land, Water and Planning)
<b>DSE</b>	Department of Sustainability and Environment (currently Department of Environment, Land, Water and Planning)
<b>DTPLI</b>	Department of Transport, Planning and Local Infrastructure (currently Department of Environment, Land, Water and Planning)
<b>EPA</b>	Environment Protection Authority
<b>EPBC Act</b>	<i>Environment and Protection Biodiversity Conservation Act 1999</i>
<b>FIS</b>	Flora Information System
<b>FFG Act</b>	<i>Flora and Fauna Guarantee Act 1988</i>
<b>GIS</b>	Geographical Information System
<b>GPS</b>	Global Positioning System
<b>GSM</b>	Golden Sun Moth

ACRONYM	DEFINITION
KPI	Key Performance Indicator
MRPV	Major Road Projects Victoria
PEPS	Project Environmental Protection Strategy
ROW	Right of Way
SRF	Spiny Rice-flower
TSMP	Threatened Species Management Plan
VVP	Victorian Volcanic Plains Bioregion
WHP	Western Highway Project

## 1.8 Relevant Documentation

*A comparative study of habitats of the Golden Sun Moth *Synemon plana* Walker (Lepidoptera: Castniidae) (O'Dwyer & Attiwill, 1999)*

*Bundling Guidelines (EPA Publication No. 347, 1992)*

*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.*

*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 - *Rutidosia leptorrhynchoidea**

*Flora and Fauna Guarantee Action Statement 132 Revised 2008 - Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens* (DSE, 2003)*

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

*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 (Rutidosia 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);*

*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)*

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

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

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

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

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

## **2. Baseline Information**

### **2.1 Baseline Information**

Appendix C outlines the preliminary assessments and targeted surveys that have been undertaken by Ecology and Heritage Partners to provide baseline data for threatened species present within the project area. 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.

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 100m of the species. This will be submitted to DELWP and DAWE within 14 calendar days of commencing works and used as a basis for monitoring the species during construction.

## 3. Spiny Rice-flower



Critically Endangered (EPBC Act)  
Listed (FFG Act)  
Endangered (DEPI Advisory List)

### 3.1 Description

Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens* is listed as Critically Endangered under the EPBC Act. In Victoria, Spiny Rice-flower is listed under the FFG Act and is considered endangered on the DEPI Advisory List (DEPI 2014).

Spiny Rice-flower is a small spreading shrub growing to 30cm in height, with partly herbaceous stems. It has narrow, green, hairless, oval-shaped leaves 2-10mm long and 1- 3mm 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 Condition

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 project area with a total of 574 plants identified during targeted surveys completed during the development of the EES. All plants were recorded within 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 project area; between the road and rail reserve, except for one plant which was recorded on the south side of the Western Highway.

Further baseline information for the Spiny Rice-Flower will be collected prior to construction works commencing within 100m of the species. This will be submitted to DELWP and DAWE within 14 calendar days of commencing works and used as a basis for monitoring the species during construction and post-construction. The baseline information will include information on the total number plants and total hectare of Spiny Rice-flower within the area and KPIs (% weed cover and % bio mass) which may be potentially directly or indirectly impacted by the proposed action, as well as a description of the starting performance indicators values, such as percentage of weed cover and of native vegetation etc.

### 3.1.2 Impacts

Spiny Rice-flower is not located within the project area for Section 2B. It is contained in adjacent areas to the project area. As a precautionary measure, the following management actions have been included in this plan as a reference in the event that the project area is extended to include any area west of Section 2B.

### 3.1.3 Management Approach

Major Road Projects Victoria currently manages the Spiny Rice-Flower patches in accordance with *Roadside Conservation Management Plan: Western Highway, East of Ararat (Hopkins River to the 196.0 km post) (University Ballarat, 2006)*. This plan covers the management of weeds, fire regimes, slashing, land use, community education and signage. This plan is developed and maintained in consultation with DELWP, CFA and Ararat Rural City Council.

Building on current management practises, this plan aims to ensure:

1. Continued control Weed Invasion, particularly perennial introduced grasses and most at risk are small, heavily disturbed sites.
2. Continued management of grazing - particularly additional pressure from domestic stock.
3. Continued management of fire regimes - lack of fire or similar biomass reduction strategy may lead to plants being crowded out.
4. Continued protection of the population from changing land use and impacts of road maintenance works.
5. Construction activities avoid impact to the Spiny Rice-Flower patches.

**Table 4 – Spiny Rice-flower Management<sup>^</sup>**

REF	MANAGEMENT APPROACH	MANAGEMENT ACTIONS	PERFORMANCE INDICATOR	MONITORING TIMING	CORRECTIVE ACTION
SRF 1.1	Preclearance surveys	Project Area and existing road/rail reserve containing Spiny Rice- Flower to be surveyed 100m either side of existing patches. Baseline condition to be determined (including no. of individuals, % weed cover & % biomass)	Prior to commencing construction within 100m of Spiny Rice- Flower patches.	Surveys to be conducted between April and August.	DELWP and DAWE to be notified to determine best course of action if additional SRF patches are located within the project area
SRF 1.2	Control weed invasion	Implement spraying as per approved WHP Section 2 Weed Management Plan	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
SRF 1.3	Restrict access <sup>3</sup>	Install no-go zones in accordance with Section 14	Prior to commencing construction within 100m of Spiny Rice- Flower patches.	Monitoring of no-go zones to occur weekly	Repair incorrectly installed or damaged no-go zones within 24 hours
SRF 1.4	Ongoing Health Monitoring	Qualified personnel to document the health of Spiny Rice-flower populations retained in-situ within Road	Maintenance of current population numbers within retained areas and a reduction in exotic biomass to help reduce	Annually for the first ten years of this Plan (between April and August).	If a qualified ecologist determines that the exotic biomass and weed cover is not maintained or

REF	MANAGEMENT APPROACH	MANAGEMENT ACTIONS	PERFORMANCE INDICATOR	MONITORING TIMING	CORRECTIVE ACTION
		Reserves 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.	competition and create open space for Spiny Rice-flower populations to survive and reproduce.		improved, then these DAWE and DELWP must be consulted with to determine corrective action
SRF 1.5	Manage Grazing	Restrict access to domestic stock	No stock to access the road reserve containing Spiny-Rice Flower. Ensure ROW boundaries within 100m of Spiny Rice- Flower patches are secure	Existing ROW fencing to be monitored annually for 10 years post-construction	ROW fences to be repaired within 1 month of defect being identified
SRF 1.6	Manage Fire Regimes	Refer to <i>Roadside Conservation Management Plan: Western Highway, East of Ararat (Hopkins River to the 196.0 km post)</i> . (University Ballarat, 2006).			
SRF 1.7	Rubbish	Ensure rubbish or litter in and around retained Spiny Rice-flower populations is managed within VicRoads road reserve	Rubbish and litter removed to ensure species survival	At least once per year for the first ten years of the TSMP	Rubbish removal must be undertaken regardless of success of the translocation.

<sup>^</sup> Spiny Rice-flower management included as precautionary measure in the event works extend west of Section 2B

<sup>3</sup> The installation of permanent fencing was considered however was ruled out due to highly likelihood of damage due to the fire regimes outlined in SRF 1.6

Note: A schedule of implementation of actions and monitoring is at Appendix D

## 3.2 Mitigation Measures

### 3.2.1 Pre-clearance Surveys

Prior to undertaking construction activities within 100m of the Spiny Rice-flower patches, a suitably qualified ecologist must undertake a pre-clearance survey in accordance with *Significant impact guidelines for the critically endangered spiny rice-flower (Pimelea spinescens subsp. Spinescens)*.

### 3.2.2 No-go Zones

Prior to undertaking construction activities within 100m of the Spiny Rice-flower patch, the suitably qualified ecologist must establish no-go zone(s) as per Section 14 around the Spiny Rice-flower plants identified in Appendix B.

### **3.3 Access Control**

#### **3.3.1 Salvage and Translocation**

Salvage and translocation for Spiny Rice-Flower is not required as the current alignment avoids all impacts on the species. Further survey undertaken in April 2014 and August 2016 did not identify any Spiny Rice-Flower individuals within the project area. If additional Spiny Rice-Flower plants are identified prior to or during construction MRPV must consult with DELWP and DAWE to determine the most appropriate course of action.

### **3.4 Monitoring**

No-go Zones must be regularly monitored and maintained throughout the construction phase to ensure compliance with this plan. Table 4 above also outlines the monitoring actions required for the retained populations of Spiny Rice-flower adjacent to the project area including the responsible agents and reporting requirements.

### **3.5 Corrective Action**

The protected Spiny Rice-Flower population is located in an existing rail and road reserve which is outside of the project area and will not be impacted by construction.

Prior to construction works occurring within 100m, No-Go Zone(s) will be installed, ensuring the risk of impact is negligible.

Ongoing management of the Spiny Rice-flower individuals and the area containing the populations are outlined in Table 4 and Appendix B, including adaptive management actions required during the management period.



## 4. Dwarf Galaxias



Endangered (EPBC Act)

Listed (FFG Act)

Near threatened (DSE Advisory List)

Please refer to *Conservation Management Plan for the Dwarf Galaxias (Galaxiella pusilla) – Western Highway Project: Section 2 Beaufort to Ararat, Victoria* (Appendix G).

This Dwarf Galaxias Conservation Management Plan must be implemented for Section 2B (Pope Road to Wurrayatkin Road).

## 5. Button Wrinklewort



Endangered (EPBC Act)

Listed (FFG Act)

Endangered (DEPI Advisory List)

### 5.1 Description

Button Wrinklewort (*Rutidosia leptorhynchoides*) is listed as endangered under the EPBC Act. In Victoria, it is listed under the FFG Act, and is considered endangered on the DEPI Advisory List (DEPI 2014).

Button Wrinklewort is a perennial forb which produces multiple flowering stems 15 to 30cm 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 1.5-3.5cm long, 0.5-1.5mm wide, hairless and have their edges slightly rolled under. In Victorian 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 growing in Plains Grassland and Grassy Woodland vegetation (Walsh and Entwistle 1994).

#### 5.1.1 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.

#### 5.1.2 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 Alluvial Terraces Herb-rich Woodland within the road reserve east of Warrayatkin Road on the north side of the Western Highway.

Further baseline information for the Button Wrinklewort will be collected prior to construction works commencing within 100m of the species. This will be submitted to DELWP and DAWE within 14 calendar days of commencing works and used as a basis for monitoring the species during construction. This baseline information will include information on the total number plants and/or total hectare of Button Wrinklewort within the area, which may be potentially directly or indirectly impacted by the proposed action, as well as a description of the starting performance indicators values, such as percentage of weed cover and of native vegetation etc.

### 5.1.3 Impacts

Button Wrinklewort is located within the project area. It is contained in adjacent areas to the project area within the rail/road reserve east of Warrayatkin Road, Ararat. During the Environment Effects Statement development process the alignment was adjusted and management actions developed (Table 5) to avoid impact to the species.

### 5.1.4 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 road reserve from changes to land use.
- Limit grazing on sites where populations within the road reserve occur.
- Facilitate weed control in and adjacent to populations in accordance with the approved WHP Section 2 Weed Management Plan.
- Facilitate the marking of sites and potential habitat on to 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.
- Avoid physical alteration to Button Wrinklewort habitat.
- Restore and protect damaged or depleted habitat caused by construction, through revegetation and habitat maintenance.
- 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	Project Area and existing road/rail reserve containing Button Wrinklewort to be surveyed 100m either side of existing patches. Baseline condition to be determined (including no. of individuals, % weed cover & % bio mass)	Prior to commencing construction within 100m of Button Wrinklewort patches	Surveys to be conducted between October and February.	DELWP and DAWE to be notified to determine best course of action if additional Button Wrinklewort patches are located within the project area
BW 1.2	Control weed invasion	Implement spraying as per approved WHP Section 2 Weed Management Plan	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 permanent fencing <sup>4</sup> and signage to identify the sensitive area	Prior to commencing construction within 100m of Button Wrinklewort patches	Monitoring of signage to occur monthly during construction of Section 2B	Repair fallen signs within 24 hours of being identified

REF	MANAGEMENT APPROACH	MANAGEMENT ACTIONS	PERFORMANCE INDICATOR	MONITORING TIMING	CORRECTIVE ACTION
BW 1.3b		Install no-go zones in accordance with Section 14	Prior to commencing construction within 100m of Button Wrinklewort patches	Monitoring of no-go zones to occur weekly	Repair incorrectly installed or damaged no-go zones within 24 hours
BW 1.4	Ongoing Health Monitoring	Qualified personnel to document the health of Button Wrinklewort populations retained in-situ within Road Reserves 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 retained areas and a reduction in exotic biomass to help reduce competition and create open space for Button Wrinklewort populations to survive and reproduce. Ensure translocation is undertaken based on actions and protocols outlined Section 5.2.3.	Annually for the first ten years of this Plan (between October and February)	If a qualified ecologist determines that the exotic biomass and weed cover is not maintained or improved, then DAWE and DELWP 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 containing Button Wrinklewort. Ensure ROW boundaries within 100m of Button Wrinklewort patches are secure	Existing ROW fencing to be monitored annually for 10 years post-construction	ROW fences to be repaired within 1 month of defect being identified
BW 1.6	Rubbish	Ensure rubbish or litter in and around retained Button Wrinklewort populations is managed within VicRoads road reserve	Rubbish and litter removed to ensure species survival	At least once per year for the first ten years of the TSMP	Rubbish removal must be undertaken regardless of success of the translocation

<sup>4</sup> For patches identified in Appendix B. Not applicable for patches contained within areas of Button Wrinklewort fire regime.

## **5.2 Mitigation Measures**

### **5.2.1 Pre-clearance Surveys**

Prior to undertaking construction activities within 100m of the Button Wrinklewort patches, a suitably qualified ecologist will undertake a pre-clearance survey to identify any unknown individuals.

### **5.2.2 No-go Zones**

Prior to undertaking construction activities within 100m of the Button Wrinklewort patches, the suitably qualified ecologist must establish no-go zone(s) as per Section 14 around the Button Wrinklewort patches identified Appendix B.

Prior to construction works occurring within 100m, permanent fencing will be constructed around the population immediately east of Warrayatkin Road (Appendix B). The permanent fencing must be monitored every 6 months after erection with any noted damaged repaired within 4 weeks. This must be undertaken for a period of 10 years post- construction.

### **5.2.3 Salvage and Translocation**

Salvage and translocation for Button Wrinklewort is not required as the current alignment avoids all impacts on the species. Further survey undertaken in April 2014 and November 2016 did not identify any Button Wrinklewort individuals within the project area. In the event that further Button Wrinklewort is identified prior to or during construction MRPV must consult with DELWP and DAWE to determine the most appropriate course of action.

## **5.3 Monitoring**

No-go Zones 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 DELWP and MRPV staff and any changes to population health or removal of individuals that may potentially occur to these populations will be identified during construction.

## **5.4 Corrective Action**

Prior to construction works occurring within 100m, permanent fencing will be constructed around the population immediately east of Warrayatkin Road (Appendix B). The permanent fencing must be monitored every 6 months after erection with any noted damaged repaired within 4 weeks. This must be undertaken for a period of 10 years post- construction.

## 6. Golden Sun Moth



Critically Endangered (EPBC Act)

Listed (FFG Act)

Critically Endangered (DSE Advisory List)

### 6.1 Description

The Golden Sun Moth is listed as Critically Endangered under the EPBC Act. In Victoria, it is listed under the FFG Act, and is considered Critically Endangered on the DEPI Advisory List (DEPI 2014)

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 *Austrodanthonia* spp. (DSE 2004) but is also known to inhabit areas dominated by Kangaroo Grass (Endersby & Koehler 2006) and introduced species such as Chilean Needle-grass (*A. Organ* pers. obs.).

#### 6.1.1 Distribution

Prior to the Golden Sun Moth targeted surveys conducted by Ecology and Heritage Partners 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). Based on the current range of habitats and their relative condition, there is the potential for Golden Sun Moth to occur within grassland remnants within the project area with confirmed presence between Hillside Road and Pope Road (Appendix B). Other sites that have the potential to have Golden Sun Moth presence include Hopkins River and Langi Ghiran Picnic Ground Road (Appendix B).

#### 6.1.2 Baseline Conditions

The majority of Golden Sun Moth habitat within and surrounding the project area 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 70.6ha of habitat for the Golden Sun Moth is located adjacent to the project area. Major Road Projects Victoria will ensure construction activities do not compromise the quality of this habitat, however it is possible these areas 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 project area west of Pope Road (Appendix B). No other individuals were located within the project area, however potential habitat exists at Billy Billy Creek and Hopkins River.

Further baseline information for known populations of Golden Sun Moth will be collected prior to construction works commencing within 100m of the species (see further discussion under impacts below). This will be submitted to DELWP and DAWE within 14 calendar days of commencing works and used as a basis for monitoring the species during construction. This baseline information will include survey data containing the number of identified individuals and information on the total hectares of Golden Sun Moth habitat within the area, which may be potentially directly or indirectly impacted by the proposed action, as well as a description of the starting performance indicators values, such as percentage of weed cover and of native vegetation etc.

#### **6.1.2.1 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 survey undertaken in 12, 13, 19 December 2016 where the species was confirmed to be present at the sites where the species had previously been detected.

#### **6.1.2.2 Pre-clearance Surveys**

Pre-clearance surveys for Golden Sun Moth were undertaken on 6, 11, 12 and 19 December 2018, and 10 January 2019. Surveys concentrated in areas identified as supporting indigenous grassland, namely those supporting Wallaby grass (*Rytidosperma* spp.) which is a known food source for Golden Sun Moth and areas within 100 metres 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 11am and 3pm 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.

#### **6.1.3 Impacts**

Detailed Net Gain analysis has estimated the construction footprint of Section 2 will impact 27.4 hectares of potential Golden Sun Moth habitat.

MRPV has approval under the EPBC Act to remove no more than 31.56 hectares of known Golden Sun Moth habitat within the overall project area for Section 2 of the Western Highway Duplication Project (EPBC Approval 2010/5741).

#### **6.1.4 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	Preclearance 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 100m of known Golden Sun Moth populations	Surveys to be conducted between November and January.	Baseline data submitted to DELWP and DAWE within 14 days of commencing works
GSM 1.4	Control weed invasion	Implement spraying as per approved WHP Section 2 Weed Management Plan	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
GSM 1.5	Restrict access	Install no-go zones in accordance with Section 14	Prior to commencing construction within 100m of Golden Sun Moth population.	Monitoring of no-go zones to occur weekly	Repair incorrectly installed or damaged no-go zones within 24 hours
GSM 1.6	Revegetation area	Refer to Section 6.2.2			
GSM 1.7	Ongoing Health Monitoring	Refer to Section 6.3			



## **6.2 Mitigation Measures**

### **6.2.1 No-go Zones**

Prior to undertaking construction activities within 100m of Golden Sun-Moth habitat, the suitably qualified ecologist must establish no-go zone(s) as per Section 14 around the Golden Sun-Moth habitat identified Appendix B.

### **6.2.2 Broad Revegetation Plan**

A broad plan for Golden Sun Moth habitat developed by Greening Australia '*Implementation of Buangor Golden Sun Moth Reserve Revegetation and Management Plan*' is attached in Appendix F. The Golden Sun Moth management area is approximately 5.6 hectares and consists of both revegetation sites and enhancement areas. Topsoil excavated during construction must be replaced over the disturbed zone after construction (NB: timeframes detailed in Appendix F do not reflect the current construction program).

If native vegetation recolonisation is not successful by returning the retained topsoil, revegetation will be undertaken using a suite of flora species appropriate to the Natural Temperate Grasslands of the Victorian Volcanic Plain.

Revegetation of the disturbed areas and rehabilitation of redundant sections of the existing Western Highway where Golden Sun Moth populations are known to be present will proceed with grassland species favoured as a food source by Golden Sun Moth. Major Road Projects Victoria will submit a detailed revegetation plan to DAWE 3 months prior to undertaking any revegetation works in this area for their comment and approval.

### **6.2.3 Pest Plant Management**

Areas of retained remnant native vegetation following construction will face increased pressures from weed invasion, increased disturbance and edge effects from the newly constructed areas. Consequently, a management procedure must be implemented in order to ensure the long-term survival of these remnants. A Weed Management Plan will be implemented prior to commencement of construction within the project area. Weed management procedures and monitoring will continue for at least three years after completion of construction.

### **6.2.4 Site Preparation**

The following actions will be proposed prior to undertaking any revegetation works on site, in order of implementation:

- Eliminate all woody weeds from the site;
- Control grassy and herbaceous weed species to <5% cover prior to revegetation works;
- Control high threat weed species to <5% cover prior to revegetation works;
- Fence off the revegetation site and/or provide individual plan guards for all tube stoke; and
- Proceed with revegetation work.

### **6.2.5 Plant Species**

Species suitable for revegetation will be selected from a variety of life forms appropriate to the re-establishment of Golden Sun Moth habitat (e.g. Plains Grassland EVC). In areas known to have previously supported Golden Sun Moth populations which are proposed for revegetation and rehabilitation, landscape plantings must include:

- Flora species appropriate to the local grassland EVC including a suite of understorey and ground cover species, to be used in all revegetation and landscape plantings; and
- Grassland species favoured as a food source by Golden Sun Moth.

Further details of the revegetation species will be detailed in the revegetation plan submitted to DAWE (see Section 6.2.2 above).

### **6.2.6 Existing Vegetation Retention**

Where practical, existing remnant vegetation (predominantly indigenous grasses) within the proposed revegetation area will be retained. The retention of existing remnant vegetation will add structural complexity

to the revegetation area and maintain some level of habitat value during both the construction and revegetation works.

### **6.2.7 Planting Design**

The planting design for the proposed revegetation area will be designed in accordance with the Department of Sustainability and Environment (2006) *Native Vegetation Revegetation planting standards – Guidelines for establishing native vegetation for net gain accounting*. The aim of the revegetation works is to maintain and improve existing habitat for Golden Sun Moth as well as other native fauna species within the local area.

Tube stock and direct seeding methods can be used for revegetation. The former must be adopted in the initial revegetation phase due to the existing cover of remnant vegetation currently present within the revegetation area. Tube stock planting must be undertaken by hand to reduce disturbance to native vegetation and to provide more reliable and immediate results. Tube stock also tends to be more robust and have a higher likelihood of survival, particularly where there is competition from exotic perennial grasses.

### **6.2.8 Provenance**

Plant and seed stock used for revegetation works must be sourced from within the local area (if available) to ensure that the genetic integrity and species mix is representative of surrounding intact areas of native vegetation.

### **6.2.9 Planting Schedule**

Revegetation works will be undertaken in late winter to early spring after completion of construction. It is important that revegetation occurs within this period in order to increase the seedling survival; due to the optimal growth conditions (i.e. optimal rainfall, sunlight) associated with spring.

### **6.2.10 Budget Estimate**

Preparation and planting of the revegetation site will be the most costly part of the revegetation plan and this is likely to occur within the first three years of establishment. It is estimated that the total revegetation project will cost \$145,000 with the first three years of implementation requiring \$25,000 per year, and the following seven years of management requiring \$10,000 per year for monitoring and supplementary planting.

### **6.2.11 Monitoring**

An ongoing monitoring program detailing the progress of revegetation works must be undertaken over a 10-year management period. Monitoring will commence one year after the revegetation works and be undertaken every two years henceforth. Monitoring must include the following measures:

- Regularly monitor survival rates of planted individuals. This will be gauged by counting the number of plants at the time of monitoring and comparing it to the initial number of individuals planted. If the survival rate drops below 50%, supplementary planting must occur.
- Regularly monitor weeds and pest abundance to ensure that weed cover is decreasing and pests are not hindering plant growth and survival.
- Monitoring and auditing will be completed at the conclusion of the 10-year period by a suitably qualified ecologist.

Measurable outcomes for the revegetation project:

- Achieving control and eradication of key (noxious) weed species (over the 10-year management period);
- No new infestations of additional environmental weed species;
- No damage or harm to existing and regenerating native vegetation within the site;
- Fencing is maintained in good order; and
- Survival rate is maintained above 50%.

## **6.3 Monitoring**

As described below, all monitoring undertaken must be in accordance with 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).

Monitoring is required for all sites of a known Golden Sun Moth population to determine if Golden Sun Moth has persisted in grassland areas within the roadside reserve or adjacent to construction activities to determine

reproductive success and to ensure that management actions and habitats are suitable for a viable Golden Sun Moth population in the future. Specific survey procedures will follow those used to monitor the species elsewhere (i.e. timed surveys, generally along transect). Monitoring for at least three years after the road is operational will be used to guide decisions upon the success of habitat reservation and management within the roadside reserve. There is a high likelihood the species will persist in this area in the future (the species has been recorded along other linear corridors such as railway reserves north of Melbourne), particularly given that the roadside reserve will be contiguous with larger area of suitable grassland habitat on private properties which are also known to contain the species.

At least four days of survey over the flight season (i.e. typically between October and early January) of Golden Sun Moth will be conducted to collect data on habitat variables, and to ensure that the grassland areas along the roadside remain suitable for the species. This is particularly pertinent given that the roadside reserve will experience high levels of disturbance from traffic and other threats such as increased water, nutrient and gross pollutant run-off, accumulation of rubbish, and inappropriate slashing or mowing regimes (i.e. season and frequency).

The following will be undertaken as part of population monitoring and habitat monitoring of suitable grassland habitats proposed to be retained for Golden Sun Moth:

- Survey will be carried out by qualified zoologists in areas of suitable habitat within the project area. The survey will focus in areas of indigenous grassland (namely those areas dominated by wallaby-grass *Rytidosperma* spp., but also in areas of Needle Grass *Nassella* spp. which is a known food source for the species) and areas where the species has previously been recorded;
- The surveys will be undertaken during optimal conditions suitable for detecting species. The male of this species generally flies between 11am and 3pm 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 +/- 5 meters).

Several site-specific habitat variables will also be assessed during the monitoring period, specifically:

- Vegetation diversity, structure, composition and percentage of cover (percentage cover of particular grassland species such as wallaby grass and/or Kangaroo Grass);
- Density of grass and height (providing an indication of when it was last slashed or potentially grazed);
- Presence of other natural features such exposed rock;
- The suitability of adjoining grassland habitats which are also known to support Golden Sun Moth; and
- Presence of pollutants, rubbish and other threatening processes as outlined above.

#### **6.4 Corrective Action**

VicRoads has secured Golden Sun Moth habit to offset against the impacts of Western Highway Project, Section 2- Beaufort to Ararat in accordance with the requirements of EPBC Approval 2010/5741.

Any reduction in Golden Sun Moth population for adjacent properties to the road reserve is likely to be related to deteriorating habitat conditions. As such, corrective actions will be associated with ongoing weed management, informed by the Weed Management Plan.

## 7. Brown Toadlet



Listed (FFG Act)  
Endangered (DSE Advisory List)

### 7.1 Description

In Victoria, the Brown Toadlet is listed under the FFG Act, and considered as endangered on the DEPI Advisory List (DEPI 2014).

The Brown Toadlet is a small brownish coloured Toadlet endemic to south-eastern Australia including Tasmania and is found in a variety of habitats not necessarily associated with permanent water. The Brown Toadlet is brown to black on its back, with a scattering of darker flecks and red spots. Its underbelly is marbled black and white and there is a bright yellow patch around its cloaca. In Victoria, the Brown Toadlet is distributed from the north-east through to central and western Victoria with scattered records in Gippsland. In the South West region, it is recorded from all bioregions except the Otway Ranges bioregions, although most records are grouped on the Volcanic Plains bioregion north of Werribee, the Greater Grampians bioregion and the Lowan Mallee bioregion in the Little Desert.

### 7.2 Distribution

Prior to the targeted surveys for Brown Toadlet conducted by Ecology and Heritage Partners (2011, 2014, 2018), there were five previous records of Brown Toadlet from the local area, the most recent being from 1963. There is suitable habitat for this species in the Hopkins River and Billy Billy Creek, as well as Charliecombe Creek, Middle Creek Fiery Creek and several smaller, unnamed drainage lines within the broader area.

Over 28 records of Brown Toadlet were collected within the Section 2 project area during targeted Brown Toadlet surveys throughout the duration of the project. Individuals were detected during the targeted nocturnal surveys and incidentally whilst undertaking other surveys (e.g. whilst collecting hair tubes and infra-red cameras etc.). Records of Brown Toadlet collected during the targeted surveys and incidentally are presented in Appendix B however this species is widespread throughout the project area in many of the drainage lines, seeps, road ditches and culverts located within or adjacent to woodland vegetation.

### 7.3 Impact

Habitat for Brown Toadlet is widespread throughout the project area in many of the wetlands, drainage lines, seeps, road ditches and culverts located within or adjacent to woodland vegetation.

### 7.4 Mitigation Measures

#### 7.4.1 No-go Zones

No-Go Zones have been specified for the Brown Toadlet. However, all areas of vegetation that can be protected through refined detailed design will form part of additional No-Go Zones not outlined in this plan.

## 7.4.2 Salvage and Translocation

### Salvage and Translocation (Preconstruction)

#### *Active season (late March -June)*

- Pre-construction salvage will take place prior to site disturbance, but as close as possible to proposed construction periods, i.e. one to three days (a longer intervening period may mean frogs have moved back into the area);
- Two observers will spend a minimum two nights surveying, by spotlighting and call playback, in identified areas of habitat (to be identified during targeted surveys prior to commencement of construction) within the project area prior to the commencement of works in their vicinity. Any individuals detected will be relocated to the nearest suitable habitat at least 200 metres, but no greater than 500 metres, from the construction zone;
- Frog and tadpole salvage will be undertaken during the drainage/pumping of any dams identified as known habitat by the species within the project area;
- Footwear will be washed in disinfectant at the beginning and end of each salvage period to prevent the introduction and/or spread of any diseases. All salvage procedures will be conducted in accordance with the hygiene protocol for the control of disease in frogs (NPWS 2001).

#### *Inactive season (July - February)*

As any Brown Toadlet that may be present will be inactive during these months, nocturnal surveys prior to construction activities will not be required.

### Salvage and Translocation (During Construction)

- Frog and tadpole salvage will be undertaken during the drainage/pumping of any dams identified as known habitat by the species within the project area;
- For the removal of any vegetation or refuge in and around the waterbody, zoologists are to communicate how to best undertake removal to avoid injury to native fauna.

## 8. State Listed Threatened Species

### 8.1 State Listed Threatened Species

Assessments have recorded three flora species listed on the DELWP advisory listed species present within the construction footprint. These include Emerald-lip Greenhood, Golden Cowslip and Yarra Gum.

The locations of these species in the context of the project area are shown in the maps included as Appendix E to the Native Vegetation Management Plan, Western Highway Project, Section 2B: Buangor to Ararat.

#### 8.1.1 Emerald-lip Greenhood

Due to the delicate nature of the Emerald-lip Greenhood, translocation of impacted individuals is not being considered. Seed has been collected. Recipient locations for Emerald-lip Greenhood may be determined in consultation with DELWP for conservation purposes.

#### 8.1.2 Golden Cowslip

Section 2B concept design has avoided the single Golden Cowslip that has been identified within the current alignment. If this is unachievable then the plant will be relocated.

#### 8.1.3 Yarra Gum

Due to the nature of the species, translocation of impacted Yarra Gum individuals is not appropriate. Seed has been collected. Recipient locations for Yarra Gum will be determined in consultation with DELWP for conservation purposes and the species should also be included in revegetation plans for this area.

### 8.2 No Go Zones

Refer to Section 14.

# 9. Erosion and Sediment Control

## 9.1 General

All sediment and pollution control protocols are implemented, in accordance with *Construction Techniques for Sediment Pollution Control (EPA Publication No. 275, 1991)*; and *Environmental Guidelines for Major Construction Sites (EPA Publication No. 480, February 1996)*.

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.

## 9.2 Works in / near Waters

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, EMPs shall be prepared to protect beneficial uses in accordance with any permit, the State Environmental Planning Policy (Waters of Victoria) its schedules and best practice guidelines.

## 9.3 Sedimentation 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.

#### **9.4 Stockpiles**

Where soil or granular material is stockpiled on site, such stockpiles shall be located to provide a clearance of not less than 100m from waterways.

#### **9.5 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;
- within one hour of the commencement of any runoff resulting from rain events during working hours;
- every four hours during periods of continuous rain during working hours;
- within 12 hours of a rain event outside working hours.

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.

## **10. Fuels and Chemicals**

### **10.1 General**

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

EMPs 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 Dangerous Goods (Storage and Handling) Regulations 2000 and EPA Bunding Guidelines (EPA Publication 347) including the placarding 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 100 m from any drainage point or waterways;
- 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.

### **10.2 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.



# 11. Air Quality

## 11.1 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;
- materials of any type shall not be disposed of through burning;
- 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.

## 11.2 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.

## 11.3 Mitigation Measures

### 11.3.1 General

Monitoring shall comply with the following requirements:

- insoluble solids from any air quality monitoring station, as measured by a dust deposit gauge in accordance with the requirements of AS 3580.10.1, shall not exceed 4 g/m<sup>2</sup>/month or 2 g/m<sup>2</sup>/month above the background measurement, whichever is the lesser
- directional dust gauges that comply with the equipment requirements of AS 2724.5 shall be installed alongside each air quality monitoring station. Directional dust gauges shall be orientated such that one of the collecting cylinders is directed towards the construction activities;
- directional dust shall be measured as insoluble solids in accordance with AS 3580.10.1 for each of the four collecting cylinders. Directional dust gravimetric results shall be expressed as the percentage of the total directional dust gauge catch for each cylinder;
- dust deposition and directional dust monitoring shall be supplemented with continuous monitoring using a portable laser light scattering instrument, or equivalent, to allow changes to dust control measures if the PM<sub>10</sub> 1-hour average concentration exceeds 120 µg/m<sup>3</sup>;
- no less than one portable laser light scattering instruments shall be operational daily while undertaking construction activities;
- portable laser light scattering instrument(s) shall provide a visible and logged alarm and SMS notification if the 1-hour average criterion of 120 µg/m<sup>3</sup> is exceeded;
- 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.

### 11.3.2 Location of Monitoring Equipment

Dust deposit gauges and directional dust gauges shall be established in accordance with the requirements of AS 3580.1.1.

One dust deposit gauge shall be installed and maintained as a background reference station. The reference station shall be in close proximity to the site, but unaffected by works under the Contract.

No less six other monitoring stations shall be located where roadworks are likely to have the greatest impact on adjacent properties or create nuisance/inconvenience to the public.

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.

### **11.3.3 Results**

Results of dust deposition and directional dust monitoring shall be submitted to the Superintendent within 24 hours of receipt from the laboratory.

Daily results of continuous monitoring including the location(s) of the instrument shall be made available upon request.

A daily visual assessment of the site for airborne dust and vehicle emissions shall be undertaken at locations where works are being carried out and records maintained of these inspections.

Hourly wind speed and wind direction data that correlates to the site location shall be obtained and maintained in the Contractor's records and made available to the Superintendent upon request.

### **11.3.4 Timing**

Sampling frequency for dust deposition and directional dust is based on the risk of generation of nuisance dust and is season dependent. Dust deposition and directional dust sampling frequency shall have a sample frequency of:

- 14-day consecutive period between November and March
- 30-day consecutive period between April and October

## **12. Contaminated Soils and Materials**

### **12.1 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 and EPA;
- contaminated materials to be reused on site as part of the Contract shall be temporarily stored and managed to minimise any impact on the site or surrounding environment;
- the transport and disposal of contaminated soils or materials offsite shall be undertaken in accordance with relevant legislation and State Environment Protection Policies.

### **12.2 Discovery of Contaminated Material**

The discovery of contaminated material on the site during works shall be managed in accordance with VicRoads and EPA Guidelines. If contaminated material is encountered on the site, the Contractor shall:

- notify the Superintendent and where applicable EPA;
- undertake comprehensive sampling and analysis to determine the type levels and extent of contamination in accordance with VicRoads and EPA guidelines;
- investigate the opportunity to reuse the contaminated soil and/or material as a fill material on site;
- ensure that any proposed reuse and/or disposal methods are acceptable to the Superintendent and EPA.

### 12.3 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.

## 13. Waste and Resource Use

### 13.1 General

The generation of waste materials shall be managed in accordance with the 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 7 below.

