

## 20. Matters of National Environmental Significance

The Biodiversity and Habitat Assessment identified three EPBC listed species (Dwarf Galaxias (vulnerable), Golden Sun Moth (critically endangered) and Spiny Rice-flower (critically endangered)) and two EPBC listed communities (the Natural Temperate Grassland of the Victorian Volcanic Plain (critically endangered) and the Grassy Eucalypt Woodland of the Victorian Volcanic Plain (critically endangered)) that may be impacted by the Project.

During the Options Assessment process, matters of National Environmental Significance (NES) and vegetation of Very High and High conservation significance, were deemed to be of highest conservation significance and priority was given to avoiding and minimising impacts on matters of NES where possible. Through alignment design changes avoidance of significant amounts of matters of NES was achieved. However, it was not possible to entirely avoid impacts on matters on NES. Therefore, it is expected that the Project would remove one Spiny Rice-flower plant; 31.56 hectares (ha) of Golden Sun Moth habitat in Option 1 and 23.8ha of Golden Sun Moth habitat in Option 2; and potentially impact on Dwarf Galaxias habitat. The Project would also remove approximately 5.25ha of Natural Temperate Grassland of the Victorian Volcanic Plain (in both Option 1 and Option 2) and approximately 11.14ha of Grassy Eucalypt Woodland of the Victorian Volcanic Plain for Option 1 and 8.65ha for Option 2.

It is not expected that the Project would have significant impacts on Spiny Rice-flower or the Dwarf Galaxias as only one Spiny Rice-flower plant is expected to be impacted by the Project and management measures including placing bridge structures outside the low flow channel of Billy Billy Creek are expected to result in negligible to low impacts to the Dwarf Galaxias. It is however expected that the Project would have a significant impact on the Golden Sun Moth, the Natural Temperate Grassland of the Victorian Volcanic Plain and the Grassy Eucalypt Woodland of the Victorian Volcanic Plain due to the amounts of this native vegetation that would be removed by the Project.

The impacts on listed flora species and communities would be offset in accordance with the Environmental Offsets Policy –

Consultation Draft August 2011 and Victoria's Native Vegetation Management – A Framework for Action

It is expected that VicRoads would be able to source appropriate offsets for removal of native vegetation required for this Project.

### 20.1 Introduction

This Chapter provides a summary of the predicted risks and impacts from the Project on matters of National Environmental Significance (NES) as defined in the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

An EPBC Act Referral was submitted for the Project and it was determined by the Commonwealth Environment Minister that the Project would be a controlled action on 17 December 2010, due to the presence of listed threatened species and communities (under Sections 18 and 18A of the EPBC Act).

The Project is being assessed in accordance with the bilateral agreement that exists between the Commonwealth and the State of Victoria relating to Environmental Impact Assessment.

Information on the biodiversity and habitat values (in addition to matters of NES) is outlined in Chapter 13 (Biodiversity and Habitat). Information on the Options Assessment is outlined in Chapter 5 (Project Alternatives).

This Chapter is based on the Biodiversity and Habitat Assessment Report completed by Ecology and Heritage Partners Pty Ltd (EHP, 2012) which is included in Technical Appendix H.

### 20.2 Scoping requirements

The Victorian Minister for Planning's Final Scoping Requirements state: "The EES should also include a separate summary assessment addressing effects on, and avoidance, mitigation and management measures for, matters of national environmental significance. This summary must include, but not be limited to, information on the following species and ecological communities listed as threatened under the EPBC Act:

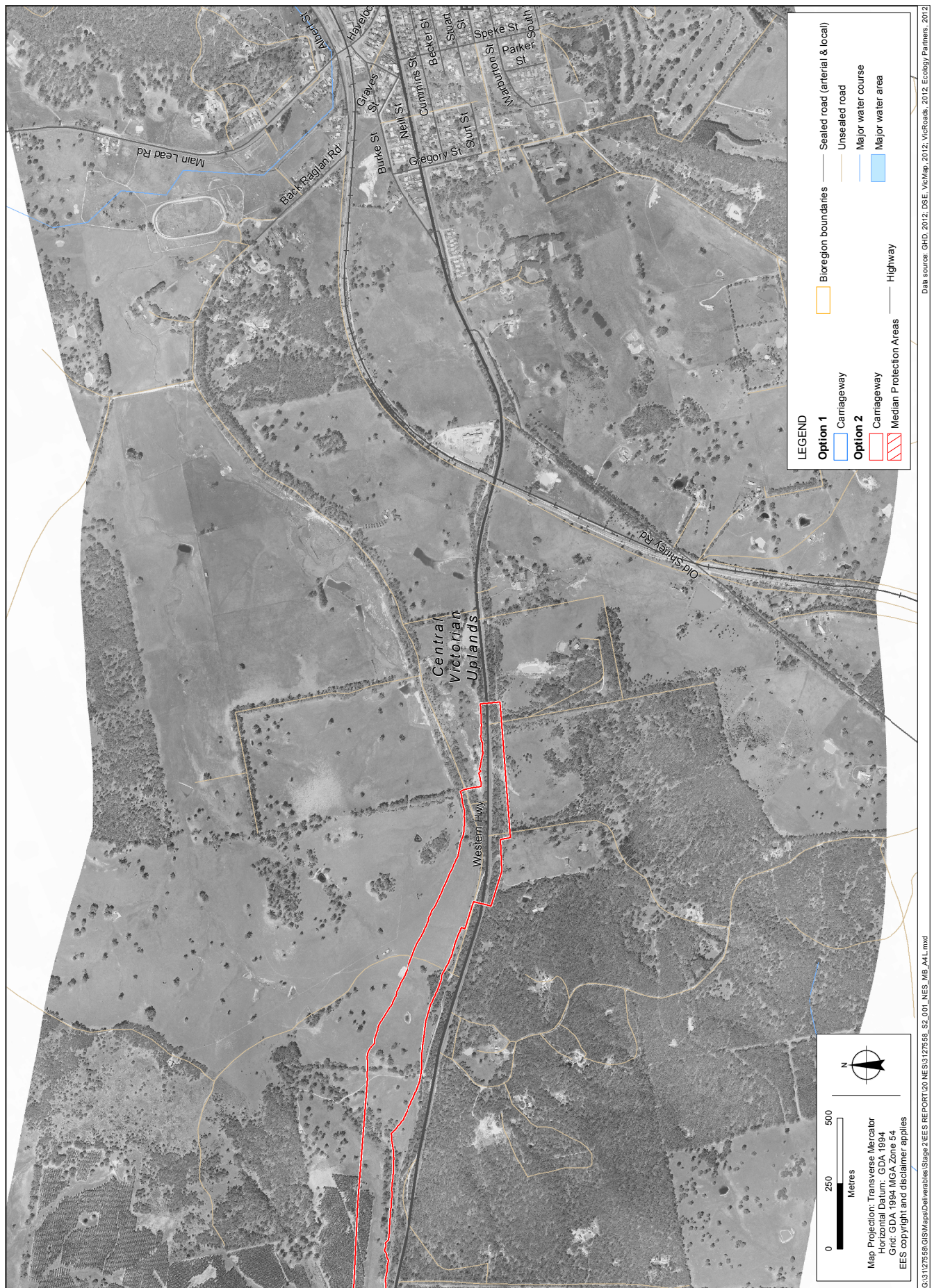
- Southern Brown Bandicoot, Golden Sun Moth, Plains Wanderer, Striped Legless Lizard, Growling Grass Frog, Murray Cod, Australian Grayling and Eastern Dwarf Galaxias;
- Button Wrinklewort, Spiny Rice-flower, Langi Ghiran Grevillea, Tawny Spider-orchid and Large-fruit Fireweed;
- Natural Temperate Grasslands of the Victorian Volcanic Plains; and
- Buloke Woodlands of the Riverine and Murray-Darling Depression Bioregions".

## 20.3 Study Area

The study area was defined for the purposes of characterising the existing conditions for the Project, and to consider alignment alternatives. The project area encompasses a corridor extending up to 1500 metres (m) either side (north and south) of the edge of the current road reserve (encompassing the extent of the new alignment possibilities). The study area for the matters of NES assessment is equivalent to the project area as it is the area of direct impact where native vegetation and habitat would be removed. The study area is shown in Figure 20-1.







