4. EES Assessment Framework and Approach to EES Investigations

4.1 Introduction

This EES documents the assessment for the Project and comprises of evaluation objectives and associated criteria that have been developed for the assessment of alignment options.

An iterative approach was adopted that allowed for progressive refinement of the alignment option that incorporated the outcomes of specialist assessments.

An overview of the approach adopted for these investigations is presented in this chapter, along with an explanation of the environmental risk assessment methodology. Chapter 5 (Project Alternatives) documents the approach to the options assessment.

4.2 EES Draft Evaluation Objectives

The principal purpose of the EES is to provide stakeholders and decision makers with a detailed description of the potential environmental effects of the Project.

The draft EES Evaluation Objectives contained in the EES Scoping Requirements (September 2011) were developed specifically for the Project to guide the assessment of the potential effects of the Project.

This EES has been prepared to address the draft EES Evaluation Objectives, with each section of the EES highlighting the relevant objectives being considered.

The draft EES Evaluation Objectives are the basis for the EES assessment framework and are listed in Table 4-1.

4.3 EES Assessment Framework

The EES Assessment framework was based on an integrated assessment of environmental effects to assess alignment options and the risk and impact of the proposed alignment.

The EES framework comprised of the following elements:

- Objectives of relevant legislation, guidelines and policy;
- EES Scoping Requirements and draft Evaluation Objectives developed by the Department of Planning and Community Development (DPCD); and
- VicRoads Project Objectives, as included in Chapter 1 (Introduction), which are more general and relate to the delivery of the Project.

Evaluation criteria were developed for the assessment of alignment options and the proposed alignment against each element of the evaluation framework.

The evaluation criteria were used to assess the alignment options and inform the selection of the proposed alignment option.

The Technical Reference Group reviewed the evaluation criteria and provided feedback through TRG meetings. The criteria were developed and refined by technical specialists prior to undertaking the options and impact assessments.

As the options assessment progressed from a long list to the proposed alignment assessed in this EES, the evaluation criteria became more detailed. The criteria then informed the environmental risk and impact assessments through the development of the Project specific consequence criteria.

The criteria allowed for assessment of the proposed alignment against the EES assessment framework. The outcomes of the risk and impact assessments therefore assess how the Project meets the draft EES Evaluation Objectives.

The legislation, guidelines and policies relevant to the draft EES Evaluation Objectives are shown in Table 4-1 and further discussed in the EES chapters and Technical Appendices of this EES.

Table 4-1 EES Draft Evaluation Objectives and Relevant Legislation, Guidelines and Policies