**Table 7 – 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
Formwork	Reuse or dispose to landfill
Plastics (Recycle Nos. 1, 2,	Recycling facility - not to landfill

MATERIAL	WASTE MANGEMENT APPROACH
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

## 13.2 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.

# 14. Establishing and Maintaining No-go Zones

## 14.1 Procedure for Establishing and Maintaining No-go Zones

No work will occur outside the project area. As per the Western Highway Project Section 2 EES, additional areas of vegetation will be protected within the project area to protect Threatened Species as described in this plan and shown in Appendix B. In addition to No- Go Zones identified in the plan, No-Go Zones will be implemented where vegetation can be protected through refined detailed design.

All fencing of No Go Zones must as a minimum be:

- erected 3 metres beyond the boundary of the threatened species habitat to be protected or erected 1 metre beyond the boundary of any native vegetation to be protected;
- constructed of star picket or timber posts with a minimum of one wire support have a high visibility component (i.e paraweb or flags);
- communicated by signage installed on the temporary fencing at intervals no more than 20 metres apart with appropriate wording (e.g 'Protected Area- No Unauthorised Access'); and
- retained in place for the duration of the construction period (until Practical Completion).

All No-Go Zone fencing must be checked on a weekly basis to ensure that they are effective. If the fencing has been damaged, repairs must be undertaken immediately, where possible, or as soon as practicable once the fault has been reported to the Contractor.

The no-go zones are to be installed using and GPS device and the vegetation GIS layer provided by MRPV in accordance with additional pre-clearance survey data (if applicable).

Where No-Go Zones compromise Road Safety (i.e appear in a clear zone) then star pickets will be replaced with sand bagged bollards or suitable frangible posts and monitored daily. This will be at the discretion of MRPV.

## 15. Procedure for Reporting

An annual summary statement or report will be prepared to inform DELWP and DAWE of relevant ecological issues, milestones and threats. The annual report will report on compliance for 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 matters of NES 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.

## 16. Environmental Audits and Surveillance

In addition to regular monitoring and maintenance of environmental protection measures in accordance with this Plan the Contractor shall arrange an audit of the Construction Environmental Management Plan (CEMP) prior to the commencement of Works

The environmental audit shall be undertaken by an environmental auditor that:

- is independent of the Contractor (a specialist in the employ of the Contractor is not acceptable); and
- has no involvement in the development of the Contractor's EMP for the works under this Contract.

The Contractor's CEMP shall be independently audited to ensure compliance with the Contract Specification and to verify that the CEMP will be sufficient to protect the beneficial uses.

Non-conformances will be reported to DAWE as per EPBC approval conditions.

### 16.1 MRPV Surveillance and Audits during Construction

MRPV will arrange surveillance and audits to verify the effectiveness of the TSMP and CEMP and compliance with the Contract Specification. All non-conformances will be logged in an MRPV incident database and captured in the annual compliance report submitted to DAWE. Any non-conformance relating to the EPBC Approval Notice 2010/5741 will be reported to DAWE within 2 business days.

The Contractor shall co-operate with any reasonable requests by MRPV or from relevant environmental agencies to undertake environmental audits and or surveillance activities of the Contract.

All non-conformances arising from an audit shall be addressed by the Contractor. The Contractor shall take immediate action to address any significant environmental non- conformance identified by an audit.

If the Contractor does not take action to address a non-conformance, the Superintendent may act to resolve the non-conformance and the cost of such action shall be deducted from moneys due or becoming due to the Contractor.

# Appendix A – Project Location



NOTE: BOUNDARIES ON THE PLAN AND CO-ORDINATES IN THE DIGITAL BASE ARE APPROXIMATE AND SUBJECT TO VERIFICATION BY GROUND SURVEY. FOR FURTHER APPLICATIONS OF THE DIGITAL BASE CONTACT INTEGRATION SERVICES-SURVEY AND DECLARATION.

**LEGEND**

PROJECT AREA / BOUNDARY

PREPARED BY ROADS CORPORATION  
 INTEGRATION SERVICES - SURVEY & DECLARATION  
 40 DENMARK STREET NSW 2101  
 0 400 800 1200  
 SCALE OF METRES  
 DRAWING FILE: LINS/surveyplans/29455-its--cb-87-dgn  
 Job Book Number 29455

**WESTERN HIGHWAY PROJECT  
 SECTION 2B  
 PROJECT AREA**



# Appendix B – Threatened Species Management Plan Maps

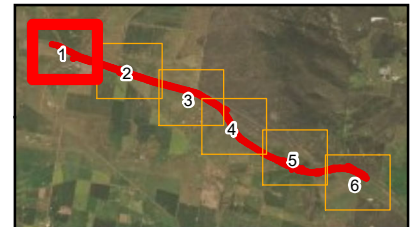
NB. While these maps only include location information for the EPBC listed species identified during ecological assessments for the project, the specified no go zones also include areas that protect DSE Advisory list species. The locations of DSE Advisory List species in the context of the project area are shown in the maps included as Appendix E to the Native Vegetation Management Plan, Western Highway Project, Section 2B: Buangor to Ararat.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



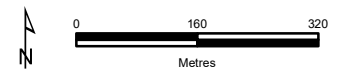
### Legend

- Project Boundary
- EPBC Act listed Fauna Species**
  - Golden Sun Moth
  - Golden Sun Moth habitat
- EPBC Act listed Flora Species**
  - 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 - Threatened Species
  - Salvage
- ★ 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*

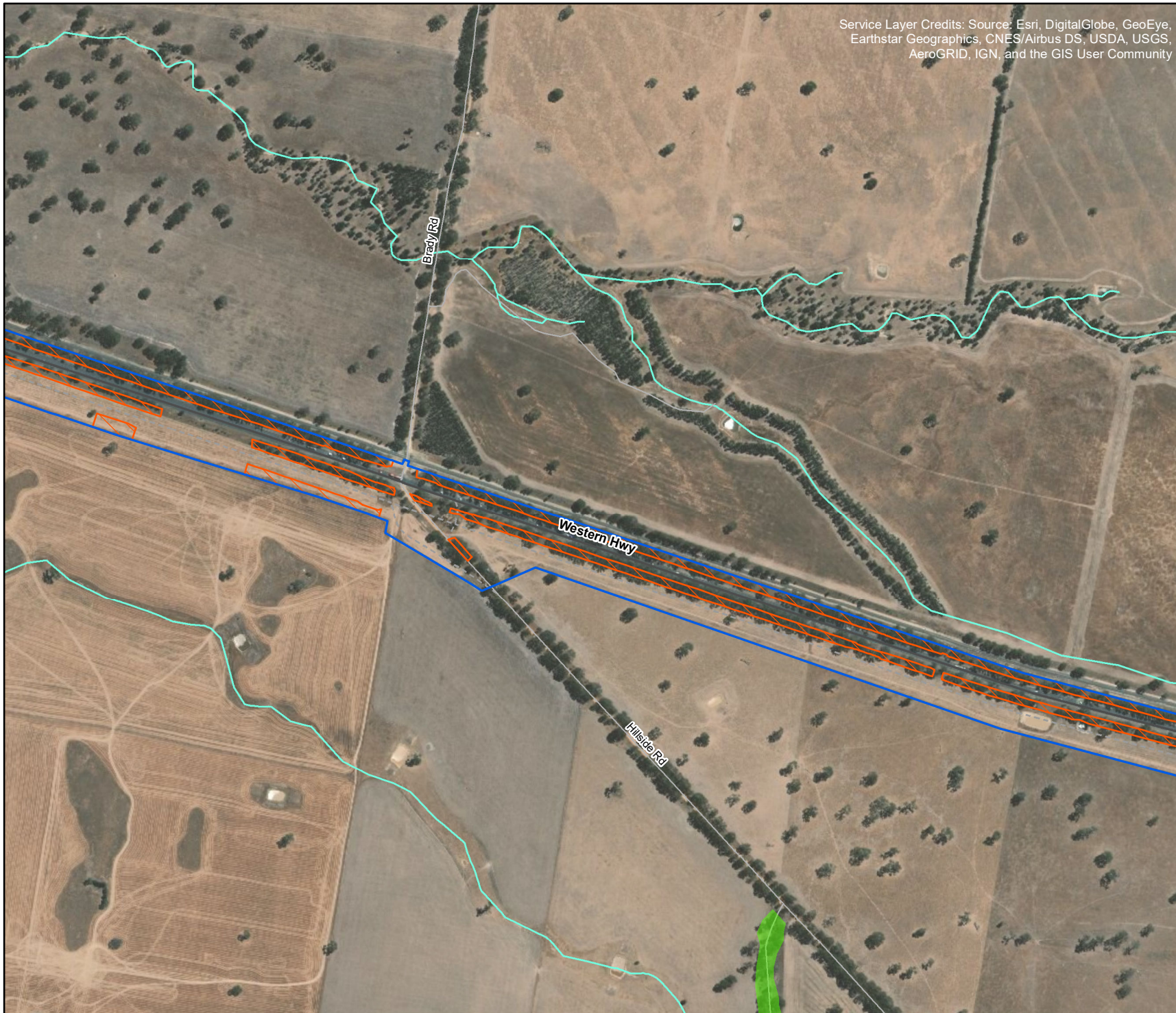
Issue Date: 15/05/2020







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

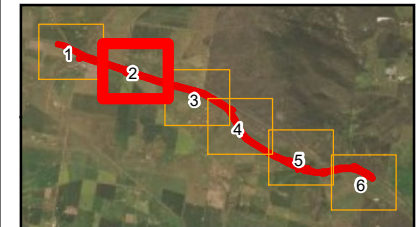
VicMap Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.

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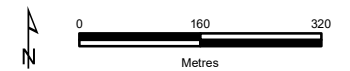
### Legend

-  Project Boundary
- EPBC Act listed Communities**
  -  Grassy Eucalypt
  -  Woodland of the VVP
- Mitigation Actions**
  -  No Go Zones - Threatened Species



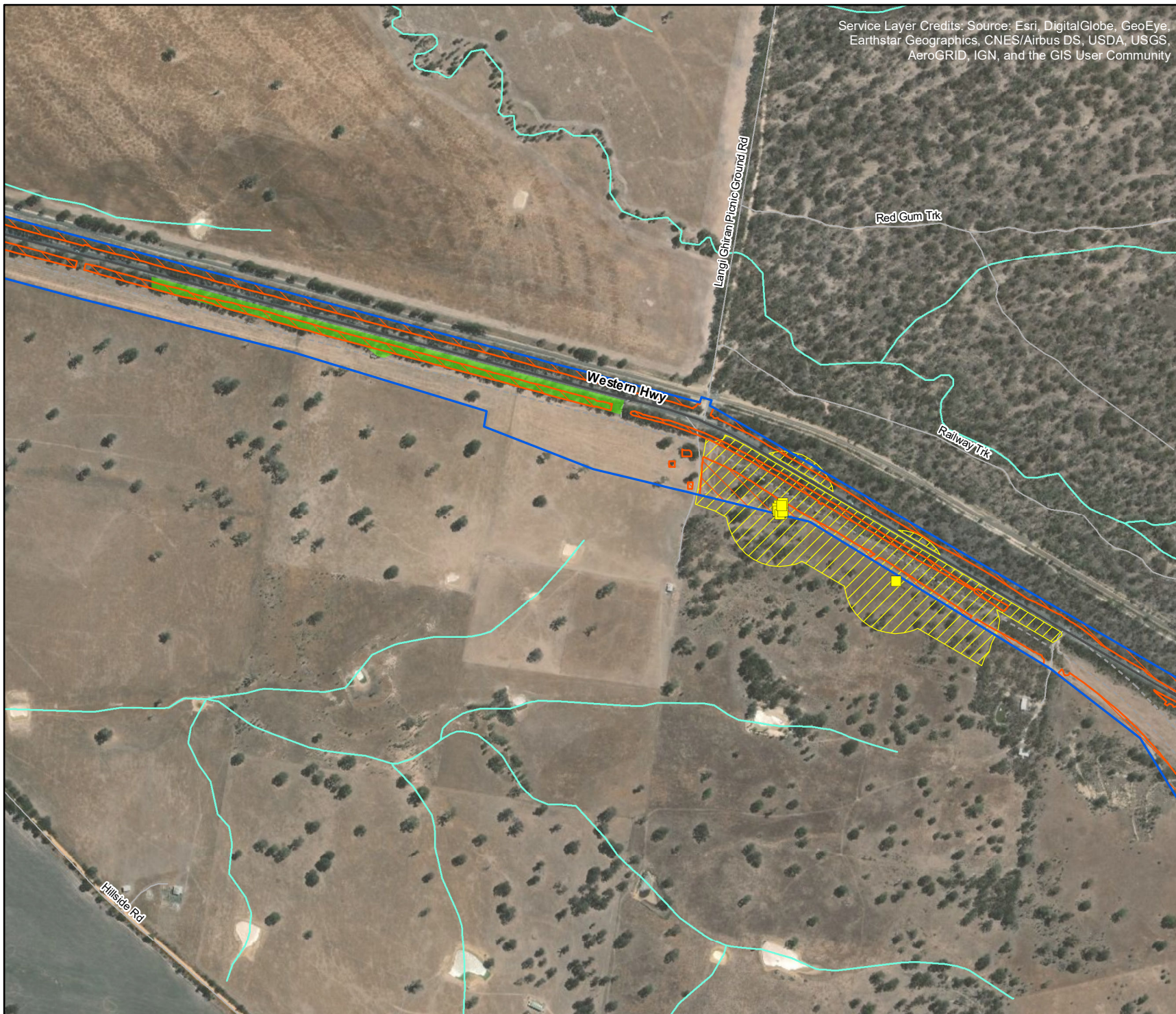
**Map 2**  
**Threatened Species Management Plan**  
*Western Highway Duplication - Section 2B, Beaufort to Ararat*

Issue Date: 15/05/2020



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

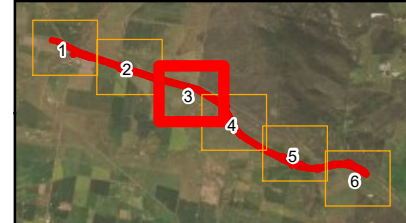
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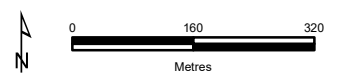
**Legend**

- Project Boundary
- 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 - Threatened Species



**Map 3**  
**Threatened Species Management Plan**  
*Western Highway Duplication - Section 2B, Beaufort to Ararat*

Issue Date: 15/05/2020







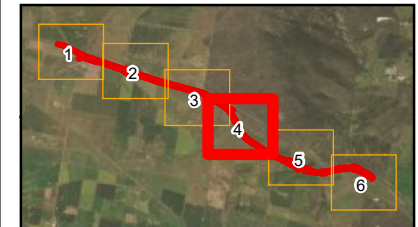
Map created by Ecology & Heritage Partners with ecological data sourced from Ecology & Heritage Partners fieldwork.

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Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

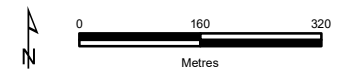
### Legend

-  Project Boundary
- EPBC Act listed Fauna Species**
  -  Golden Sun Moth
  -  Golden Sun Moth habitat
- Mitigation Actions**
  -  No Go Zones - Threatened Species



### Map 4 Threatened Species Management Plan *Western Highway Duplication - Section 2B, Beaufort to Ararat*

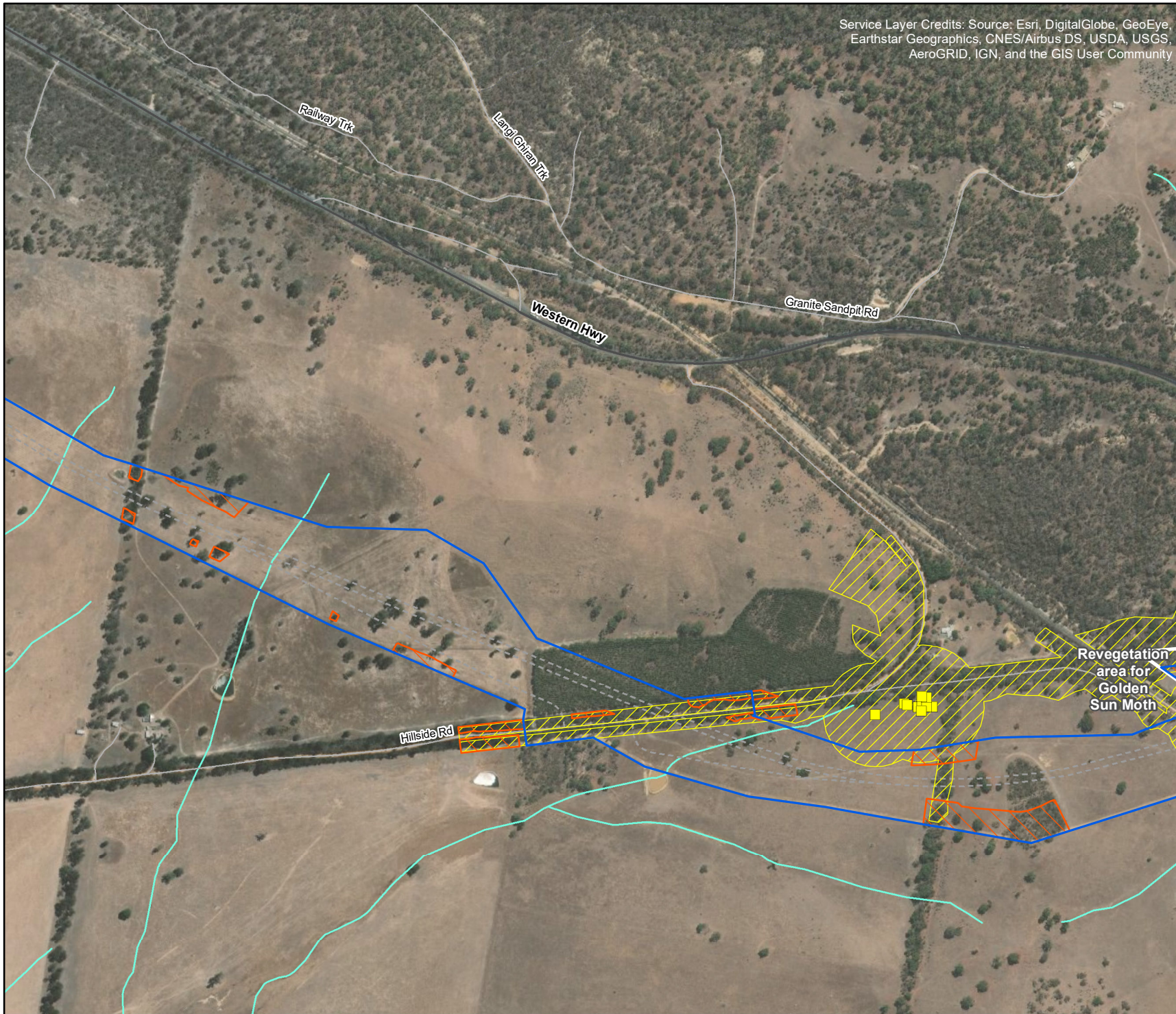
Issue Date: 15/05/2020







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

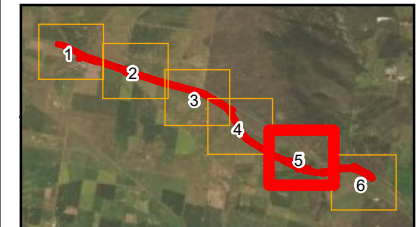
VicMap Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.

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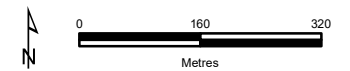
## Legend

-  Project Boundary
- EPBC Act listed Fauna Species**
  -  Golden Sun Moth
  -  Golden Sun Moth habitat
  -  Dwarf Galaxias habitat
- Mitigation Actions**
  -  No Go Zones - Threatened Species



### Map 5 Threatened Species Management Plan Western Highway Duplication - Section 2B, Beaufort to Ararat

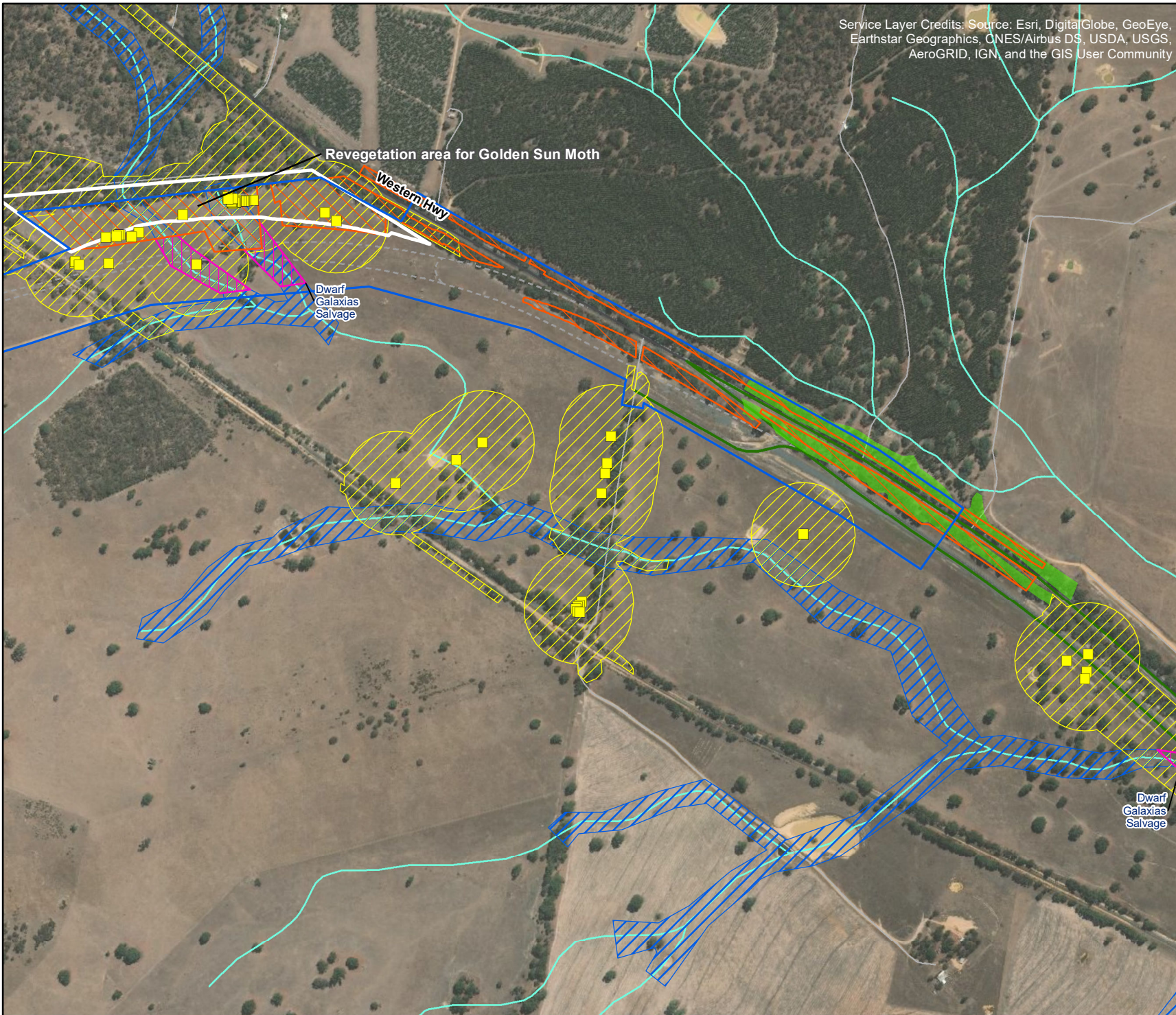
Issue Date: 15/05/2020



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

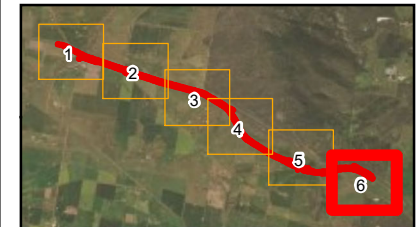
VicMap Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.

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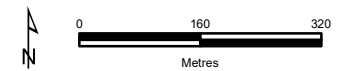
### Legend

- Project Boundary
- EPBC Act listed Fauna Species**
  - Golden Sun Moth
  - Golden Sun Moth habitat
  - Dwarf Galaxias habitat
- EPBC Act listed Communities**
  - Grassy Eucalypt Woodland of the VVP
- Mitigation Actions**
  - No Go Zones - Threatened Species
  - Salvage



### Map 6 Threatened Species Management Plan Western Highway Duplication - Section 2B, Beaufort to Ararat

Issue Date: 15/05/2020



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## Appendix C – Surveys

**Table 8 – Surveys undertaken for Matters of National Environmental Significance**

SURVEY	SURVEY AREA	DATE(S) COMPLETED	SEASON	RESULT	HABITAT DESCRIPTION
Preliminary flora assessment	The Project area	20-22 October, 26- 30 October, 3-5 November 2010	Spring	As per EES Technical Appendices	NA
Preliminary fauna assessment	The Project area	20-22 October 2010	Spring	As per EES Technical Appendices	NA
Targeted flora and fauna surveys					
Langi Ghiran Grevillea	Areas within the Project area that support suitable habitat for this species	14 February 2011	Summer	No plants recorded	NA
Spiny Rice- flower	Areas within the Project area that support suitable habitat for this species	2 August, 29-31 August 2010  18 August 2016	Winter	575 plants recorded, one plant to be impacted	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 the Project area that support suitable habitat for this species	8-11 November 2011  18 November 2016	Spring	88 plants recorded, no plants to be impacted	Plants recorded within high quality vegetation (vegetation quality as per Habitat Hectare Assessment from EES Technical



SURVEY	SURVEY AREA	DATE(S) COMPLETED	SEASON	RESULT	HABITAT DESCRIPTION
					Appendices). Cohorts from multiple age classes were recorded and plants were actively reproducing
Large-headed Fireweed	Areas within the Project area that support suitable habitat for this species	8-11 November 2011	Spring	No plants recorded	NA
Tawny Spider Orchid	Areas within the Project area that support suitable habitat for this species	8-11 November 2011	Spring	No plants recorded	NA
Targeted Growling Grass Frog surveys	21 sites within the Project area 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 the Project area that support suitable habitat for	15 February to 2 March 2010	Summer Autumn	No individuals recorded	NA
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.	16, 22, 29 December 2011 13 January 2012  12, 13, 19 December 2016	Summer	145 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 project area 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

SURVEY	SURVEY AREA	DATE(S) COMPLETED	SEASON	RESULT	HABITAT DESCRIPTION
					scattered tussocks of wallaby grass <i>Rytidosperma</i> spp., a preferred food source for Golden Sun Moth.
Targeted Dwarf Galaxias surveys	All suitable creeks and drainage lines in the Project area	16 to 22 June 2011	Winter	156 individuals recorded	Much of the riparian vegetation has been cleared around Billy Billy Creek. The percentage of macrophyte cover is high (20-40%), providing a good source of habitat for small native fish species.
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.	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 project area 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 <i>Rytidosperma</i> spp., a preferred food source for Golden Sun Moth.
The Project area	20-22 October 2010	Spring	As per EES Technical Appendices	NA	
The Project area	19-20 January 2012	Summer	As per EES Technical Appendices	NA	

## Appendix D – Schedule of Management Actions (EPBC Matters)

Table 9 – Schedule of Management Actions (EPBC Matters)

YEAR <sup>6</sup>	REF NO.	SECTION 2B	MANAGEMENT ACTIONS	TIMING	RESPONSIBLE AGENT	PERFORMANCE INDICATOR	DATE COMPLETED: COPLETION SUPERVISED BY: RELEVANT DOCUMENTATION:
0		Y	EPBC Approval Notice and Threatened Species Management Plan	Prior to commencing construction	MRPV / VicRoads	MRPV to issue contractor a copy of the TSMP and relevant EPBC approval conditions	
0		Y	Construction Environment Management Plan (CEMP)	To be developed and approved in the pre-construction phase and implemented in the construction phase.	Contractor	Approval of CEMP by DELWP	
0		Y	Audit of CEMP	Prior to construction	Contractor	Audit submitted to MRPV	
0	SRF 1.2, BW 1.2, GSM 1.4	Y	Weed Management Plan (WMP)	Implement prior to commencing construction	Contractor	Refer to WMP	
0	SRF 1.1	^	Preclearance surveys- Spiny Rice-Flower	Prior to commencing construction within 100m of SRF patches	MRPV / VicRoads	Baseline data submitted to DELWP and DAWE within 14 days of commencing works	

YEAR <sup>6</sup>	REF NO.	SECTION 2B	MANAGEMENT ACTIONS	TIMING	RESPONSIBLE AGENT	PERFORMANCE INDICATOR	DATE COMPLETED: COPLETION SUPERVISED BY: RELEVANT DOCUMENTATION:
0	SRF 1.3	^	No-go Zones- Spiny Rice-Flower	Prior to commencing construction within 100m of SRF patches	Contractor	No-go zones complete	
0	BW 1.1	Y	Preclearance surveys- Button Wrinklewort	Prior to commencing construction within 100m of BW patches	MRPV / VicRoads	Baseline data submitted to DELWP and DAWE within 14 days of commencing works	
0	BW 1.3a	Y	Permanent Fencing- Button Wrinklewort	Prior to commencing construction within 100m of BW patches	MRPV / VicRoads	Fencing installed	
0	BW 1.3b	Y	No-go Zones- Button Wrinklewort	Prior to commencing construction within 100m of BW patches	Contractor	No-go zones complete	
0	GSM 1.1	Y	Implement Offset Management Plan	Refer to EPBC Approval Notice 2010/5741	MRPV / VicRoads	Refer to EPBC Approval Notice 2010/5741	
0	GSM 1.2	Y	Refine detailed design	Prior to commencement of construction for Section 2B East	MRPV / VicRoads	N/A (may not be possible)	

YEAR <sup>6</sup>	REF NO.	SECTION 2B	MANAGEMENT ACTIONS	TIMING	RESPONSIBLE AGENT	PERFORMANCE INDICATOR	DATE COMPLETED: COMPLETION SUPERVISED BY: RELEVANT DOCUMENTATION:
0	GSM 1.6	Y	Golden Sun Moth Revegetation Area	Finalised and submitted to DAWE 3 months prior to construction	MRPV / VicRoads	DAWE approval	
0	GSM 1.3	Y	Preclearance surveys- Golden Sun Moth	Prior to commencing construction within 100m of known Golden Sun Moth populations	MRPV / VicRoads	Baseline data submitted to DELWP and DAWE within 14 days of commencing works	
0	GSM 1.5	Y	No-go Zones- Golden Sun Moth	Prior to commencing construction within 100m of GSM habitat	Contractor	No-go zones complete	
1	SRF 1.3	^	Maintain no-go zones- Spiny Rice-Flower	Ongoing until practical completion for relevant sections	Contractor	Maintain No-go Zones	
1	SRF 1.4	^	Ongoing Health Monitoring- Spiny Rice-Flower	Between April and August	MRPV / VicRoads	Ongoing monitoring completed as per Section 3.4. No additional loss of individuals has occurred.	
1	SRF 1.5	^	Manage Grazing- Spiny Rice-Flower	Between April and August	MRPV / VicRoads	Fencing repaired (if required)	
1	SRF 1.7	^	Manage Rubbish- Spiny Rice-Flower	Between April and August	MRPV / VicRoads	Rubbish removed	

YEAR <sup>6</sup>	REF NO.	SECTION 2B	MANAGEMENT ACTIONS	TIMING	RESPONSIBLE AGENT	PERFORMANCE INDICATOR	DATE COMPLETED: COPLETION SUPERVISED BY: RELEVANT DOCUMENTATION:
1	BW 1.3b	Y	Maintain no-go zones- Button Wrinklewort	Prior to commencing construction within 100m of BW patches	Contractor	No-go zones complete	
1	BW 1.4	Y	Ongoing Health Monitoring- Button Wrinklewort	Between October and February	MRPV / VicRoads	Ongoing monitoring completed as per Section 5.4. No additional loss of individuals has occurred.	
1	BW 1.5	Y	Manage Grazing - Button Wrinklewort	Between October and February	MRPV / VicRoads	Fencing repaired (if required)	
1	BW 1.6	Y	Manage Rubbish - Button Wrinklewort	Between October and February	MRPV / VicRoads	Rubbish removed	
1	GSM 1.5	Y	Maintain no-go zones- Golden Sun Moth	Prior to commencing construction within 100m of GSM patches	Contractor	No-go zones complete	
2	SRF 1.3	^	Maintain no-go zones- Spiny Rice Flower	Ongoing until practical completion for relevant sections	Contractor	Maintain No-go Zones	
2	SRF 1.4	^	Ongoing Health Monitoring- Spiny Rice- Flower	Between April and August	MRPV / VicRoads	Ongoing monitoring completed as per Section 3.4. No additional loss of individuals has occurred.	

YEAR <sup>6</sup>	REF NO.	SECTION 2B	MANAGEMENT ACTIONS	TIMING	RESPONSIBLE AGENT	PERFORMANCE INDICATOR	DATE COMPLETED: COMPLETION SUPERVISED BY: RELEVANT DOCUMENTATION:
2	SRF 1.5	^	Manage Grazing- Spiny Rice-Flower	Between April and August	MRPV / VicRoads	Fencing repaired (if required)	
2	SRF 1.7	^	Manage Rubbish- Spiny Rice-Flower	Between April and August	MRPV / VicRoads	Rubbish removed	
2	BW 1.3b	Y	Maintain no-go zones- Button Wrinklewort	Prior to commencing construction within 100m of BW patches	Contractor	No-go zones complete	
2	BW 1.4	Y	Ongoing Health Monitoring- Button Wrinklewort	Between October and February	MRPV / VicRoads	Ongoing monitoring completed as per Section 5.4. No additional loss of individuals has occurred.	
2	BW 1.5	Y	Manage Grazing - Button Wrinklewort	Between October and February	MRPV / VicRoads	Fencing repaired (if required)	
2	BW 1.6	Y	Manage Rubbish - Button Wrinklewort	Between October and February	MRPV / VicRoads	Rubbish removed	
2	GSM 1.7	Y	Ongoing Health Monitoring - Golden Sun Moth	Between October and January	MRPV / VicRoads	Ongoing monitoring completed as per Section 6.4. No additional loss of individuals has occurred.	