**Figure 20-1a Matters of NES in the Study Area**



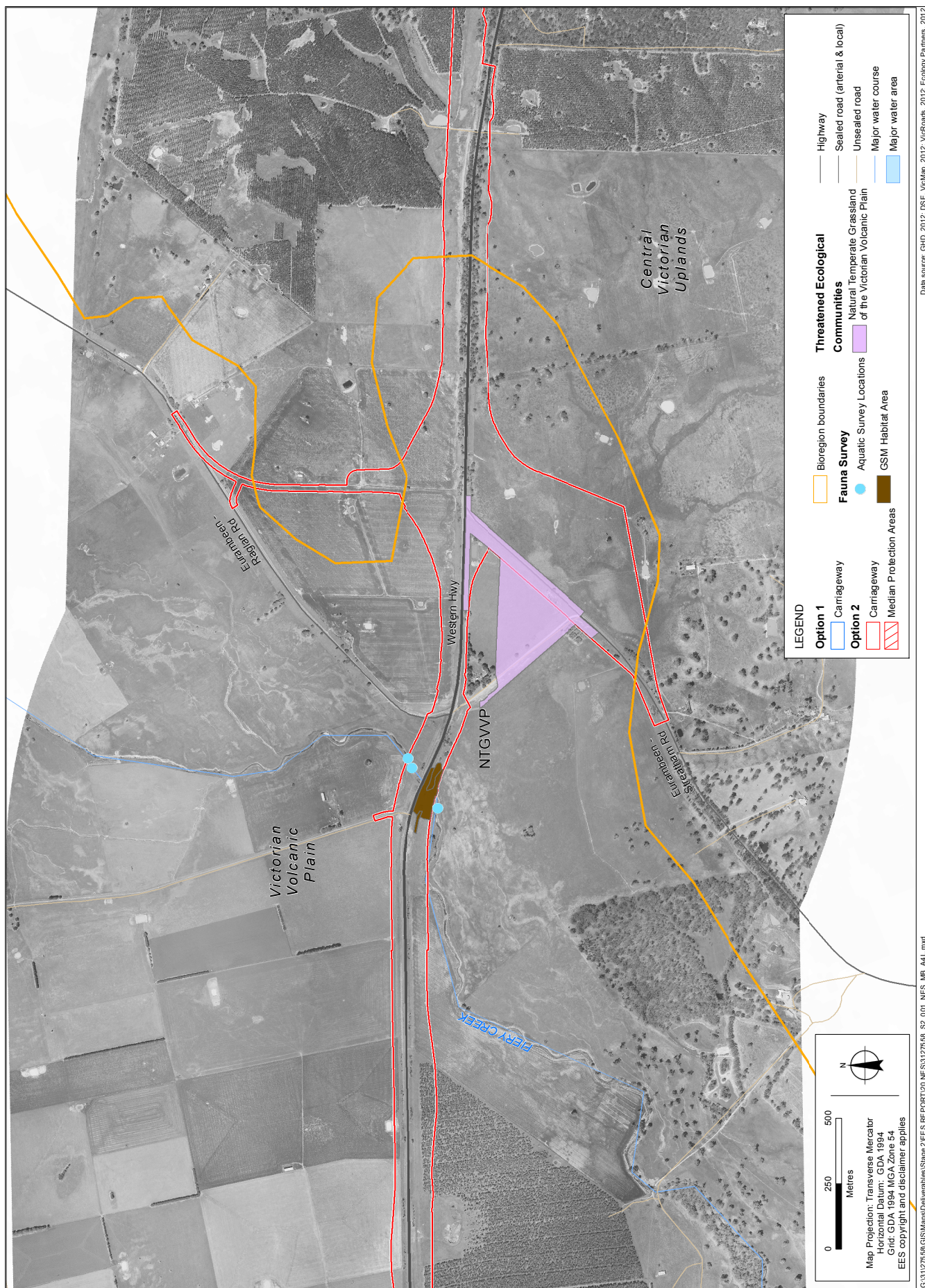
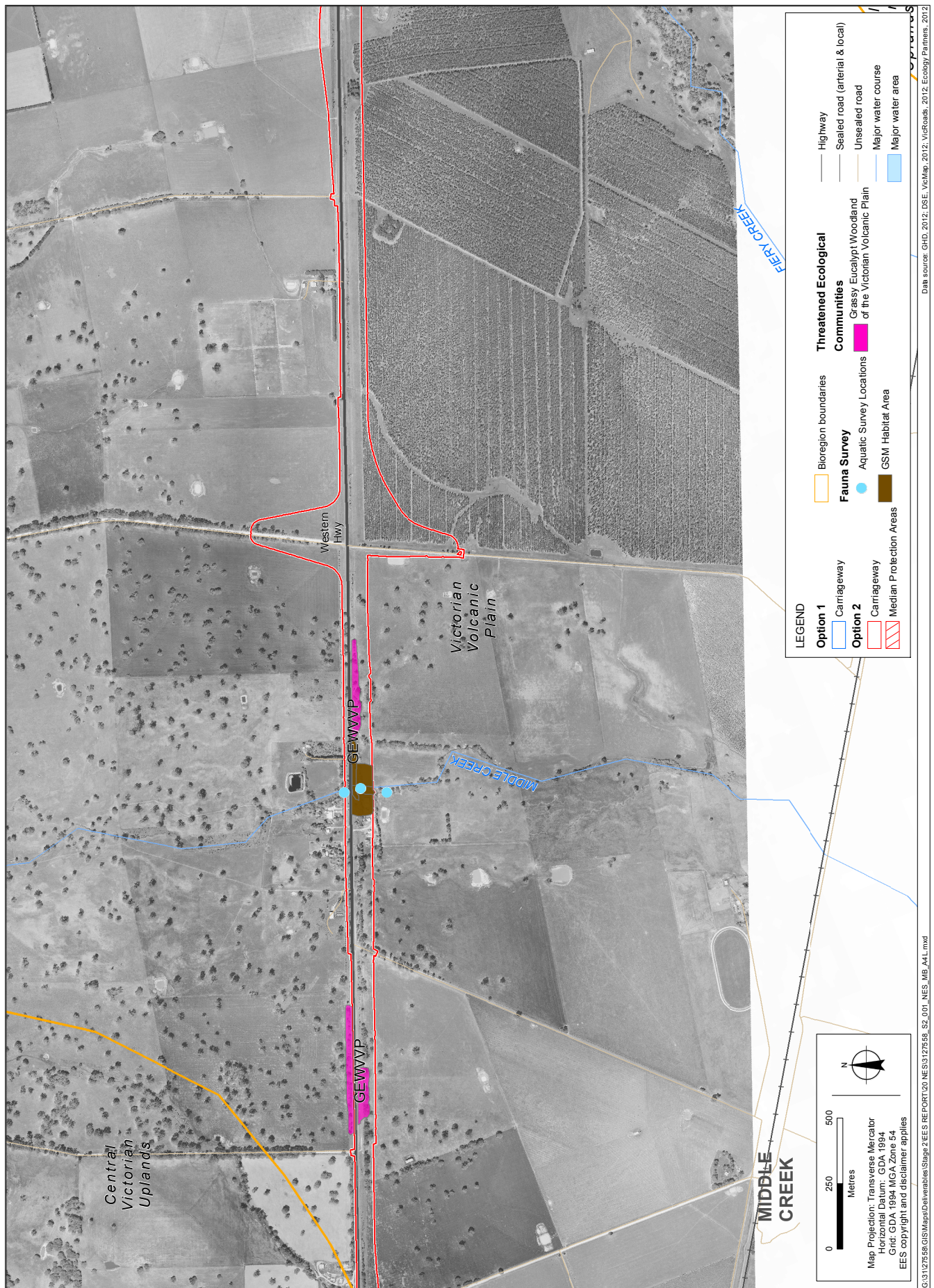


