



VicRoads

Western Highway Project – Section 2: Beaufort to Ararat
Environmental Risk Assessment Report

August 2012



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The services undertaken by GHD in connection with preparing this Report were limited to those specifically detailed in Sections '1.3 Risk Assessment Scope and Objectives' and '4. Risk Assessment Methodology' of this Report.

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Executive Summary

The Western Highway Project, Section 2 – Beaufort to Ararat (the Project), is part of a larger project to duplicate the Western Highway between Ballarat and Stawell, Victoria. In October 2010 the then Victorian Minister for Planning determined that an Environment Effects Statement (EES) was required for the Project. The Scoping Requirements for the EES state that in providing an integrated assessment of the project, the EES should describe the implications of potential effects and associated risks.

This report documents the approach and outcomes of the risk assessment only. It does not provide discussion of the risk assessment pathways or the mitigation measures as this discussion is provided in the technical reports prepared by each specialist, which are appended to the EES. The technical appendices inform the chapters of the EES document and conclusions about the impact of the project.

Approach

An environmental risk assessment was undertaken to identify impact pathways and appropriate mitigation measures that could reduce the impact of the Project. The risk assessment helps to identify the key risks that are then the focus of the Impact Assessments for the EES. The objectives of the risk assessment are to:

- ▶ Identify key project environmental risks which require detailed investigation;
- ▶ Facilitate a consistent approach to risk assessment across the various project disciplines; and
- ▶ Guide the level of investigation and environmental management measures, in proportion to the relative risk of issues.

As many environmental risks are difficult to quantify, a semi-quantitative risk assessment has been used for the Project. This means that risks have been quantified where possible, however if that is not possible without significant assumptions, then a qualitative assessment has been made.

The scope of the risk assessment included construction and operational risks of the Project in relation to social, environmental and economic values on both a local and regional scale. The risk assessment did not consider risks of project delays or reputational, financial or organisational effectiveness risks posed to VicRoads or the contractor(s) managing or undertaking the project.

An initial risk assessment was undertaken for each impact pathway as identified by specialists for each of the 3 alignment options for Section 2. This initial rating assumed implementation of the standard VicRoads environmental management procedures and design measures. After each risk was assigned a rating, proportional management and mitigation measures were developed. The risk rating was then re-evaluated, taking into account the additional management and mitigation measures, to identify the residual risk from the Project.

Once a preliminary risk register was completed by each technical specialist, a risk workshop was held to discuss the key risks. This workshop allowed technical specialists from each discipline to collectively discuss risks which were interrelated. The heritage specialists were not present at the workshop as their field work was being completed. A separate workshop was held with selected specialists to review the risk assessment for cultural heritage in context of the other disciplines.



After the risk workshop, specialists then developed impact assessments that further investigated the effects of the Project. These assessments were used to inform the final iteration of each specialist's risk register, and this report reflects the results of the final assessments.

Outcomes

A simple analysis of the number of risks within each discipline and for each alignment option was undertaken. Discussion of the risk pathways and the significance of risks within each discipline are provided in the specialist reports.

In the final analysis of the risks associated with the Project, there were 149 impact pathways identified for Option 1, and 150 for Options 2 and 3. Following consideration of risk treatment measures, the risk pathways and ratings included:

- 46 negligible residual risks
- 62 low residual risks for Option 1 and 3, and 63 for Option 2
- 35 medium residual risks for Option 1 and 2, and 36 for Option 3
- 6 high residual risks
- 0 extreme residual risks.

The highest number of impacts were identified by the biodiversity and habitat specialists, which recorded three high residual ratings across all three options. These related to impacts on FFG listed grasslands and EPBC listed grassland and woodland communities. Further assessment is being undertaken to define risk treatment measures to reduce these risks to an acceptable level.

The other discipline which also recorded three high residual risks across all three options was the cultural heritage specialists. This is due to the alignments necessitating the destruction of two occasional occurrence Aboriginal cultural heritage places, and the possible destruction of a previously unidentified Aboriginal mortuary tree.

Identification of high risks through the risk assessment process means that the mitigation measures identified through the Impact Assessment can be prioritised for consideration during the detailed design and construction phases. The impact pathways and the proposed mitigation and management measures have been used to inform the Environmental Management Framework for the Project, described in Chapter 21 of the EES document.

Comparison of Options

The difference between three alignment options was discussed with specialists during the workshop. As a result of the workshop, overall, Option 1 was preferred by more specialist disciplines than the other options. Option 1 was preferred by the traffic, biodiversity and habitat, social, soils and geology, and historical heritage specialists. Whereas Option 2 was preferred by the surface water and economic specialists, and Option 3 was preferred by only the noise specialist. All other disciplines (groundwater, air, planning and land use, Aboriginal cultural heritage) did not distinguish between the options.

Another consideration that the risk assessment highlighted is that more initial high risks are associated with biodiversity and habitat and cultural heritage compared to other disciplines. It is also within the biodiversity and habitat assessment that the only extreme initial risk was identified. Mitigation measures have been recommended to reduce the extreme risk and high risks. This illustrates that risks to



biodiversity and habitat are a key consideration for the project and selection of a preferred alignment in Section 2.

It should be noted however that as the impact assessment progressed following the workshop, the conclusions regarding the preferred option by each specialist evolved based on the refinement of the design. This report outlines the risks based on the final design.

As a result of the outcomes of the risk workshop and impact assessments, it was decided that both Option 1 and Option 2 would be considered for refinement and incorporation into the EES, as they were both deemed to have a comparable level of risk and have less impacts than Option 3.



1. Introduction

1.1 Background

The Western Highway (A8) is being progressively upgraded as a four lane divided highway between Ballarat and Stawell. As the principal road link between Melbourne and Adelaide, it serves interstate trade and is the key corridor through Victoria's west, supporting farming, grain production, regional tourism and a range of manufacturing and service activities.

Section 2 of the Western Highway Project (the Project) commences west of Old Shirley Road, Beaufort and extends for approximately 38 kilometres (km) to Heath Street, Ararat. It includes a bypass of the township of Buangor and crossing of the Melbourne to Adelaide railway, which carries both local and interstate passengers. In October 2010 the then Victorian Minister for Planning determined that an Environment Effects Statement (EES) was required for the Project. The EES has been prepared in accordance with the Minister for Planning's 'Guidelines for assessment of environmental effects under the Environment Effects Act 1978' and the finalised 'Scoping Requirements: Western Highway Duplication – Section 2 Beaufort to Ararat, Environment Effects Statement (September 2011)' (Scoping Requirements).

The Scoping Requirements state that in providing an integrated assessment of the project, the EES should describe the implications of potential effects and associated risks. The following requirements are identified for risk assessment:

The EES documentation should be prepared in the context of the principles of a systems approach and proportionality to risk, as set out in the Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978 (Ministerial Guidelines) (Section 4.1, Scoping Requirements).

The Ministerial Guidelines set out the following (page 14):

A risk-based approach should be adopted in the assessment of environmental effects so that suitable, intensive, best practice methods can be applied to accurately assess those matters that involve relatively high levels of risk of significant adverse effects and guide the design of strategies to manage these risks. Simpler or less comprehensive methods of investigation may be applied to matters that can be shown to involve lower levels of risk.

Implementation of a risk-based approach means that a staged study design may be appropriate. The initial phase of investigation should characterise environmental assets that may be affected, potential threats arising from a project, and the potential environmental consequences. This phase should enable the design of any necessary further studies proportionate to the risk to analyse the consequences and likelihood of adverse effects.

The development of the risk assessment process, its implementation and findings are documented in this report.



1.2 Approach to EES Investigations

Development of the alignment options and environmental investigations for the Project has been undertaken in three phases:

- ▶ **Phase 1** involved developing a range of alignment options, followed by a rapid assessment to identify a shortlist.
- ▶ **Phase 2** involved the detailed assessment of the options shortlisted in Phase 1 to identify a recommended option.
- ▶ **Phase 3** involved an Environmental Risk Assessment of the recommended alignment options and completion of the specialist impact assessments. The Phase 2 assessment identified three recommended options, therefore the environmental risk assessment was utilised to identify preferred alignments for presentation in the EES.

As a result of this process, two options were considered feasible for adoption by VicRoads. These options were Option 1 and Option 2, which were subject to further refinement in order to mitigate potential areas of impact.

The specialist studies, completed to inform the EES, occurred in parallel with the selection of preferred and alternative alignment options for the duplication of the Western Highway. The outcomes of specialist studies were used progressively to make micro alignment changes to reduce impacts of the final alignments. The outcomes of the specialist studies informed the selection of the preferred and alternative alignment and development of the environmental management framework.

1.3 Report Objectives

The objectives of this report are to:

- ▶ Outline how the risk assessment fits within the context of the broader EES evaluation framework for the Project;
- ▶ Describe the risk assessment process that was undertaken;
- ▶ Summarise the construction and operation risks associated with Project activities; and
- ▶ Demonstrate that the risk assessment meets the Scoping Requirements.

This report documents the approach and outcomes of the risk assessment only. It does not provide discussion of the risk assessment pathways or the mitigation measures as this discussion will be provided in the technical reports prepared by each specialist. The specialist reports will be technical appendices to the EES and inform the chapters of the EES document and conclusions about the impact of the project.

This report will also be a technical appendix to the EES document for Section 2 of the Western Highway Project.

1.4 Risk Assessment Scope and Objectives

This scope of the risk assessment was to evaluate the three recommended alignment options for Section 2 as identified through the options assessment process (refer to the Section 2 Options Assessment Report, GHD, February 2012). The risk assessment was undertaken on the concept designs of the each recommended alignment option that was developed for the EES. The recommended alignment options



are described in detail in the Project Alternatives chapter (Chapter 5) and further details of the preferred alignment are provided in the Project Description chapter (Chapter 6) of the EES document. The alignments considered in the risk assessment are shown in detail in the map book contained in Appendix A of this report, and overall in Figure 1. (Note that these alignments are preliminary and the final alignments assessed are in Technical Appendix A to the EES).

The objectives of the risk assessment process are to:

- ▶ Identify key project environmental risks which require detailed investigation;
- ▶ Facilitate a consistent approach to risk assessment across the various project disciplines; and
- ▶ Guide the level of investigation and environmental management measures, in proportion to the relative risk of issues.



2. Standard for Risk Assessment

2.1 Risk Management Standard AS/NZS ISO 31000:2009

The risk assessment approach to be followed for the Project is not prescribed by legislation. The Australian/New Zealand and International Standard for Risk Management is AS/NZS ISO 31000:2009, and this provides a structured approach which has been adopted for this assessment. This Standard is widely recognised and routinely used as a basis for EES and other risk assessments.

The risk management process outlined in AS/NZS ISO 31000 is iterative and can be applied to specific projects and activities. The steps in the risk management process are shown in Figure 2. The main elements are:

- **Communicate and Consult** – communicate and consult with internal and external stakeholders at each stage of the risk management process.
- **Establish the Context** – establish the external, internal and risk management context in which the rest of the process will take place.
- **Identify Risks** – identify where, when, why and how events could prevent, degrade, delay or enhance the achievement of the objectives.
- **Analyse Risks** – identify existing controls, determine likelihood and consequences and determine the level of risk.
- **Evaluate Risks** – compare estimated levels of risk against the criteria and consider the balance between potential benefits and adverse outcomes.
- **Treat Risks** – develop and implement specific cost-effective strategies and action plans for increasing potential benefits and reducing potential costs.
- **Monitor and Review** – monitor the effectiveness of all steps of the risk management process.

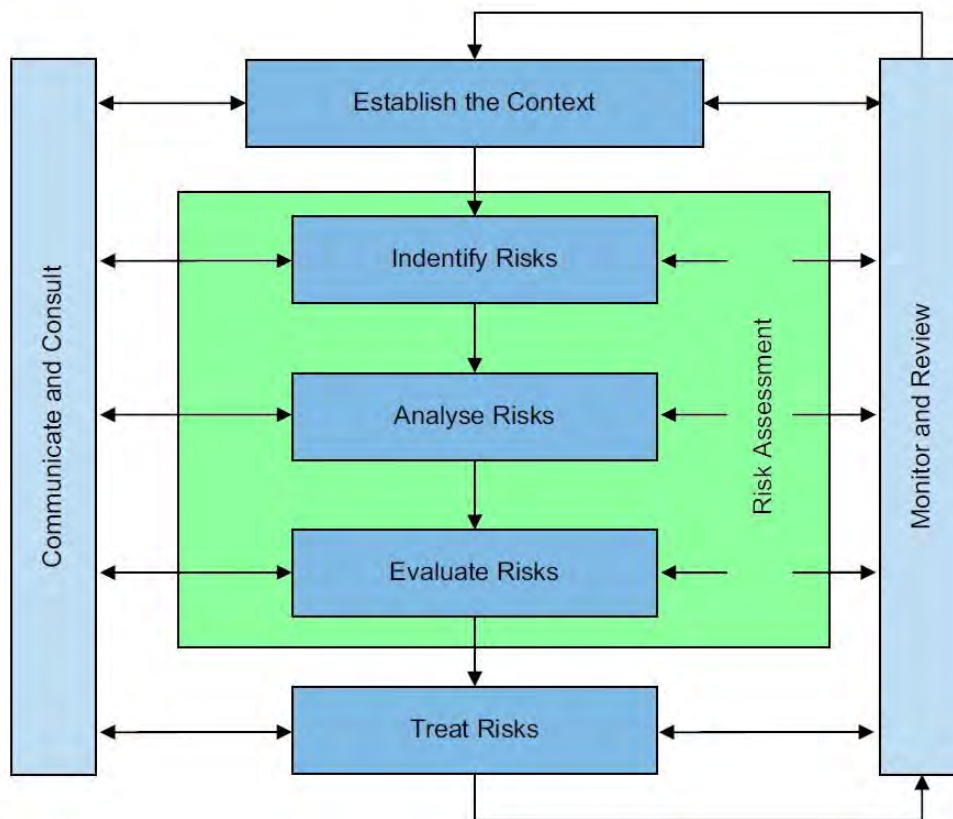


Figure 2 Risk Management Process (AS/NZS ISO 31000:2009)



3. Key Concepts

3.1 Definitions

Commonly used terms in the risk assessment for this EES are defined as follows:

Impact Pathway

This is the cause and effect 'pathway' that exists between a particular project activity and a component of the environment. It describes how aspects of project construction and operation interact with assets, values and uses.

Consequence

Consequence is an outcome of a risk event (AS/NZS ISO 31000:2009); in this case through an environmental impact pathway.

Likelihood

Likelihood is the chance of something happening (AS/NZS ISO 31000:2009). A general description of the probability or frequency of an event occurring is used as a guide.

Risk

- AS/NZS ISO 31000:2009 defines risk as the effect of uncertainty on objectives. It is expressed in terms of a combination of the consequences of an event (including changes in circumstances) and the associated likelihood of occurrence.
- Risk is a condition involving **exposure** to events that would have an adverse impact, in this case, on the biophysical, social or economic elements of the environment.
- The EES risk assessment specifically focuses on the negative impacts resulting from the Project. Positive opportunities or impacts have not been considered.
- A risk event can only occur if a cause and effect '**impact pathway**' exists between a particular project activity and a component of the environment.

Initial Risk

The risks prior to the application of treatment measures, other than measures inherent in the standard project design and environmental management framework.

Residual Risk

The risk that remains after applying risk treatment or control measures to the initial risk.

3.2 Risk Treatment / Controls

A control is a measure that is modifying risk (AS/NZS ISO 31000:2009).

In the context of this EES, risk treatment measures are the controls that are proposed to avoid, remedy, or mitigate the risk for potential adverse environmental impact. This includes design changes to avoid impacts, mitigation to reduce severity or remedial action to rectify a consequence after the fact. Controls were assessed at two stages in this EES:



- ▶ 'Planned Controls' are those base level controls inherent in the project design, project description and standard VicRoads Environmental Management Framework, and these were considered prior to the initial risk assessment. This framework comprised a standard set of environmental protection measures which are typically incorporated into VicRoads construction contracts for road works and bridge works, and are described in a document identified as '*VicRoads, Contract Shell DC1: Design & Construct*', April 2012.
- ▶ 'Controls to Reduce Risk' are the additional measures proposed to reduce the initial risk to an acceptable residual risk level.

The risk controls are documented in specialist reports and the Environmental Management Framework of the EES.



4. Risk Assessment Methodology

4.1 Introduction

Risk assessments may be quantitative, semi-quantitative or qualitative. As many environmental risks are difficult to quantify, a semi-quantitative risk assessment has been used for the Project. This means that risks have been quantified where possible, however if that is not possible without significant assumptions, then a qualitative assessment has been made.

The risk management process consists of a cycle of formulation of risk criteria, identification of risk events, assessment of risks, formulation of measures to reduce risk and review. The process enables risk treatment actions to be formulated based on the source of the risk (the impact pathway) and the components of the risk (likelihood and consequence).

A risk assessment process can be used to identify impact pathways and activities related to a project that pose the greatest risk and therefore an impact to social, environmental and economic values. The risk assessment helps to identify the key risks that are then the focus of the Impact Assessments for the EES.

4.2 Process Overview

An overview of the environmental risk assessment process used for the Project is presented in . This shows feedback loops to allow for risk re-evaluation and continuous development of the risk assessment and the Project Description.

The early steps in the process involved establishing the context of the risk assessment. A key consideration is setting the boundaries and scope for the assessment. An initial Project Description was developed for technical specialists (e.g. ecologist) to describe the design details such as the proposed construction method, details of waterway crossings and road design information. The Project Description defined the scope of the assessments and forms the basis for the impact assessments and environmental risk assessment. The Project Description was updated as the impact assessment progressed to reflect mitigation measures recommended. The final version informed Chapter 6 of the EES document.

After the context was established, technical specialists identified impact pathways describing how project construction or operation activities and events interact with assets, values and uses. Standard planned controls, comprising standard VicRoads environmental management procedures and design measures, were identified from the Project Description and matched to the appropriate impact pathway.

An initial risk assessment was then undertaken on each impact pathway, by considering the consequences and likelihood of the impact occurring. This initial rating assumed implementation of the standard planned controls.

After each risk was assigned a rating, proportional management and mitigation measures were developed. The risk rating was then re-evaluated, taking into account the additional management and mitigation measures, to identify the residual risk from the Project.

Once a preliminary risk register was completed by each technical specialist, a risk workshop was held to discuss the key risks. This workshop allowed technical specialists from each discipline to collectively discuss risks which were interrelated.

The impact assessments undertaken by the specialists followed the risk workshop and further refined impact pathways, the associated risks and mitigation measures.

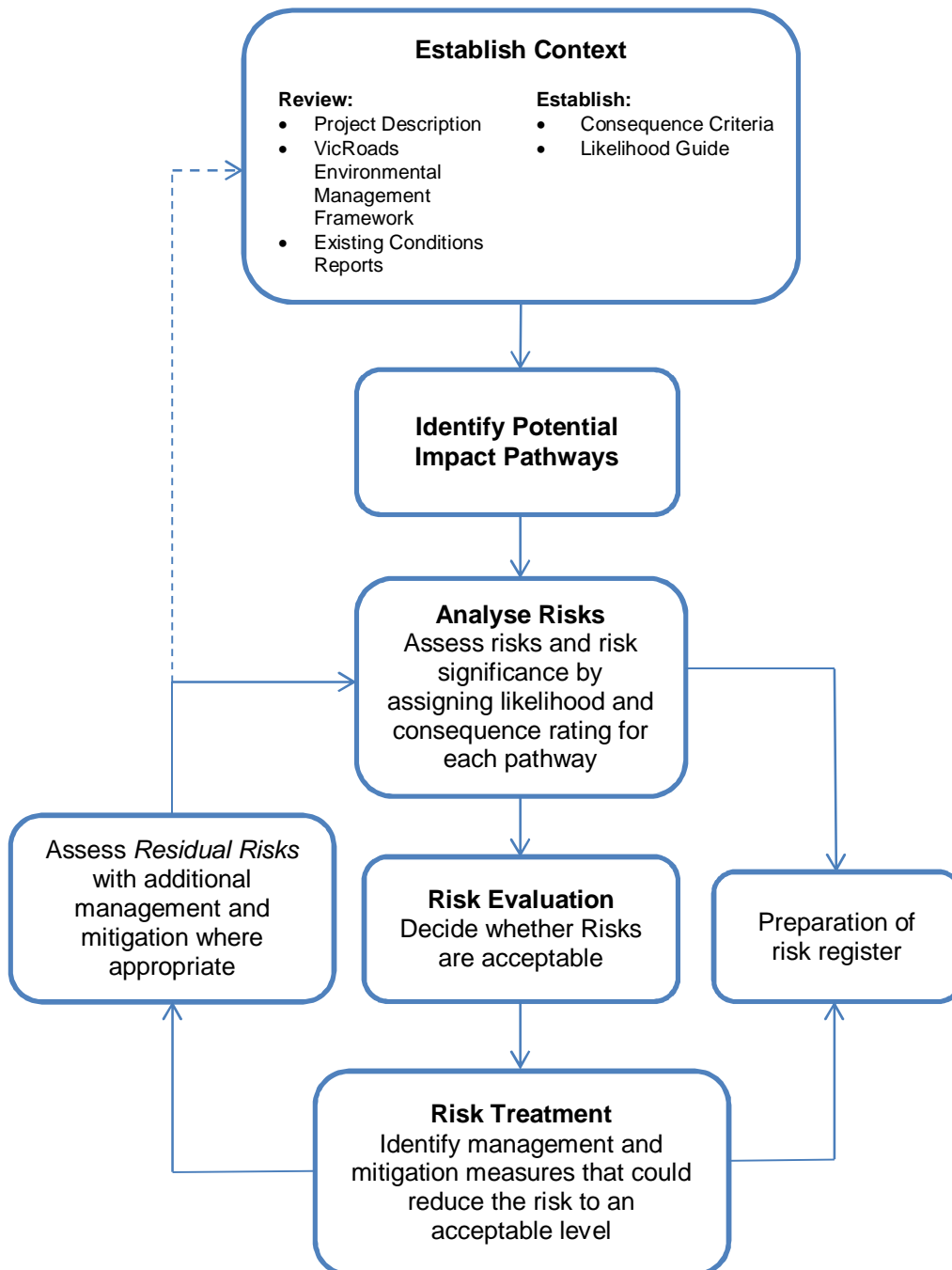


Figure 3 EES Risk Assessment Process



4.3 Establishing the Context

4.3.1 Boundaries and Scope

The scope of the risk assessment included construction and operational risks of the Project in relation to social, environmental and economic values on both a local and regional scale.

The risk assessment did not consider risks of project delays or reputational, financial or organisational effectiveness risks posed to VicRoads or the contractor(s) managing or undertaking the Project.

An initial Project Description was issued to all technical specialists and this, along with existing conditions reports, is the basis for the risk assessments. The Project Description provides details of the:

- Dimensions of the proposed route and interchanges to define the footprint of the development;
- Proposed gradeline and generalised cut and fill requirements;
- Proposed changes to existing roads and access arrangements;
- Predicted levels of traffic following project construction; and
- Construction methodology, including activities, staging, equipment and management procedures.

The Project Description also established the base level of planned controls that are inherent in the project design, or within VicRoads' standard Environmental Management Framework. This framework comprised a standard set of environmental protection measures which are typically incorporated into VicRoads construction contracts for road works and bridge works, and are described in a document identified as "*VicRoads, Contract Shell DC1: Design & Construct*". These measures are inherent to the project design and are therefore considered before undertaking the initial risk assessment.

When the project design changed significantly through the impact assessment process (perhaps due to the adoption of new mitigation measures or a realignment to avoid an impact) the Project Description was updated and reissued to all technical specialists in order to allow the impact of the change to be reassessed. Chapter 6 of the EES presents the finalised Project Description as a result of this cyclical process of continual improvement. The alignments assessed in the risk assessment are shown in totality in Figure 1, and in detail in Appendix A.

4.3.2 Establishing Consequence and Likelihood Criteria

A risk rating is determined by the likelihood of an event occurring and the consequences of that event. Descriptions for the range of possible consequences and likelihood were established in consultation with key technical specialists (e.g. surface water engineers, botanists, etc.). These were influenced by the requirements of relevant legislation and guidelines, as well as the draft evaluation objectives for the EES defined in the EES Scoping Requirements. The outcome was parameters that were reasonable and representative for their given disciplines.

The likelihood guide is shown in Table 1, and contains a general description of the probability or frequency of an event occurring.



Table 1 Likelihood Guide

Descriptor	Explanation
Almost Certain	The event is expected to occur in most circumstances
Likely	The event will probably occur in most circumstances
Possible	The event could occur
Unlikely	The event could occur but is not expected
Rare	The event may occur only in exceptional circumstances

Consequence criteria were defined for each discipline, and range on a scale of magnitude from 'insignificant' to 'catastrophic' as shown in Appendix B. Magnitude was considered a function of the **size** of the impact, the spatial **area** affected and expected recovery **time** of the environmental system. Consequence criteria descriptions indicating a minimal size impact over a local area, and with a recovery time potential within the range of normal variability were considered to be at the 'insignificant' end of the scale. Conversely, 'catastrophic' consequence criteria describe scenarios involving a very high magnitude event, affecting a State-wide area, or requiring over a decade to reach functional recovery.

4.4 Identifying Impact Pathways

To determine risks it is necessary to identify and describe cause and effect pathways for the project. This was done systematically for each discipline area (e.g. noise, groundwater) to determine links between project activities and their subsequent consequences. Impact pathways identify the activity or event associated with construction (including site establishment and restoration) or operation project phases, and give consideration to the assets, values and uses requiring protection which were established in existing conditions assessments.

Linkages between discipline areas were identified and explored in a multi-disciplinary workshop, explained further in Section 4.7. If a particular risk had 'downstream' implications for other specialist areas, this linkage was brought to the attention of the wider EES team to evaluate whether appropriate action was being taken. An example is construction dust emissions (an air quality impact pathway) potentially affecting flora and fauna, an adjacent business or nearby residents (economic and social receivers).

4.5 Analysing Risks

Risk ratings were established for each pathway by technical specialists assigning a level of likelihood in accordance with the **Likelihood Guide** shown in Table 1 and assigning levels of consequence in accordance with the **Consequence Table** provided in Appendix B.

The likelihood of the risk occurring took into account the probability of the maximum credible consequence as described in the Consequence Table, assuming the planned controls specified in the project description are in place and operating at their expected level of performance. A base level of mitigation is inherent through the implementation of VicRoads' standard Environmental Management Framework. The adequacy of these controls to manage the risk was considered when assigning the likelihood rating.

The descriptors in the Consequence Table were used to assign consequence levels to risks within each specialist's area of study. These were conservatively assigned on the basis of the 'credible worst case' scenario which considers the range of possible outcomes and the mode (most common outcome), to supply a credible worst case rating. This approach enabled prioritisation of risks and plausible pathways from activities to receptor. Otherwise, there was the potential that the Project activities could, by considering an implausible and nearly impossible event scenario, be assessed as an extreme outcome which would not be credible or of use in informing a proportionate treatment response. The Consequence Criteria were treated as a guide only, and professional judgment and experience was also used to assign consequence levels.

Uncertainty was considered when assigning likelihood and consequence levels. In cases where information was incomplete, a conservative assessment was made on the basis of the maximum credible consequence. Areas where further work could be done to reduce uncertainty (and therefore provide a more precise risk rating) were identified and prioritised.

The degree of risk was then established by considering its constituent components of likelihood and consequences in the matrix shown in Table 2. A risk event may pose a 'high' risk because it is likely to occur frequently, although the consequences may not be substantial for any single event. A risk event may also pose a 'high' risk if it has a low likelihood of occurrence but the magnitude of consequences will be substantial. A risk event that poses an 'extreme' risk will represent both a high likelihood of occurrence and substantial consequences. The Table 2 matrix is commonly used in environmental impact assessment, and complies with AS/NZS ISO 31000:2009.

Table 2 Risk Significance Matrix

Likelihood Level	Consequence Level				
	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Low	Medium	High	Extreme	Extreme
Likely	Low	Medium	High	High	Extreme
Possible	Negligible	Low	Medium	High	High
Unlikely	Negligible	Low	Medium	Medium	High
Rare	Negligible	Negligible	Low	Medium	Medium

4.6 Risk Evaluation and Treatment

Risk treatment involves identify measures for reducing the identified risks, and implementing those measures. Risk treatment involves a cyclical process of:

- Assessing a risk treatment;
- Deciding whether residual risk levels are tolerable
- If not tolerable, generating a new risk treatment; and
- Assessing the effectiveness of that treatment.



Risk treatment measures are not necessarily mutually exclusive or appropriate in all circumstances and can include the following:

- Avoiding the risk by deciding not to start or continue with the activity that gives rise to the risk;
- Removing the risk source. For example, by moving a chemical storage area away from a watercourse;
- Changing the likelihood. For example, the probability of traffic crashes may decrease if large fauna wildlife crossings are incorporated;
- Changing the consequences. For example, providing screen planting may reduce the consequences to visual amenity; or
- Retaining the risk by informed decision.

The risk significance in Table 2 was used to evaluate impact pathways which required detailed investigation, areas where additional mitigation or remedial measures were necessary, or where changes to the project were needed to avoid risks. It also provided a way to screen out the less significant issues.

In general, a proportional level treatment or mitigation was required where residual risks were assessed as having a significance of 'Medium' or greater rating. Any residual risks rating as 'High' or 'Extreme' were treated as potential fatal flaws and would potentially require design modifications to reduce the impact to an acceptable level.

Where initial risks were considered unacceptable, mitigation measures in addition to those inherent in the design and VicRoads standard Environmental Protection Measures were recommended by the specialist to reduce the level of risk. The risks were then rated again to confirm that the mitigation measure had the desired effect. This second rating is known as the 'residual risk rating'.

Where mitigation measures caused a significant change to the Project Description, the Project Description was updated and the impact pathways reassessed as appropriate.

4.7 Risk Workshop

After all technical specialists had completed their risk assessments, a multi-disciplinary workshop was held on 23 January 2012 to address the interactions between impact pathways in differing disciplines and their consequences.

The systematic application of the risk assessment process in a workshop involving experienced technical specialists from different disciplines achieved the following:

- As much as possible, all risks of relevance are identified;
- Knowledge and information transfer occurred between the various practitioner disciplines, enabling inter-disciplinary pathways and interactions to be captured;
- Greater understanding of identified risks, in terms of the range of potential consequences and their likelihood of occurrence;
- Assessment was carried out of individual risks relative to other risks to support priority setting and resource allocation; and
- Environmental risk management measures take account of opportunities to address more than one risk.



The cultural heritage specialists were not present at the workshop as their field work was yet to be completed. Once the field work was complete, the risk register for both non-Aboriginal and Aboriginal cultural heritage was completed and reviewed with selected specialists to consider the risks in context of other disciplines.

4.8 Risk Register

A risk register was established to document the findings of the risk assessment process. The risk register contains details of impact pathways, their consequences, planned controls inherent in the project description, an initial risk assessment, treatment measures, and the revised risk assessment. This is presented in Appendix C.

The final risk register presented in Appendix C is a refinement on the draft register that was initially reviewed at the workshop. Specialists reviewed and updated their risk assessment during the writing of their impact assessment process, and as such the final risk register has changed to match the final impact assessments.



5. Risk Assessment Outcomes

Please note that all information on impact pathways and associated risks are cited from the specialist reports (ALA 2012a and b, ASPECT 2012, EHP 2012, GHD 2012a to GHD 2012i).

5.1 Risk Assessment Analysis

The following section provides a simple analysis of the number of risks within each discipline and for each alignment option was undertaken. Discussion of the risk pathways and the significance of risks within each discipline are provided in the specialist reports.

In the final analysis of the risks associated with the Project, there were 149 impact pathways identified for Option 1, and 150 for Options 2 and 3. Following consideration of risk treatment measures, the risk pathways and ratings included:

- ▶ 46 negligible residual risks
- ▶ 62 low residual risks for Option 1 and 3, and 63 for Option 2
- ▶ 35 medium residual risks for Option 1 and 2, and 36 for Option 3
- ▶ 6 high residual risks
- ▶ 0 extreme residual risks.

The effect of the mitigation measures is shown in Figure 4. This graph compares the frequency of initial risk magnitude ratings to the corresponding residual risk counts, and illustrates the substantial shift in the distribution of risk magnitudes towards the low and negligible end of the scale following treatment.

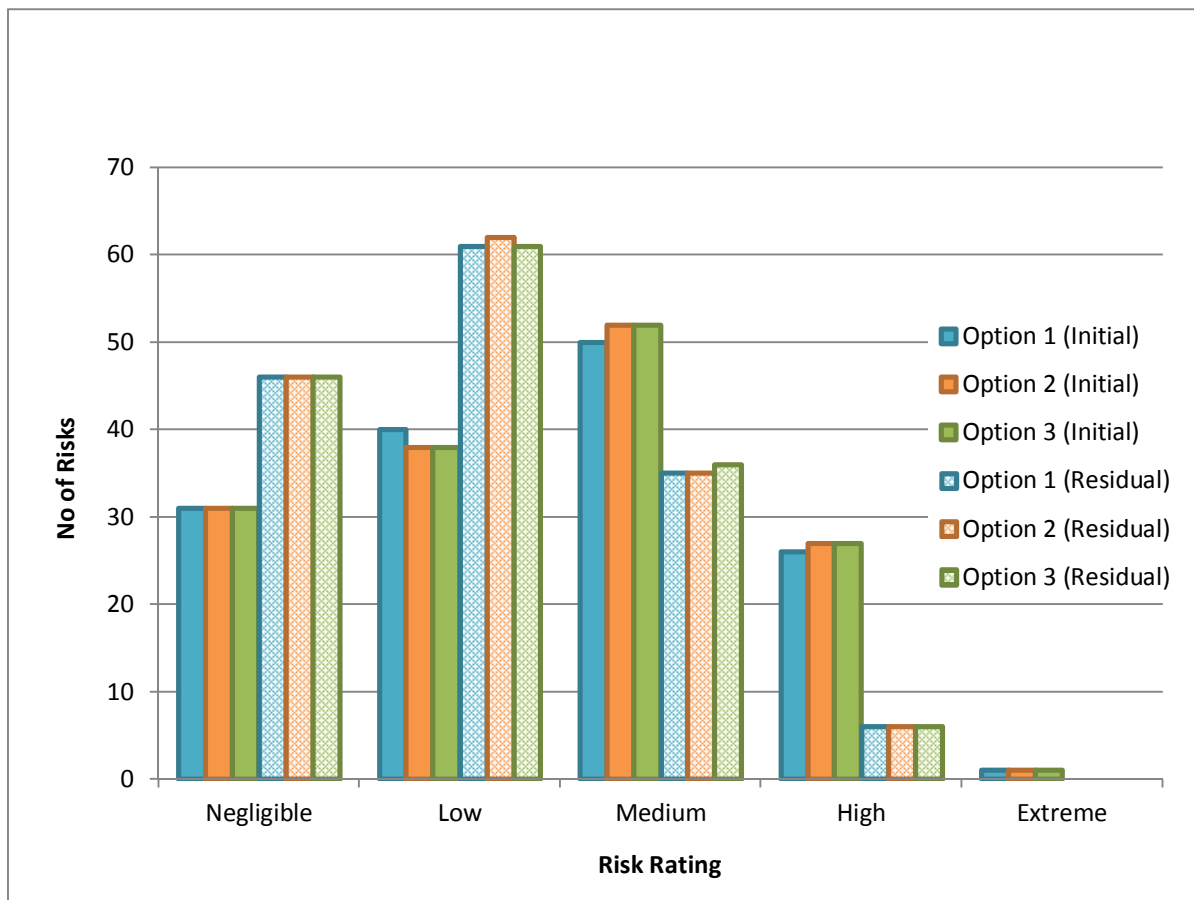


Figure 4 Frequency of Initial and Residual Risks by Rating Category

No extreme residual risks were identified by specialists. The only residual high risks were identified by the biodiversity and habitat and cultural heritage specialists with both having three high residual ratings across all three options. The biodiversity and habitat risks related to impacts on FFG listed grasslands, EPBC listed grassland and woodland communities, and are described in Table 3, while the cultural heritage risks relate to the destruction of two occasional occurrence Aboriginal heritage sites, and the potential destruction of a previously unidentified Aboriginal mortuary tree (also in Table 3).