YEAR <sup>6</sup>	REF NO.	SECTION 2B	MANAGEMENT ACTIONS	TIMING	RESPONSIBLE AGENT	PERFORMANCE INDICATOR	DATE COMPLETED: COPLETION SUPERVISED BY: RELEVANT DOCUMENTATION:
3	SRF 1.4	^	Ongoing Health Monitoring- Spiny Rice-Flower	Between April and August	MRPV / VicRoads	Ongoing monitoring completed as per Section 3.4. No additional loss of individuals has occurred.	
3	SRF 1.5	^	Manage Grazing- Spiny Rice-Flower	Between April and August	MRPV / VicRoads	Fencing repaired (if required)	
3	SRF 1.6	^	Manage Fire Regime- Spiny Rice-Flower	In consultation with CFA	MRPV / VicRoads	Burn to be undertaken in accordance with Roadside Conservation Management Plan: Western Highway, East of Ararat (Hopkins River to the 196.0 km post). (University Ballarat, 2006).	
3	SRF 1.7	^	Manage Rubbish- Spiny Rice-Flower	Between April and August	MRPV / VicRoads	Rubbish removed	
3	BW 1.4	Y	Ongoing Health Monitoring- Button Wrinklewort	Between October and February	MRPV / VicRoads	Ongoing monitoring completed as per Section 5.4. No additional loss of individuals has occurred.	
3	BW 1.5	Y	Manage Grazing- Button Wrinklewort	Between October and February	MRPV / VicRoads	Fencing repaired (if required)	



YEAR <sup>6</sup>	REF NO.	SECTION 2B	MANAGEMENT ACTIONS	TIMING	RESPONSIBLE AGENT	PERFORMANCE INDICATOR	DATE COMPLETED: COPLETION SUPERVISED BY: RELEVANT DOCUMENTATION:
3	BW 1.6	Y	Manage Rubbish - Button Wrinklewort	Between October and February	MRPV / VicRoads	Rubbish removed	
3	GSM 1.3	Y	Golden Sun Moth Survey	Between October and January	MRPV / VicRoads	Golden Sun Moth population retained	
4	SRF 1.4	^	Ongoing Health Monitoring- Spiny Rice- Flower	Between April and August	MRPV / VicRoads	Ongoing monitoring completed as per Section 3.4. No additional loss of individuals has occurred.	
4	SRF 1.5	^	Manage Grazing- Spiny Rice-Flower	Between April and August	MRPV / VicRoads	Fencing repaired (if required)	
4	SRF 1.7	^	Manage Rubbish- Spiny Rice-Flower	Between April and August	MRPV / VicRoads	Rubbish removed	
4	BW 1.4	Y	Ongoing Health Monitoring- Button Wrinklewort	Between October and February	MRPV / VicRoads	Ongoing monitoring completed as per Section 5.4. No additional loss of individuals has occurred.	
4	BW 1.5	Y	Manage Grazing - Button Wrinklewort	Between October and February	MRPV / VicRoads	Fencing repaired (if required)	
4	BW 1.6	Y	Manage Rubbish- Button Wrinklewort	Between October and February	MRPV / VicRoads	Rubbish removed	

YEAR <sup>6</sup>	REF NO.	SECTION 2B	MANAGEMENT ACTIONS	TIMING	RESPONSIBLE AGENT	PERFORMANCE INDICATOR	DATE COMPLETED: COPLETION SUPERVISED BY: RELEVANT DOCUMENTATION:
4	GSM 1.3	Y	Golden Sun Moth Survey	Between October and January	MRPV / VicRoads	Golden Sun Moth population retained	
5	SRF 1.4	^	Ongoing Health Monitoring- Spiny Rice-Flower	Between April and August	MRPV / VicRoads	Ongoing monitoring completed as per Section 3.4. No additional loss of individuals has occurred.	
5	SRF 1.5	^	Manage Grazing- Spiny Rice-Flower	Between April and August	MRPV / VicRoads	Fencing repaired (if required)	
5	SRF 1.7	^	Manage Rubbish- Spiny Rice-Flower	Between April and August	MRPV / VicRoads	Rubbish removed	
5	BW 1.4	Y	Ongoing Health Monitoring- Button Wrinklewort	Between October and February	MRPV / VicRoads	Ongoing monitoring completed as per Section 5.4. No additional loss of individuals has occurred.	
5	BW 1.5	Y	Manage Grazing - Button Wrinklewort	Between October and February	MRPV / VicRoads	Fencing repaired (if required)	
5	BW 1.6	Y	Manage Rubbish - Button Wrinklewort	Between October and February	MRPV / VicRoads	Rubbish removed	
5	GSM1.3	Y	Golden Sun Moth Survey	Between October and January	MRPV / VicRoads	Golden Sun Moth population retained	

YEAR <sup>6</sup>	REF NO.	SECTION 2B	MANAGEMENT ACTIONS	TIMING	RESPONSIBLE AGENT	PERFORMANCE INDICATOR	DATE COMPLETED: COPLETION SUPERVISED BY: RELEVANT DOCUMENTATION:
6	SRF 1.4	^	Ongoing Health Monitoring- Spiny Rice-Flower	Between April and August	MRPV / VicRoads	Ongoing monitoring completed as per Section 3.4. No additional loss of individuals has occurred.	
6	SRF 1.5	^	Manage Grazing- Spiny Rice-Flower	Between April and August	MRPV / VicRoads	Fencing repaired (if required)	
6	SRF 1.6	^	Manage Fire Regime- Spiny Rice-Flower	In consultation with CFA	MRPV / VicRoads	Burn to be undertaken in accordance with Roadside Conservation Management Plan: Western Highway, East of Ararat (Hopkins River to the 196.0 km post). (University Ballarat, 2006).	
6	SRF 1.7	^	Manage Rubbish- Spiny Rice-Flower	Between April and August	MRPV / VicRoads	Rubbish removed	
6	BW 1.4	Y	Ongoing Health Monitoring- Button Wrinklewort	Between October and February	MRPV / VicRoads	Ongoing monitoring completed as per Section 5.4. No additional loss of individuals has occurred.	
6	BW 1.5	Y	Manage Grazing - Button Wrinklewort	Between October and February	MRPV / VicRoads	Fencing repaired (if required)	

YEAR <sup>6</sup>	REF NO.	SECTION 2B	MANAGEMENT ACTIONS	TIMING	RESPONSIBLE AGENT	PERFORMANCE INDICATOR	DATE COMPLETED: COPLETION SUPERVISED BY: RELEVANT DOCUMENTATION:
6	BW 1.6	Y	Manage Rubbish - Button Wrinklewort	Between October and February	MRPV / VicRoads	Rubbish removed	
7	SRF 1.4	^	Ongoing Health Monitoring- Spiny Rice- Flower	Between April and August	MRPV / VicRoads	Ongoing monitoring completed as per Section 3.4. No additional loss of individuals has occurred.	
7	SRF 1.5	^	Manage Grazing- Spiny Rice-Flower	Between April and August	MRPV / VicRoads	Fencing repaired (if required)	
7	SRF 1.7	^	Manage Rubbish- Spiny Rice-Flower	Between April and August	MRPV / VicRoads	Rubbish removed	
7	BW 1.4	Y	Ongoing Health Monitoring- Button Wrinklewort	Between October and February	MRPV / VicRoads	Ongoing monitoring completed as per Section 5.4. No additional loss of individuals has occurred.	
7	BW 1.5	Y	Manage Grazing - Button Wrinklewort	Between October and February	MRPV / VicRoads	Fencing repaired (if required)	
7	BW 1.6	Y	Manage Rubbish Health Monitoring- Button Wrinklewort	Between October and February	MRPV / VicRoads	Rubbish removed	

YEAR <sup>6</sup>	REF NO.	SECTION 2B	MANAGEMENT ACTIONS	TIMING	RESPONSIBLE AGENT	PERFORMANCE INDICATOR	DATE COMPLETED: COPLETION SUPERVISED BY: RELEVANT DOCUMENTATION:
8	SRF 1.4	^	Ongoing Health Monitoring- Spiny Rice-Flower	Between April and August	MRPV / VicRoads	Ongoing monitoring completed as per Section 3.4. No additional loss of individuals has occurred.	
8	SRF 1.5	^	Manage Grazing- Spiny Rice-Flower	Between April and August	MRPV / VicRoads	Fencing repaired (if required)	
8	SRF 1.7	^	Manage Rubbish- Spiny Rice-Flower	Between April and August	MRPV / VicRoads	Rubbish removed	
8	BW 1.4	Y	Ongoing Health Monitoring- Button Wrinklewort	Between October and February	MRPV / VicRoads	Ongoing monitoring completed as per Section 5.4. No additional loss of individuals has occurred.	
8	BW 1.5	Y	Manage Grazing - Button Wrinklewort	Between October and February	MRPV / VicRoads	Fencing repaired (if required)	
8	BW 1.6	Y	Manage Rubbish - Button Wrinklewort	Between October and February	MRPV / VicRoads	Rubbish removed	
9	SRF 1.4	^	Ongoing Health Monitoring- Spiny Rice-Flower	Between April and August	MRPV / VicRoads	Ongoing monitoring completed as per Section 3.4. No additional loss of individuals has occurred.	

YEAR <sup>6</sup>	REF NO.	SECTION 2B	MANAGEMENT ACTIONS	TIMING	RESPONSIBLE AGENT	PERFORMANCE INDICATOR	DATE COMPLETED: COPLETION SUPERVISED BY: RELEVANT DOCUMENTATION:
9	SRF 1.5	^	Manage Grazing- Spiny Rice-Flower	Between April and August	MRPV / VicRoads	Fencing repaired (if required)	
9	SRF 1.6	^	Manage Fire Regime- Spiny Rice-Flower	In consultation with CFA	MRPV / VicRoads	Burn to be undertaken in accordance with Roadside Conservation Management Plan: Western Highway, East of Ararat (Hopkins River to the 196.0 km post). (University Ballarat, 2006).	
9	SRF 1.7	^	Manage Rubbish- Spiny Rice-Flower	Between April and August	MRPV / VicRoads	Rubbish removed	
9	BW 1.4	Y	Ongoing Health Monitoring- Button Wrinklewort	Between October and February	MRPV / VicRoads	Ongoing monitoring completed as per Section 5.4. No additional loss of individuals has occurred.	
9	BW 1.5	Y	Manage Grazing - Button Wrinklewort	Between October and February	MRPV / VicRoads	Fencing repaired (if required)	
9	BW 1.6	Y	Manage Rubbish - Button Wrinklewort	Between October and February	MRPV / VicRoads	Rubbish removed	

YEAR <sup>6</sup>	REF NO.	SECTION 2B	MANAGEMENT ACTIONS	TIMING	RESPONSIBLE AGENT	PERFORMANCE INDICATOR	DATE COMPLETED: COPLETION SUPERVISED BY: RELEVANT DOCUMENTATION:
10	SRF 1.4	^	Ongoing Health Monitoring- Spiny Rice-Flower	Between April and August	MRPV / VicRoads	Ongoing monitoring completed as per Section 3.4. No additional loss of individuals has occurred.	
10	SRF 1.5	^	Manage Grazing- Spiny Rice-Flower	Between April and August	MRPV / VicRoads	Fencing repaired (if required)	
10	SRF 1.7	^	Manage Rubbish- Spiny Rice-Flower	Between April and August	MRPV / VicRoads	Rubbish removed	
10	BW 1.4	Y	Ongoing Health Monitoring- Button Wrinklewort	Between October and February	MRPV / VicRoads	Ongoing monitoring completed as per Section 5.4. No additional loss of individuals has occurred.	
10	BW 1.5	Y	Manage Grazing - Button Wrinklewort	Between October and February	MRPV / VicRoads	Fencing repaired (if required)	
10	BW 1.6	Y	Manage Rubbish- Button Wrinklewort	Between October and February	MRPV / VicRoads	Rubbish removed	

^ precautionary measure in the event works extend west of Section 2B

<sup>6</sup>Year 'X' refers to 'X' years from commencement of construction for relevant section

## Appendix E – 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			
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		



# **Appendix F – Greening Australia Implementation of Buangor Golden Sun Moth Reserve Revegetation and Management Plan**



Healthy landscapes where people and nature thrive

**Implementation of Buangor Golden Sun-Moth  
Reserve Revegetation and Management Plan  
Western Highway Duplication Project Stage 2  
Prepared for VicRoads, November 2016**

**Please contact:**

**Jess Gardner**  
Wimmera Ecologist  
Greening Australia

24 Darlot St,  
Horsham VIC 3400  
0437 958 259  
JGardner@greeningaustralia.org.au

[www.greeningaustralia.org.au](http://www.greeningaustralia.org.au)

#### **About Greening Australia**

Greening Australia is a not-for-profit, solution-driven organisation that works in remote, regional and metropolitan communities to protect and restore the unique Australian landscapes.

**Our vision** - Healthy and productive landscapes where people and nature thrive.

**Our mission** - To conserve and restore landscapes at scale through collaborative, science-based and innovative conservation programs.

Greening Australia is committed to environmental and social sustainability and provides opportunities for community, small business and corporate organisations to reduce their carbon footprints and contribute to enhancing their local environment.



## BACKGROUND

Project: Implementation of VicRoads 'Revegetation and Management Plan for Vicroads Golden-Sun Moth Reserve near Buangor, Victoria' as part of Stage 2 of Western Highway Duplication Project

Prepared for: VicRoads

Date: 14<sup>th</sup> November, 2016

Greening Australia has led the development and implementation of grassland re-instatement techniques across Victoria, including a number of projects with VicRoads which have proven highly successful in achieving the outcome of re-establishing and managing complex native grassland systems. These Ecological Vegetation Classes are amongst the most critically endangered of all vegetation communities and support a number of nationally and state listed threatened species including the Golden Sun Moth, *Synemon plana*.

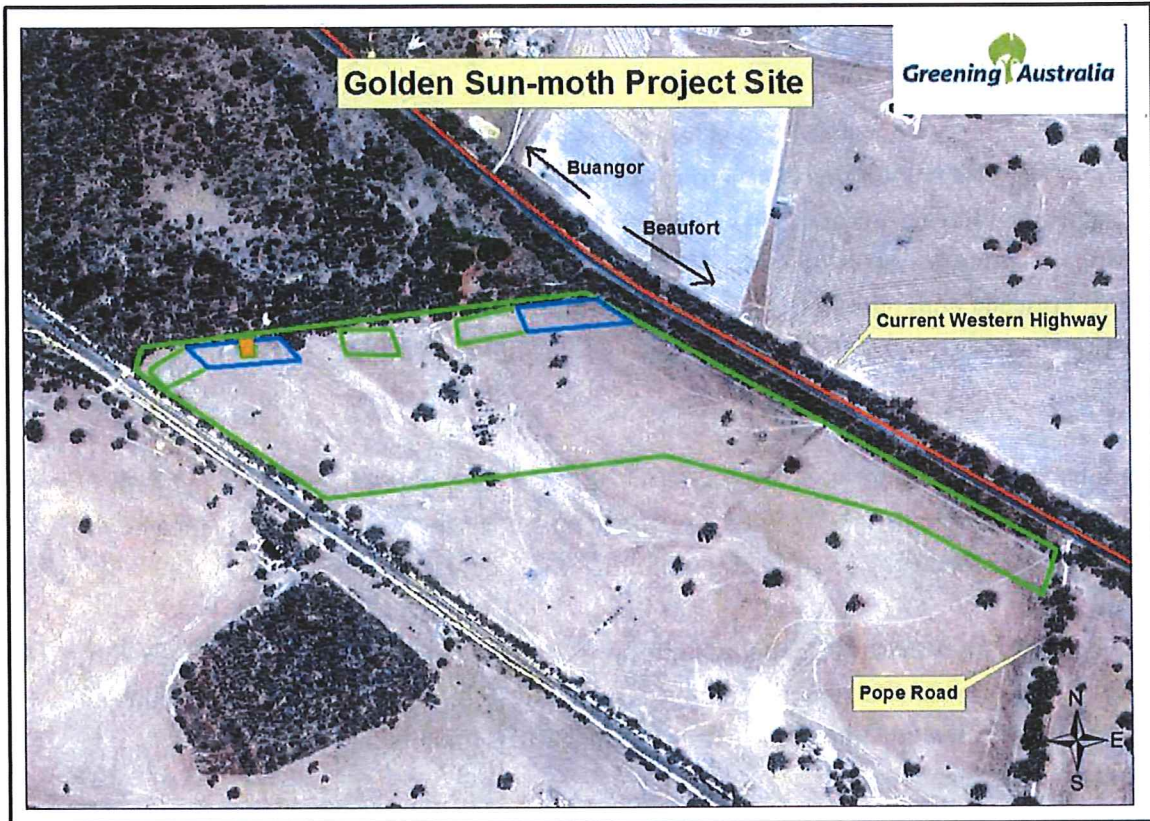
In July, 2016, Greening Australia prepared a 10 year Revegetation and Management Plan for the VicRoads Golden Sun Moth Reserve near Buangor. This document has since been approved by the Department of Environment, Land, Water and Planning.

This document details the scope, assumptions, inclusions and exclusions involved in the implementation of this plan including a costing over the 10 year plan and will act as an agreement between Greening Australia and VicRoads for the duration of its implementation.

**SCOPE OF WORKS**

The project site that the revegetation and management plan refers to is located to the south of the current Western Highway between Buangor and Beaufort, adjacent to Pope Road as shown in Figure 1 below.

GPS reference: 143o7'23.046" East and 37o20'39.926" South



**Figure 1: Golden Sun-moth Project Location**

The total project area is 5.6ha.

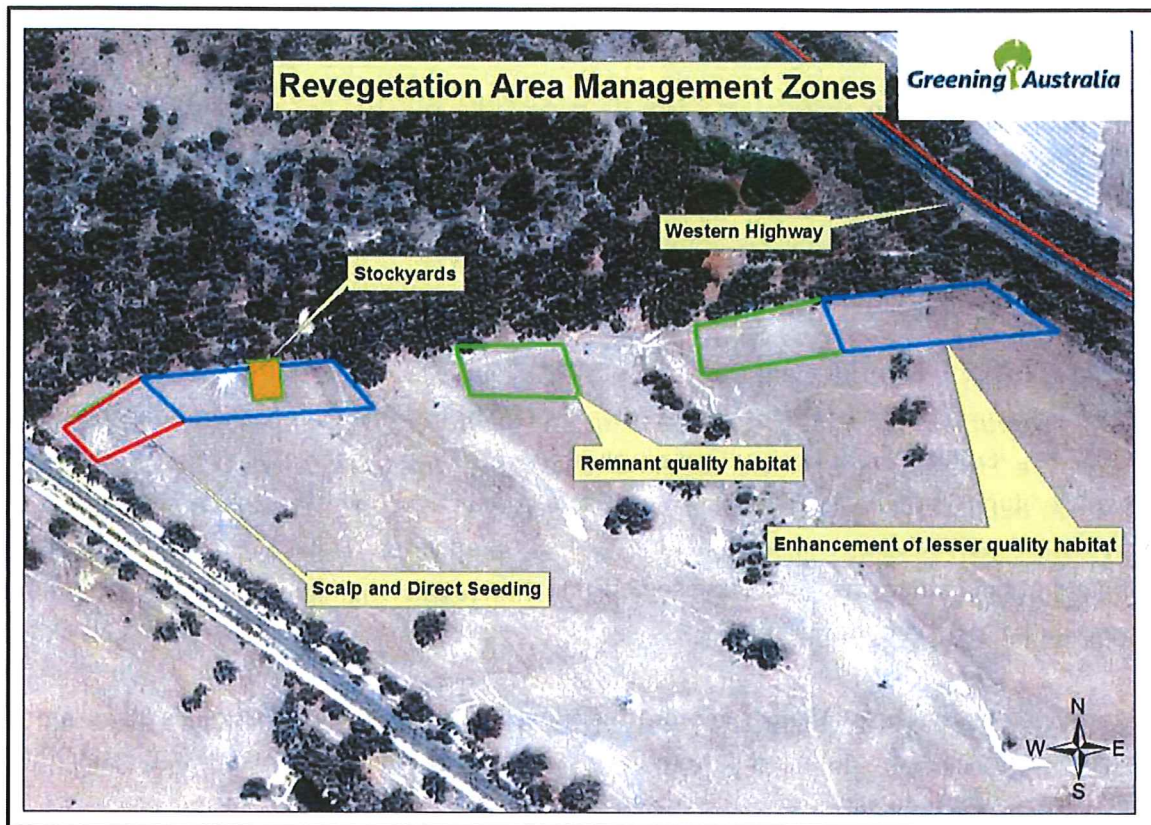


Figure 2: Golden Sun Moth revegetation and management zones

### ASSUMPTIONS FOR VICROADS ACTIONS

The pricing and actions outlined in this document are based on the following assumptions of actions to be completed by VicRoads.

- VicRoads is responsible for the establishment of 'No Go Zones' prior to construction which will exclude any machinery from disturbing areas identified in the plan as habitat for Golden Sun Moth.
- VicRoads will communicate with Greening Australia staff to ensure that they are present to oversee earthworks during construction works relating to the area identified as the scalp and direct seeding zone in Figure 2.
- Topsoil in this area will be scraped by VicRoads to the northern side of the site to a depth of 100mm and to the satisfaction of Greening Australia staff.
- Construction will be completed by June, 2019.
- **No works** will occur on site for the months of **November and December** during the emergence time of the Golden Sun Moth.

### RESOURCES

**Jess Gardner** – Wimmera Ecologist, Victoria

Jess has been involved in technical development and delivery of the Grassy Groundcover Restoration Project since its inception in 2005 and has 10 years in project management and community engagement experience with Greening Australia.

**Rod White** – Greening Australia, Grassland Woodland Restoration Manager, Victoria  
Rod was a key staff member in the development of our showcase 20 HA restored grassland site at Moolapio, Pt. Henry, Geelong. Rod’s passion and professional manner has led to Greening Australia becoming a leading contractor in the offset market across the volcanic plains bioregion.

**David Franklin** – ‘Franklin Plant Native’

David has worked with Greening Australia on Grassland Groundcover Restoration since 2005. The ‘Franklin Plant Native’ nursery at Chatsworth was the location of the Western Highway duplication *Plains Grassland Seed Production Area*. David Franklin is one of Greening Australia’s key collaborators for on the ground works, collecting seed, modifying and maintaining machinery, growing seed production plants, managing seed production areas and direct seeder operations.

**Specialised Grassy Groundcover Restoration equipment** – Greening Australia’s owns and maintains purpose modified equipment developed specifically for grassland seed collection and restoration seed sewing.

## INCLUSIONS

- **Baseline vegetation monitoring** - random quadrat surveys will be used to undertake baseline vegetation surveys across the site and will assess species composition and vegetation structure as is currently supporting the population of Golden Sun Moths at the sight. This information will be used assess the effectiveness of management actions over time.
- **Seed Collection** – Includes field collection, travel, processing of seed and storage during the 2016-17 summer and the 2017-18 summer collection periods.
- **Site preparation** – Includes removal of stockyards, woody weed control and oversight of earthworks to scalp the scalp and direct seeding area
- **Direct Seeding** – includes machinery float and labour for tractor operator and staff member
- **Monitoring/reporting** – includes provision of an annual report, annual vegetation species composition and structure. An entomologist will be engaged in 2019 to undertake a Golden Sun Moth survey and every two years following that. Includes time for preparing media releases and meeting with VicRoads staff twice a year on site.
- **Maintenance** – Includes the cost of herbicides, contractor boom spraying, spot spraying and slashing.

- **Ecological Burns** – Includes preparation of a burn plan to be submitted to the Department of Environment, Land, Water and Planning, site preparation and support staff of 4 people plus vehicles and equipment hire

#### **EXCLUSIONS**

- **Any activities not listed under Inclusions (above)**. For example but not limited to: preparation and attendance at off-site meetings; project presentations; development of Vic Roads information and education material, or other promotional documents. NOTE: Greening Australia would welcome the opportunity to provide such additional services under the arrangements set out in the Project Variation Procedure (below).

#### **PROJECT VARIATION PROCEDURE**

Variation to project deliverables, fees for services and project timeframes will be negotiated in good faith by both parties. Any variation will always be described in writing and approval granted by the original signatories to the agreement, their replacements, or their senior managers. No new works or other project actions will commence before the written variation is signed by both parties.



**Project Price Quote**

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Project: Western Hwy Golden Sun Moth 10 year management plan implementation

Quote No: 0

Client: Vic Roads

Date: 20/09/2016

Financial Year	Breakdown of Works	Works Cost	Total Amount	Total Discounted Amount
2016-17	Baseline vegetation survey	\$3,791		
	Seed collection	\$12,690		
	Site preparation	\$11,793	\$28,274	\$28,274.00
2017-18	Direct Seeding	\$4,100		
	Maintenance	\$11,954		
	Monitoring / Reporting	\$4,966		
	Seed Collection	\$6,882	\$27,902	\$ 27,089.32
2018-19	Direct Seeding	\$5,520		
	Maintenance	\$11,734		
	Ecological Burn	\$9,673		
	Monitoring / Reporting	\$5,590	\$32,517	\$31,255.34
2019-20	Maintenance	\$13,900		
	Monitoring / Reporting	\$9,050	\$22,950	\$21,002.50
2020-21	Maintenance	\$15,615		
	Ecological Burn	\$10,609		

	Monitoring / Reporting	\$6,008	\$32,232	\$28,637.92
2021-22	Maintenance	\$14,172		
	Monitoring / Reporting	\$9,448	\$23,620	\$20,374.63
2022-23	Maintenance	\$16,366		
	Ecological Burn	\$12,883		
	Monitoring / Reporting	\$6,279	\$35,528	\$29,754.14
2023-24	Maintenance	\$16,713		
	Monitoring / Reporting	\$9,672	\$26,385	\$21,453.78
2024-25	Maintenance	\$17,061		
	Ecological Burn	\$11,620		
	Monitoring / Reporting	\$6,517	\$35,198	\$27,785.49
2025-26	Maintenance	\$17,715		
	Monitoring / Reporting	\$13,346	\$31,061	\$23,805.84
	<b>Sub-total:</b>		<b>\$295,667.00</b>	<b>\$258,827.60</b>
	GST @ 10%:			\$25,882.76
	<b>Total Quote (Inc GST):</b>			<b>\$284,710.36</b>

## **PAYMENT TERMS & ACCEPTANCE INSTRUCTION**

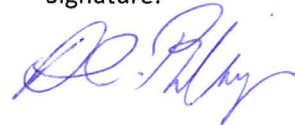
The total quote amount is to be paid in advance of any project actions commencing and as a project fee to be paid in advance has been discounted accordingly over time.

VicRoads accepts the scope, assumptions, expectations, inclusions, exclusions and procedure as outlined in this document. VicRoads also agrees that this proposal will form the contract of engagement and that no works will commence until this contract has been signed and returned to Greening Australia, PO Box 118, La Trobe University, VIC 3083.

### **GREENING AUSTRALIA**

Signed by: **Alistair Phillips**

Signature:



Position: Director of Conservation, Victoria

Date: 09/12/2016

### **VICROADS**

Signed by: **Bart Popielczyk**

Signature:



Position: Acting Delivery Manager, VicRoads Western Highway Project

Date: 09/12/2016

# Appendix G – Dwarf Galaxias Conservation Management Plan

**Conservation Management Plan for the  
Dwarf Galaxias (*Galaxiella pusilla*) –  
Western Highway Project: Section 2  
Beaufort to Ararat, Victoria**



**Dwarf galaxias habitat in Billy Billy Creek at Buangor**

**John McGuckin  
Streamline Research Pty. Ltd.**

***Final Report Version 2***

**October 2014**

## **EXECUTIVE SUMMARY**

Streamline Research was commissioned by VicRoads to prepare a Conservation Management Plan for the dwarf galaxias (*Galaxiella pusilla*). A pre-construction targeted investigation has provided an understanding of the dwarf galaxias distribution between Beaufort and Ararat so that appropriate mitigation measures for the preservation and potential enhancement of habitat for the species can occur with the Western Highway Duplication.

The principal environmental objectives of the Conservation Management Plan is to:

- provide operator awareness of the dwarf galaxias during the works program
- provide, protect and maintain favourable aquatic habitat
- preserve existing flooding characteristics and aquatic passage
- preserve water quality conditions (both for the dwarf galaxias and other native fish species)
- protect and maintain vegetation in and adjacent to aquatic habitat
- monitor the dwarf galaxias population during and after road construction

The Conservation Management Plan is divided into two main sections, Section 1 providing general information on the dwarf galaxias and Section 2 outlining preservation measures that can be used to ensure the construction of the new road is conducted without interference to any dwarf galaxias population or known habitat for the species.

VicRoads approach to environmental management is to avoid potential impacts, and where possible it will minimise potential impacts through appropriate design and construction techniques.

Implementation of the Conservation Management Plan for the dwarf galaxias will also provide protection to other aquatic fauna and flora aquatic values, and is be considered in conjunction with all other environmental requirements for the Western Highway Project: Section 2, Beaufort to Ararat, Victoria.

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## **1.0 INTRODUCTION**

In April 2014, the federal Department of the Environment (DoE) assessed that the proposed works for the Western Highway Project Section 2 – Beaufort to Ararat (EPBC referral 2010/5741) are ‘a controlled action’ under the Commonwealth Environment Protection and Biodiversity Conservation (EPBC) Act, 1999.

Commonwealth approval is subject to a revision of the Threatened Species Management Plan (Ecology and Heritage Partners, 2013) for conservation and enhancement of the spiny rice-flower, button wrinklewort, golden sun moth and dwarf galaxias. A copy of Commonwealth Approval Conditions and the Streamline Research letter addressing issues for the dwarf galaxias (*Galaxiella pusilla*) is included in Appendix 1.

This document provides a Conservation Management Plan (CMP) specific to the dwarf galaxias (*Galaxiella pusilla*) for the construction and operational stages of the upgrade of the Western Highway. It provides appropriate mitigation measures for the preservation of dwarf galaxias populations and habitat.

Section 1 of this report provides general information on the dwarf galaxias. Section 2 outlines appropriate mitigation measures that can be applied to minimise interference to dwarf galaxias populations or known habitat for the species and addresses pre-requisite information requested by DoE.

The principal environmental objectives of this CMP is to:

- provide operator awareness of the dwarf galaxias during the works program
- provide, protect and maintain favourable aquatic habitat
- preserve existing flooding characteristics and aquatic passage
- preserve water quality conditions (both for the dwarf galaxias and other native fish species)
- protect and maintain vegetation in and adjacent to aquatic habitat
- monitor the dwarf galaxias population during and after road construction

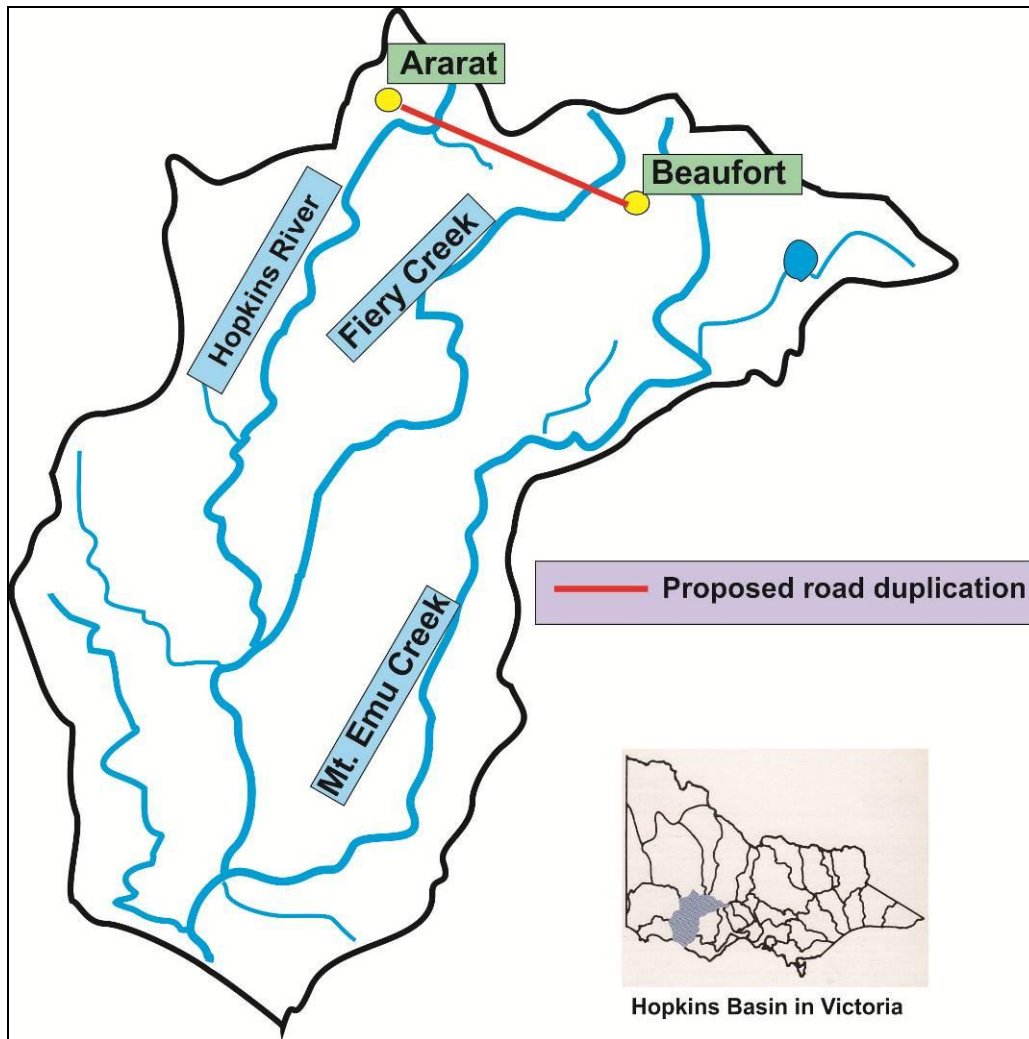
The format and content in this dwarf galaxias CMP is similar to that of the dwarf galaxias CMP for the Princes Highway Duplication Traralgon to Kilmany (EPBC referral 2010/5640) and the South Gippsland Highway Upgrade (EPBC referral 2009/4959).

### **1.1 Watercourses**

The proposed works for the duplication of the Western Highway between Beaufort and Ararat is located near the top of the Hopkins Basin (Figure 1).

The Hopkins Basin is bound by the Great Dividing Range to the north and by the Grampians Ranges to the north-west (Department of Water Resources, 1989). It extends approximately 160 kilometres from its’ northern boundary to the Southern Ocean and is approximately 60

kilometres wide (Department of Water Resources, 1989). The main waterway is the Hopkins River, which has two large tributaries, Fiery and Mt. Emu Creeks.

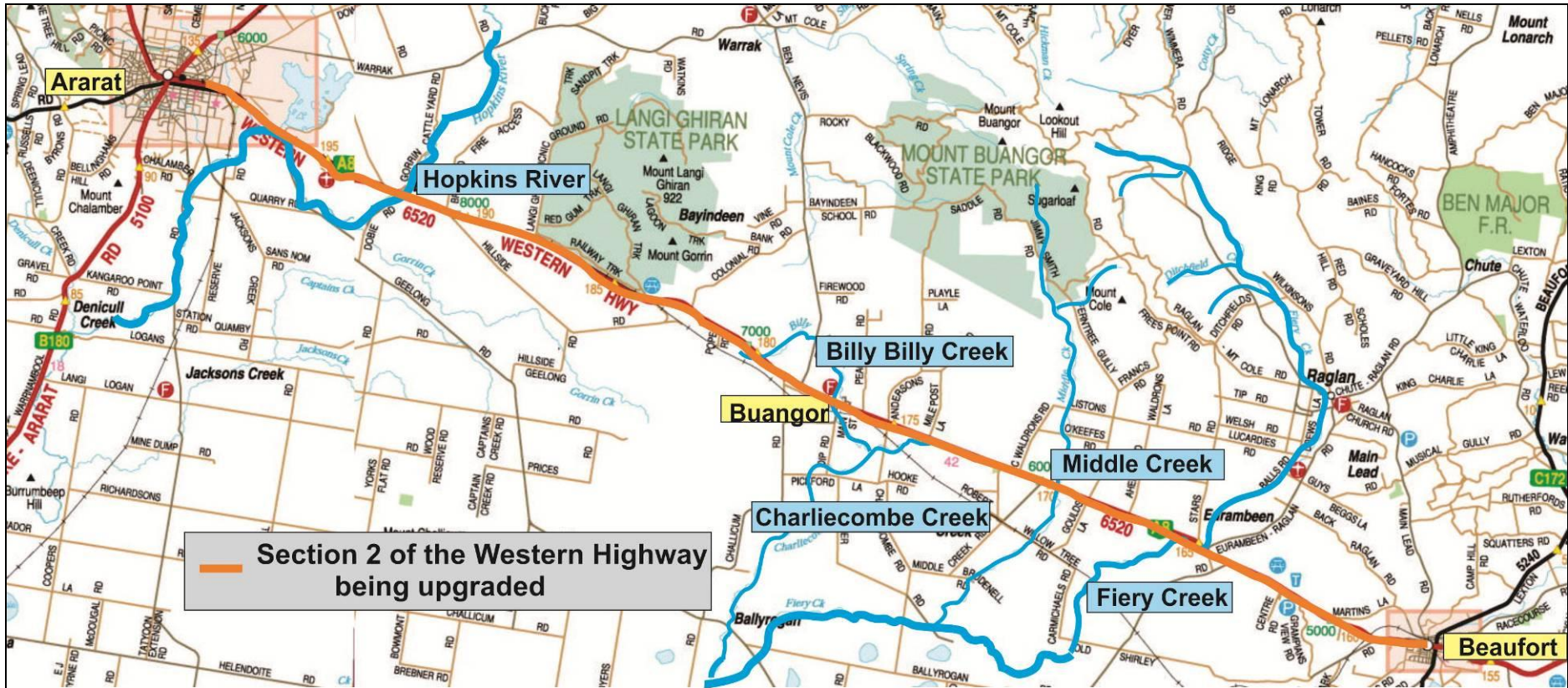


**Figure 1. The location of the Western Highway duplication in the Hopkins River Basin.**

The named waterways crossing the proposed alignment of the upgrade of the Western Highway between Beaufort and Ararat are shown in Figure 2.

