PART 5 ATTACHMENTS

Attachment III
Environmental Risk Report

Executive summary

This Environmental Risk Report contains the results of an environmental risk assessment for the Yan Yean Road Upgrade – Stage 2 Upgrade Project (the Project). A risk register has been developed that provides the rationale behind risk ratings and highlights those risks which require greater consideration.

The Project would duplicate a 5.5 kilometres section of Yan Yean Road between Kurrak Road and Bridge Inn Road increasing the existing two lanes to four lanes (comprising two lanes in each direction). Construction would include two new roundabouts, five new signalised intersections, upgrades to one existing signalised intersection, a new walking and cycling path and footpath.

➔ An Environmental Risk Management Guideline has been developed to assist Major Road Projects Victoria (MRPV) staff, consultants and contractors in the management of the environment in relation to the planning, development, delivery and maintenance of the road network.

This environmental risk assessment process has been undertaken in accordance with the MRPV Environmental Risk Management Guideline and the Scoping Requirements set out by the Minister for Planning. It identifies mitigation measures to ensure that there is a clear, unambiguous and transparent set of controls in place to guide project delivery. While it will not be possible to avoid all effects and impacts, the recommendations and outcomes of the environmental risk assessment provide an effective way to minimise and manage potential risk.

120 impact pathways were assessed as part of this environmental risk assessment. The initial risk assessment rated impact pathways as low, medium, significant or high and assisted to focus assessment and mitigation on areas of significant and high risks. The key mechanism for ensuring risks are effectively mitigated is through the development of a suite of Environmental Performance Requirements (EPRs).

There were 40 significant and high initial risks identified across environmental aspects and Project phases. Following implementation of the identified mitigation measures outlined in the Environmental Performance Requirements for the Project, there were 21 significant and high residual risks related to:

- Loss of or damage to remnant, planted or regenerated trees, reducing canopy cover which can affect air temperature, climate, landscape, biodiversity, aesthetic, and recreational values during site establishment, earthworks and civils and structures phases
- Potential removal, destruction or lopping of native vegetation (including patches and scattered trees) during site establishment, earthworks and civils and structures phases
- Potential impact on Commonwealth and/or Victorian listed threatened species and communities, or their habitat (including freshwater ecology) during site establishment, earthworks and civils and structures phases
- Potential impact on wildlife or their habitat during site establishment and operation phases
- Potential changes inconsistent with current or proposed future land use, including land acquisition, severance and occupation during site establishment, earthworks and civils and structures phases
- Potential adverse impacts from construction activities on visual and/or landscape values experienced from sensitive receptors including residential areas, recreational and open spaces, hospitals, educational institutes and community facilities during site establishment phase
- Potential impacts on social and cultural values such as community, educational, religious or recreational facilities due to changes to access or amenity during site establishment and civils and structures phases
- Loss of or damage to remnant, planted or regenerated vegetation during construction impacting on social and cultural values during site establishment, earthworks, civils and structures and reinstatement phases.

These risks will be managed by the Project's Environmental Management Framework including Environmental Performance Requirements that manage the risks and mitigate potential impacts.

Introduction

Purpose

This Environmental Risk Report contains the results of an environmental risk assessment for the Yan Yean Road Upgrade – Stage 2 (the Project).

On 14 October 2018, the Minister for Planning determined an Environment Effects Statement (EES) would be required under the *Environment Effects Act 1978* to assess the potential for significant environmental effects of the Project. The EES allows stakeholders to understand the likely environmental effects of the Project and how they would be managed.

This environmental risk assessment report has been prepared for the EES in accordance with the Scoping Requirements set out by the Minister for Planning in June 2019. The Minister determined an EES was required for the Project due mainly to the potential significant effects on transport capacity and connectivity, biodiversity and social and cultural values as a result of the proposed clearance of a very large number of trees and habitat, including potential cumulative effects on the habitat of the Swift Parrot.

A risk register has been developed that provides the rationale behind risk ratings and highlights those risks which require greater consideration. As risks vary as a project progresses through the project lifecycle, the risk register will be updated on an ongoing basis.

Background

An Environmental Risk Management Guideline has been developed to assist Major Road Projects Victoria (MRPV) staff, consultants and contractors in the management of the environment in relation to the planning, development, delivery and maintenance of the road network.

The environmental risk assessment process has been undertaken in accordance with this Guideline and identifies mitigation measures to ensure that there is a clear, unambiguous and transparent set of controls in place to guide project delivery. While it will not be possible to avoid all effects and impacts, the recommendations and outcomes of the environmental risk assessment provide an effective way to minimise and manage potential risk.

Risk assessment approach

Environmental risks and impacts are a key consideration for the planning and delivery of the Yan Yean Road Upgrade – Stage 2.

AS/NZS ISO 31000:2018 *Risk management – Guidelines* defines risk as the: effect of uncertainty on objectives.

A preliminary screening analysis of environmental risk was undertaken during the reference design phase to identify the potential for the Project to impact assets, values and uses and prioritise issues for further investigation. This screening analysis considered the reference design, findings of preliminary scoping investigations, discussions with key stakeholders, early engagement with the community and relevant legislation, policy and guidelines.

Risk assessment scope

The risk assessment considered risks to the environment that may arise from 16 environmental aspects across the following six project activities: site establishment, earthworks, civils and structures, reinstatement, operation and maintenance. The interrelationship of environmental aspects is reflected in the grouping of topics into five themes for the EES main report. Environmental aspects assessed in the risk assessment are grouped under each of these five themes below, as they relate to Evaluation Objectives as established by the Minister for Planning:

- Effects on transport capacity and connectivity:
  - Transport (both road users and active users)
- Effects on biodiversity:
  - Arboriculture
  - Ecology (native vegetation, threatened species and communities, wildlife)
- Effects on social and cultural values:
  - Aboriginal cultural heritage
  - Historical heritage
  - Landscape and visual
  - Vegetation – Social and cultural values
- Effects on land uses, businesses and social assets:
  - Business
  - Land use planning
  - Social
- Effects on physical environment:
  - Air quality
  - Contaminated land
  - Groundwater
  - Noise and vibration
  - Surface water
  - Sustainability.

Project benefits were not considered as part of the risk assessment.

The objective of the risk assessment was to identify environmental risks associated with different project activities and to develop measures to reduce these risks where practicable and appropriate. Specifically, the risk assessment aimed to:

- Systematically identify the interactions between project elements and activities and assets, values and uses
- Focus the impact assessment and enable differentiation of high risks and impacts from lower risks and impacts
- Inform development of the Project to avoid, mitigate and manage environmental impacts
- Inform development of Environmental Performance Requirements (EPRs) that set the minimum outcomes necessary to avoid, mitigate or manage environmental impacts and reduce environmental risks during delivery of the Project.

Project description

Project objectives

The objectives of the Yan Yean Road Upgrade – Stage 2 Project are:

- **Improved road safety** – The Project would achieve this by isolating road users from hazards through construction of continuous safety barriers and by improving access control through traffic lights at intersections. Congestion and the complex road environment (poor sight lines due to sharp hills and bends) are presently contributing to the poor safety record on Yan Yean Road
- **Improved customer experience** – The Project would achieve this by improving access and network connectivity, and providing opportunities for active transport and more road capacity
- **Improved network efficiency** – The Project would achieve improved traffic flow and a reduction in travel times by increasing road capacity and reducing congestion.

From this, the environmental performance objectives of the Project were determined as shown in Table 1.

Table 1 Environmental performance objectives

Aspect	Environmental performance objective
Aboriginal cultural heritage	To avoid where possible, and otherwise minimise adverse effects on Aboriginal cultural heritage values, and to maximise the enhancement of these values where opportunities exist
Air quality	To protect beneficial uses of the air environment
Arboriculture	To avoid where possible, and otherwise minimise adverse impacts on remnant, planted, regenerated and large old trees
Business	To avoid where possible, and otherwise minimise adverse impacts on business and commercial facilities
Contaminated land	To protect the beneficial uses of land and minimise risk to human health and ecosystems from exposure to contaminated soils
Ecology (native vegetation, threatened species and communities, wildlife)	To avoid where possible, and otherwise minimise adverse impacts on native vegetation and listed species and ecological communities, and their habitat
Groundwater	To protect beneficial uses of groundwater
Historical heritage	To avoid where possible, and otherwise minimise adverse effects on historical heritage values, and to maximise the enhancement of these values where opportunities exist
Land use planning	To minimise impacts on existing and proposed future land use
Landscape and visual	To avoid where possible, and otherwise minimise adverse effects on landscape values, and to maximise the enhancement of these values where opportunities exist
Noise and vibration	To minimise the impacts of noise and vibration impacts to sensitive receptors
Social	To avoid where possible, and otherwise minimise adverse effects on social and cultural values, and maximise the enhancement of these values where opportunities exist
Surface water	To maintain or improve existing surface water quality, protect beneficial uses, and minimise risk of changes to flood levels
Sustainability (including greenhouse gas emissions)	To minimise resource use, including energy and water, during project activities
Transport (both road users and active users)	To provide for an effective corridor through the northern outer suburbs of Melbourne, to improve travel efficiency, road safety, and capacity
Vegetation – Social and cultural values	To avoid where possible, and otherwise minimise adverse effects on remnant, planted or regenerated vegetation, and maximise the enhancement of these values where opportunities exist

This design was adopted due to various constraints: road safety issues, steep and rolling terrain, high cut and fill batters and subsequent retaining walls at certain locations.

Project description

The Project would duplicate a 5.5 kilometre section of Yan Yean Road between Kurrak Road and Bridge Inn Road, increasing the existing two lanes to four lanes (comprising two lanes in each direction). The design speed along Yan Yean Road within the extent of the project area is 70 kilometres per hour, with the exception of north of Bridge Inn Road where the design speed is 80 kilometres per hour. This is consistent with existing speed limits. The design for the Project assessed in this EES has 3.5-metre-wide lanes, with the majority of the Project using a central 2.2 metre-wide median.

This design was adopted due to various constraints: road safety issues, steep and rolling terrain, high cut and fill batters and subsequent retaining walls at certain locations. The design also seeks to limit impacts to existing properties, local accesses and trees along Yan Yean Road.

The existing road alignment has been retained due to constraints around the topography and land uses adjacent to the road corridor. The exception is at the Bridge Inn Road intersection, which would be shifted to the north east to retain two River Red Gums (referred to as the Doreen River Red Gums) and two businesses. The key components of the Project are shown in Figure 1.

The Project includes:

- Two new roundabouts: one at Heard Avenue and one at Youngs Road
- Five new signalised intersections at Bannons Lane, Jorgensen Avenue, North Oatlands Road, Orchard Road and Bridge Inn Road
- Upgrades to one existing signalised intersection at Ironbark Road, including an additional right-hand turning lane, slip lane and traffic island
- New street lighting at all intersections, road signage and landscaping
- A new walking and cycling path on the western side and a footpath on the eastern side of Yan Yean Road, linking Diamond Creek to Doreen and improving safety and connectivity for pedestrians and cyclists
- Continuous safety barriers running along the Project's length, proposed in the median and behind outer kerbs along the mid-block sections of the carriageways
- A wide median between Bannons Lane and Jorgensen Avenue to provide for additional landscaping opportunities and potential avoidance of existing biodiversity values and large trees.

Project construction

Key construction activities and requirements for the Project provide the basis for preparing the EES and assessing the potential impacts on construction. Construction details would be subject to further refinement as the Project progresses, however any changes to the activities and requirements outlined below would need to be in accordance with the Environmental Performance Requirements (EPRs) set out in Chapter 12 *Environmental Management Framework*.

Proposed construction activities would be standard road construction activities to be undertaken in accordance with the EPRs for the Project.

Site establishment will involve tree clearance and vegetation lopping and removal within the project area, establishment of construction site compounds, clearing and grubbing, temporary sediment and erosion control works, and establishment of environmental and traffic controls.

Earthworks will involve remediation of any existing contamination and removal of any hazardous material, as appropriate, protecting and relocating services, widening of existing rock cuttings (approximately 750 metres of existing cut along the Project would be widened by approximately 20 metres), new cuttings (approximately 1,300 metres of new rock cut would be required to a width of approximately 5 metres along the Project), and bulk earthworks and haulage.

Civil and structural works will involve construction of infrastructure, including roundabouts and intersection upgrades, walking and cycling path and pedestrian path construction and connections, retaining walls, drainage works, and pavement works.

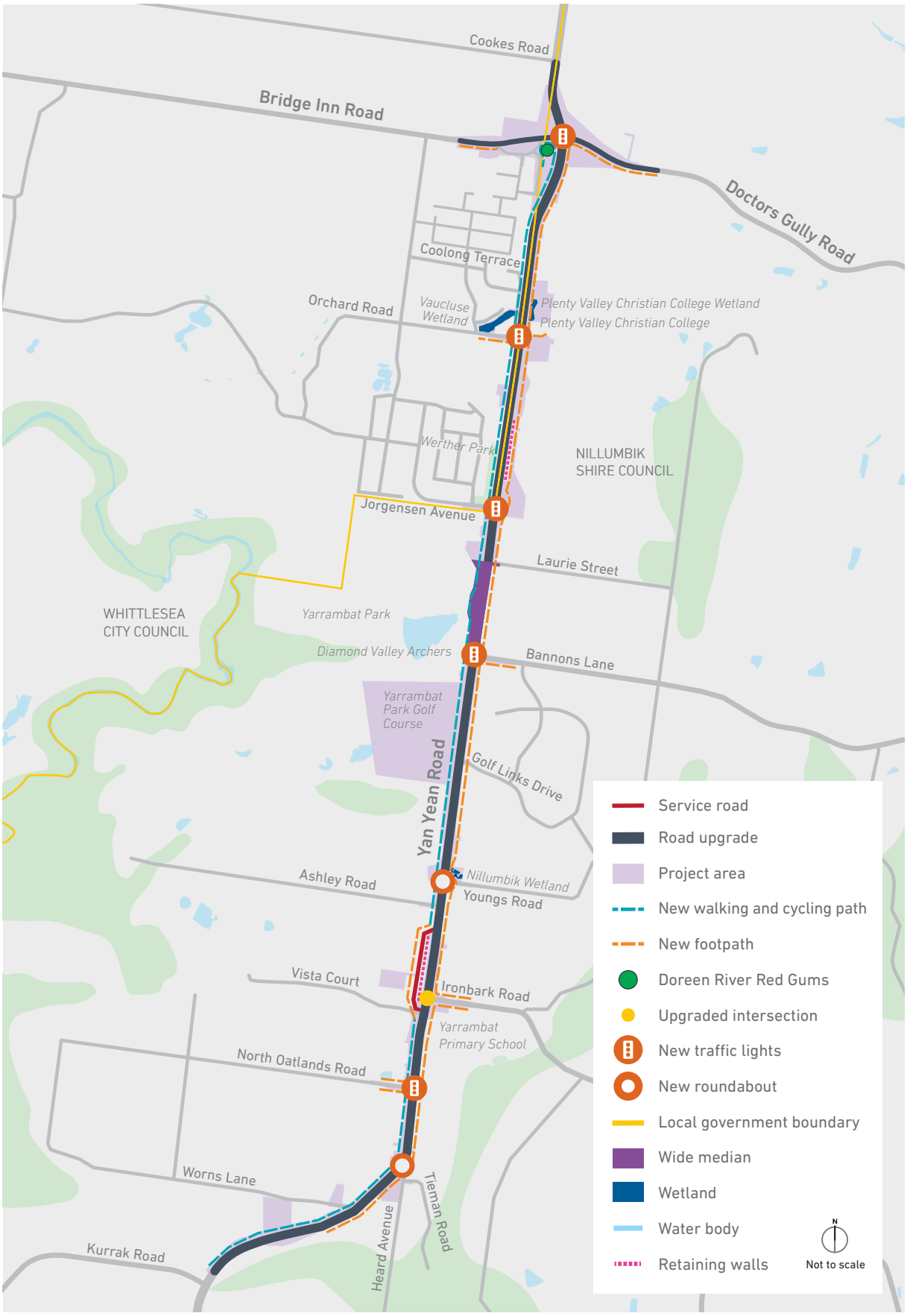
Reinstatement will involve implementation of traffic management systems and landscaping in accordance with the Landscape Strategy for the Project.