A comparison of the initial and residual risk ratings for each discipline is illustrated in Figure 5.

Identification of high risks through the risk assessment process means that they can be prioritised for consideration during the detailed design and construction phases. For example, it is expected that small realignments of the carriageways will provide opportunity to reduce or avoid impacts to sensitive ecological communities. These impact pathways are detailed in the relevant impact assessment reports.

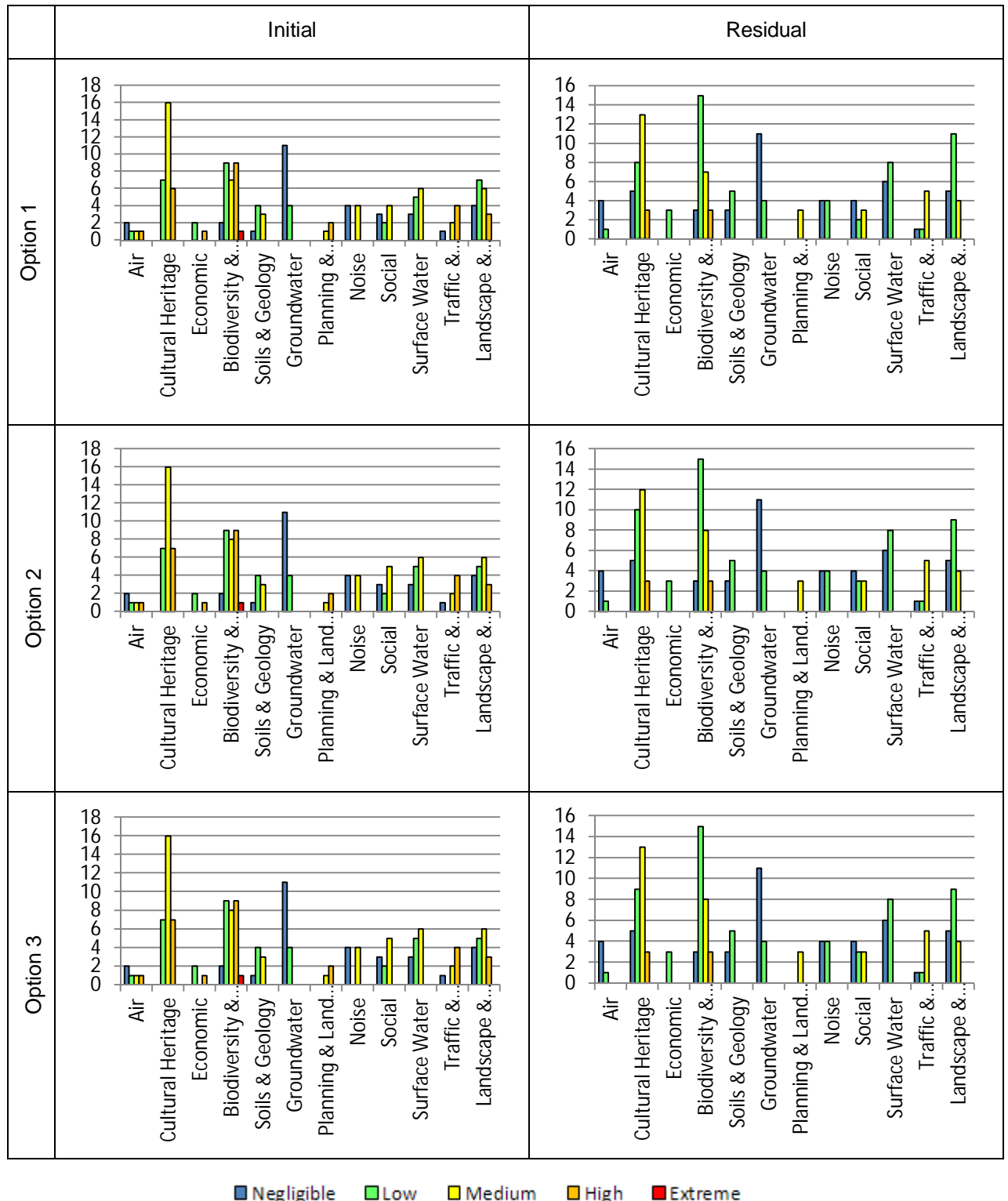


Figure 5 Frequency of Initial and Residual Risk Ratings by Discipline



Table 3 Impact Pathways and Consequences with Residual Risks rated 'High' or greater

Discipline	Risk No.	Option Number	Impact Pathway Description	Description of consequences	Planned Controls to Manage Risk (as per Project Description, and VicRoads Contract Shell DC1: Design & Construct (April 2012)).	Initial Risks			Controls Recommended to Reduce Risk	Residual Risks		
						Consequence	Likelihood	Risk Rating		Consequence	Likelihood	Risk Rating
Biodiversity & Habitat	FF14a	All	Construction encounters the EPBC listed community, Grassy Eucalypt Woodland of the Victorian Volcanic plain, located along entire alignment.	Removal of the EPBC Act-listed community.	Vegetation/habitat sites and areas of significance listed in Table 1200.132 of the report, and native flora/fauna sites or habitat discovered during works under the Contract shall not be damaged, disturbed or otherwise adversely impacted without prior approval of the Superintendent and obtaining all relevant permits. Plant, equipment, material or debris shall not be placed or stored within the limit of the root zone of vegetation to be retained. Fencing and signage to protect populations during construction.	Major	Almost Certain	Extreme	Detailed design and construction planning to minimise native vegetation loss as far as possible.	Moderate	Likely	High
Biodiversity & Habitat	FF14b	All	Construction encounters the EPBC listed community, Natural Temperate Grassland of the Victorian Volcanic Plain.	Removal of the EPBC Act-listed community.	As above	Moderate	Almost Certain	High	Detailed design and construction planning to minimise native vegetation loss as far as possible.	Moderate	Likely	High
Biodiversity & Habitat	FF15	All	Construction encounters the following FFG listed community - Western (Basalt) Plains Grasslands - located along entire alignment	Removal of the FFG Act-listed community.	As above	Major	Likely	High	Detailed design and construction planning to minimise native vegetation loss as far as possible.	Major	Likely	High



Discipline	Risk No.	Option Number	Impact Pathway Description	Description of consequences	Planned Controls to Manage Risk (as per Project Description, and VicRoads Contract Shell DC1: Design & Construct (April 2012)).	Initial Risks			Controls Recommended to Reduce Risk	Residual Risks		
						Consequence	Likelihood	Risk Rating		Consequence	Likelihood	Risk Rating
Aboriginal Cultural Heritage	ACH13	All	Construction encounters the following previously identified Aboriginal cultural heritage place: Western Highway 5 ~ Ch. 16,115	Destruction of an occasional occurrence Aboriginal cultural heritage place.	Following registration with VAHR approvals must be obtained from relevant authorities prior to impacting on the Aboriginal cultural heritage place.	Moderate	Almost Certain	High	An approved Cultural Heritage Management Plan (CHMP).	Moderate	Almost Certain	High
Aboriginal Cultural Heritage	ACH14	All	Construction encounters the following previously identified Aboriginal cultural heritage place: Western Highway 3 ~ Ch. 17, 495 (Option 1 and 3), 17,455 (Option 2)	Destruction of an occasional occurrence Aboriginal cultural heritage place.	Following registration with VAHR approvals must be obtained from relevant authorities prior to impacting on the Aboriginal cultural heritage place.	Moderate	Almost Certain	High	An approved Cultural Heritage Management Plan (CHMP).	Moderate	Almost Certain	High
Aboriginal Cultural Heritage	ACH22	All	Construction encounters previously unregistered and unassessed mortuary tree Aboriginal cultural heritage place.	Destruction of a mortuary tree Aboriginal cultural heritage place.	Undertake a Complex Assessment.	Catastrophic	Possible	High	To consider realignment if a mortuary tree is identified in the future.	Catastrophic	Unlikely	High

5.2 Comparison of Options

The outcome of the risk assessment is one consideration in the selection of a preferred alignment from the three options for Section 2. The selection process and outcome is described in Chapter 5 of the EES document, and in the Options Assessment Paper (Technical Appendix to the EES).

The difference between options was discussed with specialists during the workshop. The outcomes of this discussion are illustrated in Table 4 for each discipline, where the ticks indicate the option preferred by each relevant specialist at the time of the workshop. It should be noted however that these preferences preceded the impact assessments undertaken by the specialists, and as such may not be the same preferences indicated in the specialist's reports.

Overall, Option 1 was preferred by more specialist disciplines than the other options. Option 1 was preferred by the traffic, biodiversity and habitat, social, soils and geology and non-Aboriginal (historical) specialists. Whereas Option 2 was preferred by the surface water and economic specialists, and Option 3 was preferred by only the noise specialist. All other disciplines present at the workshop (groundwater, air, planning and land use and Aboriginal cultural heritage) did not distinguish between the options.

Another consideration that the risk assessment highlighted is that more initial high risks are associated with biodiversity and habitat and cultural heritage compared to other disciplines. It is also within the biodiversity and habitat assessment that the only extreme initial risk was identified. Mitigation measures have been recommended to reduce the extreme risk and high risks. This illustrates that risks to biodiversity and habitat are a key consideration for the project and selection of a preferred alignment in Section 2.

As mentioned above, the impact assessment in each specialty progressed following the workshop, so the conclusions regarding the preferred option by each specialist evolved based on the refinement of the design. Table 4 notes the initial preference by specialists at the time of the workshop (or after initial assessment for the cultural heritage specialists).

Table 4 Preferred Option reported by discipline

Discipline	Option 1	Option 2	Option 3	Comments
Groundwater	✓	✓	✓	All options are similar.
Traffic and Transport	✓			Option 1 is slightly preferred due to lower potential construction impacts. This is because it does not follow the existing highway alignment as closely Options 2 and 3; therefore the existing highway can remain operational during construction.
Air Quality	✓	✓	✓	All options are similar.
Noise and Vibration			✓	Option 3 best avoids bringing traffic closer to dwellings that are not currently near the highway.
Surface Water		✓		Option 2 crosses Billy Billy Creek in a less sensitive area, and the crossing has a smaller foot print.
Soils and Geology	✓			Option 1 is preferred. There is a lower



Discipline	Option 1	Option 2	Option 3	Comments
				potential for contamination due to it avoiding the railway reserve, and there is less interaction with the harder geology of the granite contact compared to Options 2 and 3.
Biodiversity and Habitat	✓			Option 1 is preferred as it has less impact on significant species (Emerald-lip Greenhood and Yarra Gum), and does not follow the existing road reserve, where many sensitive areas exist, as much as Options 2 and 3. All options have potential impacts on Golden Sun Moth.
Visual and Landscape		✓	✓	Options 2 and 3 are preferred as they have less impact on landscape character by following the existing highway more closely than Option 1.
Social	✓			Option 1 is preferred as it has less impact on the dwelling near the intersection of Hillside Road and the existing Western Highway.
Economic		✓		Option 2 is preferred as it has less impact on agricultural operations.
Planning and Land Use	✓	✓	✓	All options are similar.
Non Aboriginal Heritage	✓			Option 2 impacts on more sites therefore Option 1 is preferred.
Aboriginal Heritage	✓	✓	✓	All options are similar.

5.3 Key Outcomes of the Risk Assessment Process

The key outcomes of the risk assessment process are summarised below:

- ▀ A risk register that documents the outcomes of the risk identification process.
- ▀ Confirmation of the identified risk events, allowing prioritisation.
- ▀ A project management tool for informing project decisions, the Project Description and the EES.
- ▀ Integration and interaction between technical specialists fostering an inter-disciplinary approach to the project.
- ▀ Identification of some key areas for further work and/or clarification.
- ▀ Achievement of key risk assessment process requirements and objectives as set out in the EES Scoping Requirements and this risk report.
- ▀ Increased understanding amongst the technical specialists of all aspects of the project and how their research impacts on other technical disciplines.
- ▀ Completing the Impact Assessments based on the impact pathways identified through the risk assessment.



- Technical specialists reporting on impacts, risks, controls and proposing mitigation and management plans. This is used to inform the Environmental Management Framework.

The outcomes highlight the integrated approach applied through the risk assessment process.

5.4 Conclusion

A risk-based approach was adopted to identify and assess each impact pathway associated with the Project. The approach assessed the credible worst case consequence and the likelihood of that consequence occurring for each impact pathway.

In the final analysis of the risks associated with the Project, overall there were 149 impact pathways identified for Option 1, and 150 for Options 2 and 3. There were three residual high risks identified by both the biodiversity and habitat and cultural heritage specialists across all three options. Further assessment is being undertaken to define risk treatment measures to reduce these risks to an acceptable level. The risk assessment was conservative in approach, providing repeatable results.

Of the three alignment options considered in Section 2, Option 1 was preferred by more specialist disciplines present at the workshop than the other options. Option 1 was preferred by the traffic, biodiversity and habitat, social and soils and geology specialists. Whereas Option 2 was preferred by the surface water and economic specialists, and Option 3 was preferred by only the noise specialist. All other disciplines present at the workshop (groundwater, air, planning and land use) did not distinguish between the options. Though not present at the workshop, after their initial risk assessment the non-Aboriginal cultural heritage specialists preferred Option 1 while the Aboriginal cultural heritage specialists had no preference. It should be noted however that these preferences preceded the impact assessments undertaken by the specialists, and as such may not be the same preferences indicated in the specialist's reports.

The results of the risk assessment have been reported in the individual impact assessment reports for each discipline area, providing justification for the rating and proposing mitigation and management measures to reduce risk.

The impact pathways and the proposed mitigation and management measures were used to inform the Environmental Management Framework for the Project, described in Chapter 21 of the EES document, and in particular the aspects in the Environmental Management Plan and associated monitoring programs. (The proposed measures in the risk register attached have changed from the initial measures at the workshop; this is due to updates made following the risk workshop and throughout the completion of the impact assessments).

As a result of the outcomes of this Risk Assessment, it was decided that both Option 1 and Option 2 would be considered for refinement and incorporation into the EES, as they were deemed to have less impacts than Option 3.

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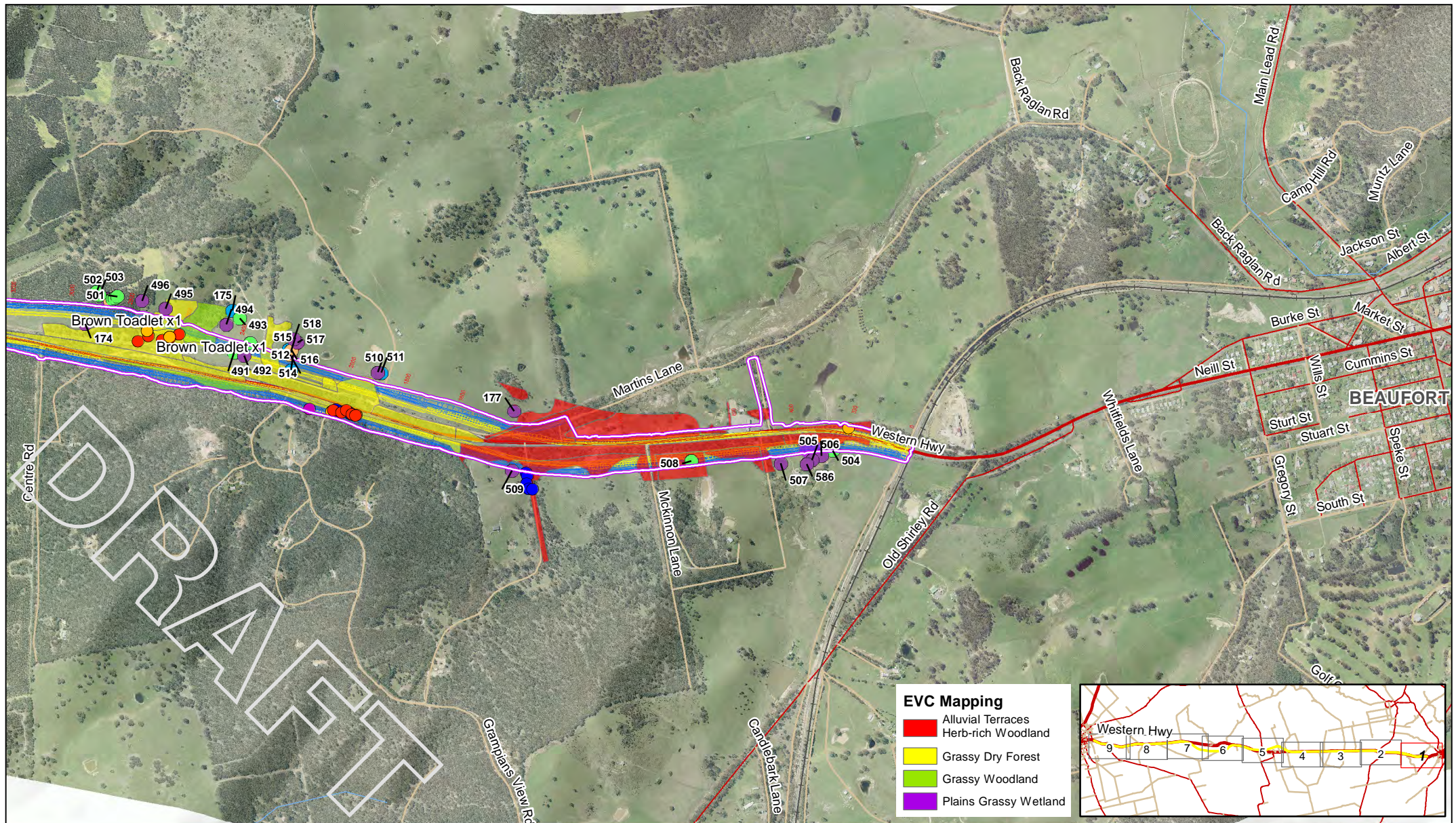
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Appendix A

Alignment Options Map Books

Note that these are the alignments as initially assessed by the Risk Assessment. The following are not the final alignments presented in the EES, which have been refined as a result of the risk and subsequent impact assessment.



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Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 54

LEGEND

Maximum Construction Footprint

Carriageway & Interchanges

Service Road

Fauna Survey

● Arboreal mammal & woodland bird

● Brown Toadlet

● Owls

● Terrestrial mammal & woodland birds

● Medium Old Trees

● Small Trees

Scattered Trees

● Very Large Old Trees

● Large Old Trees

EVC Mapping

Alluvial Terraces

Grassy Dry Forest

Grassy Woodland

Plains Grassy Wetland

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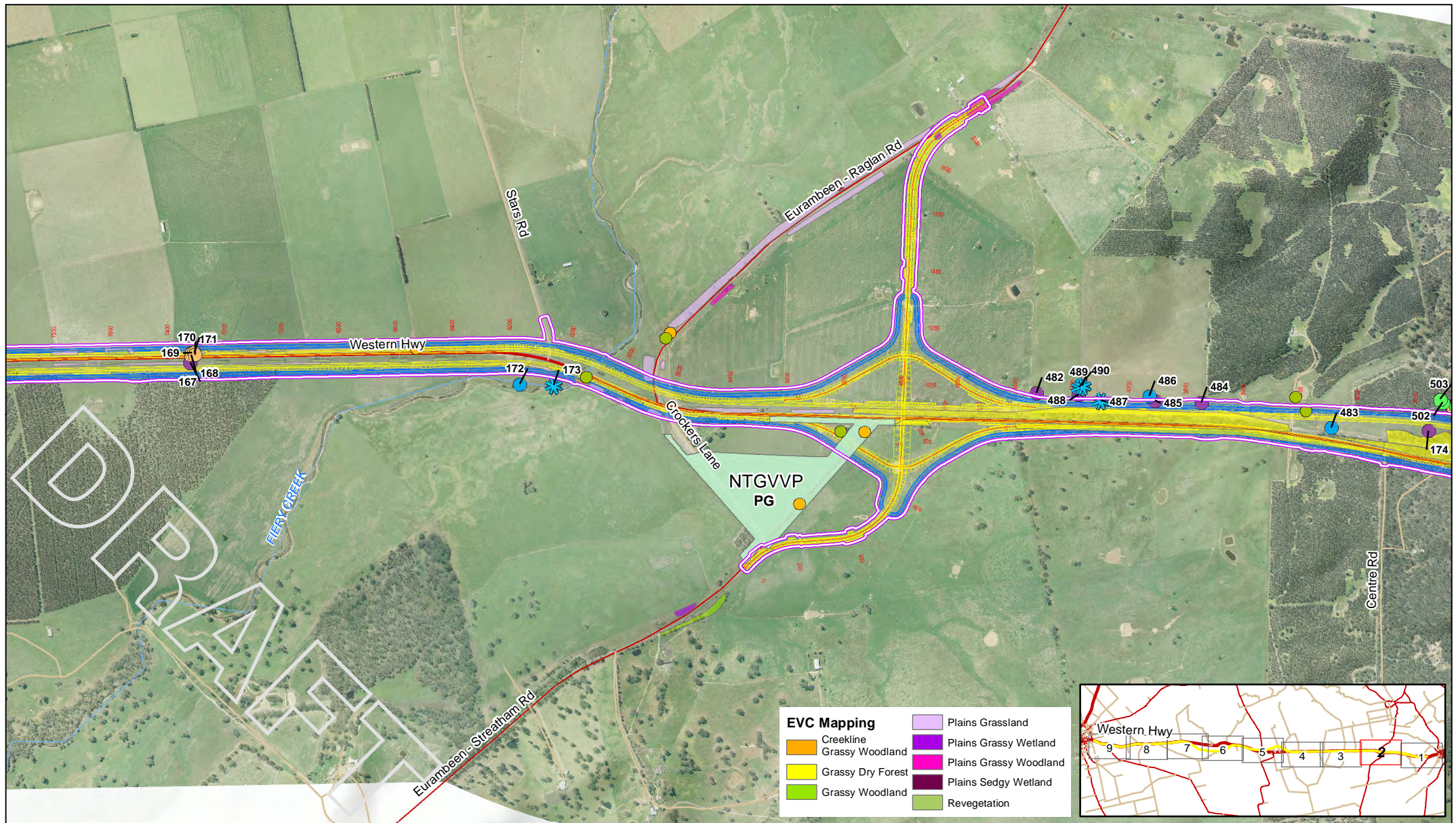
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VicRoads
Western Highway Project

Job Number 31-27558
Revision A
Date 14 Feb 2012

**Beaufort to Ararat
Ecology Partners Flora & Fauna Data
Recommended Option 1**

Sheet 1



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Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 54



LEGEND

- | | | |
|--------------------------------|--|------------------------|
| Maximum Construction Footprint | Growing Grass Frog | Scattered Trees |
| Carriageway & Interchanges | Threatened Ecological Communities | Very Large Old Trees |
| Service Road | NTGVPP | Large Old Trees |
| Fauna Survey | Hollow Bearing Trees | Medium Old Trees |
| Brown Toadlet | | Small Trees |



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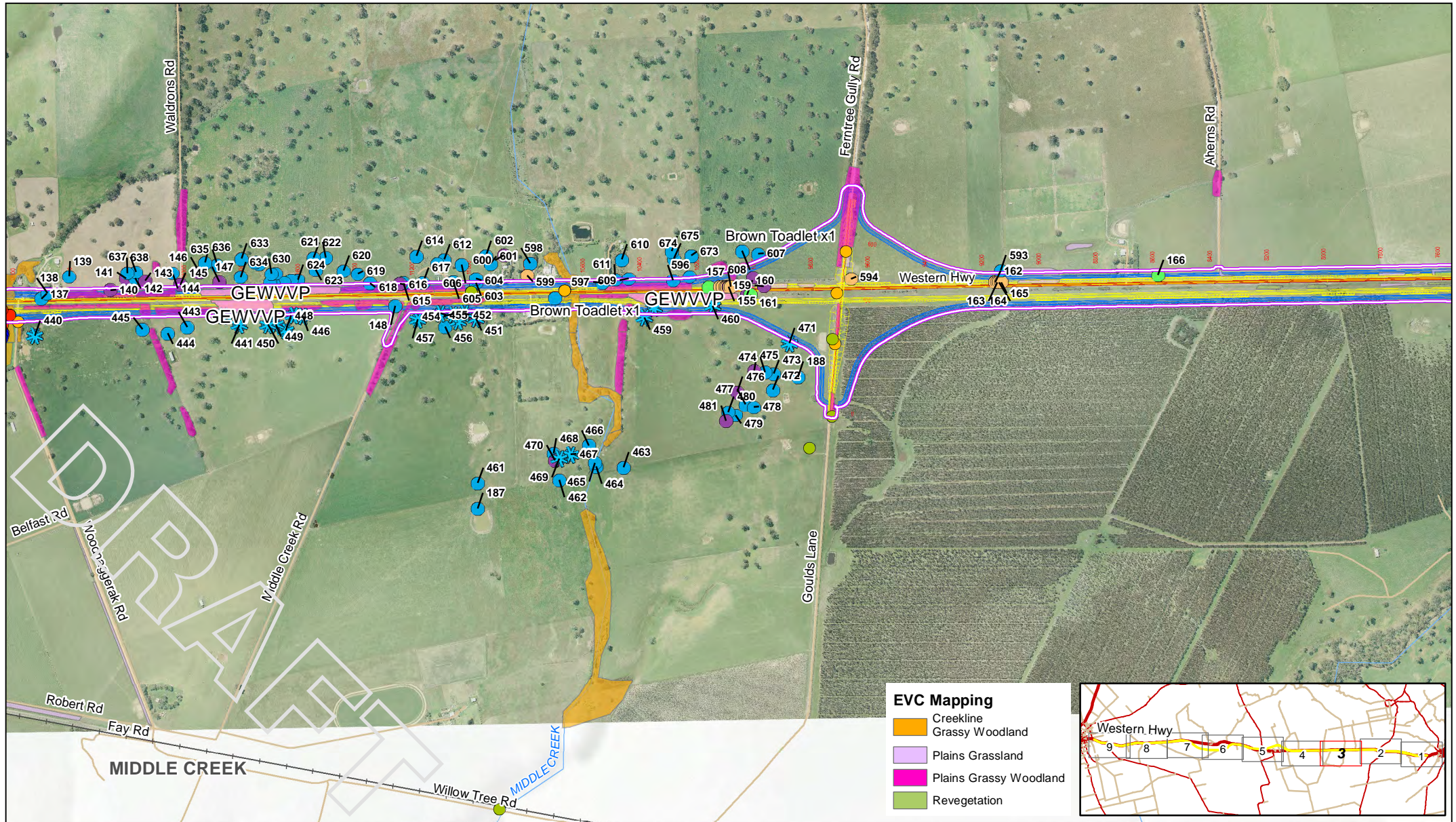
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Recommended Option 1
Sheet 2

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Grid: GDA 1994 MGA Zone 54



LEGEND

- Fauna Survey**
- Maximum Construction Footprint
 - Carriageway & Interchanges
 - Service Road
 - Arboreal mammal & woodland bird
 - Brown Toadlet
 - Growing Grass Frog
 - Terrestrial mammal & woodland birds
 - Hollow Bearing Trees
 - Scattered Trees
 - Large Old Trees
 - Medium Old Trees
 - Small Trees
- Threatened Ecological Communities**
- GEWVVP



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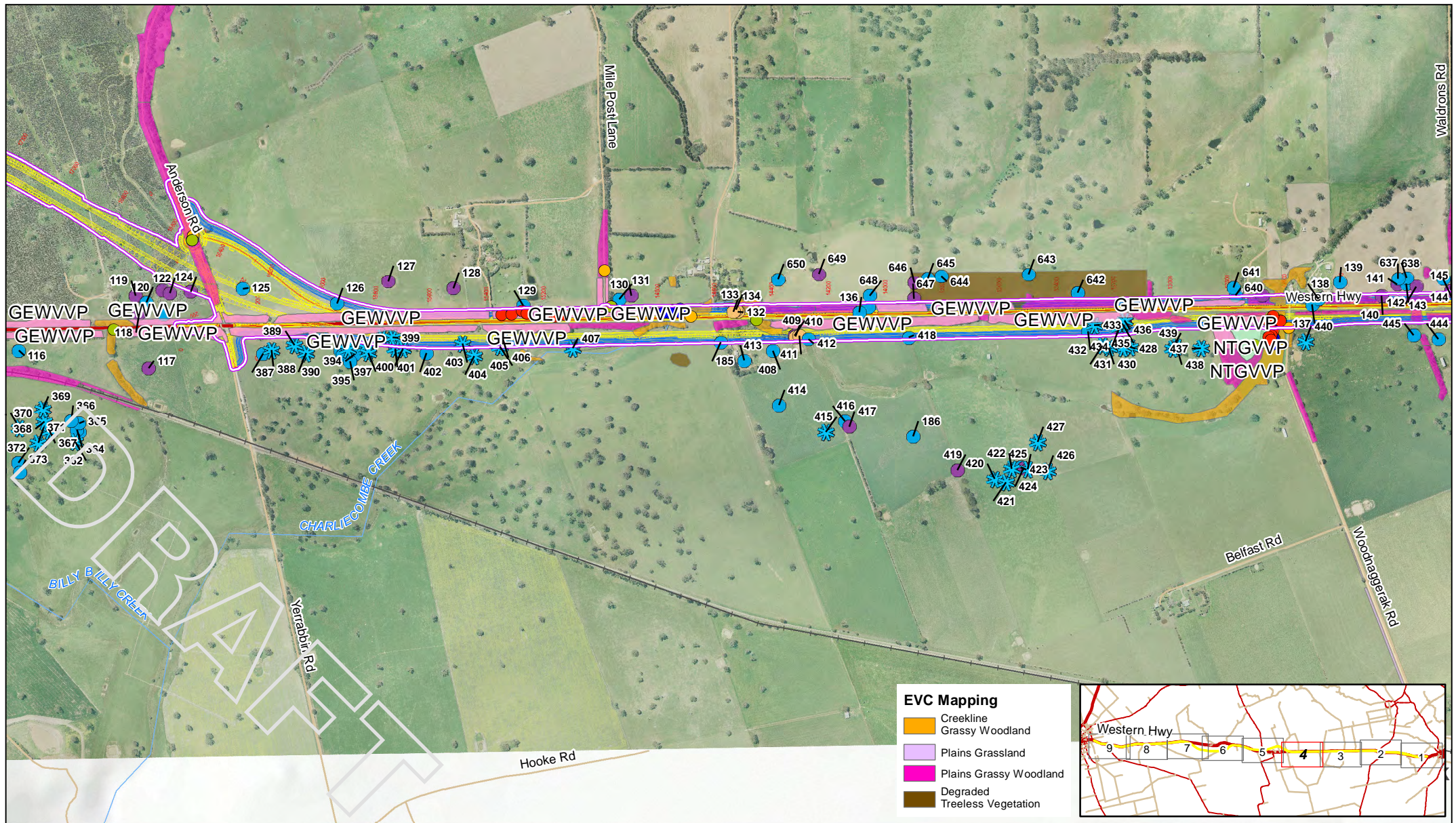
Beaufort to Ararat
Ecology Partners Flora & Fauna Data
Recommended Option 1
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Grid: GDA 1994 MGA Zone 54