Waterways between Beaufort (in the east) and Ararat (in the west) include a number of small unnamed channels, as well as some named watercourses. A headwater stream of Trawalla Creek (a tributary of Mt. Emu Creek), is crossed at several locations near Beaufort. Fiery Creek and a number of tributaries; Middle, Charliecombe and Billy Billy Creeks are then crossed before reaching the township of Buangor. The Hopkins River plus the tributaries of Gorrin, Greenhills and Cemetery Creeks are crossed between Buangor and Ararat.

All of the waterways that cross the Western Highway between Beaufort and Ararat have either intermittent or ephemeral streamflow. Fiery, Middle, Charliecombe and Billy Billy Creeks and the Hopkins River are all expected to have intermittent streamflow due to their proximity to the top of the Hopkins Basin. The headwater creeks of Trawalla Creek, plus the tributaries of Fiery, Middle, Charliecombe and Billy Billy Creeks are all ephemeral streams.



(base map - reproduction from VicRoads Country Street Directory)

Figure 2. Waterways to be crossed between Beaufort and Ararat.

## **1.2 Priority waters**

Targeted surveys for the dwarf galaxias were conducted in May 2014 as part of the federal government request for providing supporting evidence on the baseline condition of dwarf galaxias populations and habitat within the project area (DoE, 2014). Survey points are shown on maps in Appendix 2. Pictures of each site are shown in Appendix 3 and Appendix 4 lists the name of the waterway, and provides a topographical grid reference.

Priority waters for the preservation of dwarf galaxias populations and habitat for the Western Highway Project Section 2 – Beaufort to Ararat can be divided into two types of waters:

1. Waters which currently support dwarf galaxias populations
2. Waters which have habitat which could potentially support dwarf galaxias (but there is no known record of a population)

### *Waters which currently support the dwarf galaxias*

For the dwarf galaxias, Fiery Creek and Billy Billy Creek are the most important waterways in the Western Highway study area between Beaufort to Ararat. Populations of dwarf galaxias were recorded in both creeks in the targeted investigation in May 2014. Habitat in both creeks is considered of high conservation value.

Extremely dry conditions in recent years has limited the habitat occupied by dwarf galaxias. The only pool found to support dwarf galaxias in Fiery Creek was approximately two by three metres and approximately one metre in depth (Photograph 1). In Billy Billy Creek, only one remnant pool (at the existing highway) was found to support dwarf galaxias. The pool was approximately 50 metres in length, 10 metres wide and several metres in depth (Photograph 2).

### *Water which may have habitat which could potentially support dwarf galaxias*

The majority of waters between Beaufort and Ararat are not capable of providing habitat for the long term support of dwarf galaxias populations. All are intermittent or ephemeral, and most regularly dry out.

During extremely wet periods it is possible for dwarf galaxias from permanent populations (Fiery Creek and Billy Billy Creek) to have connectivity to waters like Middle and Charliecombe Creeks. If fish do happen to venture into these waters, establishment is expected to be short lived, as both Middle and Charliecombe Creeks can dry out.

Under extremely wet condition it is possible that the population of dwarf galaxias known to exist in Mt. Emu Creek (near the township of Trawalla, 10 kilometres east of Beaufort) could move into Trawalla Creek, and from there into the headwater tributaries near Beaufort. If dwarf galaxias were to find passage into the Trawalla Creek tributaries near Beaufort, they would die when the streams dry out.



**Photograph 1. The one pool of Fiery Creek where dwarf galaxias were present in May 2014.**



**Photograph 2. Billy Billy Creek at the existing Western Highway bridge, dwarf galaxias were present here in May 2014.**

The effect of drying and poor connectivity on dwarf galaxias populations is evident in Billy Billy Creek. Dwarf galaxias were recorded in the crossing of the creek to the west of Buangor, at the Western Highway at Buangor and 100 metres south at the railway in 2012 (Ecology and Heritage Partners, 2012). In May 2014, Billy Billy Creek was dry to the west of Buangor. No dwarf galaxias were found in the pools to the north of Buangor or in pools near the rail line. It is expected that the pools have been dry until recently, and that populations of dwarf galaxias formerly found in these habitats have been lost during dry conditions. Despite recent rains providing surface water, there has not been connectivity to allow movement of dwarf galaxias from the one permanent water habitat in Billy Billy Creek at the Western Highway at Buangor.

### **1.3 Waterway crossings and potential impacts on dwarf galaxias**

The proposed works for waterway crossings for the duplication of the Western Highway Section 2 includes the construction of bridges for waterways with large streamflow and the use of culverts for watercourses that have lower streamflows.

Bridge crossings are planned for Fiery, Middle and Charliecombe Creeks and the Hopkins River, as has previously existed at these locations. Culverts are planned for all smaller tributaries.

A new bridge crossing is planned for Fiery Creek (see Appendix 4). It will be located immediately to the south of the existing bridge. The existing bridge is to be demolished.

A bridge crossing of Billy Billy Creek has been designed (see Appendix 4) for the new crossing of Billy Billy Creek (Figures 3 and 4), approximately 600 metres north of the existing Western Highway bridge over Billy Billy Creek at Buangor. The existing bridge location is the critical habitat which was found to support the dwarf galaxias population (no works are proposed at this location).

The realignment of Billy Billy Creek at the new bridge crossing location will result in the removal and modification of a small section of habitat (approximately 60-80 m in length) which can occasionally be used by dwarf galaxias. Adjacent creek habitat will be protected by 'No Go Zones' during the works. Loss of existing instream and riparian habitat is expected to result in the short term decline of water quality due to increased sediment loading, accelerating existing erosion issues and modification to the hydrological regime. An appropriate planning regime will be developed in accordance with the Glenelg Hopkins Catchment Management Authority (GHCMA) which includes the following:

- Pre-construction approval by GHCMA of bridge crossing design drawings and construction details demonstrating how impacts on waterway health will be minimised.
- GHCMA Works on Waterways Licence application and compliance with licence conditions for the construction of the waterway crossing over Billy Billy Creek.

Culverts are planned for the Billy Billy crossing of the Western Highway to the west of Buangor, approximately two kilometres further upstream (see Appendix 4). The new culverts will be located adjacent to existing culverts at this location.

For dwarf galaxias it is not a matter of whether a bridge or culvert is used to cross a waterway, but whether dispersal of dwarf galaxias can occur during flood periods. Fish passage is, therefore, the main priority at road crossings. If streamflow remains unimpeded by road structures dwarf galaxias movement will not be restricted and opportunity for establishment in new habitat will be possible in floods.

If appropriate mitigation measures are developed and implemented, waterway crossings will have no impacts on dwarf galaxias populations or habitat between Beaufort and Ararat.



**Photograph 3. Billy Billy Creek on new alignment to the north of Buangor, view north.**



**Photograph 4. Billy Billy Creek on new alignment to the north of Buangor, view south.**



#### 1.4 Assessment of impact under Significant Impact Criteria Guidelines

The following discussion assesses the impact of the Western Highway Duplication between Beaufort and Ararat on the dwarf galaxias based on the Commonwealth's Significant Impact Criteria Guidelines (Department of the Environment, Water, Heritage and the Arts, 2009).

- a. *lead to a long term decrease in the size of an important population.*

**Unlikely** – the existing dwarf galaxias population in the Hopkins River Basin is extensively fragmented. The small populations that are known to occur in Fiery Creek and Billy Billy Creek will not be adversely affected by duplication of the Western Highway construction work. 'No Go Zones' will effectively exclude workers and machinery from interfering with dwarf galaxias habitat.

- b. *reduce the area of occupancy of an important species.*

**Unlikely** – minimal or no disturbance will occur to known habitat for the dwarf galaxias with appropriate 'No Go Zones' and protective fencing to protect against erosion and riparian vegetation damage.

- c. *fragment an important population into two or more populations.*

**Unlikely** – fragmentation is not likely to occur to either the Fiery Creek or Billy Billy Creek dwarf galaxias populations. For Fiery Creek, bridge construction is to occur to the north of the known habitat. In Billy Billy Creek works are planned for a dry streambed, isolated from a downstream dwarf galaxias population. Connectivity in both Fiery and Billy Billy Creeks will not be compromised during road construction.

- d. *adversely affect habitat critical to the survival of the species.*

**Unlikely** - For Fiery Creek, bridge construction is to occur to the north of known habitat, in an area that is currently restricted to small saline pools that do not support the dwarf galaxias. In Billy Billy Creek works are planned for a dry reach of the creek. In both instances, the reaches are not critical habitat.

- e. *disrupt breeding cycle of an important population.*

**Unlikely** – the works are to take place in areas which currently do not support dwarf galaxias populations. Even if wet conditions allowed for movement of dwarf galaxias from known populations into these areas, 'No Go Zones' and protective fencing will protect stream habitat.

- f. *modify, destroy, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.*

**Unlikely** – no loss of habitat will occur during the construction period. ‘No Go Zones’ will protect habitat that could potentially be used by dwarf galaxias. No existing habitat is likely to be lost that would result in the decline of the species.

- g. *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat.*

**Unlikely** – the most problematic species, the eastern gambusia (*Gambusia holbrooki*) is already present in the waters occupied by dwarf galaxias. The interaction between the two species will not be changed by Western Highway Duplication construction work.

- h. *introduce disease that may cause the species to decline.*

**Unlikely** – no unforeseen diseases are likely to be accidentally introduced.

- i. *interfere substantially with the recovery of the species.*

**Unlikely** – no unforeseen circumstances are expected to interfere with any potential re-establishment of dwarf galaxias into habitat formerly occupied by the species.

Overall, the Western Highway Duplication between Beaufort and Ararat is unlikely to result in a significant impact on the dwarf galaxias caused by:

- A long term decrease in the size of an important population or significant reduction in the overall known habitat of an important population,
- Isolation or fragmentation of an important population or critical habitat; or
- The introduction of predatory or invasive fish (they are already present within the construction area).

Implementation of appropriate mitigation measures (Section 2 of this report) will minimise any impact on dwarf galaxias populations and habitat.

## **1.5 Consultation**

This dwarf galaxias CMP has been developed with input from a variety of stakeholders. Organisations include those involved with decisions on the most suitable alignment for the Western Highway Duplication between Beaufort and Ararat.

Stakeholders consulted include:

- Department of Environment and Primary Industries (DEPI)
- Glenelg Hopkins Catchment Management Authority (GHCMA)
- Southern Rural Water
- Ararat Rural City Council
- Pyrenees Shire
- Department of the Environment (DoE)

## **SECTION 1**

### **2.0 DWARF GALAXIAS GENERAL INFORMATION**

#### **2.1 Status**

The dwarf galaxias is considered of national significance and is listed as vulnerable under the EPBC Act, 1999. In Victoria, the dwarf galaxias is considered an endangered threatened species (Department of Sustainability and Environment (DSE), 2013) and is listed for protection under the Flora and Fauna Guarantee (FFG) Act, 1988.

#### **2.2 Description**

The dwarf galaxias is a small native fish species (maximum size of 50 mm) which has an exclusive freshwater lifecycle. The species is sexually dimorphic, the males are smaller and more slender than the females, having three longitudinal black stripes along each side of the trunk, and a distinct red strip between the mid and lower black strip. The black stripes are less distinct or absent in females (Cadwallader and Backhouse, 1983). Figure 3 shows an example of both a male and female dwarf galaxias.

The dwarf galaxias is a short lived species, with only a few individuals surviving through to a second year. The spawning period is mainly between winter and spring, but can extend throughout summer when conditions are favourable. Spawning adults are typically over 25 mm in size. Recently hatched young are about 10 mm in size.



**Figure 3. Dwarf galaxias.**

### **2.3 Past Known Distribution**

There is only a few records of dwarf galaxias known for waterways that cross the Western Highway.

One historical record is known for the Hopkins River in 1904 (in Ecology and Heritage Partners, 2012).

The dwarf galaxias has been captured in Mt. Emu Creek near the Trawalla township in 2011, but has not been recorded in past few years when the water has been surveyed (Rhys Coleman pers. comm. 2014).

In Fiery Creek dwarf galaxias have been recorded immediately downstream of the Western Highway as recently as three years ago (Chris Bloink, pers. comm. 2014) and also further south near Skipton over the past decade (Department of Sustainability and Environment, 2010\*, Rhys Coleman pers. comm. 2014).

For Billy Billy Creek dwarf galaxias were recorded at three sites in and around Buangor in surveys conducted in June 2011 and January 2012 as part of the ecological assessment for the Western Highway Project (Ecology and Heritage Partners, 2012).

With potential for drought conditions to have dried waters since the 2011 and 2012 surveys (Ecology and Heritage Partners, 2012), Streamline Research provided an up-to-date survey in Map 2014; a survey that specifically targeted waterways for the presence/absence of dwarf galaxias.

### **2.4 Targeted survey**

Streamline Research undertook the targeted dwarf galaxias investigation for all waterways that cross the proposed route of the duplication of the Western Highway between Beaufort to Ararat on 22-23 May, 2014.

A total of 41 watercourses were examined. Appendix 2 shows aerial maps between Beaufort and Ararat marking the survey points. Appendix 3 shows photographs of each of the watercourses and Appendix 3 shows the topographical map reference of each location. Nine locations had surface water, which could be sampled for dwarf galaxias.

The fish survey technique used was dip netting, as the technique can be very effective for the capture of dwarf galaxias and a large number of locations can be surveyed in a day. The study was conducted under permit and licence approval from the Department of Environment and Primary Industries.

\* *database has not been updated since 2010*

Table 1 lists the fish species present at surveyed locations. In total four fish species were recorded, three native species and one introduced species. The native species recorded included the dwarf galaxias, the southern pygmy perch (*Nannoperca australis*) and the mountain galaxias (*Galaxias olirus*). The one exotic fish species recorded was the eastern gambusia.

Dwarf galaxias were only recorded at two locations; Fiery Creek (site 10) and Billy Billy Creek (site 26). Southern pygmy perch and mountain galaxias were present in both Fiery Creek (site 10) and Middle Creek (site 13).

No fish were recorded at six of the survey locations (sites 3, 6, 8, 18, 25 and 27), presumably because these locations had, until recently been dry. Recent rain has provided surface water but has not been connected to remnant pools that have supported fish populations.

**Table 1. Fish species captured at each survey site.**

SITE No.	LOCATION	WATERWAY	NO FISH PRESENT	NATIVE FISH SPECIES			EXOTIC FISH SPECIES
				dwarf galaxias	southern pygmy perch	mountain galaxias	eastern gambusia
3	Trawalla Creek tributary	pools	X				
6	Fiery Creek tributary	2 farm dams	X				
8	Fiery Creek tributary	farm dam	X				
10	Fiery Creek	pools		X	X	X	X
13	Middle Creek	pools			X	X	
18	Charliecombe Creek	one pool	X				
25	Billy Billy Creek	pools	X				
26	Billy Billy Creek	pools		X			X
27	Billy Billy Creek	pools	X				

The majority of the waters on the proposed alignment for the Western Highway were found to be ephemeral or intermittent and as such can only be used temporarily, if at all, by dwarf galaxias.

With appropriate mitigation measures road works can be conducted without adversely affecting dwarf galaxias populations or their habitat.

## 2.5 Habitat requirements

The dwarf galaxias occurs in waters which have an array of native aquatic vegetation, typically preferring swampy floodplain environments, but can also be found in creeks and rivers. The natural degree of wetland connectivity to a more permanent waterbody (such as a river or creek) may be vital to their long term survival (particularly during extended dry conditions) and must be considered as part of the habitat requirement critical to survival (Saddler *et al.*, 2008).

Dwarf galaxias can be found in two types of habitats, primary habitats which have permanent water, and secondary habitats which have intermittent or ephemeral water regimes. Primary habitats (permanent water sites) are responsible for the long term survival of the species (McGuckin, 2001).

Dwarf galaxias can establish self sustaining populations in secondary habitats, but these populations can be lost when the habitat dries out. Recolonisation of dwarf galaxias into these habitats is reliant on the movement of fish from primary habitat.

The species is opportunistic, using floodplains for the movement of fish from primary habitat into new habitats (secondary habitat) for range extensions during flood events. New environments are advantageous as they can provide food for the growth of young and often, have an absence of predators. Spawning has been noted in seemingly unsustainable habitats like puddles created by vehicle wheel marks, pools in low lying grassed paddocks, sand pits and farm dams. Long term persistence in these environments is largely dependent on permanent water remaining at the location.

Although dwarf galaxias were recorded at three locations in Billy Billy Creek in 2011 and 2012 (Ecology and Heritage Partners, 2012), the absence of the species from pools north of Buangor and south at the rail line in the May 2014 survey, suggests that neither of these areas are primary habitat for the dwarf galaxias.

Critical habitat for the dwarf galaxias in Billy Billy Creek is the pool beneath the existing Western Highway at Buangor. The dwarf galaxias population in this pool is most likely responsible for the long term persistence of the species in Billy Billy Creek.

The presence of only a small number of dwarf galaxias in Fiery Creek (approximately 20), tends to indicate that the pool habitat is not critical to the species. It is suspected that the area is only secondary habitat for the dwarf galaxias and primary habitat (which is yet to be found) is likely to be the source of fish found in the pool near the Western Highway.

## **2.6 Populations under threat**

With the exception of secure populations in places like Discovery Bay National Park and the Grampians National Park, most populations of dwarf galaxias in Victoria are under threat. Many wetland habitats throughout the range of the species have been destroyed or modified as part of agriculture or residential development.

The type of threats applying to particular populations depend largely on land tenure and management (Saddler *et al.*, 2008). Unfortunately, the majority of populations occur at sites that have little or no formal protection.

The dwarf galaxias population in Fiery and Billy Billy Creeks is currently given no formal protection. With the discovery of the population, both the Department of Environment and Primary Industries and the Glenelg Hopkins Catchment Management Authority have been notified. It is now the responsibility of the Department of Environment and Primary Industries to oversee protection of dwarf galaxias habitat for the long term survival of the species.

## **2.7 Threatening processes**

There is a number of threatening processes applicable to the dwarf galaxias which are identified in the Victorian FFG Act 1988 (Victorian Government, 1988). The Victoria's Biodiversity Strategy (Department of Natural Resources and Environment, 1997) outlines key environmental considerations necessary for the preservation of the species.

### Victorian FFG Act 1988

Potentially threatening processes listed under Schedule 3 of the FFG Act, 1988 applicable to the dwarf galaxias are:

- Alteration to the natural flow regimes of rivers and streams
- Alteration to the natural temperature regimes of rivers and streams
- Degradation of native riparian vegetation along Victorian rivers and streams
- Increase in sediment input into Victorian rivers and streams due to human activities
- Habitat fragmentation as a threatening process for fauna in Victoria
- Input of toxic substances into Victorian rivers and streams
- Prevention of passage of aquatic biota as a result of the presence of instream structures

### Victorian Biodiversity Strategy

Under the Victorian Biodiversity Strategy the conservation and maintenance of dwarf galaxias populations and habitat can be achieved by:

- Maintaining and where necessary restoring ecological processes and biodiversity dependent upon freshwater environments
- Preventing further preventable decline in the viability of any rare species or of any rare ecological community
- Increasing the viability of threatened species and the extent and quality of threatened ecological communities



## **2.8 Management strategies**

The National Recovery Plan for the dwarf galaxias (Saddler *et al.*, 2008) summarises appropriate management strategies to avoid threatening processes. These include:

- No direct loss of habitat through wetland drainage on either public or private land
- No physical alteration to dwarf galaxias habitat as a consequence of land adjoining dwarf galaxias habitat
- No further damage to riparian vegetation
- Damaged or depleted riparian vegetation is protected and (if necessary) supplemented by active revegetation works
- Plans to clear vegetation lying adjacent to dwarf galaxias habitat will not impact upon water quality (no increase in sedimentation/nutrient levels/pesticides/herbicides etc.)
- Proposals to translocate aquatic species into dwarf galaxias habitat are subject to relevant risk management processes according to relevant national and State guidelines

All of the strategies from the National Recovery Plan (listed above) are considered relevant to the Western Highway Duplication between Beaufort and Ararat and have been adopted in the dwarf galaxias CMP.

## **SECTION 2**

### **3.0 PRESERVATION MEASURES**

#### **3.1 Environmental controls to protect aquatic habitat**

All waterways are to be protected from potential instream degradation due to road works.

A number of environmental controls used by VicRoads to protect aquatic conditions are important to the protection of dwarf galaxias populations and habitat. 'No Go Zones' will exclude works from occurring in Fiery and Billy Billy Creeks; in locations where dwarf galaxias have been recorded in May 2014 and waterways intersecting the Western Highway Duplication which currently support the dwarf galaxias. The 'No Go Zones' will effectively exclude workers and machinery from interfering with dwarf galaxias habitat. They also provide an effective method of avoiding impact on the breeding and dispersal of dwarf galaxias.

Documentation with respect to the finding of dwarf galaxias in Fiery Creek and appropriate mitigation measures for bridge construction are discussed in Appendix 5. Attachments includes detailed design, 'No Go Zones' and erosion and sediment controls that have been approved by the federal Department of the Environment, and as such, are not requirement for further discussion in this document.

The design drawing and 'No Go Zones' for the Billy Billy Creek bridge crossings to the north of Buangor are shown in Appendix 6. The design drawing of the culvert crossing on the Western Highway to the west of Buangor is also shown in Appendix 6.

For Billy Billy Creek permanent 'No Go Zones' will be fenced off once the bridge abutments have been constructed. Summer period works would include erection of 'No Go' fencing, creek realignment and bridge abutment construction. Once bridge abutment completion 'No Go Zones' extended to 1.5 metres of abutment wall. A temporary culvert crossing will be constructed according to GHCMA permit requirements.

'No Go Zones' are to be clearly demarcated with high visibility (ie. par webbing or flags) and appropriate signage (ie. Protected Area – No Unauthorised Access). The fencing is to remain in place and be checked weekly or after any rain event for the duration of the construction period. Damaged fencing must be repaired/replaced immediately or as soon as practicable.

The realignment of Billy Billy Creek will result in the removal and modification of a small section of creek immediately to the north of survey point 24, which is known to be habitat for dwarf galaxias. Specific mitigation measures can only be developed for the dwarf galaxias when functional design has been completed. The design concept for the realignment of the creek will form part of a Works on Waterway application to the GHCMA. The Environmental Management Plan (EMP) is to be developed by the contractor/s in consultation with the Department of Environment and Primary Industries (DEPI), the Ararat Rural City Council, and then submitted to, and endorsed by the Secretary of the Department of Transport, Planning and Local Infrastructure (DTPLI) or delegate.

The EMP for Billy Billy Creek will be prepared for construction activities to protect aquatic attributes in accordance with any necessary permits, the State Environment Protection Policy (Waters of Victoria) and EPA best practice guidelines. It will address:

- The establishment of a 'No Go Zone' of Billy Billy Creek while the diversion is being constructed;
- The construction and stabilisation of the realigned creek prior to allowing flows to pass through the creek; and
- The establishment of mitigation measures as identified in Section 3.2 prior to the commencement of bridge construction.

### **3.2 Mitigation measures for Billy Billy Creeks**

Key considerations of environmental mitigation measures specific to dwarf galaxias are:

- Installation and maintenance of erosion and sedimentation controls are to be in accordance with the Victorian Environment Protection Authority (EPA) best practice guidelines including Environmental Guidelines for Major Construction Sites (1996) and Construction Techniques for Sediment Pollution Control (1991) and Doing it Right on Subdivisions (2004).
- Erosion and sediment controls need to be adaptive and may change as works progress. Implementation will be conducted in accordance with the Principals of Best Practice of the EPA guidelines. Controls need to be monitored at intervals of at least once weekly, during and after rain events. Any defects or deficiencies in control measures identified by monitoring shall be rectified immediately. Control measures shall be cleaned, repaired and augmented as required to ensure effective control thereafter.
- Refilling of vehicles and machinery shall be made in a designated area no closer than 100 metres from any drainage point or waterway.
- Fuel and chemicals are to be banded to EPA guidelines and stored outside of flood zones at a minimum of 100 m from waterways. Storage and handling of fuels and chemicals is to be in accordance with Material Safety Procedures. Monitoring for compliance must be made at intervals of at least once weekly and after rain events. A contingency plan shall address containment, treatment and disposal of any spill.
- Construction personnel must undertake an induction to understand the importance of 'No Go Zones' for the protection of high priority dwarf galaxias waters.

- Water quality shall be monitored upstream and downstream of the construction site in Billy Billy Creeks at least once weekly, during and after rain events. The monitoring program is to start at the commencement of construction and continue until construction activities are completed. *In situ* measurements of temperature pH, dissolved oxygen, electrical conductivity and turbidity are to be made.
  - Methodology to be adopted shall be in accordance with EPA Publication 441 – A Guide to the Sampling and Analysis of Waters, Wasterwaters, Soils and Wastes. The contractor/s EMP shall include methodology detail for water quality monitoring as outlined in Appendix 7.

### **3.3 Fiery Creek bridge removal**

After completion of the new Western Highway bridge at Fiery Creek the existing bridge is to be removed. Demolition will be carried out from top down. Barriers and railing will be first removed, followed by deck beams, crossheads and finally the piers. It is likely that the piers will be cut off or broken down to just above ground/water level to avoid disturbing the sediments. The contractor is expected to provide containment structures to prevent any debris from entering the Fiery Creek channel and to avoid/minimise disturbance of the banks.

### **3.4 Corrective actions and contingency measures**

During works, a clear indication needs to be made to construction personnel of expected mitigation measures and importance to maintaining ecological values. Direct disturbance like unplanned movement of construction equipment or indirect disturbances like spills from machinery could have a detrimental effect on habitat that can be used by the dwarf galaxias. Compliance of mitigation practices during the construction period will be checked by VicRoads. Non compliance issues need to be addressed.

Contractors need to have contingency for reporting accidents (disturbance to aquatic habitat) that may impact on waterways. A chain of command between construction personnel, VicRoads and a qualified biologist is needed to report problems and to provide appropriate on-ground responses.

Monitoring following an incident will comprise a survey and appropriate sampling to confirm the extent of the disturbance to aquatic habitat. For spillages, post incident monitoring will be repeated at weekly intervals until the contaminant is no longer considered to be a threat.

Monitoring will be performed by a suitably qualified aquatic biologist. An interpretative report will be prepared for each monitoring exercise and distributed to the Department of Environment and Primary Industries and other interested parties.

### **3.5 Post construction monitoring**

A post construction survey for dwarf galaxias is to be made 12 months after completion of the road works. It will be inclusive of all known habitats in Fiery and Billy Billy Creeks in which dwarf galaxias have been identified in the recent targeted investigation and in the surveys conducted in June 2011 and January 2012 (Ecology and Heritage Partners, 2012).

Five locations, four of which dwarf galaxias have previously been recorded, will be resurveyed as part of post construction monitoring. One location will be on Fiery Creek and the remaining four on Billy Billy Creek.

#### Fiery Creek

- immediately to the south of the Western Highway

#### Billy Billy Creek

- At the Western Highway
- At the rail bridge, Buangor
- Approximately 600 metres north of Buangor, on the new alignment of the Western Highway
- the road crossing several kilometres to the west of Buangor township

The primary purpose of the monitoring is to determine that there has been no change to dwarf galaxias populations or habitat as a direct result of the Western Highway Duplication between Beaufort and Ararat. The monitoring will provide an assessment of the impacts, if any, of the works.

Should any new dwarf galaxias habitat be found, details of the location shall be reported to DEPI and DoE and 'No Go Zones' established immediately to protect against any habitat disturbance. A qualified aquatic biologist/zoologist shall be engaged to investigate the findings and prepare a report outlining management actions required.

When road duplication is to be undertaken in the vicinity of the Hopkins River another targeted dwarf galaxias survey is to be made to ascertain the presence/absence of the species in the river near the Western Highway (the area is currently dry). If dwarf galaxias are not found in the area, no action will be necessary. If dwarf galaxias are found, management actions similar to those to be used at Billy Billy Creek will also be used for the Hopkins River bridge crossing.

### 3.6 Additional conditions in relation to approval

As discussed in the Introduction (page 1), this report provides information to address Approval Conditions associated with EPBC Referral 2010/5741 relating to action necessary for minimising impact to dwarf galaxias populations and habitat.

Table 2 summarises additional considerations in relation to management actions specified in the Approvals Notice which are considered to be unwarranted or unnecessary (as detailed in the Streamline Research P/L letter in Appendix 1).

Item No.	DoE Approval condition	Recommendation and comment
4 (b) iv.	<p><i>-a commitment to avoid construction activities within Hopkins River or Billy Billy Creek crossings during the dwarf galaxias breeding period (from 1 April to 30 November in any year)</i></p>	<p><i>Not recommended</i></p> <p>-‘No Go Zones’ will ensure that no actions taken for road construction are expected to prevent or restrict dwarf galaxias breeding.</p> <p>-The Hopkins River has not had a known population of the dwarf galaxias in the past century and recent investigation found no water in the main channel within 5 km of the proposed bridge crossing.</p>
4 (b) v.	<p><i>-a procedure for isolating Dwarf Galaxias habitat, and procedure for salvage and relocating dwarf galaxias, in the event that construction activities occur within dwarf galaxias habitat</i></p>	<p><i>Not recommended</i></p> <p>-‘No Go Zones’ will be sufficient to protect dwarf galaxias populations and habitats.</p> <p>-Salvaging considered inappropriate for this project as impact to <i>dwarf galaxias</i> habitat is expected to be minimal.</p>
4 (b) vii.	<p><i>-a plan and schedule for revegetation, rehabilitation and weed removal works within dwarf galaxias habitat, including establishment of in-stream habitat with suitable features such as woody debris and native riparian and aquatic species impacted by the proposed action</i></p>	<p><i>Not recommended</i></p> <p>-Given that dwarf galaxias habitat will not be compromised by the proposed works, revegetation and rehabilitation should not be required.</p> <p>-Instream conditions will remain unchanged by bridgeworks.</p>

#### **4.0 ACKNOWLEDGEMENTS**

I would like to thank Harry Ostapiw from VicRoads for giving Streamline Research the opportunity to conduct a dwarf galaxias investigation between Beaufort and Ararat. Harry assisted with the provision of the base maps which have been used in this report. Michael Wickerson, Harry Ostapiw and Frank Kauhausen made valuable comments on earlier drafts of this report.

Rhys Coleman from Melbourne Water is also thanked for sharing findings from his dwarf galaxias surveys in Western Victoria. Chris Bloink from Ecology Australia is thanked for sharing information on locations where he has captured dwarf galaxias in and near the study area. Finally Dave Lucas is thanked for his field assistance.

## **5.0 BIBLIOGRAPHY**

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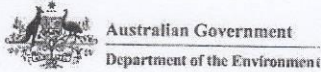
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## Appendix 1. Commonwealth Decision and Action Taken



EPBC Ref: 2010/5741

Mr Michael McCarthy  
Project Director - Western Highway Project  
VicRoads  
PO Box 148  
WENDOUREE VIC 3355

Dear Mr McCarthy

**Decision on approval**  
**Western Highway Project Section 2 – Beaufort to Ararat, Victoria (EPBC 2010/5741)**

I am writing to you in relation to a proposal to upgrade the Western Highway between Beaufort and Ararat, Victoria. I have considered the proposal in accordance with Part 9 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and have decided to grant an approval to Roads Corporation, trading as VicRoads. The details of my decision are attached. The proposal must be undertaken in accordance with the conditions specified in the approval.

I would appreciate your assistance by informing me when you start the action, and provide the various management plans and offset agreements specified in the conditions. Please also provide details of who will be the contact person responsible for the administration of the approval decision. Please note any plans required as conditions of approval will be regarded as public documents unless you provide sufficient justification to warrant commercial-in-confidence status.

You should also note that this EPBC Act approval does not affect obligations to comply with any other laws of the Commonwealth, state or territory that are applicable to the action. Neither does this approval confer any right, title or interest that may be required to access land or waters to take the action.

The Department has an active audit program for proposals that have been referred or approved under the EPBC Act. The audit program aims to ensure that proposals are implemented as planned and that there is a high degree of compliance with any associated conditions. Please note that your project may be selected for audit by the department at any time and all related records and documents may be subject to scrutiny. Information about the department's compliance monitoring and auditing program is enclosed.

I have also written to the following parties to advise them of this decision:

State authority	The Hon Matthew Guy MLC Victorian Minister for Planning
Commonwealth Minister	The Hon Warren Truss MP Minister for Infrastructure and Regional Development

GPO Box 787 Canberra ACT 2601 • Telephone 02 6274 1111 • Facsimile 02 6274 1666  
[www.environment.gov.au](http://www.environment.gov.au)

The Department has recently published an *Environmental Impact Assessment Client Service Charter* (the Charter) which outlines the Department's commitments when undertaking environmental impact assessments under the EPBC Act. A copy of the Charter can be found at: <http://www.environment.gov.au/epbc/publications/index.html>. Should you have any feedback on the environmental impact assessment process, please send them through to [EIAClientfeedback@environment.gov.au](mailto:EIAClientfeedback@environment.gov.au).

If you have any questions about this decision, please contact the project manager, Amanda Young, by email to [amanda.young@environment.gov.au](mailto:amanda.young@environment.gov.au), or telephone 6274 1299 and quote the EPBC reference number shown at the beginning of this letter.

Yours sincerely



Mahani Taylor  
Acting Assistant Secretary  
South-Eastern Australia Environment Assessments Branch  
17 April 2014



Australian Government  
Department of the Environment

**APPROVAL**

**Western Highway Project Section 2 - Beaufort to Ararat, Victoria (EPBC 2010/5741)**

This decision is made under sections 130(1) and 133 of the *Environment Protection and Biodiversity Conservation Act 1999*.

**Proposed action**

**Person to whom the approval is granted** Roads Corporation, trading as VicRoads

**Proponent's ACN (if applicable)** ABN:61 760 960 480

**Proposed action** To upgrade the Western Highway between Beaufort and Ararat, Victoria [See EPBC Act referral 2010/5741].

**Approval decision**

Controlling Provision	Decision
Listed threatened species and communities (sections 18 & 18A)	Approved

**Conditions of approval**

This approval is subject to the conditions specified below.

**Expiry date of approval**

This approval has effect until 30 June 2034

**Decision maker**

**Name and position** Mahani Taylor  
Acting Assistant Secretary  
South-Eastern Australia Environment Assessments Branch

**Signature**

**Date of decision**

17/4/14

**Conditions attached to the approval**

To minimise impacts of construction on listed threatened species and ecological communities:

1. The person taking the action must ensure that the action does not occur outside of the **project area** as illustrated at **Annex 1**.

2. The person taking the action must ensure that project activities do not **impact** more than five (5) **Spiny Rice-flower** plants.
3. The person taking the action must ensure the approved **Weed Management Plan** is implemented.
4. The person taking the action must in consultation with a **suitably qualified ecologist** revise the **Threatened Species Management Plan(s)** for the conservation and enhancement of the **Spiny Rice-flower, Button Wrinklewort, Golden Sun Moth habitat, and Dwarf Galaxias habitat** in accordance with the requirements set out below, and submit the revised plan(s) for the **Minister's** approval. **Construction activities** must not commence within 100m of each of the matters identified above (as illustrated in **Annex 1**) until the **Minister** approves the revised plan(s) in relation to that matter.
  - a) base line data and other supporting evidence that documents the baseline condition of populations of **Spiny Rice-flower, Button Wrinklewort, Golden Sun Moth and Dwarf Galaxias** habitat and populations within the **project area**;
  - b) specific management actions to maintain and/or improve **Spiny Rice-flower, Button Wrinklewort, Golden Sun Moth, and Dwarf Galaxias** populations and habitat within the **project area**, including but not limited to details of:
    - i. establishing **no-go zone(s)** with a minimum 3m buffer around **Spiny Rice-flower patch(s), Button Wrinklewort patch(s), Golden Sun Moth habitat, and Dwarf Galaxias habitat** to be avoided. Clearly marking **no-go zone(s)** with high-visibility fencing and signage for at least the duration that **construction activities** are within 100m of the **no-go zone(s)**;
    - ii. a plan and schedule for revegetation, rehabilitation and weed removal works for the improvement of **Golden Sun Moth habitat** impacted by the proposed action;
    - iii. how any pipes, culverts and/or bridges constructed within **Dwarf Galaxias habitat** will not restrict habitat connectivity or hinder the dispersal of **Dwarf Galaxias**;
    - iv. a commitment to avoid **construction activities** within Hopkins River or Billy Billy Creek crossings during the **Dwarf Galaxias** breeding period (from 1 April to 30 November in any year);
    - v. a procedure for isolating **Dwarf Galaxias habitat**, and procedure for salvage and relocating **Dwarf Galaxias**, in the event that **construction activities** occur within **Dwarf Galaxias habitat**;
    - vi. the method and schedule for water quality monitoring of **Dwarf Galaxias habitat** during **construction activities**;
    - vii. a plan and schedule for revegetation, rehabilitation and weed removal works within **Dwarf Galaxias habitat**, including establishment of in-stream habitat with suitable features such as woody debris and native riparian and aquatic species;
    - viii. implementing sediment, erosion and pollution control protocols, in accordance with *Construction Techniques for Sediment Pollution Control (EPA Publication No. 275, 1991)*; and *Environmental Guidelines for Major Construction Sites (EPA Publication No. 480, February 1996)*; and

- ix. ensuring chemicals and fuels are stored and handled in accordance with the relevant Material Safety Data Sheets. Ensuring chemicals and fuels are not stockpiled within 100m of waterways, and a spill kit must be kept onsite for the duration of construction. Implementing an emergency response procedure in the event of a chemical or fuel spill near waterways.
  - c) information and commitments about monitoring and reporting on the improvements in the condition of the **project area**; and
  - d) corrective actions and contingency measures to be implemented where monitoring under the **Threatened Species Management Plan(s)** indicates a degradation of **Spiny Rice-flower, Button Wrinklewort, Golden Sun Moth habitat, and/or Dwarf Galaxias habitat**.
5. The person taking the action must ensure the approved **Threatened Species Management Plan(s)** is implemented.