Project operation and maintenance

When complete, the Project would be owned by the Department of Transport. The risk assessment also assessed operation and maintenance phases:

- Operations: Functional phase of the Project
- Maintenance: Regular maintenance and unplanned maintenance / emergency response.

Figure 1 Key components of the Project



Existing conditions

Existing conditions and key issues requiring assessment are summarised in Table 2.

Table 2 Summary of existing environmental conditions

Aspect	Existing conditions and key issues
Aboriginal cultural heritage	Technical Report F – *Aboriginal and Historical Cultural Heritage Impact Assessment* identified the Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation as the Registered Aboriginal Party (RAP) for the project area. The assessment found two Victorian Aboriginal Heritage Register (VAHR) places within the project area. VAHR Registered 1 consists of a Stone Artefact Scatter, located along a road reserve, while VAHR Registered 2 is a Low Density Artefact Distribution. A Cultural Heritage Management Plan (CHMP) (#15169), mandatory under the *Aboriginal Heritage Act 2006,* has been drafted by Ecology & Heritage Partners.
Air quality	Technical Report M – *Air Quality Impact Assessment* defined sensitive receptors as 'hospitals, schools or residences', which include Plenty Valley Christian College and Yarrambat Primary School.
Arboriculture	Technical Report C – *Arboriculture Assessment* identified that a total of 7,030 trees and shrubs were recorded in the project area and a 20-metre buffer zone adjacent to the project area, comprising 2,775 native trees, 707 understorey trees, 2,113 planted native or indigenous trees, and 1,435 exotic trees. The report found 12 trees to have very high retention value, 346 to have high retention value and a further 2,169 to have moderate retention value. The two Doreen River Red Gums are classified as high and very high retention value trees, with suggested Tree Protection Zone (TPZ) radii of 15m. C&R Ryder also completed a non-destructive Root investigation assessment (2020) near the two Doreen River Red Gums at the intersection of Yan Yean Road and Bridge Inn Road. Based on this assessment, the health of the River Red Gum tree adjacent to the northern boundary of Bridge Inn Road (east side of intersection) is declining, whereas the one on the east side of Yan Yean Road (north of intersection) is in good health.
Business	Technical Report E – *Business Impact Assessment* assessed the potential impact on businesses along the alignment, including: Yarrambat Veterinary Hospital, Smiling Children Childcare and Early Learning Centre, Hippety Hop Childcare, M&S Franco Builders, Personal Training, Firewood, Plenty Valley Christian College, J&C Yeoman Slate Wholesalers & Homestead Farm, Welcome Boarding Kennels and Cattery, golf course (incl. mini golf and associated cafe) and businesses within the Doreen business park.. The former Post Office and Doreen General Store and Hadlow and Sons Pet Supplies and Stockfeed Store at Bridge Inn Road would be impacted by access changes.

Aspect	Existing conditions and key issues
Contaminated land	Technical Report K – *Contaminated Land Impact Assessment* identified low probability of acid sulfate soils and all results for soil samples analysed were below adopted human health assessment criteria. Category C Contaminated Soils have been identified within the project area. The assessment identified Category C Contaminated Soil when assessing Arsenic, Fluoride, Hexavalent Chromium and Nickel concentrations. If disposal is needed during construction, leachate analysis will be required. A landfill gas risk assessment was conducted by Golder Associates in 2015, as part of the post-closure management of the former Plenty Landfill. The assessment found low risk of lateral landfill gas migration.
Ecology	Technical Report B2 – *Biodiversity Impact Assessment* identified the project area has been heavily impacted by past and current land use. Most of the project area has been cleared, with approximately 20% of the project area supporting remnant native vegetation. Weeds are prolific in some parts of the project area. One species listed under the *Flora and Fauna Guarantee Act* (FFG Act) and *Environment Protection and Biodiversity Conservation Act* (EPBC Act) occurs within the project area: Matted Flax-lily (*Dianella amoena*). Two species listed on the Victorian Advisory List of Threatened Flora Species were recorded in the project area (*Eucalyptus studleyensis* and Pale-flowered Crane's Bill *Geranium*). Seven Ecological Vegetation Classes (EVCs) were recorded within the project area including the following: • EVC 22 Grassy Dry Forest (Least Concern) • EVC 47 Valley Grassy Forest (Vulnerable) • EVC 55 Plains Grassy Woodland (Endangered) • EVC 647 Plains Sedgy Wetland (Endangered) • EVC 653 Aquatic Herbland (no status) • EVC 821 Tall Marsh (Vulnerable) • EVC 937 Swampy Woodland (Endangered). The project area is likely or known to be foraging habitat for several fauna species, including the EPBC Act listed Greyheaded Flying-fox and Swift Parrot. The FFG Act listed Brush-tailed Phascogale may periodically disperse via vegetation in the project area. Kangaroos are known to cross the road corridor in this area.
Groundwater	Technical Report J – *Groundwater Impact Assessment* found the groundwater table to be over 60 metres below ground level.
Historical heritage	Technical Report F – *Aboriginal and Historical Cultural Heritage Impact Assessment* identified one historical place, St. Michael Anglican Church (HO219) within the project area. The assessment also identified a heritage overlay (HO191) which covers the two Doreen River Red Gums. The River Red Gums have cultural significance to the community.

Aspect	Existing conditions and key issues
Land use planning	Technical Report H – *Planning and Land Use Impact Assessment* found the Project to be located in a predominantly low density residential and rural living area within the metropolitan Green Wedge. The northern western end of the Project is within the Whittlesea Growth Corridor which is experiencing rapid land use change from rural living to residential. The project area falls across two municipalities: City of Whittlesea and Shire of Nillumbik.
Landscape and visual	Technical Report G – *Landscape Strategy* has been prepared for the Project to ensure that the landscape response will contribute to the character of the Yan Yean Road corridor. There are a large number of mature, native and non-native trees along the existing road corridor, providing screening and visual amenity.
Noise and vibration	Technical Report I – *Noise and Vibration Impact Assessment* found the highest average $L_{10,18hr}$ along the alignment to be 71.2dBA, which is above the 49.9dBA objective set in the VicRoads Traffic Noise Reduction Policy 2005. It is understood that the existing road has spray seal pavement finish, which results in elevated noise levels.
Social	Technical Report D – *Social Impact Assessment* identified two Doreen River Red Gums, which are culturally significant, and an old Post Office and General Store which is of public interest, at the Bridge Inn Road and Yan Yean Road intersection. The project area passes through two suburbs, Doreen and Yarrambat. Doreen has been identified as a residential growth area, comprised predominately of family households. Yarrambat has a smaller population, with many family households, however has a higher proportion of lone person households compared to other communities within the project area. Community, educational, religious or recreational facilities along the alignment with the potential to be impact by construction include: Yarrambat Park Golf Course and community groups in Yarrambat Park, Yarrambat Primary School, Plenty Valley Christian College, Butterflies and Smiling Childcare and Early Learning Centres.
Surface water	Technical Report L – *Surface Water Impact Assessment* found the Project to sit within the Yarra catchment. Yan Yean Road sits east of Plenty River. Sensitive receptors along the corridor include: • Vaucluse Wetland at Orchards Road (Melbourne Water asset) • Nillumbik Shire Council Wetland (at Youngs Road and Yan Yean Road junction) • Yarrambat Lake (west of Bannons Lane and Yan Yean Road junction). An assessment of stream conditions was conducted, and the Plenty River varied from poor to very poor under the Index of Stream Conditions (ISC) assessment. Melbourne Water have planned the Doreen Drainage Scheme; however this does not intersect with the road.

Aspect	Existing conditions and key issues
Transport (both road users and active users)	Technical Report A – *Transport Impact Assessment* found Yan Yean Road to carry 20,000-24,000 vehicles per weekday, through the project area. The volumes are generally lower towards the north end of the road. Yan Yean Road and all arterial roads in the area are gazetted as being suitable for B-doubles and carry reasonable numbers of heavy vehicles. The morning commuter peak period in the area is 6-9am and the afternoon from 3-7pm. The corridor is currently serviced by two bus routes, Mernda Station to Diamond Creek Station and Greensborough to Mernda North. There are only short sections of footpaths for pedestrians and cyclists. These are generally found close to schools (Plenty Valley Christian College, Yarrambat Primary School). Additionally, there are several informal paths along the alignment, used occasionally by pedestrians, cyclists and horse riders. There are currently no formal on-road cycling facilities.
Vegetation – Social and cultural values	Technical Report G – *Landscape Strategy* found existing vegetation along the road corridor makes a recognisable contribution to landscape character, visual amenity or placemaking qualities. Technical Report D – *Social Impact Assessment* found the majority of stakeholder submissions received during the consultation phase on the Scoping Requirements referred to the two Doreen River Red Gums and some focused on the loss of total trees along the alignment. Tree 1265 (adjacent to Yan Yean Road) is listed on the National Trust of Australia as "significant for aesthetic and social reasons at Regional level".

Risk method

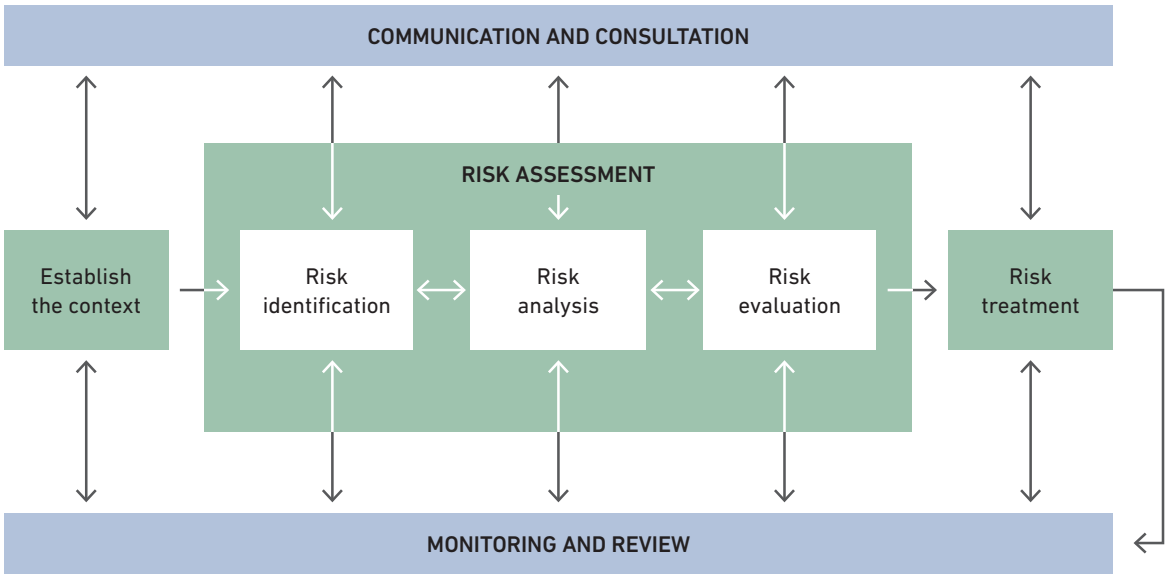
Overview

The Project risk assessment has been carried out in accordance with the MRPV Environmental Risk Management Guideline and International Standard ISO 31000:2018 *Risk management – Guidelines*.

ISO 31000:2018 requires a risk management process to involve the systematic application of policies, procedures and practices to the activities of communicating and consulting, establishing the context and assessing, treating, monitoring, reviewing, recording and reporting risk. This process is shown in Figure 2.

Please refer to Chapter 4 *Environment Effects Statement Assessment Framework* (Section 4.3.3 Risk assessment) and the MRPV Environmental Risk Management Guideline for detailed risk methodology.

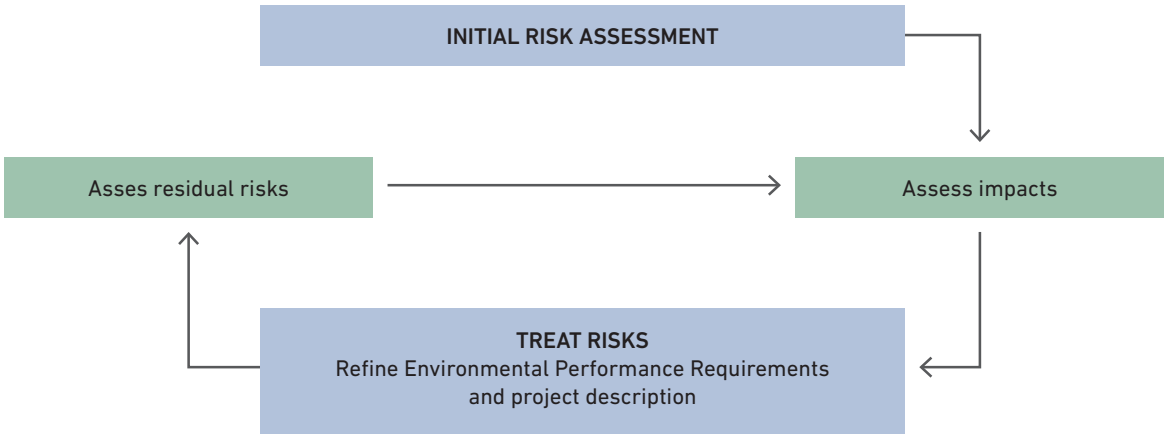
Figure 2 Risk management process



Risk analysis

The risk analysis of consequence, likelihood and level of risk is summarised in Figure 3.

Figure 3 Risk analysis process



The assignment of an initial level of likelihood and consequence for each of the impact pathways took into account standard construction practices and management measures that are typical of a project of this scale and type. Specialists used their professional judgment and experience to assign the appropriate consequence levels.

Likelihood and generic consequence criteria, informed by the MRPV corporate risk matrix, are shown in Table 3 and Table 4. Please refer to Appendix III-B for an aspect-based consequence guide.

Risk ratings were then reassessed following risk evaluation and risk treatment to generate a 'residual' risk rating. Both initial and residual risk ratings are documented in the risk register attached in Appendix III-A.

Risk levels were determined using the matrix in Table 5, which was informed by the MRPV corporate risk matrix.

Table 3 Likelihood criteria

Likelihood	Description
Almost certain	• 76-99% Has occurred before and is expected to occur again • Is expected to occur each year or more frequently • All of the controls associated with the risk are extremely weak/non-existent. Without control improvement there is almost no doubt that the risk will eventuate
Likely	• 51-75% Has occurred before with a chance of it occurring again • Has occurred several times at the Department, Group, Division, Program or Project before • The majority of the controls associated with the risk are weak. Without control improvement it is more likely than not that the risk will eventuate
Possible	• 26-50% Has occurred before with a chance of occurring again • Has occurred at the Department, Group, Division, Program or Project once before • There are some controls that need improvement, however unless there is improvement the risk may eventuate
Unlikely	• 6-25% Has occurred elsewhere before, therefore a small chance of occurring • The majority of controls are strong with no control gaps. The strength of this control environment means that is likely that the risk eventuating would be caused by external factors not known to the organisation
Rare	• 0-5% Has never occurred but may occur • Is expected to occur 1/100 or more years • All controls are strong with no control gaps. The strength of this control environment means that if this risk eventuated, it is most likely as a result of external circumstances outside of the control of the organisation

Table 4 Generic consequence criteria[1]

Consequence	Description
Critical	A critical degree of impact on an environmental asset, value or use of moderate or higher significance
Major	A high degree of impact on an environmental asset, value or use of moderate or higher significance
Moderate	A moderate degree of impact on an environmental asset, value or use of moderate or higher significance
Minor	A low degree of impact on an environmental asset, value or use
Insignificant	A very low degree of impact on an environmental asset, value or use

Table 5 Risk matrix

Likelihood	Consequence level				
	Insignificant	Minor	Moderate	Major	Critical
Almost Certain	Medium	Significant	High	High	High
Likely	Medium	Medium	Significant	High	High
Possible	Low	Medium	Medium	Significant	High
Unlikely	Low	Low	Medium	Medium	Significant
Rare	Low	Low	Low	Medium	Medium

Communication and consultation

Communication and consultation has informed the risk process in a number of ways. Initial risk ratings were tested at a multi-disciplinary facilitated workshop with the project team and suitably qualified specialists held on 24 February 2020 to contribute to a robust environmental risk assessment. The risk register was updated with specialist input following the risk workshop.