Figure 20-1b Matters of NES in the Study Area





**Figure 20-1c Matters of NES in the Study Area**



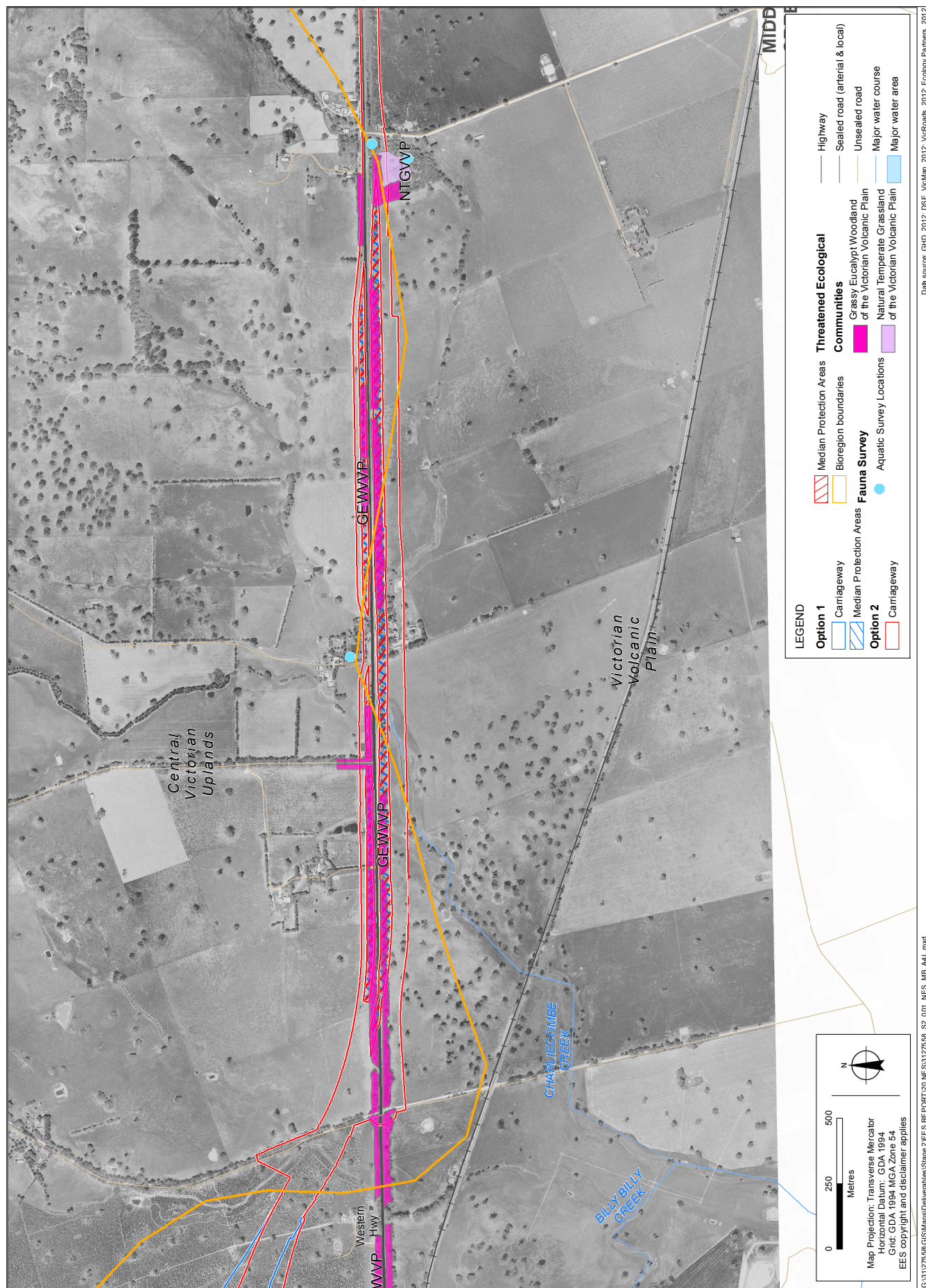
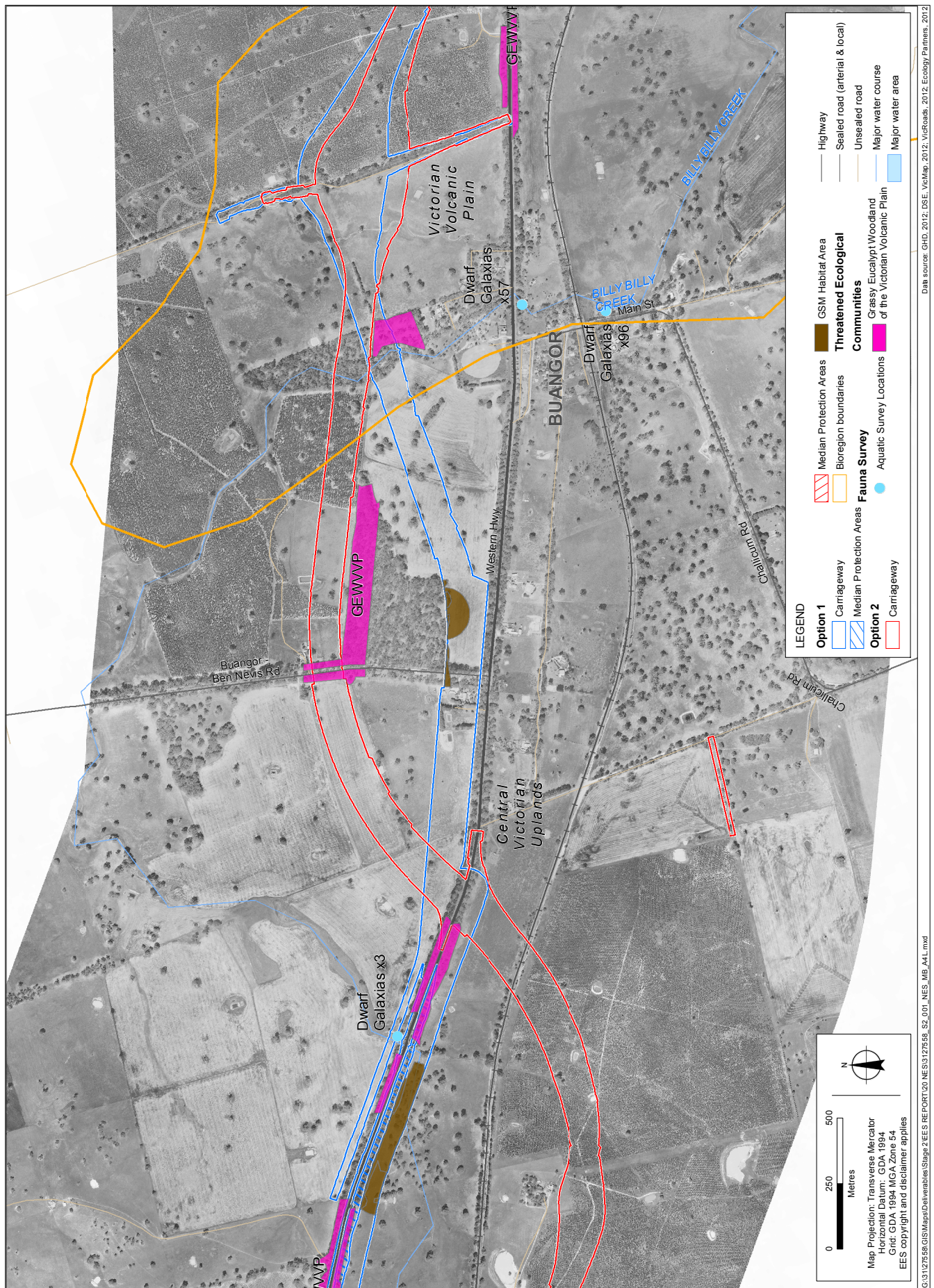


Figure 20-1d Matters of NES in the Study Area





**Figure 20-1e Matters of NES in the Study Area**



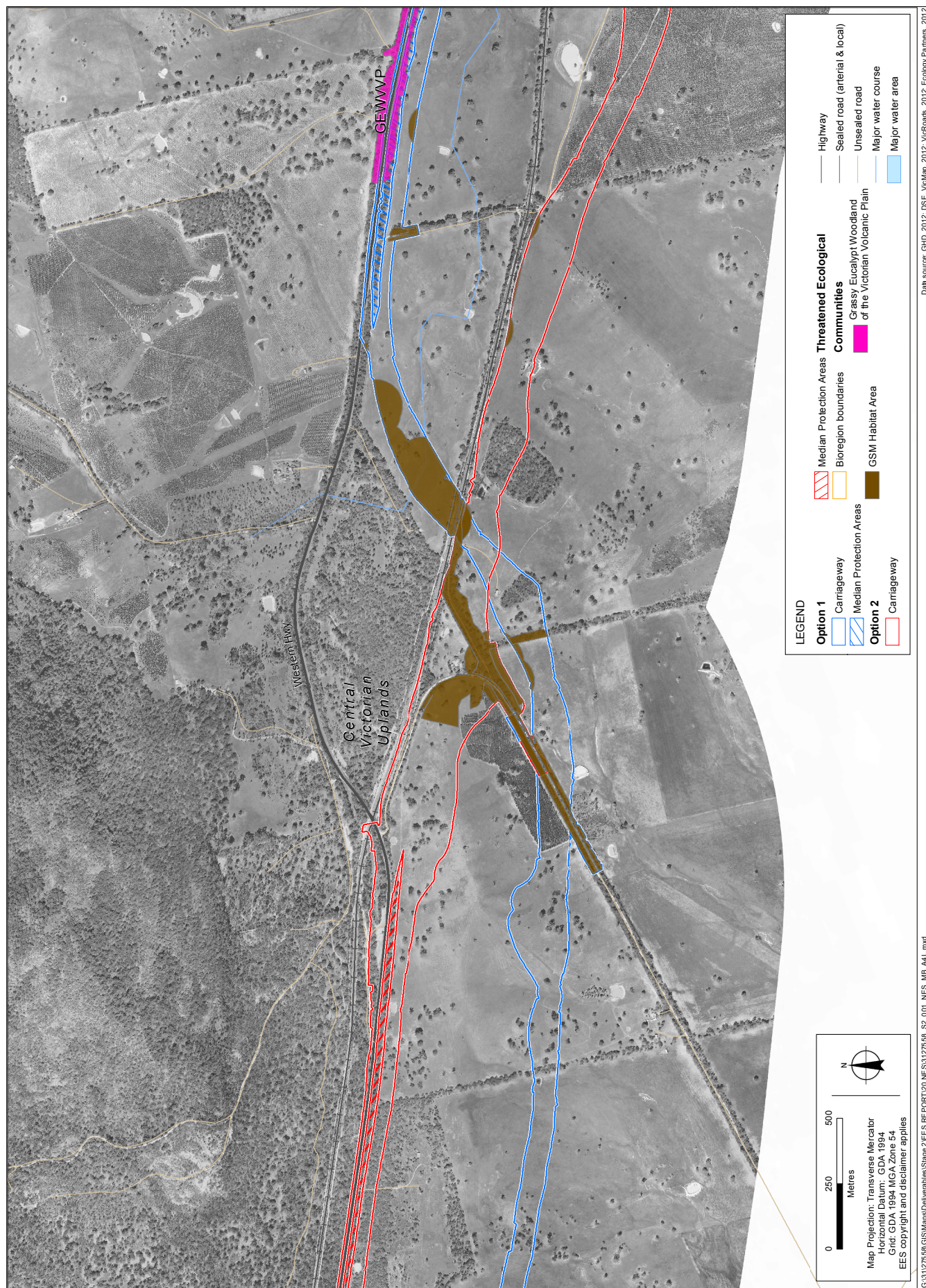
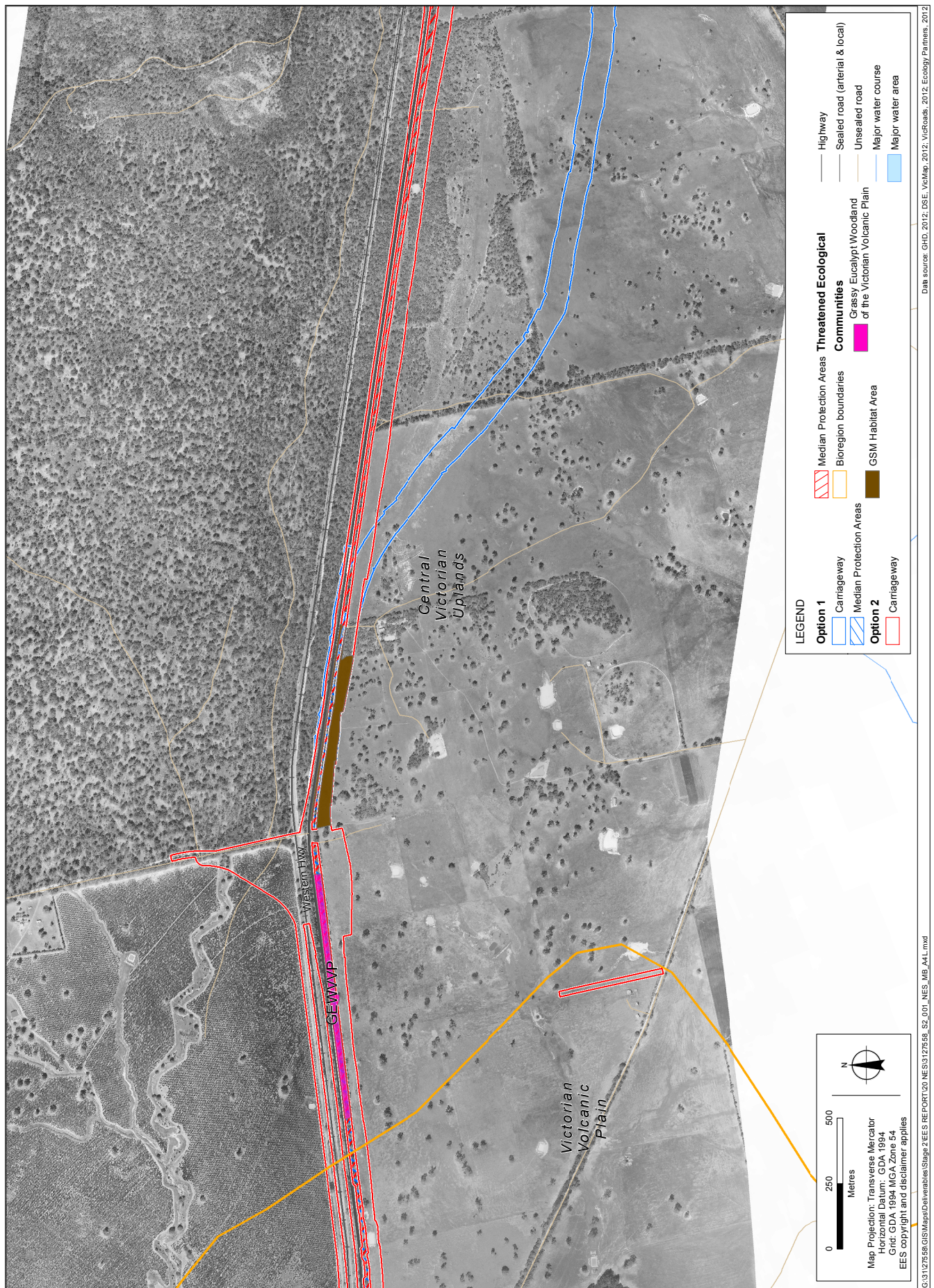