LEGEND

Maximum Construction Footprint

Carriageway & Interchanges

Service Road

Fauna Survey

● Arboreal mammal & woodland bird

● Brown Toadlet

● Growing Grass Frog

● Owls

Terrestrial mammal & woodland birds

● Button Wrinklewort

● Hollow Bearing Trees

Threatened Ecological Communities

GEWVVP

NTGVVP

Targeted Flora

● Very Large Old Trees

● Large Old Trees

● Small Trees

EVC Mapping

Creekline

Grassy Woodland

Plains Grassland

Plains Grassy Woodland

Degraded

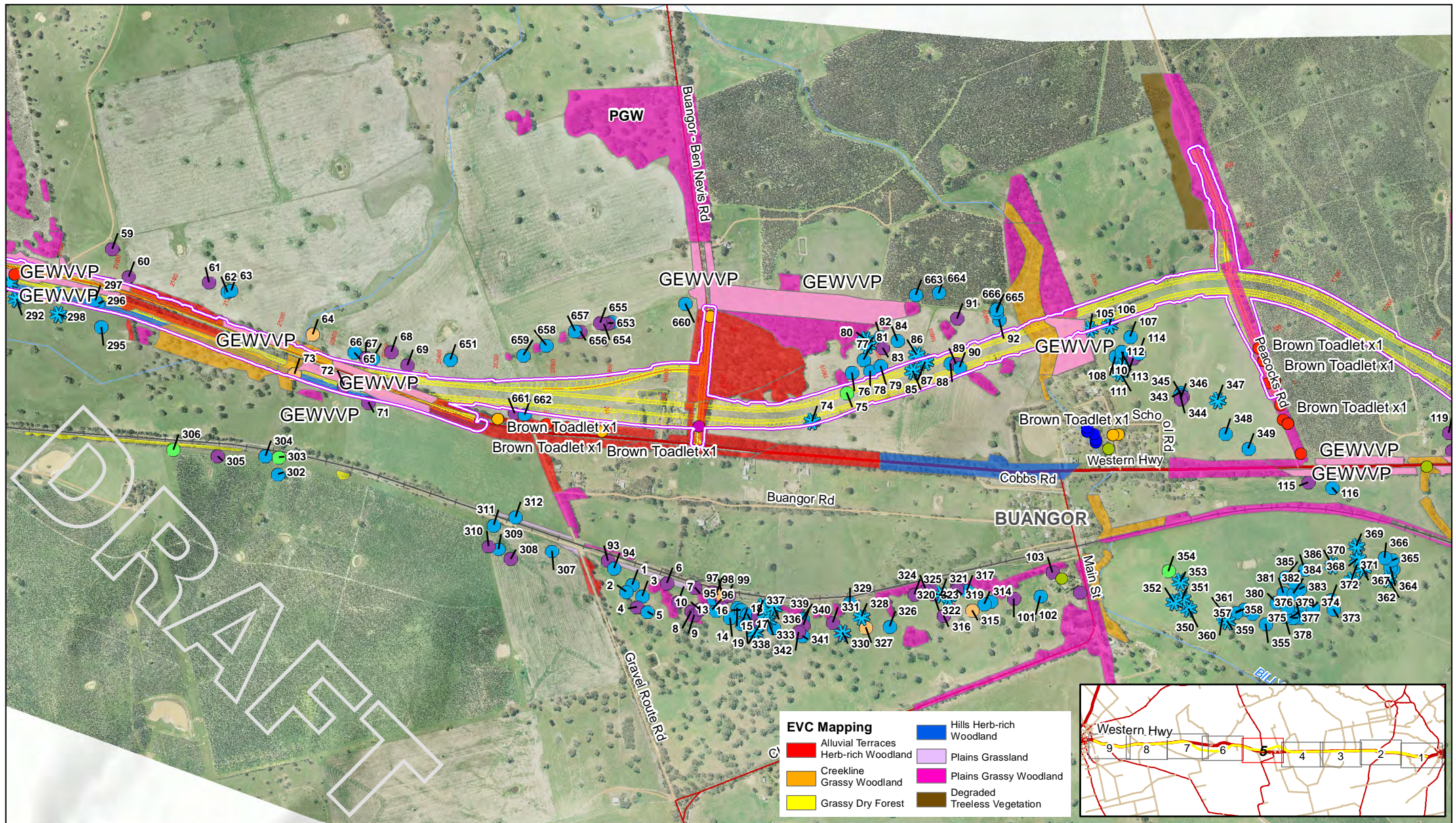
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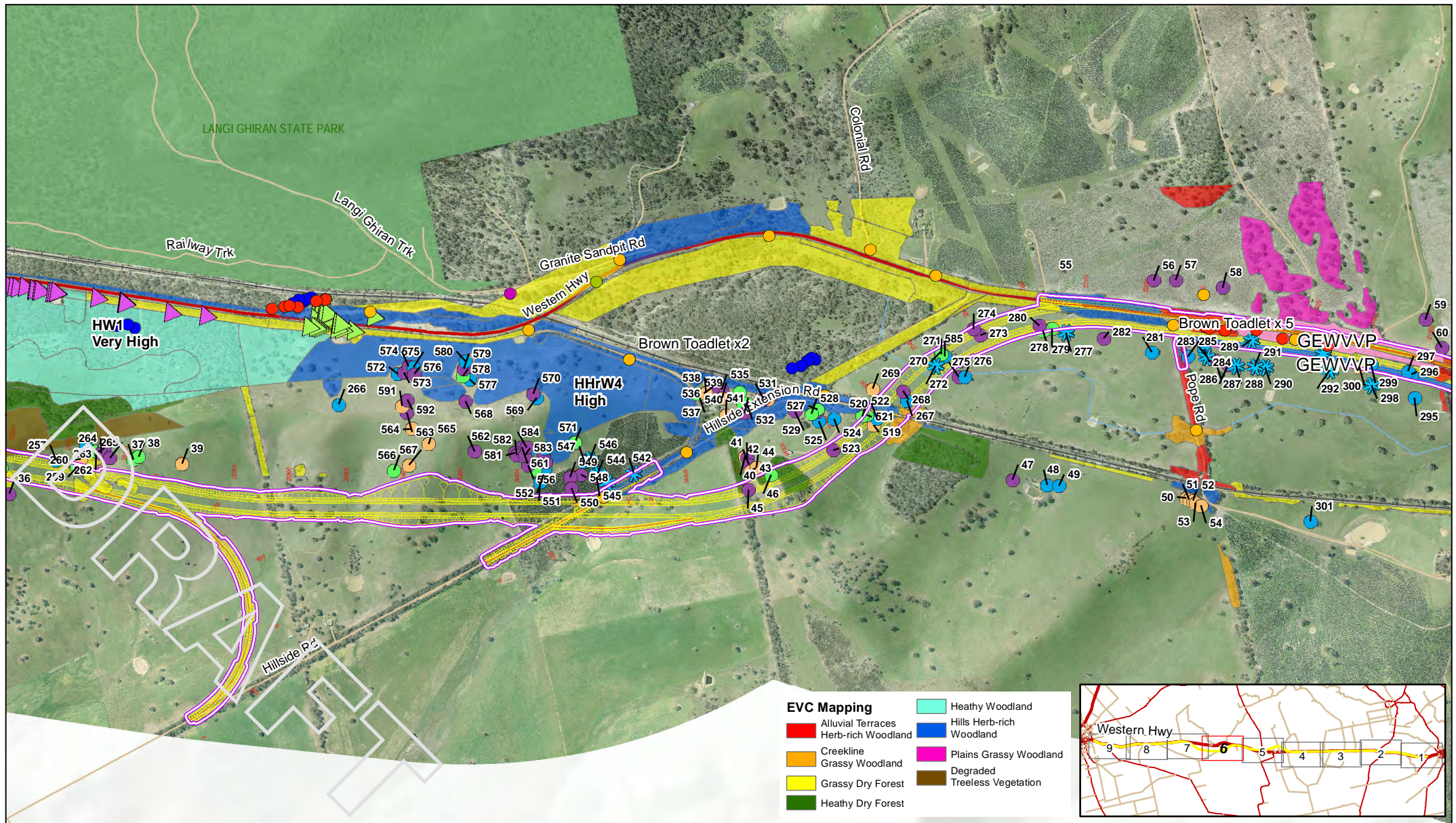
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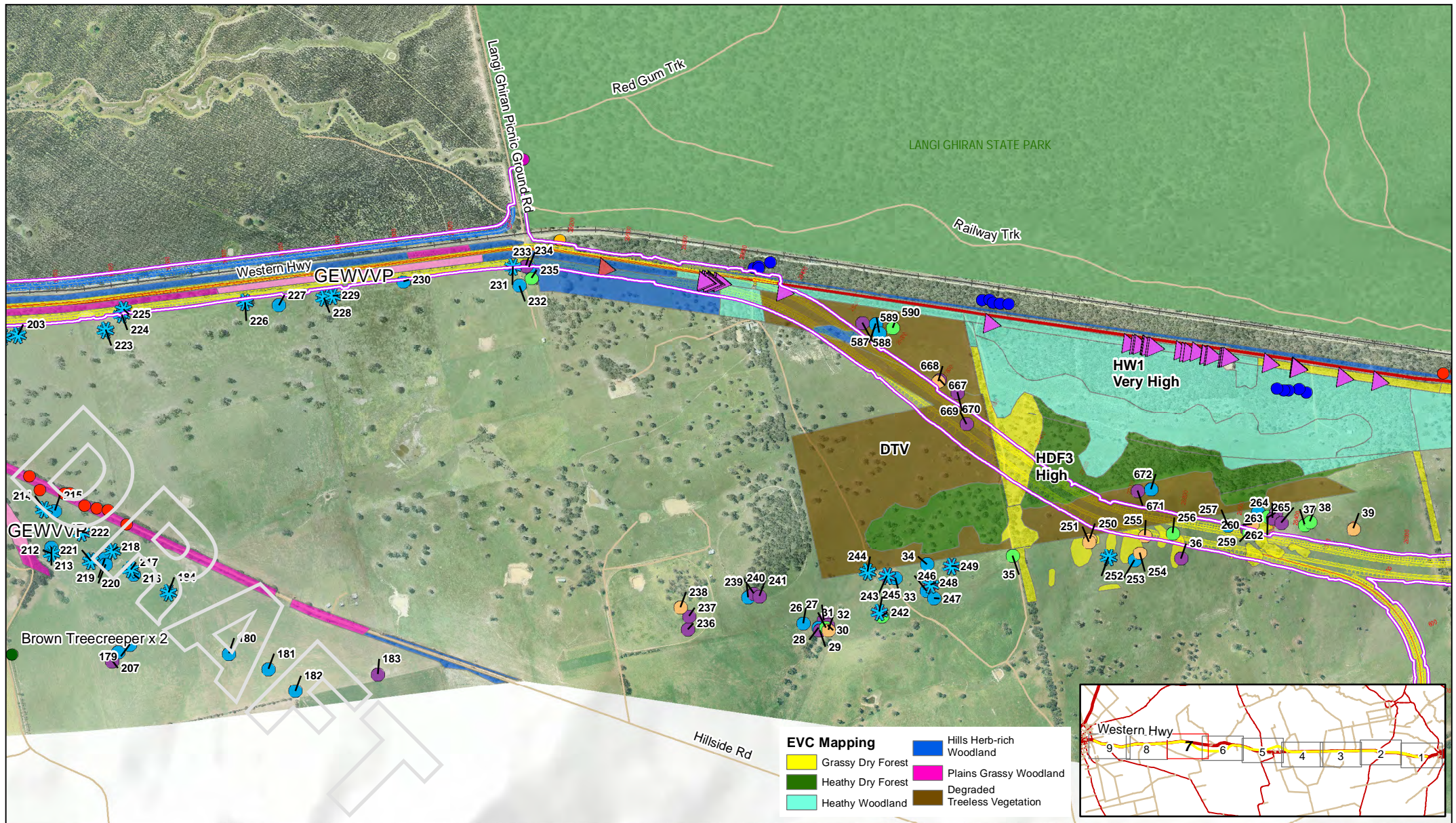
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**Beaufort to Ararat
Ecology Partners Flora & Fauna Data
Recommended Option 1**

Sheet 4

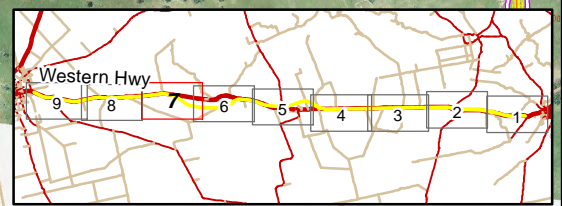






EVC Mapping

Grassy Dry Forest	Hills Herb-rich Woodland
Heathy Dry Forest	Plains Grassy Woodland
Heathy Woodland	Degraded Treeless Vegetation



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Grid: GDA 1994 MGA Zone 54

LEGEND

Maximum Construction Footprint

Carriageway & Interchanges

Service Road

Fauna Survey

Arboreal mammal & woodland bird

Brown Toadlet

Incidental

Owls

Terrestrial mammal & woodland birds

Terrestrial mammal & woodland birds

Threatened Ecological Communities

GEWVVP

Targeted Flora

Emerald-lip Greenhood

Golden Cowslips

Hollow Bearing Trees

Scattered Trees

Very Large Old Trees

Large Old Trees

Medium Old Trees

Small Trees

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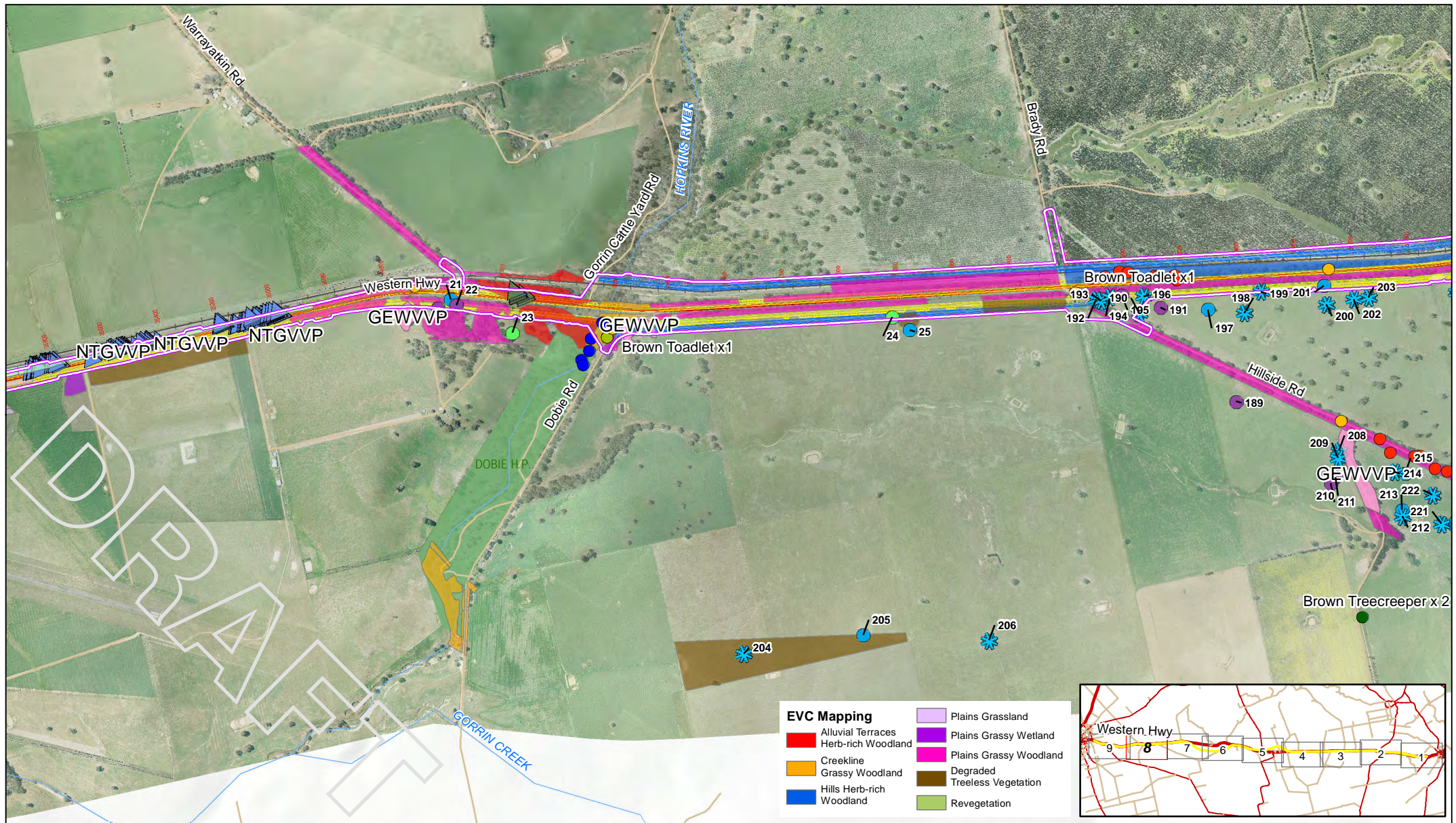
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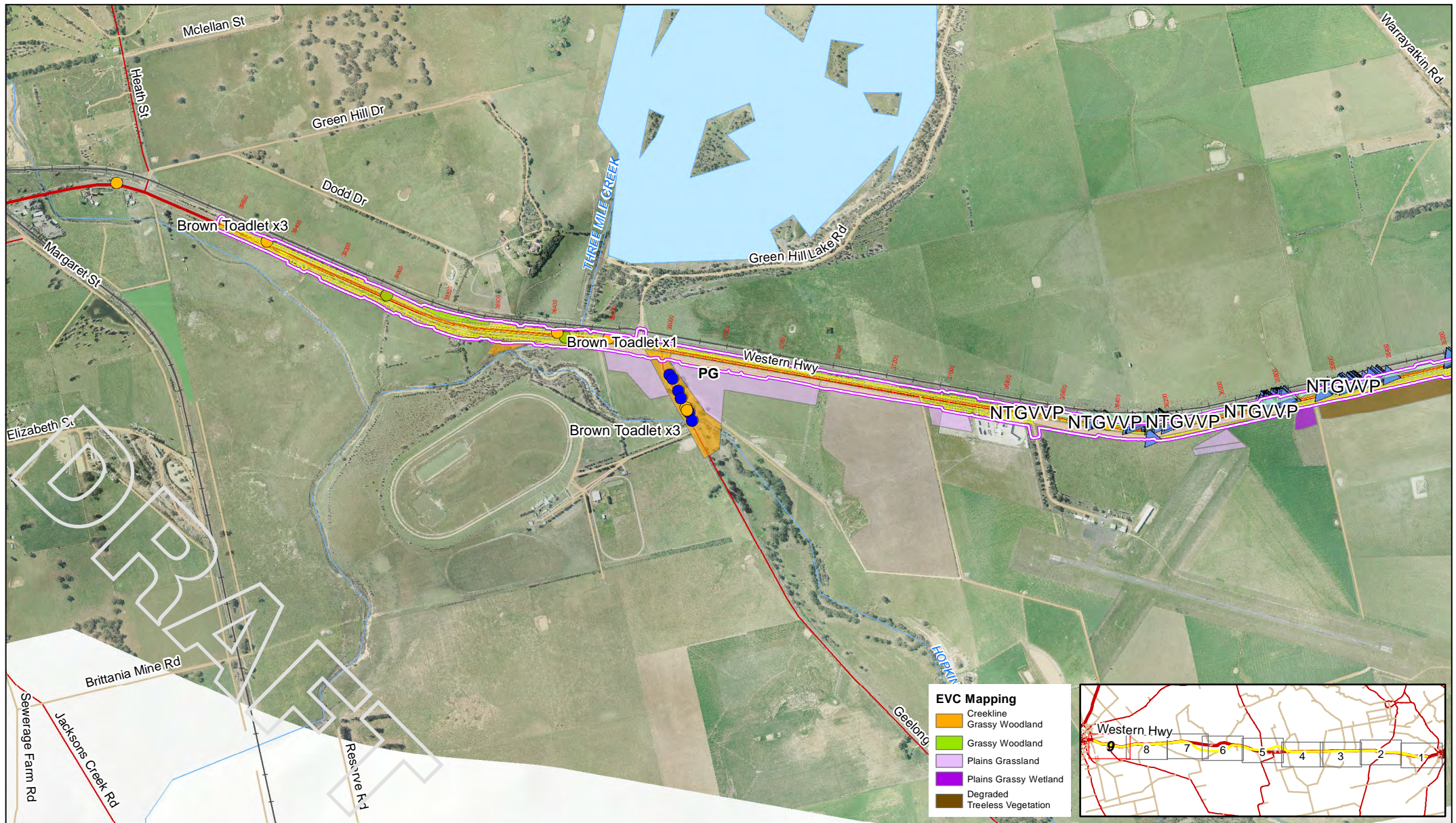
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Beaufort to Ararat Ecology Partners Flora & Fauna Data Recommended Option 1

Sheet 7





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Grid: GDA 1994 MGA Zone 54



LEGEND

- Maximum Construction Footprint
- Carriageway & Interchanges
- Service Road
- Fauna Survey**
 - Brown Toadlet

- Growing Grass Frog
- Terrestrial mammal & woodland birds
- Threatened Ecological Communities**
 - NTGVVP

Targeted Flora

- Button Winklewort
- Spiny Rice-flower



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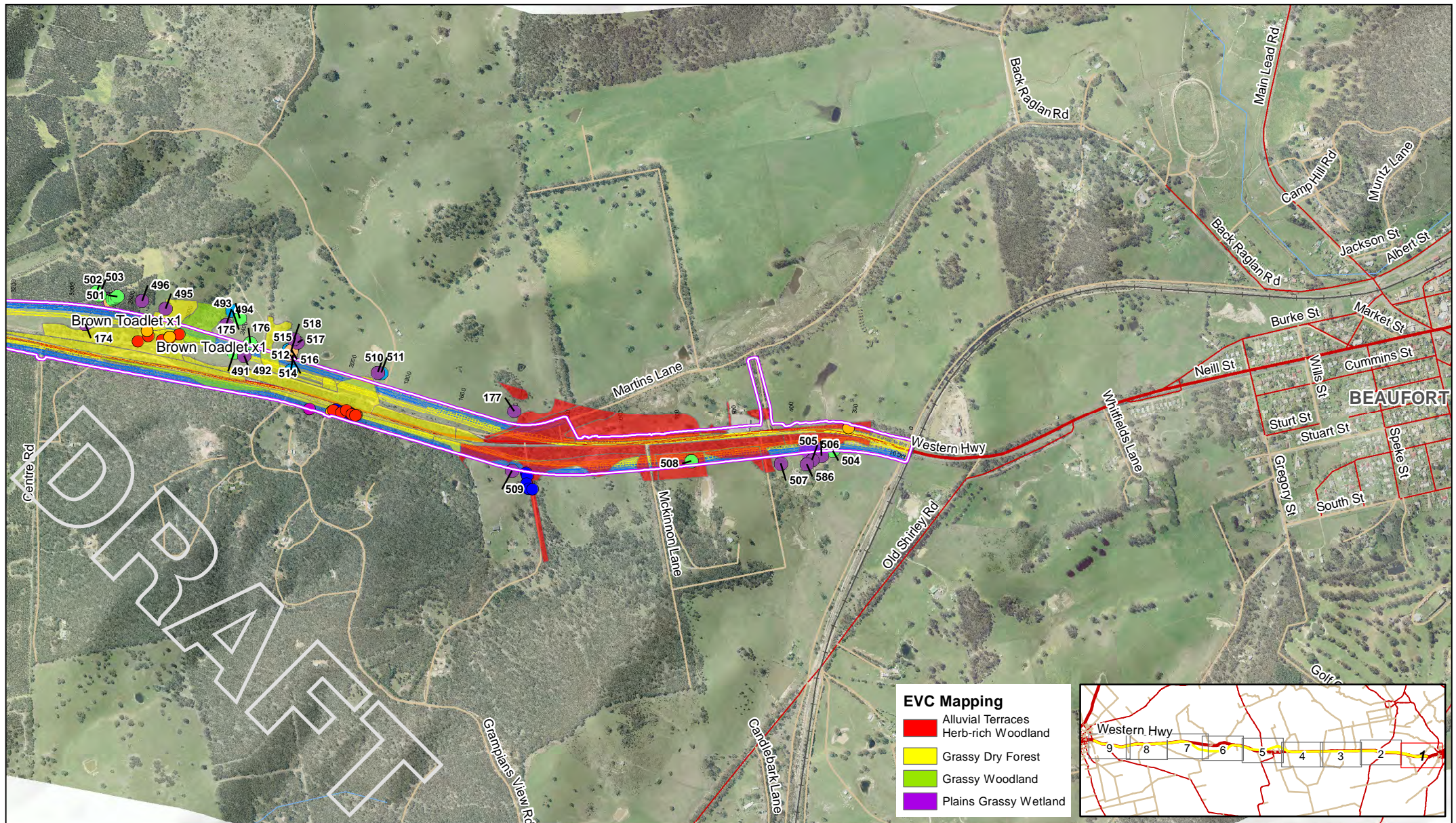
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LEGEND

Maximum Construction Footprint

Carriageway & Interchanges

Service Road

Fauna Survey

● Arboreal mammal & woodland bird

● Brown Toadlet

● Owls

● Terrestrial mammal & woodland birds

Scattered Trees

● Very Large Old Trees

● Large Old Trees

● Medium Old Trees

● Small Trees

EVC Mapping

■ Alluvial Terraces

■ Herb-rich Woodland

■ Grassy Dry Forest

■ Grassy Woodland

■ Plains Grassy Wetland

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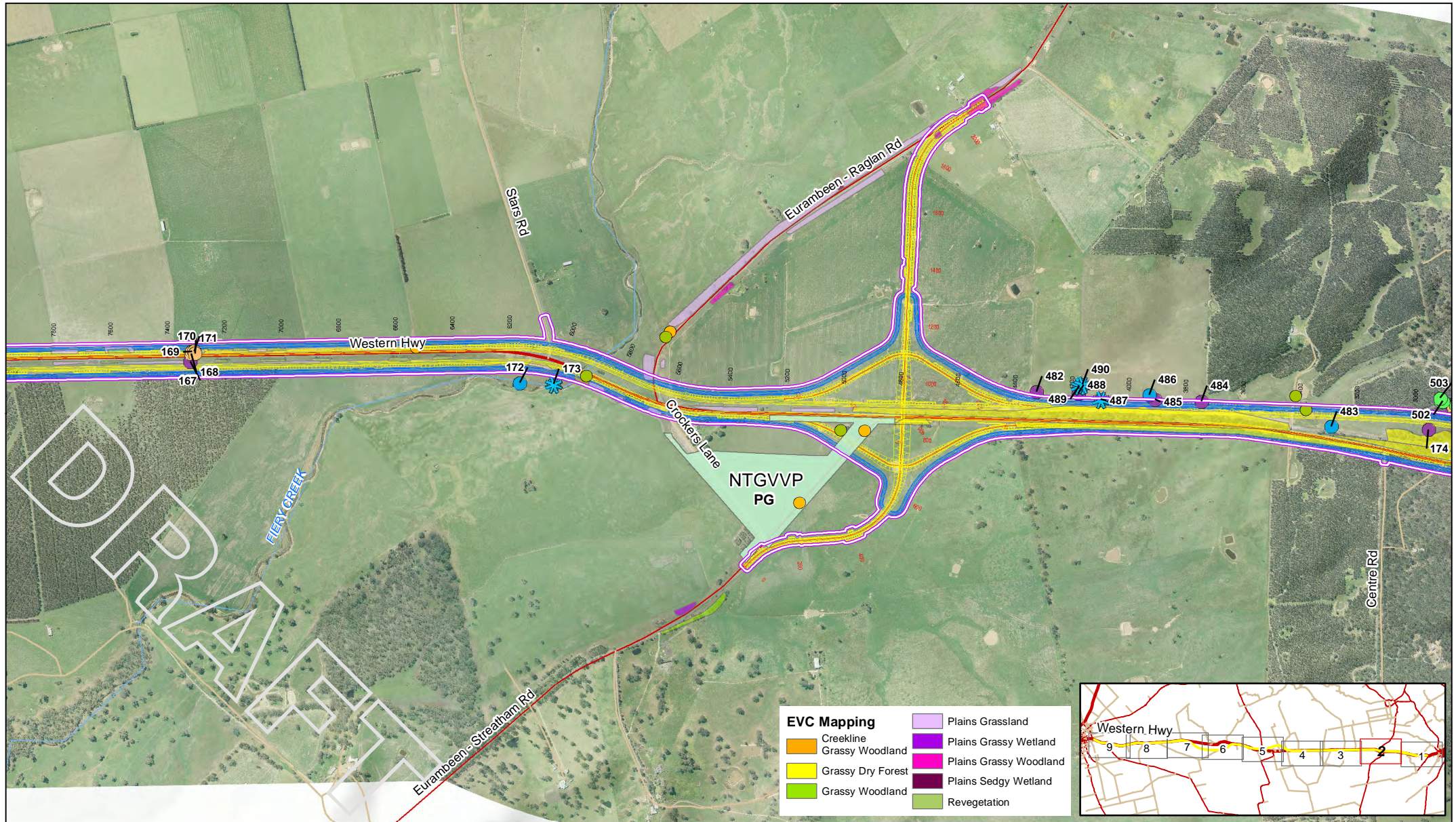
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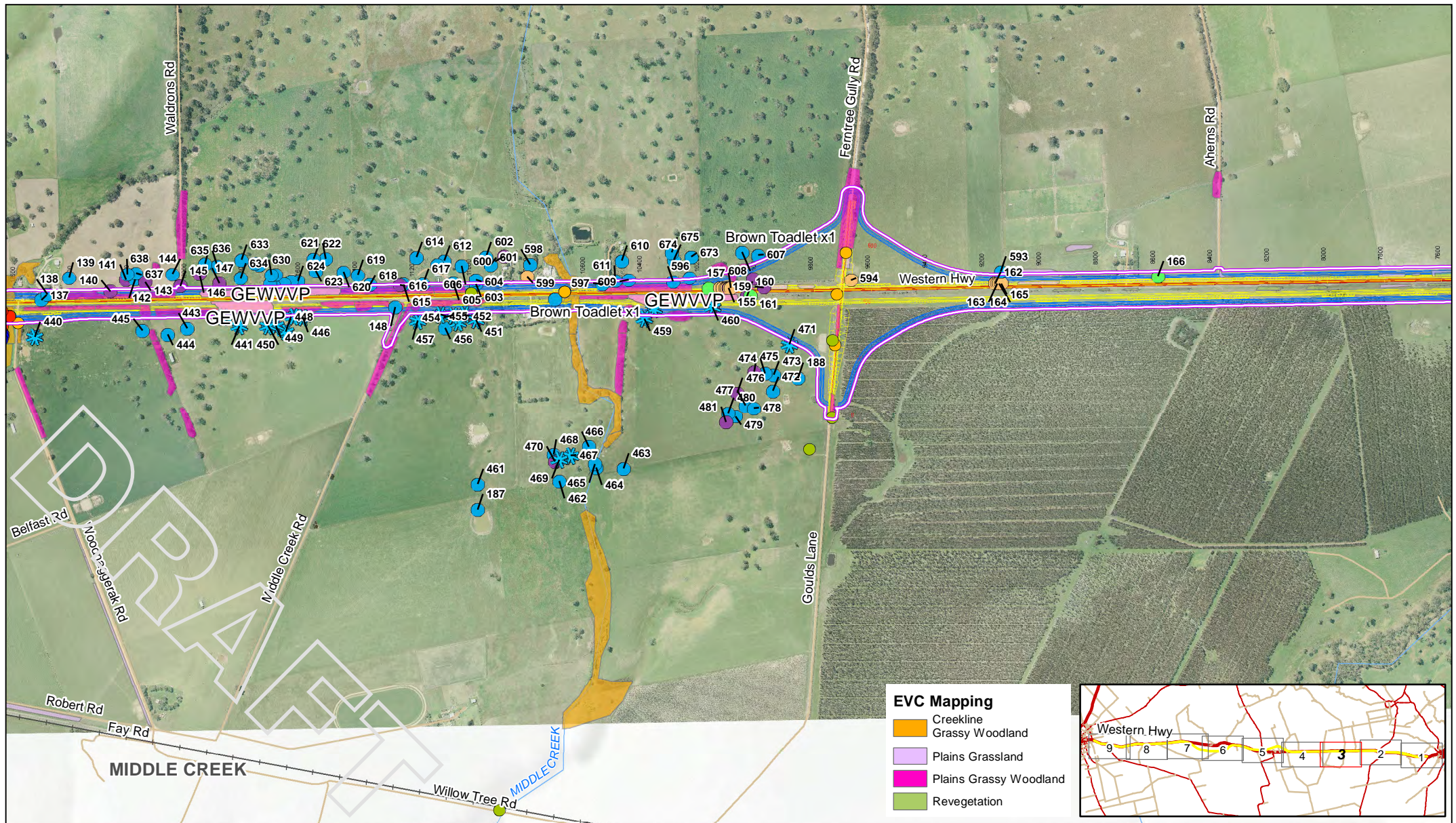
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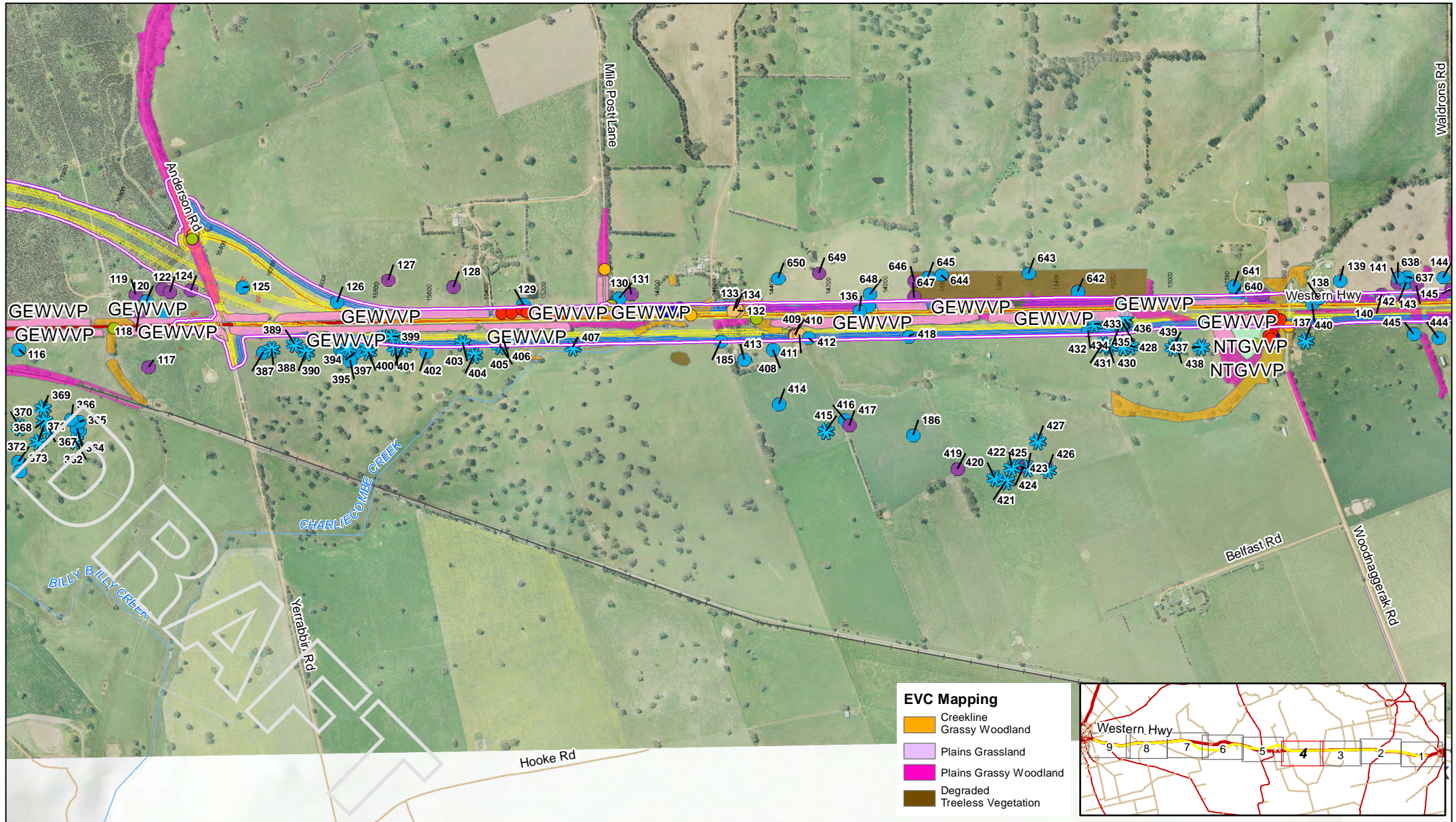
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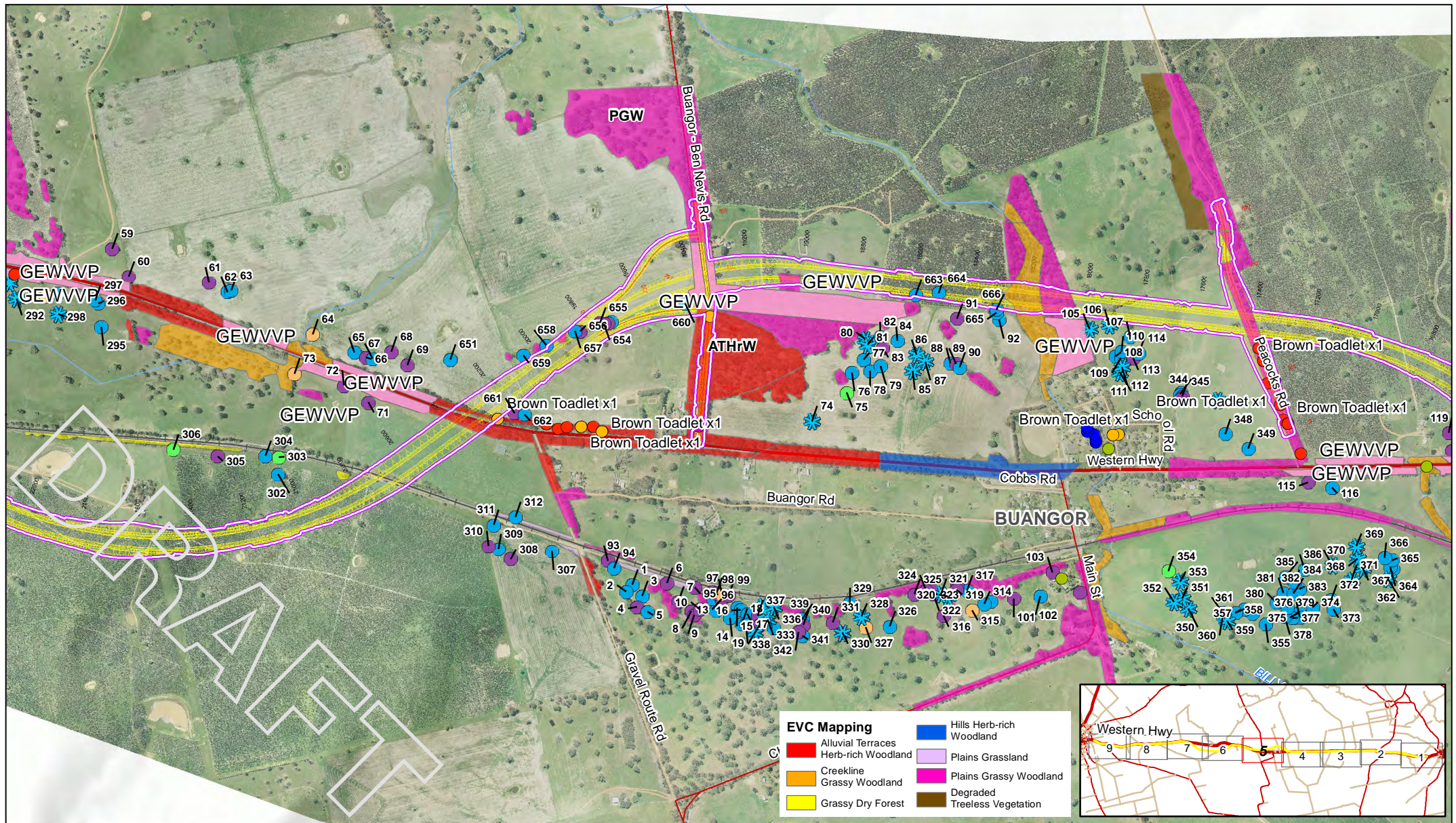
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Ecology Partners Flora & Fauna Data
Recommended Option 2