1 *Please refer to Appendix III-B for an aspect-based consequence guide*

Risk results

A range of impact pathways were identified and assessed during the risk assessment process. The risk assessment rated these impact pathways as low, medium, significant and high.

This section presents a summary of the impact pathways with initial risks identified as significant and high. The risk register is presented in Appendix III-A.

In some instances, the register shows that risk levels have changed between the initial and residual risk assessment. The change in risk level reflects that between the initial risk assessment and the residual risk assessment the design has been refined and further assessment has been carried out to better understand the impact pathways.

The initial risk ratings are detailed within the environmental risk register in Appendix III-A. The 40 significant and high initial risks are summarised in Table 6 below.

Following implementation of the identified mitigation measures outlined in the Environmental Performance Requirements for the Project, the 21 significant and high residual risks relate to:

- Loss of or damage to remnant, planted or regenerated trees, reducing canopy cover which can affect air temperature, climate, landscape, biodiversity, aesthetic, and recreational values during site establishment, earthworks and civils and structures phases
- Potential removal, destruction or lopping of native vegetation (including patches and scattered trees) during site establishment, earthworks and civils and structures phases
- Potential impact on Commonwealth and/or Victorian listed threatened species and communities, or their habitat (including freshwater ecology) during site establishment, earthworks and civils and structures phases
- Potential impact on wildlife or their habitat during site establishment and operation phases
- Potential changes inconsistent with current or proposed future land use, including land acquisition, severance and occupation during site establishment, earthworks and civils and structures phases
- Potential adverse impacts from construction activities on visual and/or landscape values experienced from sensitive receptors including residential areas, recreational and open spaces, hospitals, educational institutes and community facilities during site establishment phase
- Potential impacts on social and cultural values such as community, educational, religious or recreational facilities due to changes to access or amenity during site establishment and civils and structures phases
- Loss of or damage to remnant, planted or regenerated vegetation during construction impacting on social and cultural values during site establishment, earthworks, civils and structures and reinstatement phases.

The mitigation measures and residual risk ratings are detailed within the environmental risk register in Appendix III-A.

Table 6 Significant and high initial risks and proposed Environmental Performance Requirements

Aspect	Phase	Impact pathway	Initial risk rating	EPR number	Residual risk rating
Effects on transport capacity and connectivity – To provide for an effective corridor through the northern outer suburbs of Melbourne, to improve travel efficiency, road safety, and capacity.					
Transport – Road users	Earthworks, civils and structures	Construction activities impede the efficient movement of road traffic including general traffic, emergency services, public transport (i.e. buses)	Significant	EPR TP2	Medium
Effects on biodiversity – To avoid or, at least, minimise adverse effects on native vegetation (including remnant, planted, regenerated and large old trees), listed migratory and protected species/ecological communities and then to address offset requirements consistent with relevant state and commonwealth policies.					
Ecology – Native vegetation	Site establishment, earthworks, civils and structures	Potential removal, destruction or lopping of native vegetation (including patches and scattered trees)	High	EPR E1, EPR E3	High
Ecology – Threatened species and communities, or their habitat	Site establishment, earthworks, civils and structures	Potential impact on Commonwealth and/or Victorian listed threatened species and communities, or their habitat (including freshwater ecology)	High	EPR E2, EPR E3, EPR E4, EPR E5	Significant
Ecology – Wildlife	Site establishment, operation	Potential impact on wildlife or their habitat	High	EPR E2, EPR E3, EPR E8	Significant
	Earthworks, civils and structures		Significant	EPR E2, EPR E3	Medium
Arboriculture	Site establishment, earthworks, civils and structures	Loss of or damage to remnant, planted or regenerated trees, reducing canopy cover which can affect air temperature, climate, landscape, biodiversity, aesthetic, and recreational values	High	EPR AR1, EPR AR2, EPR AR3	Significant

Aspect	Phase	Impact pathway	Initial risk rating	EPR number	Residual risk rating
Effects on social and cultural values – To avoid or minimise the adverse effects on social and cultural values, including landscape values, Aboriginal and historical cultural heritage values, and remnant, planted and regenerated vegetation, and to maximise the enhancement of these values where opportunities exist.					
Aboriginal cultural heritage	Site establishment, earthworks, civils and structures	Disturbance of known or previously unrecorded Aboriginal cultural heritage potentially impacting on heritage values	Significant	EPR ACH1	Medium
Historical heritage	Earthworks, civils and structures	Potential impact on the values of heritage places and/or archaeological sites	Significant	EPR HH1, EPR HH2, EPR HH3	Medium
Landscape and visual	Site establishment	Potential adverse impacts from construction activities on visual and/or landscape values experienced from sensitive receptors including residential areas, recreational and open spaces, hospitals, educational institutes and community facilities	High	EPR LV1	High
	Earthworks, civils and structures		Significant	EPR LV1	Medium
Vegetation – Social and cultural values	Site establishment, earthworks, civils and structures, reinstatement	Loss of or damage to remnant, planted or regenerated vegetation during construction impacting on social and cultural values	High	EPR V1	Significant
Effects on land use planning – Identify other potential adverse environmental effects of the project, such as on social, land use, community amenity and planning, and canvass an environmental management approach and performance measures to ensure any effects are identified and avoided, minimised or mitigated.					
Land use planning	Site establishment, earthworks, civils and structures	Potential changes inconsistent with current or proposed future land use, including land acquisition, severance and occupation	High	EPR LU1, EPR LU2	Significant
	Reinstatement		Significant	EPR LU1, EPR LU2	Medium
Business	Site establishment, earthworks, civils and structures	Potential business impacts such as displacement or acquisition, or impact to business operation due to changes in access and/or amenity	Significant	EPR B1, EPR B2, EPR B3	Medium

Aspect	Phase	Impact pathway	Initial risk rating	EPR number	Residual risk rating
Social	Site establishment, civils and structures	Potential impacts on social and cultural values such as community, educational, religious or recreational facilities due to changes to access or amenity	High	EPR S1, EPR S2, EPR S3	Significant
	Earthworks, reinstatement		Significant	EPR S1, EPR S2, EPR S3	Medium
Effects on physical environment – Identify other potential adverse environmental effects of the project and canvass an environmental management approach and performance measures to ensure any effects are identified and avoided, minimised or mitigated.					
Noise and vibration	Earthworks, civils and structures	Noise and/or vibration from construction activities potentially impacting on sensitive receptors	Significant	EPR NV1	Medium

Conclusion

This environmental risk assessment process has been undertaken in accordance with the MRPV Environmental Risk Management Guideline. It identifies mitigation measures to ensure that there is a clear, unambiguous and transparent set of controls in place to guide project delivery. While it will not be possible to avoid all effects and impacts, the recommendations and outcomes of the environmental risk assessment provide an effective way to minimise and manage potential risk.

120 impact pathways were assessed as part of this environmental risk assessment. The initial risk assessment rated impact pathways as low, medium, significant or high and assisted to focus assessment and mitigation on areas of significant and high risks. The key mechanism for ensuring risks are effectively mitigated is through the development of a suite of Environmental Performance Requirements (EPRs).

There were 40 significant and high initial risks related to:

- Disturbance of known or previously unrecorded Aboriginal cultural heritage potentially impacting on heritage values during site establishment, earthworks and civils and structures phases
- Loss of or damage to remnant, planted or regenerated trees, reducing canopy cover which can affect air temperature, climate, landscape, biodiversity, aesthetic, and recreational values during site establishment, earthworks and civils and structures phases
- Potential business impacts such as displacement or acquisition, or impact to business operation due to changes in access and/or amenity during site establishment, earthworks and civils and structures phases
- Potential removal, destruction or lopping of native vegetation (including patches and scattered trees) during site establishment, earthworks and civils and structures phases
- Potential impact on Commonwealth and/or Victorian listed threatened species and communities, or their habitat (including freshwater ecology) during site establishment, earthworks and civils and structures phases
- Potential impact on wildlife or their habitat during site establishment, earthworks, civils and structures and operation phases

- Potential impact on the values of heritage places and/or archaeological sites during earthworks and civils and structures phase
- Potential changes inconsistent with current or proposed future land use, including land acquisition, severance and occupation site establishment, earthworks, civils and structures and reinstatement phases
- Potential adverse impacts from construction activities on visual and/or landscape values experienced from sensitive receptors including residential areas, recreational and open spaces, hospitals, educational institutes and community facilities during site establishment, earthworks and civils and structures phases
- Noise and/or vibration from construction activities potentially impacting on sensitive receptors during earthworks and civils and structures phases
- Potential impacts on social and cultural values such as community, educational, religious or recreational facilities due to changes to access or amenity during site establishment, earthworks, civils and structures and reinstatement phases
- Construction activities impede the efficient movement of road traffic including general traffic, emergency services, public transport (i.e. buses) during earthworks and civils and structures phases
- Loss of or damage to remnant, planted or regenerated vegetation during construction impacting on social and cultural values during site establishment, earthworks, civils and structures and reinstatement phases.

Following implementation of the identified mitigation measures outlined in the Environmental Performance Requirements for the Project, the significant and high residual risks relate to:

- Loss of or damage to remnant, planted or regenerated trees, reducing canopy cover which can affect air temperature, climate, landscape, biodiversity, aesthetic, and recreational values during site establishment, earthworks and civils and structures phases
- Potential removal, destruction or lopping of native vegetation (including patches and scattered trees) during site establishment, earthworks and civils and structures phases
- Potential impact on Commonwealth and/or Victorian listed threatened species and communities, or their habitat (including freshwater ecology) during site establishment, earthworks and civils and structures phases
- Potential impact on wildlife or their habitat during site establishment and operation phases
- Potential changes inconsistent with current or proposed future land use, including land acquisition, severance and occupation during site establishment, earthworks and civils and structures phases
- Potential adverse impacts from construction activities on visual and/or landscape values experienced from sensitive receptors including residential areas, recreational and open spaces, hospitals, educational institutes and community facilities during site establishment phase
- Potential impacts on social and cultural values such as community, educational, religious or recreational facilities due to changes to access or amenity during site establishment and civils and structures phases
- Loss of or damage to remnant, planted or regenerated vegetation during construction impacting on social and cultural values during site establishment, earthworks, civils and structures and reinstatement phases.

➔ These risks will be managed by the Project's Environmental Management Framework including Environmental Performance Requirements that manage the identified risks and mitigate potential impacts.