*Grassy Eucalypt Woodland of the Victorian Volcanic Plain (GEWVVP)*

6. The person taking the action must ensure that **construction activities** do not **impact** more than 11.14 ha of **GEWVVP**.
7. Unless approved by the **Minister**, the person taking the action must establish a 33.5 ha **GEWVVP Offset** at the **Dunkeld Property**, to compensate for the loss of **GEWVVP**. Within 9 months of the date of this approval, the person taking the action must:
  - a) enter into **Agreement** with the **landowner** under section 173 of the *Planning and Environment Act 1987*, or a **Trust for Nature** covenant mechanism to secure a 33.5 ha **GEWVVP Offset** at the **Dunkeld Property**;
  - b) provide the **Department** with a signed copy of the **Agreement** and evidence of lodgement with the **Titles Office**, within 2 weeks of lodgement;
  - c) provide the **Department** with the **offset attributes, shapefile** and map(s) clearly defining the location and boundaries of the **GEWVVP Offset**, within 2 weeks of lodgement; and
  - d) ensure that the **Agreement** is registered on the title on which the **GEWVVP Offset** is located. The **Department** must be provided with evidence of registration within 2 weeks of registration.
8. Within 9 months of the date of this approval, the person taking the action must submit a draft **GEWVVP Offset Management Plan** to the **Department** for the **Minister's** approval. The **GEWVVP Management Plan** must be prepared in consultation with a **suitably qualified ecologist** and provide for the conservation and enhancement of **GEWVVP** within the **GEWVVP Offset(s)**, and must include details of:
  - a. base line data and other supporting evidence that documents the baseline condition of **GEWVVP** on the **GEWVVP Offset(s)**;
  - b. description, key performance indicator, and timeframe for implementing specific management actions to improve the condition of **GEWVVP** within the **GEWVVP Offset(s)**, including but not limited to control of weed and pest species, control of access to the protected land, strategic fire and grazing management (acknowledging that such impacts may be positive or negative depending on circumstances);

- c. measures to ensure that actions taken have no detrimental **impact** on the populations or habitat of other listed threatened species and communities that are likely to occur or utilise the **GEWVVP Offset(s)**;
  - d. information and commitments about monitoring and reporting on the improvements in condition of the offset site; and
  - e. corrective actions and contingency measures to be implemented where monitoring under the **GEWVVP Offset Management Plan** indicates a degradation of the **GEWVVP**.
9. The person taking the action must ensure the **GEWVVP Offset(s)** is managed in accordance with the approved **GEWVVP Offset Management Plan** for a period of at least 10 years from the date of execution of the **Agreement**.

*Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP)*

10. The person taking the action must ensure that **construction activities** do not **impact** more than 5.25 ha of **NTGVVP**.
11. Unless approved by the **Minister**, the person taking the action must establish a 20.3 ha **NTGVVP Offset** at the **Darlington Property** to compensate for the loss of **NTGVVP**. Within 9 months of the date of this approval, the person taking the action must:
- a) enter into **Agreement** with the **landowner** under section 173 of the *Planning and Environment Act 1987*, or a **Trust for Nature** covenant mechanism to secure a 20.3 ha **NTGVVP Offset** at the **Darlington Property**;
  - b) provide the **Department** with a signed copy of the **Agreement** and evidence of lodgement with the **Titles Office**, within 2 weeks of lodgement;
  - c) provide the **Department** with the **offset attributes**, **shapefile** and map(s) clearly defining the location and boundaries of the **NTGVVP Offset**, within 2 weeks of lodgement; and
  - d) ensure that the **Agreement** is registered on the title on which the **NTGVVP Offset** is located. The **Department** must be provided with evidence of registration within 2 weeks of registration.
12. Within 9 months of the date of this approval, the person taking the action must submit a draft **NTGVVP Offset Management Plan** to the **Department** for the **Minister's** approval. The **NTGVVP Offset Management Plan** must be prepared in consultation with a **suitably qualified ecologist** and provide for the conservation and enhancement of the viability of the population of **NTGVVP** within the **NTGVVP Offset**, and must include:
- a) baseline data and other supporting evidence that documents the baseline quality of **NTGVVP** within the **NTGVVP Offset Management Plan**;
  - b) description, key performance indicator, and timeframe for implementing specific management actions to improve the condition of **NTGVVP** within the **NTGVVP Offset Management Plan**, including but not limited to control of weed and pest species, control of access to the protected land, strategic fire and grazing management (acknowledging that such impacts may be positive or negative depending on circumstances);

- c) measures to ensure that actions taken have no detrimental **impact** on the populations or habitat of other listed threatened species and communities that are likely to occur or utilise the **NTGVVP Offset Management Plan**;
  - d) information and commitments about monitoring and reporting on the improvements in condition of the offset site; and
  - e) corrective actions and contingency measures to be implemented where monitoring under the **NTGVVP Offset Management Plan** indicates a degradation of the **NTGVVP**.
13. The person taking the action must ensure the **NTGVVP Offset** is managed in accordance with the approved **NTGVVP Offset Management Plan** for a period of at least 10 years from the date of execution of the **Agreement**.

*Golden Sun Moth*

14. The person taking the action must ensure that **construction activities** does not **impact** more than 31.56 ha of known **Golden Sun Moth habitat**.
15. Unless approved by the **Minister**, the person taking the action must establish a 100 ha **Golden Sun Moth Offset** at the **Darlington Property** to compensate for the loss of **Golden Sun Moth habitat**. Within 9 months of the date of this approval, the person taking the action must:
- a) provide the **Department** with evidence that the property(s) identified to form the basis of the **Golden Sun Moth Offset** contain a viable population of **Golden Sun Moth**, and at least 100 ha of known **Golden Sun Moth habitat**. Property(s) must be surveyed in accordance with *EPBC Act policy statement 3.12 - significant impact guidelines for the critically endangered golden sun moth (Synemon plana)* by a **suitably qualified ecologist**;
  - b) enter into **Agreement** with the **landowner** under section 173 of the *Planning and Environment Act 1987*, or a **Trust for Nature** covenant mechanism to secure a 100 ha **Golden Sun Moth Offset** of known **Golden Sun Moth habitat** at the **Darlington Property**;
  - c) provide the **Department** with a signed copy of the **Agreement** and evidence of lodgement with the **Titles Office**, within 2 weeks of lodgement;
  - d) provide the **Department** with the **offset attributes**, **shapefile** and map(s) clearly defining the location and boundaries of the **Golden Sun Moth Offset**, within 2 weeks of lodgement; and
  - e) ensure that the **Agreement** is registered on the title on which the **Golden Sun Moth Offset** is located. The **Department** must be provided with evidence of registration within 2 weeks of registration.
16. Within 9 months of the date of this approval, the person taking the action must submit a draft **Golden Sun Moth Offset Management Plan** to the **Department** for the **Minister's** approval. The **Golden Sun Moth Offset Management Plan** must be prepared in consultation with a **suitably qualified ecologist** and provide for the conservation and enhancement of **Golden Sun Moth** within the **Golden Sun Moth Offset(s)**, and must include details of:

- c) measures to ensure that actions taken have no detrimental **impact** on the populations or habitat of other listed threatened species and communities that are likely to occur or utilise the **NTGVVP Offset Management Plan**;
  - d) information and commitments about monitoring and reporting on the improvements in condition of the offset site; and
  - e) corrective actions and contingency measures to be implemented where monitoring under the **NTGVVP Offset Management Plan** indicates a degradation of the **NTGVVP**.
13. The person taking the action must ensure the **NTGVVP Offset** is managed in accordance with the approved **NTGVVP Offset Management Plan** for a period of at least 10 years from the date of execution of the **Agreement**.

*Golden Sun Moth*

14. The person taking the action must ensure that **construction activities** does not **impact** more than 31.56 ha of known **Golden Sun Moth habitat**.
15. Unless approved by the **Minister**, the person taking the action must establish a 100 ha **Golden Sun Moth Offset** at the **Darlington Property** to compensate for the loss of **Golden Sun Moth habitat**. Within 9 months of the date of this approval, the person taking the action must:
- a) provide the **Department** with evidence that the property(s) identified to form the basis of the **Golden Sun Moth Offset** contain a viable population of **Golden Sun Moth**, and at least 100 ha of known **Golden Sun Moth habitat**. Property(s) must be surveyed in accordance with *EPBC Act policy statement 3.12 - significant impact guidelines for the critically endangered golden sun moth (Synemon plana)* by a **suitably qualified ecologist**;
  - b) enter into **Agreement** with the **landowner** under section 173 of the *Planning and Environment Act 1987*, or a **Trust for Nature** covenant mechanism to secure a 100 ha **Golden Sun Moth Offset** of known **Golden Sun Moth habitat** at the **Darlington Property**;
  - c) provide the **Department** with a signed copy of the **Agreement** and evidence of lodgement with the **Titles Office**, within 2 weeks of lodgement;
  - d) provide the **Department** with the **offset attributes**, **shapefile** and map(s) clearly defining the location and boundaries of the **Golden Sun Moth Offset**, within 2 weeks of lodgement; and
  - e) ensure that the **Agreement** is registered on the title on which the **Golden Sun Moth Offset** is located. The **Department** must be provided with evidence of registration within 2 weeks of registration.
16. Within 9 months of the date of this approval, the person taking the action must submit a draft **Golden Sun Moth Offset Management Plan** to the **Department** for the **Minister's** approval. The **Golden Sun Moth Offset Management Plan** must be prepared in consultation with a **suitably qualified ecologist** and provide for the conservation and enhancement of **Golden Sun Moth** within the **Golden Sun Moth Offset(s)**, and must include details of:



- a) baseline data and other supporting evidence that documents the baseline condition and extent of **Golden Sun Moth habitat** and population viability on the **Golden Sun Moth Offset(s)**;
  - b) description, key performance indicator, and timeframe for implementing specific management actions to improve the condition of **Golden Sun Moth habitat** within the **Golden Sun Moth Offset(s)**, including but not limited to control of weed and pest species, control of access to the protected land, strategic fire and grazing management (acknowledging that such impacts may be positive or negative depending on circumstances);
  - c) measures to ensure that actions taken have no detrimental **impact** on the populations or habitat of other listed threatened species and communities that are likely to occur or utilise the **Golden Sun Moth Offset(s)**;
  - d) information and commitments about monitoring and reporting on the improvements in condition of the offset site; and
  - e) corrective actions and contingency measures to be implemented where monitoring under the **Golden Sun Moth Offset Management Plan** indicates a degradation of **Golden Sun Moth habitat**.
17. The person taking the action must ensure the **Golden Sun Moth Offset(s)** is managed in accordance with the approved **Golden Sun Moth Offset Management Plan** for a period of at least 10 years from the date of execution of the **Agreement**.

*Contingency condition for offsets*

18. If the **GEWVVP Offset** as per condition 7, and/or the **NTGVVP Offset** as per condition 11, and/or the **GSM Offset** as per condition 15 cannot be secured as an offset within 9 months of the date of this approval, and/or if information required by condition 15(a) fails to demonstrate a viable population of **Golden Sun Moth** at the **Darlington Property** to the **Department's** satisfaction, the person taking the action must establish a **Contingency Offset(s)** with **Trust for Nature** for the residual offset requirements of the relevant condition.
- a. within 10 months of the date of this approval, the person taking the action must provide the **Department** with a proposal for the **Contingency Offset(s)**, for the **Department's** approval. The proposal must include a copy of the draft **Agreement with Trust for Nature** that documents the property(s) identified to form the basis of the **Contingency Offset(s)**, prior to signature by any parties. The plan must also include details of how the size and quality of the matters present at the site of the proposed **Contingency Offset(s)** will provide for the residual offset requirements of this approval, supported by surveys in accordance with the **Department's** guidelines and by a **suitably qualified ecologist**; and
  - b. within 24 months of the date of this approval, the person taking the action must:
    - i. enter into a written **Agreement with Trust for Nature** that documents the property(s) agreed by the **Department** to form the basis of the **Contingency Offset(s)**. The person proposing to take the action must provide the **Department** with a signed copy of the **Agreement** and within 7 days of signature by all parties;

- ii. ensure that the properties(s) identified by **Trust For Nature** to form the basis of the **Contingency Offset(s)** are surveyed in accordance with relevant survey guidelines by a **suitably qualified ecologist** to determine the baseline quality;
- iii. provide **Trust for Nature** with \$50,000 Australian dollars per hectare, for the number of hectares required by the **Department** for the **Contingency Offset(s) (the funds)**, to be held until such time as the **Contingency Offset(s)** is approved by the **Minister**, at which time the money will form the basis of the payment to purchase environmental services from the **landowner** of the **Contingency Offset(s)**. If the cost of purchasing the environmental services is greater than **the funds**, the person taking the action must provide additional funds to **Trust for Nature** as required. If the cost of purchasing the environmental services is less than **the funds**, the remaining funds must be returned to the person taking the action. The arrangements for the provision and expenditure of **the funds** must be set out in the **Agreement**;
- iv. enter into a **Credit Trading Agreement** with **Trust for Nature** and the **landowner** under the *Nature Conservation Trust Act 1972*, to secure **Contingency Offset(s)**;
- v. provide the **Department** with a signed copy of the **Credit Trading Agreement** within 2 weeks of its signature by all parties;
- vi. ensure that a **Deed of Covenant** for the **Contingency Offset(s)** is executed with **Trust for Nature** and is registered on the title documents of the site of the **Contingency Offset(s)** within 6 months of the date of signing the **Credit Trading Agreement**;
- vii. provide the **Department** with evidence of registration within 2 weeks of registration;
- viii. provide the **Department** with the **offset attributes, shapefile** and map clearly defining the location and boundaries of the **Contingency Offset(s)**, within 2 weeks of registration; and
- ix. provide a **Contingency Offset Management plan** to the **Department** for the **Minister's** approval. The person taking the action must ensure that any **Contingency Offset(s)** are managed in accordance with an approved **Contingency Offset Management Plan** for a period of at least 10 years from the date of execution of the **Agreement**.

*Administrative conditions*

19. Within 30 calendar days after the commencement of **construction activities**, the person taking the action must advise the **Department** in writing of the actual date of commencement **construction activities**.
20. The person taking the action must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement management plans and make them available upon request to the **Department**. Such records may be subject to audit by the **Department** or an independent auditor in accordance with section 458 of the **EPBC Act**, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the **Department's** website. The results of audits may also be publicised through the general media.

21. Within three months of June 30 each year following the commencement of **construction activities**, the person taking the action must publish an annual report of compliance on their website addressing compliance with each of the conditions of this approval, including implementation of any management plans as specified in the conditions. Documentary evidence providing proof of the date of publication and non - compliance with any of the conditions of this approval must be provided to the **Department** at the same time as the annual report of compliance is published. The annual report of compliance must document the outcomes of the management plan(s) against the performance indicators of the management plan(s).
22. The person taking the action must notify the **Department** in writing of any non - compliance with conditions as soon as practicable and no later than 2 business days of becoming aware of the non - compliance.
23. Upon the direction of the **Minister**, the person taking the action must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the **Minister**. The independent auditor must be approved by the **Minister** prior to the commencement of the audit. Audit criteria must be agreed to by the **Minister** and the audit report must address the criteria to the satisfaction of the **Minister**.
24. If the person taking the action wishes to carry out any activity otherwise than in accordance with management plans as specified in the conditions, the person taking the action must submit to the **Department** for the **Minister's** written approval a revised version of that management plan. The varied activity shall not commence until the **Minister** has approved the varied management plan in writing. The **Minister** will not approve a varied management plan unless the revised management plan would result in an equivalent or improved environmental outcome over time. If the **Minister** approves the revised management plan, that management plan must be implemented in place of the management plan originally approved.
25. If the **Minister** believes that it is necessary or convenient for the better protection of listed threatened species and ecological communities and wetlands of international importance to do so, the **Minister** may request that the person taking the action make specified revisions to the management plans specified in the conditions and submit the revised management plans for the **Minister's** written approval. The person taking the action must comply with any such request. The revised approved management plans must be implemented. Unless the **Minister** has approved the revised management plans then the person taking the action must continue to implement the management plans originally approved, as specified in the conditions.
26. Unless otherwise agreed to in writing by the **Minister**, the person taking the action must publish a copy of each approved management plan referred to in these conditions of approval on their website within 1 month of approval of the management plan. Each management plan(s) must be accessible to general members of the public for a period of at least 10 years from the date of approval of the management plan(s). Any variations to management plans must be published on the website within 1 month of the variation being approved by the **Minister**.
27. If, at any time after 5 years from the date of this approval, the person taking the action has not **substantially commenced** the action, then the person taking the action must not **substantially commence** the action without the written agreement of the **Minister**.

**Definitions:**

- i. **Agreement** - the executed agreement between the person taking the action and the relevant landowner, to secure the land in perpetuity.
- ii. **Button Wrinklewort** - the native plant species *Rutidosia leptorrhynchoides*, protected under the EPBC Act.
- iii. **Button Wrinklewort patch(s)** - the patch(s) of habitat for the **Button Wrinklewort** within the **project area** as illustrated at **Annex 1**.
- iv. **Construction activities** - all works associated with changes within the **project area**; 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, works to prepare the land for revegetation.
- v. **Contingency Offset Management plan** - the document developed by a **suitably qualified ecologist** to the satisfaction of the **Department**, detailing the long-term management of EPBC Act listed threatened species and ecological communities of the **Contingency Offset(s)**.
- vi. **Contingency Offset(s)** - land secured in perpetuity to compensate for residual impacts on EPBC Act listed threatened species and ecological communities.
- vii. **Credit Trading Agreement** - the legal agreement between **Trust for Nature** and the person taking the action and the property owner of the protected land. The agreement stipulates the obligations of each party, including financial payments, to manage the protected land for a period of 10 years.
- viii. **Darlington Property** - the paddock within the property 'Terrinallum South', 833 Carranballac - Darlington Road, Darlington Victoria, as illustrated at **Annex 2**.
- ix. **Deed of Covenant** - an encumbrance registered to Trust for Nature on the title of the protected land and includes the Offset Management Plan and any other document that the owner of the protected land is required to comply with.
- x. **Department** - the Australian Government department administering the EPBC Act.
- xi. **Dunkeld Property** - the paddock within the property 6640 Glenelg highway, Dunkeld, Victoria, as illustrated at **Annex 3**.
- xii. **Dwarf Galaxias** - the native fish species *Galaxiella pusilla*, protected under the EPBC Act.
- xiii. **Dwarf Galaxias habitat** - in-stream habitat and fringing vegetation along sections of Hopkins river, Billy Billy Creek and/or Mount Emu Creek within the **project area**.
- xiv. **EPBC Act** - the *Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)*.
- xv. **GEWVVP** - the ecological community *Grassy Eucalypt Woodland of the Victorian Volcanic Plain* protected under the EPBC Act.
- xvi. **GEWVVP Offset** - an area of land secured in perpetuity to compensate for impacts on GEWVVP as a result of the action.
- xvii. **GEWVVP Offset Management Plan** - the document developed by a **suitably qualified ecologist** to the satisfaction of the **Department**, detailing the long-term management of GEWVVP at the **GEWVVP Offset(s)**.
- xviii. **Golden Sun Moth** - the native moth species *Synemon plana*, protected under the EPBC Act.

- xix. **Golden Sun Moth habitat** - is any grassland (exotic and native) that may be utilised by the **Golden Sun Moth** at any stage of its life cycle.
- xx. **Golden Sun Moth Offset** - an area of land secured in perpetuity to compensate for impacts on **Golden Sun Moth** as a result of the action.
- xxi. **Golden Sun Moth Offset Management Plan** - the document developed by a **suitably qualified ecologist** to the satisfaction of the **Department**, detailing the long-term management of **Golden Sun Moth** populations and habitat at the **Golden Sun Moth Offset(s)**.
- xxii. **Impact(ing)** - adverse impact by cutting down, felling, thinning, logging, removing, killing, destroying, smothering, poisoning, ringbarking, uprooting or burning.
- xxiii. **Landowner** – the person(s) and/or company who legally owns the property that is secured as an offset site for the long-term management and protection of EPBC Act listed matters.
- xxiv. **Minister** - the Minister administering the **EPBC Act** and includes a delegate of the Minister.
- xxv. **No-go zone(s)** - clearly delineated area(s) of conservation value, to be avoided by construction related activities, including machinery, vehicles and personnel.
- xxvi. **NTGVVP** - the ecological community *Natural Temperate Grassland of the Victorian Volcanic Plain* protected under the **EPBC Act**.
- xxvii. **NTGVVP Offset** - an area of land secured in perpetuity to compensate for impacts on **NTGVVP** as a result of the action.
- xxviii. **NTGVVP Offset Management Plan** - the document developed by a **suitably qualified ecologist** to the satisfaction of the **Department**, detailing the long-term management of **NTGVVP** at the **NTGVVP Offset(s)**.
- xxix. **Offset attributes** - an '.xls' file capturing relevant attributes of the offset site, including the EPBC reference ID number, the physical address of the offset site, coordinates of the boundary points in decimal degrees, the **EPBC Act** protected matters that the offset compensates for, any additional **EPBC Act** protected matters that are benefiting from the offset, and the size of the offset in hectares.
- xxx. **Project area** - the footprint area where the proposed action will occur, as illustrated at **Annex 1**.
- xxxi. **Shapefile** - an ESRI Shapefile containing '.shp', '.shx' and '.dbf' files and other files capturing attributes including at least the EPBC reference ID number and EPBC protected matters present at the relevant site. Attributes should also be captured in '.xls' format.
- xxxii. **Spiny Rice-flower** - the native flora species *Pimelea spinescens subsp. spinescens*, protected under the **EPBC Act**.
- xxxiii. **Spiny Rice-flower patch** - the patch(s) of habitat for the **Spiny Rice-flower** within the **project area** as illustrated at **Annex 1**.
- xxxiv. **Striped Legless Lizard** - the native lizard species *Delma impar*, protected under the **EPBC Act**.
- xxxv. **Substantially commence(d)** - commencement of construction of the road surface or bridges. This does not include preparatory works.
- xxxvi. **Suitably qualified ecologist** - practising ecologist with tertiary qualifications from a recognised institute with at least three years of field experience undertaking fauna and flora surveys.
- xxxvii. **The funds** – the monetary value that forms the basis of payment for environmental services of the **Contingency Offset**

- xxxviii. **Threatened Species Management Plan** - the document entitled Western Highway Project Section 2: Beaufort to Ararat, Victoria, Threatened Species Management Plan, dated October 2013 prepared in compliance with the Victorian condition of approval for this proposal.
- xxxix. **Titles Office** - the relevant authority responsible for registering land title transaction.
- xl. **Trust for Nature** - the Trust for Nature (Victoria) as established and defined by the *Victorian Conservation Trust Act 1972 (Victoria)*.
- xli. **Weed management Plan** - the document titled final report Weed Management Plan, Western Highway Duplication Project - Section 2, Beaufort to Ararat, Victoria, dated June 2013, as per **Annex 4**.

## Streamline Research Pty. Ltd.

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3 June 2014

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Senior Project Officer  
Western Highway Project  
VicRoads  
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Wendouree, Vic. 3355

### **Re: Dwarf galaxias Conservation Management Plan for the Western Highway Project Section 2 – Beaufort to Ararat ((Reference Number EPBC 2010/5741)**

Streamline Research has completed a dwarf galaxias Conservation Management Plan (CMP) for the Western Highway Project Section 2 – Beaufort to Ararat (EPBC referral 2010/5741). The Plan has addressed issues raised for the conservation and enhancement of dwarf galaxias habitat in accordance with requirements of the federal Department of the Environment (letter dated 17 April 2014).

Each of the conditions raised by the federal Department of the Environment with respect to the dwarf galaxias is addressed below:

*Base line data and other supporting evidence that documents the baseline condition of populations of Dwarf Galaxias habitat and populations within the project area*

In May 2014 Streamline Research undertook a targeted dwarf galaxias investigation of all waterways that cross the proposed route of the duplication of the Western Highway between Beaufort to Ararat. Unlike previous aquatic work which only made comments upon waters which were surveyed (Ecology & Heritage Partners, 2012) the targeted dwarf galaxias investigation addressed in the dwarf galaxias CMP assesses each water according to potential for support dwarf galaxias populations and providing habitat for the species.

Most waters located on the proposed duplication of the Western Highway between Beaufort and Ararat were found to be intermittent or ephemeral in nature. As such, they could at best only be used temporarily, if at all, by dwarf galaxias. Dwarf galaxias were found in two waters, Fiery Creek and Billy Billy Creek and mitigation measures in the CMP that align with those suggested by the Commonwealth will ensure that these populations and habitats will not be adversely affected by the proposed road works.

*Specific management actions to maintain and/or improve Dwarf Galaxias populations and habitat within the project area, including but not limited to details of*

- *establishing no-go zone(s) with a minimum 3m buffer around Dwarf Galaxias habitat. Clearly marked no-go zone(s) with high visibility fencing and signage for at least the duration that construction activities are within 100m of the no go zone(s)*

The dwarf galaxias CMP has recommended that ‘No Go Zones’ be placed around dwarf galaxias habitat in Fiery Creek and Billy Billy Creek. Buffers of 10 metres from the top of the bank from each side of these waterways should be sufficient to protect riparian vegetation, prevent erosion and protect instream habitat. High visibility fencing and signage 100 metres from the ‘No Go Zones’ is to be clearly marked and is to remain in place for the duration of construction work.

- *how any pipes, culverts and/or bridges constructed within Dwarf Galaxias habitat will not restrict connectivity or hinder the dispersal of Dwarf Galaxias*

The dwarf galaxias CMP makes consideration of all crossings of watercourses. Fish passage is necessary for the dispersal of dwarf galaxias into new habitats during flood periods, but it is equally important to all fish species found in the study area. No new structures will be placed into waterways which will restrict fish movement. Oversized culverts are recommended for low order streams with small streamflows. Waters with larger streamflows (typically named creeks and rivers) are expected to have bridge crossings. VicRoads is to have bridge crossings of Fiery Creek, Middle Creek, Charliecombe Creek and the Hopkins River.

Bridge construction and ‘No Go Zones’ planned for Fiery Creek will ensure that opportunity for connectivity of dwarf galaxias in the creek will not be compromised by works undertaken during the duplication of the Western Highway.

Bridge construction previously considered for Billy Billy Creek for the crossing to the north of Buangor (Ecology & Heritage Partners, 2013) is not considered a necessary requirement needed to provide connectivity of the Billy Billy Creek dwarf galaxias population. As the upstream catchment is quite small, culverts may be suitable, as has previously been used at the crossing of the Western Highway to the west of Buangor (approximately two kilometres further upstream on the Western Highway).

- *a commitment to avoid construction activities within Hopkins River or Billy Billy Creek crossings during the Dwarf Galaxias breeding period (from 1 April to 30 November in any year)*

It would appear to be totally unnecessary to place this constraint on the works proposed for the duplication of the Western Highway between Beaufort to Ararat. No actions taken for road construction are expected to prevent or restrict dwarf galaxias breeding.

With the exception of a historical record from 1904 (in Ecology & Heritage Partners, 2012), dwarf galaxias have not been found in the Hopkins River in either the surveys made in 2011 and 2012 or in the targeted survey made in May 2014. Furthermore, in the recent investigation no water was found in the main channel of the Hopkins River. Not even remnant pools were evident. Pooled water in the channel was first observed approximately five kilometres south of the Western Highway.



With a bridge crossing proposed for the Hopkins River, no water in the channel and no known population of dwarf galaxias in the past century, a restriction on construction activities would appear pointless, as it would not result in any benefit to the dwarf galaxias.

Currently, the dwarf galaxias population in Billy Billy Creek is restricted to the pool that is under the existing Western Highway, approximately 600 m south of the proposed works area on Billy Billy Creek. As there is no water in the channel to the north where the road works are to be conducted, dwarf galaxias have no opportunity for currently using this area for breeding during 2014. Even in the event that rain resulted in the presence of surface water and connectivity with the downstream dwarf galaxias population occurred, the 'No Go Zones' will ensure that disruption to possible dwarf galaxias breeding does not occur.

Streamline Research does not agree with the findings of Ecology & Heritage Partners, (2012) that there is suitable habitat for dwarf galaxias in Cemetery Creek, Green Hill Creek, the Hopkins River, Middle Creek, as well as several smaller, unnamed drainage lines and dams. If dwarf galaxias were to ever utilise these habitats it could only be on a temporary basis as all are ephemeral or intermittent waters. No permanent habitat for dwarf galaxias populations is found in any of these waters on the alignment of the proposed works for the Western Highway Project between Beaufort and Ararat.

- *a procedure for isolating Dwarf Galaxias habitat, and procedure for salvage and relocating Dwarf Galaxias, in the event that construction activities occur within Dwarf Galaxias habitat*

There is no need for dwarf galaxias to be salvaged or relocated for the duplication of the Western Highway Project between Beaufort and Ararat. Dwarf galaxias habitat that has been identified (in Fiery Creek and Billy Billy Creek) will be protected whilst works are undertaken. 'No Go Zones' will be sufficient in protecting the dwarf galaxias populations and habitat of these waters.

The concept of salvaging dwarf galaxias is not one that would be recommended by Streamline Research unless a waterway was to be totally modified by proposed works. VicRoads has successfully undertaken works in areas where dwarf galaxias have occurred like the Pakenham Bypass (EPBC 2001/536), the South Gippsland Highway (EPBC 2009/4959) and the Princes Highway Duplication (EPBC 2010/4959). In all of these works, appropriate mitigation measures have been used to ensure that there has been no necessity to salvage or relocate dwarf galaxias.

- *the method and schedule for water quality monitoring of dwarf galaxias habitat during construction activities*

Included as a mitigation measure in the dwarf galaxias CMP.

- *a plan and schedule for revegetation, rehabilitation and weed removal works within Dwarf Galaxias habitat, including establishment of in-stream habitat with suitable features such as woody debris and native riparian and aquatic species impacted by the proposed action*

Given that dwarf galaxias habitat will not be compromised by the proposed road works, revegetating and rehabilitation should not be required. Furthermore, instream conditions for the dwarf galaxias will remain unchanged by bridge works. 'No Go Zones' will protect known habitat for the dwarf galaxias.

- *implement sediment, erosion and pollution controls with Construction Techniques for Sediment Pollution Controls (EPA Publication No. 275, 1991); and Environmental Guidelines for Major Construction Sites (EPA Publication No. 480, February 1996)*

Sediment erosion and pollutions controls have been included in the dwarf galaxias CMP.

- *ensuring chemicals and fuels are stored and handled in accordance with the relevant Material Safety Data Sheets. Ensuring chemicals and fuels are not stockpiled within 100m of waterways, and a spill kit must be kept onsite for the duration of construction. Implementing an emergency response procedure in the event of a chemical or fuel spill near waterways*

Appropriate mitigation measures are included in the dwarf galaxias CMP.

*Information and commitments about monitoring and reporting on the improvements in the condition of the project area*

Included in the dwarf galaxias CMP.

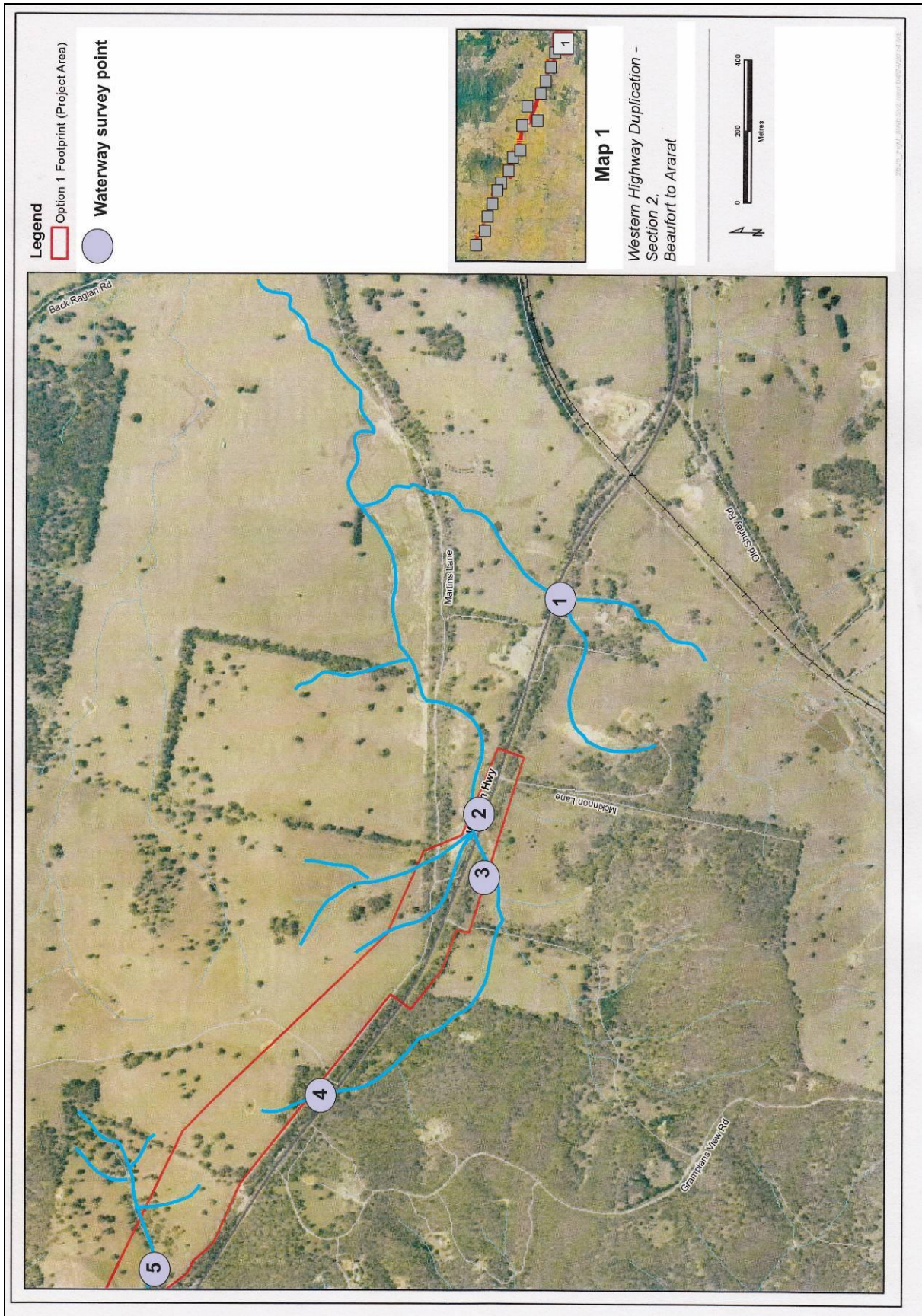
*Corrective actions and contingency measures to be implemented where monitoring under the Threatened Species Management Plan indicates a degradation of Dwarf Galaxias habitat*

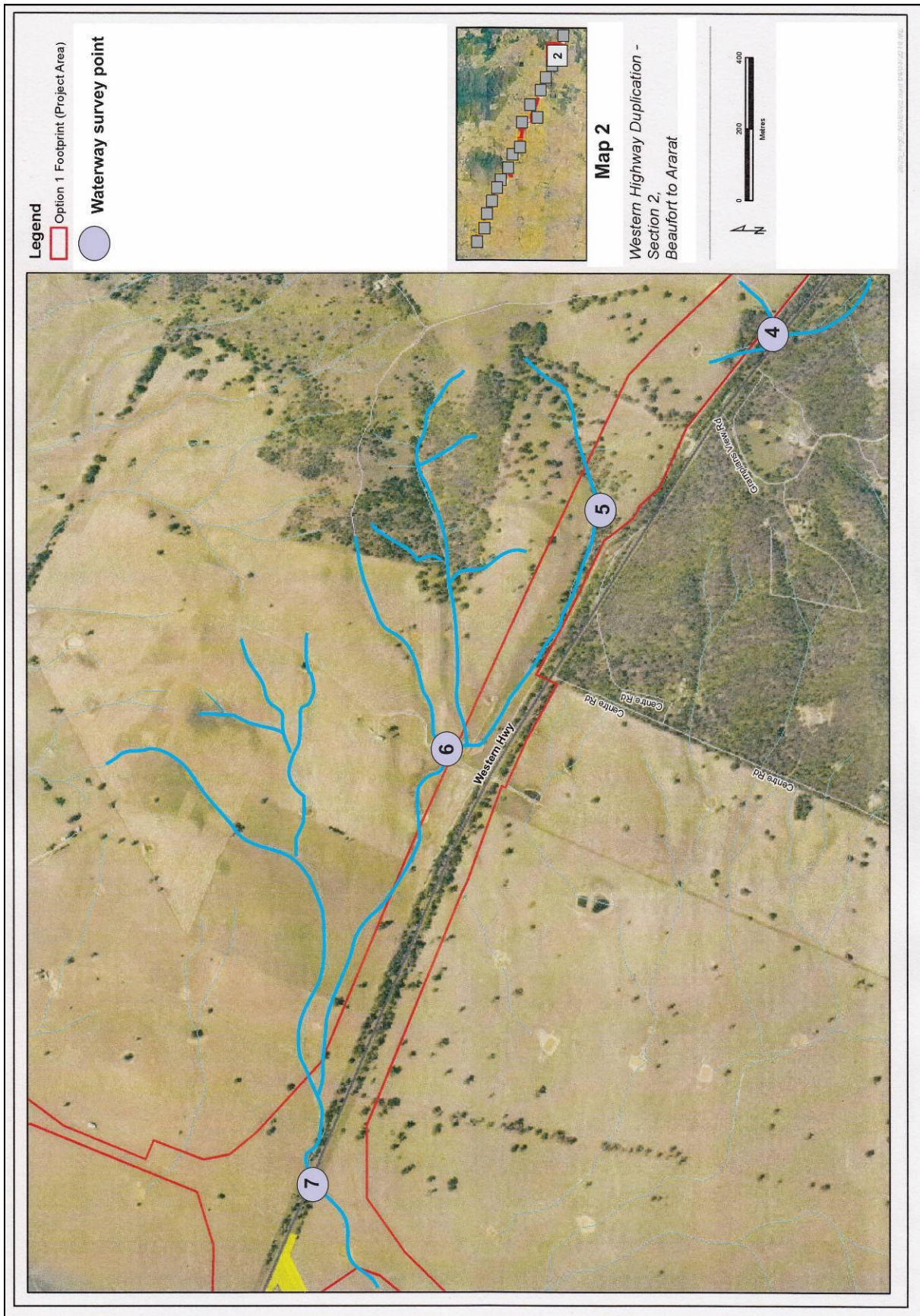
Also included in the dwarf galaxias CMP.