Figure 20-1f Matters of NES in the Study Area





**Figure 20-1g Matters of NES in the Study Area**



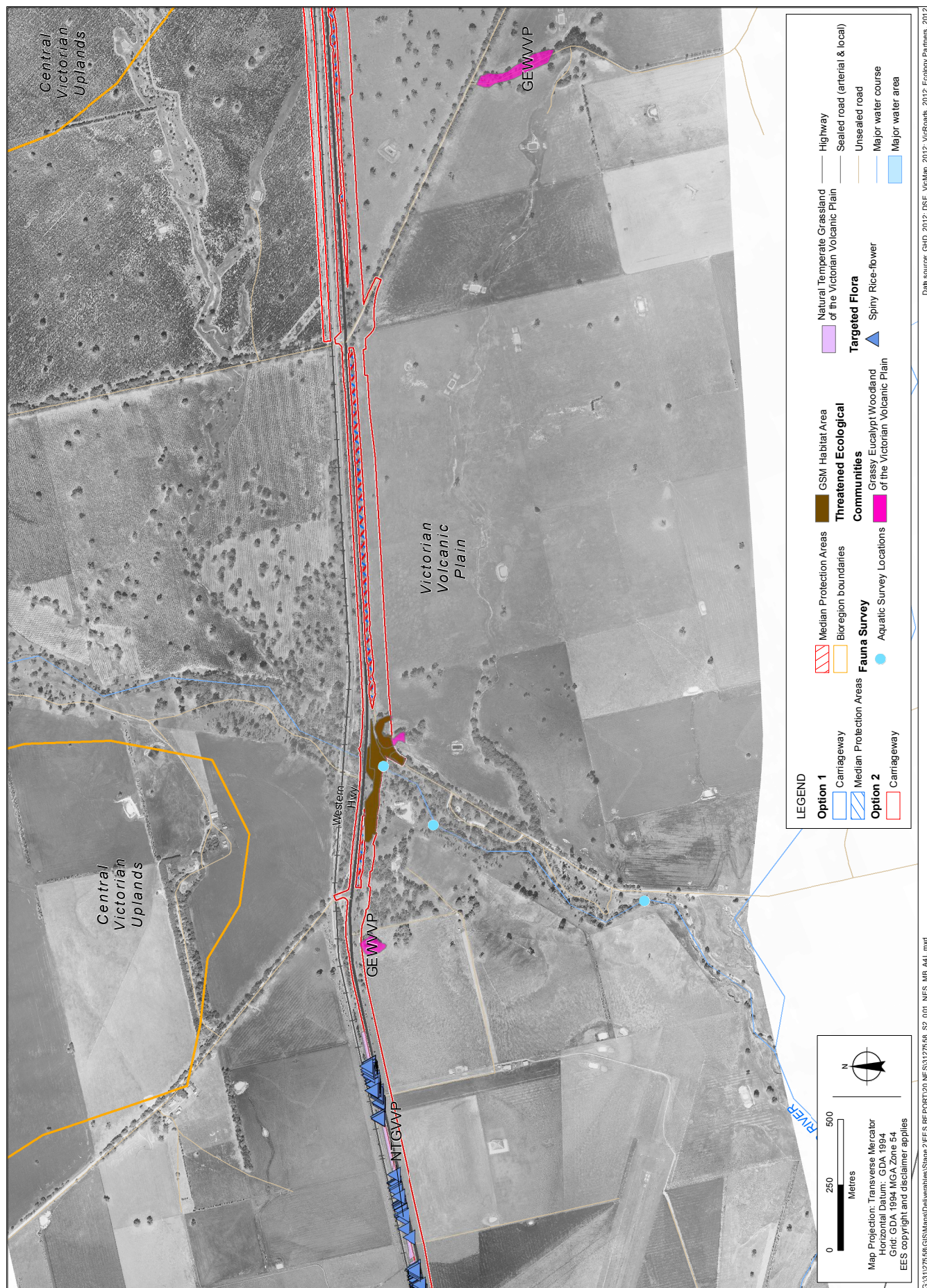
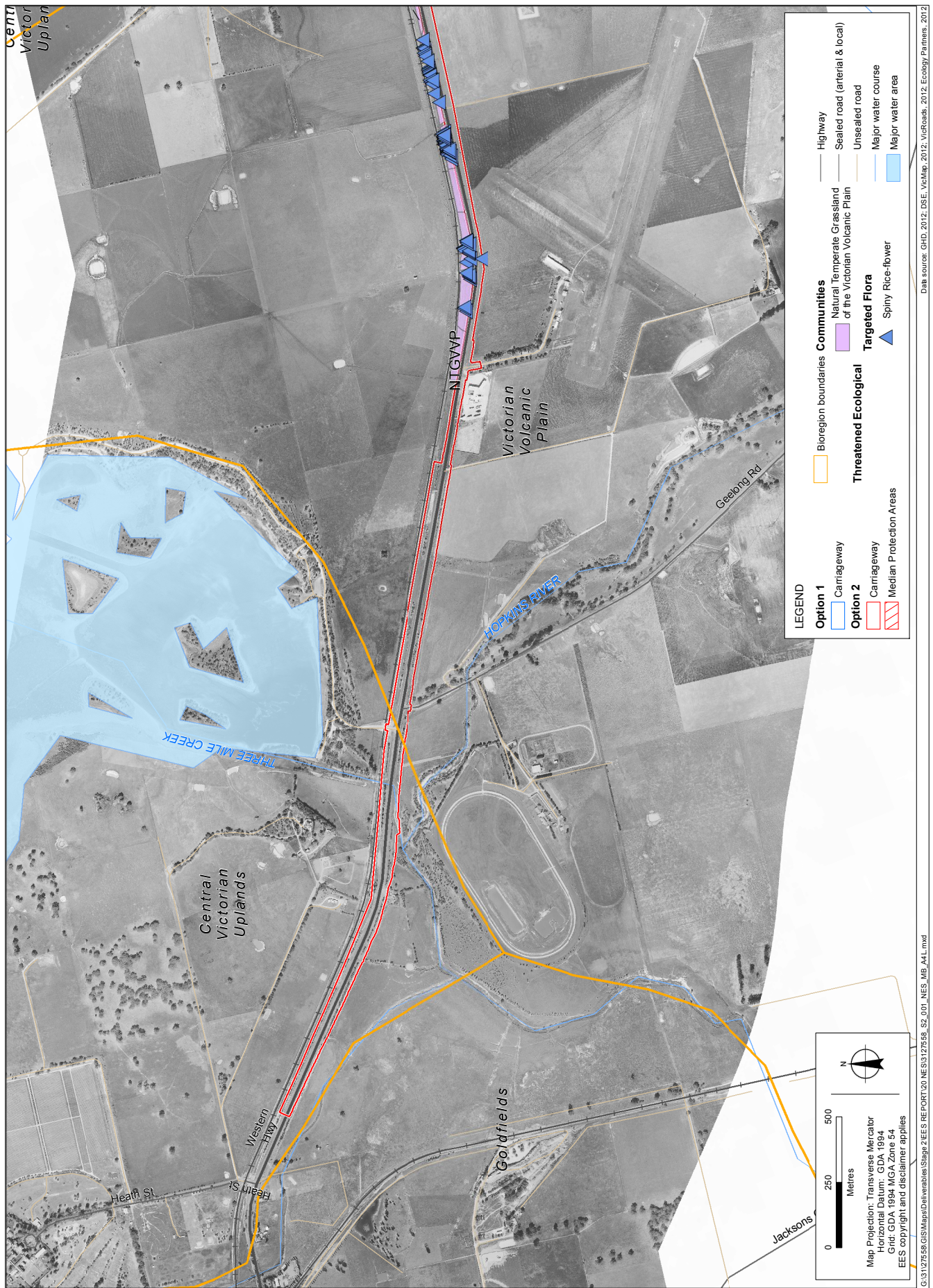


Figure 20-1h Matters of NES in the Study Area





**Figure 20-1i Matters of NES in the Study Area**



## 20.4 Matters of National Environmental Significance

There are eight matters of NES protected under the EPBC Act. These matters of NES are listed in Table 20-1, together with an explanation as to the relevance of each matter to this Project.