Appendix III-A: Risk register

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
CONSTRUCTION – SITE ESTABLISHMENT													
1	Aboriginal cultural heritage	Disturbance of known or previously unrecorded Aboriginal cultural heritage potentially impacting on heritage values	Site establishment	Likely	Moderate	Significant	Comply with the Cultural Heritage Management Plan (No.15169) when approved by Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation as the Registered Aboriginal Party under the *Aboriginal Heritage Act 2006*. All management conditions and contingencies would be adhered to.	EPR ACH1	Possible	Moderate	Medium	The Aboriginal and Historical Cultural Heritage Impact Assessment (Ecology & Heritage Partners 2020) identified two Aboriginal places within the project area. A draft Cultural Heritage Management Plan (No.15169) has been prepared in consultation with the Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation.	Technical Report F – *Aboriginal and Historical Cultural Heritage Impact Assessment*
2	Air quality	Generation of air emissions from construction works impacting on sensitive receptors such as hospitals, schools or residences	Site establishment	Possible	Minor	Medium	Prepare and implement a Construction Environmental Management Plan which will include processes and measures to manage air quality in accordance with the relevant air quality objectives set out in the existing State Environment Protection Policy (air quality management) and draft Environmental Reference Standard under the *Environment Protection Amendment Act 2018* and other relevant statutory requirements. Best practice measures will include, but not be limited to: • Ensure that all vehicles and machinery are fitted with appropriate emission control equipment, maintained frequently and serviced to the manufacturers' specifications • Smoke from internal combustion engines should not be visible for more than ten seconds • Cover stockpiles or use wet suppression and wind shield to control exposed dust sources • Review construction methodology in response to potential dust generation during dry and windy weather conditions, and in response to site inspection or complaints related to air and/or dust disruption.	EPR AQ1	Unlikely	Minor	Low	The Air Quality Impact Assessment (WSP 2020) found that the largest impact to air quality would mainly be associated with particulate matter emissions during site establishment, earthworks and civil works. The assessment also identified fuel combustion from construction vehicles would generate emissions. The impact on air quality will vary based on vehicle size, however impact will be low with standard mitigation measures applied.	Technical Report M – *Air Quality Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
3	Arboriculture	Loss of or damage to remnant, planted or regenerated trees, reducing canopy cover which can affect air temperature, climate, landscape, biodiversity, aesthetic, and recreational values	Site establishment	Likely	Major	High	During detailed design, review potential tree impacts (particularly to the Doreen River Red Gums and other large/higher value trees), and provide for maximum tree retention where possible. This may be achieved through: • Designing permanent and temporary works to avoid where possible, and otherwise minimise, adverse effects on trees, including the two Doreen River Red Gums • The location and width of walking and cycling paths and footpaths is to be varied further if possible to minimise Tree Protection Zone encroachment • Apply suitable construction techniques to minimise impact on Tree Protection Zones, including limiting excavation depth or building above grade. Include additional retaining walls in the design for high priority trees where appropriate • Optimise design of Safety Barriers to retain trees, such as avoiding trenching and footing • Prepare a Tree Impact Assessment which includes consideration of necessary cut and fill and grading requirements (3D design) which can be undertaken in stages • Establishment of no-go zones to exclude and protect the trees within the project area, with fencing to be as per the Australian Standard 4970-2009 Protection of Trees on Development Sites.	EPR AR1 EPR AR2 EPR AR3	Possible	Major	Significant	C&R Ryder Consulting Pty Ltd completed an Arboriculture Assessment (2020) identified that of the identified a total of 7,030 trees and shrubs were recorded in the project area and a 20-metre buffer zone adjacent to the project area, comprising 2,775 native trees, 707 understorey trees, 2,113 planted native or indigenous trees, and 1,435 exotic trees. The report found 12 trees to have very high retention value, 346 to have high retention value and a further 2,169 to have moderate retention value. C&R Ryder also completed a non-destructive Root Investigation Assessment (2019) near two large River Red Gums at the intersection of Yan Yean Road and Bridge Inn Road. Based on this assessment, the health of the River Red Gum tree adjacent to the northern boundary of Bridge Inn Road (east side of intersection) is declining, whereas the one on the east side of Yan Yean Road (north of intersection) is in good health.	Technical Report C – *Arboriculture Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
3	Continued.	Cont.	Cont.	Cont.	Cont.	Cont.	Prior to construction commencing, develop and implement a Tree Management Plan based on the recommendations of Australian Standard 4970-2009 Protection of Trees on Development Sites. This should be in consultation with the City of Whittlesea and Nillumbik Shire Council and informed by a project arborist (with a minimum qualification of Diploma in Arboriculture (AQF level 5 or equivalent), which covers: • Trees to be removed or retained which will be informed by Tree Impact Assessment • Condition or significance of trees to be removed • Options for relocation and reinstatement of trees if feasible • All tree protection zones and structural root zones • All tree protection fenced off areas and areas where ground protection systems will be used • All services to be located within the tree protection zone and a notation to state that all services will either be located outside of the tree protection zone or bored under the tree protection zone • Location of tree protection measures and ground protection • To reduce tree removal and retain trees for as long as possible, tree removal should be staged with relevant construction works The two Doreen River Red Gums will have specific Tree Management Plans.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
4	Business	Potential business impacts such as displacement or acquisition, or impact to business operation due to changes in access and/or amenity	Site establishment	Likely	Moderate	Significant	Any reduction in the level of access, amenity or function of any business or commercial facility must be mitigated where possible. Prepare and implement a Trader Engagement Plan in accordance with Victorian Small Business Engagement Guidelines to manage impacts to non-acquired businesses and to engage with business and property owners throughout the construction phase. The plan shall include: • Timely information on key project milestones • Changes to traffic conditions and duration of impact • A project construction schedule developed in coordination with transport authorities and City of Whittlesea and Nillumbik Shire Council and in consultation with businesses to minimise cumulative impacts of this and other projects • Plans for signage to notify customers of proposed changes to business operations, including the setting of suitable timeframes for notification prior to commencement of changes • Measures to ensure access to businesses is maintained for customers, delivery and waste removal unless there has been prior engagement with affected businesses (including mutually agreed mitigation measures as required). This could include the installation of directional and business signage to assist customers • Process for registering and management of complaints from affected businesses and potential support services offered • Ensure emergency services are notified ahead of major works • A 24-hour emergency number to reach the construction team.	EPR B1 EPR B2 EPR B3	Possible	Moderate	Medium	Businesses along the alignment with the potential to be impacted by the site establishment phase include: Yarrambat Veterinary Hospital, Smiling Children Childcare and Early Learning Centre, Hippety Hop Childcare, M&S Franco Builders, Personal Training, Firewood, Plenty Valley Christian College, J&C Yeoman Slate Wholesalers & Homestead Farm, Welcome Boarding Kennels and Cattery, golf course (incl. mini golf and associated cafe) and businesses within the Doreen business park. The former Post Office and Doreen General Store and Hadlow and Sons Pet Supplies and Stockfeeds Store at the Bridge Inn Road intersection would be impacted by access changes.	Technical Report E – *Business Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
5	Contaminated land	Excavation, stockpiling, transport and/or disposal of known or previously unrecorded contaminated material (including acid sulfate soils) leading to potential risks to human health and the environment	Site establishment	Possible	Minor	Medium	Prepare and implement a Construction Environmental Management Plan which includes processes and measures to manage contaminated soil that comply with relevant legislation and guidelines, including but not limited to: • Land and water objectives set out in the existing State Environment Protection Policy (Prevention and Management of Contamination of Land) and draft Environment Reference Standard under the *Environment Protection Amendment Act 2018* and other relevant statutory requirements • EPA Publication 1827: Waste classification assessment protocol and EPA Publication 1828: Waste disposal categories – characteristics and thresholds • Environment Protection (Industrial Waste Resource) Regulations 2009 • Industrial Waste Management Policy (Waste Acid Sulfate Soils) 1999 • National Environment Protection (Assessment of Site Contamination) Measures 1999, amended 2013 (ASC NEPM) • WorkSafe Occupational Health and Safety Regulations 2007 (Asbestos). The Construction Environmental Management Plan will include measures such as: • Characterising soil prior to disposal or reuse • Identifying soil containing asbestos and if present, developing management strategies in accordance with the WorkSafe Regulations • Assessing geological formations with naturally enriched metals and applicable spoil management options and or off-site disposal to the satisfaction of EPA Victoria • Identifying suitably licensed facilities for the disposal or treatment of contaminated soil • Management of wastewater • Management of dust, potential stormwater run-off and seepage from stockpiled materials • Undertaking a baseline site assessment of areas proposed for construction laydown prior to use • Protection of the beneficial uses of land associated with current and planned future use.	EPR CL1	Unlikely	Minor	Low	The Limited Environmental Site Assessment (Arcadis 2020) found low pH soil and elevated natural background concentrations of arsenic and fluoride within the study area, however they are consistent with background levels found in the Shire of Nillumbik. If disposal is required, leachate analysis will be required by the receiving landfill prior to disposal. With standard mitigation measures applied, the assessment identified impact from existing contaminated land to sensitive receptors to be low. The Assessment also included soil classification and disposal, with targeted sampling completed adjacent to areas which have been historically used for industrial or commercial purposes.	Technical Report K – *Contaminated Land Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
6	Ecology – Native vegetation	Potential removal, destruction or lopping of native vegetation (including patches and scattered trees)	Site establishment	Likely	Major	High	Develop and implement measures to avoid and otherwise minimise impacts, to the extent practicable, on native vegetation through detailed design and construction, including: • Minimising footprint and disturbance of temporary and permanent works during detailed design • Further minimisation of native tree loss during detailed design, prioritising retention of large and hollow-bearing trees • Trees for which the Project will impact <10% of the Tree Protection Zone (TPZ) are likely to be able to be retained. For these specific trees, once construction methods are better known, a detailed arborist assessment should be conducted • Implementation of no-go zones • Develop a Construction Environmental Management Plan, including requirements and methods for: – Fencing protected areas and no-go zones to prevent access during construction – Vegetation clearing controls and protection measures, including protocols such as pre-clearing surveys, two-stage clearing, minimised clearing during spring where practicable, and phased removal wherever practicable – Pathogen mitigation, management, monitoring and reporting measures – Fire risk management measures – Reduction of weed risk – Development and implementation of a Tree Management Plan for protection of retained trees based on the recommendations of Australian Standard 4970-2009 Protection of Trees on Development Sites • Native vegetation removal must be avoided, minimised and offset in accordance with DELWP's Guidelines for the removal, destruction or lopping of native vegetation 2017 (DELWP 2017c).	EPR E1 EPR E3	Likely	Major	High	Initial vegetation mapping was undertaken by Ecology and Heritage Partners in 2017. Arcadis undertook further mapping and habitat hectare assessments in 2018 that were ground-truthed and refined by WSP in May 2019 which was updated in July 2020. SMEC completed an impact assessment in 2020. The likely impacts to native vegetation from the Project are the removal of 11.888 ha of vegetation, 470 understory trees, 174 large trees and 1814 scattered trees that provide habitat for a range of flora and fauna species. Seven Ecological Vegetation Classes (EVCs) were recorded within the study area including the following: • EVC 22 Grassy Dry Forest (Least Concern) • EVC 47 Valley Grassy Forest (Vulnerable) • EVC 55 Plains Grassy Woodland (Endangered) • EVC 647 Plains Sedgy Wetland (Endangered) • EVC 653 Aquatic Herbland (no status) • EVC 821 Tall Marsh (Vulnerable) • EVC 937 Swampy Woodland (Endangered) General offset requirement (further offsets are detailed in the threatened species and communities impact pathway): The Project requires a general offset amount of 4.478 ha of general units to be provided within Port Phillip and Westernport Catchment Management Authority (CMA) or Nillumbik Shire and Whittlesea City Council. Total number of large trees that the offset must protect is 174.	Technical Report B1 – *Biodiversity Existing Conditions Report* Technical Report B2 – *Biodiversity Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
7	Ecology – Threatened species and communities, or their habitat	Potential impact on Commonwealth and/or Victorian listed threatened species and communities, or their habitat (including freshwater ecology)	Site establishment	Likely	Major	High	Develop and implement measures to avoid and otherwise minimise impacts, to the extent practicable, on listed species, ecological communities, wildlife and their habitat through detailed design and construction, including: • Minimising footprint and disturbance of temporary and permanent works • Installation of rope bridges in key connectivity areas for arboreal mammals, to be installed as early as practicable during construction, constructed in accordance with the MRPV Fauna Sensitive Road Design Guideline (2019) • Complying with the mitigation measures specified in the Swift Parrot Management Plan • Avoidance of transparent or reflective materials to minimise the potential for birds or other fauna to collide with them. This includes bus shelters, barriers, fencing, and signage • Avoidance of chain-mesh fencing and barbed wire. If chain mesh fencing is required, it must be designed to minimise collision risk • Develop a CEMP including requirements and methods for: – Fencing protected areas and no-go zones to prevent access during construction – Vegetation clearing controls and protection measures – Retention of dead, declining, or impacted trees for habitat where practicable – Measures during clearing and construction (including weed and disease hygiene) – Minimise impact of construction lighting through consideration of siting, direction and fixtures – Listed species habitat to be removed during construction works should be phased to the relevant works wherever practicable • Where Matted Flax-lily is to be impacted, implement a salvage and translocation plan for the removal of Matted Flax-lily.	EPR E2 EPR E3 EPR E4 EPR E5	Possible	Major	Significant	The Project has the potential to impact the following threatened species: • Impacts to two Matted Flax-lily listed under the EPBC Act as Endangered, Flora and Fauna Guarantee Act 1988 (FFG Act) listed, and listed as endangered on the Victorian Advisory List of Threatened Plants (VicAdv) • Loss of one Studley Park Gum Eucalyptus from direct removal listed VicAdv endangered • Loss of three Pale-flowered Crane's-bill listed under the Advisory List • Impacts to potential habitat for the following threatened fauna: – Potential foraging habitat for Swift Parrot, including the loss of up to 1693 preferred and secondary potential foraging trees (95 large trees, 1598 small trees); – Potential foraging habitat for Grey-headed Flying-fox, including loss of up to 2521 eucalypts (174 large trees, 2347 small trees); – Potential dispersal habitat for Brush-tailed Phascogale will be fragmented; and – Potential grassland habitat for Tussock Skink. An assessment was undertaken of the potential for cumulative impacts on Swift Parrot based on the Project proposing to remove preferred and secondary potential foraging trees. Swift Parrots have not been recorded using potential habitat – preferred foraging trees – in the Project area. Within the Project area, 364 preferred foraging trees are proposed to be removed. Of these, 15 are large trees (i.e. over 60 cm DBH). Of the 15 large preferred foraging trees, 14 are expected to provide potential foraging resources for Swift Parrots based on their size, health and condition.	Technical Report B1 – *Biodiversity Existing Conditions Report* Technical Report B2 – *Biodiversity Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