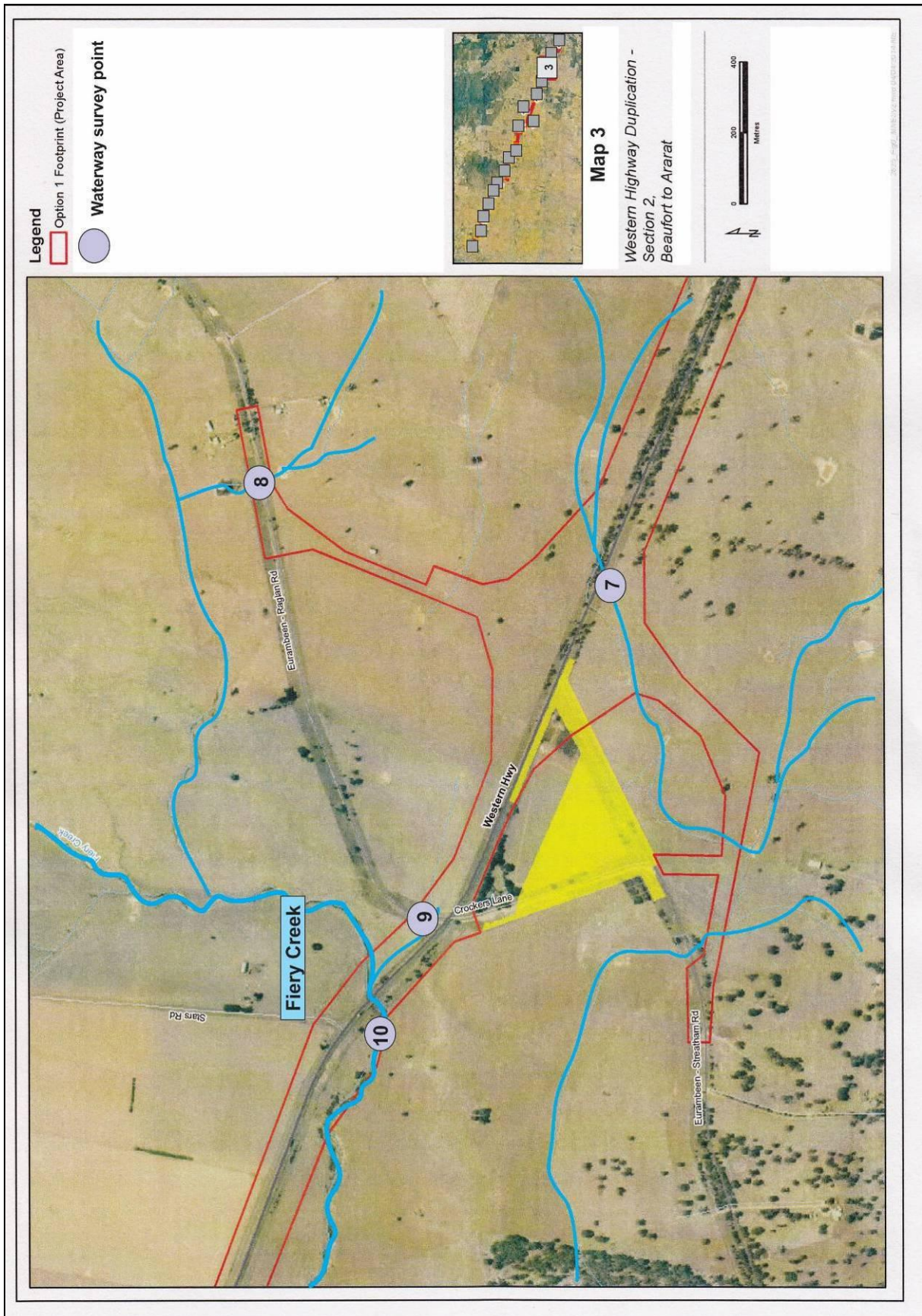
Conditions attached to the approval included a revision of the Threatened Species Management Plan for conservation and enhancement of Dwarf Galaxias habitat. Attached is a dwarf galaxias CMP which has been written in accordance with the requirements set out by the federal Department of the Environment. I hope that the revised plan meets with the Ministers approval.

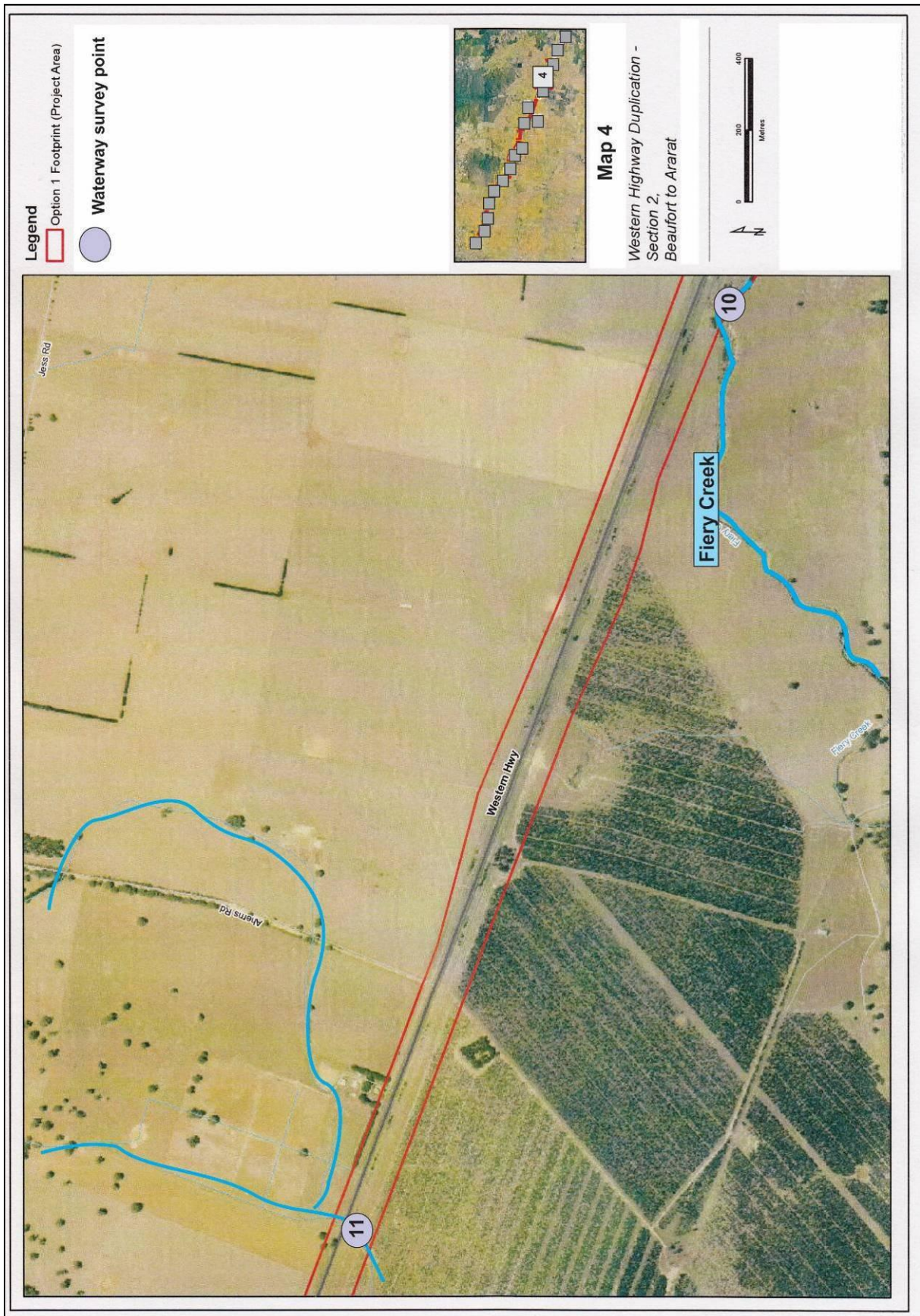
John McGuckin  
Director  
Streamline Research

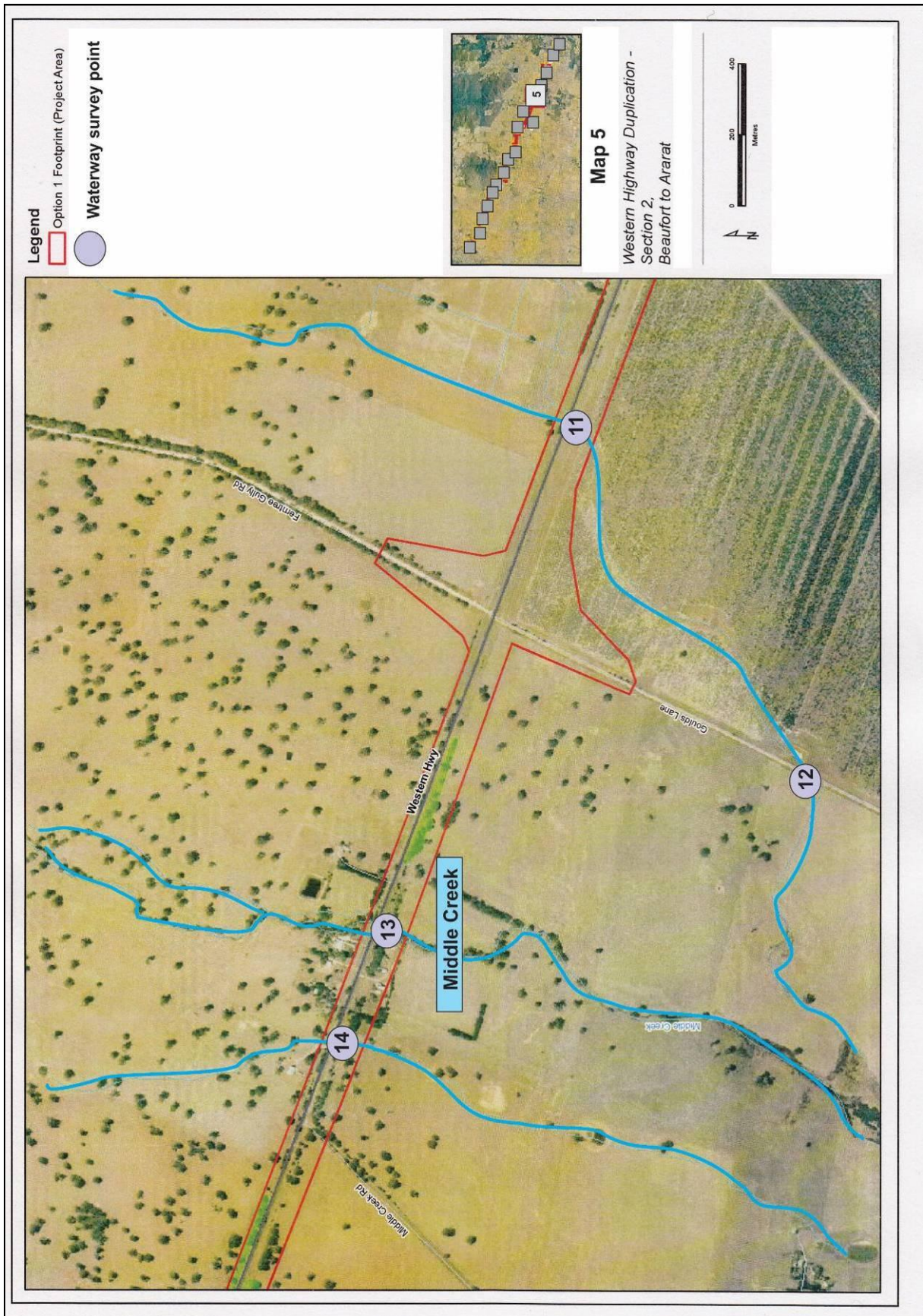
### Appendix 2. Maps of waterways survey points (Beaufort to Ararat)