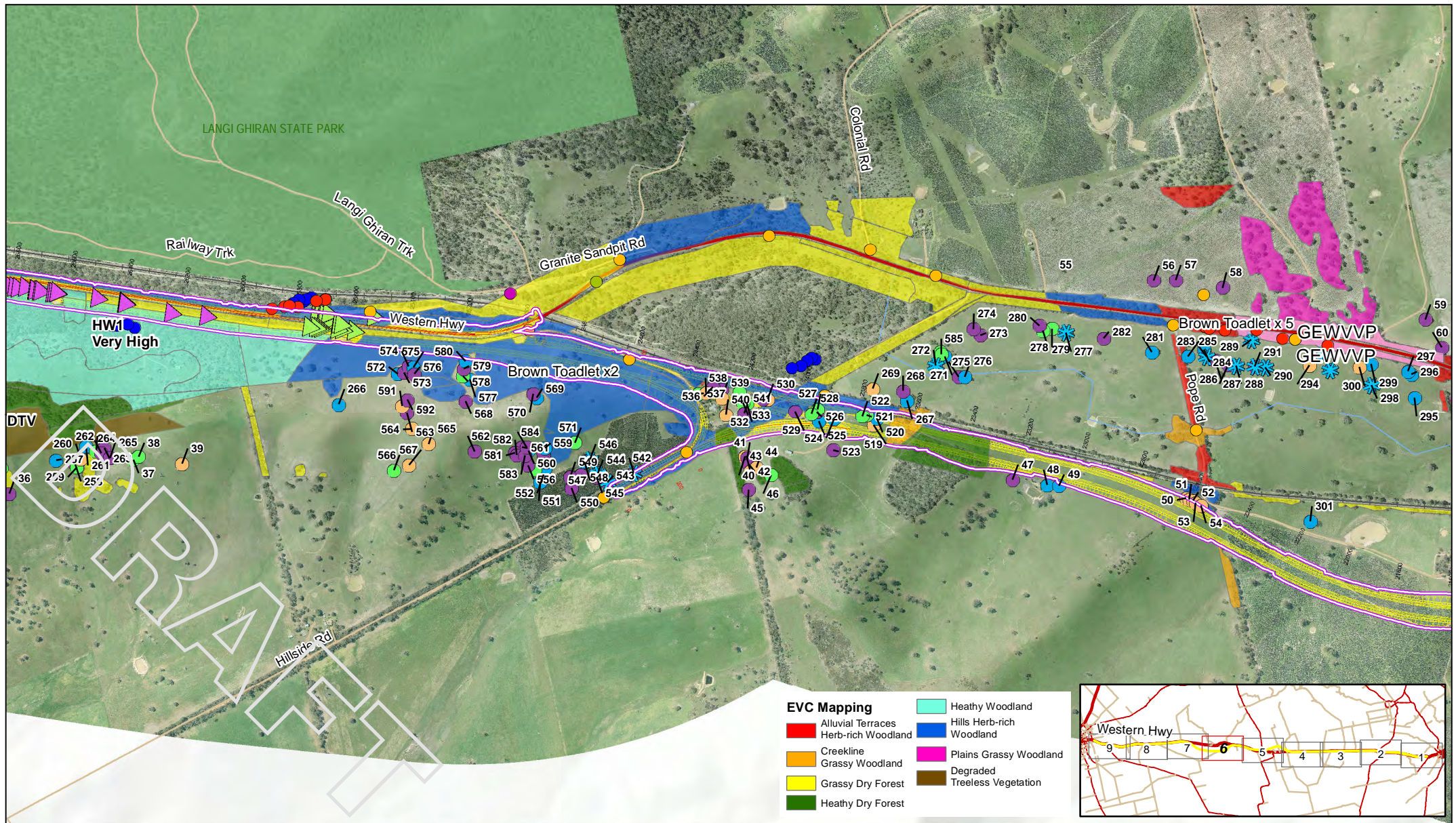
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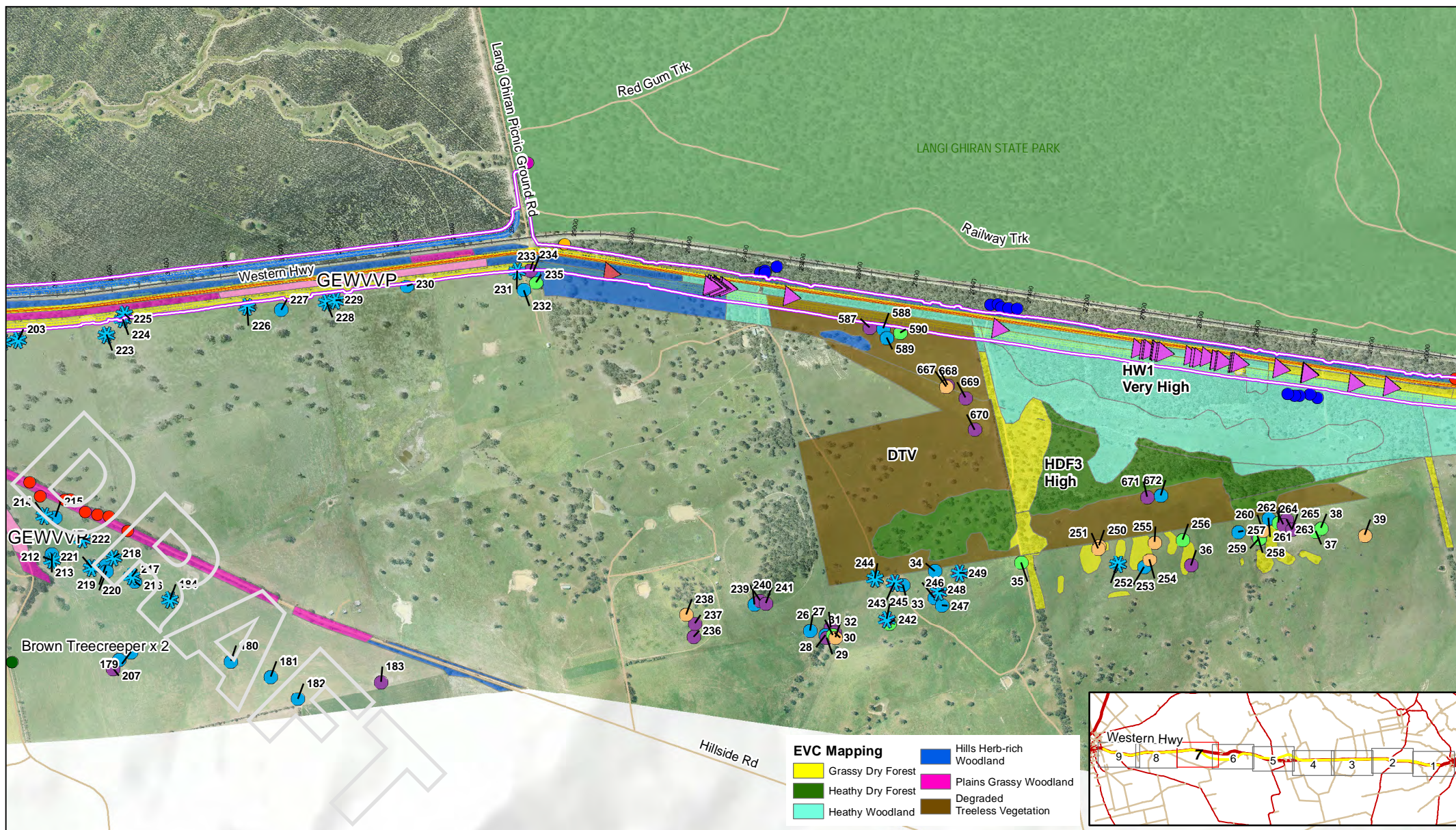


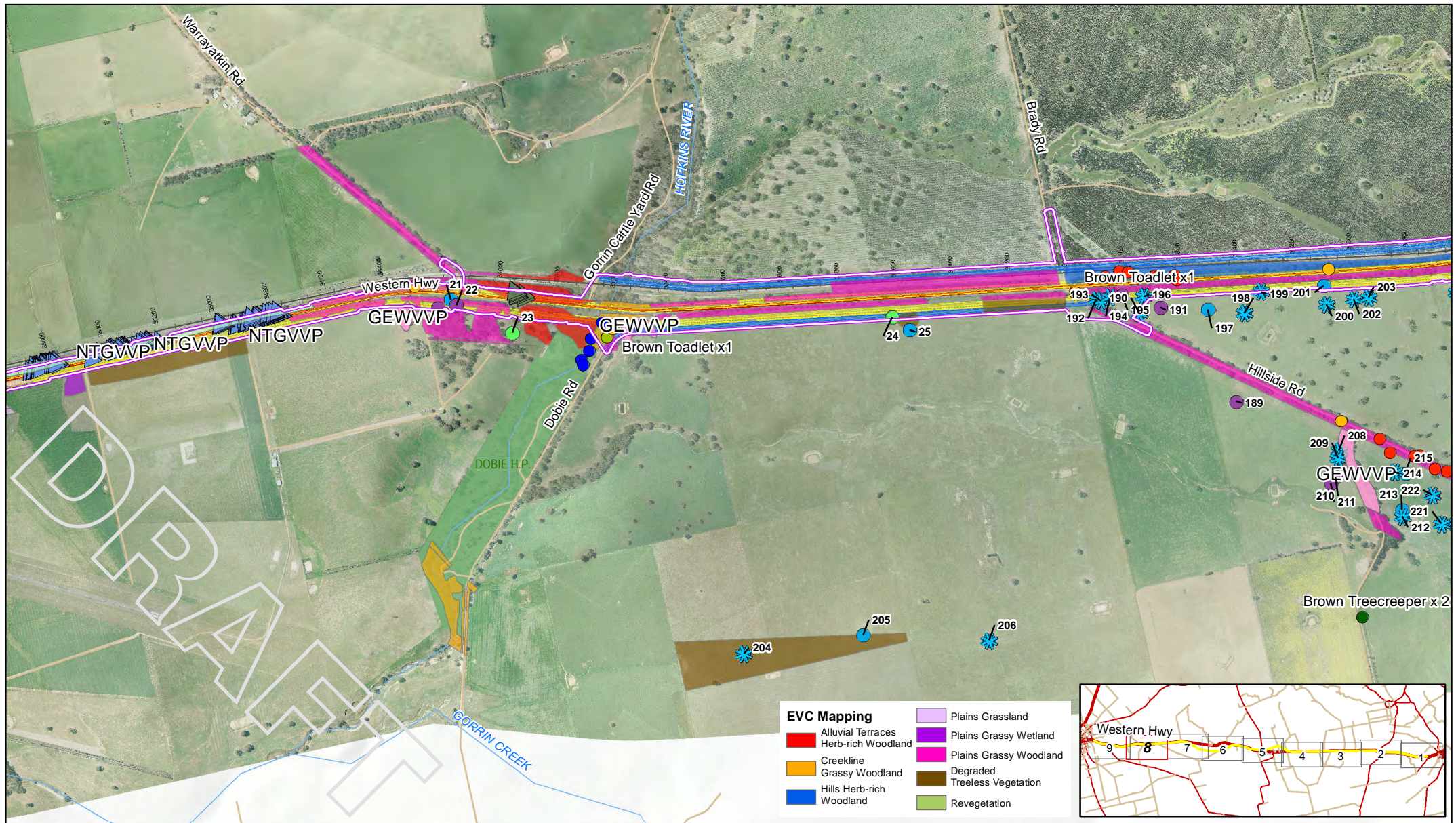


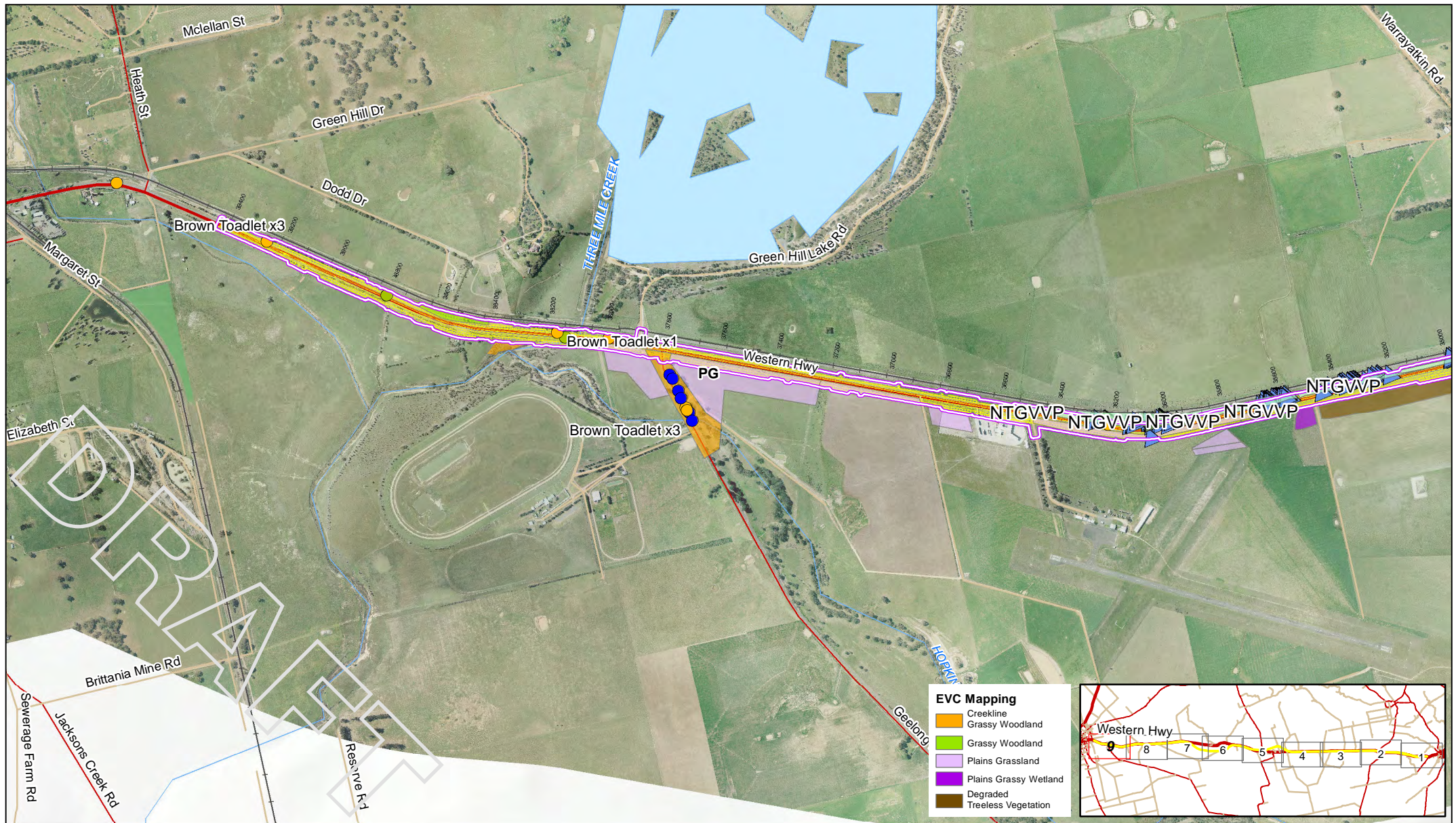












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LEGEND

- Maximum Construction Footprint
- Carriageway & Interchanges
- Service Road
- Brown Toadlet

- Growing Grass Frog
- Terrestrial mammal & woodland birds
- Threatened Ecological Communities
- NTGVVP

Targeted Flora

- Button Winklewort
- Spiny Rice-flower



VicRoads
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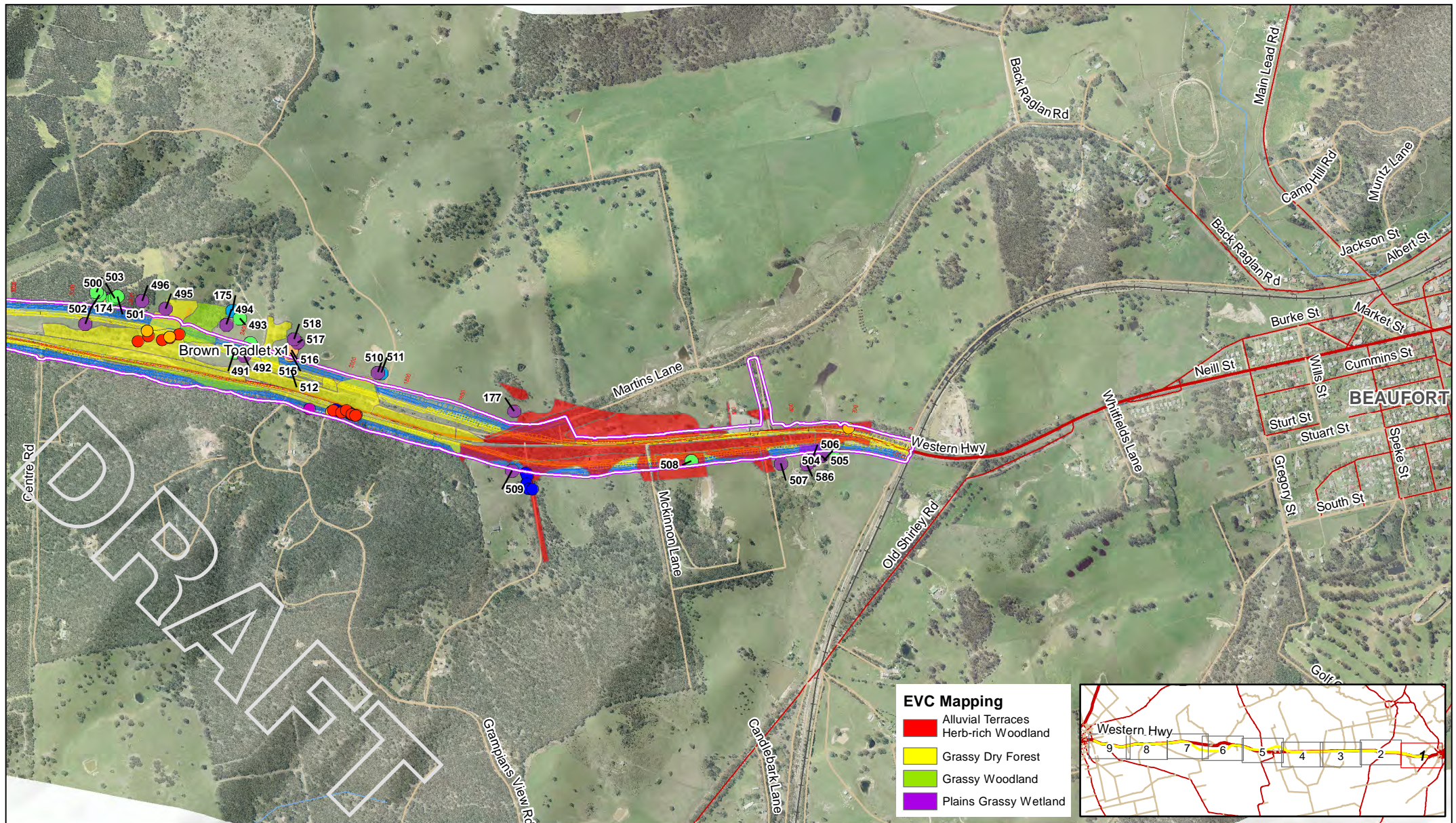
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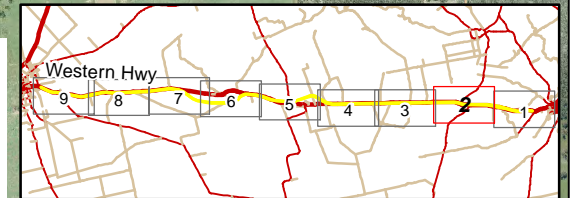
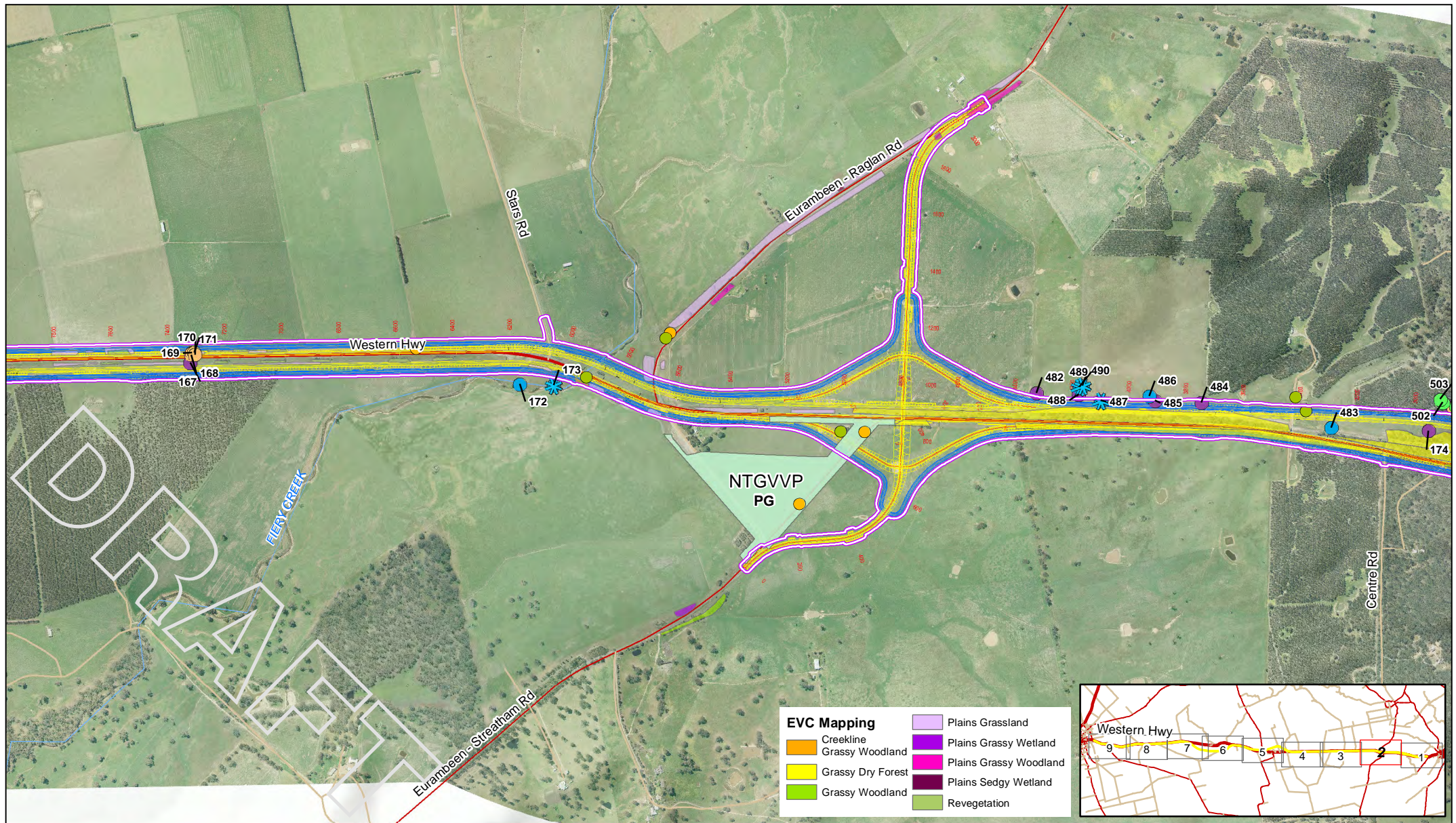
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Grid: GDA 1994 MGA Zone 54



LEGEND

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|--------------------------------|--|------------------------|
| Maximum Construction Footprint | Growing Grass Frog | Scattered Trees |
| Carriageway & Interchanges | Threatened Ecological Communities | Very Large Old Trees |
| Service Road | NTGVVP | Large Old Trees |
| Fauna Survey | | Medium Old Trees |
| Brown Toadlet | Hollow Bearing Trees | Small Trees |



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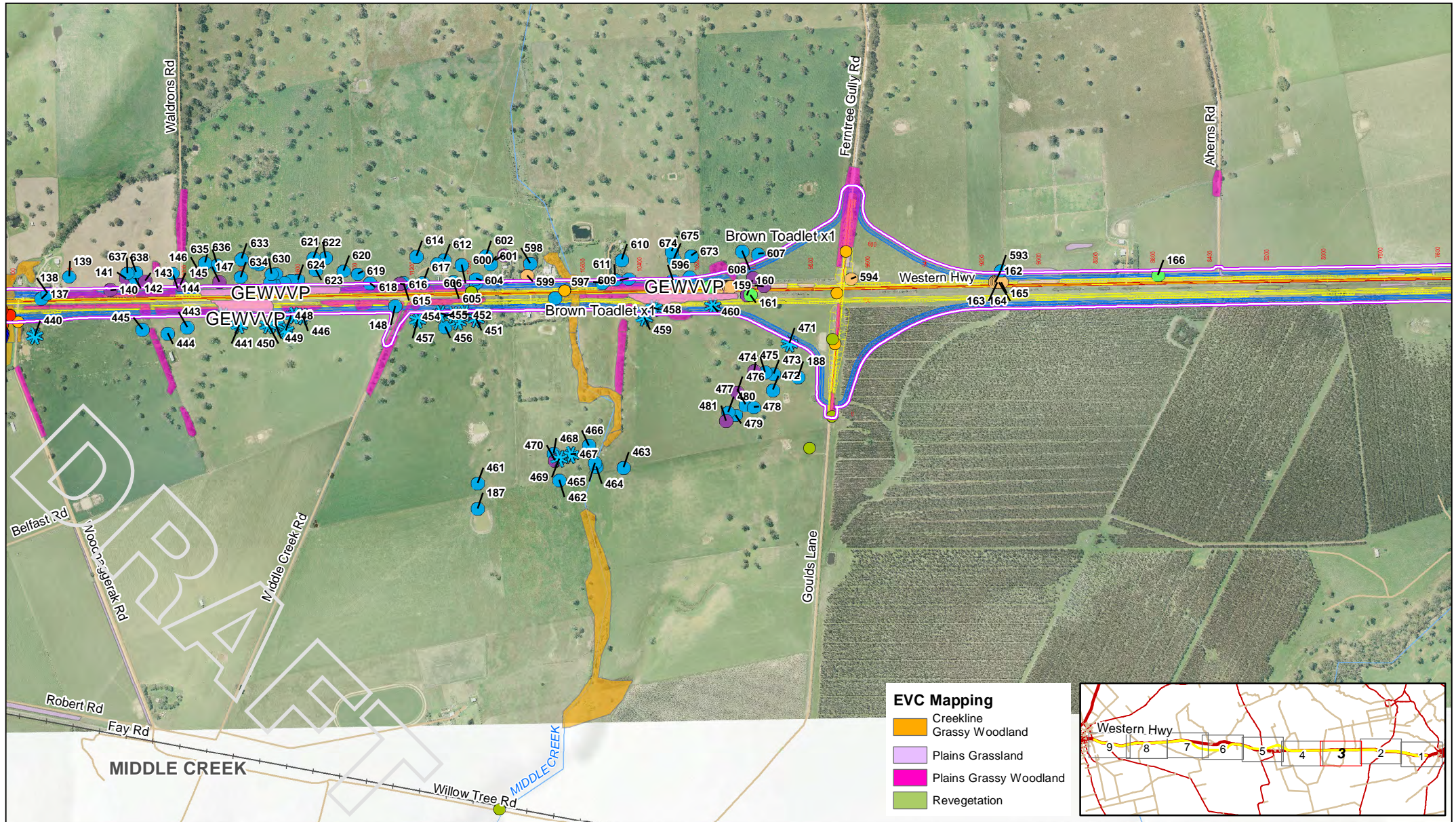
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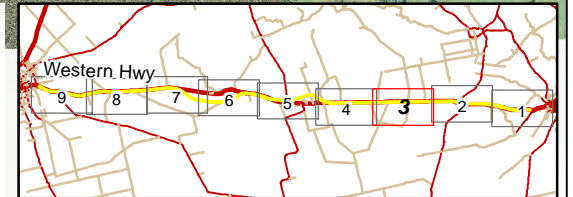
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EVC Mapping

- Creekline Grassy Woodland
- Plains Grassland
- Plains Grassy Woodland
- Revegetation



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LEGEND

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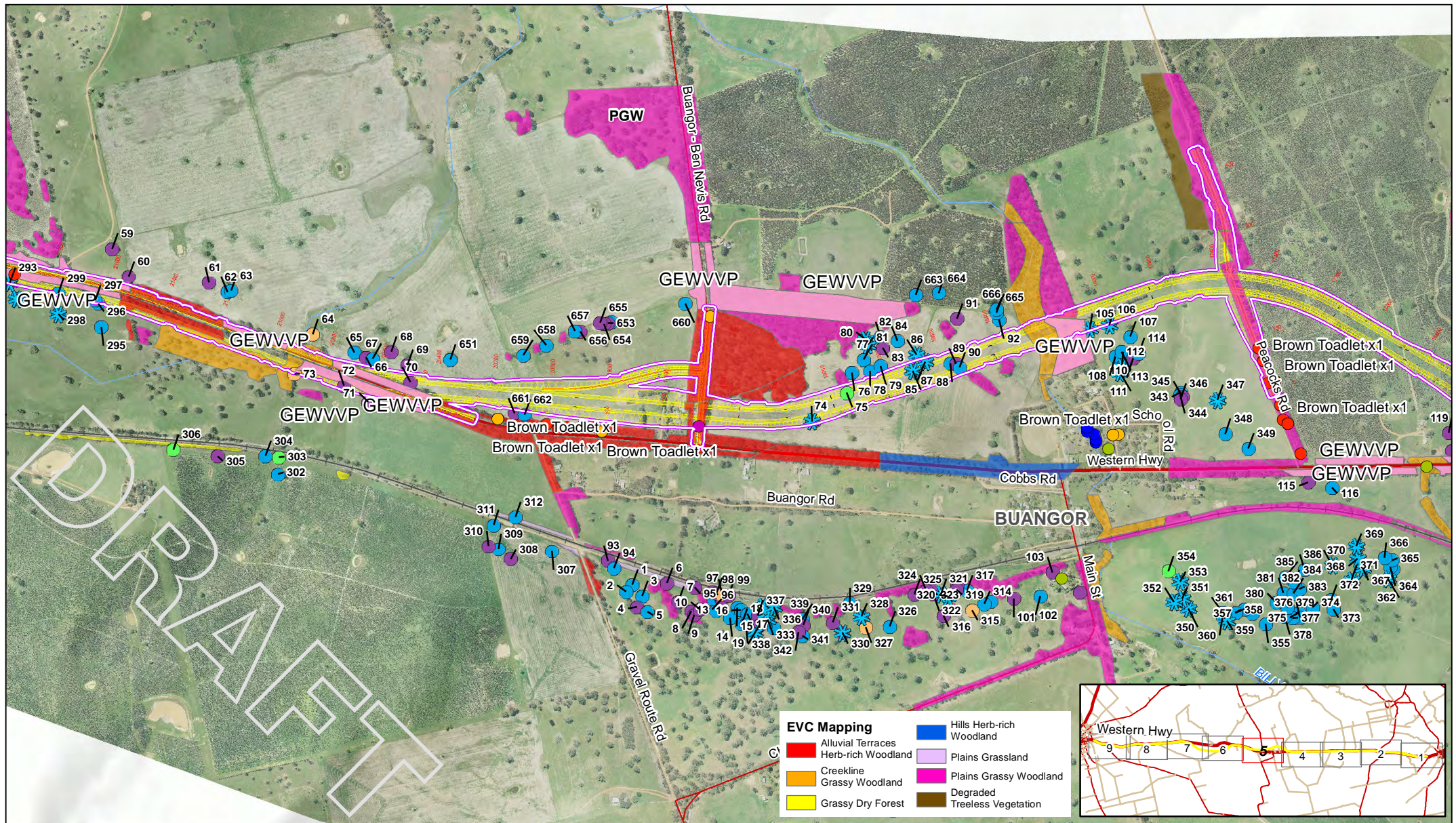
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LEGEND