7	Continued.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Native vegetation species offset: Species offsets is required to be provided for Little Pink Spider orchid (1.861 species units).	Cont.
8	Ecology – Wildlife	Potential impact on wildlife or their habitat	Site establishment	Likely	Major	High	Develop and implement measures to avoid and otherwise minimise impacts, to the extent practicable, on listed species, ecological communities, wildlife and their habitat through detailed design and construction, including: • Installation of rope bridges in key connectivity areas for arboreal mammals, to be installed as early as practicable during construction, constructed in accordance with the MRPV Fauna Sensitive Road Design Guideline (2019) • Develop a CEMP including requirements and methods for: – Egress points for fauna (particularly kangaroos) in construction fencing. Construction personnel to report fauna entrapment and traffic control to slow or stop vehicles when wildlife is sighted to minimise collision risk – Pre-clearing survey and two-stage clearing, based on the protocols in the Flora and Fauna Impact Assessment – Minimise clearing during spring where practicable – Trench management, including avoiding open trenches overnight where practicable. Where trenches cannot be closed, check trenches early in the morning – Vegetation and habitat to be removed during construction works should be phased to the relevant works wherever practicable • Strategic revegetation to minimise long term fragmentation impacts to be incorporated into the Landscape Strategy.	EPR E2 EPR E3	Possible	Major	Significant	The Project is likely to impact non-listed fauna through loss of habitat and mortality. This includes arboreal mammals, reptiles, larger terrestrial mammals including Eastern Grey Kangaroos, and numerous birds. Lessons learnt from Yan Yean Road Stage 1 indicated the importance of considering kangaroo exit points given the interface with traffic. This has also been highlighted in the WSP Flora and Fauna Impact Assessment.	Technical Report B1 – *Biodiversity Existing Conditions Report* Technical Report B2 – *Biodiversity Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
9	Groundwater	Potential changes to groundwater levels or flows from construction works, resulting in impacts on groundwater quality and / or beneficial uses	Site establishment	Unlikely	Minor	Low	The Construction Environmental Management Plan will include processes and measures to manage groundwater in accordance with the relevant water objectives set out in the existing State Environment Protection Policy (Waters) and draft Environment Reference Standard under the *Environment Protection Amendment Act 2018*, Water Industry Regulations 2006 (Vic) and other relevant statutory requirements.	EPR GW1	Unlikely	Minor	Low	The Groundwater Impact Assessment (Arcadis 2020) identified the water table to be 60m below surface level, therefore it is unlikely that the water table will be intersected during the Project. In the case that shallow perched groundwater is identified or fuel or chemical spills occur, standard mitigation measures should be employed to mitigate impact.	Technical Report J – *Groundwater Impact Assessment*
10	Historical heritage	Potential impact on the values of heritage places and/or archaeological sites	Site establishment	Possible	Moderate	Medium	Designing permanent and temporary works to avoid where possible, and otherwise minimise, adverse effects on the two Doreen River Red Gums (HO191) and St. Michael Anglican Church (HO219). As part of the Construction Environmental Management Plan, there would be an archaeological discovery protocol that specifies measures to avoid and minimise impacts on any previously unidentified historical archaeological sites and values discovered during construction. The management protocol must be consistent with the requirements of the *Heritage Act 2017* and include procedures for ceasing work if human remains or archaeological artefacts are discovered, notifying Heritage Victoria of the find, obtaining consent to deal with the find, and dealing with the find in accordance with the consent. All personnel on site must undertake a Cultural Heritage Awareness Induction prior to commencing work, which would include information on the Doreen River Red Gums.	EPR HH1 EPR HH2 EPR HH3	Possible	Moderate	Medium	The Aboriginal and Historical Cultural Heritage Impact Assessment (Ecology & Heritage Partners 2020) identified one Heritage Overlay (HO191) for the two Doreen River Red Gums. These trees have cultural significance to the community, and therefore must be avoided.	Technical Report F – *Aboriginal and Historical Cultural Heritage Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
11	Land use planning	Potential changes inconsistent with current or proposed future land use, including land acquisition, severance and occupation	Site establishment	Almost Certain	Major	High	The Project must be designed and constructed to: • Minimise the design footprint and avoid, to the extent practicable, any temporary and permanent impacts on the following land uses: – Parks and reserves – Other sensitive land uses such as educational facilities – Recreational and community facilities – Residential properties – Commercial and industrial sites. • Consolidate or minimise the fragmentation of, and provide access to, residual land parcels to support future viable land use to the extent practicable • Consultation must occur with land managers and/or authorities responsible for the implementation of the relevant strategic land use plans and policies, including City of Whittlesea, Shire of Nillumbik, Melbourne Water and Yarra Valley Water.	EPR LU1 EPR LU2	Possible	Major	Significant	WSP has completed a Planning and Land Use Impact Assessment in 2020. According to this assessment, the Project is located in predominantly low density residential and rural living area within the metropolitan Green Wedge. The northern western end of the Project is within the Whittlesea Growth Corridor which is experiencing rapid land use change from rural living to residential. The Project's impacts on existing land uses during construction have been identified as follows: • Using Yan Yean Road for a purpose than a movement corridor (i.e. temporary construction and laydown areas and temporary site offices) • Potential relocation of existing utility services • Amenity impacts including disruption to access, air quality, noise, visual and an increase in construction traffic.	Technical Report H – *Planning and Land Use Impact Assessment*
12	Landscape and visual	Potential adverse impacts from construction activities on visual and/or landscape values experienced from sensitive receptors including residential areas, recreational and open spaces, hospitals, educational institutes and community facilities	Site establishment	Likely	Critical	High	To avoid where possible, and otherwise minimise adverse effects on landscape values in accordance with the Project's Landscape Strategy, through mitigation measures such as: • Develop potential and proposed design options and measures that can avoid or minimise significant direct and indirect effects on trees or other landscape elements – with a focus on high value vegetation as identified within the Landscape Strategy's 'Cultural Value of Vegetation Assessment' • Prior to construction commencing, develop a Tree Management Plan based on the recommendations of Australian Standard 4970-2009 Protection of Trees on Development Sites. This should be in consultation with the City of Whittlesea and Nillumbik Shire Council and informed by a project arborist (with a minimum qualification of Diploma in Arboriculture (AQF level 5 or equivalent)	EPR LV1	Likely	Major	High	A Landscape Strategy is being developed in consultation with Councils and other key stakeholders to ensure that the Project fits sensitively into the built, natural and cultural environment of Doreen and Yarrambat. The strategy will ensure that the landscape response is well designed and contributes to the character and functioning of the Yan Yean Road corridor and the surrounding area, as well as the accessibility and connectivity of people within the wider region and community.	Technical Report G – *Landscape Strategy*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
12	Continued.	Cont.	Cont.	Cont.	Cont.	Cont.	• Develop strategies to address the loss of trees or other landscape elements • Retain and reinforce key existing views as identified within the Landscape Strategy. Design permanent and temporary works to minimise adverse visual impact, particularly in relation to: • Heritage values • Existing and proposed landmark elements across the Project • High value vegetation as identified within the Landscape Strategy's 'Cultural Value of Vegetation Assessment' • Community and recreational centres and open space, including existing Council masterplans for Doreen Recreational Reserve, Yarrambat Park & Golf Course and Yarrambat Township • Residential interfaces • Business interfaces.	Cont.	Cont.	Cont.	Cont.	The Project will seek to provide new and reinstated landscapes that are appropriate to the local conditions, consistent with the existing varied character of the area, provide opportunities to increase canopy cover wherever possible and provide improved public realm amenity.	Cont.
13	Noise and vibration	Noise and/or vibration from construction activities potentially impacting on sensitive receptors	Site establishment	Possible	Moderate	Medium	Prepare and implement a Construction Environmental Management Plan in accordance with the relevant noise objectives in the Environment Reference Standard under the *Environment Protection Amendment Act 2018*, EPA Publication 1254 (Noise Control Guidelines), EPA Publication 480 (EPA Environmental Guidelines for Major Construction Sites) and other relevant statutory requirements. The CEMP should include measures, such as (but not limited to): • Fit and maintain appropriate mufflers on earth-moving and other vehicles on the site • Enclose noisy equipment • Provide noise attenuation screens, where appropriate • Where an activity is likely to cause a noise nuisance to nearby residents, restrict operating hours to between 7 am and 6 pm weekdays and 7 am to 1 pm Saturday, except where, for practical reasons, the activity is unavoidable • Undertake targeted noise monitoring of construction activities that are expected to cause higher impacts (if required), and modify management actions as necessary	EPR NV1	Unlikely	Minor	Low	The Noise and Vibration Impact Assessment (WSP 2020) identified that construction is likely to have adverse noise and vibration impacts to sensitive receptors, which can be mitigated with standard measures. The site establishment works are not expected to have significant noise/ vibration generating activities, and extend periods of out-of-hours works.	Technical Report I – *Noise and Vibration Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
13	Continued.	Cont.	Cont.	Cont.	Cont.	Cont.	• Advise local residents when unavoidable out-of-hours work will occur • Schedule deliveries to the site so that disruption to local amenity and traffic are minimised • Conduct a study on the impact of ground vibration from construction activities, where these operations occur within 50 metres of a building and take appropriate action • A noise and vibration communications subplan for advising on the requirements for informing the community of work scheduling and working hours.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.
14	Social	Potential impacts on social and cultural values such as community, educational, religious or recreational facilities due to changes to access or amenity	Site establishment	Likely	Major	High	To develop and implement measures to avoid and minimise impacts on social and cultural values, including: • Designing permanent and temporary works to avoid where possible, and otherwise minimise adverse effects on the two Doreen River Red Gums • Minimising where practicable, impact to the former Post Office and General Store in consultation with the existing owners, tenants and Councils • Continue one-on-one consultation with all owners and tenants, particularly the tenants and owner of 920/920A Yan Yean Road (former Post Office and General Store and Stockfeed store), to outline the acquisition and compensation process (if required), and provide clear timelines of proposed action • Detailed design to protect and, where practicable, improve access to amenity for potentially affected residents, open space, social and community infrastructure and commercial facilities, and implementing the principles of Crime Prevention Through Environmental Design.	EPR S1 EPR S2 EPR S3	Possible	Major	Significant	Community, educational, religious or recreational facilities along the alignment with the potential to be impact by construction include: Yarrambat Park Golf Course and community groups in Yarrambat Park, Yarrambat Primary School, Plenty Valley Christian College, Butterflies and Smiling Childcare and Early Learning Centres. Community groups will be notified of impacts and where possible the works will manage service in and out of Yarrambat Park and their direct business access. WSP completed a Social and Cultural Values Impact Assessment for the Project in 2020.	Technical Report D – *Social Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
14	Continued.	Cont.	Cont.	Cont.	Cont.	Cont.	Develop and implement a Communications and Stakeholder Engagement Plan to engage and consult the community and affected stakeholders and discuss progress of construction activities and operation. The Communications and Stakeholder Engagement Plan must consider measures to: • Maintain community safety through appropriate measures such as providing convenient and safe access across Yan Yean Road at all bus stops, activity nodes and places of community significance • Ensure that the construction program considers the use of facilities, operating hours and peak visitation times • Ensure that communities are notified of construction and changes well in advance of works commencing as approved by MRPV • Ensure that the consultation program includes provision for onsite signage of affected properties that provide a service to the local or regional community • Engage impacted residents in the preparation of a landscaping plan to offset the impacts of trees removed through acquisition and construction, and help ensure that the landscaping adds to the valued character of the local area • Attempt to contact memorial makers to organise relocation • Make provision for a twenty-four hour phone number to be available to the community to report concerns.	Cont.	Cont.	Cont.	Cont.	Overall, the Project will generate benefits for local community through increased safety, reduced congestion, and enhanced opportunities for non-vehicle transport. The Yarrambat Veterinary Hospital has been identified as a facility likely to experience the greater impacts, although they are not considered significant overall. The Aboriginal and Historical Cultural Heritage Impact Assessment (Ecology & Heritage Partners 2020) identified a former Post Office and General Store which has no statutory protections but is of interest to locals and as such should be avoided if practicable.	Cont.