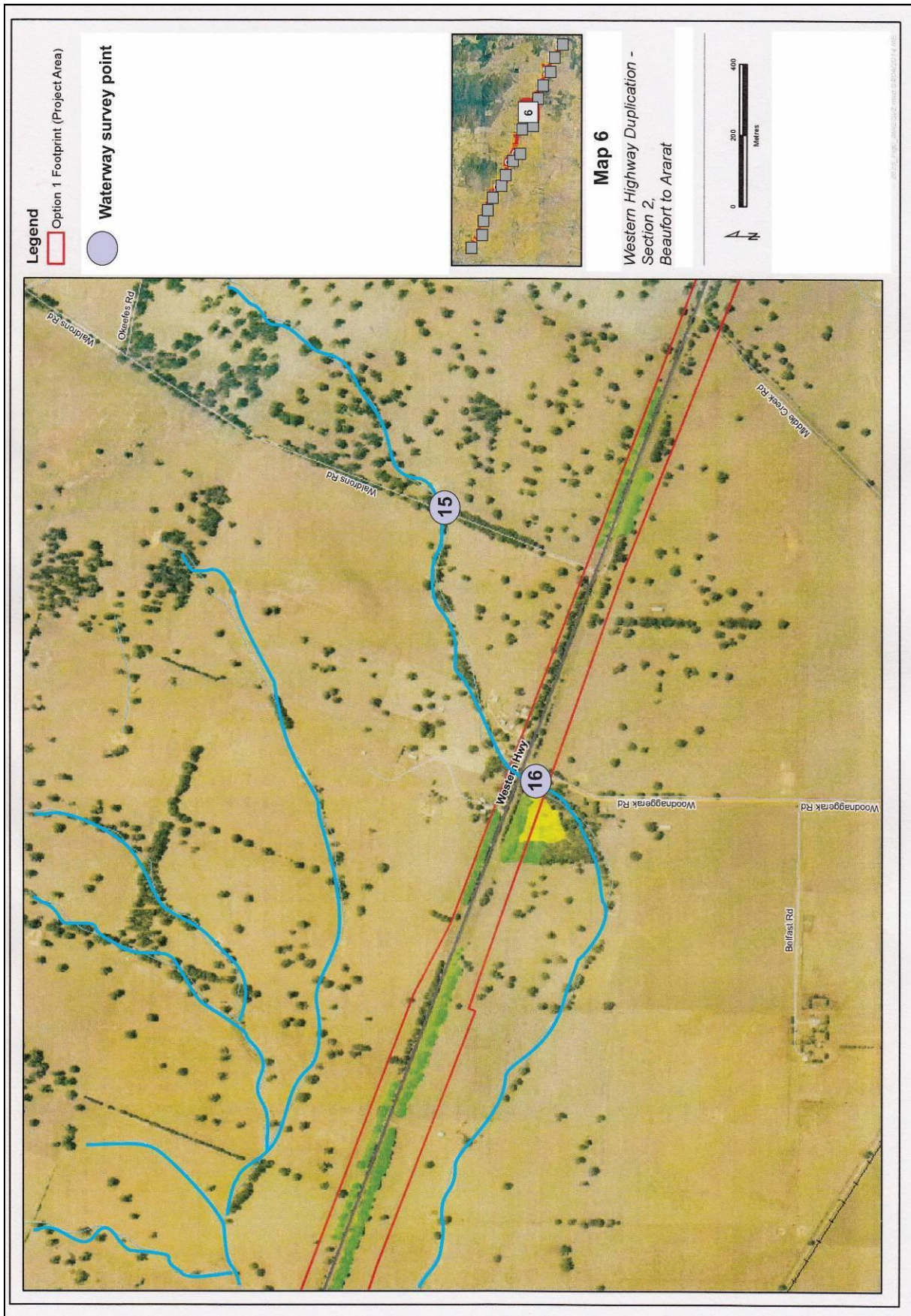




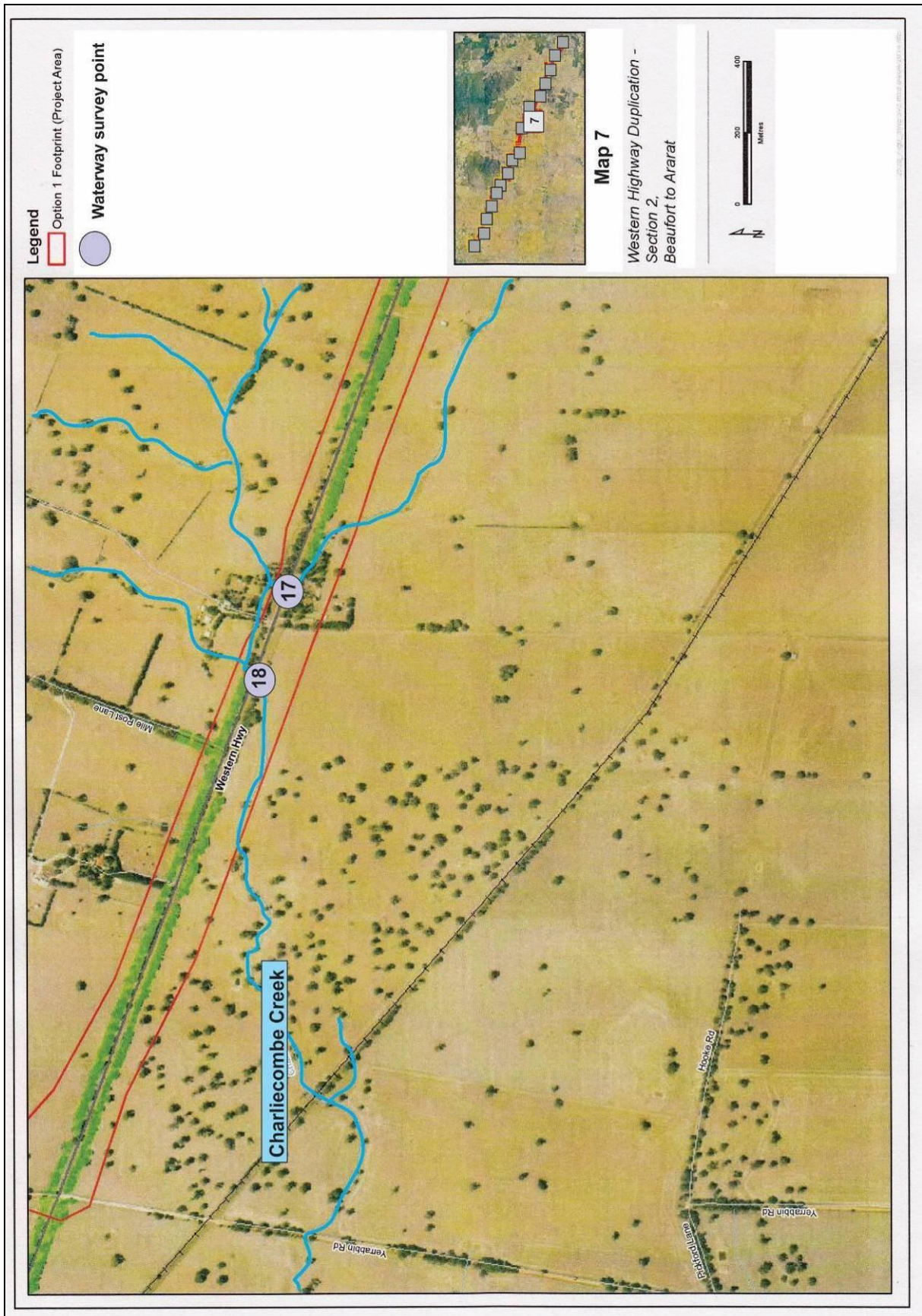


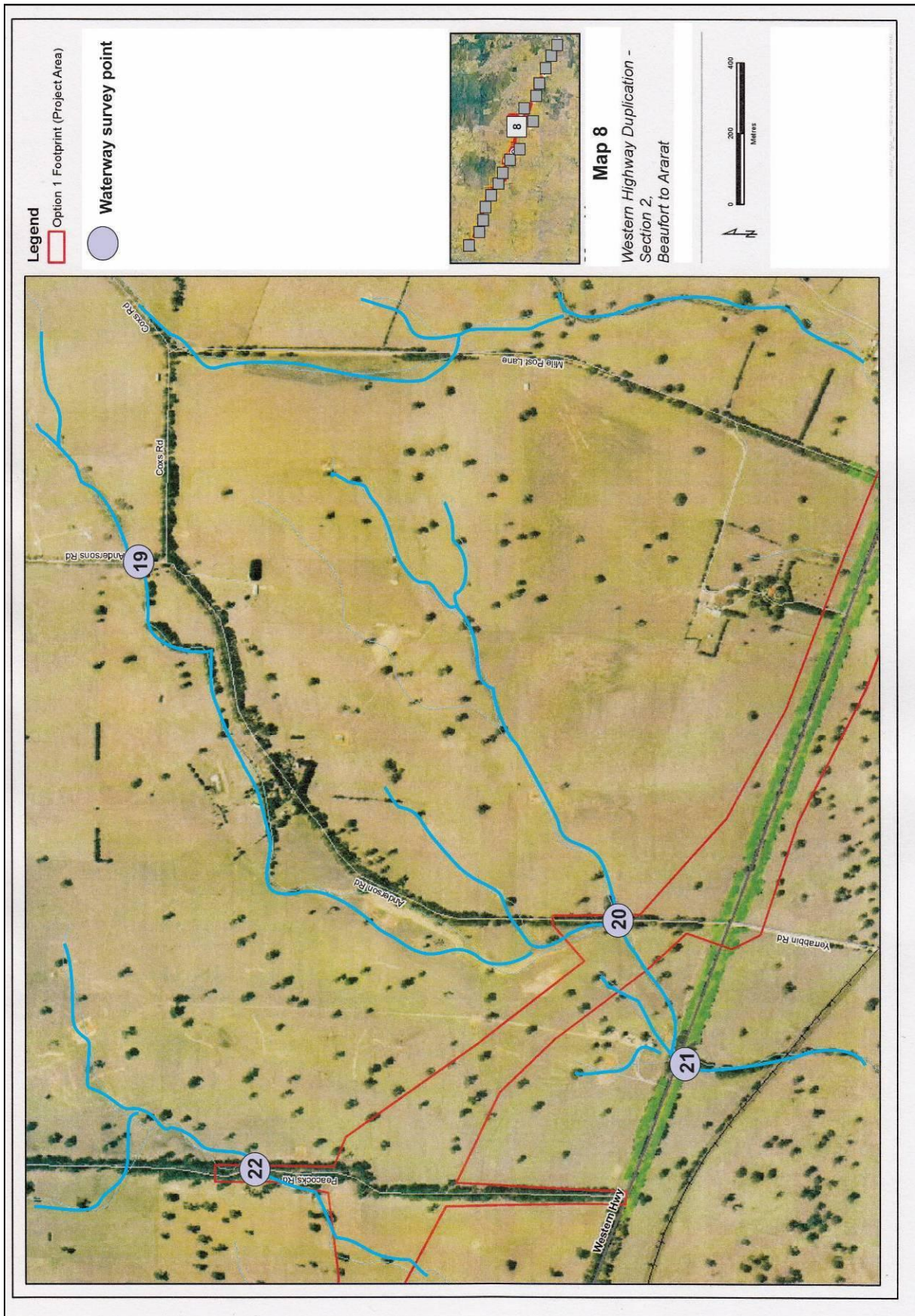


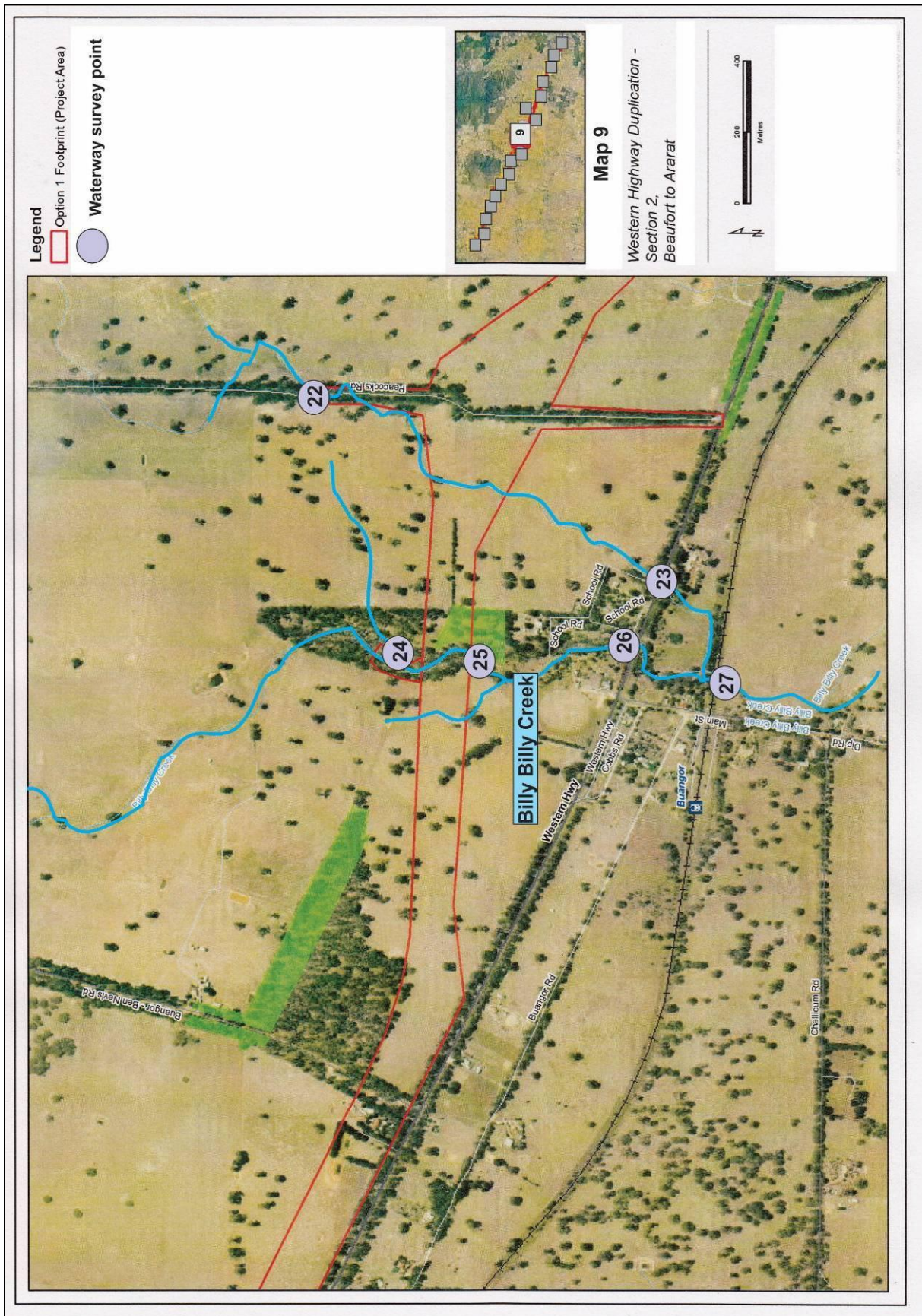


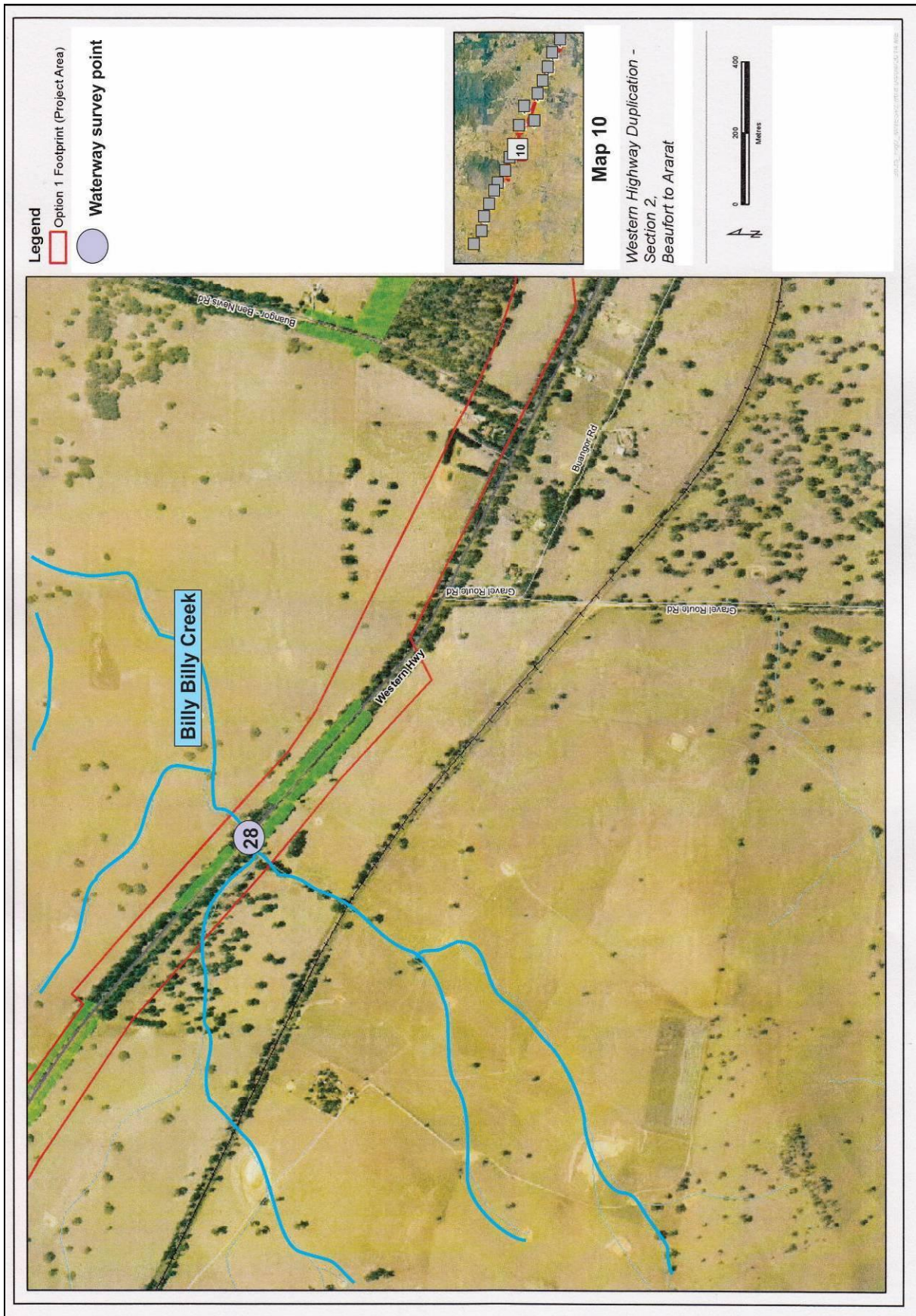


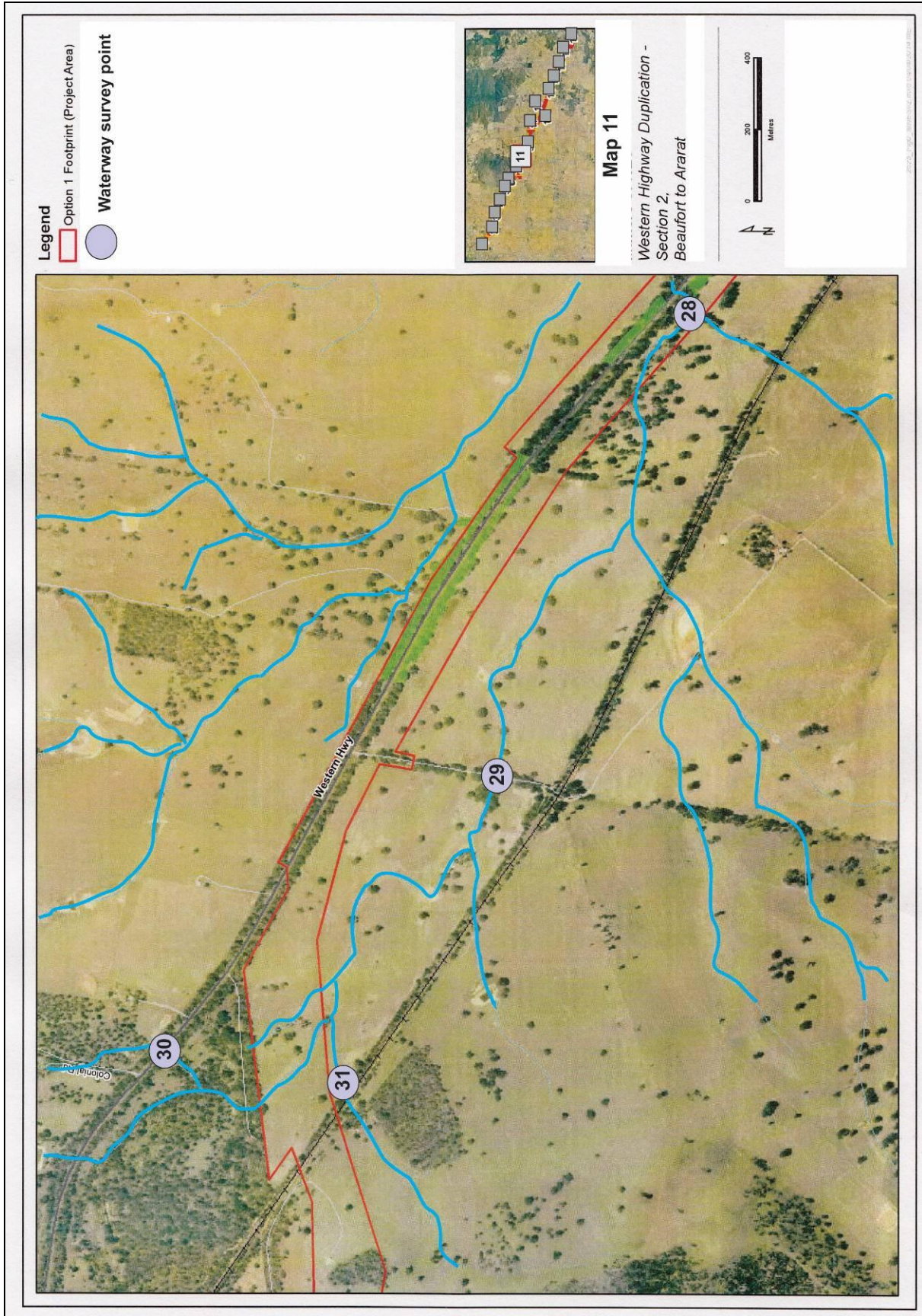


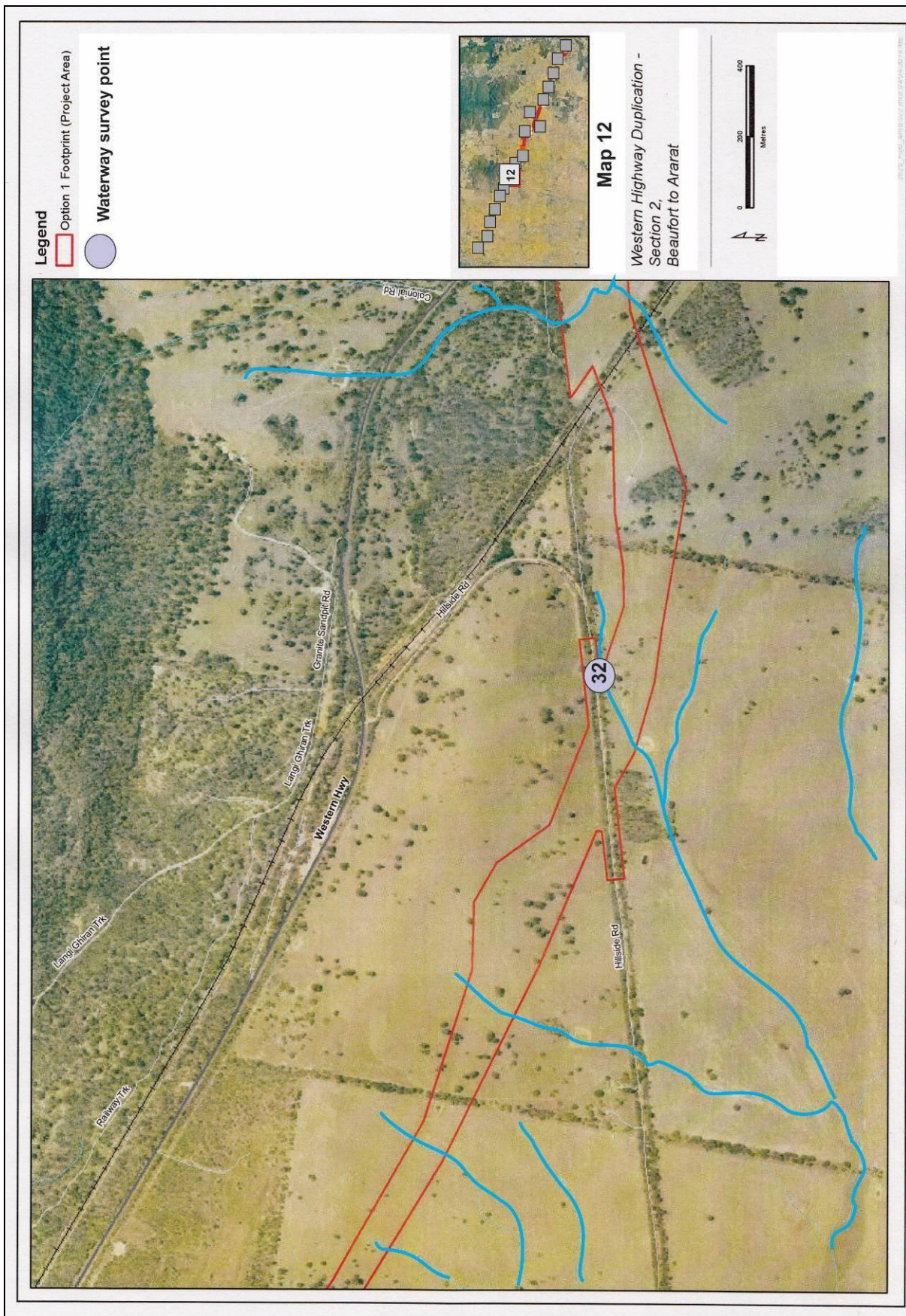


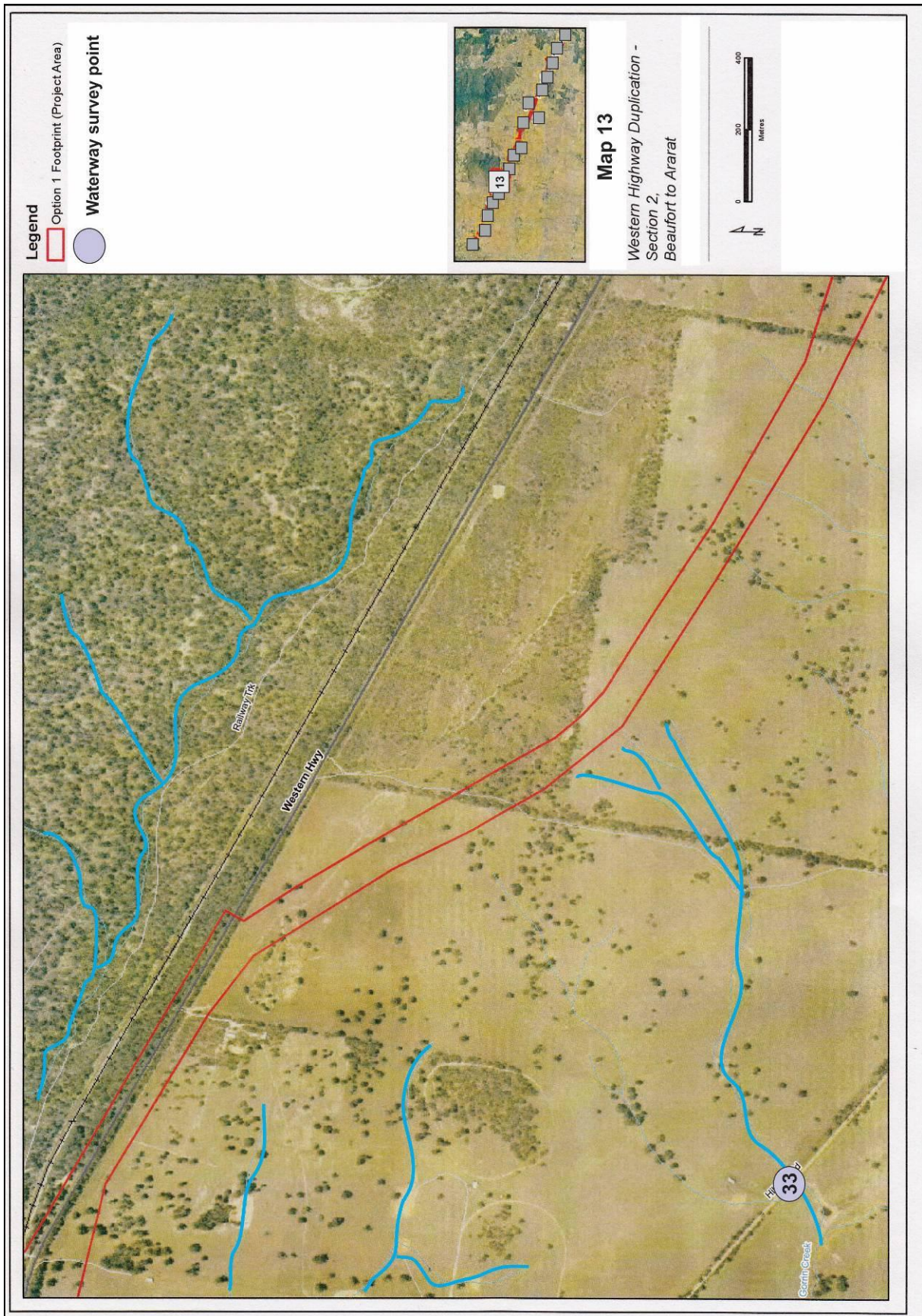


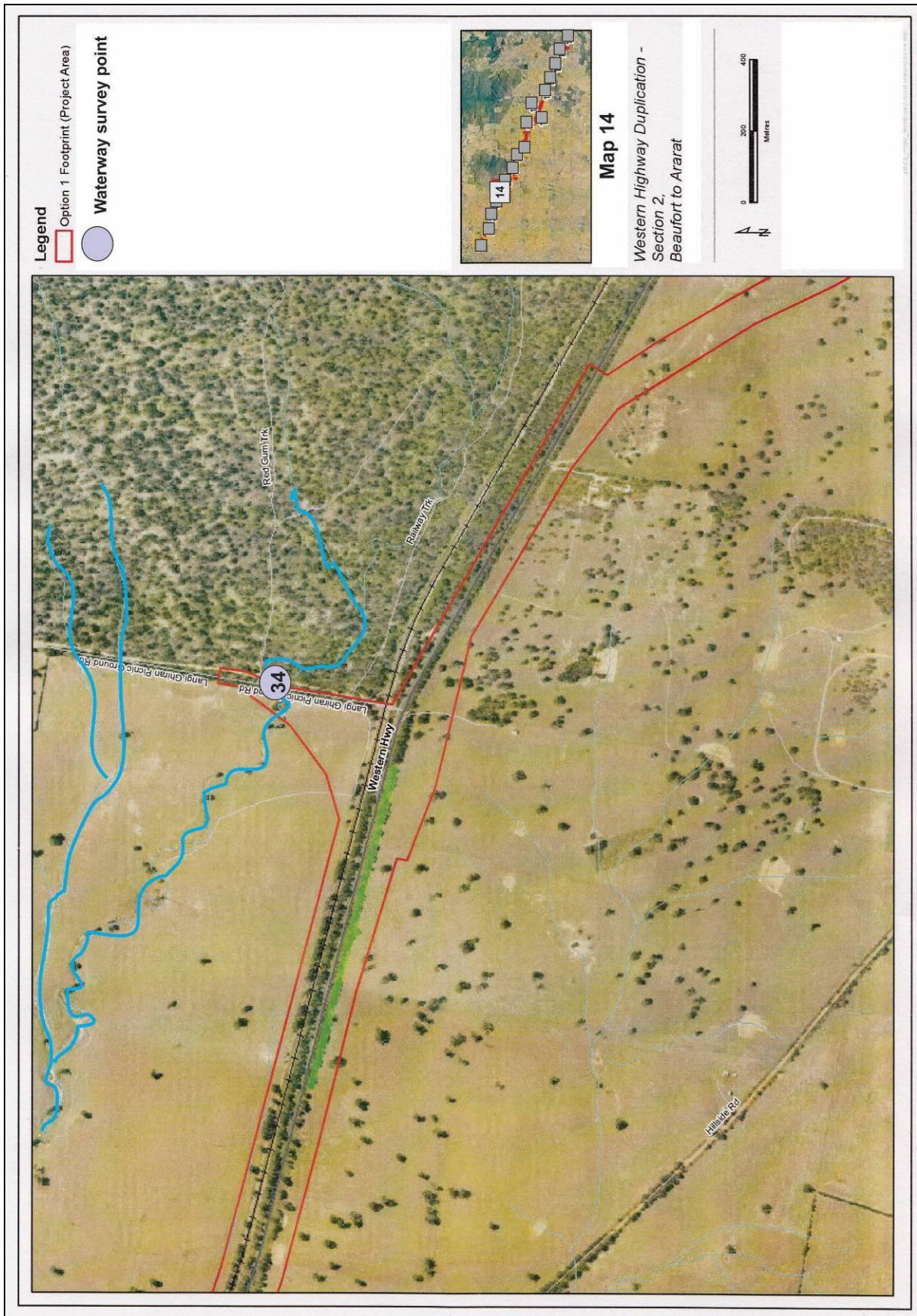




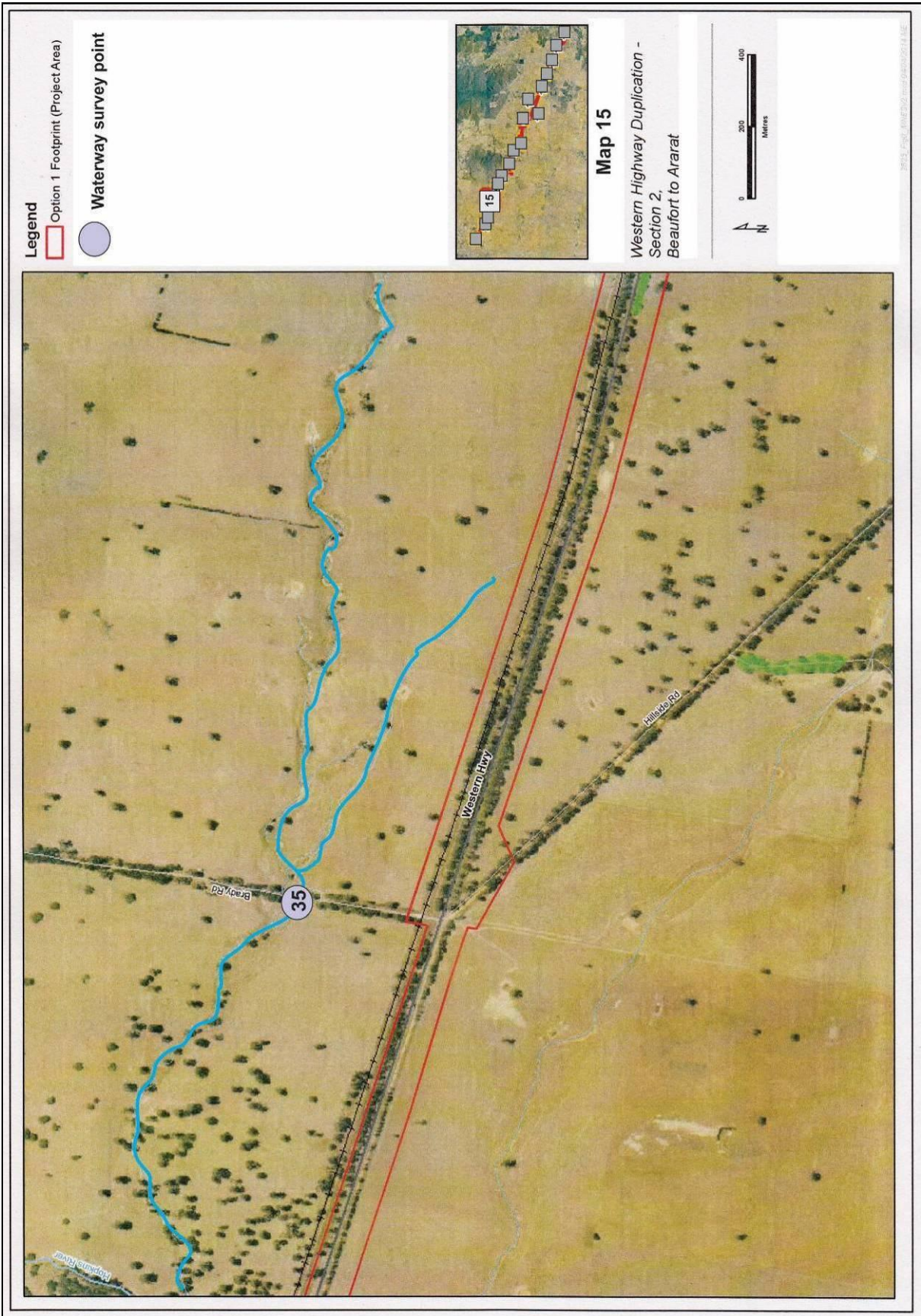


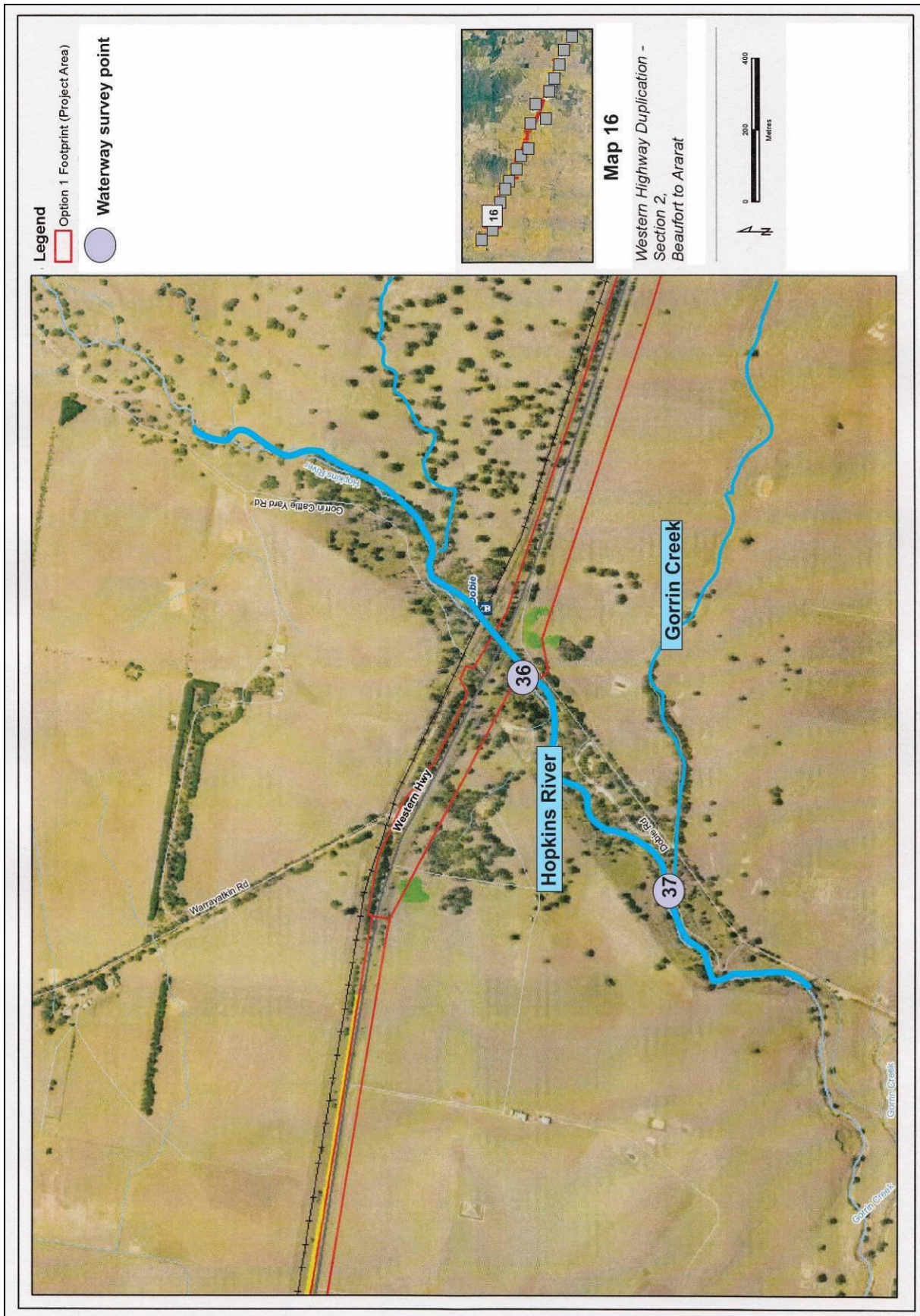


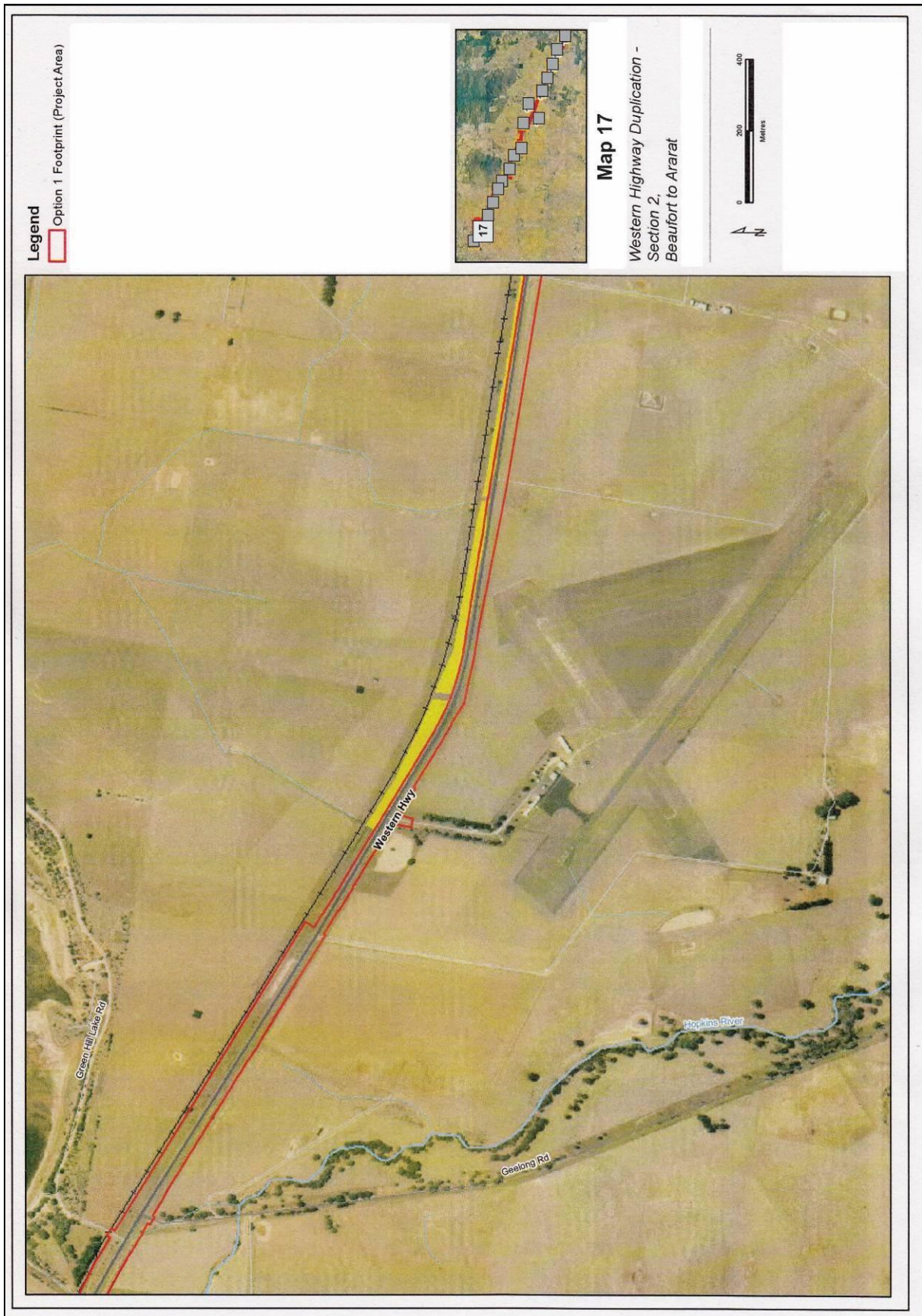


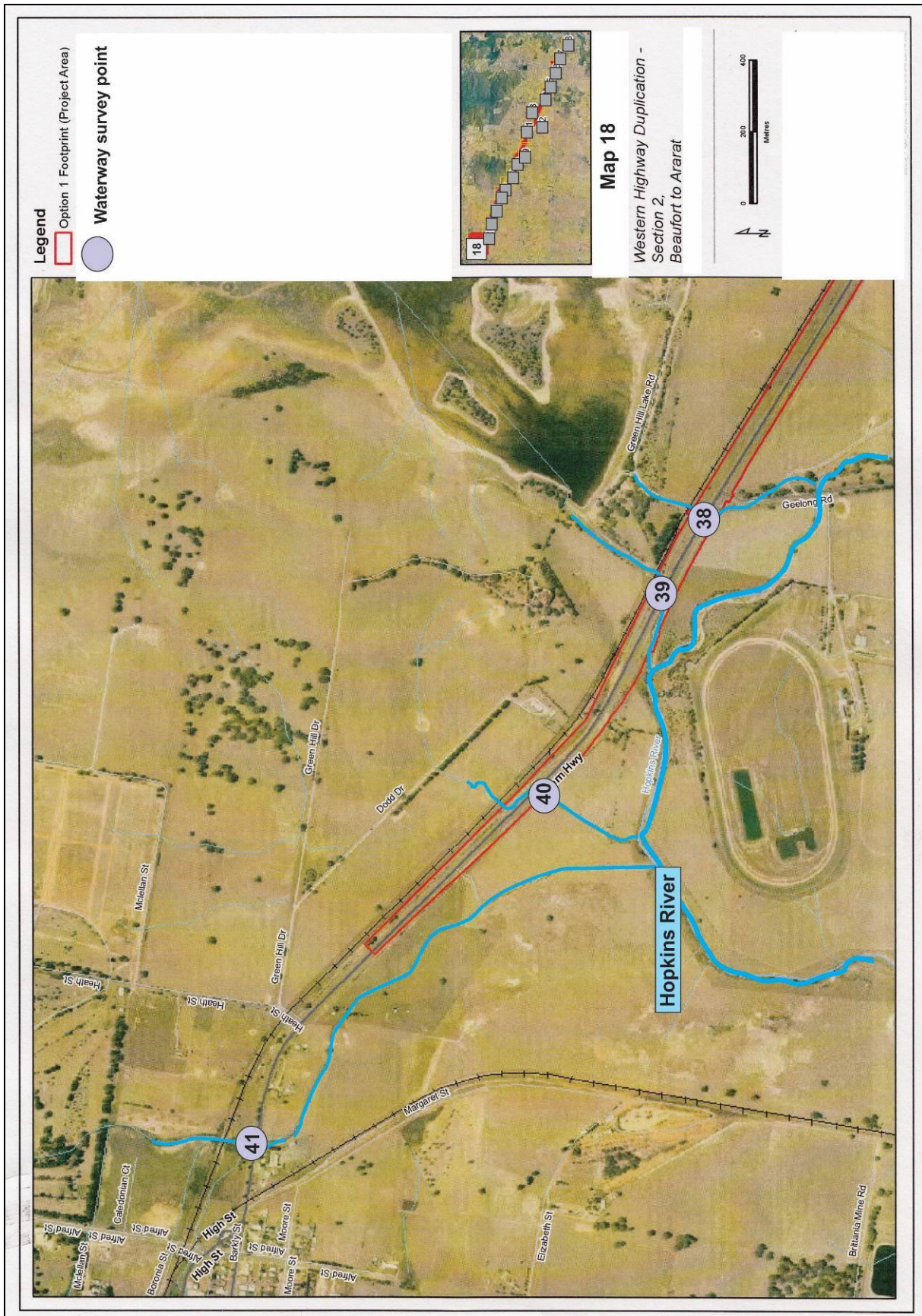












**Appendix 3. Photographs of waterway survey points (Beaufort to Ararat)**



**Site 1. Trawalla Creek tributary at Western Highway- north (left) and south (right).**



**Site 2. Trawalla Creek tributary at Western Highway- north (left) and south (right).**



**Site 3. Trawalla Creek tributary at Western Highway- north (left) and south (right).**



**Site 4. Trawalla Creek tributary - south of Western Highway.**



**Site 5. Fiery Creek tributary - south of Western Highway.**



**Site 6. Fiery Creek tributary - north of Western Highway.**



**Site 7. Fiery Creek tributary – south of Western Highway.**



**Site 8. Fiery Creek tributary Eurambeen Raglan Road – west (left) and east (right).**



**Site 9. Fiery Creek tributary Eurambeen Raglan Road – west (left) and east (right).**



**Site 10. Fiery Creek at Western Highway – north (left) and south (right).**



**Site 11. Middle Creek tributary at Western Highway – north (left) and south (right).**



**Site 12. Middle Creek tributary at Western Highway – north (left) and south (right).**





**Site 13. Middle Creek at Western Highway – north (left) and south (right).**



**Site 14. Middle Creek tributary at Western Highway – north (left) and south (right).**



**Site 15. Charliecombe Creek tributary at Waldrons Road – north (left) and south (right).**



**Site 16. Charliecombe Creek tributary at Western Highway – north (left) and south (right).**



**Site 17. Charliecombe Creek tributary at Western Highway – north (left) and south (right).**



**Site 18. Charliecombe Creek tributary at Western Highway – north (left) and south (right).**



**Site 19. Charliecombe Creek tributary at Anderson Road – west (left) and east (right).**



**Site 20. Charliecombe Creek tributary at Anderson Road – west (left) and east (right).**



**Site 21. Charliecombe Creek tributary at Western Highway – north (left) and south (right).**



**Site 22. Billy Billy Creek tributary at Peacocks Road – west (left) and east (right).**



**Site 23. Billy Billy Creek tributary at Western Highway – west (left) and east (right).**



**Site 24. Billy Billy Creek on alignment 600 metres north of Western Highway.**



**Site 25. Billy Billy Creek 500 metres north of Western Highway.**



**Site 26. Billy Billy Creek at Western Highway – north (left) and south (right).**



**Site 27. Billy Billy Creek at Buangor rail line– north (left) and south (right).**



**Site 28. Billy Billy Creek at Western Highway west of Buangor – north (left) and south (right).**



**Site 29. Billy Billy Creek at Pope Road – west (left) and east (right).**



**Site 30. Billy Billy Creek tributary at Western Highway – north (left) and south (right).**



**Site 31. Billy Billy Creek tributary at rail line.**



**Site 32. Gorrin Creek tributary at Hillside Road.**



**Site 33. Gorrin Creek tributary at Hillside Road.**



**Site 34. Hopkins River tributary at Langi Ghiran Picnic Ground Road – west (left) and east (right).**



**Site 35. Hopkins River tributary at Brady Road.**



**Site 36. Hopkins River at Western Highway – north (left) and south (right).**





**Site 37. Gorrin Creek at the Hopkins River junction, Dobie Road – west (left) and east (right).**



**Site 38. Hopkins River tributary, south of Western Highway.**



**Site 39. Greenhill Creek at Western Highway – north (left) and south (right).**



**Site 40. Hopkins River tributary south of Western Highway.**

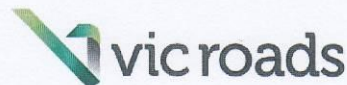


**Site 41. Cemetery Creek at Western Highway – north (left) and south (right).**

**Appendix 4. Grid references of waterway survey points (Beaufort to Ararat)**

Site	Waterway	Location	East	North	Aquatic habitat	Connection
1	Trawalla Creek tributary	Western Highway	708585	5855289	dry channel	Connected tributaries
2	Trawalla Creek tributary	Western Highway	707912	5855488	dry channel	
3	Trawalla Creek tributary	Western Highway	707802	5855532	pools	
4	Trawalla Creek tributary	Western Highway	707062	5855956	dry channel	
5	Fiery Creek tributary east	Western Highway	706229	5856586	dry channel	Connected tributaries
6	Fiery Creek tributary east	Western Highway	705933	5856761	2 farm dams	
7	Fiery Creek tributary east	Western Highway	704407	5873890	dry channel	
8	Fiery Creek tributary north	Eurambeen Raglan Road	705094	5858230	farm dam	Connected tributaries
9	Fiery Creek tributary north	Eurambeen Raglan Road	703862	5857746	dry channel	
10	Fiery Creek	Western Highway	703630	5857895	pools	Main channel
11	Middle Creek tributary east	Western Highway	700716	5859100	dry channel	Connected tributaries
12	Middle Creek tributary east	Goulds Lane	699696	5858384	dry channel	
13	Middle Creek	Western Highway	699279	5859645	pools	Main channel
14	Middle Creek tributary west	Western Highway	698966	5859764	dry channel	tributary
15	Charliecombe Creek tributary east	Waldrons Road	698196	5860609	dry channel	Connected tributaries
16	Charliecombe Creek tributary east	Western Highway	697401	5860340	dry channel	
17	Charliecombe Creek tributary east	Western Highway	695700	5861024	dry channel	
18	Charliecombe Creek	Western Highway	695442	5861118	one pool	Connected tributaries
19	Charliecombe Creek tributary west	Anderson Road	695004	5863390	dry channel	
20	Charliecombe Creek tributary west	Anderson Road	693978	5861997	dry channel	
21	Charliecombe Creek tributary west	Western Highway	693613	5861833	dry channel	
22	Billy Billy Creek tributary east	Peacocks Road	693287	5863043	dry channel	One tributary
23	Billy Billy Creek tributary east	Western Highway	692745	5862124	dry channel	
24	Billy Billy Creek	600 m north of Western Highway	692402	5862821	dry channel	Main channel
25	Billy Billy Creek	500 m north of Western Highway	692493	5862608	pools	
26	Billy Billy Creek	Western Highway	692591	5862242	pools	
27	Billy Billy Creek	Southern side of rail line	692491	5861992	pools	
28	Billy Billy Creek tributary west	Western Highway, west of Buangor	690086	5863667	dry channel	Connected tributaries
29	Billy Billy Creek tributary west	Pope Road	688721	5864150	dry channel	
30	Billy Billy Creek tributary west	Western Highway	687996	5865074	dry channel	
31	Billy Billy Creek tributary west	Northern side of rail line	687839	5864639	dry channel	
32	Gorrin Creek tributary	Hillside Road	686874	5864747	dry channel	
33	Gorrin Creek tributary	Hillside Road	681484	5866921	dry channel	Connected tributaries
34	Hopkins River tributary	Langi Ghiran Picnic Ground Road	683125	5867720	dry channel	Connected tributaries
35	Hopkins River tributary	Brady Road	680329	5868680	dry channel	
36	Hopkins River	Western Highway	678836	5868767	dry channel	Main channel
37	Gorrin Creek	At Hopkins River, Dobie Road	678270	5868274	dry channel	tributary
38	Hopkins River tributary	Western Highway	674933	5870246	dry channel	tributary
39	Greenhill Creek	Western Highway	674643	5870447	dry channel	tributary
40	Hopkins River tributary	Western Highway	674005	5870841	dry channel	tributary
41	Cemetery Creek	Western Highway	673105	5871592	dry channel	tributary

## Appendix 5. Dwarf galaxias and Fiery Creek works



Western Highway Project  
237 Ring Road  
Wendouree Victoria 3355  
PO Box 148 Wendouree Victoria 3355

Telephone 1300 779 642  
Fax (03) 5309 1099  
Email whp@roads.vic.gov.au

[vicroads.vic.gov.au](http://vicroads.vic.gov.au)

Charmayne Murray  
Victoria Section  
South-Eastern Australian Environment Assessments Branch  
Environment Assessment Branch  
Department of Environment  
GPO Box 787  
**CANBERRA ACT 2601**

6 June 2014  
Our Ref: n2539061  
File No: CN-8612-065-002  
Your Ref: EPBC 2010/5741

Dear Charmayne

**DWARF GALAXIAS LOCATED IN FIERY CREEK  
WESTERN HIGHWAY PROJECT SECTION 2- BEAUFORT TO ARARAT, VICTORIA  
(EPBC 2010/5741)**

As part of the Western Highway Project Section 2- Beaufort to Ararat Environment Effects Statement, survey for Dwarf Galaxias habitat was undertaken at Fiery Creek with no habitat or population identified.