EES Draft Evaluation Objective	Relevant Legislation	Relevant Guideline / Policy	Relevant EES Chapter
To provide for the duplication of the Western Highway between Ararat and Stawell to address safety, efficiency and capacity issues.	▪ *Road Management Act 2004* ▪ *Transport Integration Act 2010*	▪ Arrive Alive! 2008 – 2017 Victoria's Road Safety Strategy ▪ VicRoads Access Management Policies (2006)	▪ Chapter 9 ▪ Chapter 19
To avoid or minimise effects on flora and fauna species and ecological communities listed under the *Flora and Fauna Guarantee Act 1988* (Vic) or the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) and to comply with requirements under Victoria's Native Vegetation Management – A Framework for Action, 2002.	▪ *Environment Protection and Biodiversity Conservation Act 1999* ▪ *Flora and Fauna Guarantee Act 1988* ▪ *Wildlife Act 1975* ▪ *Catchment and Land Protection Act 1994* ▪ *Planning & Environment Act 1987*	▪ Victoria's Native Vegetation Management – A Framework for Action ▪ Wimmera Regional Catchment Strategy (2011)	▪ Chapter 13
To protect catchment values, surface water and groundwater quality, stream flows and floodway capacity, as well as to avoid impacts on protected beneficial uses.	▪ *Planning and Environment Act 1987* ▪ *Catchment and Land Protection Act 1994* ▪ *Water Act 1989* ▪ *Environment Protection Act 1970*	▪ State Environment Protection Policy (Groundwaters of Victoria) 1997 ▪ State Environment Protection Policy (Waters of Victoria) 1988 ▪ Wimmera Regional Catchment Strategy (2011) ▪ State Environment Protection Policy (Prevention & Management of Contamination of Land) 2002 ▪ National Environmental Protection (Assessment of Site Contamination) Measure 1999 ▪ EPA (Vic) Publications 668, 840, 669, 441, 440, 275, 347 ▪ Industrial Waste Management Policy (Waste Acid Sulfate Soils) 1999	▪ Chapter 10 ▪ Chapter 11 ▪ Chapter 12
To avoid or minimise disruption and other adverse effects on infrastructure, land use (including agriculture) and households, as well as road users resulting from the construction and operation of the highway duplication.	▪ *Planning and Environment Act 1987* ▪ *Environment Protection Act 1970* ▪ *Public Health & Wellbeing Act 2008* ▪ *Environment Protection and Biodiversity Conservation Act 1999* ▪ *Transport Integration Act 2010* ▪ *Crown Land (Reserves) Act 1978* ▪ *Land Act 1958*	▪ National Environment Protection (Air Quality and Air Toxics) Measures ▪ Ararat Planning Scheme ▪ Northern Grampians Planning Scheme	▪ Chapter 8 ▪ Chapter 9 ▪ Chapter 18 ▪ Chapter 19
To minimise air emissions, noise, visual, landscape and other adverse amenity effects, during the development and operation of the proposed duplicated highway to the maximum extent practicable.	▪ *Planning and Environment Act 1987* ▪ *Environment Protection Act 1970* ▪ *Public Health & Wellbeing Act 2008* ▪ *Environment Protection and Biodiversity Conservation Act 1999* ▪ *Transport Integration Act 2010*	▪ State Environment Protection Policies (Air Quality Management 2001 and Ambient Air Quality 1999) ▪ Traffic Noise Reduction Policy (VicRoads, February 2005) ▪ Traffic Noise Measurement Requirements for Acoustic Consultants (VicRoads, November 2005) ▪ AS 2702-1984: Acoustics-Methods for the Measurement of Road Traffic Noise.	▪ Chapter 15 ▪ Chapter 16 ▪ Chapter 17 ▪ Chapter 18

EES Draft Evaluation Objective	Relevant Legislation	Relevant Guideline / Policy	Relevant EES Chapter
To protect residents' well-being and minimise any dislocation of residents and severance of communities, to the extent practicable.	▪ *Environment Protection and Biodiversity Conservation Act 1999* ▪ *Environment Protection Act 1970* ▪ *Transport Integration Act 2010* ▪ *Public Health and Wellbeing Act 2008* ▪ *Planning and Environment Act 1987*	▪ Ready for Tomorrow – a Blueprint for Regional and Rural Victoria (2010) ▪ Central Highlands Regional Strategic Plan ▪ Arrive Alive! 2008-2017 Victoria's Road Safety Strategy ▪ Western Highway M8/A8 Corridor Strategy – Deer Park to South Australian Border, (1999) ▪ National Transport Links – Growing Victoria's Economy (2007) ▪ Melbourne-Adelaide Corridor Strategy – Building Our National Transport Future (2007) ▪ State Planning Policy Framework ▪ Ararat Planning Scheme ▪ Ararat Council Plan (2009) ▪ Ararat Municipal Public Health and Well-being Plan (2009-2013) ▪ Northern Grampians Council Plan (2009) ▪ Northern Grampians Planning Scheme	▪ Chapter 18
To provide net economic benefits for the State having regard to road user benefits, direct costs and indirect costs including with respect to other land uses and economic activities.	▪ *Planning and Environment Act 1987*	▪ State Planning Policy Framework ▪ Ararat Planning Scheme ▪ Ararat Council Plan (2009) ▪ Northern Grampians Council Plan (2009) ▪ Northern Grampians Planning Scheme	▪ Chapter 19
To protect Aboriginal and non-Aboriginal cultural heritage.	▪ *Heritage Act 1995* ▪ *Aboriginal Heritage Act 2006* ▪ *Traditional Owner Settlement Act 2010* ▪ *Native Title Act 1993*	▪ Aboriginal Heritage Regulations 2007 ▪ Ararat Planning Scheme ▪ Northern Grampians Planning Scheme ▪ Victorian Heritage Register ▪ Heritage Inventory	▪ Chapter 14
To provide a transparent framework with clear accountabilities for managing environmental effects and hazards associated with the Project in order to achieve acceptable environmental outcomes.	▪ *Environment Effects Act 1978* ▪ *Environment Protection Act 1970* ▪ *Planning and Environment Act 1987*		▪ Chapter 21 ▪ Chapter 4
Overall, to identify an alignment and conceptual design for the Western Highway Project from Ararat to Stawell that would achieve a sustainable balance of economic, environmental and social outcomes.	▪ *Road Management Act 2004* ▪ *Transport Integration Act 2010* ▪ *Planning and Environment Act 1987*	▪ Arrive Alive! 2008 – 2017 Victoria's Road Safety Strategy ▪ VicRoads Access Management Policies (2006)	▪ Chapter 5