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
15	Surface water	Potential changes to stormwater flows as a result of site works, and/or adverse impacts on water quality and beneficial uses including waterway health and listed Wetlands (if applicable)	Site establishment	Unlikely	Minor	Low	The Construction Environmental Management Plan will include processes and measures to manage surface water in accordance with the relevant water objectives set out in the existing State Environment Protection Policy (Waters) and draft Environment Reference Standard under the *Environment Protection Amendment Act 2018*, Melbourne Water Performance Criteria and other relevant statutory requirements. Mitigation measures to inform the Construction Environmental Management Plan will be established in accordance with Melbourne Water and Council requirements, contract specifications, EPA Publications 275, 480 and 960 and include: • Best practice sediment and erosion control • Maintenance of existing flow paths, drainage lines and floodplain storage, or in the case where existing flow paths will be modified, mitigate the effects of changes to flow where practicable • Water quality monitoring during construction and management of drainage infrastructure to be carried out in accordance with MRPV's Integrated Water Management Guideline (2019) • Stormwater or flood modelling mitigation solutions for temporary works as required • Flood emergency management including consideration of scheduling works • Maximise the visual and aesthetic amenity of waterways having regard to any relevant development plans in consultation with Melbourne Water • Refuelling in designated areas where hardstand is present and removal of impacted soils following minor spills.	EPR SW1 SW2	Unlikely	Minor	Low	The Surface Water Impact Assessment (WSP 2020) identified erosion from construction sites have the potential to contribute large sediment loads to downstream areas. Water supplies may be needed during construction for dust control and other such purposes. Depending on the quantities needed, there may be an impact on users of the water resource and aquatic fauna and flora. Regular site supervision and consultation with key stakeholders will ensure the Construction Environmental Management Plan (CEMP) is being fully implemented. In addition to this, reviews and improvements to the CEMP will be carried out when necessary to ensure Project compliance with listed published guidelines and Project specifications.	Technical Report L – *Surface Water Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
16	Sustainability (including greenhouse gas emissions)	Inefficient use of resources such as consumption of fossil fuels for electricity generation and operation of plant and equipment during construction resulting in the release of excess greenhouse gas emissions	Site establishment	Likely	Minor	Medium	Integrate sustainable design and construction practices to minimise, to the extent practicable, resource use particularly greenhouse gas emissions from construction of the Project		Unlikely	Minor	Low	The Air Quality Impact Assessment (WSP 2020) found the total emissions generated through construction to total 31,314 t CO2-e over an 18-month period.	Technical Report M – *Air Quality Impact Assessment*
17	Transport – Active users	Construction activities impede the efficient movement of active users, including pedestrians, cyclists and horse riders.	Site establishment	Possible	Moderate	Medium	To mitigate impacts associated with construction activities on active transport users, a Traffic Management Plan should be completed in consultation with the appropriate road management authorities, Nillumbik Shire Council and Whittlesea Council in accordance with AS1742.3-2009. The Traffic Management Plan should clearly outline traffic control measures that: • Minimise access restrictions and disruption to all active transport users including pedestrians, cyclists and horse riders • Consider impacts on both formal and informal pedestrian access, paths and trails • At a minimum adhere to safe construction practices in accordance with WorkSafe and road authority requirements • Consider the needs of vulnerable road users and in particular pedestrian and cyclist paths and crossings at the schools along the route. • Consider the needs of horse riders, in consultation with the Pony Club • Provide detour routes for affected active transport users • Maintain community engagement with advance warning of changed traffic conditions	EPR TP2	Unlikely	Moderate	Medium	Construction staging and appropriate traffic management is key to maintaining safe traffic flow. • Staging details and traffic management approach will ultimately be determined by the contractor in consultation with relevant authorities. Construction staging may include: • Constructing the majority of the second carriageway offline while maintaining traffic flow on the existing carriageway. • Switching the traffic flow to the second carriageway to allow upgrade of the old carriageway. • Temporary closures (off peak times) to traffic may be required for constructing complicated intersections Community engagement • Staging is expected to have impacts on local direct access at times – communication with residents is essential	Technical Report A – *Transport Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
18	Transport – Road users	Construction activities impede the efficient movement of road traffic including general traffic, emergency services, public transport (i.e. buses)	Site establishment	Likely	Minor	Medium	To mitigate impacts associated with construction activities on road users, a Traffic Management Plan should be completed in consultation with the appropriate road management authorities, Nillumbik Shire Council and Whittlesea Council in accordance with AS1742.3-2009. The Traffic Management Plan should clearly outline traffic control measures that: • Minimise access restrictions and disruption to all active transport users including pedestrians, cyclists and horse riders • Consider impacts on both formal and informal pedestrian access, paths and trails • At a minimum adhere to safe construction practices in accordance with WorkSafe and road authority requirements • Consider the needs of vulnerable road users and in particular pedestrian and cyclist paths and crossings at the schools along the route. • Provide detour routes where required • Are coordinated with other works occurring in the area where construction timeframes overlap • Maintain community engagement with advance warning of changed traffic conditions.	EPR TP2	Likely	Insignificant	Medium	Construction staging and appropriate traffic management is key to maintaining safe traffic flow. • Staging details and traffic management approach will ultimately be determined by the contractor in consultation with relevant authorities. Construction staging may include: • Constructing the majority of the second carriageway offline while maintaining traffic flow on the existing carriageway. • Switching the traffic flow to the second carriageway to allow upgrade of the old carriageway. • Temporary closures (off peak times) to traffic may be required for constructing complicated intersections Community engagement • Staging is expected to have impacts on local direct access at times – communication with residents is essential • Given that the Project is within a growth area, coordination of detour routes, closure times, signage and communication across the Project and other nearby projects under construction.	Technical Report A – *Transport Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
19	Transport – Road users	Construction activities result in access changes for adjacent residents and businesses that increase trip lengths and travel times. Examples include converting 'all movements' access to left in/left out and turn bans at intersections	Site establishment	Likely	Minor	Medium	A Traffic Management Plan should be completed in consultation with the appropriate road management authorities, Nillumbik Shire Council and Whittlesea Council in accordance with AS1742.3-2009. The project should be completed in stages to minimise impact. The Traffic Management Plan should clearly outline traffic control measures that: • Minimise access restrictions • Consider the viability of alternative routes available and impacts of additional turning traffic along these routes. • At a minimum adhere to safe construction practices in accordance with WorkSafe and road authority requirements • Maintain community engagement with advance warning of changed access conditions.	EPR TP2	Likely	Insignificant	Medium	It is expected that access to some properties along Yan Yean Road will need to be altered for construction (and some will also be permanently altered as part of the design). The details of which locations and how this will be managed are not currently known and will be determined by the contractor.	Technical Report A – *Transport Impact Assessment*
20	Vegetation – Social and cultural values	Loss of or damage to remnant, planted or regenerated vegetation during construction impacting on social and cultural values	Site establishment	Likely	Major	High	• Design permanent and temporary works to avoid where possible, and otherwise minimise adverse effects on high value vegetation as identified within the Landscape Strategy's 'Cultural Value of Vegetation Assessment'. Where required, removal of vegetation should be phased wherever practicable to temporarily reduce visual impacts • Prior to construction commencing works, develop a Tree Management Plan based on the recommendations of Australian Standard 4970-2009 Protection of Trees on Development Sites. This should be in consultation with the City of Whittlesea and Nillumbik Shire Council and informed by a project arborist (with a minimum qualification of Diploma in Arboriculture (AQF level 5 or equivalent)	EPR V1	Possible	Major	Significant	WSP prepared a Social and Cultural Values Impact Assessment (2020) which found that the majority of stakeholder submissions received during the consultation phase on the Scoping Requirements referred to the two River Red Gums and some focused on the loss of total trees along the alignment. Tree 1265 (adjacent to Yan Yean Road) is listed on the National Trust of Australia as "significant for aesthetic and social reasons at Regional level". Given these identified social and cultural values, it is considered likely that loss of damage to planted or regenerated vegetation, particularly the River Red Gums, will have a major impact on the community. The Landscape Strategy for the Project will be sympathetic to existing values and seek to mitigate impacts.	Technical Report G – *Landscape Strategy* Technical Report D – *Social Impact Assessment* Technical Report F – *Aboriginal and Historical Cultural Heritage Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
CONSTRUCTION – EARTHWORKS													
21	Aboriginal cultural heritage	Disturbance of known or previously unrecorded Aboriginal cultural heritage potentially impacting on heritage values	Earthworks	Likely	Moderate	Significant	Comply with the Cultural Heritage Management Plan (No.15169) when approved by Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation as the Registered Aboriginal Party under the *Aboriginal Heritage Act 2006*. All management conditions and contingencies would be adhered to.	EPR ACH1	Possible	Moderate	Medium	The Aboriginal and Historical Cultural Heritage Impact Assessment (Ecology & Heritage Partners 2020) identified two Aboriginal places within the project area. A draft Cultural Heritage Management Plan (No.15169) has been prepared in consultation with the Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation.	Technical Report F – *Aboriginal and Historical Cultural Heritage Impact Assessment*
22	Air quality	Generation of air emissions from construction works impacting on sensitive receptors such as hospitals, schools or residences	Earthworks	Possible	Minor	Medium	Implement the Construction Environmental Management Plan which will include processes and measures to manage air quality in accordance with the relevant air quality objectives set out in the existing State Environment Protection Policy (air quality management) and draft Environmental Reference Standard under the *Environment Protection Amendment Act 2018* and other relevant statutory requirements. Best practice measures will include, but not be limited to: • Ensure that all vehicles and machinery are fitted with appropriate emission control equipment, maintained frequently and serviced to the manufacturers' specifications • Smoke from internal combustion engines should not be visible for more than ten seconds • Cover stockpiles or use wet suppression and wind shield to control exposed dust sources • Review construction methodology in response to potential dust generation during dry and windy weather conditions, and in response to site inspection or complaints related to air and/or dust disruption.	EPR AQ1	Unlikely	Minor	Low	The Air Quality Impact Assessment (WSP 2020) found that the largest impact to air quality would mainly be associated with particulate matter emissions during site establishment, earthworks and civil works. The assessment also identified fuel combustion from construction vehicles would generate emissions. The impact on air quality will vary based on vehicle size, however impact will be low with standard mitigation measures applied.	Technical Report M – *Air Quality Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
23	Arboriculture	Loss of or damage to remnant, planted or regenerated trees, reducing canopy cover which can affect air temperature, climate, landscape, biodiversity, aesthetic, and recreational values	Earthworks	Likely	Major	High	During detailed design, review potential tree impacts (particularly to the Doreen River Red Gums and other large/higher value trees), and provide for maximum tree retention where possible. This may be achieved through: • Designing permanent and temporary works to avoid where possible, and otherwise minimise, adverse effects on trees, including the two Doreen River Red Gums • The location and width of walking and cycling paths and footpaths is to be varied further if possible to minimise Tree Protection Zone encroachment • Apply suitable construction techniques to minimise impact on Tree Protection Zones, including limiting excavation depth or building above grade. Include additional retaining walls in the design for high priority trees where appropriate • Optimise design of Safety Barriers to retain trees, such as avoiding trenching and footing • Prepare a Tree Impact Assessment which includes consideration of necessary cut and fill and grading requirements (3D design) which can be undertaken in stages • Establishment of no-go zones to exclude and protect the trees within the project area, with fencing to be as per the Australian Standard 4970-2009 Protection of Trees on Development Sites. Implement the Tree Management Plan developed in consultation with the City of Whittlesea and Nillumbik Shire Council and informed by a project arborist (with a minimum qualification of Diploma in Arboriculture (AQF level 5 or equivalent).	EPR AR1 EPR AR2 EPR AR3	Possible	Major	Significant	C&R Ryder Consulting Pty Ltd completed an Arboriculture Assessment (2020) identified a total of 7,030 trees and shrubs were recorded in the project area and a 20-metre buffer zone adjacent to the project area, comprising 2,775 native trees, 707 understorey trees, 2,113 planted native or indigenous trees, and 1,435 exotic trees. The report found 12 trees to have very high retention value, 346 to have high retention value and a further 2,169 to have moderate retention value. C&R Ryder also completed a non-destructive Root Investigation Assessment (2019) near two large River Red Gums at the intersection of Yan Yean Road and Bridge Inn Road. Based on this assessment, the health of the River Red Gum tree adjacent to the northern boundary of Bridge Inn Road (east side of intersection) is declining, whereas the one on the east side of Yan Yean Road (north of intersection) is in good health. The assessment concluded that very little root damage is expected based on the proposed alignment in 2019 subject to the excavation not exceeding 600-800mm without additional investigation.	Technical Report C – *Arboriculture Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
24	Business	Potential business impacts such as displacement or acquisition, or impact to business operation due to changes in access and/or amenity	Earthworks	Likely	Moderate	Significant	Any reduction in the level of access, amenity or function of any business or commercial facility must be mitigated where possible. Implement the Trader Engagement Plan to manage impacts to non-acquired businesses and to engage with business and property owners throughout the construction phase to ensure all stakeholders are aware of impacts.	EPR B1 EPR B2 EPR B3	Possible	Moderate	Medium	Businesses along the alignment with the potential to be impacted by the site establishment phase include: Yarrambat Veterinary Hospital, Smiling Children Childcare and Early Learning Centre, Hippety Hop Childcare, M&S Franco Builders, Personal Training, Firewood, Plenty Valley Christian College, J&C Yeoman Slate Wholesalers & Homestead Farm, Welcome Boarding Kennels and Cattery, golf course (incl. mini golf and associated cafe) and businesses within the Doreen business park. The former Post Office and Doreen General Store and Hadlow and Sons Pet Supplies and Stockfeeds Store at the Bridge Inn Road intersection would be impacted by access changes.	Technical Report E – *Business Impact Assessment*
25	Contaminated land	Excavation, stockpiling, transport and/or disposal of known or previously unrecorded contaminated material (including acid sulfate soils) leading to potential risks to human health and the environment	Earthworks	Possible	Minor	Medium	Implement a Construction Environmental Management Plan which includes processes and measures to manage contaminated soil that comply with relevant legislation and guidelines, including but not limited to: • Land and water objectives set out in the Environment Reference Standard under the *Environment Protection Amendment Act 2018* and other relevant statutory requirements • EPA Publication 1827: Waste classification assessment protocol and EPA Publication 1828: Waste disposal categories – characteristics and thresholds • Environment Protection (Industrial Waste Resource) Regulations 2009 • Industrial Waste Management Policy (Waste Acid Sulfate Soils) 1999 • National Environment Protection (Assessment of Site Contamination) Measures 1999, amended 2013 (ASC NEPM) • WorkSafe Occupational Health and Safety Regulations 2007 (Asbestos).	EPR CL1	Unlikely	Minor	Low	The Contaminated Land Impact Assessment (Arcadis 2020) found low pH soil and elevated natural background concentrations of arsenic and fluoride within the study area, however they are consistent with background levels found in the Shire of Nillumbik. If disposal is required, leachate analysis will be required by the receiving landfill prior to disposal. With standard mitigation measures applied, the assessment identified impact from existing contaminated land to sensitive receptors to be low. The Assessment also included soil classification and disposal, with targeted sampling completed adjacent to areas which have been historically used for industrial or commercial purposes.	Technical Report K – *Contaminated Land Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
25	Continued.	Cont.	Cont.	Cont.	Cont.	Cont.	The Construction Environmental Management Plan will include measures such as: • Characterising soil prior to disposal or reuse • Identifying soil containing asbestos and if present, developing management strategies in accordance with the WorkSafe Regulations • Assessing geological formations with naturally enriched metals and applicable spoil management options and or off-site disposal to the satisfaction of EPA Victoria • Identifying suitably licensed facilities for the disposal or treatment of contaminated soil • Management of wastewater • Management of dust, potential stormwater run-off and seepage from stockpiled materials • Undertaking a baseline site assessment of areas proposed for construction laydown prior to use • Protection of the beneficial uses of land associated with current and planned future use.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.
26	Ecology – Native vegetation	Potential removal, destruction or lopping of native vegetation (including patches and scattered trees)	Earthworks	Likely	Major	High	Develop and implement measures to avoid and otherwise minimise impacts, to the extent practicable, on native vegetation through detailed design and construction, including: • Minimising footprint and disturbance of temporary and permanent works during detailed design • Further minimisation of native tree loss during detailed design, prioritising retention of large and hollow-bearing trees • Trees for which the Project will impact <10% of the Tree Protection Zone (TPZ) are likely to be able to be retained. For these specific trees, once construction methods are better known, a detailed arborist assessment should be conducted • Implementation of no-go zones	EPR E1 EPR E3	Likely	Major	High	Initial vegetation mapping was undertaken by Ecology and Heritage Partners in 2017. Arcadis undertook further mapping and habitat hectare assessments in 2018 that were ground-truthed and refined by WSP in May 2019 which was updated in July 2020. SMEC undertook an impact assessment in 2020.. The likely impacts to native vegetation from the Project are the removal of 11.888 ha of vegetation, 470 understory trees, 174 large trees and 1814 scattered trees that provide habitat for a range of flora and fauna species..	Technical Report B1 – *Biodiversity Existing Conditions Report* Technical Report B2 – *Biodiversity Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
26	Continued.	Cont.	Cont.	Cont.	Cont.	Cont.	• Implementation of the Construction Environmental Management Plan, including requirements and methods for: – Fencing protected areas and no-go zones to prevent access during construction – Vegetation clearing controls and protection measures, including protocols such as pre-clearing surveys, two-stage clearing, minimised clearing during spring where practicable, and phased removal wherever practicable – Pathogen mitigation, management, monitoring and reporting measures – Fire risk management measures – Reduction of weed risk – Development and implementation of a Tree Management Plan for protection of retained trees based on the recommendations of Australian Standard 4970-2009 Protection of Trees on Development Sites • Native vegetation removal must be avoided, minimised and offset in accordance with DELWP's Guidelines for the removal, destruction or lopping of native vegetation 2017 (DELWP 2017c).	Cont.	Cont.	Cont.	Cont.	Seven Ecological Vegetation Classes (EVCs) were recorded within the study area including the following: • EVC 22 Grassy Dry Forest (Least Concern) • EVC 47 Valley Grassy Forest (Vulnerable) • EVC 55 Plains Grassy Woodland (Endangered) • EVC 647 Plains Sedgy Wetland (Endangered) • EVC 653 Aquatic Herbland (no status) • EVC 821 Tall Marsh (Vulnerable) • EVC 937 Swampy Woodland (Endangered) General offset requirement (further offsets are detailed in the threatened species and communities impact pathway): The Project requires a general offset amount of 4.478 ha of general units to be provided within Port Phillip and Westernport Catchment Management Authority (CMA) or Nillumbik Shire and Whittlesea City Council.Total number of large trees that the offset must protect is 174.	Cont.
27	Ecology – Threatened species and communities, or their habitat	Potential impact on Commonwealth and/or Victorian listed threatened species and communities, or their habitat (including freshwater ecology)	Earthworks	Likely	Major	High	Develop and implement measures to avoid and otherwise minimise impacts, to the extent practicable, on listed species, ecological communities, wildlife and their habitat through detailed design and construction, including: • Minimising footprint and disturbance of temporary and permanent works • Installation of rope bridges in key connectivity areas for arboreal mammals, to be installed as early as practicable during construction, constructed in accordance with the MRPV Fauna Sensitive Road Design Guideline (2019) • Complying with the mitigation measures specified in the Swift Parrot Management Plan • Avoidance of transparent or reflective materials to minimise the potential for birds or other fauna to collide with them. This includes bus shelters, barriers, fencing, and signage	EPR E2 EPR E3 EPR E4 EPR E5	Possible	Major	Significant	The Project has the potential to impact the following threatened species: • Impacts to two Matted Flax-lily listed under the EPBC Act as Endangered, Flora and Fauna Guarantee Act 1988 (FFG Act) listed, and listed as endangered on the Victorian Advisory List of Threatened Plants (VicAdv) • Loss of one Studley Park Gum Eucalyptus from direct removal listed VicAdv endangered • Loss of three Pale-flowered Crane's-bill listed under the Advisory List	Technical Report B1 – *Biodiversity Existing Conditions Report* Technical Report B2 – *Biodiversity Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
27	Continued.	Cont.	Cont.	Cont.	Cont.	Cont.	• Avoidance of chain-mesh fencing and barbed wire. If chain mesh fencing is required, it must be designed to minimise collision risk • Implement the CEMP including requirements and methods for: – Fencing protected areas and no-go zones to prevent access during construction – Vegetation clearing controls and protection measures – Retention of dead, declining, or impacted trees for habitat where practicable – Measures during clearing and construction (including weed and disease hygiene) – Minimise impact of construction lighting through consideration of siting, direction and fixtures – Listed species habitat to be removed during construction works should be phased to the relevant works wherever practicable.	Cont.	Cont.	Cont.	Cont.	• Impacts to potential habitat for the following threatened fauna: – Potential foraging habitat for Swift Parrot, including the loss of up to 1693 preferred and secondary potential foraging trees (95 large trees, 1598 small trees); – Potential foraging habitat for Grey-headed Flying-fox, including loss of up to 2521 eucalypts (174 large trees, 2347 small trees); – Potential dispersal habitat for Brush-tailed Phascogale will be fragmented; and – Potential grassland habitat for Tussock Skink. An assessment was undertaken of the potential for cumulative impacts on Swift Parrot based on the Project proposing to remove preferred and secondary potential foraging trees. Swift Parrots have not been recorded using potential habitat – preferred foraging trees – in the Project area. Within the Project area, 364 preferred foraging trees are proposed to be removed. Of these, 15 are large trees (i.e. over 60 cm DBH). Of the 15 large preferred foraging trees, 14 are expected to provide potential foraging resources for Swift Parrots based on their size, health and condition. Native vegetation species offset: Species offsets is required to be provided for Little Pink Spider orchid (1.861 species units).	Cont.