Maximum Construction

Carriageway & Interchanges

Service Road

Fauna Survey

Arboreal mammal & woodland bird

Brown Toadlet

Growing Grass Frog

Owls

Terrestrial mammal & woodland birds

Threatened Ecological Communities

GEWVVP

Hollow Bearing Trees

Scattered Trees

Very Large Old Trees

Large Old Trees

Medium Old Trees

Small Trees

Hills Herb-rich Woodland

Plains Grassland

Plains Grassy Woodland

Degraded Treeless Vegetation

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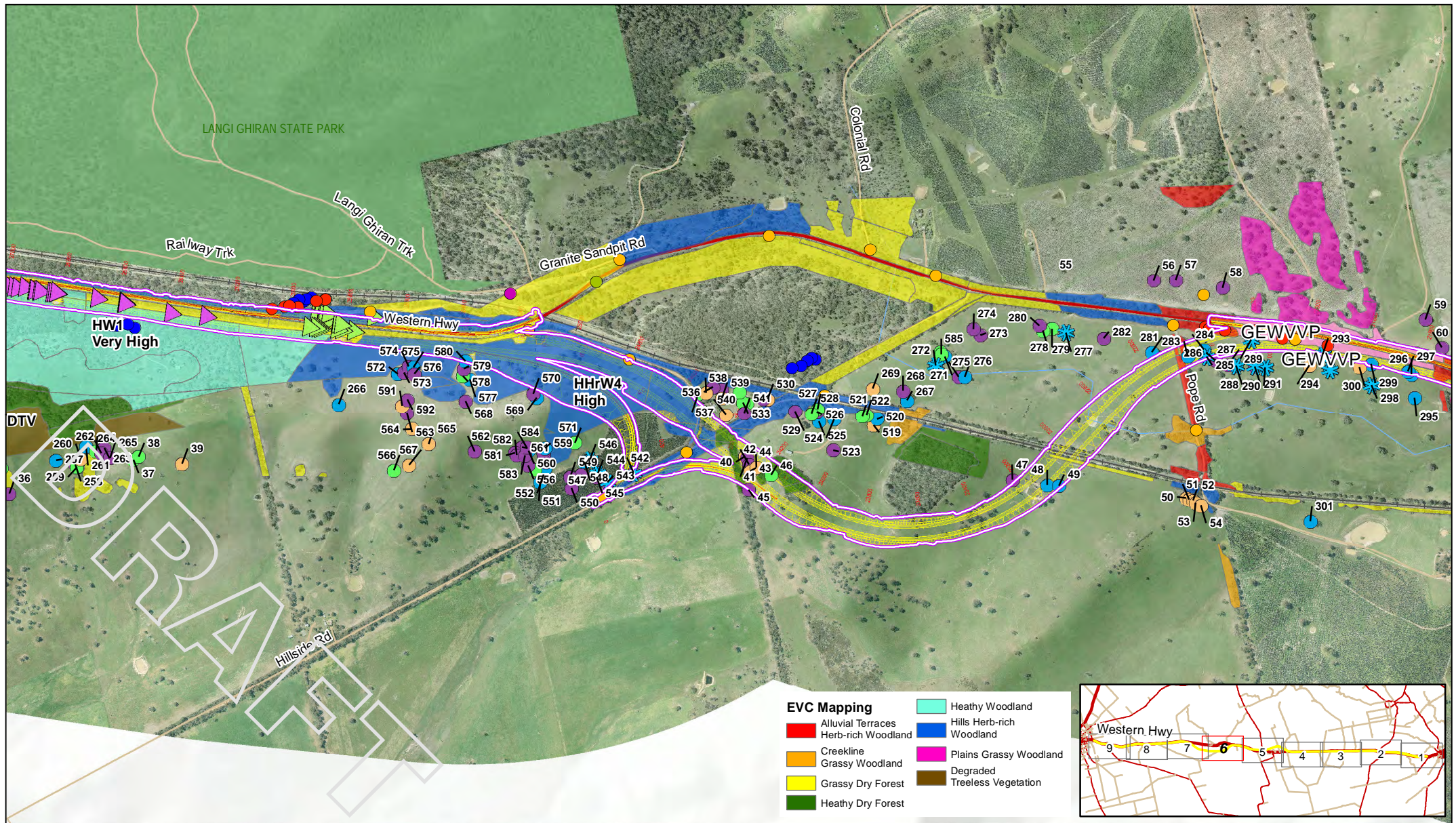
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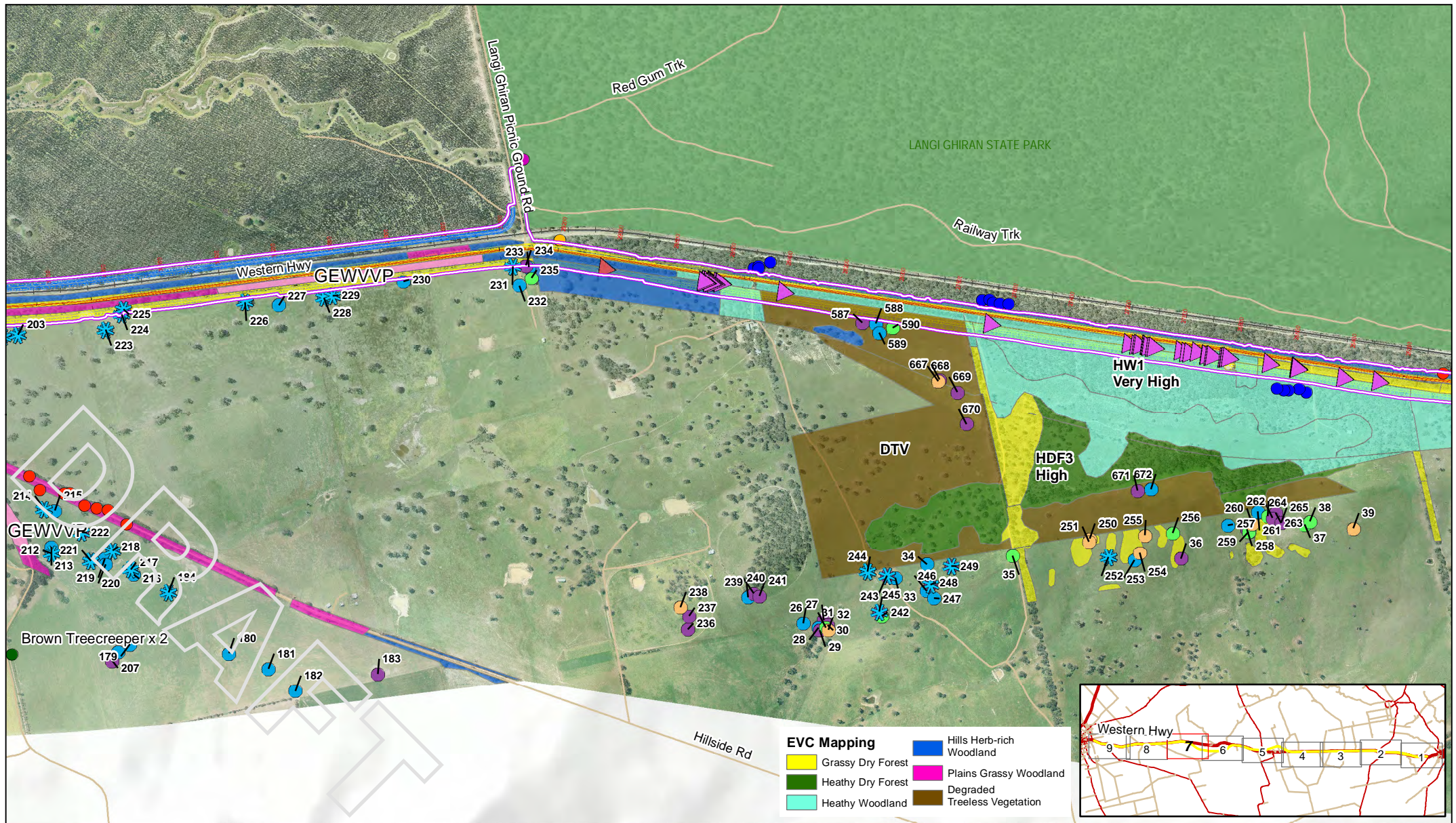
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LEGEND

- Maximum Construction Footprint**
- Carriageway & Interchanges**
- Service Road**
- Fauna Survey**
 - Arboreal mammal & woodland bird
 - Brown Toadlet
 - Incidental
 - Owls
- Terrestrial mammal & woodland birds**
- Threatened Ecological Communities**
 - GEWVVP
- Targeted Flora**
 - Emerald-lip Greenhood
 - Golden Cowslips
 - Hollow Bearing Trees
- Scattered Trees**
 - Very Large Old Trees
 - Large Old Trees
 - Medium Old Trees
 - Small Trees



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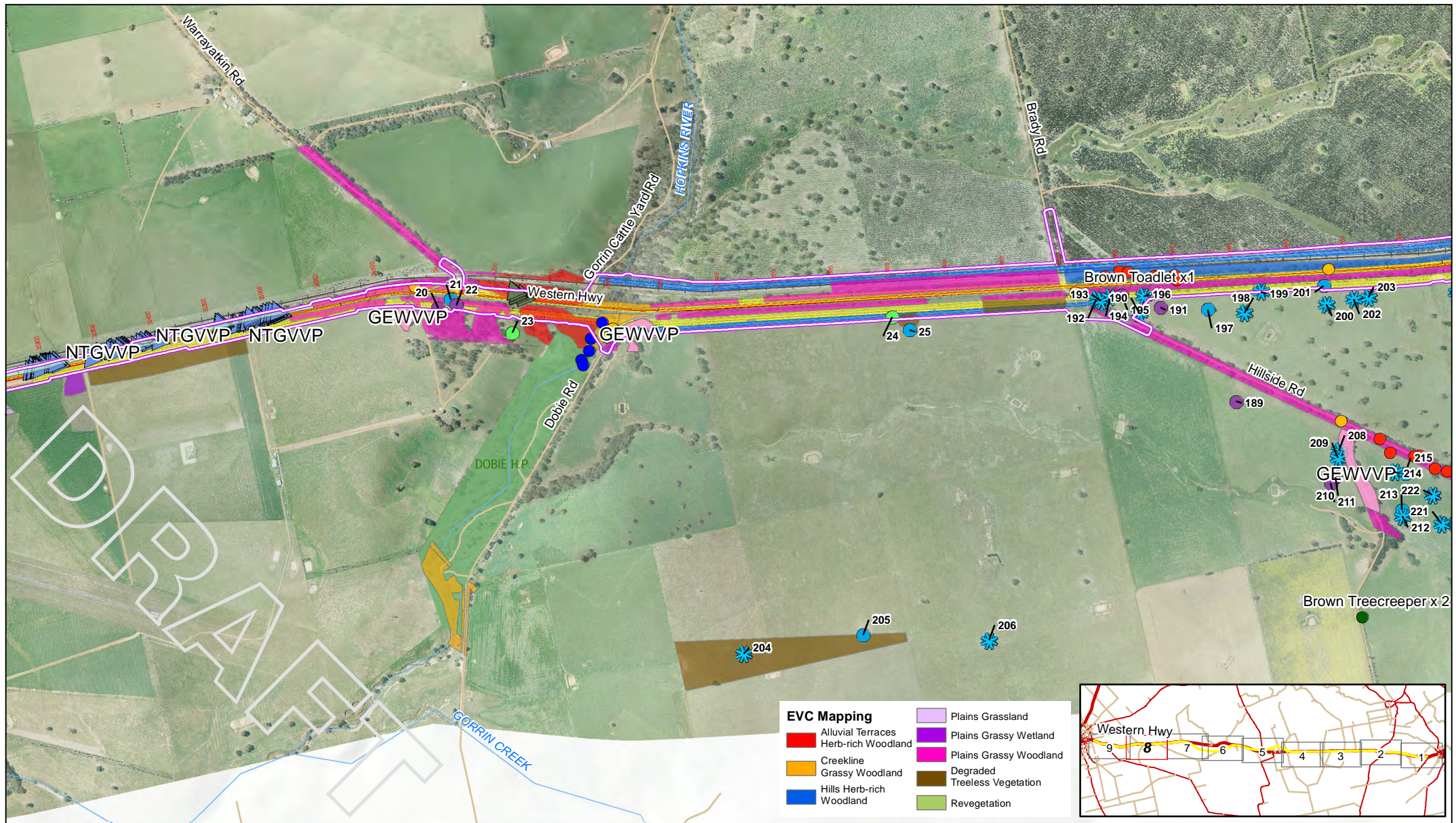
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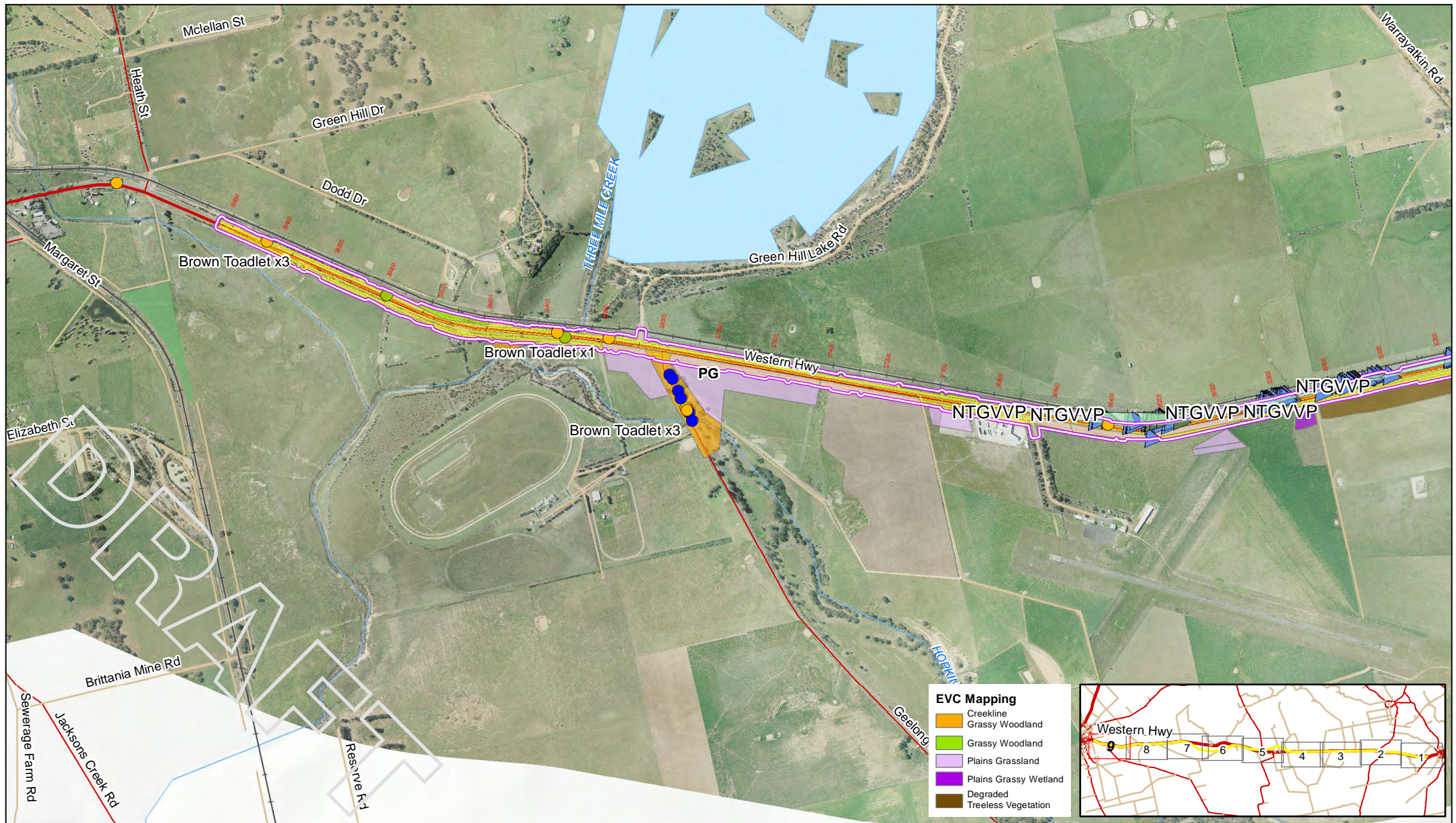
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LEGEND

- Maximum Construction Footprint
- Carriageway & Interchanges
- Service Road
- Fauna Survey**
 - Brown Toadlet
- Threatened Ecological Communities**
 - NTGVVP

- Targeted Flora**
 - Growing Grass Frog
 - Terrestrial mammal & woodland birds
 - Button Winklewort
 - Spiny Rice-flower



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Appendix B

Consequence Criteria

Consequence Criteria guide specialists in assigning consequence levels to impact pathways for their relevant impact assessment discipline, in conjunction with their judgment and experience. The reason(s) for assigning consequence levels are documented in the relevant Impact Assessment Reports.

Consequence Guide

Category of Impact	Aspect	Insignificant	Minor	Moderate	Major	Catastrophic
Air	Emissions (construction and operation)	Applicable air quality standards met at all sensitive receptors (e.g. dwellings), at all times.	Isolated temporary exceedance of air quality standards at a sensitive receptor.	Minor temporary exceedance of applicable air quality standards in a local area.	Exceedance of applicable air quality standards in a number of local areas.	Widespread exceedance of applicable air quality standards.
Economic	Economic impacts on businesses including agricultural enterprises	Loss of annual revenue less than \$100,000.	Loss of annual revenue less than \$1M, but greater than \$100,000.	Loss of revenue less than \$10M, but greater than \$1M.	Loss of revenues less than \$100M, but greater than \$10M.	Loss of revenues less than \$1B but greater than \$100M.
Biodiversity & Habitat	Listed Threatened Fauna Species	Population change not detectable for any fauna species listed under the EPBC Act, FFG Act or DSE Advisory List	Removal of < 1% of the project area population for an EPBC listed species, OR Removal of < 1% of the regional area population for an FFG or DSE Advisory-listed species	Removal of > 1% of the project area population BUT < 1% of the regional area population for an EPBC-listed species, OR Removal of > 1% of the regional population BUT < 2% of the State population for an FFG- or DSE Advisory-listed species	Removal of > 1% of the regional population BUT < 1% of the State population for an EPBC-listed species, OR Removal of > 2% of the State population for an FFG - or DSE Advisory-listed species	Removal of > 1% of the State population for an EPBC-listed species
Biodiversity & Habitat	Listed Flora Species	Population change not detectable for any flora species listed under the EPBC Act, FFG Act or DSE Advisory List	Removal of < 1% of the project area population for an EPBC listed species, OR Removal of < 1% of the regional area population for an FFG or DSE Advisory-listed species.	Removal of > 1% of the project area population BUT < 1% of the regional area population for an EPBC-listed species, OR Removal of > 1% of the regional population BUT < 10% of the State population for an FFG- or DSE Advisory-listed species	Removal of > 1% of the regional population BUT < 10% of the national population for an EPBC-listed species, OR Removal of > 10% of the State population for an FFG- or DSE Advisory-listed species	Removal of > 10% of the national population for an EPBC-listed species
Biodiversity & Habitat	Ecological Vegetation Classes	No measurable impacts on the extent of an EVC	Loss of < 0.1% of an EVC of High or Very High conservation significance from the region (based on the total area of an EVC from the bioregion). Net Gain achievable.	Loss of 0.1- 1% of an EVC of High or Very High conservation significance from the region (based on the total area of an EVC from the bioregion). Net Gain achievable.	Loss of > 1% BUT < 5% of an EVC of High or Very High conservation significance from the region (based on the total area of an EVC from the bioregion). Net Gain achievable.	Loss of > 5% of an EVC of High or Very High conservation significance from the region (based on the total area of an EVC from the bioregion). Net Gain not achievable.

Category of Impact	Aspect	Insignificant	Minor	Moderate	Major	Catastrophic
Biodiversity & Habitat	EPBC listed community - Grassy Eucalypt Woodland of the VVP, Natural Temperate Grassland of the VVP FFG listed community - Western (Basalt) Plains Grassland community	No measurable impacts on the extent of a community listed under the EPBC Act or FFG Act	Loss of <1 ha of an EPBC Act or FFG Act listed community.	Loss of 1-20 ha of an EPBC Act or FFG Act listed community.	Loss of 20-50 ha of an EPBC Act or FFG Act listed community.	Loss of > 50 ha of an EPBC Act or FFG Act listed community.
Biodiversity & Habitat	Scattered trees / wildlife habitat	Loss of < 5 scattered trees (including MTs, LOTs and VLOTs).	Loss of 6-50 scattered trees (including MTs, LOTs and VLOTs).	Loss of 51-250 scattered trees (including MTs, LOTs and VLOTs).	Loss of 250-1000 scattered trees (including MTs, LOTs and VLOTs).	Loss of > 1000 scattered trees (including MTs, LOTs and VLOTs).
Biodiversity & Habitat	Wildlife corridor	No measurable impact on the quantity and extent of wildlife corridors. Alignment does not intercept or reduce any existing wildlife corridors or habitat linkages.	Alignment reduces the width of the wildlife corridor by up to 10%. Alignment intercepts 1 - 2 habitat linkages.	Alignment reduces the width of the wildlife corridor by 10-50%. Alignment intercepts 3 - 4 habitat linkages.	Alignment reduces the width of the wildlife corridor by 50-75%. Alignment intercepts 5 habitat linkages.	Alignment reduces the width of the wildlife corridor by greater than 75%. Alignment intercepts 6 or more habitat linkages.
Soils & Geology	Erosion / sediment generation potential	Negligible potential	Potential for erosion and sediment mobilisation in small isolated locations along the alignment	Potential for erosion and sediment mobilisation in multiple locations along the alignment	Potential for erosion and sediment mobilisation along the majority of the alignment	Potential for significant erosion, sediment generation or land instability along the majority of the alignment
Soils & Geology	Land Contamination (historic, construction or operation)	Insignificant risk of encountering historic land contamination during construction, or contaminating land through construction or operation	Potential for minor land contamination, but minimal risk to sensitive receivers	Potential for moderate land contamination, some risk to sensitive receivers	Potential for gross land contamination, confined to a localised area. Significant risk to sensitive receivers, health	Potential for gross and widespread land contamination. Significant risk to sensitive receivers, health
Soils & Geology	Soil settlement due to poor (compressible) ground conditions	No potential	Potential for significant soil settlement in small isolated locations along the alignment	Potential for significant soil settlement in multiple locations along the alignment	Potential for significant soil settlement along many sections of the alignment	Potential significant soil settlement along the majority of the alignment
Groundwater	Construction	Negligible change to groundwater regime, quality and availability	Temporary or slight changes to groundwater regime, quality and availability but no significant implications.	Changes to groundwater regime, quality and availability with minor groundwater implications (localised).	Groundwater regime, quality or availability significantly compromised.	Widespread groundwater resource depletion, contamination or subsidence
Groundwater	Operation	Negligible change to groundwater regime, quality and availability	Changes to groundwater regime, quality and availability but no significant implications.	Changes to groundwater regime, quality and availability with minor groundwater implications for a localised area.	Groundwater regime, quality or availability significantly compromised.	Widespread groundwater resource depletion, contamination or subsidence

Category of Impact	Aspect	Insignificant	Minor	Moderate	Major	Catastrophic
Cultural Heritage	Aboriginal cultural heritage	It is not possible to insignificantly affect cultural heritage values	Destruction of common occurrence Site containing: (a) a small number (e.g. 0-10 artefacts) or limited range of cultural materials with no evident stratification. Site destroyed or in a deteriorated condition with a high degree of disturbance; some cultural materials remaining.	Destruction of occasional occurrence Site containing: (a) a larger number, but limited range of cultural materials: and/or (b) some intact stratified deposit remains. Site in a fair to good condition, but with some disturbance. Occasional occurrence	Destruction of rare occurrence Site (e.g. burned mounds) containing: (a) a large number and diverse range of cultural materials; and/or (b) largely intact stratified deposit; and/or (c) surface spatial patterning of cultural materials that still reflect the way in which the cultural materials were laid down. Site in an excellent condition with little or no disturbance. For surface artefact scatters this may mean that the spatial patterning of cultural materials still reflects the way in which the cultural materials were laid down.	Destruction of Site containing: (a) a mortuary tree. (a response to AAV identifying that these sites types were of high cultural heritage significance and their presence could prevent construction of an alignment).
Cultural Heritage	Non-Aboriginal cultural heritage	No impact to heritage sites. Sites remain unaffected.	Disturbance to a locally significant heritage feature or site (HO or DSE local listing).	Complete removal of heritage site of local significance (HO); and/or Disturbance of a historical heritage inventory site (HI).	Disturbance of a heritage site of State or National significance (VHR).	Complete removal of a heritage site of State or National significance (VHR).
Planning & Land Use	Land use change	Land use changes that would not result in inconsistency with planning policies	Land use changes that would result in minor inconsistency with local planning policies	Land use changes that would result in significant inconsistency with local planning policies	Land use changes that would result in significant inconsistency with local and State planning policies	Land use changes that would result in extensive conflict with planning policies
Planning & Land Use	Utility and infrastructure services	No impact on existing utilities	Temporary impediment to operation and/or maintenance of existing utilities during construction but still able to be adequately operated and maintained with mitigation measures	Impediment to operation and/or maintenance of existing utilities but still able to be adequately operated and maintained with mitigation measures	Significant disruption to the operation and/or maintenance of existing utilities but still able to be adequately operated and maintained with mitigation measures	Utilities of regional or State significance not able to be maintained and/or operated
Planning & Land Use	Acquisition and fragmentation of existing land uses and landholdings	No or negligible fragmentation of land uses or land holdings (such as the acquisition of land within 10 m of the existing property boundary)	Some minor fragmentation / acquisition of land but properties still able to be used for existing purposes	Fragmentation of land results in 1-10 properties no longer being viable / accessible / useable for existing purpose. (assumes acquisition through the centre of existing parcels of land)	Fragmentation / acquisition of land results in 10-20 properties no longer being viable / accessible / useable for existing purpose. (assumes acquisition through the centre of existing parcels of land)	Fragmentation / acquisition of land results in 20+ properties no longer being viable / accessible / useable for existing purpose. (assumes acquisition through the centre of existing parcels of land)
Noise & Vibration	Construction and Operation	Applicable standards met at all sensitive receptors (e.g. dwellings, schools, hospitals), at all times	Isolated and temporary exceedance of standards at a sensitive receptor	Exceedance of applicable standards in a local area	Exceedance of applicable standards in a number of local areas	Widespread exceedance of applicable standards across the region

Category of Impact	Aspect	Insignificant	Minor	Moderate	Major	Catastrophic
Social	Displacement of residents	No displacement of residents	Displacement of one or two households	Displacement of three to six households	Displacement of households significantly affects a local area	Displacement of households significantly affects a number of local areas
Social	Displacement of businesses	No displacement of businesses	Displacement of businesses with social or economic impacts on a small number of individuals	Displacement of businesses with significant social or economic impacts on part of a local area	Displacement of businesses significantly affects a local area	Displacement of businesses significantly affects a number of local areas
Social	Severance of residents or businesses	No severance of local movement patterns	Severance of local movement patterns for less than 10 residents or businesses	Severance of local movement patterns of 10 to 20 residents or businesses	Severance of movement patterns significantly affects a local area	Severance of movement patterns significantly affects a number of local areas
Social	Community facilities and public open space	No noticeable effects	Effects on facilities with social or economic impacts on a small number of individuals	Effects on facilities with social or economic impacts on a local area	Effects on facilities with significant social or economic impacts on a local area	Effects on facilities with significant social or economic impacts on a number of local areas
Social	Amenity	No detrimental impacts on amenity	Detrimental impacts on amenity affect a small number of households	Detrimental impacts on amenity affect a local area	Detrimental impacts on amenity significantly affect a local area	Detrimental impacts on amenity significantly affect a number of local areas
Surface Water	Construction activities result in disturbance of channel planform, geometry and/or river health values.	Medium level impact to waterway, river health or floodplain function on minor waterway Low level impact to waterway, river health or floodplain function on significant waterway [Minor, Moderate and Major waterways as described in the impact assessment report]	High level impact to waterway, river health or floodplain function on minor waterway Medium level impact to waterway, river health or floodplain function on significant waterway Low level impact to waterway, river health or floodplain function on major waterway [Minor, Moderate and Major waterways as described in the impact assessment report]	Severe level impact to waterway, river health or floodplain function on minor waterway High level impact to waterway, river health or floodplain function on significant waterway Medium level impact to waterway, river health or floodplain function on major waterway [Minor, Moderate and Major waterways as described in the impact assessment report]	Severe level impact to waterway, river health or floodplain function on significant waterway High level impact to waterway, river health or floodplain function on major waterway [Moderate and Major waterways as described in the impact assessment report]	Severe level of impact to a major waterway [Major waterways as described in the impact assessment report]
Surface Water	Construction or operation activities result in increased stormwater runoff, sediment and contaminant loading to waterway	Minor increases to stormwater runoff, sediment and or contaminant loading to the waterway.	Significant increases to stormwater runoff, sediment and or contaminant loading to a minor waterway (defined in the impact assessment report).	Significant increases to stormwater runoff, sediment and or contaminant loading to a moderate waterway (defined in the impact assessment report).	Significant increases to stormwater runoff, sediment and or contaminant loading to a major waterway (defined in the impact assessment report).	An uncontained spill of contaminants directly to a major waterway (defined in the impact assessment report).

Category of Impact	Aspect	Insignificant	Minor	Moderate	Major	Catastrophic
Surface Water	Construction of the road results in changes to the floodplain characteristics	No additional floodplain impacts to any houses, outbuildings or infrastructure.	Slight increase in flooding at a rural scale.	Medium increase in flooding at a rural scale or slight increase in flooding at a township scale.	Significant increase in flooding at a rural scale or medium increase in flooding at a township scale.	Significant increase in flooding at a township scale.
Traffic & Transport	Road safety (construction)	Occurrence of road accidents resulting in less than 10 property damage only road accidents during construction period	Occurrence of road accidents resulting in more than 10 property damage only road accidents or minor injury to less than 20 individuals during construction period	Occurrence of road accidents causing minor injury to between 20 and 100 individuals or major injury to less than 5 individuals during construction period	Occurrence of road accidents causing minor injury to more than 100 individuals or major injury to between 5 and 50 individuals during construction period	Occurrence of road accidents resulting in major injury to more than 50 individuals or one or more fatalities during construction period
Traffic & Transport	Traffic and transport operations (construction and operation)	Negligible adverse impact on traffic and transport conditions	Detectable adverse changes in traffic and transport condition (decrease in Level of Service) at one or two locations at any one point in time during the construction period or at a single location during duplicated highway operation	Detectable adverse change in traffic and transport conditions (decrease in Level of Service) at multiple locations	Traffic and transport congestion and delays exceed acceptable levels at multiple locations	Traffic and transport congestion or events lead to the closure of the Western Highway with no suitable alternative
Traffic & Transport	Traffic access (construction & operation)	Negligible impact on access routes during construction/operation	Less than 5 routes with direct access removed	Greater than 5 and less than 10 routes with direct access removed	Greater than 10 and less than 30 routes with direct access removed	Greater than 30 routes with direct access removed
Traffic & Transport	Road safety (operation)	Occurrence of road accidents resulting in less than 10 property damage only road accidents during a five-year period	Occurrence of road accidents resulting in more than 10 property damage only road accidents or minor injury to less than 20 individuals during a five-year period or major injury to less than 5 individuals during a five-year period	Occurrence of road accidents causing minor injury to between 20 and 100 individuals or major injury to less than 10 individuals during a five-year period	Occurrence of road accidents causing minor injury to more than 100 individuals or major injury to between 5 and 50 individuals during a five-year period	Occurrence of road accidents resulting in major injury to more than 50 individuals or one or more fatalities during a five-year period
Visual & Landscape	Amenity of adjacent residents	Moderate impact upon low number of households. Minor impact upon medium number of households. Insignificant impact upon high number of households.	Significant visual impact upon low number of households. Moderate impact upon medium number of households. Minor impact upon large number of households.	Significant visual impact upon medium number of households. Moderate impact upon high number of households.	Significant visual impact upon high number of households.	Significant visual impact upon households across the entire region
Visual & Landscape	Impact upon townships and places of landscape and cultural value	Negligible visual change from townships and places of cultural and natural value	Minor visual change from townships and places of cultural and natural value	Moderate visual change from townships and places of cultural and natural value	Significant visual change from townships and places of cultural and natural value	Catastrophic visual change from townships and places of cultural and natural value

Category of Impact	Aspect	Insignificant	Minor	Moderate	Major	Catastrophic
Visual & Landscape	Impact upon existing landscape character	Moderate impact upon landscape character types of low landscape sensitivity. Minor impact upon landscape character types of medium to medium-high landscape sensitivity. Negligible impact upon landscape character types of high landscape sensitivity	Significant impact upon landscape character types of low landscape sensitivity. Moderate impact upon landscape character types of medium to medium-high landscape sensitivity. Minor impact upon landscape character types of high landscape sensitivity	Significant impact upon landscape character types of medium to medium to medium-high landscape sensitivity. Moderate impact upon landscape character types of high landscape sensitivity	Significant impact upon landscape character types of high landscape sensitivity	Catastrophic visual impact upon landscape character types of significant landscape sensitivity.