On 25 May 2014 a small isolated area of Dwarf Galaxias population was located within Fiery Creek (Attachment 1). This area was previously unknown to contain Dwarf Galaxias habitat or population and does not form part of our EPBC approval conditions (2010/5741).

The area was surveyed by John McGuckin (Steamline Research), a fish biologist with 28 years of experience. John has described the area as:

- A limited area of 3 x 2 metres within the stream
- A non-primary source of Dwarf Galaxias population
- Having highly disturbed river banks with no fringe vegetation.

John McGuckin has informed VicRoads that the area is highly unlikely to have a significant impact to the population given there is no in-stream works within Fiery Creek.

Regardless of this assessment, VicRoads, in consultation with John McGuckin, will commit to the following:

1. Design and construct the Fiery Creek bridges with no in-stream impact. Detailed design drawings are shown in Attachment 2
2. No go zones are installed at a buffer of at least 3m from the Dwarf Galaxias habitat and at a buffer of 10m from the bank where possible. A proposed sketch is shown in Attachment 3
3. Best practice sediment controls are enforced as per VicRoads standard contract clause 177 (Attachment 4)
4. Prior to commencement of construction and throughout the construction period, water quality monitoring will occur each week both upstream and downstream of the Fiery Creek structures.

Please confirm this approach is satisfactory to the Department at your earliest convenience.

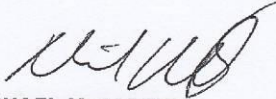


VicRoads ABN 61 760 960 480

PSL 126

Should you require further information, please contact Michael Wickerson from this office (Tel: 03 5309 1075) would be pleased to assist.

Yours sincerely



**MICHAEL McCARTHY**  
**PROJECT DIRECTOR - WESTERN HIGHWAY**

Enclosed: Attachment 1- Fiery Creek location  
Attachment 2- Fiery Creek detailed design  
Attachment 3- Proposed No Go Zones at Fiery Creek  
Attachment 4- Section 177 PART D Erosion and Sediment Controls

**Attachment 1**

- Legend**
- Option 1 Footprint (Project Area)
  - EPBC Act listed Fauna Species
    - Golden Sun Moth
    - Golden Sun Moth habitat
  - EPBC Act listed Communities
    - Natural Temperate Grassland of the VVP
  - Mitigation Actions
    - No Go Zone
  - Water Quality Monitoring: Three upstream and four downstreams will be established prior to construction and clearly marked for on-going monitoring.



**Map 16**  
**Matters of NES**  
**Western Highway Duplication -**  
**Section 2**  
**Beaufort to Ararat**  
 Issue Date: 30/04/2014

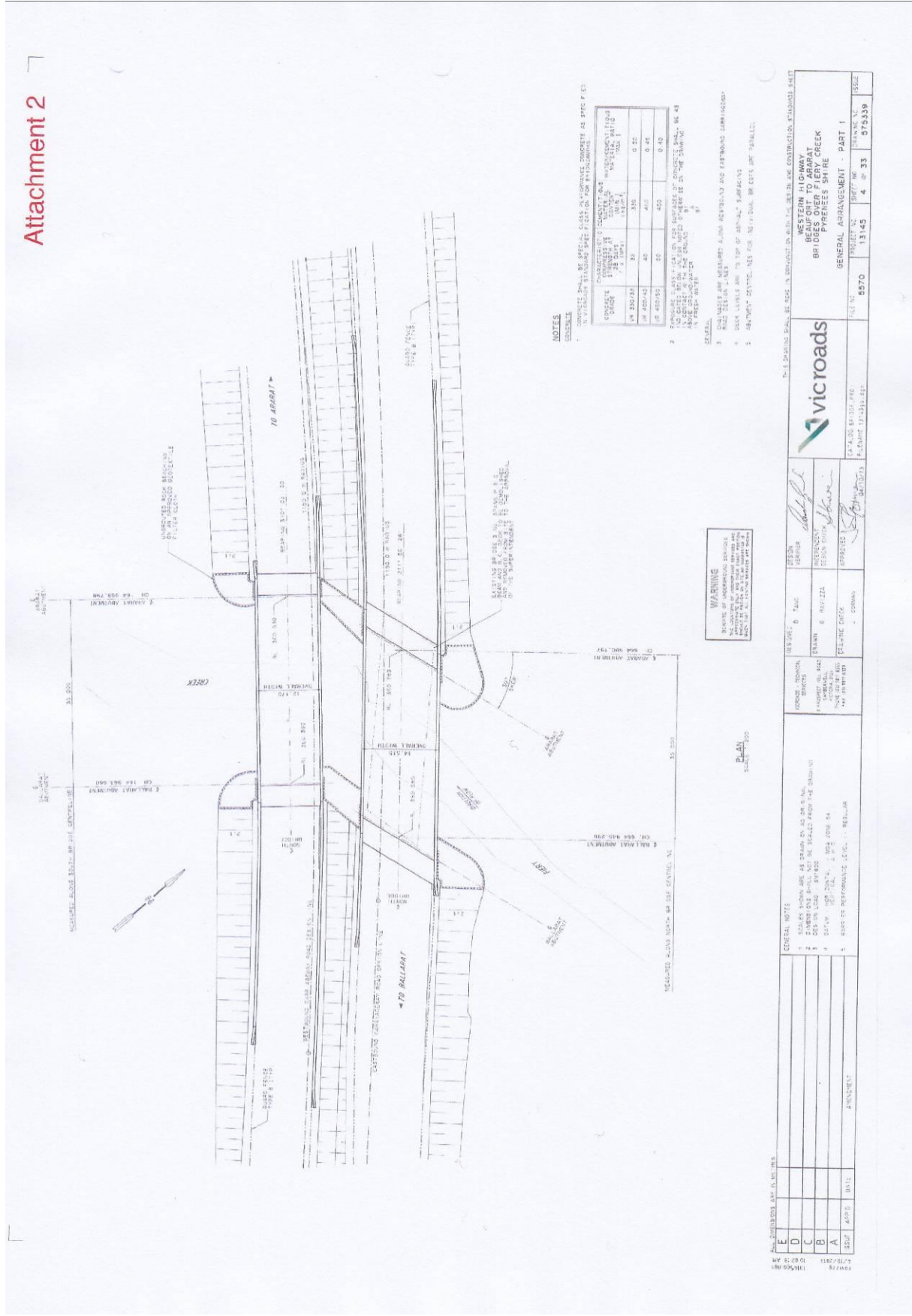


Map created by Ecology & Heritage Partners with ecological data sourced from Ecology & Heritage Partners' Network.  
 Map Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication. It is a preliminary map and should not be used for any purpose other than the intended purpose. The State of Victoria and its agencies do not accept any liability for any errors or omissions, whether in whole or in part, which may appear in this publication.



**Dwarf Galaxias**  
 located on the  
 south side of  
 Fiery Creek

Attachment 2



Attachment 2

**NOTES**  
**GENERAL**  
 1. THE BRIDGE SHALL BE BUILT IN ACCORDANCE WITH THE SPECIFICATIONS SET OUT IN THE CONTRACT DOCUMENTS AND AS SPECIFIED IN THE STANDARD DRAWINGS SPECIFIED IN THE CONTRACT DOCUMENTS.  
 2. THE BRIDGE SHALL BE BUILT IN ACCORDANCE WITH THE SPECIFICATIONS SET OUT IN THE CONTRACT DOCUMENTS AND AS SPECIFIED IN THE STANDARD DRAWINGS SPECIFIED IN THE CONTRACT DOCUMENTS.  
 3. THE BRIDGE SHALL BE BUILT IN ACCORDANCE WITH THE SPECIFICATIONS SET OUT IN THE CONTRACT DOCUMENTS AND AS SPECIFIED IN THE STANDARD DRAWINGS SPECIFIED IN THE CONTRACT DOCUMENTS.  
 4. THE BRIDGE SHALL BE BUILT IN ACCORDANCE WITH THE SPECIFICATIONS SET OUT IN THE CONTRACT DOCUMENTS AND AS SPECIFIED IN THE STANDARD DRAWINGS SPECIFIED IN THE CONTRACT DOCUMENTS.  
 5. THE BRIDGE SHALL BE BUILT IN ACCORDANCE WITH THE SPECIFICATIONS SET OUT IN THE CONTRACT DOCUMENTS AND AS SPECIFIED IN THE STANDARD DRAWINGS SPECIFIED IN THE CONTRACT DOCUMENTS.

CHARACTERISTIC	UNIT	VALUE
1. BRIDGE LENGTH	M	71.000
2. BRIDGE WIDTH	M	12.000
3. BRIDGE HEIGHT	M	4.000
4. BRIDGE AREA	M <sup>2</sup>	852.000
5. BRIDGE VOLUME	M <sup>3</sup>	3368.000

**WARNING**  
 THERE ARE UNDERGROUND SERVICES IN THIS AREA. ANY WORK SHOULD BE STOPPED IMMEDIATELY IF ANY SERVICES ARE FOUND TO BE DAMAGED OR EXPOSED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL SERVICES.

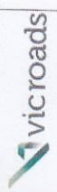
**PLAN**  
 14/02/2020

**GENERAL NOTES**

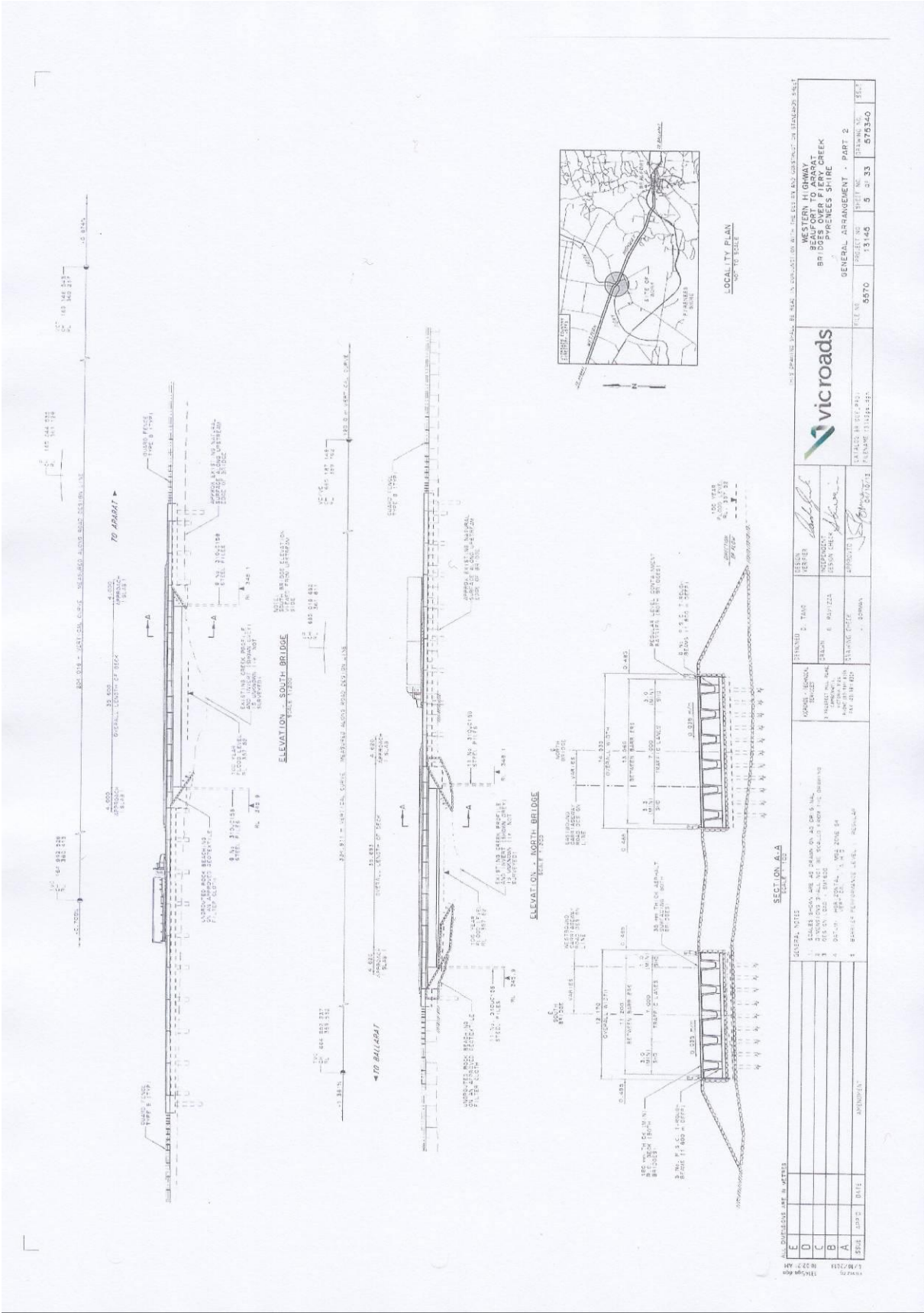
1	SCALE SHALL BE AS SHOWN ON THE DRAWING.
2	ALL DIMENSIONS SHALL BE AS SHOWN ON THE DRAWING UNLESS OTHERWISE SPECIFIED.
3	ALL DIMENSIONS SHALL BE AS SHOWN ON THE DRAWING UNLESS OTHERWISE SPECIFIED.
4	ALL DIMENSIONS SHALL BE AS SHOWN ON THE DRAWING UNLESS OTHERWISE SPECIFIED.
5	ALL DIMENSIONS SHALL BE AS SHOWN ON THE DRAWING UNLESS OTHERWISE SPECIFIED.

**GENERAL ARRANGEMENT - PART 1**

NO.	DESCRIPTION	QTY	UNIT	AMOUNT	PRICE	TOTAL
5570	BRIDGE	1	BRIDGE	1	13145	13145
5571	BRIDGE	1	BRIDGE	1	57339	57339

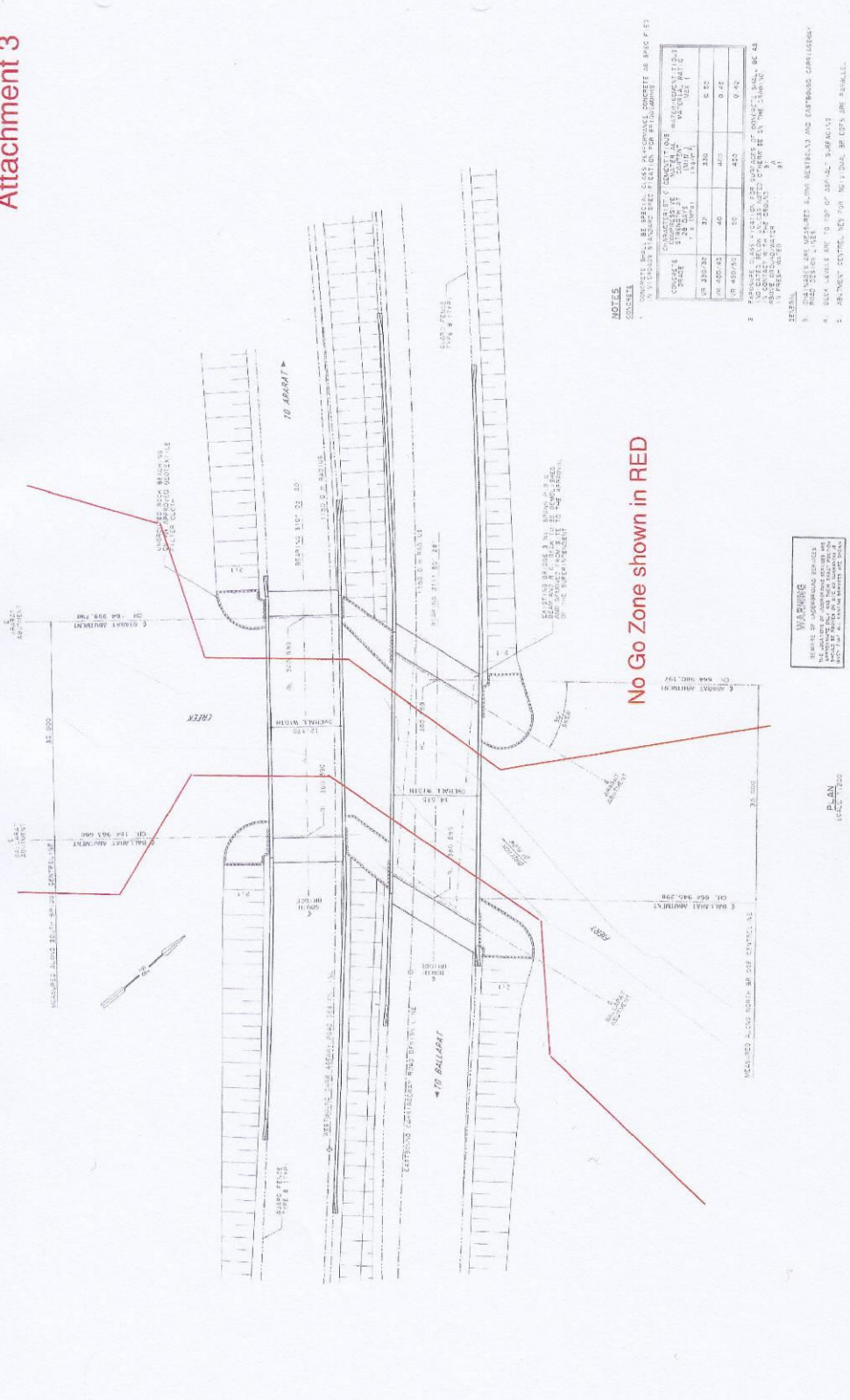


WESTERN HIGHWAY  
 BEAUFORT TO ARARAT  
 BRIDGE OVER CREEK  
 PYRENEAN SHIRE  
 GENERAL ARRANGEMENT - PART 1





Attachment 3



**No Go Zone shown in RED**

**NOTES**  
 GENERAL  
 1. ALL DIMENSIONS ARE IN METRES.  
 2. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.  
 3. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.  
 4. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.  
 5. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.

NO.	DESCRIPTION	QUANTITY	UNIT
1	GRAVEL	100	M <sup>3</sup>
2	CRUSHED BRICK	100	M <sup>3</sup>
3	CONCRETE	100	M <sup>3</sup>
4	ASPHALT	100	M <sup>2</sup>
5	PAVING	100	M <sup>2</sup>

**WARNING**  
 This drawing shall be used in accordance with the conditions of use set out in the contract documents. It is the user's responsibility to ensure that the drawing is used in accordance with the conditions of use.

PLAN  
 SCALE 1:1000

<p>1. SCALE TO SHOW ALL DIMENSIONS AS SHOWN ON THIS PLAN.</p> <p>2. DIMENSIONS SHALL NOT BE CALLED FROM THE DRAWING.</p> <p>3. DIMENSIONS SHALL NOT BE CALLED FROM THE DRAWING.</p> <p>4. DIMENSIONS SHALL NOT BE CALLED FROM THE DRAWING.</p> <p>5. DIMENSIONS SHALL NOT BE CALLED FROM THE DRAWING.</p>	<p>DESIGNER: [Signature]</p> <p>CHECKED: [Signature]</p> <p>DATE: 11/11/11</p>	<p>PROJECT NO: 5570</p> <p>PROJECT NAME: WESTERN HIGHWAY</p> <p>PROJECT LOCATION: BEAUFORT TO ARARAT</p> <p>PROJECT CLIENT: BIRDSBOROUGH COUNCIL</p> <p>PROJECT SHIRE: BIRDSBOROUGH SHIRE</p> <p>PROJECT PART: PART 1</p> <p>PROJECT SHEET NO: 4 OF 33</p> <p>PROJECT SHEET TOTAL: 37</p> <p>PROJECT SHEET NO: 570339</p>
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## PART D - EROSION AND SEDIMENT CONTROL

### 177.D1 EROSION AND SEDIMENT CONTROL

#### (a) General

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.

#### (b) Work in/near Waters

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, EMPs shall be prepared to protect beneficial uses in accordance with any permit, the *State Environmental Planning Policy (Waters of Victoria)* its schedules and best practice guidelines.

#### (c) Sedimentation 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 or 'VicRoads Temporary Sedimentation Basin Sizing Tool'.

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 in accordance with Attachment C to this Section 177. The declaration shall accompany submission of the sedimentation basin designs to the Superintendent.

**HP 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.

The Contractor shall maintain the capacity of the sedimentation basin and shall ensure compliance with Clause 177.B1(b)(ii) if dewatering to a waterway.

(d) Stockpiles

Where soil is stockpiled on site, such stockpiles shall be located, where possible, to provide a clearance of not less than 10 m from waterways. Where it is not possible to provide a clearance of 10 m, the stockpile shall be above the normal high water level of the waterways and additional protection shall be provided to prevent the stockpiled material entering the waterways.

(e) 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 days;
- within one hour of the commencement of any runoff resulting from rain events during working hours;
- every four hours during periods of continuous rain during working hours;
- within 12 hours of a rain event outside working hours.

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.



Australian Government  
Department of the Environment

Date Received	19/06/14
File Location:	
GD No.	
Distribution	
Init.	Sign
mrm	
SP	
MG	
MW	
VG	
AB	
To Reply:	

EPBC Ref: 2010/5741

Mr Michael McCarthy  
Project Director - Western Highway Project  
VicRoads  
PO Box 148  
WENDOUREE VIC 3355

Dear Mr McCarthy

**Western Highway Project, Section 2, Beaufort to Ararat, Victoria (EPBC 2010/5741)**

Thank you for your letter dated 6 June 2014, providing an update on the project Western Highway Project, Section 2, Beaufort to Ararat, Victoria (EPBC 2010/5741), approved under the *Environment Protection and Biodiversity Conservation Act 1999* on 17 April 2014.

In your letter, you state that surveys have been undertaken by a suitably qualified ecologist to inform the updated Dwarf Galaxias Management Plan required under condition 4 of the approval decision notice. You note the surveys identified a small isolated population of Dwarf Galaxias at Fiery Creek, not previously identified by targeted surveys undertaken for the assessment documentation. The population is described as not a primary source of Dwarf Galaxias, located in an isolated pond approximately 3m by 2m within a highly disturbed river bank with no fringe vegetation.

The Department notes that the action, as described in the referral documentation and approval notice, will not involve in-stream works at Fiery Creek or clearing of habitat for the Dwarf Galaxias, and includes a commitment to appropriate sediment and erosion controls along with water quality monitoring. Based on the information in the letter, and the commitments in the design of the approved action, I consider that the population of Dwarf Galaxias at Fiery Creek is not a significant population, and is appropriately managed by existing controls. I consider the action is in accordance with existing approval conditions and no further conditions are required.

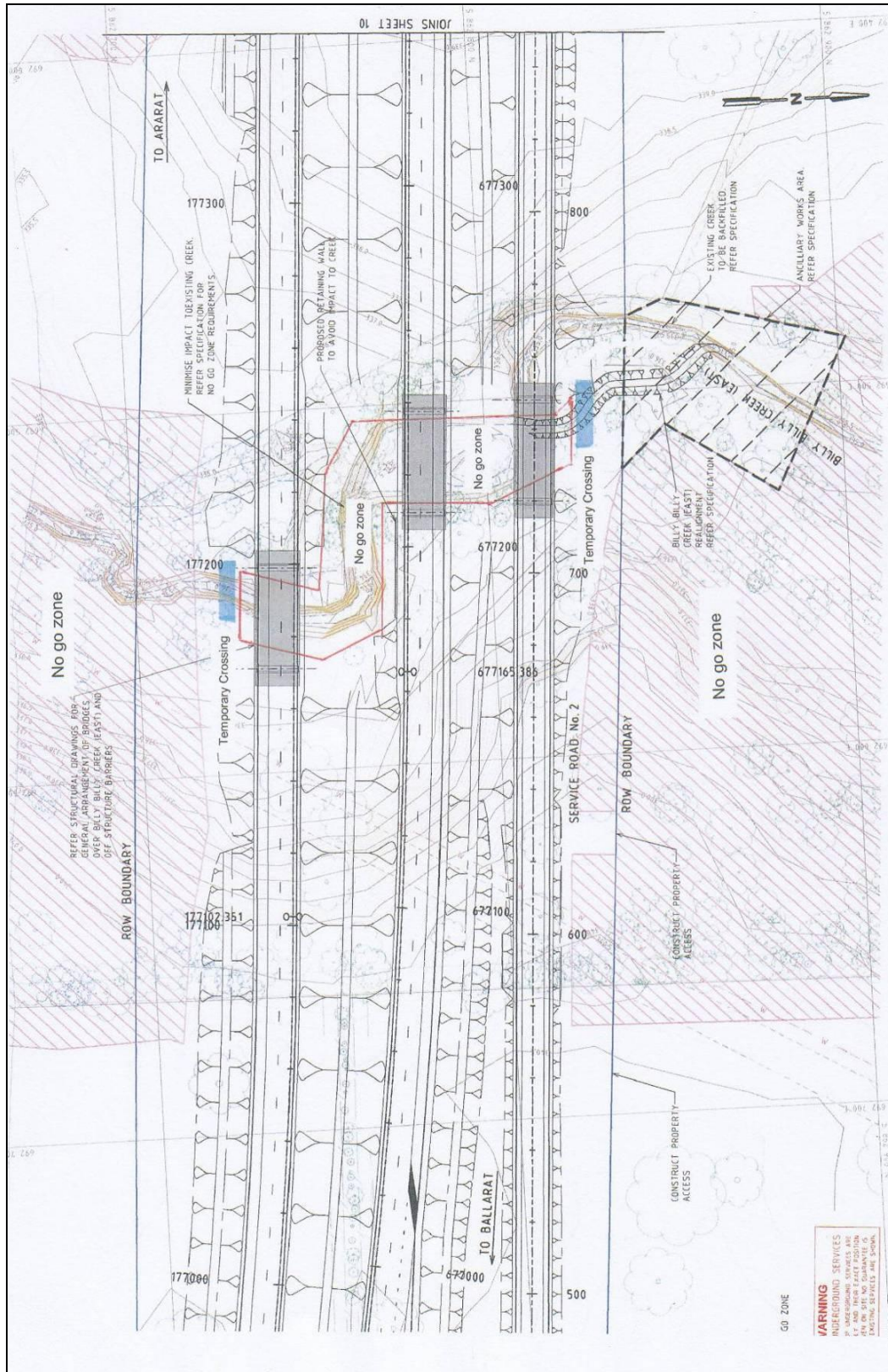
If you have any questions about this advice, please contact the project manager, Jackie Lyons, by email to [jackie.lyons@environment.gov.au](mailto:jackie.lyons@environment.gov.au), or telephone (02) 6274 2793 and quote the EPBC reference number shown at the beginning of this letter.

Yours sincerely

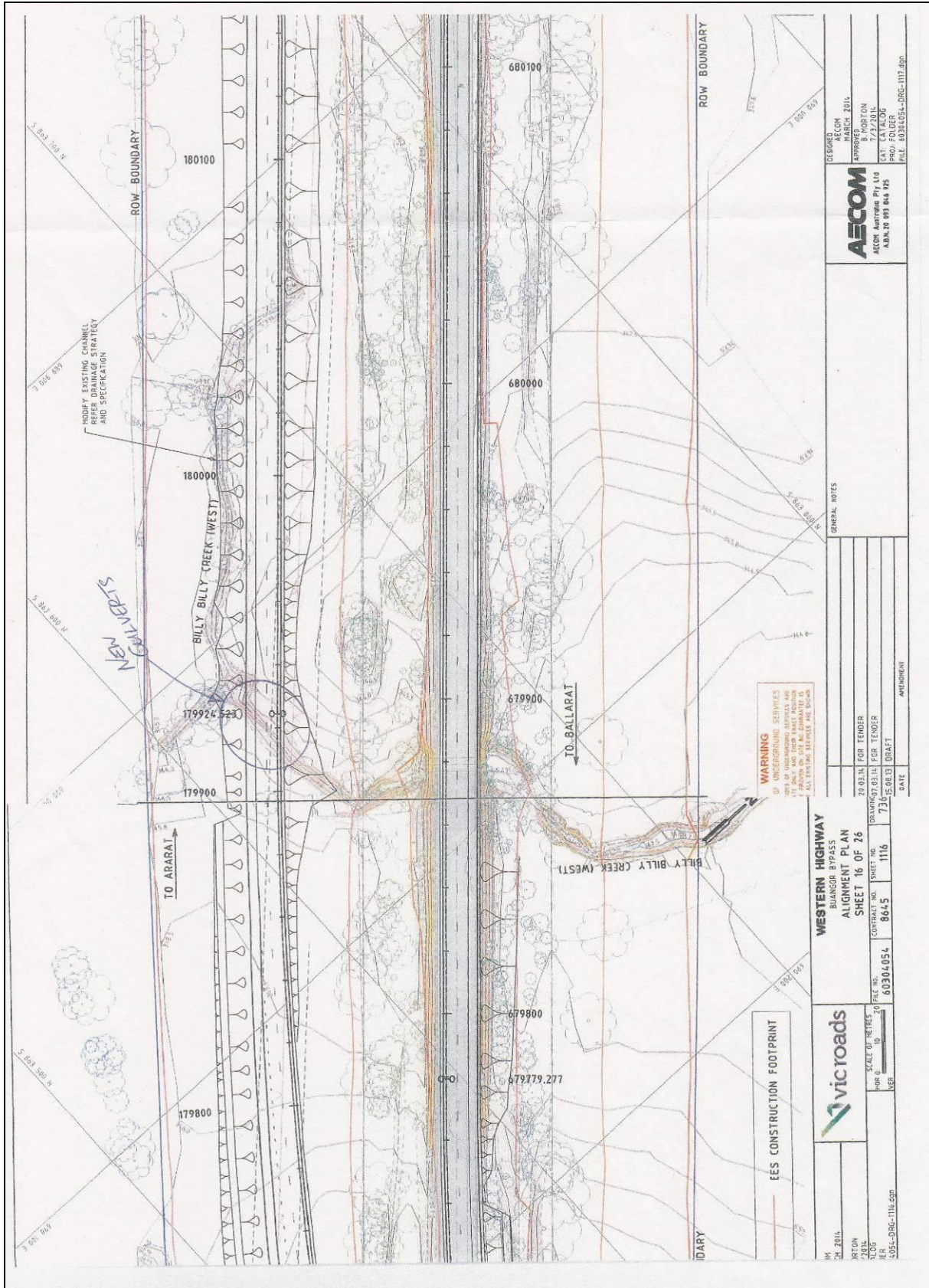
James Tregurtha  
Assistant Secretary  
South-Eastern Australia Environment Assessments Branch

12 June 2014

### Appendix 6. Bridge and culvert drawings for Billy Billy Creek



The new Billy Billy Creek bridge and “No Go Zones’ on the Western Highway, north of Buangor.



The new Billy Billy Creek culvert on the Western Highway, west of Buangor.

## Appendix 7. Specification for Water Quality and Sediment Controls

### 1200.04 WATER

#### (a) General

The quality of water in waterways shall not be detrimentally impacted by runoff from the site.

#### (b) Monitoring

##### (i) General

Water quality and rainfall shall be monitored for the parameters identified in Table 1200.041 during all stages of construction to ensure that the water quality in the receiving waterways:

- does not deteriorate between the upstream and downstream limits of the work site during the construction period (where upstream results become the background limits) - the allowable variation between results shall be no more than twice the measurement uncertainty; or
- is as agreed between the Contractor, the Superintendent and EPA.

The Contractor shall provide and maintain equipment capable of providing instantaneous monitoring of parameters as required in Table 1200.041 and have such equipment available on-site at all times. All equipment associated with monitoring shall be maintained and calibrated in accordance with the manufacturer's or equipment supplier's requirements.

**Table 1200.041 Construction Monitoring**

Parameter	Method
Turbidity – NTU	Measure with on-site meter
Electrical Conductivity (EC) – $\mu\text{S}/\text{cm}$	Measure with on-site meter
pH	Measure with on-site meter
Dissolved oxygen (DO) – mg/L	Measure with on-site meter
Temperature - °C	Measure with on-site meter
Litter (definition, including solid inert waste)	Visual (prevent litter from entering waterways and drainage systems)
Oils and Greases	Visual (No visible free oil or greases)
Rainfall	Measure with on-site meter capable of logging rainfall at a minimal interval of 10 minutes

##### (ii) Dewatering

Water quality monitoring shall be undertaken when dewatering ponded water to receiving waterways.

The quality of ponded water to be dewatered to receiving waterways shall not exceed 30 NTU or shall be equal to or better than the water quality in the receiving waterways if the turbidity in the receiving waterway is less than 30 NTU.

The pH of ponded water to be dewatered shall be within the range of 6.4 – 7.7.

(iii) Bypass Pumping

Water quality monitoring shall be undertaken when bypass pumping water around works that is being undertaken within a waterway.

(iv) Locations

Monitoring shall be carried out at locations as follows:

- in waterways and/or drainage infrastructure upstream and downstream of the limits of the Site; and
- at appropriate locations in waterways within the Site including immediately upstream and downstream of each point source (or flow) entering along the length of waterways within the Site.

Details of all monitoring locations shall be maintained on the scaled drawings associated with the EMP. Monitoring sites must be accessible during all on-site activity and in all weather conditions.

Monitoring for dewatering activities will be undertaken at locations as follows:

- the ponded water at the pump intake; and
- in the receiving waterways and/or drainage infrastructure immediately upstream and downstream of the discharge point (within the mixing zone of the waterway and discharged water).

Monitoring for bypass pumping activities will be undertaken at locations immediately upstream and downstream of the pumping activity.

(v) Timing

Monitoring shall be undertaken:

- immediately prior to work commencing;
- fortnightly, *except for Billy Billy Creek where monitoring shall be weekly*;
- for each rain event as follows:
  - within one hour of commencement of the rain event during working hours,
  - every 4 hours for periods of continuous rain during working hours, and
  - within 12 hours of a rain event, outside working hours;
- immediately prior to the commencement of and then hourly during dewatering and bypass pumping activities.



## **1200.08 EROSION AND SEDIMENT CONTROL**

### **(a) General**

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 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.

### **(b) Work in/near Waterways**

Works shall be programmed and managed so as to avoid work in waterways. Where work in waterways is unavoidable, procedures shall be developed and implemented to satisfy the requirements of this Clause 1200 and as required by any permits from the responsible authority(s).

Where construction activities are undertaken in, near or over waterways, Environmental Management Plan(s) shall be prepared to protect beneficial uses in accordance with any permit, the State Environment Protection Policy (Waters of Victoria), its schedules and best practice guidelines.

Any work in waterways shall be limited to times when the waterway is in a low flow or in a no-flow condition, except where permission is obtained from the Glenelg-Hopkins Catchment Management Authority (GHCMA).

### **(c) Sedimentation Basins**

Sedimentation basins shall be used as the primary sediment control for the works unless the Contractor can demonstrate 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 2 years and 6 hours 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 shall be used. The sizing and modelling of sedimentation basin(s) shall consider the expected works and associated area of disturbance within catchment areas(s) within the site.

The sizing and modelling of temporary sedimentation basins shall be undertaken utilising recognised 'best practice' modelling techniques or by utilising 'VicRoads Temporary Sedimentation Basin Design Tool'.

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 5 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 of this specification. The declaration shall accompany submission of the sedimentation basin designs to the Superintendent.

**HP The Contractor shall submit to the Superintendent the temporary sedimentation designs and the associated independent verification declarations not less than 2 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 percent or more, or whenever the sediment has built up to a point where it is less than 500mm below the spillway crest, whichever occurs earlier.

The Contractor shall maintain the capacity of the sedimentation basin and shall ensure compliance with Clause 1200.04(b)(ii) if dewatering to a waterway.

#### (d) Stockpiles

Where soil is stockpiled on Site, such stockpiles shall be located, where possible, to provide a clearance of not less than 10 metres from waterways. Where it is not possible to provide a clearance of 10 metres, the stockpile shall be above the normal high water level of the waterways and additional protection shall be provided to prevent the stockpiled material entering the waterways.

(e) 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 7 days;
- within one hour of the commencement of any runoff resulting from rain events during working hours;
- every 4 hours during periods of continuous rain during working hours; and
- within 12 hours of a rain event outside working hours.

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 thereafter.