4.4 Summary of Approach to EES Investigations

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

- **Phase 1** – Development of a long list of alignment options to identify a short-list through a high level consideration of potential impacts and benefits – informed by a desktop review of previous investigations for the Project and other available environmental information.
- **Phase 2** – Identification of the proposed alignment and completion of specialist existing conditions assessments alignment through a more detailed consideration of potential impacts and benefits.
- **Phase 3** – Environmental risk assessment and completion of specialist impact assessments of the proposed alignment to identify areas where further alignment refinements were required to mitigate potential areas of impact.

Whilst risks were broadly considered with the impacts of options, a detailed risk assessment was undertaken for the proposed alignment.

The specialists studies, completed to inform the EES, occurred in parallel with the selection of the proposed alignment. The outcomes of the specialist studies informed the selection of the proposed alignment and development of the environmental management framework.

Once the proposed alignment was selected, a detailed environmental risk assessment was conducted and the specialist impact assessments were completed. The risk assessment was used as a tool to identify potentially significant risk events for more detailed assessment of impact and mitigation measures. The process enabled activities and events with relatively high levels of risk to be prioritised from those with a lower level of risk or which were easily managed.

Figure 4-1 shows a flowchart of the approach to the EES and the integration of the alignment selection process, the specialist studies and the preparation of the EES. Chapter 5 (Project Alternatives) provides further details on the options assessment.