Appendix C

Risk Register

Discipline	Risk No. (Sort in order, i.e. design, construction, then operation)	Option			Impact pathway (how the Project interacts with assets, values, uses and location (state chainage))	Description of consequences (and describe whether it is design, construction or operation)	Linkages	DC1 Contract Shell Ref	Planned Controls to Manage Risk (as per Project Description, and VicRoads Contract Shell DC1: Design & Construct, (April 2012)).	Initial Risks			Controls Recommended to Reduce Risk	Residual Risks		
		1	2	3						Consequence	Likelihood	Risk Rating		Consequence	Likelihood	Risk Rating
Air	A1	x	x	x	Construction emissions impact an individual sensitive receptor	Exceedance of State Environment Protection Policy (Air Quality Management) within a small localised area affecting a sensitive receptor, Aeolian transport and deposition potentially affecting human health, flora, fauna, visual and social aspects, and water quality. The impact zone for construction dust where an exceedance of the SEPP (AQM) may occur (and therefore the "recommended controls" should be carried out to reduce risk at individual sensitive receptors) can be described by the following areas: • North of the Project, a line of up to 395 m from the edge of the construction zone and running parallel to the boundary. • South of the Project, a line of up to 375 m from the edge of the construction zone and running parallel to the boundary.	Flora and Fauna Social Surface water	1200.07 (Air Quality)	<ul style="list-style-type: none"> Emissions of visible smoke to the atmosphere from construction plant and equipment shall be for periods no greater than 10 consecutive seconds. 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. Monitor PM10 close to sensitive receptors using a portable laser light scattering instrument with an alarm provided as well as dust deposition gauges. 	Minor	Likely	Medium	<ul style="list-style-type: none"> Implement methods and management systems (including continuous air monitoring) to maintain air quality during construction consistent with State Environmental Protection Policy (Air Quality Management) intervention levels for particulates, and EPA Best Practice Environmental Management: 'Environmental Guidelines for Major Construction Sites', (EPA, 1996). Suitable measures are in the 'Dust Management Protocol Monitoring' table, contained in the EES Air Impact Assessment report (GHD Pty Ltd, 2012) and include: <ul style="list-style-type: none"> Minimise land disturbance by using phased approach, rehabilitate cleared areas promptly. Applying dust suppression measures such as water cart sprays on haul roads and exposed areas as required. Keep vehicles to well-defined haul roads, limit vehicle speed and seal haul roads and other exposed areas by means of crushed rock or paving where necessary. 	Minor	Rare	Negligible
Air	A2	x	x	x	Construction emissions impact a local area (community) such as: *McKinnon Lane, Beaufort (Chainage 800 - 1,000) *Woodnaggerak / Middle Creek Road Community, Middle Creek (Chainage 10,400 - 12,800) *Buangor Township, Between Andersons/Gravel Route Roads, Buangor (Chainage 16,400 - 20,000) *Geelong Road Community, Ararat (Chainage 35,200 - 40,400)	Exceedance of State Environment Protection Policy (Air Quality Management) within a local area, Aeolian transport and deposition potentially affecting human health, flora, fauna, visual and social aspects, and water quality. The impact zone for construction dust where an exceedance of the SEPP (AQM) may occur (and therefore the "recommended controls" should be carried out to reduce risk at sensitive receptors) can be described by the following quadrants surrounding Buangor: • North of the Project, a line of up to 395 m from the edge of the construction zone and running parallel to the boundary. • South of the Project, a line of up to 375 m from the edge of the construction zone and running parallel to the boundary.	Flora and Fauna Social Surface water	1200.07 (Air Quality)	As for Risk A1	Moderate	Likely	High	As for Risk A1, and Use of dust deposition gauges to judge effectiveness of EMP, and evaluate implementation of further controls such as halting work under certain conditions.	Moderate	Rare	Low
Air	A3	x	x	x	Construction emissions deposit on residential housing that drain into domestic water supplies (i.e. tank water).	Exceedance of 2004 Australian Drinking Water Guideline (ADWG) for residential rainwater tanks along the alignment used for residential water supply.	Social	1200.07 (Air Quality)	As for Risk A1	Minor	Rare	Negligible	As for Risk A1, and Where concerns are raised by land owners and if warranted, sensitive receptors on rain water supplies should be encouraged, at their cost, to have '1st flush devices' installed between the water runoff and tank.	Insignificant	Rare	Negligible
Air	A4	x	x	x	Construction emissions deposit on Agricultural/Horticultural businesses at an individual sensitive receptor location such as: There are no vineyards or olive groves plantations identified that run parallel along the construction boundary or within the Project study area.	Potential detrimental effects on agriculture/horticulture. In particular vineyards and olive groves nearby (properties with common boundary) the construction activity.	Social Economic	1200.07 (Air Quality)	As for Risk A1	Minor	Unlikely	Low	As for Risk A2, and Take dust mitigation steps such as reduced activity or additional water application when adverse (hot, dry and/or gusty) winds resulting in visible dust heading towards actively growing or in-fruit vines or olives trees (in the case that should these are present) nearby the construction activity.	Minor	Rare	Negligible
Air	A5	x	x	x	Operation of the Western Highway generates air emissions from vehicular traffic.	Exceedance of State Environment Protection Policy (Air Quality Management).	Flora and Fauna Social		Air quality issues during operation determined through existing complaints procedure.	Insignificant	Unlikely	Negligible		Insignificant	Rare	Negligible
Cultural Heritage	CH1	x	x	x	Construction encounters Major Mitchell Cairn (DSE local) Ch. ~10100	Damage to, or complete destruction of, previously registered historical site.		2100.15	Submission to approvals authority (relevant LGA) prior to damaging, disturbing or otherwise impacting cultural heritage site to relocate site to an agreed area.	Minor	Almost Certain	Medium	Early application to approvals authority for relocation (prior to construction) alleviates any potential delays resulting from unexpected finds and does not compromise the collection of data.	Minor	Unlikely	Low
Cultural Heritage	CH2	x	x	x	Construction immediately adjacent to Woodnagerak Homestead Ch. ~10625-~10800	Present design places the construction on the boundary of this site. Alteration to design could cause damage to, or completely destroy historical site earmarked for Heritage Overlay.		2100.15	Current design avoids site.	Moderate	Unlikely	Medium	'No-go zones' around site would be clearly marked on site maps and fenced if necessary.	Insignificant	Rare	Negligible
Cultural Heritage	CH3	x	x	x	Construction immediately adjacent to Former Middle Creek School HI site. Ch. ~10850	Present design places the construction on the boundary of this site. Alteration to design could cause damage to, or completely destroy site.		2100.15	Current design avoids site.	Moderate	Unlikely	Medium	'No-go zones' around site would be clearly marked on site maps and fenced if necessary.	Insignificant	Rare	Negligible

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Cultural Heritage	CH14	x	x	x	Construction immediately adjacent to Former Prince of Wales Hotel HI site. Ch. ~12500-12600	Present design places the construction on the boundary of this site. Alteration to design could cause damage to, or completely destroy site.		2100.15	Current design avoids site.	Moderate	Unlikely	Medium	'No-go zones' around site would be clearly marked on site maps and fenced if necessary.	Insignificant	Rare	Negligible
Cultural Heritage	CH15		x		Construction encounters Peacocks Road House HI site Ch. ~18300-18400	Damage to, or complete destruction of previously registered historical archaeological sites or features (HI)		2100.15	Approval would be obtained from Heritage Victoria prior to damaging, disturbing or otherwise impacting cultural heritage sites	Moderate	Almost Certain	High	Early application from Heritage Victoria for consent to destroy (prior to construction) alleviates any potential delays resulting from unexpected finds and does not compromise the collection of data.	Moderate	Rare	Low
Cultural Heritage	CH16		x	x	Construction encounters Former Colvinby School site Ch. ~26100-26180	Damage to, or complete destruction of previously registered historical archaeological sites or features (HI)		2100.15	Approval would be obtained from Heritage Victoria prior to damaging, disturbing or otherwise impacting cultural heritage sites	Moderate	Almost Certain	High	Early application from Heritage Victoria for consent to destroy (prior to construction) alleviates any potential delays resulting from unexpected finds and does not compromise the collection of data.	Moderate	Rare	Low
Cultural Heritage	CH17	x	x	x	Construction immediately adjacent to Former Dobie Railway Station HI site Ch. ~33150~33210	Present design places the construction on the boundary of this site. Alteration to design could cause damage to, or completely destroy site		2100.15	Current design avoids site.	Moderate	Unlikely	Medium	'No-go zones' around site would be clearly marked on site maps and fenced if necessary.	Insignificant	Rare	Negligible
Cultural Heritage	CH18	x	x	x	Construction immediately adjacent to Dobie House Ruins HI site. Ch. ~33820~33975	Present design places the construction on the boundary of one site. Alteration to design could cause damage to, or completely destroy site.		2100.15	Current design avoids site.	Moderate	Unlikely	Medium	'No-go zones' around site would be clearly marked on site maps and fenced if necessary.	Insignificant	Rare	Negligible
Cultural Heritage	CH19	x	x	x	Construction encounters previously unregistered and unassessed historical cultural heritage sites	Alteration to design could cause damage to, or completely destroy site previously unregistered and unassessed historical cultural heritage sites.		2100.15	Avoidance or Approval would be obtained from relevant authorities prior to damaging, disturbing or otherwise impacting cultural heritage sites	Major	Unlikely	Medium	An EMP would be prepared to include contingency measures that manage the unexpected discovery of historical cultural heritage sites and features, in accordance with the <i>Heritage Act 1995 (Vic)</i>	Major	Rare	Medium
Cultural Heritage	ACH1	x	x	x	Construction encounters the following previously identified Aboriginal cultural heritage place: Western Highway Eurambeen 2 IA ~ Ch. 4,125	Destruction of common occurrence Aboriginal cultural heritage place.		2100.15	Following registration with VAHR approvals must be obtained from relevant authorities prior to impacting the Aboriginal cultural heritage place.	Minor	Almost Certain	Medium	An approved Cultural Heritage Management Plan (CHMP).	Minor	Almost Certain	Medium
Cultural Heritage	ACH2	x	x	x	Construction encounters the following previously identified Aboriginal Heritage Places: Eurambeen-Streatham Road Eurambeen 5 IA Eurambeen-Streatham Road Eurambeen 7 IA ~ Ch. 4,800	Destruction of two common occurrence Aboriginal cultural heritage places.		2100.15	Following registration with VAHR approvals must be obtained from relevant authorities prior to impacting the Aboriginal cultural heritage places.	Minor	Almost Certain	Medium	An approved Cultural Heritage Management Plan (CHMP).	Minor	Almost Certain	Medium
Cultural Heritage	ACH3	x	x	x	Construction encounters the following previously identified Aboriginal cultural heritage places: Eurambeen-Streatham Road Eurambeen 6 IA Eurambeen-Streatham Road Eurambeen 4 IA ~ Ch. 4,825	Destruction of two common occurrence Aboriginal cultural heritage places.		2100.15	Following registration with VAHR approvals must be obtained from relevant authorities prior to impacting the Aboriginal cultural heritage places.	Minor	Almost Certain	Medium	An approved Cultural Heritage Management Plan (CHMP).	Minor	Almost Certain	Medium
Cultural Heritage	ACH4	x	x	x	Construction encounters the following previously identified Aboriginal cultural heritage places: Eurambeen-Streatham Road Eurambeen 8 IA ~ Ch. 5,015	Destruction of one common occurrence Aboriginal cultural heritage places.		2100.15	Following registration with VAHR approvals must be obtained from relevant authorities prior to impacting the Aboriginal cultural heritage places.	Minor	Almost Certain	Medium	An approved Cultural Heritage Management Plan (CHMP).	Minor	Almost Certain	Medium
Cultural Heritage	ACH5	x	x	x	Construction immediately adjacent to (within 10 m) the following previously identified Aboriginal cultural heritage place: Eurambeen-Streatham Road Eurambeen 9 IA ~ Ch. 5,120	Present design places the construction immediately adjacent to this Aboriginal cultural heritage place. Alteration to design could destroy a common occurrence Aboriginal cultural heritage place.		2100.15	Following registration with VAHR approvals must be obtained from relevant authorities prior to impacting the Aboriginal cultural heritage place.	Minor	Possible	Low	Maintain current design to avoid impact if it is determined to occur outside the construction. An approved Cultural Heritage Management Plan (CHMP) will be required if it is determined construction will encounter it.	Minor	Unlikely	Low

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Cultural Heritage	ACH6	x	x	x	Construction encounters the following previously identified Aboriginal Heritage Places: Eurambeen-Streatham Road Eurambeen 1 Eurambeen-Streatham Road Eurambeen 2 IA ~ Ch. 5,290	Destruction of two common occurrence Aboriginal cultural heritage places.		2100.15	Following registration with VAHR approvals must be obtained from relevant authorities prior to impacting on the two Aboriginal cultural heritage places.	Minor	Almost Certain	Medium	An approved Cultural Heritage Management Plan (CHMP).	Minor	Almost Certain	Medium
Cultural Heritage	ACH7	x	x	x	Construction adjacent to (within 40 m) the following previously identified Aboriginal Heritage Place: Fiery Creek Eurambeen 6 IA ~ Ch. 5,725	Present design places the construction immediately adjacent to this Aboriginal cultural heritage place. Alteration to design could destroy a common occurrence Aboriginal cultural heritage place.		2100.15	Following registration with VAHR confirm precise place extent in relation to proposed construction.	Minor	Possible	Low	Maintain current design to avoid impact if it is determined to occur outside the construction. An approved Cultural Heritage Management Plan (CHMP) will be required if it is determined construction will encounter it.	Minor	Possible	Low
Cultural Heritage	ACH8	x	x	x	Construction adjacent to (within 40 m) the following previously identified Aboriginal Heritage Place: Fiery Creek Eurambeen 5 IA ~ Ch. 5,750	Present design places the construction adjacent to this Aboriginal cultural heritage place. Alteration to design could destroy a common occurrence Aboriginal cultural heritage place.		2100.15	Following registration with VAHR confirm precise place extent in relation to proposed construction.	Minor	Possible	Low	Maintain current design to avoid impact if it is determined to occur outside the construction. An approved Cultural Heritage Management Plan (CHMP) will be required if it is determined construction will encounter it.	Minor	Possible	Low
Cultural Heritage	ACH9	x	x	x	Construction immediately adjacent to (within 5 m) the following previously identified Aboriginal cultural heritage place: Fiery Creek Eurambeen 4 ~ Ch. 5,790	Present design places the construction immediately adjacent to this Aboriginal cultural heritage place. Alteration to design could destroy a common occurrence Aboriginal cultural heritage place.		2100.15	Following registration with VAHR confirm precise place extent in relation to proposed construction.	Minor	Possible	Low	Maintain current design to avoid impact if it is determined to occur outside the construction. An approved Cultural Heritage Management Plan (CHMP) will be required if it is determined construction will encounter it.	Minor	Possible	Low
Cultural Heritage	ACH10	x	x	x	Construction immediately adjacent to (within 5 m) the following previously identified Aboriginal cultural heritage place: Fiery Creek Eurambeen 2 IA ~ Ch. 5,800	Present design places the construction immediately adjacent to this Aboriginal cultural heritage place. Alteration to design could destroy a common occurrence Aboriginal cultural heritage place.		2100.15	Following registration with VAHR confirm precise place extent in relation to proposed construction.	Minor	Possible	Low	Maintain current design to avoid impact if it is determined to occur outside the construction. An approved Cultural Heritage Management Plan (CHMP) will be required if it is determined construction will encounter it.	Minor	Possible	Low
Cultural Heritage	ACH11	x	x	x	Construction adjacent to (within 20 m) the following previously identified Aboriginal Heritage Place: Fiery Creek Eurambeen 1 IA ~ Ch. 5,860	Present design places the construction immediately adjacent to this Aboriginal cultural heritage place. Alteration to design could destroy a common occurrence Aboriginal cultural heritage place.		2100.15	Following registration with VAHR confirm precise place extent in relation to proposed construction.	Minor	Possible	Low	Maintain current design to avoid impact if it is determined to occur outside the construction. An approved Cultural Heritage Management Plan (CHMP) will be required if it is determined construction will encounter it.	Minor	Possible	Low
Cultural Heritage	ACH12	x	x	x	Construction adjacent to (within 50 m) the following previously identified Aboriginal cultural heritage place: Western Highway 1 ~ Ch. 12,945	Present design places the construction adjacent to this Aboriginal cultural heritage place. Alteration to design could destroy a occasional occurrence Aboriginal cultural heritage place.		2100.15	Following registration with VAHR confirm precise place extent in relation to proposed construction.	Moderate	Possible	Medium	Maintain current design to avoid impact if it is determined to occur outside the construction. An approved Cultural Heritage Management Plan (CHMP) will be required if it is determined construction will encounter it.	Moderate	Possible	Medium
Cultural Heritage	ACH13	x	x	x	Construction encounters the following previously identified Aboriginal cultural heritage place: Western Highway 5 ~ Ch. 16,115	Destruction of an occasional occurrence Aboriginal cultural heritage place.		2100.15	Following registration with VAHR approvals must be obtained from relevant authorities prior to impacting on the Aboriginal cultural heritage place.	Moderate	Almost Certain	High	An approved Cultural Heritage Management Plan (CHMP).	Moderate	Almost Certain	High
Cultural Heritage	ACH14	x	x	x	Construction encounters the following previously identified Aboriginal cultural heritage place: Western Highway 3 ~ Ch. 17,495 (Option 1 and 3), 17,455 (Option 2)	Destruction of an occasional occurrence Aboriginal cultural heritage place.		2100.15	Following registration with VAHR approvals must be obtained from relevant authorities prior to impacting on the Aboriginal cultural heritage place.	Moderate	Almost Certain	High	An approved Cultural Heritage Management Plan (CHMP).	Moderate	Almost Certain	High
Cultural Heritage	ACH15	x		x	Construction immediately adjacent to (within 2 m) the following previously identified Aboriginal cultural heritage place: Western Highway 4 ~ Ch. 18,400	Present design places the construction immediately adjacent to this Aboriginal cultural heritage place. Alteration to design could destroy a occasional occurrence Aboriginal cultural heritage place.		2100.15	Following registration with VAHR confirm precise place extent in relation to proposed construction.	Moderate	Likely	High	Maintain current design to avoid impact if it is determined to occur outside the construction. An approved Cultural Heritage Management Plan (CHMP) will be required if it is determined construction will encounter it.	Moderate	Possible	Medium
Cultural Heritage	ACH16	x	x	x	Construction adjacent to (50 m) the following previously registered Aboriginal cultural heritage place: Gorinn 1 (7523-0001) ~ Ch. 32,235 (Option 1 and 3), 32,115 (Option 2)	Present design places the construction adjacent to this Aboriginal cultural heritage place. Alteration to design could destroy a rare occurrence Aboriginal cultural heritage place.		2100.15	Determine precise place extent in relation to proposed construction.	Major	Possible	High	Current design avoids impact to Gorinn 1. 'No-go zones' around Gorinn 1 will be clearly marked on site maps and fenced if necessary.	Major	Unlikely	Medium

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Cultural Heritage	ACH17	x	x	x	Construction encounters the following previously identified Aboriginal cultural heritage place: Western Highway 7 ~ Ch. 33,700 (Option 1 and 3), 33,600 (Option 2)	Destruction of a common occurrence Aboriginal cultural heritage place.		2100.15	Following registration with VAHR approvals must be obtained from relevant authorities prior to impacting on the Aboriginal cultural heritage place.	Minor	Almost Certain	Medium	An approved Cultural Heritage Management Plan (CHMP).	Minor	Almost Certain	Medium
Cultural Heritage	ACH18	x	x	x	Construction adjacent to (within 35 m) the following previously registered Aboriginal cultural heritage place: LG/ST 23 (7523-0109) ~ Ch. 39,290 (Option 1 and 3), 29,160 (Option 2)	Present design places the construction adjacent to this Aboriginal cultural heritage place. Alteration to design could destroy an occasional occurrence Aboriginal cultural heritage place.		2100.15	Determine precise place extent in relation to proposed construction.	Moderate	Possible	Medium	Maintain current design to avoid impact if it is determined to occur outside the construction. An approved Cultural Heritage Management Plan (CHMP) will be required if it is determined construction will encounter it.	Moderate	Possible	Medium
Cultural Heritage	ACH19	x	x	x	Construction encounters previously unregistered and unassessed common occurrence Aboriginal cultural heritage place.	Destruction of a common occurrence Aboriginal cultural heritage place.		2100.15	Undertake a Complex Assessment.	Minor	Possible	Low	An approved Cultural Heritage Management Plan (CHMP).	Minor	Possible	Low
Cultural Heritage	ACH20	x	x	x	Construction encounters previously unregistered and unassessed occasional occurrence Aboriginal cultural heritage place.	Destruction of an occasional occurrence Aboriginal cultural heritage place.		2100.15	Undertake a Complex Assessment.	Moderate	Possible	Medium	An approved Cultural Heritage Management Plan (CHMP).	Moderate	Possible	Medium
Cultural Heritage	ACH21	x	x	x	Construction encounters previously unregistered and unassessed rare occurrence (e.g. burned mounds) Aboriginal cultural heritage place.	Destruction of a rare occurrence (e.g. burned mounds) Aboriginal cultural heritage place.		2100.15	Undertake a Complex Assessment.	Major	Possible	High	An approved Cultural Heritage Management Plan (CHMP).	Major	Unlikely	Medium
Cultural Heritage	ACH22	x	x	x	Construction encounters previously unregistered and unassessed mortuary tree Aboriginal cultural heritage place.	Destruction of a mortuary tree Aboriginal cultural heritage place.		2100.15	Undertake a Complex Assessment.	Catastrophic	Possible	High	To consider realignment if a mortuary tree is identified in the future.	Catastrophic	Unlikely	High
Economic	E1	x	x	x	Construction of the Project would reduce passing trade for some businesses (Buangor)	Some businesses along the alignment rely for a portion of their turnover on passing traffic. This traffic would be reduced with a consequent reduction in turnover.	Socio-Economic Social			Insignificant	Almost Certain	Low	Install signage for any business areas affected by reduction in passing trade and maintain existing signage that relates to areas of interest for tourists.	Insignificant	Almost Certain	Low
Economic	E2	x	x	x	Construction of the Project would result in the loss of agricultural facilities and infrastructure plus the loss of agricultural land and severance of properties across the alignment	Stock yards, sheds, access lanes and other infrastructure may require replacement or relocation. Some agricultural land would be lost as a result of the construction and there would be severance and access issues to some properties.	Socio-Economic Social		Consultation with existing land owners who would be affected by the alignment options	Moderate	Almost Certain	High	Compensation measures for loss of infrastructure, land, severance and access issues. Optimise intersections and access opportunities for affected properties.	Insignificant	Almost Certain	Low
Economic	E3	x	x	x	Construction of the Project would disrupt access to non-agricultural businesses during construction	Some agricultural and other businesses along the route would have access disrupted during the construction process	Socio-Economic Social	1160 and 2050	Continuous access would be maintained to commercial property, consistent with business operating hours. Any alteration would be with written agreement of proprietor. Traffic Management Plans (TMPs) would be prepared to identify, assess and appropriately eliminate, reduce or mitigate road safety hazards and to be reviewed by VicRoads prior to implementation. TMPs would comply with standard VicRoads practices, the Traffic Management Code of Practice and the <i>Road Management Act 2004</i> . Examples include: speed reduction where appropriate, worksite safety barriers, advance warning signage, hazard visibility, etc. Various businesses may actually benefit during the construction period due to displacement of trade away from other businesses.	Insignificant	Almost Certain	Low	Work with businesses to optimise construction schedules	Insignificant	Almost Certain	Low

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Biodiversity and Habitat	FF1	X (Ch. 34800- 36400)	X (Ch. 34700- 36400)	X (Ch. 34800- 36400)	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	Flora and Fauna	1200.13	Vegetation/habitat sites and areas of significance listed in Table 1200.132 of the report, and native flora/fauna sites or habitat discovered during works under the Contract shall not be damaged, disturbed or otherwise adversely impacted without prior approval of the Superintendent and obtaining all relevant permits. Plant, equipment, material or debris shall not be placed or stored within the limit of the root zone of vegetation to be retained. Fencing and signage to protect populations during construction.	Minor	Likely	Medium	Further targeted survey to be completed on final alignment prior to construction to identify all existing individuals. Potential for detailed design or construction planning to avoid impact at known locations (e.g. micro alignment change to construction corridor). Prepare and implement a Conservation Management Plan (CMP), 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.	Insignificant	Likely	Low
Biodiversity and Habitat	FF2	X (Ch. 29100)	X (Ch. 29100)	X (Ch. 29000)	Potential removal of individuals of a known population of the DSE advisory listed flora	Golden Cowslip are present within Options 1, 2 and 3. See targeted flora map for exact locations.	Flora and Fauna	1200.13	As for FF1.	Insignificant	Almost Certain	Low	As for FF1. Translocation to be undertaken in accordance with a formal translocation plan approved by DSE, which would include post-translocation monitoring.	Insignificant	Unlikely	Negligible
Biodiversity and Habitat	FF3a	X (Ch. 26300- 29200)	X (Ch. 26000- 29200)	X (Ch. 26300- 29400)	Approved removal of individuals of a known population of the DSE advisory listed flora	Emerald-lip Greenhood is present within Options 1, 2 and 3. See targeted flora map for exact locations.	Flora and Fauna	1200.13	As for FF1.	Minor	Likely	Medium	As for FF1. Translocation to be undertaken in accordance with a formal translocation plan approved by DSE, which would include post-translocation monitoring.	Insignificant	Likely	Low
Biodiversity and Habitat	FF3b		X (Ch. 25600- 26000)	X (Ch. 25800- 26200)	Approved removal of individuals of a known population of the DSE advisory listed flora	Yarra Gum are present within Options 2 and 3. See targeted flora map for exact locations.	Flora and Fauna	1200.13	As for FF1.	Minor	Likely	Medium	As for FF1. Translocation to be undertaken in accordance with a formal translocation plan approved by DSE, which would include post-translocation monitoring.	Minor	Likely	Medium
Biodiversity and Habitat	FF4	X	X	X	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	Flora and Fauna	1200.13	In the event that a significant flora or fauna site, species or habitat is discovered, the Contractor shall immediately notify the Superintendent. The Contractor shall submit to the Superintendent for approval the proposed actions to manage the site, species or habitat.	Minor	Possible	Low	Avoid impacts if possible, by altering the construction area. Otherwise where applicable, implement a translocation plan for these individuals.	Minor	Possible	Low
Biodiversity and Habitat	FF5	X (Ch. 20900, 18200)	X (Ch. 21200, 18200)	X (Ch. 20900, 18200)	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.	Flora and Fauna	1200.04, 1200.08, 1200.11 and 1200.13	Implementation of a Construction EMP detailing erosions and sediment control measures. As for FF1.	Major	Likely	High	Development of a specific management plan for Dwarf Galaxias. Construction around and in watercourse to occur outside breeding period/dispersal period. 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. All waterway crossings within known and potential habitats to be designed to allow for unimpeded Dwarf Galaxias dispersal under flood conditions. Conduct pre-clearance fauna surveys and then attempt relocation where possible.	Minor	Possible	Low
Biodiversity and Habitat	FF6	X (Ch. 29300- 28500, 22800- 21700, 21500- 20900, 19200)	X (Ch. 29300- 29500, 21800, 24100)	X (Ch. 29300- 28500, 21800, 24400, 19400)	Construction encounters EPBC Act listed Golden Sun Moth (Pope Road)	Removal of fauna habitat, possible injury/death to listed fauna species individuals during construction.	Flora and Fauna	1200.13	As for FF1.	Moderate	Likely	High	Potential for detailed design or construction planning to avoid impact at known locations/habitats (e.g. micro alignment change to construction corridor). Revegetate ROW with grassland species favoured as a food source by GSM (e.g. <i>Austrodanthonia</i> sp.) where GSM populations are known to be present.	Minor	Likely	Medium

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Biodiversity and Habitat	FF7	x	x	x	Construction encounters FFG Act-listed Brown Toadlet and Brown Tree creeper	Removal of fauna habitat, possible injury/death to listed fauna species individuals during construction.	Flora and Fauna	1200.13	As for FF1.	Moderate	Almost Certain	High	Conduct further targeted surveys for Brown Toadlet within final alignment. Potential for detailed design or construction planning to avoid impact at known locations/habitats (e.g. micro alignment change to construction corridor). 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.	Minor	Likely	Medium
Biodiversity and Habitat	FF8	x	x	x	Construction encounters DSE Advisory listed Brown Toadlet and Brown Tree creeper	Removal of fauna habitat, possible injury/death to listed fauna species individuals during construction.	Flora and Fauna	1200.13	As for FF1.	Moderate	Almost Certain	High	Conduct further targeted surveys for Brown Toadlet within final alignment. Potential for detailed design or construction planning to avoid impact at known locations/habitats (e.g. micro alignment change to construction corridor). 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.	Minor	Likely	Medium
Biodiversity and Habitat	FF9	x	x	x	Construction encounters FFG listed Victorian Temperate Woodland Bird Community - located along entire alignment	Removal of fauna habitat, possible injury/death to listed fauna species individuals during construction.	Flora and Fauna	1200.13	As for FF1.	Moderate	Almost Certain	High	Potential for detailed design or construction planning to avoid impact at known locations/habitats (e.g. micro alignment change to construction corridor). 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.	Minor	Likely	Medium
Biodiversity and Habitat	FF10	x	x	x	The duplication removes or disrupts wildlife corridors or fauna habitat - located along entire alignment	Impacts on habitat or wildlife corridors may affect Golden Sun Moth, Brown Toadlet and Brown Tree creeper, 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.	Flora and Fauna	1200.13	As for FF1.	Moderate	Likely	High	Potential for detailed design or construction planning to avoid impact at known locations/habitats (e.g. micro alignment change to construction corridor). Install warning signs for potential fauna crossings. Investigate appropriate design response and implement recommendations, for example: - Installation of fauna sensitive road design features at wildlife corridors. - Implement before/after comparison study for fauna road mortality to investigate a) the impact of the road; b) the efficacy of crossing structures.	Minor	Likely	Medium
Biodiversity and Habitat	FF11	x	x	x	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	Flora and Fauna	1200.13	As for FF4.	Minor	Possible	Low	As for FF4. 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.	Minor	Possible	Low
Biodiversity and Habitat	FF12	x	x	x	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 Tree creeper, 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.	Flora and Fauna	-	-	Minor	Likely	Medium	As for FF10.	Minor	Possible	Low

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Biodiversity and Habitat	FF13	x	x	x	Construction encounters Ecological Vegetation Communities (EVCs) (Native vegetation and fauna habitat) - located along entire alignment	Removal of EVCs of high and very high conservation significance including: Alluvial Terraces Herb-rich Woodland, Grassy Dry Forest, Grassy Woodland, Plains Grassy Wetland, Creekline Grassy Woodland, Plains Grassy Woodland, Plains Grassland, Heathy Dry Forest, Hill Herb-rich Woodland, Heathy Woodland.	Flora and Fauna	1200.13	As for FF1.	Minor	Likely	Medium	Potential for detailed design or construction planning to avoid impact at known locations/habitats (e.g. micro alignment change to construction corridor). Revegetation or landscape plantings to include species appropriate to the local EVC.	Minor	Likely	Medium
Biodiversity and Habitat	FF14a	x GSAVVP (11.14ha)	x GSAVVP (8.65ha)	x GSAVVP (11.65ha)	Construction encounters the EPBC listed community, Grassy Eucalypt Woodland of the Victorian Volcanic plain, located along entire alignment.	Removal of the EPBC Act-listed community.	Flora and Fauna	1200.13	As for FF1.	Major	Almost Certain	Extreme	Detailed design and construction planning to minimise native vegetation loss as far as possible.	Moderate	Likely	High
Biodiversity and Habitat	FF14b	x NTGVVP (5.25ha)	x NTGVVP (5.25ha)	x NTGVVP (5.25ha)	Construction encounters the EPBC listed community, Natural Temperate Grassland of the Victorian Volcanic Plain.	Removal of the EPBC Act-listed community.	Flora and Fauna	1200.13	As for FF1.	Moderate	Almost Certain	High	Detailed design and construction planning to minimise native vegetation loss as far as possible.	Moderate	Likely	High
Biodiversity and Habitat	FF15	x (10.86ha)	x (10.86ha)	x (10.86ha)	Construction encounters the following FFG listed community - Western (Basalt) Plains Grasslands - located along entire alignment	Removal of the FFG Act-listed community.	Flora and Fauna	1200.13	As for FF1.	Major	Likely	High	Detailed design and construction planning to minimise native vegetation loss as far as possible.	Moderate	Likely	High
Biodiversity and Habitat	FF16	x	x	x	Construction encounters Large and Very Large Scattered Trees/Hollow-bearing trees/fauna habitat - located along entire alignment	Removal of scattered trees.	Flora and Fauna	1200.13	As for FF1.	Moderate	Almost Certain	High	Detailed design and construction planning to minimise loss of trees, particularly MOTs, LOTs and VLOTs and those which are hollow bearing, with the advice of an aborist.	Minor	Almost Certain	Medium
Biodiversity and Habitat	FF17	x	x	x	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).	Surface Water Flora and Fauna	1200.04, 1200.08 and 1200.11	Implementation of a Construction EMP detailing: • Erosion and sediment control measures. • Fuel and chemical management procedures.	Moderate	Possible	Medium	No structures within the stream, and consistent with CMA requirements. Ensure fish sensitive design of structures to ensure safe fish passage. Schedule construction to no-flow or low-flow periods.	Minor	Possible	Low
Biodiversity and Habitat	FF18	x	x	x	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.	Surface Water Flora and Fauna	1200.04, 1200.08 and 1200.11	As for FF17.	Minor	Possible	Low	Implement fish sensitive design of structures to provide for safe fish passage. Schedule construction to no-flow or low-flow periods.	Minor	Possible	Low
Biodiversity and Habitat	FF19	x	x	x	Realignment of Charliecombe Creek	This is unlikely to have a significant impact on any flora or fauna species of significance, nor are vegetation losses likely to change significantly. However, the primary impacts will be related to sedimentation and turbidity downstream of the impact site as a result of erosion issues with disturbance of the creek alignment.	Surface Water Flora and Fauna	1200.04, 1200.08 and 1200.12	As for FF17.	Moderate	Possible	Medium	Undertake creek realignment during the dry season (summer-autumn) to reduce the likelihood of large water flows through the waterway when the soils are most unstable. Line creek banks with rock material or Geofab to increase bank stability and reduce erosion. Revegetate creek banks as soon as possible after realignment to increase bank stability (using plant species consistent with the local creekline EVC) Replace any in-stream habitats (e.g. rocks, branches, other snags, etc.). Charliecombe Creek is an ephemeral waterway, however sitting water pools are likely to provide habitat to locally common aquatic fauna species. An assessment of the water table should be completed to ensure that sitting pools are retained. Pool, riffle, run morphological features should be retained to their current lengths and depths. Pre, during and post ecological monitoring (including water quality and macroinvertebrates) should be implemented. Soil testing should be conducted to ensure the soil type is appropriate for the new creek alignment.	Minor	Possible	Low

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Biodiversity and Habitat	FF20	x	x	x	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	Flora and Fauna	1200.13	Existing vegetation and native fauna habitat identified in the Contract to be retained, shall 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. Plant, equipment, material or debris not to be placed or stored within the limit of the root zone of vegetation to be retained.	Minor	Possible	Low	-	Minor	Possible	Low
Biodiversity and Habitat	FF21	x	x	x	Weeds and/or pathogens introduced or spread through construction activities.	Displacement/invasion of native vegetation and/or fauna habitat and increased spread of weed species or pathogens. Potential pathogens include Cinnamon Fungus <i>Phytophthora cinnamomi</i> , Bovine Johne's Disease <i>Mycobacterium paratuberculosis</i> , Grape phyloxera <i>Daktulosphaera vitifoliae</i> , Potato Cyst Nematode <i>Globodera rostochiensis</i> and Amphibian Chytrid Fungus <i>Batrachochytrium dendrobatidis</i> .	Flora and Fauna	1200.14	The Contractor shall develop a procedure to prevent the spread of declared weeds, pests and diseases within the Site and off-site.	Minor	Likely	Medium	A weed management and control program to control invasions would be implemented for no less than 2 years following construction. Pre construction mapping of weeds and soil pathogens, as other soil pathogens (in addition to cinnamon fungus) may exist in the area. Pathogen management procedures developed to prevent spread. Ensure management measures are strictly adhered to.	Minor	Unlikely	Low
Biodiversity and Habitat	FF22	x	x	x	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.	Surface Water Flora and Fauna Soils and Geology	1200.04, 1200.08	Implementation of a Construction EMP detailing erosion and sediment control measures.	Minor	Possible	Low	Installation of sediment fencing adjacent to waterways	Minor	Possible	Low
Biodiversity and Habitat	FF23	x	x	x	Construction modifies hydrological/surface water flows	Impact to retained native vegetation and fauna habitats	Surface Water Flora and Fauna Soils and Geology	1200.04, 1200.08	As for FF17.	Minor	Possible	Low	Installation of appropriate drainage systems . Schedule construction to no-flow or low-flow periods.	Minor	Possible	Low
Biodiversity and Habitat	FF24	x	x	x	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.	Flora and Fauna Noise	3110.01	Traffic noise levels shall not exceed the objectives specified in VicRoads Traffic Noise Reduction Policy for new and improved roads within and outside of the limit of works.	Minor	Possible	Low	-	Minor	Possible	Low
Biodiversity and Habitat	FF25	x	x	x	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.	Flora and Fauna Landscape and Visual	-	-	Minor	Possible	Low	-	Minor	Possible	Low
Biodiversity and Habitat	FF26	x	x	x	Construction creates dust impacting on native fauna, native flora and surface water ecosystems	Impact to retained native vegetation and fauna habitats	Flora and Fauna	1200.07	Implementation of a Construction EMP detailing air quality control measures and strict monitoring procedures.	Insignificant	Possible	Negligible	Implement methods and management systems consistent with EPA Best Practice Environmental Management; 'Environmental Guidelines for Major Construction Sites' (EPA, 1996). Minimise land disturbance by using phased approach, rehabilitate cleared areas promptly. 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. Employ dust suppression methods such as watering down the ROW	Insignificant	Possible	Negligible
Biodiversity and Habitat	FF27	x	x	x	Creation of pollutants (including smoke, dust, petrochemicals, litter etc.) during construction and operation.	Impact to retained native vegetation and fauna habitats	Flora and Fauna	1200.07	As for FF17 and 24	Insignificant	Possible	Negligible	As per Risk FF24.	Insignificant	Possible	Negligible