**Table 20-1 Matters of NES**

Matter of NES	Relevance to the Project
World heritage properties	There are no World heritage properties that would be impacted by the Project.
National heritage places	There are no National heritage places that would be impacted by the Project.
Wetlands of international importance	Lake Albacutya is a Ramsar wetland, located over 200 kilometres (km) north of the study area. The study area is not within this catchment for this Ramsar wetland, therefore it would not be impacted by the Project.
Listed threatened species and ecological communities	18 flora species, 14 fauna species and three ecological vegetation communities have either been previously recorded in the study area or are predicted to occur or have habitat that may occur in the study area. Of these, four species and two ecological communities were recorded in the study area. A summary of the impact on this matter of NES is provided in this Chapter.
Migratory species	It is unlikely that listed migratory species would be significantly impacted by the Project as it is likely that the study area only provides transitory habitat for listed species.
Commonwealth marine areas	The Project would not impact upon any Commonwealth Marine areas.
The Great Barrier Reef Marine Park	The Project would not impact upon the Great Barrier Reef Marine Park.
Nuclear actions	The Project is not a nuclear action.

### 20.4.1 Surveys for Matters of NES

A detailed description of the survey methods used and species that were targeted during survey are included in Technical Appendix H.

Table 20-2 provides a summary of the surveys completed for matters of NES for the Project.

**Table 20-2 Surveys undertaken for matters of NES**

Survey	Survey area	Date(s) completed	Season (s)
Preliminary flora assessment	The study area	20 – 22 October, 26 – 30 October, 3 – 5 November 2010	Spring
Preliminary fauna assessment	The study area	20 – 22 October 2010	Spring
Targeted flora surveys for: <ul style="list-style-type: none"> <li>▪ Spiny Rice-Flower</li> <li>▪ Button Wrinklewort</li> <li>▪ Large-headed Fireweed</li> <li>▪ Langi Ghiran Grevillea</li> <li>▪ Tawny Spider Orchid</li> </ul>	The study area	14 February, 2 August, 29-31 August and 8 – 11 November 2011.	Summer Winter Spring
Golden Sun Moth surveys	All remnant patches of Plains Grassland and areas of Modified Treeless Vegetation that supported >25 % cover of wallaby grass	16, 22 and 29 December 2011 13 January 2012	Summer



Survey	Survey area	Date(s) completed	Season (s)
Targeted Growling Grass Frog surveys	21 sites within the study area that support suitable habitat for the species	16 and 17 February 2011 3 March 2011	Summer Autumn
Targeted Southern Brown Bandicoot surveys	Areas within the study area that support suitable habitat for the Southern Brown Bandicoot.	15 February to 2 March 2010	Summer Autumn
Targeted Dwarf Galaxias surveys	All suitable creeks and drainage lines in the study area	Between 16 and 22 June 2011	Winter

## 20.5 Threatened Flora Species

There are 18 nationally listed flora species that have either been previously recorded within 10 kilometres (km) of the study area or were identified from the Protected Matters Search Tool (PMST) search as potentially occurring within the study area. These species are listed in Technical Appendix H. A preliminary survey of the study area was undertaken to determine the likelihood of these species or habitat for these species being present in the study area. From this assessment it was determined that targeted surveys should only be undertaken for some of these 18 species. The species that were targeted during surveys, and the results of these surveys are outlined below and are shown in Figure 20-1.

### **Button Wrinklewort (*Rutidosia leptorhynchoidea*) (endangered)**

88 Button Wrinklewort plants were recorded within the study area during the targeted surveys. Most (83) of these plants were recorded within the road reserve east of Warrayatkin Road on the north side of the existing Western Highway. Five plants were recorded within the Woodnaggerak Reserve west of Woodnaggerak Road on the southern side of the existing Western Highway. However, it is not expected that any Button Wrinklewort plants would be impacted by the Project.

### **Spiny Rice-flower (*Pimelea spinescens* subsp. *spinescens*) (critically endangered)**

575 Spiny Rice-flower plants were recorded within the study area. The plants were recorded within the existing Western Highway road reserve between the Ararat Aerodrome entrance/Service Centre and Warrayatkin Road. All plants were recorded on the northern side of the existing Western Highway between the road pavement and the rail reserve, except for one plant which was recorded on the southern side of the highway. It is expected that only one individual of this species would be impacted by the Project which is not considered to be a significant impact.

### **Large-headed Fireweed (*Senecio macrocarpus*) (vulnerable)**

No Large-headed Fireweed plants were recorded during the targeted surveys. It is considered unlikely

that this species is present within the proposed alignment options, therefore it is not expected that this species would be impacted by the Project.

### **Tawny Spider Orchid (*Caladenia fulva*) (endangered)**

No Tawny Spider Orchid plants were recorded within the study area during the targeted surveys. It is considered unlikely that this species is present within the proposed alignment options, therefore it is not expected that this species would be impacted by the Project.

### **Langi Ghiran Grevillea (*Grevillea monticola* subsp. *Brevistyla*) (vulnerable).**

No Langi Ghiran Grevillea plants were recorded within the study area. It is considered unlikely that this species is present within the proposed alignment options, therefore it is not expected that this species would be impacted by the Project.

## 20.6 Threatened Fauna Species

There are 14 nationally listed fauna species that have either been previously recorded within 10km of the study area or identified from the PMST search as potentially occurring or having potential habitat within the study area. These species are listed in Technical Appendix H. A preliminary survey of the study area was undertaken to determine the likelihood of these species or habitat for these species being present in the study area. From this assessment it was determined that targeted surveys should only be undertaken for some of these 14 species. The species that were targeted during survey and the results of the targeted surveys are outlined in the following Sections and are shown in Figure 20-1.

### **Southern Brown Bandicoot (*Isodon obesulus obesulus*) (endangered)**

The Southern Brown Bandicoot was not recorded during the targeted surveys. However due to the presence of suitable habitat, it is considered that there is a low likelihood that this species may be an infrequent user of habitat in the study area. Due to the low likelihood of presence it is expected that the impacts of the Project on this species would be nil to negligible.



### **Growling Grass Frog (*Litoria raniformis*) (vulnerable)**

No Growling Grass Frogs were recorded during the targeted surveys. However due to suitable habitat being identified in the surveys it is considered that there is a low to moderate likelihood of this species being in the Project area, although it is expected that the Project would have a nil to negligible impact on this species.

### **Dwarf Galaxias (*Galaxiella pusilla*) (vulnerable)**

156 Dwarf Galaxias individuals were recorded during the targeted aquatic surveys. All of these individuals were located within Billy Billy Creek. Due to the construction of bridges over Billy Billy Creek it is considered possible that some Dwarf Galaxias individuals may be at risk of being impacted by the Project. However, with the proposed mitigation measures as outlined in Table 20-5 the impacts on this species are expected to be negligible to low.

### **Golden Sun Moth (*Synemon plana*) (critically endangered)**

The Golden Sun Moth was recorded at numerous 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. Due to the linear nature of the Project and the number of areas of Golden Sun Moth habitat identified during the targeted surveys, the Project would impact on Golden Sun Moth habitat. The Project would result in the loss of 31.56ha of Golden Sun Moth habitat in Option 1 and 23.8ha of Golden Sun Moth habitat in Option 2. A total number of 145 Golden Sun Moth individuals were recorded during the targeted surveys. This is considered to be a significant impact according to SEWPaC guidelines.

#### **20.6.1 Other fauna species considered**

The following EPBC listed species were considered as part of the biodiversity and habitat assessment due to either the PMST results indicating that the species may be present in or near the study area, or to address the EES Scoping Requirements (refer to Section 20.2):

- Striped Legless Lizard (vulnerable)
- Australian Grayling (vulnerable)
- Murray Cod (vulnerable)
- Plains Wanderer (vulnerable)

The nearest previous record of Striped Legless Lizard is 7 kilometres from the study area. In Victoria, microhabitat usually includes cover or mat of native or introduced vegetation together with basalt rocks on the surface or embedded in the cracking clay soils. The field surveys found that there is no suitable habitat for the Striped Legless Lizard; therefore it is highly unlikely to be present in the study area. For this reason, it is not expected that this species would be impacted by the Project.

Despite the presence of suitable habitat in the study area, the targeted surveys for the Australian Grayling and the Murray Cod, did not record any of these species. It is therefore considered unlikely that these species are present in the study area. Therefore it is not expected that these species would be impacted by the Project.

There are no previous records of the Plains Wanderer in the local area and the PMST does not list the area as supporting suitable habitat for the species. As such, the species is unlikely to be found in the study area. It is not expected that the Project would impact on the Plains Wanderer.

## **20.7 Threatened Ecological Communities**

Two EPBC Act listed ecological communities were recorded in the study area. These are:

- Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP) (critically endangered). This forms part of the Plains Grassland EVC (State listed).
- Grassy Eucalypt Woodland of the Victorian Volcanic Plain (GEWVVP) (critically endangered). This forms part of the Plains Grassy Woodland EVC (State listed).

As no individual Buloke Woodlands *Allocasuarina luehmannii* trees were recorded during the biodiversity and habitat assessment and the study area is outside the Riverina and Murray Darling Depression bioregions, it is considered unlikely that the *Buloke Woodlands of the Riverine and Murray-Darling Depression Bioregions* community would be present in the study area and as such would not be impacted by the Project.