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
28	Ecology – Wildlife	Potential impact on wildlife or their habitat	Earthworks	Likely	Moderate	Significant	Develop and implement measures to avoid and otherwise minimise impacts, to the extent practicable, on listed species, ecological communities, wildlife and their habitat through detailed design and construction, including: • Installation of rope bridges in key connectivity areas for arboreal mammals, to be installed as early as practicable during construction, constructed in accordance with the MRPV Fauna Sensitive Road Design Guideline (2019) • Implement the CEMP including requirements and methods for: – Egress points for fauna (particularly kangaroos) in construction fencing. Construction personnel to report fauna entrapment and traffic control to slow or stop vehicles when wildlife is sighted to minimise collision risk – Pre-clearing survey and two-stage clearing, based on the protocols in the Flora and Fauna Impact Assessment – Minimise clearing during spring where practicable – Trench management, including avoiding open trenches overnight where practicable. Where trenches cannot be closed, check trenches early in the morning – Vegetation and habitat to be removed during construction works should be phased to the relevant works wherever practicable • Strategic revegetation to minimise long term fragmentation impacts to be incorporated into the Landscape Strategy.	EPR E2 EPR E3	Possible	Moderate	Medium	The Project is likely to impact non-listed fauna through loss of habitat and mortality. This includes arboreal mammals, reptiles, larger terrestrial mammals including Eastern Grey Kangaroos, and numerous birds. Lessons learnt from Yan Yean Road Stage 1 indicated the importance of considering kangaroo exit points given the interface with traffic. This has also been highlighted in the WSP Flora and Fauna Impact Assessment.	Technical Report B1 – *Biodiversity Existing Conditions Report* Technical Report B2 – *Biodiversity Impact Assessment*
29	Groundwater	Potential changes to groundwater levels or flows from construction works, resulting in impacts on groundwater quality and / or beneficial uses	Earthworks	Unlikely	Minor	Low	The Construction Environmental Management Plan will include processes and measures to manage groundwater in accordance with the relevant water objectives set out in the existing State Environment Protection Policy (Waters) and draft Environment Reference Standard under the *Environment Protection Amendment Act 2018*, Water Industry Regulations 2006 (Vic) and other relevant statutory requirements.	EPR GW1	Unlikely	Minor	Low	The Preliminary Groundwater Impact Assessment (Arcadis 2020) identified the water table to be 60m below surface level, therefore it is unlikely that the water table will be intersected during the Project. In the case that shallow perched groundwater is identified or fuel or chemical spills occur, standard mitigation measures should be employed to mitigate impact.	Technical Report J – *Groundwater Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
30	Historical heritage	Potential impact on the values of heritage places and/or archaeological sites	Earthworks	Likely	Moderate	Significant	Designing permanent and temporary works to avoid where possible, and otherwise minimise, adverse effects on the two Doreen River Red Gums (HO191) and St. Michael Anglican Church (HO219). As part of the Construction Environmental Management Plan, there would be an archaeological discovery protocol that specifies measures to avoid and minimise impacts on any previously unidentified historical archaeological sites and values discovered during construction. The management protocol must be consistent with the requirements of the *Heritage Act 2017* and include procedures for ceasing work if human remains or archaeological artefacts are discovered, notifying Heritage Victoria of the find, obtaining consent to deal with the find, and dealing with the find in accordance with the consent. All personnel on site must undertake a Cultural Heritage Awareness Induction prior to commencing work, which would include information on the Doreen River Red Gums.	EPR HH1 EPR HH2 EPR HH3	Unlikely	Moderate	Medium	The Aboriginal and Historical Cultural Heritage Impact Assessment (Ecology & Heritage Partners 2020) identified one Heritage Overlay (HO191) for the two Doreen River Red Gums. These trees have cultural significance to the community, and therefore must be avoided.	Technical Report F – *Aboriginal and Historical Cultural Heritage Impact Assessment*
31	Land use planning	Potential changes inconsistent with current or proposed future land use, including land acquisition, severance and occupation	Earthworks	Likely	Major	High	The Project must be designed and constructed to: • Minimise the design footprint and avoid, to the extent practicable, any temporary and permanent impacts on the following land uses: – Parks and reserves – Other sensitive land uses such as educational facilities – Recreational and community facilities – Residential properties – Commercial and industrial sites. • Consolidate or minimise the fragmentation of, and provide access to, residual land parcels to support future viable land use to the extent practicable • Consultation must occur with land managers and/or authorities responsible for the implementation of the relevant strategic land use plans and policies, including City of Whittlesea, Shire of Nillumbik, Melbourne Water and Yarra Valley Water.	EPR LU1 EPR LU2	Possible	Major	Significant	WSP has completed a Planning and Land Use Impact Assessment in 2020. According to this assessment, the Project is located in predominantly low density residential and rural living area within the metropolitan Green Wedge. The northern western end of the Project is within the Whittlesea Growth Corridor which is experiencing rapid land use change from rural living to residential. The Project's impacts on existing land uses during construction have been identified as follows: • Using Yan Yean Road for a purpose than a movement corridor (i.e. temporary construction and laydown areas and temporary site offices) • Potential relocation of existing utility services • Amenity impacts including disruption to access, air quality, noise, visual and an increase in construction traffic.	Technical Report H – *Planning and Land Use Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
32	Landscape and visual	Potential adverse impacts from construction activities on visual and/or landscape values experienced from sensitive receptors including residential areas, recreational and open spaces, hospitals, educational institutes and community facilities	Earthworks	Likely	Moderate	Significant	To avoid where possible, and otherwise minimise adverse effects on landscape values in accordance with the Project's Landscape Strategy, through mitigation measures such as: • Develop potential and proposed design options and measures that can avoid or minimise significant direct and indirect effects on trees or other landscape elements – with a focus on high value vegetation as identified within the Landscape Strategy's 'Cultural Value of Vegetation Assessment' • Prior to construction commencing, develop a Tree Management Plan based on the recommendations of Australian Standard 4970-2009 Protection of Trees on Development Sites. This should be in consultation with the City of Whittlesea and Nillumbik Shire Council and informed by a project arborist (with a minimum qualification of Diploma in Arboriculture (AQF level 5 or equivalent) • Develop strategies to address the loss of trees or other landscape elements • Retain and reinforce key existing views as identified within the Landscape Strategy. Design permanent and temporary works to minimise adverse visual impact, particularly in relation to: • Heritage values • Existing and proposed landmark elements across the Project • High value vegetation as identified within the Landscape Strategy's 'Cultural Value of Vegetation Assessment' • Community and recreational centres and open space, including existing Council masterplans for Doreen Recreational Reserve, Yarrambat Park & Golf Course and Yarrambat Township • Residential interfaces • Business interfaces.	EPR LV1	Possible	Moderate	Medium	A Landscape Strategy is being developed in consultation with Councils and other key stakeholders to ensure that the Project fits sensitively into the built, natural and cultural environment of Doreen and Yarrambat. The strategy will ensure that the landscape response is well designed and contributes to the character and functioning of the Yan Yean Road corridor and the surrounding area, as well as the accessibility and connectivity of people within the wider region and community. The Project will seek to provide new and reinstated landscapes that are appropriate to the local conditions, consistent with the existing varied character of the area, provide opportunities to increase canopy cover wherever possible and provide improved public realm amenity.	Technical Report G – *Landscape Strategy*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
33	Noise and vibration	Noise and/or vibration from construction activities potentially impacting on sensitive receptors	Earthworks	Likely	Moderate	Significant	Implement the Construction Environmental Management Plan in accordance with the relevant noise objectives in the Environment Reference Standard under the *Environment Protection Amendment Act 2018*, EPA Publication 1254 (Noise Control Guidelines), EPA Publication 480 (EPA Environmental Guidelines for Major Construction Sites) and other relevant statutory requirements. The CEMP should include measures, such as (but not limited to): • Fit and maintain appropriate mufflers on earth-moving and other vehicles on the site • Enclose noisy equipment • Provide noise attenuation screens, where appropriate • Where an activity is likely to cause a noise nuisance to nearby residents, restrict operating hours to between 7 am and 6 pm weekdays and 7 am to 1 pm Saturday, except where, for practical reasons, the activity is unavoidable • Undertake targeted noise monitoring of construction activities that are expected to cause higher impacts (if required), and modify management actions as necessary • Advise local residents when unavoidable out-of-hours work will occur • Schedule deliveries to the site so that disruption to local amenity and traffic are minimised • Conduct a study on the impact of ground vibration from construction activities, where these operations occur within 50 metres of a building and take appropriate action • A noise and vibration communications subplan for advising on the requirements for informing the community of work scheduling and working hours.	EPR NV1	Possible	Moderate	Medium	The Noise and Vibration Impact Assessment (WSP 2020) identified that construction is likely to have adverse noise and vibration impacts to sensitive receptors, which can be mitigated with standard measures.	Technical Report I – *Noise and Vibration Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
34	Social	Potential impacts on social and cultural values such as community, educational, religious or recreational facilities due to changes to access or amenity	Earthworks	Likely	Moderate	Significant	To develop and implement measures to avoid and minimise impacts on social and cultural values, including: • Designing permanent and temporary works to avoid where possible, and otherwise minimise adverse effects on the two Doreen River Red Gums • Minimising where practicable, impact to the former Post Office and General Store in consultation with the existing owners, tenants and Councils • Continue one-on-one consultation with all owners and tenants, particularly the tenants and owner of 920/920A Yan Yean Road (former Post Office and General Store and Stockfeed store), to outline the acquisition and compensation process (if required), and provide clear timelines of proposed action • Detailed design to protect and, where practicable, improve access to amenity for potentially affected residents, open space, social and community infrastructure and commercial facilities, and implementing the principles of Crime Prevention Through Environmental Design. Develop and implement a Communications and Stakeholder Engagement Plan to engage and consult the community and affected stakeholders and discuss progress of construction activities and operation.	EPR S1 EPR S2 EPR S3	Possible	Moderate	Medium	Community, educational, religious or recreational facilities along the alignment with the potential to be impact by construction include: Yarrambat Park Golf Course and community groups in Yarrambat Park, Yarrambat Primary School, Plenty Valley Christian College, Butterflies and Smiling Childcare and Early Learning Centres. Community groups will be notified of impacts and where possible the works will manage service in and out of Yarrambat Park and their direct business access. WSP completed a Social and Cultural Values Impact Assessment for the Project in 2020. Overall, the Project will generate benefits for local community through increased safety, reduced congestion, and enhanced opportunities for non-vehicle transport. The Yarrambat Veterinary Hospital has been identified as a facility likely to experience the greater impacts, although they are not considered significant overall. The Aboriginal and Historical Cultural Heritage Impact Assessment (Ecology & Heritage Partners 2020) identified a former Post Office and General Store which has no statutory protections but is of interest to locals and as such should be avoided if practicable.	Technical Report D – *Social Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
34	Continued.	Cont.	Cont.	Cont.	Cont.	Cont.	The Communications and Stakeholder Engagement Plan must consider measures to: • Maintain community safety through appropriate measures such as providing convenient and safe access across Yan Yean Road at all bus stops, activity nodes and places of community significance • Ensure that the construction program considers the use of facilities, operating hours and peak visitation times • Ensure that communities are notified of construction and changes well in advance of works commencing as approved by MRPV • Ensure that the consultation program includes provision for onsite signage of affected properties that provide a service to the local or regional community • Engage impacted residents in the preparation of a landscaping plan to offset the impacts of trees removed through acquisition and construction, and help ensure that the landscaping adds to the valued character of the local area • Attempt to contact memorial makers to organise relocation • Make provision for a twenty-four hour phone number to be available to the community to report concerns.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.
35	Surface water	Potential changes to stormwater flows as a result of site works, reduction of flood conveyance or floodplain storage, and/or adverse impacts on water quality and beneficial uses including waterway health and listed Wetlands (if applicable)	Earthworks	Unlikely	Minor	Low	The Construction Environmental Management Plan will include processes and measures to manage surface water in accordance with the relevant water objectives set out in the existing State Environment Protection Policy (Waters) and draft Environment Reference Standard under the *Environment Protection Amendment Act 2018*, Melbourne Water Performance Criteria and other relevant statutory requirements.	EPR SW1 EPR SW2	Unlikely	Minor	Low	The Surface Water Impact Assessment (WSP 2020) identified erosion from construction sites have the potential to contribute large sediment loads to downstream areas. Water supplies may be needed during construction for dust control and other such purposes. Depending on the quantities needed, there may be an impact on users of the water resource and aquatic fauna and flora.	Technical Report L – *Surface Water Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
35	Continued.	Cont.	Cont.	Cont.	Cont.	Cont.	Mitigation measures to inform the Construction Environmental Management Plan will be established in accordance with Melbourne Water and Council requirements, contract specifications, EPA Publications 275, 480 and 960 and include: • Best practice sediment and erosion control • Maintenance of existing flow paths, drainage lines and floodplain storage, or in the case where existing flow paths will be modified, mitigate the effects of changes to flow where practicable • Water quality monitoring during construction and management of drainage infrastructure to be carried out in accordance with MRPV's Integrated Water Management Guideline (2019) • Stormwater or flood modelling mitigation solutions for temporary works as required • Flood emergency management including consideration of scheduling works • Maximise the visual and aesthetic amenity of waterways having regard to any relevant development plans in consultation with Melbourne Water • Refuelling in designated areas where hardstand is present and removal of impacted soils following minor spills.	Cont.	Cont.	Cont.	Cont.	Regular site supervision and consultation with key stakeholders will ensure the Construction Environmental Management Plan (CEMP) is being fully implemented. In addition to this, reviews and improvements to the CEMP will be carried out when necessary to ensure Project compliance with listed published guidelines and Project specifications.	Cont.
36	Sustainability (including greenhouse gas emissions)	Inefficient use of resources such as consumption of fossil fuels for electricity generation and operation of plant and equipment during construction resulting in the release of excess greenhouse gas emissions	Earthworks	Likely	Minor	Medium	Integrate sustainable design and construction practices to minimise, to the extent practicable, resource use particularly greenhouse gas emissions from construction of the Project		Unlikely	Minor	Low	The Air Quality Impact Assessment (WSP 2020) found the total emissions generated through construction to total 31,314 t CO2-e over an 18-month period.	Technical Report M – *Air Quality Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
37	Transport – Active users	Construction activities impede the efficient movement of active users, including pedestrians, cyclists and horse riders	Earthworks	Possible	Moderate	Medium	To mitigate impacts associated with construction activities on active transport users, a Traffic Management Plan should be completed in consultation with the appropriate road management authorities, Nillumbik Shire Council and Whittlesea Council in accordance with AS1742.3-2009. The Traffic Management Plan should clearly outline traffic control measures that: • Minimise access restrictions and disruption to all active transport users including pedestrians, cyclists and horse riders • Consider impacts on both formal and informal pedestrian access, paths and trails • At a minimum adhere to safe construction practices in accordance with WorkSafe and road authority requirements • Consider the needs of vulnerable road users and in particular pedestrian and cyclist paths and crossings at the schools along the route. • Consider the needs of horse riders, in consultation with the Pony Club • Provide detour routes for affected active transport users • Maintain community engagement with advance warning of changed traffic conditions.	EPR TP2	Unlikely	Moderate	Medium	Construction staging and appropriate traffic management is key to maintaining safe traffic flow. • Staging details and traffic management approach will ultimately be determined by the contractor in consultation with relevant authorities. Construction staging may include: • Constructing the majority of the second carriageway offline while maintaining traffic flow on the existing carriageway. • Switching the traffic flow to the second carriageway to allow upgrade of the old carriageway. • Temporary closures (off peak times) to traffic may be required for constructing complicated intersections Community engagement • Staging is expected to have impacts on local direct access at times – communication with residents is essential.	Technical Report A – *Transport Impact Assessment*
38	Transport – Road users	Construction activities impede the efficient movement of road traffic including general traffic, emergency services, public transport (i.e. buses)	Earthworks	Likely	Moderate	Significant	To mitigate impacts associated with construction activities on road users, a Traffic Management Plan should be completed in consultation with the appropriate road management authorities, Nillumbik Shire Council and Whittlesea Council in accordance with AS1742.3-2009.	EPR TP2	Possible	Moderate	Medium	Construction staging and appropriate traffic management is key to maintaining safe traffic flow. • Staging details and traffic management approach will ultimately be determined by the contractor in consultation with relevant authorities.	Technical Report A – *Transport Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