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Soils and Geology	G1	x	x	x	Presence of contaminated soil along alignment.	<p>Construction worker exposure to soil contamination via dermal contact, ingestion and inhalation. Could occur at any location along the alignment, but more likely within the vicinity of agricultural land, waste disposal sites (controlled and uncontrolled), commercial and industrial activity and rail corridors due to the use of herbicides and other related rail uses. These areas include:</p> <p>OPTIONS 1, 2 and 3</p> <ul style="list-style-type: none"> - Service Station (Ch. 36800) - Farm Sheds (Ch. 10600 to 10800, 14 500) - Disturbed Soil (Ch. 6000) - Intersection with Rail Corridor (Ch. 29400, 32200, 34300 and 38000) - Close proximity with Rail corridor (Ch. 29000 to 39600) <p>OPTION 1</p> <ul style="list-style-type: none"> - Disturbed Soil (Ch. 28200) - Intersection with Rail Corridor (Ch. 23400) <p>OPTION 1 and 3</p> <ul style="list-style-type: none"> - Farm Sheds (Ch. 19600 and 24000) <p>OPTION 2</p> <ul style="list-style-type: none"> - Intersection with Rail Corridor (Ch. 20800) - Close proximity with Rail corridor (Ch. 22600 to 25000) <p>OPTION 2 and 3</p> <ul style="list-style-type: none"> - Farm Sheds (Ch. 24400) <p>OPTION 3</p> <ul style="list-style-type: none"> - Farm Shed (Ch. 24400) - Intersection with Rail Corridor (Ch. 23000) - Close proximity with Rail corridor (Ch. 24800 to 25200) <p>Generation of surplus soils during construction may require treatment and appropriate handling or disposal.</p>	Groundwater Social Economic Flora & Fauna Planning & Landuse Surface Water	1200.09	<p>1) The discovery of contaminated material on the site during construction works shall be managed in accordance with VicRoads and EPA Guidelines.</p> <p>2) Where putrescible waste material is encountered, the Superintendent and EPA shall be notified. Construction works along the affected area shall stop until a mitigation plan is established and agreed between the relevant project stakeholders.</p> <p>3) The Contractor shall undertake a visual assessment of the Site for contaminated soils and uncontrolled waste during construction works.</p>	Moderate	Possible	Medium	The Construction Environmental Management Plan (CEMP) is to provide details on appropriate methods for managing contaminated soils.	Moderate	Rare	Low
Soils and Geology	G2	x	x	x	Uncontained spill or leak of chemicals during construction	<p>Groundwater, soil and/or surface water contamination. Impacts on water resources, flora, fauna, and human health. This risk could occur at any location along the alignment but the more sensitive locations are within the vicinity of waterways, including:</p> <ul style="list-style-type: none"> - Goodes Gully (Ch. 400) - Fiery Creek (Ch. 5900) - Middle Creek (Ch. 10600) - Charliecombe Creek (Ch. 12600, 14400 and 14700) - Billy Billy Creek (Ch. 18200 and 20800) - Hopkins River (Ch. 33800) - Greenhills Creek (Ch. 38300) 	Flora and Fauna Groundwater Surface Water	1200.10 1200.11	<p><u>Contaminated Soils and Waste Materials</u></p> <p>1) The discovery of contaminated soils along the alignment during construction works shall be managed in accordance with VicRoads and EPA Guidelines.</p> <p>2) Where putrescible waste material is encountered the Superintendent and EPA shall be notified and a management strategy established to mitigate any potential risks to immediate .</p> <p>3) The Contractor shall undertake a visual assessment of the construction areas for contaminated soils and waste materials.</p> <p><u>Fuels and Chemicals</u></p> <p>1) CEMP to include specific procedures to minimise spillage of any fuels or chemicals and mitigate the effect in the event that leakages and spillages occur.</p> <p>2) Fuel, chemical and equipment storage areas shall be visually monitored at intervals of not more than 7 days to mitigate contamination in a timely manner.</p>	Moderate	Rare	Low	Additional measures may be required depending on the CEMP which would include: Appropriate procedures for containing spills and leaks should be contained Appropriate methods for cleaning up spills and leaks where safe to do so. If an uncontained spill or leak occurs during construction resulting in soil contamination, refer to management controls detailed in G1.	Insignificant	Rare	Negligible
Soils and Geology	G3	x	x	x	Runoff transports road contaminants offsite during operation.	<p>Contamination of waterways with hydrocarbons or heavy metals. Impacts on water resources, flora, fauna, and human health, including:</p> <ul style="list-style-type: none"> - Maintenance workers - General Public - Local Flora and Fauna <p>The following potential areas may be affected:</p> <ul style="list-style-type: none"> - Goodes Gully (Ch. 400) - Fiery Creek (Ch. 5900) - Middle Creek (Ch. 10600) - Charliecombe Creek (Ch. 12600, 14400 and 14700) - Billy Billy Creek (Ch. 18200 and 20800) - Hopkins River (Ch. 33800) - Greenhills Creek (Ch. 38300) 	Flora and Fauna Groundwater Surface Water	1200.11 and 1200.08	Water Sensitive Road Design measures would be evaluated for inclusion in the detailed design phase, as described in VicRoads Integrated Water Management Guidelines (August 2011).	Insignificant	Possible	Negligible		Insignificant	Possible	Negligible
Soils and Geology	G4	x	x	x	Excavation encounters unstable geological units or erosion prone areas. Geological units of Cambro-Ordovician origin may be more prone to erosional processes on exposure. The following potential areas may require specific consideration associated with Cambro-Ordovician geology: - Ch. 800 to 4000 - Ch. 12400 to 34200 - Ch. 38300 to 39600	<p>Instability exacerbates erosion or mass wasting impacts on safety, land and water resources. This risk may occur within areas subject to cuts, or steepening / excessive loading of existing slopes. Areas near watercourse may also be of concern.</p> <p>Materials demonstrating dispersive behaviour were observed along the alignment. Changes in prevailing topography / site geometry or exposure may result in accelerated soil loss due to loss of fines.</p>	Soils and Geology	1200.08	<p>Geotechnical investigations would be conducted prior to construction to assess nature of soils encountered along the alignment.</p> <p>Implement Erosion and Sediment Control Measures through an EMP, including but not limited to: minimising the amount of exposed erodible surfaces, installation of erosion and sedimentation control, prompt covering of exposed surfaces, progressive revegetation of the site, management of stockpiles and co-ordination to avoid works near watercourses.</p>	Moderate	Possible	Medium	Detailed design of cuts and final batter slopes to appropriately reflect the local geological and geotechnical conditions.	Minor	Possible	Low

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Soils and Geology	G5	x	x	x	Soft or compressible soils are present along proposed alignment. The following locations predominantly associated with alluvial sediments are highlighted: - Ch. 4200 to 6400 - Ch. 8600 to 9200 - Ch. 10300 to 10800 - Ch. 14300 to 14800 - Ch. 16400 to 16800 - Ch. 17400 to 18400 (high fill / grade separation) - Ch. 33200 to 33900 - Ch. 37600 to 38200	Construction of fill embankments or drawdown of groundwater induces ground settlement. This risk could occur at locations along the alignment characterised by soft fluvial sediments, being areas dominated by Quaternary age sediments. The more sensitive locations are within the vicinity of waterways, including the following significant watercourses: - Fieri Creek (Ch. 5900) - Middle Creek (Ch. 10600) - Charliecombe Creek (Ch. 12600, 14400 and 14700) - Billy Billy Creek (Ch. 18200 and 20800/21200) - Hopkins River (Ch. 33800) - Greenhills Creek (Ch. 38300)	Soils and Geology	1200.08	Geotechnical investigations would be conducted prior to construction to identify and assess the nature of soft or compressible soils, together with recommendations for construction. Such recommendations may include adopting a staged construction approach (allowing for dissipation of pore pressure and / or temporary surcharge loading) or treatment of existing subgrade soils.	Moderate	Possible	Medium	Project to implement a staged construction approach in the construction of fill embankments, allowing for dissipation of excess pore water pressures where soft soils are expected or known to exist. Subgrade treatment or improvement may be required in instances to control settlement of fills. Consider the identification of soft or compressible soils by using the proof roll of prepared subgrades to receive fill, together with in-situ density and bearing capacity tests, at an appropriate interval for the section of road being constructed.	Minor	Possible	Low
Soils and Geology	G6	x	x	x	Imbalance in the volume of suitable fill and the volume of excavated material. Areas requiring more significant volumes of cut and fill are identified in the following locations: - Ch. 1400 to 3000 (high cut volumes) - Ch. 4200 to 5200 (high fill / grade separation) - Ch. 17400 to 17800 (high fill / grade separation) - Ch. 23000 to 23600 (Option 1) (high fill volumes) - Ch. 24400 to 25200 (Option 2) (high cut volumes) - Ch. 25000 to 25800 (Option 1) (high cut volumes) - Ch. 33600 to 34000 (high cut volumes)	Imbalance of suitable cut-to-fill material during construction results in unplanned disposal of cut material off site, or sourcing of suitable additional material. Greater requirement for site won fill material results deeper cuts, larger exposed areas, and / or longer slope lengths	Soils and Geology		Earthworks are expected to be dominated by the need for fill above the natural surface to achieve drainage and greater flood control or grade separation. Fill material would be sourced from surplus materials from site, and additional sources including local quarries, borrow pits under arrangement between Contractors and local land owners. Road pavement materials would be sourced from appropriately licenced facilities. Surplus material that cannot be used on site would be re-used or disposed of in the following order of priority: 1. Transfer to nearby VicRoads projects for immediate use or to an approved VicRoads stockpile site for future use; 2. Transfer to an alternative VicRoads approved site for re-use on concurrent private/local government project; or 3. Disposal at an accredited materials recycling, waste disposal facility or borrow pit excavated during the construction phase to source additional fill material and licenced to receive waste materials.	Minor	Possible	Low	Assess likely earthworks volumes during design to optimise design solution (balance cut and fill where possible). Surplus material that cannot be used on site would be re-used or disposed of in the following order of priority: 1. Transfer to nearby VicRoads projects for immediate use or to an approved VicRoads stockpile site for future use; 2. Transfer to an alternative VicRoads approved site for re-use on concurrent private/local government project; or 3. Disposal at an accredited materials recycling or waste disposal facility or an approved borrow pit.	Minor	Possible	Low
Soils and Geology	G7	x	x	x	Construction intersects Acid Sulfate Soil/Rock, potential disturbance and exposure to air	The Project alignment options are not considered to be in a Potential Acid Sulfate Soil risk area. Sulphuric acid, iron, aluminium and heavy metal contamination. Potential impacts to ecology, human health, crops, infrastructure and property (through corrosion, iron precipitates, and/or subsidence).	Groundwater Social Economic Flora & Fauna Planning & Landuse Surface Water	1200.09		Moderate	Rare	Low	Soils suspected of being acid sulfate soils (ASS) are to be sampled and analysed to assess the ASS potential. In the event ASS are discovered an ASS Management Plan would be prepared.	Insignificant	Rare	Negligible
Soils and Geology	G8	x	x	x	Construction intersects historic gold mining works, including deep lead and shallow workings.	Construction on areas of shallow working may result in soil instability and ground subsidence. Construction near historic deep lead workings and shafts may result in ground subsidence or instability.	Soils and Geology	1200.08	Geotechnical investigations would be conducted prior to design and construction to identify the extent and nature of the historic mine workings.	Minor	Possible	Low	Project to implement a ground improvement programme for areas identified as having shallow workings. Such measures may include ground replacement, or reinforcement with geosynthetic materials. The control measures for mine shafts and deep lead mining will depend on numerous factors such as the depths and reinstatement methods adopted after the completion of the mining works.	Minor	Unlikely	Low
Groundwater	GW1	x	x	x	Cuts below water table along alignment, requiring dewatering	Construction dewatering results in unacceptable impact to other groundwater users, e.g. existing irrigators, stock and domestic users. (construction and/or operation).		1200.05	Implementation of a Groundwater Management Plan and Monitoring Program. Implementation of sediment control measures, and water disposal options.	Insignificant	Rare	Negligible		Insignificant	Rare	Negligible
Groundwater	GW2	x	x	x	Cuts below water table along alignment, requiring dewatering	Management of the recovered groundwater - erosion or water quality degrades receiving surface waterways (construction and/or operation).		1200.05 1200.08	Implementation of a Groundwater Management Plan and Monitoring Program. Implementation of sediment control measures, and water disposal options.	Insignificant	Rare	Negligible		Insignificant	Rare	Negligible
Groundwater	GW3	x	x	x	Cuts below water table along alignment, requiring dewatering	Dewatering / depressurisation consolidates compressible materials causing settlement and land instability. (construction and/or operation). Few built structures are in those area that are below the grade.	Soils and Geology		Implementation of a Groundwater Management Plan and Monitoring Program.	Minor	Unlikely	Low		Minor	Unlikely	Low

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Groundwater	GW4	x	x	x	Cuts below water table along alignment, requiring dewatering	Temporary construction dewatering adversely affects groundwater flow to Groundwater Dependent Ecosystems (GDEs). Cuts below grade that permanently result in change in groundwater flow regime. (construction and/or operation).	Surface Water Flora and Fauna	1200.05	Implementation of a Groundwater Management Plan and Monitoring Program.	Minor	Rare	Negligible		Minor	Rare	Negligible
Groundwater	GW5	x	x	x	Cuts below water table along alignment, requiring dewatering	Dewatering alters hydraulic gradients resulting in existing groundwater contamination plumes potentially being dislocated / moved. Interruption of existing groundwater remediation efforts.	Soils and Geology	1200.05 1200.09	A Groundwater Management Plan and Monitoring Program would be implemented. Management of Contaminated Soils and Materials: 1) The discovery of contaminated material on the site during works shall be managed in accordance with VicRoads and EPA Guidelines. 2) Where putrescible waste material is encountered the Superintendent and EPA shall be notified. 3) The Contractor shall undertake a visual assessment of the Site for contaminated soils and materials.	Minor	Rare	Negligible		Minor	Rare	Negligible
Groundwater	GW6	x	x	x	Cuts below water table along alignment, requiring dewatering	Potential generation of acid plumes / mobilisation of heavy metals / aggressive groundwater, leading to attack on submerged steel / concrete structures (piles, services)	Soils and Geology Planning and Landuse	1200.08	Management of construction dewatering (as per above). DSE Victorian Best Practice Guidelines for Assessing and Managing Coastal Acid Sulphate Soils.	Moderate	Rare	Low		Moderate	Rare	Low
Groundwater	GW7	x	x	x	Contamination of groundwater from construction activities, e.g. spillage, use of 'contaminated' fill material, construction waste management, hazardous materials handling.	Impact to groundwater quality/ breach of SEPP (Groundwater of Victoria). Potential to breach SEPP (Waters of Victoria). Impact to worker safety during construction.	Soils and Geology, Surface Water.	1200.09 1200.11	Contaminated Soils and Materials 1) The discovery of contaminated material on the site during works shall be managed in accordance with VicRoads and EPA Guidelines 2) Where putrescible waste material is encountered the Superintendent and EPA shall be notified. 3) The Contractor shall undertake a visual assessment of the Site for contaminated soils and materials Fuels and Chemicals 1) EMP to include specific procedures to minimise leakage or spillage of any fuels or chemicals, mitigate the effect. 2) Fuel and chemical storages and equipment fill areas shall be monitored at intervals of not more than 7 days.	Minor	Rare	Negligible		Minor	Rare	Negligible
Groundwater	GW8	x	x	x	Contamination of groundwater from operational activities (road runoff, traffic accidents, stormwater, spillage)	Impact to groundwater quality/ breach of SEPP (Groundwater of Victoria).	Soils and Geology, Surface Water	1200.05	Standard procedures for State Emergency Response, Country Fire Authority and Environmental Protection Authority.	Minor	Rare	Negligible		Minor	Rare	Negligible
Groundwater	GW9	x	x	x	Ponding and retention of water associated with highway drainage (operation)	New or increased groundwater accessions, altered groundwater flow patterns, new or exacerbated waterlogging and salinity impacts.	Soils and Geology Surface Water Economic		Water Sensitive Road Design measures would be evaluated for inclusion in the detailed design phase, as described in VicRoads Integrated Water Management Guidelines (August 2011).	Moderate	Rare	Low		Moderate	Rare	Low
Groundwater	GW10	x	x	x	Construction earthworks removing impervious layers (across site, floodplains, river crossings and embankments).	Site recharge enhanced increasing groundwater levels (water logging, groundwater displacement) and or introducing contaminants.		1200.05	Implementation of a groundwater management plan. River crossings duplicated consistent with CMA requirements.	Minor	Rare	Negligible	Earthwork surface finish / rehabilitation specifications to mitigate enhanced accessions.	Minor	Rare	Negligible
Groundwater	GW11	x	x	x	Construction works create impervious ground surface layers.	Reduced recharge to groundwater system.		1200.05	A Groundwater Management Plan and Monitoring Program would be implemented.	Minor	Possible	Low		Minor	Possible	Low
Groundwater	GW12	x	x	x	Project pipelines or service conduits constructed in saturated materials alter groundwater flow.	Buried services within the alignment located below the water table may create preferential groundwater seepage paths, and alter seepage migration routes. In shallow groundwater environments the resulting impact can be significant. Furthermore groundwaters (e.g. saline groundwater) may be aggressive to buried services.		1200.05	A Groundwater Management Plan and Monitoring Program would be implemented.	Insignificant	Possible	Negligible	Apply standard pipeline construction measures (trench cut off- or breakers) that mitigate risk process.	Insignificant	Possible	Negligible
Groundwater	GW13	x	x	x	Alignment of road passes through existing groundwater bore location (or farm dam) or severs access for stock or irrigation infrastructure.	Requirement to compensate groundwater user, install replacement bore (observation, stock, irrigation etc.) or replacement dam. Temporary loss of production.	Economic Social		Negotiation with asset owner	Insignificant	Rare	Negligible	Confirmation of bore locations (and operational status) within construction corridor / landholder consultation	Insignificant	Rare	Negligible
Groundwater	GW14	x	x	x	Use of groundwater for construction water supply.	Adverse impact to existing groundwater users, environment.			Southern Rural Water extraction licensing process	Insignificant	Rare	Negligible		Insignificant	Rare	Negligible

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Groundwater	GW15	x	x	x	Shallow groundwater or rising water tables	Rising water and/or precipitation of salts can damage road pavements.	Road design		Adequate road (under) drainage. Understanding of conditions of existing road i.e. correlations from existing behaviour.	Insufficient	Rare	Negligible		Insufficient	Rare	Negligible
Planning and Landuse	PLU1	x	x	x	The Project affects existing infrastructure (including wind farm infrastructure) or utility services, including fibre optic cables, overhead electricity lines, underground water pipelines, and the Ararat-Ballarat Railway line	The safe and efficient operation or maintenance of the utility or infrastructure is disrupted during construction, with services being located realigned along the new carriage way or median, affecting continued service, and ongoing ability to safely maintain the utility. Whilst Option 2 extends within the Chalcicum Hills Wind Farm property, it does not impact on existing infrastructure.	Social Socio-Economic	1140.02 1140.03	Relocation of the assets would be undertaken in accordance with provider requirements consistent with 1140.02 and 1140.03 of VicRoads Contract Shell. Preference is to keep assets within the road reserve. Easements would be sought in private property as necessary.	Minor	Almost Certain	Medium		Minor	Almost Certain	Medium
Planning and Landuse	PLU2	x			Potential impact on short term and longer term use of land for farming / agricultural purposes activities resulting from acquisition and potential for land use change	Acquisition would be limited to the edge of property boundaries where possible, but some areas of land will be separated from the balance of the title due to the new freeway at Property Nos. 1106, 1295, 1296, 1314, 1483, 1491, 1506, 1504, 1505, 1517, 1519, 1516, and 1523. In each of these instances, the severed parcels of land would no longer be viable to graze without mitigations measures in place.	Social Economic		-	Moderate	Almost Certain	High	Alteration of access arrangements, where appropriate Compensation for the loss of land where necessary. Consolidation of allotments where possible	Minor	Almost Certain	Medium
Planning and Landuse	PLU3		x		Potential impact on short term and longer term use of land for farming / agricultural purposes activities resulting from acquisition and potential for land use change	Acquisition would be limited to the edge of property boundaries where possible, but some areas of land will be separated from the balance of the title due to the new freeway at Property Nos. 1106, 1295, 1296, 1297, 1439, 1440, 1443, 1460, 1459, 1499 and 1503. In each of these instances, the severed parcels of land would no longer be viable to graze without mitigations measures in place. Property Nos. 1496, 1497, 1498 have been developed for a residence and would be wholly acquired for the purposes of Option 2.	Economic Social		-	Moderate	Almost Certain	High	Alteration of access arrangements, where appropriate Compensation for the loss of land where necessary. Consolidation of allotments where possible	Minor	Almost Certain	Medium
Planning and Landuse	PLU4			x	Potential impact on short term and longer term use of land for farming / agricultural purposes activities resulting from acquisition and potential for land use change	Acquisition would be limited to the edge of property boundaries where possible, but some areas of land will be separated from the balance of the title due to the new freeway at Property Nos. 1106, 1295, 1296, 1310, 1314. 1483, 1499, 1491, 1499 and 1503, in each of these instances, the severed parcels of land would no longer be viable to graze without mitigations measures in place.	Economic Social		-	Moderate	Almost Certain	High	Alteration of access arrangements, where appropriate Compensation for the loss of land where necessary Consolidation of allotments where possible	Minor	Almost Certain	Medium
Planning and Landuse	PLU5	x	x	x	Potential for inconsistency with planning policies and schemes including the Pyrenees and Ararat Planning Schemes	The Project would result in severance of some land parcels smaller than the minimum lot sizes and loss of native vegetation, including habitat corridors. The importance of the Western Highway is recognised as a major freight / arterial route through both the Pyrenees and Ararat Councils. Accordingly, access and connectivity along the highway should be maintained. The Bypass of Buangor has the potential to improve amenity of the town and attract future growth. The potential construction of the freeway to the north of the town could result in requests to rezone land on the northern side of the highway from a farming to township zone.	Economic Social		Clause 22.01 of the Pyrenees Planning Scheme provides requirements for land capability requirements for use of land.	Moderate	Likely	High	Where the small size of the allotment affects the agricultural viability of the land, or the ability to develop a dwelling on the lot consistent with the zoning or Council policy, consider consolidation with adjoining lots. Any necessary compensation can be managed via the <i>Land Acquisition and Compensation Act 1986</i>	Minor	Likely	Medium
Noise and Vibration	N1	x	x	x	Daytime construction of Western Highway at an individual sensitive receptor. Normal working hours under EPA Publication 1254 - Guidelines for Noise Control (2008) are: * 7 am -6 pm Monday to Friday * 7 am -1 pm Saturdays	Noise disturbance at a dwelling or other sensitive receiver. There are no limiting noise criteria for the daytime period, however there is still a duty to minimise noise impacts on the surrounding environment.	Flora and Fauna Economic Social	1150.01 (Timing) 1200.12 (Noise)	* Limit noise production through use of noise reduction technology on machinery. * Enclosing machinery where possible. * Use of smart movement alarms (alternatives to 'beeper' alarms) and construction noise monitoring. * Construction noise shall be monitored where its impact is likely to create substantial nuisance or inconvenience to sensitive receivers. * Scheduling work during normal daylight hours to meet the following requirements: (a) no work shall be carried out on any Sunday, public holiday, between Good Friday and Easter Monday inclusive, or during the Christmas to New Year period; (b) no work shall be carried out on the Site outside the period between 7 am or sunrise, whichever is the later, and 6 pm or sunset, whichever is the earlier.	Insufficient	Rare	Negligible	Contractor to implement a communication strategy with the key stakeholders and the community to manage the impacts of construction noise and limit disturbance to local amenity. Contractor to implement a noise mitigation strategy for construction activities with consideration to the EPA Publication 480 - Environmental Guidelines for Major Construction Sites (1996) and EPA Publication 1254 - Guidelines for Noise Control (2008), as well as, referring to 'Typical Construction Plant and Equipment Noise Attenuation Over Distance' table, contained in the EES Noise Impact Assessment report (GHD, 2011x).	Insufficient	Rare	Negligible

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Noise and Vibration	N2	x	x	x	Daytime construction of Western Highway near sensitive receivers (i.e. more than one receiver) in a local area (community) such as: *Mckinnon Lane, Beaufort (Chainage 800 - 1,000) *Woodnaggerak/Middle Creek Road Community, Middle Creek (Chainage 10,400 - 12,800) *Buangor Township, Between Andersons/Gravel Route Roads, Buangor (Chainage 16,400 - 20,000) *Geelong Road Community, Ararat (Chainage 35,200 - 40,400)	Noise disturbance within the local community, dwellings or other sensitive receivers. There are no limiting noise criteria for the daytime period, however there is still a duty to minimise noise impacts on the surrounding environment.	Flora and Fauna Economic Social	1150.01 (Timing) 1200.12 (Noise)	As for Risk N1	Insignificant	Rare	Negligible	As for Risk N1	Insignificant	Rare	Negligible
Noise and Vibration	N3	x	x	x	Evening construction of Western Highway Evening hours as laid out in the EPA Publication 1254 are as follows: * 6 pm -10 pm Monday to Friday * 1 pm -10 pm Saturdays * 7 am -10 pm Sundays and public holidays	Noise disturbance within the local community, dwellings or other sensitive receptors, including individual receptors. If evening works are required EPA Publication 1254 - Guidelines for Noise Control (2008) will apply.	Flora and Fauna Economic Social	1150.01 (Timing) 1200.12 (Noise)	As for Risk N1, and Evening and weekend works may occur at certain stages during the Project. If the contractor is required to undertake work during evening or weekend times, this would need to be approved by the VicRoads Superintendent. A condition of VicRoads approval would be that all relevant stakeholders are consulted including nearby residents. In the event that it becomes apparent that the working hours are to be exceeded by more than 30 minutes, or work is required out of hours in an emergency, the Contractor shall have a process in place that would immediately: • notify and obtain approval from the Superintendent; • where required by the Superintendent, notify the Environment Protection Authority; and • advise surrounding property owners/occupiers that would be disturbed by any activity.	Moderate	Possible	Medium	As for Risk N1, and Should 'Unavoidable Works' be required for evening or night time work, then where possible section 5.2.2 (b) & (c) of the Vic Roads Noise Guidelines - Construction and Maintenance Works 2007 should be adhered to.	Moderate	Rare	Low
Noise and Vibration	N4	x	x	x	Night time construction of Western Highway The night period as laid out in the EPA Publication 1254 is as follows: * 10 pm -7 am Monday to Sunday	Noise disturbance within the local community, dwellings or other sensitive receptors, including individual receptors. If night time works are required EPA Publication 1254 - Guidelines for Noise Control (2008) will apply. Noise is to be inaudible within a habitable room of any residential premises.	Flora and Fauna Economic Social	1150.01 (Timing) 1200.12 (Noise)	As for Risk N1, and Night works are not expected to be required for the Project. If the contractor is required to undertake work during night time, this would need to be approved by VicRoads. A condition of VicRoads approval would be that all relevant stakeholders are consulted including nearby residents. In the event that it becomes apparent that the working hours are to be exceeded by more than 30 minutes, or work is required out of hours in an emergency, the Contractor shall have a process in place that would immediately: • notify and obtain approval from the Superintendent; • where required by the Superintendent, notify the Environment Protection Authority; and • advise surrounding property owners/occupiers that would be disturbed by any activity.	Moderate	Unlikely	Medium	As for Risk N3	Moderate	Rare	Low
Noise and Vibration	N5	x	x	x	Site compounds and laydown areas during construction	Noise disturbance within the local community, dwellings or other sensitive receptors, including individual receptors. There are no limiting noise criteria for the daytime period, however there is still a duty to minimise noise impacts on the surrounding environment. If evening weekend or night time works are required EPA Publication 1254 - Guidelines for Noise Control (2008) will apply.	Flora and Fauna Economic Social	1150.01 (Timing) 1200.12 (Noise)	As for Risk N1, and Contractor to locate site compounds away from sensitive receivers and limit noise as much as practicable. Evening and weekend works may occur at certain stages during the Project. If the contractor is required to undertake work during evening or weekend times at the site compound, this would need to be approved by VicRoads. A condition of VicRoads approval would be that all relevant stakeholders are consulted including nearby residents. In the event that it becomes apparent that the working hours are to be exceeded by more than 30 minutes, or work is required out of hours in an emergency, the Contractor shall have a process in place that would immediately: • notify and obtain approval from the Superintendent; • where required by the Superintendent, notify the Environment Protection Authority; and • advise surrounding property owners/occupiers that would be disturbed by any activity.	Moderate	Possible	Medium	As for Risk N3	Moderate	Rare	Low

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Noise and Vibration	N6	x	x	x	Vibration caused by construction of Western Highway	<p>Vibration disturbance within the local community, dwellings or other sensitive receptors, including individual receptors.</p> <p>The magnitude of ground vibrations is not expected to be sufficient to cause structural damage, as defined by the DIN 4150-3 criteria.</p> <p>No significant vibration impacts are expected, however vibration may be just perceptible at residences within 50 m (as described in Table 28 in the Noise and Vibration Impact Assessment Report) for construction activities involving rolling and compacting. The vibration from rolling and compacting activities would be considered intermittent and short-term.</p>	Flora and Fauna Economic Social	1150.01 (Timing) 1150.04 (Vibration)	<p>The Contractor shall employ construction methods that minimise ground vibrations near existing buildings, structures, rail infrastructure and overhead and underground services. Ground particle velocities shall be measured by the Contractor immediately adjacent to any building, structure, rail infrastructure or utility service which might be damaged by vibrations.</p> <p>The Contractor shall bear all costs associated with any claim for damages resulting from the effects of ground vibration attributable to the Contractor's construction methods or work.</p>	Moderate	Possible	Medium	<p>If construction works causing vibration are required within 50 m of a sensitive receiver (building) a construction vibration assessment should be undertaken prior to works being carried out and appropriate methods of construction employed to minimise impacts.</p> <p>Timing of the works to be conducted during the recommended operational hours, to reduce vibration levels to residential properties. Residents to be made aware of the construction times and the duration they would likely be affected, through letterbox drops, personal meetings and community meetings.</p> <p>Residents to be pre-warned of high vibration events (e.g. piling operations), and any operations being undertaken outside recommended hours. Public notification should be given a minimum of 72 hours prior to planned works.</p> <p>As a precaution the contractor should undertake a dilapidation survey for any buildings, structures or utilities located within 50 m of construction works.</p> <p>Equipment operators to be made aware of potential vibration issues problems and of techniques to minimise vibration effects during construction works.</p>	Moderate	Rare	Low
Noise and Vibration	N7	x	x	x	<p>Operation of the Western Highway generates noise emissions from vehicular traffic</p> <p>Areas where the VicRoad Traffic Noise Reduction Policy 2005 Applies</p>	<p>Noise disturbance within the local community, dwellings or other sensitive receptors, including individual receptors.</p> <p>Locations Where Policy Applies: Sections where both alignments are located outside the existing road reserve, described in Section 3.2.2 in the Noise and Vibration Impact Assessment Report (GHD 2012x).</p>	Flora and Fauna Economic Social	VicRoads Traffic Noise Reduction Policy 2005	<p>Limit potential noise production during design stage through the use of alignment shifts, pavement materials, speed limits and other such items as required.</p> <p>VicRoads Traffic Noise Reduction Policy 2005 Noise attenuation would be considered for sensitive receptors that exceed 63 dB(A) (and the Policy is found to apply) Consideration for retrofitting (e.g. double glazed windows, barriers) would be given where noise levels at sensitive receptors exceed 68 dB(A) (and the Policy is found to apply).</p>	Insignificant	Rare	Negligible	Where a "new alignment" as described in the VicRoads Traffic Noise Reduction Policy (2005) is constructed (and the Policy is found to apply), noise monitoring to ensure compliance with the policies noise level objectives for Category A and B sensitive receptors should be carried out. Where the noise criteria outlined in the Traffic Noise Reduction Policy (2005) are exceeded, mitigation works as outlined in the policy should be carried out as required.	Insignificant	Rare	Negligible
Noise and Vibration	N8	x	x	x	<p>Operation of the Western Highway generates noise emissions from vehicular traffic.</p> <p>Areas where the VicRoads Traffic Noise Reduction Policy 2005 Does Not Apply.</p>	<p>Noise disturbance within the local community, dwellings or other sensitive receptors, including individual receptors.</p> <p>Locations Where Policy Does Not Apply: Sections where either one or both alignments are located inside the existing road reserve, described in Section 3.2.2 in the Noise and Vibration Impact Assessment Report (GHD 2012x).</p>	Flora and Fauna Economic Social		<p>Limit potential noise production during design stage through the use of alignment shifts, pavement materials, speed limits and other such items as required.</p>	Insignificant	Rare	Negligible		Insignificant	Rare	Negligible
Social	S1	x	x	x	The Project may lead to changes to the existing social and community conditions by creating pressures for the settlement pattern to change.	There are two locations where dwellings are clustered: at Woodnaggerak and Buangor. The project is unlikely to affect any change on this settlement pattern, particularly since it mostly follows the existing alignment. However, it may encourage the long-term growth potential for Buangor to grow as a town. Currently it has very limited growth potential, but improving amenity and safety in the town by removing through traffic may increase demand for properties in this locality. This possibility is off-set by planning scheme provisions which do not encourage increased residential development in the area.			This is controlled by the local planning scheme.	Insignificant	Possible	Negligible	Council may need to consider the implications of the project for their strategic planning processes.	Insignificant	Unlikely	Negligible
Social	S2	x		x	The Project may lead to changes to the existing social and community conditions by changing the distribution of residents in the vicinity of the Highway.	<p>The existing community is very low-density and mostly in long-established dwellings. It is unlikely that any residents would specifically move away due to the project, apart from the residents of two dwellings (Ch. 14500 and Ch. 24200) that would be acquired (Option 1).</p> <p>The project may influence future decisions on locations of dwellings, however this is unlikely to have an adverse outcome.</p>			This is controlled by the local planning scheme.	Minor	Possible	Low		Minor	Possible	Low