The area of these communities that would be impacted are:

- Approximately 5.25ha of NTGVVP (in both Option 1 and Option 2)
- Approximately 11.14ha of GEWVVP for Option 1 and 8.65ha of GEWVVP for Option 2.

These communities are displayed in Figure 20-1. It is expected that the Project would have a significant impact on each of these communities.





## 20.8 Avoidance and minimisation of impacts on matters of NES

As outlined in Chapter 5 (Project Alternatives) one of the key evaluation objectives in selecting preferred options for the Project was *"To avoid or minimise effects on species and ecological communities listed*

*under the Environment Protection and Biodiversity Conservation Act 1999"*.

The Options Assessment process (refer to Chapter 5, Project Alternatives) sought to minimise the impacts to significant flora, fauna and ecological communities via a process of elimination, progressively excluding potential alignment options that support areas of high ecological value. The process of avoidance and minimisation of impacts is on-going with micro-alignment changes to occur during the detailed design phase of the Project.

During the Options Assessment process matters of NES were considered to be of the highest ecological value. As such, priority was given to avoiding and minimising impacts on matters of NES. However, due to the size and the linear nature of the Project, it was not possible to avoid all impacts to EPBC Act listed species and communities.

Once the two final options had been selected, various refinements were made to further minimise impacts to ecological values as outlined in Table 20-3

**Table 20-3 Locations at which matters of NES were avoided**

Option	Location Description	Matter of NES	Conservation Status	Method of avoidance
Option 1 and 2	From approximately 200m west of Woodnaggerak Road to approximately 600m east of Andersons Road.	GEWVVP	Critically endangered	Location of new carriageway and service roads selected to minimise impacts on Plains Grassy Woodland (PGW) (Grassy Eucalypt Woodland of the Victorian Volcanic Plain) adjacent to the existing Western Highway.
	Approximately 1.6km east of Langi Ghiran Picnic Ground Road extending to just east of Dobie Road.	GEWVVP	Critically endangered	Location of new carriageway has been designed with wide median to minimise impact on GEWVPP adjacent to the existing highway.
	Location of new carriageway to almost totally avoid impacts on Spiny Rice-flower, Button Wrinklewort and Plains Grassland (NTGVVP) alongside existing highway.	Spiny Rice-flower Button Wrinklewort NTGVVP	Critically endangered Endangered Critically endangered	Location of new carriageway to almost totally avoid impacts on Spiny Rice-flower, Button Wrinklewort and NTGVVP alongside existing highway.
	Approximately 900m east of the Hopkins river	Spiny Rice-flower	Critically endangered	Carriageway moved further south during the functional design process.
	Approximately 200m east of Warrayatkin Road	Button Wrinklewort	Endangered	Carriageway moved further south during functional design process
Option 1	Approximately 500m west of Gravel Route Road to just west of	GEWVVP	Critically endangered	Location of new carriageway and service roads have been selected to minimise impacts on GEWVVP adjacent to the existing Western



Option	Location Description	Matter of NES	Conservation Status	Method of avoidance
	Pope Road.			Highway.
Option 1	Between Buangor Ben-Nevis Road and Billy Billy Creek	Golden Sun Moth GEVVVP	Critically endangered	Carriageway moved further south during functional design process to avoid GSM habitat and GEVVVP.
Option 2	Between Buangor Ben-Nevis Road and Billy Billy Creek	Golden Sun Moth GEVVVP	Critically endangered	Carriageway moved further north during functional design process to avoid GSM habitat and GEVVVP.
Option 2	Approximately 800m east of Buangor-Ben Nevis Road and extending to Buangor-Ben Nevi Road.	GEVVVP	Critically endangered	Location of the new road has been selected to avoid impacts on GEVVVP and which is located south of the proposed alignment.

## 20.9 Nationally Significant Flora and Fauna within the Final Alignment Options

The study area supports areas of good quality remnant native vegetation with some areas considered to be of National conservation significance and other areas considered to be of State conservation significance. One of the reasons for classifying parts of the study area as of National conservation significance is:

- The presence of several nationally significant flora and fauna species (including species and ecological communities listed under the EPBC Act).

Option 1 and Option 2 intersect a known population of Spiny Rice-flower (located between Green Hill Lake Road and Warrayatkin Road), although only one individual plant is expected to be impacted due to the avoidance and minimisation efforts outlined in Table 20-3.

Both Option 1 and Option 2 also intersect the NTGVVP and GEVVVP communities.

Option 1 and Option 2 also intersects known habitat suitable for the Dwarf Galaxias and the Golden Sun Moth.

## 20.10 Proposed Offset Strategy

One of the main impacts of the Project is the removal of parts of EPBC Act listed communities. As outlined in Section 20.7, the Project would result in the removal of:

- Approximately 5.25ha of NTGVVP (in both Option 1 and Option 2)
- Approximately 11.14ha of GEVVVP for Option 1 and 8.65ha of GEVVVP for Option 2.

It is expected that the Project would have a significant impact on both of these communities. However, it is expected that there is approximately

5,200ha of NTGVVP remaining. Therefore the Project would impact on approximately 0.1% of this community. It is also expected that there is at least 18,000ha of GEVVVP remaining so it is conservatively estimated that Option 1 would result in the removal of 0.06% of the GEVVVP community and Option 2 would result in 0.05% of the GEVVVP community.

This impact would be offset in accordance with the requirements of the Environmental Offsets Policy – Consultation Draft under the *Environment Protection and Biodiversity Conservation Act 1999* and Victoria's Native Vegetation Management – A Framework for Action.

Offsets for matters of NES could be consistent with State requirements, although some additional offsets/requirements specific to matters of NES may be necessary. Refer to Section 13.7 of Chapter 13 (Biodiversity and Habitat) for information on the proposed offset strategy for the Project.



*Tawny Spider Orchid*

(Source: EHP 2012)





## 20.11 Impact Assessment

### 20.11.1 Key issues

A summary of the impacts on matters of NES is provided in the following sections.

The key issues for matters of NES are:

- Removal of one Spiny Rice-flower individual;
- Potential removal of Dwarf Galaxias habitat and potential death or injury of individuals of the species;
- Removal of Golden Sun Moth habitat; and
- Removal of part of the ecological communities 'Natural Temperate Grassland of the Victoria Volcanic Plain' and 'Grassy Eucalypt Woodland of the Victorian Volcanic Plain'.

These issues are discussed in for the construction and operation phases of the Project in further detail below.

### 20.11.2 Construction

A summary of the impacts considered for the construction of the Project are outlined in the following Sections.

#### Removal of EPBC Act listed flora species

There is the potential for the construction of the Project to result in the removal of one individual plant of Spiny Rice-flower (located between Green Hill Lake Road and Warrayatkin Road). VicRoads have undertaken micro-alignment of the preferred alignments to minimise the impacts on this species. Refer to Figure 20-1 for the location of this

individual. Impact on one individual is not considered to be a significant impact.

#### Unexpected encounter of EPBC Act listed flora species

There is a small chance that construction may encounter and impact upon unexpected flora species that have not been identified in the targeted surveys. This may result in the removal of small numbers of individuals of Spiny Rice-flower, Button Wrinklewort, Large-headed Fireweed, Langi Ghiran Grevillea or Tawny Spider Orchid. Mitigation measures including altering constructions areas where possible if any of these species are unexpectedly identified, and implementing a translocation plan for individual plants discovered would reduce the chance of this impact occurring. The impact of this occurring is expected to be negligible to low due to the fact that targeted surveys have been carried out at optimum times for all of these species, so it is expected that if any of these species are unexpectedly identified they would be found only in very small numbers.

#### Removal of habitat and death or injury of EPBC Act listed fauna species

Construction may remove known habitat for the Dwarf Galaxias at Billy Billy Creek and would remove known habitat for the Golden Sun Moth between Buangor-Ben Nevis Road and Langi Ghiran Picnic Ground Road and in the paddocks east and west of Pope Road (refer to Figure 20-1 for more accurate locations of this habitat). Construction could also result in death or injury to Dwarf Galaxias and Golden Sun Moth individuals. To reduce the risk of impacts on the Dwarf Galaxias management measures including no bridge piers within Billy Billy Creek and construction site sediment controls would be implemented. Due to the proposed management measures the impacts on Dwarf Galaxias are expected to be minor. Impacts on the Golden Sun Moth would be reduced through micro-alignment changes and revegetation of areas where the GSM is known to be present. Even with the application of mitigation measures the impact on the Golden Sun Moth from the removal of habitat is expected to be significant as defined in the SEWPac Significant Impact Guidelines 1.1.

#### Unexpected encounter of EPBC Act listed fauna species

There is a small chance that construction may encounter unexpected EPBC Act listed fauna species that were not identified in the targeted surveys. This may result in the removal or disturbance to a small number of species including a loss of potential habitat for the Growling Grass Frog, Dwarf Galaxias, Southern Brown Bandicoot or the Golden Sun Moth. Pre-clearance surveys and translocation of individuals immediately prior to construction activities would reduce the risk of this impact from occurring. Due to the application of these management measures and the expectation that any



EPBC Act listed fauna species would be found in very low numbers, the impacts from this occurring are minor.



*Golden Sun Moth- (Source: EHP 2012)*

### **Removal of EPBC listed communities**

Construction would intersect the EPBC Act listed communities – Natural Temperate Grassland of the Victorian Volcanic Plain and Grassy Eucalypt Woodland of the Victorian Volcanic Plain. This would result in the removal of parts of these communities (approximately 5.25ha of NTGVVP (in both Option 1 and Option 2) and approximately 11.14ha of GEVVVP for Option 1 and 8.65ha of GEVVVP for Option 2). The impacts to these communities are expected to be further reduced through micro-alignment during the detailed design phase of the Project. However, under the SEWPaC Significant Impact Guidelines 1.1, it is expected that the impacts on these communities would be significant.