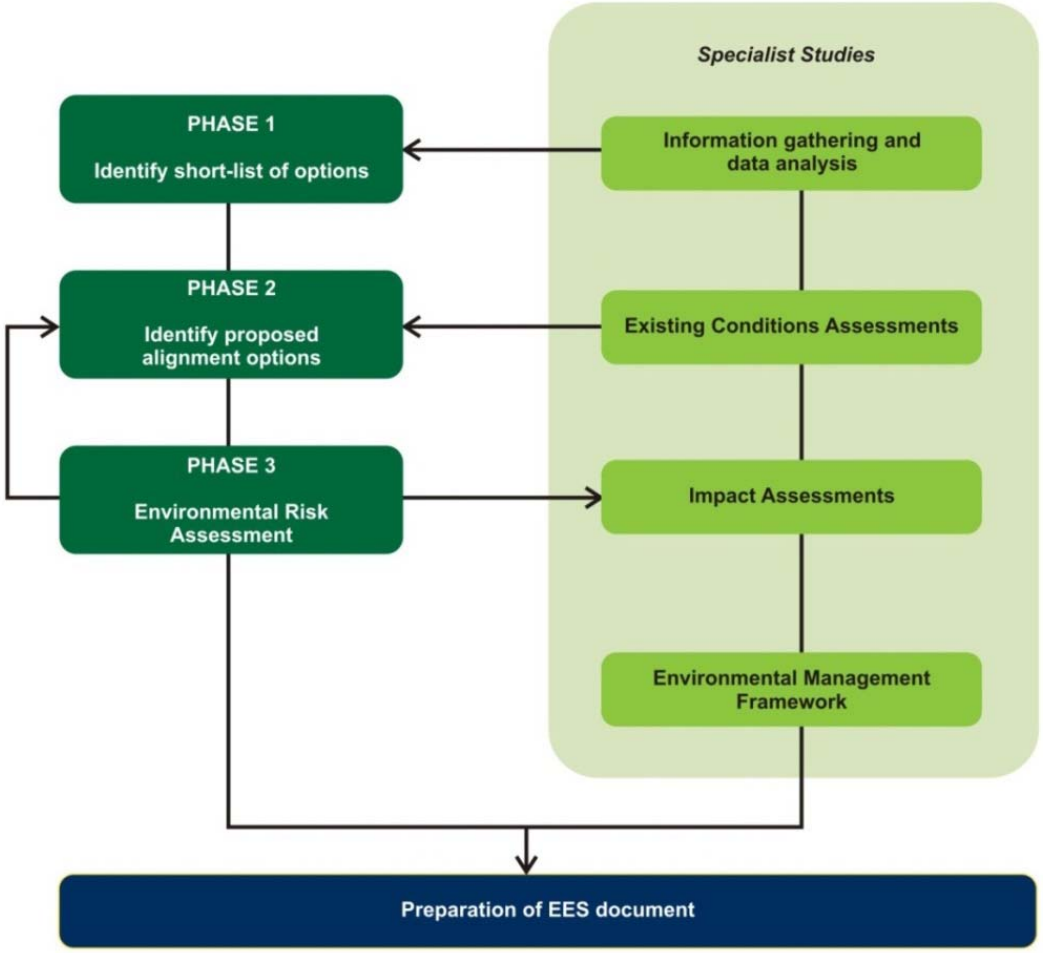

Figure 4-1 Approach to the EES

4.5 Environmental Risk Assessment

The objective of the environmental risk assessment was to identify key social, environmental and economic risks from the proposed alignment and to develop management and mitigation measures to reduce these risks.

A summary of the risk assessment process is provided in Figure 4-2. This process was based upon AS/NZS ISO 31000:2009: Risk Management.

A Project Description was developed for the proposed alignment. This Project Description contains design details such as proposed construction methods, details of waterway crossings and road design information. The Project Description forms the basis for the impact assessments and environmental risk assessment and is presented in Chapter 6 (Project Description).

As a first step in the environmental risk assessment, each specialist reviewed the Project Description and identified potential risks to the environment.

Each of the risks identified by the specialists was then allocated a likelihood consequence category, based on the descriptions in Table 4-2 and Table 4-3. The consequence category descriptions were developed by specialists with reference to the existing conditions of the Project Area, from the requirements of relevant legislation and guidelines, as well as the draft evaluation objectives for the EES.

A risk rating was then assigned to each risk, based on the consequence and likelihood categories. Table 4-4 shows the matrix used to allocate the risk rating. Risk ratings were assigned to each risk, assuming implementation of standard VicRoads environmental management procedures and design measures, as detailed in the Project Description. These were referred to as the inherent risks from the Project.

After each risk was assigned a rating, additional management and mitigation measures were developed for risks. Each 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 specialist, a multi-disciplinary risk workshop was held to discuss the key risks. The workshop allowed specialists from each area to discuss risks which were interrelated. Following the risk workshop, the alignment was refined to reduce high risks that could be addressed through design.

The risk assessment is presented in a report appended to the EES (refer Technical Appendix Q). An extract of the final risk register for each specialist area is included and discussed further in the relevant chapter of the EES.