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Social	53		x		The Project may lead to changes to the existing social and community conditions by changing the distribution of residents in the vicinity of the Highway.	The existing community is very low-density and mostly in long-established dwellings. It is unlikely that any residents would specifically move away due to the project. The project may influence future decisions on locations of dwellings, however this is unlikely to have an adverse outcome.			This is controlled by the local planning scheme.	Minor	Possible	Low		Minor	Possible	Low
Social	54	x	x	x	The Project may change the existing social and community conditions by creating change processes which affect the demographic characteristics of the Study Area.	The Project could lead to increased demand for properties from people seeking a rural lifestyle, due to decreased travel times from major centres. If this led to population change it would change the demographic characteristics of the community. Based on planning policies to protect agricultural land for farming, this would be seen as an undesirable change.			This is a long-term potential outcome of the project. The appropriate control is the planning schemes.	Insignificant	Possible	Negligible	No additional control is necessary for VicRoads.	Insignificant	Unlikely	Negligible
Social	55	x	x	x	The Project and changes to access arrangements may lead to changes to the existing social and community conditions by changing patterns of community interaction and use of social foci.	The main location for community interaction is Buangor. Social foci include the Sports ground, Cobb and Co building, the primary school and the hotel. These facilities serve the surrounding rural community as well as the hamlet. It is unlikely that either option for the Project in this locality would have a negative impact on access to, and use of, these facilities. It is more likely that removing through traffic through the town would be seen as a social benefit from the project. Woodnaggerak Homestead is seen as an important locality amongst the local community; there used to be a primary school, church and other community facilities in that locality. While these facilities are now gone, Woodnaggerak is still seen as an important to the identity of the local community. Any negative impact on this locality may be seen as a negative outcome by the local community.	Historical Heritage		Consultation with Council and the local community has been undertaken during the planning for this project to determine access requirements.	Insignificant	Possible	Negligible	Buangor: VicRoads could maximise the social benefit in this location by re-designing the road through Buangor as a local road which provides good access to the local community facilities. Council could be involved in this process. Safe access to the sports facilities and the primary school by children should be encouraged.	Insignificant	Rare	Negligible
Social	56	x	x	x	The Project may affect local residents and communities during the construction stage.	Reduced amenity for adjacent residents from construction activities, including: increased traffic noise, visual impact, and property access interruptions during construction. There are several locations along the project route where this may occur. The sites of highest sensitivity are Woodnaggerak and Buangor.	Noise Air Visual	1200.07 1200.12 1150.01 1210.01	Construction Management controls described in VicRoads Contract Shell DC1 document. This includes relevant Air Quality, Geology (Contamination), Noise, and Traffic controls described in Risks A1, G2, G5, N3, T1. The CEMP will have protocols for liaising with adjacent land owners, to keep them fully informed about construction activities in their area, and any potential disruption to their access and amenity.	Minor	Almost Certain	Medium		Minor	Almost Certain	Medium
Social	57	x	x	x	The Project may lead to effects on places with particular cultural, recreational or aesthetic values, particularly with regard to significant regional locations.	There are three locations in Section 2 which have cultural value: the Major Mitchell historical marker, the Woodnaggerak homestead and surrounds and the Cobb and Co building in Buangor. The recreation reserve in Buangor has recreational value. Of these, the two sites which face some risk are the Major Mitchell marker (see the heritage report) and Woodnaggerak. Both options would avoid the Cobb and Co building and the recreation reserve. Option 1 offers more scope for extension of the recreation reserve than Option 2. There is a slight risk that the amenity in that location may be affected by the changed noise environment. However, it is more likely that the community would perceive the reduction of traffic on the existing highway as being of benefit, and the two effects would counter-balance each other.	Social Historical Heritage Visual		The project is being designed to minimise impact at the Woodnaggerak homestead site. The alignments avoid the Major Mitchell historical marker and the Cobb and Co building.	Minor	Unlikely	Low	Woodnaggerak: the control in this locality for VicRoads is to avoid any impact on the areas where previous community facilities were located. Council may choose to undertake a heritage listing for the Woodnaggerak site where sites are identified which more fully documents the social history of the locality and its importance to the local community. The existing highway could be redeveloped to make the environment around the Cobb and Co building and recreation reserve more attractive and hence enhance the amenity if possible. The new alignment should be designed to minimise noise impacts at the recreation reserve.	Insignificant	Unlikely	Negligible
Social	58	x	x	x	The Project may create a risk of dislocation for individuals and communities.	Two dwellings would be acquired and demolished in Option 1 (Property ID 1317 (Ch. 14500) and Property ID 1438 (Ch. 24200)) and three dwellings would be acquired and demolished in Option 2 (Property ID 1316 (Ch. 19200), Property ID 1317 (Ch. 14500), Property ID 1498 (Ch. 24200)). Some other properties risk being severed to a size that is smaller than 40 hectares, which would mean the owners may not obtain a planning approval to build a house. This risk links back to S1 and the risk of change to settlement patterns.	Landscape and Visual		The impacts of property acquisition will be managed in accordance with the <i>Land Acquisition and Compensation Act 1986</i> .	Minor	Almost Certain	Medium	There does not appear to be any way to reduce the number of dwellings which will need to be acquired. Where properties are severed to an unworkable size, VicRoads should work with landowners and Council to determine appropriate solutions. It may be possible for Council to give special consideration in its application of planning scheme provisions in some circumstances.	Minor	Almost Certain	Medium
Social	59	x	x	x	The Project may create a risk of severance and accessibility changes for individuals and communities	Most existing access ways will be changed by the project, particularly in the areas where the highway is upgraded to Freeway standard. Existing access points on to the highway will be removed. Some side roads may have restricted access and egress. In Buangor, the existing highway will become downgraded to a local road. Longer distances will be required to access some properties from the new road. Access to community facilities and focal points will not be adversely affected by the project. Any psychological severance will depend on the changes to local connectivity, which are expected to be minor if not better.			Service roads are required for a Freeway Standard road and have been included in the project developed for initial assessment in the EES to maintain all property access.	Minor	Likely	Medium	It may be appropriate to re-design the existing highway through Buangor to a local access road, however that is not part of the current design. Good access to Buangor should be maintained.	Minor	Possible	Low

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Social	S10	x	x	x	The Project may create risks of reduction of amenity (in relation to visual amenity, noise other changes to the character of the area) to individuals and communities.	One dwelling at Ch. 10700 will have a new service road close to the front of the dwelling.				Minor	Likely	Medium		Minor	Likely	Medium
Social	S11		x		The Project may create risks of reduction of amenity (in relation to visual amenity, noise other changes to the character of the area) to individuals and communities.	One house would have a new freeway and access ramps relatively close (On Buangor-Ben Nevis Road at Chainage 19100). This would be a significant negative impact for the owners of this dwelling, especially as the project would be constructed on a high embankment, which would block views and leave the residents feeling isolated from the rest of Buangor. One dwelling at Hillside Extension Road (Ch. 24500) would be 'islanded' by new road. This would be a significantly negative outcome, especially since the roads would all be built up around the house. This may leave the residents feeling 'surrounded' and isolated.				Minor	Likely	Medium	The control is option selection and detailed design. Acquisition of the properties in question could also be considered. Selection of Option 1 would prevent these impacts from occurring. If Option 2 is selected, the detailed design should aim to minimise the long-term negative impact at these locations. Otherwise, consideration could be given to acquiring these properties in total, so that the owners can relocate, depending on their preference.	Minor	Possible	Low
Social	S12			x	The Project may create risks of reduction of amenity (in relation to visual amenity, noise other changes to the character of the area) to individuals and communities.	One dwelling at Hillside Extension Road (Ch. 24500) would be very close to the new road. This would be a negative outcome in terms of amenity at that location.				Minor	Likely	Medium	Selection of Option 1 would prevent these impacts from occurring. If Option 2 is selected, the detailed design should aim to minimise the long-term negative impact at these locations. Otherwise, consideration could be given to acquiring these properties in total, so that the owners can relocate, depending on their preference.	Minor	Possible	Low
Surface Water	SW1A	x	x	x	Construction activities at Hopkins River and Billy Billy Creek at Ch.18200 resulting in disturbance of channel planform, geometry and river health values.	Local destabilisation of waterway banks, channel profile and pools. Reduction in aquatic and terrestrial habitat value in the vicinity of the crossing location.	Flora and Fauna		Reinstatement of waterway in accordance with GHCMA requirements (channel profile, floodplain revegetation).	Minor	Almost Certain	Medium	Construction of bed control and/or bank protection works to protect vulnerable areas within or adjacent to the work area.	Minor	Possible	Low
Surface Water	SW1B	x	x	x	Construction activities on Billy Billy Creek at Ch. 20950 and Charliecombe Creek at Ch. 14400 & 14700 resulting in disturbance of channel planform, geometry and river health values.	Service road overlays 250 m of waterway banks, channel profile and pools. Reduction in aquatic and terrestrial habitat value in the vicinity of the crossing location.	Flora and Fauna		Reinstatement of waterway in accordance with GHCMA requirements (channel profile, floodplain revegetation); avoid unnecessary work in channel.	Minor	Almost Certain	Medium	Partial realignment of waterway to limit the length of waterway beneath carriageways or construction of realignment of service road to cross at more perpendicular angle.	Insignificant	Almost Certain	Low
Surface Water	SW1C	x	x	x	Construction activities on crossings of all other named waterways resulting in disturbance of channel planform, geometry and river health values.	Local destabilisation of waterway banks, channel profile and pools. Reduction in aquatic and terrestrial habitat value in the vicinity of the crossing location.	Flora and Fauna		Reinstatement of waterway in accordance with GHCMA requirements (channel profile, floodplain revegetation); avoid unnecessary work in channel.	Minor	Almost Certain	Medium	Construction of bed control and/or bank protection works to protect vulnerable areas within or adjacent to the work area.	Minor	Possible	Low
Surface Water	SW1D	x	x	x	Construction activities on all other waterways resulting in disturbance of channel planform, geometry and/or river health values.	Local disturbance or destabilisation of waterway banks and channel profile. Reduction in aquatic and terrestrial habitat value in the vicinity of the crossing location.	Flora and Fauna		Reinstatement of waterway in accordance with GHCMA requirements (channel profile, floodplain revegetation); avoid unnecessary work in channel.	Insignificant	Almost Certain	Low	Construction of bed control and/or bank protection works to protect vulnerable areas within or adjacent to the work area.	Insignificant	Unlikely	Negligible
Surface Water	SW2	x	x	x	Construction of the Western Highway results in the reduction in the hydraulic capacity at crossing locations.	Increased erosion potential due to the concentration of flow through a culvert or beneath a bridge.	Flora and Fauna		Appropriate design standards (e.g. adequately sized culverts, rock protection to stabilise waterway bed and banks at the crossing location if required).	Moderate	Rare	Low		Moderate	Rare	Low
Surface Water	SW3A	x	x	x	Construction of the crossing at Billy Billy Creek at Ch. 18200 results in fragmentation of river health values at crossing locations.	Restrictions to aquatic and terrestrial fauna movement, impediments to future waterway and catchment rehabilitation efforts.	Flora and Fauna		Road to cross main channel, designed from a flood perspective only.	Moderate	Possible	Medium	Appropriate design standards (e.g. culvert sized appropriately and set at bed level of waterway or span bridge where required, adequate light penetration to encourage fish passage where applicable).	Moderate	Rare	Low
Surface Water	SW3B	x	x	x	Construction of the Western Highway results in fragmentation of river health values at crossing locations.	Restrictions to aquatic and terrestrial fauna movement, impediments to future waterway and catchment rehabilitation efforts.	Flora and Fauna		Duplication of existing road crossing type where applicable.	Minor	Unlikely	Low	Appropriate design standards (e.g. culvert sized appropriately and set at bed level of waterway or span bridge where required, adequate light penetration to encourage fish passage where applicable).	Minor	Rare	Negligible

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Surface Water	SW4A	x	x	x	Construction activities result in increased sediment and contaminant loadings to Hopkins River and Billy Billy Creek at Ch. 18200.	Degradation of water quality in receiving waterways, impact on aquatic ecosystems.	Flora and Fauna	1200.08	Implement Erosion and Sediment Control Measures and SEPP WOV requirements for receiving waterways through an EMP, including but not limited to: minimising the amount of exposed erodible surfaces, installation of erosion and sedimentation control, prompt covering of exposed surfaces, progressive revegetation of the site, management of stockpiles and co-ordination to avoid works near watercourses.	Moderate	Unlikely	Medium	Increase design standard for erosion control measures from 1 in 2 year ARI to 1 in 10 year ARI.	Moderate	Rare	Low
Surface Water	SW4B	x	x	x	Construction activities result in increased sediment and contaminant loadings to all other named waterways.	Degradation of water quality in receiving waterways, impact on aquatic ecosystems.	Flora and Fauna	1200.08	Implement Erosion and Sediment Control Measures and SEPP requirements for receiving waterways through an EMP, including but not limited to: minimising the amount of exposed erodible surfaces, installation of erosion and sedimentation control, prompt covering of exposed surfaces, progressive revegetation of the site, management of stockpiles and co-ordination to avoid works near watercourses.	Minor	Unlikely	Low		Minor	Unlikely	Low
Surface Water	SW4C	x	x	x	Construction activities result in increased sediment and contaminant loadings to all other waterways.	Degradation of water quality in receiving waterways, impact on aquatic ecosystems.	Flora and Fauna	1200.08	Implement Erosion and Sediment Control Measures and SEPP requirements for receiving waterways through an EMP, including but not limited to: minimising the amount of exposed erodible surfaces, installation of erosion and sedimentation control, prompt covering of exposed surfaces, progressive revegetation of the site, management of stockpiles and co-ordination to avoid works near watercourses.	Insignificant	Unlikely	Negligible		Insignificant	Unlikely	Negligible
Surface Water	SW5A	x	x	x	Operation of the Western Highway road surface results in increased stormwater, sediment and contaminant loadings to Hopkins River and Billy Billy Creek at Ch. 18200.	Increase in quantity of stormwater runoff compared to the existing flow regime. Degradation of water quality in receiving waterways, impact on aquatic ecosystems.	Flora and Fauna		Water Sensitive Road Design measures would be evaluated for inclusion in the detailed design phase, as described in VicRoads Integrated Water Management Guidelines (August 2011). SEPP objectives for water quality met.	Moderate	Rare	Low		Moderate	Rare	Low
Surface Water	SW5B	x	x	x	Operation of the Western Highway road surface results in increased stormwater, sediment and contaminant loadings to all other named waterways.	Increase in quantity of stormwater runoff compared to the existing flow regime. Degradation of water quality in receiving waterways, impact on aquatic ecosystems.	Flora and Fauna		Water Sensitive Road Design measures would be evaluated for inclusion in the detailed design phase, as described in VicRoads Integrated Water Management Guidelines (August 2011). SEPP objectives for water quality met.	Minor	Rare	Negligible		Minor	Rare	Negligible
Surface Water	SW5C	x	x	x	Operation of the Western Highway road surface results in increased stormwater, sediment and contaminant loadings to all other waterways.	Increase in quantity of stormwater runoff compared to the existing flow regime. Degradation of water quality in receiving waterways, impact on aquatic ecosystems.	Flora and Fauna		Water Sensitive Road Design measures would be evaluated for inclusion in the detailed design phase, as described in VicRoads Integrated Water Management Guidelines (August 2011). SEPP objectives for water quality met.	Insignificant	Rare	Negligible		Insignificant	Rare	Negligible
Surface Water	SW6B	x	x	x	Construction of the Western Highway results in changes to the floodplain characteristics for [Minor flood risk]	Increased afflux and extent of upstream flooding and/or redistribution of flows or local drainage results in a slight increase in flooding at a rural scale.	Social		Appropriate design standards to achieve highway flood risk requirements (e.g. adequately sized culverts or bridge spans where required).	Minor	Almost Certain	Medium	Compensation works for loss of floodplain storage where required. Redesign highway bridge structure to increase waterway passing flow capacity.	Insignificant	Possible	Negligible
Traffic and Transport	T1	x	x	x	Changed road environment during construction results in general reduction to road safety. Examples of road environment changes include heavy vehicles entering/exiting construction accesses, additional or closer roadside hazards, variable speed limits, unfamiliar conditions. Impacted road users include private vehicles, public transport, school buses, cyclists and pedestrians.	Increased incidence of accidents that one or more incident may result in a fatality.	Social	1160 1180	Traffic Management Plans (TMPs) would be prepared to identify, assess and appropriately eliminate, reduce or mitigate road safety hazards and to be reviewed by VicRoads prior to implementation. TMPs to comply with standard VicRoads practices, the Traffic Management Code of Practice and the Road Management Act 2004. Examples include: speed reduction where appropriate, worksite safety barriers, advance warning signage, hazard visibility, etc. Road Safety Audits (RSAs) to be undertaken on TMPs. Project Description stipulates that construction vehicles would not typically use local roads.	Catastrophic	Unlikely	High	Haulage routes for construction traffic and heavy vehicles to be appropriately designated and managed as part of TMPs, with consideration for safety. Implement a communication strategy with the key stakeholders to manage impacts, and inform road users and the community	Catastrophic	Rare	Medium

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Traffic and Transport	T2	x	x	x	<p>Changed road environment during construction results in general reduction to performance and efficiency of travel modes.</p> <p>Examples of road environment changes include speed reductions, works resulting in temporary road or lane closures or cumulative impacts of the simultaneous construction of three sections of Western Highway.</p> <p>Impacted users can include private vehicles, public transport, school buses, emergency services, cyclists, pedestrians and rail.</p>	Increased disruption or displacement of road users, and increased travel time and/or distance.	Social Economic Planning & Landuse	1160 1180	<p>TMPs prepared to identify, assess and appropriately minimise likely impacts on road operations. These will comply with standard VicRoads practices, the Traffic Management Code of Practice and the Road Management Act 2004.</p> <p>Road Safety Audits (RSAs) to be undertaken on TMPs.</p> <p>Buses would be provided for rail users in the event that rail operations are temporarily suspended (in consultation with PTV, bus and rail operators).</p>	Moderate	Likely	High	<p>Construction to be staged to allow one carriageway to be operational at all times and traffic flow not to be stopped for any extended period of time.</p> <p>Consideration of non-motorised road users (ensuring connectivity is not removed), public transport, school buses, emergency services and rail interfaces. This would include:</p> <ul style="list-style-type: none"> * Local community, Department of Transport and other relevant stakeholders (such as transport operators) consulted and informed of likely disruption due to construction, including impacts to public transport and school bus services. * Haulage routes for construction traffic and heavy vehicles appropriately designated and managed as part of TMPs, with consideration for road operations. <p>* Impact on travel times as a result of TMP implementation to be analysed prior to, and assessed during, construction. Implementation of alternative TMP measures to be considered during construction if impacts on operations are determined to be unacceptable.</p> <p>* Where possible schedule construction works to minimise the impacts at public holidays, school holidays or other times when Western Highway would reasonably be expected to experience higher levels of demand and to minimise impacts on key user groups.</p> <p>* Communication between construction teams from each section and integration of Traffic Management Strategies.</p>	Minor	Likely	Medium
Traffic and Transport	T3	x	x	x	<p>The duplication disrupts/severs local access routes including cyclist connectivity post-construction (interim and ultimate operation).</p>	<p>Economic and social disruption through increased travel times and reduces accessibility.</p> <p>Vehicle traffic, public transport, school buses, emergency services, cyclists, pedestrians, rail crossings and private accesses affected</p>	Social Economic		<p>Although local access travel distances and times may be longer, the design generally maintains access to side roads and properties during the interim and ultimate solutions. Access in the interim is via wide median treatments and 'left-in' and 'left-out' access.</p> <p>While access in the ultimate is via service roads, except for a 5.6 km section from the Hopkins River to Heath Street constructed to AMP3 standard. For this section direct access is maintained through wide median treatments, and left-in / left-out only treatments</p>	Minor	Likely	Medium	<p>Local community and stakeholders to be engaged and informed of positive project outcomes as part of broader community consultation process to address perceptions of localised adverse impacts.</p> <p>Ensure signage and design permits cyclists to continue to use the shoulder of the highway such that it meets the road rule 95(2) requirements.</p> <p>Possible compensation through the <i>Land Acquisition and Compensation Act</i>.</p>	Minor	Possible	Low
Traffic and Transport	T4	x	x	x	<p>Potential for some aspects of road safety, during (interim) operation of the new road to be degraded. For example:</p> <ul style="list-style-type: none"> -Increased crossing distance for wildlife exacerbates frequency of accidents. -Increased distance for farm machinery to be travelling along the road. -Changes in atmospheric conditions i.e. fog, sunglare. -Movements at intersections and property accesses that are retained. 	Increased incidence of accidents that one or more incident may result in a fatality.	Social Economic		Road safety audit completed for the design.	Catastrophic	Possible	High	<p>Assess wildlife corridors and identify mitigation measures to reduce wildlife cross Western Highway via trafficked carriageway.</p> <p>Assessment of atmospheric conditions within the project area.</p>	Catastrophic	Rare	Medium
Traffic and Transport	T5	x	x	x	<p>Potential for some aspects of road safety, during (interim and ultimate) operation of the new road to be degraded. For example:</p> <ul style="list-style-type: none"> -Increased crossing distance for wildlife exacerbates frequency of accidents. -Increased distance for farm machinery to be travelling along the road. -Changes in atmospheric conditions i.e. fog, sunglare. 	Increased incidence of accidents that one or more incident may result in a fatality.	Flora and Fauna	1180	Road safety audit completed for the design.	Catastrophic	Unlikely	High	<p>Assess wildlife corridors and identify mitigation measures to reduce wildlife cross Western Highway via trafficked carriageway.</p> <p>Assessment of atmospheric conditions within the project area.</p>	Catastrophic	Rare	Medium

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Traffic and Transport	T6	x	x	x	Potential for some aspects of road safety to be degraded through inadequate design, including horizontal and vertical geometry, sight distance at all intersections and merge locations (ramps and service road entry/exit)	Increased incidence of accidents that one or more incident may result in a fatality.		1180	Appropriate standards are applied to the design. Road safety audit completed for the design.	Catastrophic	Rare	Medium	No additional controls.	Catastrophic	Rare	Medium
Traffic and Transport	T7	x	x	x	Traffic volumes significantly increase due to induced demand and cause congestion (for the interim and ultimate solutions).	Increased travel time for road users.	Economic		Risk is negligible due to adequate capacity and no other parallel routes of the same standard road therefore no planned controls to manage risk.	Insignificant	Rare	Negligible	Risk is negligible therefore no additional controls to manage risks.	Insignificant	Rare	Negligible
Visual and Landscape	LV1A	x	x	x	Construction and operation of the duplication along the existing Western Highway alignment will visually impact upon adjacent dwellings. (Ch. 400-1800, 8700, 10500-10900, 12400-12800, 14600-15400 and 38400-38000)	Approximately 18 dwellings will be located adjacent to the duplication and will receive a moderate or minor visual change upon their views.	Social	3060.3 Technical Bulletin No 36 AustRoads Part 6B	Provide planting in ROW	Insignificant	Likely	Low	Non-standard treatments to reduce impact: -Retention of existing roadside vegetation where possible (protective fencing treatments may be required); -Establishment of tree and shrub planting of similar character to existing roadside vegetation in close proximity to the road edge (protective fencing treatments may be required); -Establishment of clusters of screening vegetation in line with the surrounding character, including trees at the toe of the embankment shrubs upon the fill embankments; -Use of grasses upon fill embankments consistent with surrounding rural land; -Landscape designed fill embankments; and -Establishment of a new tree avenue gateway to Ararat (to be developed in conjunction with Ararat Rural City Council).	Insignificant	Possible	Negligible
Visual and Landscape	LV1B	x	x	x	Construction and operation of the duplication along a new alignment will visually impact upon adjacent dwellings. (Ch. 900 and 2600)	Approximately 2 dwellings will be located adjacent to the duplication and receive a major visual change upon their views.	Social	3060.3 Technical Bulletin No 36 AustRoads Part 6B	Provide planting in ROW	Minor	Almost Certain	Medium	Non-standard treatments to reduce impact: -Establishment of screening vegetation against eastern views for the affected dwelling; -Use of grasses upon fill embankments consistent with surrounding rural land; and -Landscape designed fill embankments.	Minor	Almost Certain	Medium
Visual and Landscape	LV1C	x	x	x	Construction and operation of a new overpass along the existing Western Highway alignment will visually impact upon an adjacent dwelling. (Ch. 4400-5600)	Approximately 1 dwelling will be located adjacent to the Eurambeen-Raglan and Eurambeen-Streatham Duplication Roads overpass and receives a minor visual change upon their views.	Social	3060.3 Technical Bulletin No 36 AustRoads Part 6B	Provide planting in ROW	Insignificant	Almost Certain	Low	Non-standard treatments to reduce impact: -Establishment of screening vegetation against eastern views for the affected dwelling; -Use of grasses upon fill embankments consistent with surrounding rural land; and -Landscape designed fill embankments.	Insignificant	Likely	Low
Visual and Landscape	LV1D	x	x	x	Construction and operation of a new overpass along the existing Western Highway alignment will visually impact upon an adjacent dwelling. (Ch. 17400-21000)	Option 1 and 3. Approximately 9 dwellings will be located adjacent to the Buangor Bypass, including the Peacock Road overpass (Ch. 17400-17600) and will receive a major visual change upon their views. Option 2 Approximately 7 dwellings will be located adjacent to the Buangor Bypass, including the Peacock Road overpass (Ch. 17400-17600 and Western Highway and rail line overpass (Ch. 20000-21000) and will receive a major visual change upon their views.	Social	3060.3 Technical Bulletin No 36 AustRoads Part 6B	Provide planting in ROW	Minor	Almost Certain	Medium	Non-standard treatments to reduce impact: Establishment of tree and shrub screening planting to effectively screen the duplication and maintain a vegetated edge to the township. Vegetation should be established in clumps and not in linear banding that contrasts with the existing landscape character; Tree planting along the base and shrub planting along embankments to screen the overpass; Possible screen planting within private properties along the interface of the overpass; and Sensitive design of embankments to be complimentary to the surrounding topography.	Insignificant	Almost Certain	Low
Visual and Landscape	LV1E	x			Construction and operation of the duplication along a new alignment will visually impact upon adjacent dwellings. (Ch. 24200)	Option 1. 1 dwelling along Hillside Road will be located adjacent to the duplication and will receive a major visual change upon their views.	Social	3060.3 Technical Bulletin No 36 AustRoads Part 6B	Provide planting in ROW	Insignificant	Almost Certain	Low	Non-standard treatments to reduce impact: -Establishment of screening vegetation within private properties; and Landscape designed fill embankments.	Insignificant	Almost Certain	Low
Visual and Landscape	LV2A	x	x	x	Construction and operation of the duplication will visually impact upon the Buangor Town Centre (Ch. 18300).	The duplication will be visible from the Buangor Town Centre.	Social	3060.3 Technical Bulletin No 36 AustRoads Part 6B	Provide planting in ROW	Minor	Almost Certain	Medium	Non-standard treatments to reduce impact: -Establishment of tree and shrub screening planting to effectively screen the duplication and maintain a vegetated edge to the township. Vegetation should be established in clumps and not in linear banding that contrasts with the existing landscape character.	Insignificant	Almost Certain	Low

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Visual and Landscape	LV2B	x	x	x	Construction and operation of the duplication will visually impact upon the Buangor Primary School (Ch. 18100).	The duplication will be visible from the Buangor Primary School, including the Peacock Road overpass and receive a moderate visual change.	Social	3060.3 Technical Bulletin No 36 AustRoads Part 6B	Provide planting in ROW	Moderate	Almost Certain	High	Non-standard treatments to reduce impact: -Establishment of tree and shrub screening planting to effectively screen the duplication and maintain a vegetated edge to the township. Vegetation should be established in clumps and not in linear banding that contrasts with the existing landscape character; -Tree planting along the base and shrub planting along embankments to screen the overpass; -Sensitive design of embankments to be complimentary to the surrounding topography; -Use of grasses upon fill embankments consistent with surrounding rural land; and -Landscape designed fill embankments.	Minor	Almost Certain	Medium
Visual and Landscape	LV2C	x	x	x	Construction and operation of the duplication will visually impact upon the approaches to the Buangor Town Centre (Ch. 15800-20800).	Options 1 and 3. The duplication will be visible from the eastern and western approaches and departure from the Buangor Town Centre, including the Peacock Road overpass (Ch. 17400-17600) and will receive a moderate visual change. Option 2. The duplication will be visible from the eastern and western approaches and departure from the Buangor Town Centre, including the Peacock Road overpass (Ch. 17400-17600) and Western Highway and rail line overpass (Ch. 20000-21000) and will receive a moderate visual change.	Social	3060.3 Technical Bulletin No 36 AustRoads Part 6B	Provide planting in ROW	Minor	Almost Certain	Medium	Non-standard treatments to reduce impact: -Establishment of tree and shrub screening planting to effectively screen the duplication and maintain a vegetated edge to the township. Vegetation should be established in clumps and not in linear banding that contrasts with the existing landscape character; -Tree planting along the base and shrub planting along embankments to screen the overpass; -Sensitive design of embankments to be complimentary to the surrounding topography.	Insignificant	Almost Certain	Low
Visual and Landscape	LV2D	x	x	x	Construction and operation of the duplication will visually impact upon Mount Buangor State Park and Mount Cole State Forest	The duplication may be visible from the Mount Buangor State Park and Mount Cole State Forest and receive an insignificant visual change.	Social	3060.3 Technical Bulletin No 36 AustRoads Part 6B	Provide planting in ROW	Insignificant	Unlikely	Negligible	None required	Insignificant	Unlikely	Negligible
Visual and Landscape	LV2E	x	x	x	Construction and operation of the duplication will visually impact upon the Langhi Ghiran State Park (Ch. 22600-29400).	The duplication may be visible from the Langhi Ghiran State Park and receive an insignificant visual change.	Social	3060.3 Technical Bulletin No 36 AustRoads Part 6B	Provide planting in ROW	Insignificant	Unlikely	Negligible	None required	Insignificant	Unlikely	Negligible
Visual and Landscape	LV2F	x	x	x	Construction and operation of the duplication will visually impact upon Green Hill Lake (Ch. 37000-38400).	The duplication will be visible from Green Hill Lake and receive an insignificant visual change.	Social	3060.3 Technical Bulletin No 36 AustRoads Part 6B	Provide planting in ROW	Insignificant	Unlikely	Negligible	None required	Insignificant	Unlikely	Negligible
Visual and Landscape	LV2G	x	x	x	Construction and operation of the duplication will visually impact upon the Ararat Regional Park Lookout.	The duplication will be barely discernible from the Ararat Regional Park Lookout and receive an insignificant visual change.	Social	3060.3 Technical Bulletin No 36 AustRoads Part 6B	Provide planting in ROW	Insignificant	Unlikely	Negligible	None required	Insignificant	Unlikely	Negligible
Visual and Landscape	LV3A	x	x	x	Construction and operation of the duplication will visually impact upon landscape character types of high landscape sensitivity (Ch. 18100-18300).	The duplication will result in a minor change upon the Bushland landscape character type through the removal of existing tree vegetation.	Social	3060.3 Technical Bulletin No 36 AustRoads Part 6B	Provide planting in ROW	Insignificant	Almost Certain	Low	None required	Insignificant	Almost Certain	Low
Visual and Landscape	LV3B	x			Construction and operation of the duplication will visually impact upon landscape character types of high landscape sensitivity (Ch. 27200-27600).	The duplication will result in an insignificant change upon the Bushland landscape character type through the removal of existing tree vegetation.	Social	3060.3 Technical Bulletin No 36 AustRoads Part 6B	Provide planting in ROW	Insignificant	Almost Certain	Low	None required	Insignificant	Almost Certain	Low

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Visual and Landscape	LV3C	x	x	x	Construction and operation of the duplication will visually impact upon landscape character types of medium-high landscape sensitivity. Option 1 (Ch. 1200-3600, 17400-18100, 18300-20600 and 22800-28600). Option 2 (Ch. 1200-3600, 17400-18100 and 18700-20500 and 22500-25200). Option 3 (Ch. 1200-3600, 17400-18100, 18300-20600 and 22500-25200)	The duplication will result in a major change upon the Vegetated Rural landscape character type through the construction of the duplication, overpasses and removal of existing tree vegetation.	Social	3060.3 Technical Bulletin No 36 AustRoads Part 6B	Provide planting in ROW	Moderate	Almost Certain	High	Non-standard treatments to reduce impact: -Establishment of clusters of screening vegetation in line with the surrounding character, including trees at the toe of the embankment and shrubs upon the fill embankments; -Use of grasses upon fill embankments consistent with surrounding rural land; and -Landscape designed fill embankments.	Minor	Almost Certain	Medium
Visual and Landscape	LV3D	x	x	x	Construction and operation of the duplication will visually impact upon landscape character types of medium landscape sensitivity. (Ch. 4200-5400).	The duplication overpass at Eurambeen-Raglan and Eurambeen-Streatham Diversion Roads will result in a major change upon the Rural landscape character type through the construction of the duplication, overpasses and removal of existing tree vegetation.	Social	3060.3 Technical Bulletin No 36 AustRoads Part 6B	Provide planting in ROW	Moderate	Almost Certain	High	Non-standard treatments to reduce impact: -Establishment of clusters of screening vegetation in line with the surrounding character, including trees at the toe of the embankment and shrubs upon the fill embankments; -Use of grasses upon fill embankments consistent with surrounding rural land; and -Landscape designed fill embankments.	Minor	Almost Certain	Medium
Visual and Landscape	LV3E	x	x	x	Construction and operation of the duplication will visually impact upon landscape character types of medium to high landscape sensitivity. (Ch. 9700).	The duplication overpass at Goulds Lane and Ferntree Gully Road will result in a moderate change upon the Rural landscape character type through the construction of the duplication, overpasses and removal of existing tree vegetation.	Social	3060.3 Technical Bulletin No 36 AustRoads Part 6B	Provide planting in ROW	Minor	Almost Certain	Medium	Non-standard treatments to reduce impact: -Establishment of clusters of screening vegetation in line with the surrounding character, including trees at the toe of the embankment and shrubs upon the fill embankments; -Use of grasses upon fill embankments consistent with surrounding rural land; and -Landscape designed fill embankments.	Insignificant	Almost Certain	Low
Visual and Landscape	LV3F	x	x	x	Construction and operation of the duplication will visually impact upon landscape character types of medium to high landscape sensitivity. (Ch. 1400-2700).	The duplication will result in a minor change upon the Vegetated Rural landscape character type through the construction of road infrastructure and removal of existing vegetation.	Social	3060.3 Technical Bulletin No 36 AustRoads Part 6B	Provide planting in ROW	Insignificant	Almost Certain	Low	None required	Insignificant	Almost Certain	Low
Visual and Landscape	LV3G	x	x	x	Construction and operation of the duplication will visually impact upon landscape character types of low landscape sensitivity. Option 1 (Ch. 847-1200, 3200-4500, 10000-12800 and 39100-39600) Option 2 (Ch. 847-1200, 3200-4500, 10000-12800 and 39100-39600) Option 3 (Ch. 847-1200, 3200-4500, 10000-12800, 15600-16300 and 39100-39600)	The duplication will result in a major change upon the Vegetated Highway character type through the removal of existing tree vegetation and widening of the road corridor.	Social	3060.3 Technical Bulletin No 36 AustRoads Part 6B	Provide planting in ROW	Minor	Almost Certain	Medium	Non-standard treatments to reduce impact: -Retention of existing roadside vegetation where possible (protective fencing treatments may be required); -Establishment of tree and shrub planting of similar character to existing roadside vegetation in close proximity to the road edge (protective fencing treatments may be required); -Establishment of a new tree avenue gateway to Ararat (to be developed in conjunction with Ararat Rural City Council)	Insignificant	Almost Certain	Low
Visual and Landscape	LV3H	x	x	x	Construction and operation of the duplication will visually impact upon landscape character types of low landscape sensitivity. Option 1 (Ch. 12800-16200, 21000-28000, 28400-31000 and 33900-34200) Option 2 (Ch. 12800-16200, 25200-30000 and 33900-34200) Option 3 (Ch. 12800-16200, 21000-22000, 25200-30000 and 33900-34200)	The duplication will result in a minor change upon the Vegetated Highway character type through the removal of existing tree vegetation and widening of the road corridor.	Social	3060.3 Technical Bulletin No 36 AustRoads Part 6B	Provide planting in ROW	Insignificant	Almost Certain	Low	Non-standard treatments to reduce impact: Establishment of tree and shrub planting of similar character to existing roadside vegetation in close proximity to the road edge (protective fencing treatments may be required)	Insignificant	Almost Certain	Low



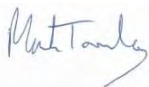
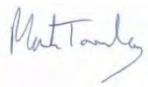
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Document Status

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