### **Construction of waterway crossings and bridge structures**

Construction of a waterway crossing at Billy Billy Creek may result in the loss of habitat of the Dwarf Galaxias. The placement of bridge structures may also create a temporary barrier for the movement of the Dwarf Galaxias. However, with the proposed mitigation measures including a bridge design that spans Billy Billy Creek without any piers within the regular flow waterway it is expected that the impacts on the Dwarf Galaxias would be minor.



*Dwarf Galaxias – (Source: EHP 2012)*

### **Construction occurs outside the construction zone**

If construction occurs outside the construction zone it could potentially result in the loss or modification of native vegetation and/or fauna habitat that was intended to be retained. The implementation of

mitigation measures in the Framework Environmental Management Plan (refer to Chapter 21, Environmental Management Framework) including the erection of high visibility temporary fencing around No-Go-Zones (known areas of native vegetation and habitat) would reduce the risk of this from occurring. As such the impact from this occurring would be minor.

### **Sediment into waterways**

Construction activities could result in sediment discharge to waterways, which may result in short term impacts to the Dwarf Galaxias. However, with the proposed mitigation measures including the installation of sediment fencing adjacent to waterways it is expected that the impacts on Dwarf Galaxias would be minor.

### **Changes to hydrological and surface water flows**

There is the potential for short term impacts on the Dwarf Galaxias due to altered hydrological and surface water flows from construction activities. However, with the application of management measures including scheduling construction to times of no-flow or low-flow it is expected that the impact of this on the Dwarf Galaxias would be minor.

### **Dust and pollutants**

Construction dust and pollutants (including smoke, petrochemicals and litter) has the potential to impact upon local aquatic fauna habitats including habitat of the Dwarf Galaxias. However, due to the application of the proposed management measures including the implementation of dust suppression techniques, it is expected that the impacts from dust and pollutants would be insignificant.

### **Fragmentation**

Golden Sun Moth habitat could be fragmented by the construction of the Project, which could result in the populations becoming isolated in some instances. It is considered that this impact would be significant.

### **20.11.3 Operation**

A summary of the impacts considered for the operation of the Project are outlined in the following Sections.

#### **Road kill**

There is the potential for Golden Sun Moth and the Southern Brown Bandicoot to be killed or injured by vehicles using the highway. Due to there only being a small chance of the Southern Brown Bandicoot being present in the study area it is expected that the impact of road kill on this species would be negligible to low. The impact of road kill on the Golden Sun Moth is also considered to be minor.

#### **Noise and vibration (operation)**

Noise and vibration are not expected to impact on the Golden Sun Moth as they have been found to be present in areas along the existing highway



indicating that they are not adversely impacted by traffic noise. Similarly, the Southern Brown Bandicoot is not expected to be impacted by the operational noise of the Project as there is only a small chance of it being present in the study area.

### Run off

During operation of the new road contaminants could enter Billy Billy Creek via run-off from the highway. This could potentially impact upon the Dwarf Galaxias. However, management measures including Water Sensitive Road Design practices which includes regular maintenance of design features intended to capture and treat stormwater run-off from the road, would mean that the impact of run-off on the Dwarf Galaxias would be negligible to low.

### Lighting

There is a chance that light from artificial sources including street lights could impact on native fauna species. However it is expected that any impact from lighting would be minor.

## 20.12 Risk Assessment

An environmental risk assessment was undertaken on the short-listed options for the Project to identify key risks for both the construction and operation of the Project. The methodology for this risk assessment is outlined in Chapter 4 (EES Assessment Framework and Approach to

Investigation). A risk assessment report that explains the process in detail and contains the complete project risk register has been included in Technical Appendix Q.

### 20.12.1 Residual risk

As outlined in Table 20-5 the majority of the risks associated with matters of NES are considered to be of a low risk. There is however, one risk pathway that has a residual risk rating of high and two risk pathways that have a residual risk rating of medium. These risk pathways were all initially identified as having a risk rating of high, however, with the additional project specific environmental management controls; the residual risk rating has been reduced on two of the three risks. The consequences of two of the risks are considered to be minor, however as it is considered likely that these risks will occur, the residual risk rating remains at medium. The consequences on risk FF14a and b is moderate, however as this risk is likely to occur the residual risk rating remains high.

As outlined in Section 20.8, efforts have been made to avoid and minimise impacts on matters of NES, however not all impacts were able to be avoided. It is not considered possible to further reduce the residual risk rating of these three risks. Refer to Table 20-5 for the management measures that would be applied to manage these three risks.

**Table 20-4 Risk Table**

Risk No.	Impact Pathway	Consequence Description
FF1	Potential removal of individuals of a known population of the EPBC listed flora	Spiny Rice-flower are present at one location: Between Warrayatkin Rd and Green Hill Lake Rd
FF4	Construction encounters unexpected listed flora species (species not known to be present from targeted survey).	Removal of small number of unknown listed flora species during pre-clearance / clearance work
FF5	Construction encounters EPBC listed Dwarf Galaxias from known habitats (Billy Billy Creek)	Removal of fauna habitat, possible injury/death to listed fauna species individuals during construction.
FF6	Construction encounters EPBC listed Golden Sun Moth (Pope Rd)	Removal of fauna habitat, possible injury/death to listed fauna species individuals during construction.
FF10	The duplication removes or disrupts wildlife corridors or fauna habitat - located along entire alignment	Impacts on habitat or wildlife corridors may affect Brown Toadlet and Brown Treecreeper, numerous locally common fauna species and to a lesser extent potential habitat for Southern Brown Bandicoot and Brush-tailed Phascogale. Particularly true for areas around Langi Ghiran State Park, as well as vegetation just north of Beaufort.
FF11	Construction encounters unexpected listed fauna species (species not known to be present from targeted survey).	Removal/disturbance to small number an unknown number of national and State listed fauna species during pre-clearance / clearance work



Risk No.	Impact Pathway	Consequence Description
FF12	Increased road kill and injury rates to arboreal native fauna from traffic on additional / new carriageway, particularly where the carriageway passes through wooded areas away from the existing road.	The proposed carriageway would create an additional barrier to the movement of aquatic and terrestrial fauna. This would result in a reduction of fauna populations due to increased mortality, particularly for predatory birds, reptiles, amphibians, and mammals including Brown Toadlet, Brown Treecreeper, Growling Grass Frog, Southern Brown Bandicoot and Brush-tailed Phascogale. It is likely that fauna are more susceptible to vehicle collision during the dusk and dawn period, where the highway intercepts wildlife corridors (e.g. near and along key waterways) and in areas away from existing roads where fauna are unaccustomed to road traffic hazards.
FF14	Construction encounters the following EPBC listed communities (Natural Temperate Grassland of the Victorian Volcanic Plain and Grassy Eucalypt Woodland of the Victorian Volcanic Plain) - located along entire alignment	Removal of the EPBC Act-listed community.
FF17	Construction of waterway crossings at Billy Billy Creek and Hopkins River.	Local destabilisation of waterway banks and channel profile. Degraded river health values, reduction of key aquatic and associated terrestrial habitat (EPBC Act listed Dwarf Galaxias).
FF18	Placement of bridge structures within a minor waterway (e.g.culverts).	Degraded river health values, reduction of key aquatic and associated terrestrial habitat including potential habitat for EPBC Act listed Dwarf Galaxias. Construction creates temporary barrier to movement of aquatic fauna.
FF20	Construction activities occur outside of agreed construction zone.	Potential loss or modification of native vegetation and/or fauna habitat that was intended to be retained.
FF22	Sediment discharge to waterways resulting from soil erosion or spoil earthworks	Impacts to aquatic ecosystems including impacts to aquatic habitat for the EPBC Act listed Dwarf Galaxias, Platypus and other aquatic fauna, at the site and downstream of the site.
FF23	Construction modifies hydrological/surface water flows	Impact to retained native vegetation and fauna habitats
FF24	Noise or vibration disturbance to native fauna during construction (daytime) and operation (traffic).	Potential for stress, and ultimately displacement of native fauna from affected habitats.
FF25	Light disturbance to native fauna (e.g., artificial light sources from street construction lights).	Potential for stress, and ultimately displacement of native fauna from affected habitats.
FF26	Construction creates dust impacting on native fauna, native flora and surface water ecosystems.	Impact to retained native vegetation and fauna habitats.
FF27	Creation of pollutants (including smoke, dust, petrochemicals, litter etc.) during construction and operation.	Impact to retained native vegetation and fauna habitats.



## 20.13 Environmental Management Measures

VicRoads has a standard set of environmental management measures which are typically incorporated into its construction contracts for road works and bridge works. These measures have been used as the starting point for the assessment of construction related risks and are described in detail

in Chapter 21 (Environmental Management Framework). In some instances, such as for matters of NES, additional Project specific environmental management measures have been proposed to reduce environmental risks.

Management measures specific to each identified matters of NES risk, and the residual risk rating after these environmental management measures have been applied are outlined in Table 20-5.