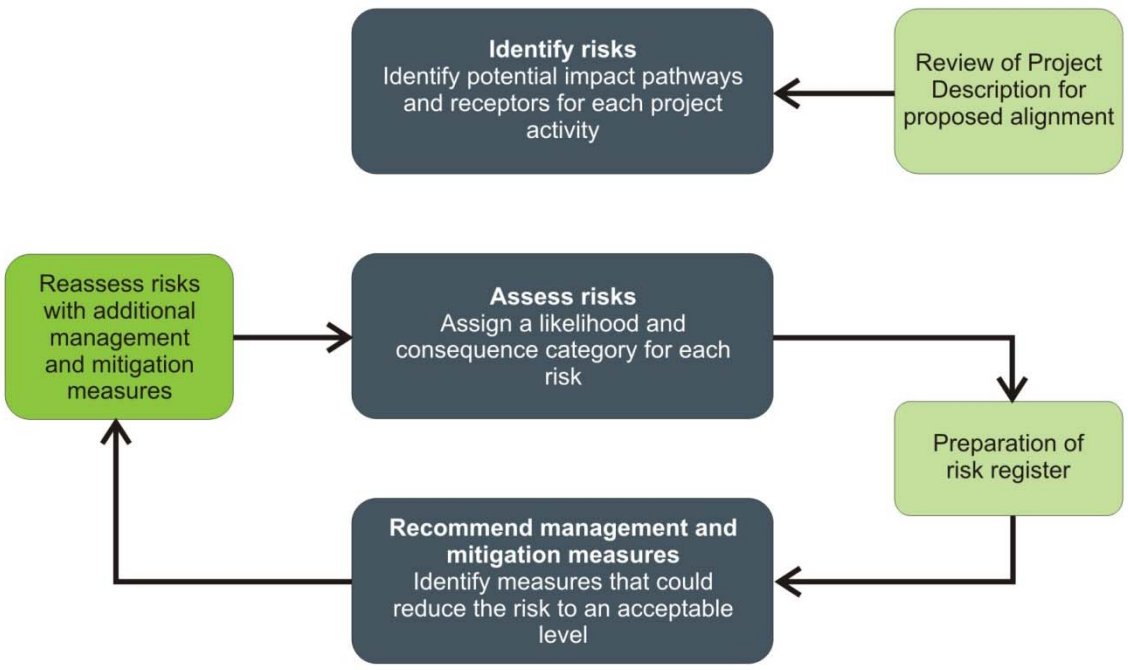

Figure 4-2 Environmental Risk Assessment Process

Table 4-2 Likelihood Categories

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 not expected
Rare	The event may occur only in exceptional circumstances

Table 4-3 Consequence Criteria*

Category	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	Total loss of annual revenue less than $100,000.	Total loss of annual revenue less than $1M, but greater than $100,000.	Loss of revenues less than $10 M but greater than $1 M.	Loss of revenues less than $100 M but greater than $10 M.	Loss of revenues less than $1B but greater than $100 M.
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.

Category	Aspect	Insignificant	Minor	Moderate	Major	Catastrophic
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 anEVC 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.
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 1-10 ha of an EPBC Act or FFG Act-listed community.	Loss of 10-50 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 51-500 scattered trees (including MTs, LOTs and VLOTs).	Loss of 501-5000 scattered trees (including MTs, LOTs and VLOTs).	Loss of > 5000 scattered trees (including MTs, LOTs and VLOTs).
Biodiversity & Habitat	Fauna 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 significant erosion, sediment generation or land instability along the majority of the alignment.

Category	Aspect	Insignificant	Minor	Moderate	Major	Catastrophic
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 and Operation	Negligible change to groundwater regime, quality and availability.	Temporary 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.
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.	Destruction of rare occurrence Site (e.g. burnt 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).

Category	Aspect	Insignificant	Minor	Moderate	Major	Catastrophic
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 10m 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.
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.

Category	Aspect	Insignificant	Minor	Moderate	Major	Catastrophic
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	Impacts on 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.	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.	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.	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.	Severe level of impact to a major waterway.
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 as described in the impact assessment report.	Significant increases to stormwater runoff, sediment and or contaminant loading to a significant waterway as described in the impact assessment report.	Significant increases to stormwater runoff, sediment and or contaminant loading to a major waterway as described in the impact assessment report.	An uncontained spill of contaminants directly to a major waterway as described in the impact assessment report.

Category	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	Road safety (operation)	Occurrence of road accidents resulting in less than 10 property damage only road accidents during a 5-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.
Traffic & Transport	Traffic and transport operations (construction & 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 and delays severely restrict the safe operation and efficiency of the transport network.
Traffic & Transport	Traffic access (construction & operation)	Negligible impact on access routes during construction/ operation.	Less than 5 routes with access compromised.	Greater than 5 and less than 10 routes with access compromised.	Greater than 10 and less than 30 routes with access compromised.	Greater than 30 routes with access compromised.

Category	Aspect	Insignificant	Minor	Moderate	Major	Catastrophic
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 household.	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.
Visual & Landscape	Impact upon existing landscape character	Moderate impact upon landscape character types of low landscape sensitivity Minor impact 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 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.

*Information on the consequence criteria and their development can be found in the related Technical Appendices C to P of this EES.

Table 4-4 Risk Rating Matrix

Likelihood	Consequence				
	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