**Table 20-5 Environmental Management Framework**

Risk No.	Environmental Management Measures	Residual Risk Rating
FF1	<p>Comply with section 1200.13 Flora and Fauna of the VicRoads contract specification. Further targeted survey to be completed on final alignment prior to construction to identify all existing individuals.</p> <p>Potential for detailed design or construction planning to avoid impact at known locations (e.g. micro alignment change to construction corridor).</p> <p>Prepare and implement a Conservation Management Plan, including a Salvage and Translocation Plan. Collect seed and implement salvage and translocation for any individuals to be removed. Translocation to be undertaken in accordance with a formal translocation plan approved by SEWPaC, which would include post-translocation monitoring.</p> <p>To protect populations during construction, protective fencing would be supplemented with a high-visibility component to indicate the sensitivity of the area.</p>	Low
FF4	<p>Comply with section 1200.13 Flora and Fauna of the VicRoads contract specification. Avoid impacts if possible, by altering the construction area. Otherwise where applicable, implement a translocation plan for these individuals.</p>	Low
FF5	<p>Comply with section 1200.13 Flora and Fauna of the VicRoads contract specification. Implement a Construction EMP detailing erosion and sediment controls. Development of a Conservation Management Plan for Dwarf Galaxias prior to project approval.</p> <p>Construction around and in watercourse to occur outside breeding period/dispersal period (May to October).</p> <p>Monitor weather for rainfall events within the catchment and postpone work near Billy Billy Creek during expected elevated flows.</p> <p>Bridge to span waterway, no structures to be installed in low-flow channel. Bridge structures to be at least 5m from the regular flow bank to allow for fauna movement under the bridge.</p> <p>All waterway crossings within known and potential habitats to be designed to allow for unimpeded Dwarf Galaxias dispersal under flood conditions.</p> <p>Conduct pre-clearance fauna surveys and then attempt relocation where possible.</p>	Low
FF6	<p>Comply with section 1200.13 Flora and Fauna of the VicRoads contract specification. Potential for detailed design or construction planning to avoid impact at known locations/habitats (e.g. micro alignment change to construction corridor).</p> <p>Revegetate ROW with grassland species favoured as a food source by GSM (e.g. <i>Austrodanthonia sp.</i>) where GSM populations are known to be present.</p>	Medium
FF10	<p>Comply with section 1200.13 Flora and Fauna of the VicRoads contract specification. Potential for detailed design or construction planning to avoid impact at known locations/habitats (e.g. micro alignment change to construction corridor).</p> <p>Install warning signs for potential fauna crossings.</p> <p>Investigate appropriate design response and implement recommendations, for example:</p> <ul style="list-style-type: none"> <li>Installation of fauna sensitive road design features at wildlife corridors.</li> <li>Implement before/after comparison study for fauna road mortality to investigate a) the impact of the road; b) the efficacy of crossing structures.</li> </ul> <p>Use the results of the above study to determine whether additional crossing structures should be installed.</p>	Medium
FF11	<p>As per Risk FF4.</p> <p>Prepare and implement a Conservation Management Plan (CMP), including a salvage and translocation plan. Where potential habitat for listed fauna species is identified to be removed a qualified ecologist would need to conduct a pre-clearance survey and attempt relocation where necessary/possible.</p>	Low
FF12	<p>Potential for detailed design or construction planning to avoid impact at known locations/habitats (e.g. micro alignment change to construction corridor).</p>	Low



Risk No.	Environmental Management Measures	Residual Risk Rating
	<p>Prepare and implement a salvage and translocation plan. Where potential habitat for listed fauna species is identified to be removed a qualified ecologist would need to conduct a pre-clearance survey and attempt relocation where necessary/possible. Investigate appropriate design response and implement recommendations, for example:</p> <ul style="list-style-type: none"> <li>▪ Installation of fauna sensitive road design features at wildlife corridors.</li> <li>▪ Implement before/after comparison study for fauna road mortality to investigate a) the impact of the road; b) the efficacy of crossing structures.</li> </ul> <p>Use the results of the above study to determine whether additional crossing structures should be installed.</p>	
FF14a	<p>Comply with section 1200.13 Flora and Fauna of the VicRoads contract specification. Detailed design and construction planning to minimise native vegetation loss as far as possible.</p>	High
FF14b	<p>Comply with section 1200.13 Flora and Fauna of the VicRoads contract specification. Detailed design and construction planning to minimise native vegetation loss as far as possible</p>	High
FF17	<p>Implementation of a Construction EMP detailing:</p> <ul style="list-style-type: none"> <li>▪ Erosion and sediment control measures.</li> <li>▪ Fuel and chemical management procedures.</li> </ul> <p>No structures within the stream, and consistent with CMA requirements. Fish sensitive design of structures to provide safe fish passage. Schedule construction to no-flow or low-flow periods. Establish a water quality monitoring regime to assess and limit any construction impacts. This would include a before/after sampling design, including several upstream and downstream sites. Establish a set of site specific criteria that would trigger intervention of works in the event of a noticeable deterioration in habitat, water quality or observed direct death or injury of aquatic fauna (particularly Dwarf Galaxias in Billy Billy Creek). Establish appropriate response actions in case of such an event based on these site specific criteria. Sedimentation and pollution control measures are to be implemented at all times, in accordance with EPA guidelines, to prevent impacts to waterways and wetlands. All waterways disturbed during project construction are to be revegetated and restored (to a condition equal to or better than pre-construction) after completion of construction. Any snags and/or logs that are removed from any waterways to be replaced in similar locations after completion of construction (particularly Billy Billy Creek as these features provide habitat for Dwarf Galaxias). The storage of fuel and chemicals (including the refuelling of vehicles and machinery) at a minimum of 50 metres away from all waterways; Site toilets to be a minimum of 50 metres away from all waterways; and, Schedule construction to no-flow or low-flow periods.</p>	Low
FF18	<p>Implementation of a Construction EMP detailing:</p> <ul style="list-style-type: none"> <li>▪ Erosion and sediment control measures.</li> <li>▪ Fuel and chemical management procedures.</li> </ul> <p>Implement fish sensitive design of structures to provide for safe fish passage. Schedule construction to no-flow or low-flow periods.</p>	Low
FF20	<p>Existing vegetation and native fauna habitat identified in the Contract to be retained, would be identified as 'No Go Zones' and protected by temporary fencing and signage erected outside the limit of the canopy of the vegetation or the habitat site. In areas of known, or possible, habitat for listed threatened flora and fauna species, protective fencing should be supplemented with a high-visibility component to indicate the sensitivity of the area. Plant, equipment, material or debris not to be placed or stored within the limit of the root zone of vegetation to be retained.</p>	Low
FF22	<p>Implementation of a Construction EMP detailing erosion and sediment control measures. Installation of sediment fencing adjacent to waterways. Routine maintenance of sediment fences, particularly after large rain events. Maintain as much of the natural vegetation filter strip as possible.</p>	Low
FF23	<p>Implementation of a Construction EMP detailing:</p> <ul style="list-style-type: none"> <li>▪ Erosion and sediment control measures.</li> <li>▪ Fuel and chemical management procedures.</li> </ul> <p>Installation of appropriate drainage systems.</p>	Low



Risk No.	Environmental Management Measures	Residual Risk Rating
	Schedule construction to no-flow or low-flow periods.	
FF24	Traffic noise levels would not exceed the objectives specified in VicRoads Traffic Noise Reduction Policy for new and improved roads within and outside of the limit of works.	Low
FF25	Risk is low and therefore there are no mitigation measures recommended to manage the risk.	Low
FF26	<p>Implementation of a Construction EMP detailing air quality control measures and strict monitoring procedures</p> <p>Implement methods and management systems consistent with EPA Best Practice Environmental Management: 'Environmental Guidelines for Major Construction Sites' (EPA, 1996).</p> <p>Minimise land disturbance by using phased approach, rehabilitate cleared areas promptly.</p> <p>Keep vehicles to well-defined haul roads, limit vehicle speed and seal haul roads and other exposed areas by means of concrete or paving where necessary.</p> <p>Employ dust suppression methods such as watering down the ROW</p>	Negligible
FF27	<p>As per Risk FF25.</p> <p>Implementation of a Construction EMP detailing:</p> <ul style="list-style-type: none"> <li>Erosion and sediment control measures.</li> </ul> <p>Fuel and chemical management procedures.</p>	Negligible





## 20.14 Conclusion

Parts of the study area are considered to be of National conservation significance.

Matters of NES were considered to be of highest conservation value during the Options Assessment process and priority was given to avoiding matters of NES where possible. However, it was not possible to avoid all impacts on matters of NES.

The Project would impact upon one Spiny Rice-flower plant (critically endangered), which was unable to be avoided during the design of the Project. This is considered to be a low impact.

During targeted surveys in 2011 Dwarf Galaxias (vulnerable) were found to be present in Billy Billy Creek, and the Project has the potential to impact upon this species. However, due to the measures proposed to manage impacts on the Dwarf Galaxias at Billy Billy Creek, which include spanning the waterway with no bridge piers within the regular flow waterway and constructing the required bridge during periods of no-flow or low flow, it is expected that the impacts to this species would be minor.

The Project would require the removal of 31.56ha of Golden Sun Moth (critically endangered) habitat in Option 1 and 23.80ha in Option 2. It would therefore result in a significant impact to this species according to SEWPaC guidelines. It is expected that the area of impact could be reduced slightly through the detailed design phase of the Project including micro-realignment alterations, however even with

the application of management measures, the impact would still be considered significant as defined in the SEWPaC Significant Impact Guidelines 1.1.

The Project would also remove approximately 5.25ha of Natural Temperate Grassland of the Victorian Volcanic Plain (critically endangered) in both Option 1 and Option 2 and approximately 11.14ha of Grassy Eucalypt Woodland of the Victorian Volcanic Plain (critically endangered) for Option 1 and 8.65ha for Option 2. This is considered to be a significant impact as defined in the SEWPaC Significant Impact Guidelines 1.1. Areas of these communities were avoided where possible however, it is not considered possible to avoid all areas of these communities. These vegetation losses will be offset in accordance with the Environmental Offsets Policy – Consultation Draft August 2011 and Victoria's Native Vegetation Management – A Framework for Action.

It is expected that further avoidance and minimisation of matters of NES would be able to be achieved through micro-realignment in the detailed design phase. The impacts on listed flora species and communities would be offset in accordance with the Environmental Offsets Policy – Consultation Draft August 2011 and Victoria's Native Vegetation Management – A Framework for Action. It is expected that VicRoads would be able to source appropriate offsets for the removal of native vegetation required for this Project.