38	Continued.	Cont.	Cont.	Cont.	Cont.	Cont.	The Traffic Management Plan should clearly outline traffic control measures that: • Minimise access restrictions and disruption to all active transport users including pedestrians, cyclists and horse riders • Consider impacts on both formal and informal pedestrian access, paths and trails • At a minimum adhere to safe construction practices in accordance with WorkSafe and road authority requirements • Consider the needs of vulnerable road users and in particular pedestrian and cyclist paths and crossings at the schools along the route. • Provide detour routes where required • Are coordinated with other works occurring in the area where construction timeframes overlap • Maintain community engagement with advance warning of changed traffic conditions.	Cont.	Cont.	Cont.	Cont.	Construction staging may include: • Constructing the majority of the second carriageway offline while maintaining traffic flow on the existing carriageway. • Switching the traffic flow to the second carriageway to allow upgrade of the old carriageway. • Temporary closures (off peak times) to traffic may be required for constructing complicated intersections Community engagement • Staging is expected to have impacts on local direct access at times – communication with residents is essential • Given that the project is within a growth area, coordination of detour routes, closure times, signage and communication across the project and other nearby projects under construction.	Cont.
39	Transport – Road users	Construction activities result in access changes for adjacent residents and businesses that increase trip lengths and travel times. Examples include converting 'all movements' access to left in/left out and turn bans at intersections	Earthworks	Likely	Minor	Medium	A Traffic Management Plan should be completed in consultation with the appropriate road management authorities, Nillumbik Shire Council and Whittlesea Council in accordance with AS1742.3-2009. The project should be completed in stages to minimise impact. The Traffic Management Plan should clearly outline traffic control measures that: • Minimise access restrictions • Consider the viability of alternative routes available and impacts of additional turning traffic along these routes. • At a minimum adhere to safe construction practices in accordance with WorkSafe and road authority requirements • Maintain community engagement with advance warning of changed access conditions.	EPR TP2	Likely	Insignificant	Medium	It is expected that access to some properties along Yan Yean Road will need to be altered for construction (and some will also be permanently altered as part of the design). The details of which locations and how this will be managed are not currently known and will be determined by the contractor.	Technical Report A – *Transport Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
40	Vegetation – Social and cultural values	Loss of or damage to remnant, planted or regenerated vegetation during construction impacting on social and cultural values	Earthworks	Likely	Major	High	• Design permanent and temporary works to avoid where possible, and otherwise minimise adverse effects on high value vegetation as identified within the Landscape Strategy's 'Cultural Value of Vegetation Assessment'. Where required, removal of vegetation should be phased wherever practicable to temporarily reduce visual impacts • Prior to construction commencing works, develop a Tree Management Plan based on the recommendations of Australian Standard 4970-2009 Protection of Trees on Development Sites. This should be in consultation with the City of Whittlesea and Nillumbik Shire Council and informed by a project arborist (with a minimum qualification of Diploma in Arboriculture (AQF level 5 or equivalent)	EPR V1	Possible	Major	Significant	WSP prepared a Social and Cultural Values Impact Assessment (2020) which found that the majority of stakeholder submissions received during the consultation phase on the Scoping Requirements referred to the two River Red Gums and some focused on the loss of total trees along the alignment. Tree 1265 (adjacent to Yan Yean Road) is listed on the National Trust of Australia as "significant for aesthetic and social reasons at Regional level". Given these identified social and cultural values, it is considered likely that loss of damage to planted or regenerated vegetation, particularly the River Red Gums, will have a major impact on the community. The Landscape Strategy for the Project will be sympathetic to existing values and seek to mitigate impacts.	Technical Report G – *Landscape Strategy* Technical Report D – *Social Impact Assessment* Technical Report F – *Aboriginal and Historical Cultural Heritage Impact Assessment*
CONSTRUCTION – CIVILS AND STRUCTURES													
41	Aboriginal cultural heritage	Disturbance of known or previously unrecorded Aboriginal cultural heritage potentially impacting on heritage values	Civils and structures	Likely	Moderate	Significant	Comply with the Cultural Heritage Management Plan (No.15169) when approved by Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation as the Registered Aboriginal Party under the *Aboriginal Heritage Act 2006*. All management conditions and contingencies would be adhered to.	EPR ACH1	Possible	Moderate	Medium	The Aboriginal and Historical Cultural Heritage Impact Assessment (Ecology & Heritage Partners 2020) identified two Aboriginal places within the project area. A draft Cultural Heritage Management Plan (No.15169) has been prepared in consultation with the Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation.	Technical Report F – *Aboriginal and Historical Cultural Heritage Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
42	Air quality	Generation of air emissions from construction works impacting on sensitive receptors such as hospitals, schools or residences	Civils and structures	Possible	Minor	Medium	Implement the Construction Environmental Management Plan which will include processes and measures to manage air quality in accordance with the relevant air quality objectives set out in the existing State Environment Protection Policy (air quality management) and draft Environmental Reference Standard under the *Environment Protection Amendment Act 2018* and other relevant statutory requirements. Best practice measures will include, but not be limited to: • Ensure that all vehicles and machinery are fitted with appropriate emission control equipment, maintained frequently and serviced to the manufacturers' specifications • Smoke from internal combustion engines should not be visible for more than ten seconds • Cover stockpiles or use wet suppression and wind shield to control exposed dust sources • Review construction methodology in response to potential dust generation during dry and windy weather conditions, and in response to site inspection or complaints related to air and/or dust disruption.	EPR AQ1	Unlikely	Minor	Low	The Air Quality Impact Assessment (WSP 2020) found that the largest impact to air quality would mainly be associated with particulate matter emissions during site establishment, earthworks and civil works. The assessment also identified fuel combustion from construction vehicles would generate emissions. The impact on air quality will vary based on vehicle size, however impact will be low with standard mitigation measures applied.	Technical Report M – *Air Quality Impact Assessment*
43	Arboriculture	Loss of or damage to remnant, planted or regenerated trees, reducing canopy cover which can affect air temperature, climate, landscape, biodiversity, aesthetic, and recreational values	Civils and structures	Likely	Major	High	During detailed design, review potential tree impacts (particularly to the Doreen River Red Gums and other large/higher value trees), and provide for maximum tree retention where possible. This may be achieved through: • Designing permanent and temporary works to avoid where possible, and otherwise minimise, adverse effects on trees, including the two Doreen River Red Gums • The location and width of walking and cycling paths and footpaths is to be varied further if possible to minimise Tree Protection Zone encroachment • Apply suitable construction techniques to minimise impact on Tree Protection Zones, including limiting excavation depth or building above grade. Include additional retaining walls in the design for high priority trees where appropriate	EPR AR1 EPR AR2 EPR AR3	Possible	Major	Significant	C&R Ryder Consulting Pty Ltd completed an Arboriculture Assessment (2020) identified a total of 7,030 trees and shrubs were recorded in the project area and a 20-metre buffer zone adjacent to the project area, comprising 2,775 native trees, 707 understorey trees, 2,113 planted native or indigenous trees, and 1,435 exotic trees. The report found 12 trees to have very high retention value, 346 to have high retention value and a further 2,169 to have moderate retention value.	Technical Report C – *Arboriculture Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
43	Continued.	Cont.	Cont.	Cont.	Cont.	Cont.	• Optimise design of Safety Barriers to retain trees, such as avoiding trenching and footing • Prepare a Tree Impact Assessment which includes consideration of necessary cut and fill and grading requirements (3D design) which can be undertaken in stages • Establishment of no-go zones to exclude and protect the trees within the project area, with fencing to be as per the Australian Standard 4970-2009 Protection of Trees on Development Sites. Implement the Tree Management Plan developed in consultation with the City of Whittlesea and Nillumbik Shire Council and informed by a project arborist (with a minimum qualification of Diploma in Arboriculture (AQF level 5 or equivalent).	Cont.	Cont.	Cont.	Cont.	The report found 15 trees to have very high retention value, 388 to have high retention value and a further 2,232 to have moderate retention value. C&R Ryder also completed a non-destructive Root Investigation Assessment (2019) near two large River Red Gums at the intersection of Yan Yean Road and Bridge Inn Road. Based on this assessment, the health of the River Red Gum tree adjacent to the northern boundary of Bridge Inn Road (east side of intersection) is declining, whereas the one on the east side of Yan Yean Road (north of intersection) is in good health. The assessment concluded that very little root damage is expected based on the proposed alignment in 2019 subject to the excavation not exceeding 600-800mm without additional investigation.	Cont.
44	Business	Potential business impacts such as displacement or acquisition, or impact to business operation due to changes in access and/or amenity	Civils and structures	Likely	Moderate	Significant	Any reduction in the level of access, amenity or function of any business or commercial facility must be mitigated where possible. Implement the Trader Engagement Plan to manage impacts to non-acquired businesses and to engage with business and property owners throughout the construction phase to ensure all stakeholders are aware of impacts.	EPR B1 EPR B2 EPR B3	Possible	Moderate	Medium	Businesses along the alignment with the potential to be impacted by the site establishment phase include: Yarrambat Veterinary Hospital, Smiling Children Childcare and Early Learning Centre, Hippety Hop Childcare, M&S Franco Builders, Personal Training, Firewood, Plenty Valley Christian College, J&C Yeoman Slate Wholesalers & Homestead Farm, Welcome Boarding Kennels and Cattery, golf course (incl. mini golf and associated cafe) and businesses within the Doreen business park. The former Post Office and Doreen General Store and Hadlow and Sons Pet Supplies and Stockfeeds Store at the Bridge Inn Road intersection would be impacted by access changes.	Technical Report E – *Business Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
45	Contaminated land	Excavation, stockpiling, transport and/or disposal of known or previously unrecorded contaminated material (including acid sulfate soils) leading to potential risks to human health and the environment	Civils and structures	Possible	Minor	Medium	Implement a Construction Environmental Management Plan which includes processes and measures to manage contaminated soil that comply with relevant legislation and guidelines, including but not limited to: • Land and water objectives set out in the existing State Environment Protection Policy (Prevention and Management of Contamination of Land) and draft Environment Reference Standard under the *Environment Protection Amendment Act 2018* and other relevant statutory requirements • EPA Publication 1827: Waste classification assessment protocol and EPA Publication 1828: Waste disposal categories – characteristics and thresholds • Environment Protection (Industrial Waste Resource) Regulations 2009 • Industrial Waste Management Policy (Waste Acid Sulfate Soils) 1999 • National Environment Protection (Assessment of Site Contamination) Measures 1999, amended 2013 (ASC NEPM) • WorkSafe Occupational Health and Safety Regulations 2007 (Asbestos). The Construction Environmental Management Plan will include measures such as: • Characterising soil prior to disposal or reuse • Identifying soil containing asbestos and if present, developing management strategies in accordance with the WorkSafe Regulations • Assessing geological formations with naturally enriched metals and applicable spoil management options and or off-site disposal to the satisfaction of EPA Victoria • Identifying suitably licensed facilities for the disposal or treatment of contaminated soil • Management of wastewater • Management of dust, potential stormwater run-off and seepage from stockpiled materials • Undertaking a baseline site assessment of areas proposed for construction laydown prior to use • Protection of the beneficial uses of land associated with current and planned future use.	EPR CL1	Unlikely	Minor	Low	The Contaminated Land Impact Assessment (Arcadis 2020) found low pH soil and elevated natural background concentrations of arsenic and fluoride within the study area, however they are consistent with background levels found in the Shire of Nillumbik. If disposal is required, leachate analysis will be required by the receiving landfill prior to disposal. With standard mitigation measures applied, the assessment identified impact from existing contaminated land to sensitive receptors to be low. The Assessment also included soil classification and disposal, with targeted sampling completed adjacent to areas which have been historically used for industrial or commercial purposes.	Technical Report K – *Contaminated Land Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
46	Ecology – Native vegetation	Potential removal, destruction or lopping of native vegetation (including patches and scattered trees)	Civils and structures	Likely	Major	High	Develop and implement measures to avoid and otherwise minimise impacts, to the extent practicable, on native vegetation through detailed design and construction, including: • Minimising footprint and disturbance of temporary and permanent works during detailed design • Further minimisation of native tree loss during detailed design, prioritising retention of large and hollow-bearing trees • Trees for which the Project will impact <10% of the Tree Protection Zone (TPZ) are likely to be able to be retained. For these specific trees, once construction methods are better known, a detailed arborist assessment should be conducted • Implementation of no-go zones • Implementation of the Construction Environmental Management Plan, including requirements and methods for: – Fencing protected areas and no-go zones to prevent access during construction – Vegetation clearing controls and protection measures, including protocols such as pre-clearing surveys, two-stage clearing, minimised clearing during spring where practicable, and phased removal wherever practicable – Pathogen mitigation, management, monitoring and reporting measures – Fire risk management measures – Reduction of weed risk – Development and implementation of a Tree Management Plan for protection of retained trees based on the recommendations of Australian Standard 4970-2009 Protection of Trees on Development Sites • Native vegetation removal must be avoided, minimised and offset in accordance with DELWP's Guidelines for the removal, destruction or lopping of native vegetation 2017 (DELWP 2017c).	EPR E1 EPR E3	Likely	Major	High	Initial vegetation mapping was undertaken by Ecology and Heritage Partners in 2017. Arcadis undertook further mapping and habitat hectare assessments in 2018 that were ground-truthed and refined by WSP in May 2019 which was updated in July 2020. SMEC undertook an impact assessment in 2020. The likely impacts to native vegetation from the Project are the removal of 11.888 ha of vegetation, 470 understory trees, 174 large trees and 1814 scattered trees that provide habitat for a range of flora and fauna species. Seven Ecological Vegetation Classes (EVCs) were recorded within the study area including the following: • EVC 22 Grassy Dry Forest (Least Concern) • EVC 47 Valley Grassy Forest (Vulnerable) • EVC 55 Plains Grassy Woodland (Endangered) • EVC 653 Aquatic Herbland (no status) • EVC 821 Tall Marsh (Vulnerable) • EVC 647 Plains Sedgy Wetland (Endangered) • EVC 937 Swampy Woodland (Endangered) General offset requirement (further offsets are detailed in the threatened species and communities impact pathway): The Project requires a general offset amount of 4.478 ha of general units to be provided within Port Phillip and Westernport Catchment Management Authority (CMA) or Nillumbik Shire and Whittlesea City Council. Total number of large trees that the offset must protect is 174.	Technical Report B1 – *Biodiversity Existing Conditions Report* Technical Report B2 – *Biodiversity Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
47	Ecology – Threatened species and communities, or their habitat	Potential impact on Commonwealth and/or Victorian listed threatened species and communities, or their habitat (including freshwater ecology)	Civils and structures	Likely	Major	High	Develop and implement measures to avoid and otherwise minimise impacts, to the extent practicable, on listed species, ecological communities, wildlife and their habitat through detailed design and construction, including: • Minimising footprint and disturbance of temporary and permanent works • Installation of rope bridges in key connectivity areas for arboreal mammals, to be installed as early as practicable during construction, constructed in accordance with the MRPV Fauna Sensitive Road Design Guideline (2019) • Complying with the mitigation measures specified in the Swift Parrot Management Plan • Avoidance of transparent or reflective materials to minimise the potential for birds or other fauna to collide with them. This includes bus shelters, barriers, fencing, and signage • Avoidance of chain-mesh fencing and barbed wire. If chain mesh fencing is required, it must be designed to minimise collision risk • Implement the CEMP including requirements and methods for: – Fencing protected areas and no-go zones to prevent access during construction – Vegetation clearing controls and protection measures – Retention of dead, declining, or impacted trees for habitat where practicable – Measures during clearing and construction (including weed and disease hygiene) – Minimise impact of construction lighting through consideration of siting, direction and fixtures – Listed species habitat to be removed during construction works should be phased to the relevant works wherever practicable • Where Matted Flax-lily is to be impacted, implement a salvage and translocation plan for the removal of Matted Flax-lily.	EPR E2 EPR E3 EPR E4 EPR E5	Possible	Major	Significant	The Project has the potential to impact the following threatened species: • Impacts to two Matted Flax-lily listed under the EPBC Act as Endangered, Flora and Fauna Guarantee Act 1988 (FFG Act) listed, and listed as endangered on the Victorian Advisory List of Threatened Plants (VicAdv) • Loss of one Studley Park Gum Eucalyptus from direct removal listed VicAdv endangered • Loss of three Pale-flowered Crane's-bill listed under the Advisory List • Impacts to potential habitat for the following threatened fauna: – Potential foraging habitat for Swift Parrot, including the loss of up to 1693 preferred and secondary potential foraging trees (95 large trees, 1598 small trees); – Potential foraging habitat for Grey-headed Flying-fox, including loss of up to 2521 eucalypts (174 large trees, 2347 small trees); – Potential dispersal habitat for Brush-tailed Phascogale will be fragmented; and – Potential grassland habitat for Tussock Skink. An assessment was undertaken of the potential for cumulative impacts on Swift Parrot based on the Project proposing to remove preferred and secondary potential foraging trees. Swift Parrots have not been recorded using potential habitat – preferred foraging trees – in the Project area. Within the Project area, 364 preferred foraging trees are proposed to be removed. Of these, 15 are large trees (i.e. over 60 cm DBH). Of the 15 large preferred foraging trees, 14 are expected to provide potential foraging resources for Swift Parrots based on their size, health and condition.	Technical Report B1 – *Biodiversity Existing Conditions Report* Technical Report B2 – *Biodiversity Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
47	Continued.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Native vegetation species offset: Species offsets is required to be provided for Little Pink Spider orchid (1.861 species units).	Cont.
48	Ecology – Wildlife	Potential impact on wildlife or their habitat	Civils and structures	Likely	Moderate	Significant	Develop and implement measures to avoid and otherwise minimise impacts, to the extent practicable, on listed species, ecological communities, wildlife and their habitat through detailed design and construction, including: • Installation of rope bridges in key connectivity areas for arboreal mammals, to be installed as early as practicable during construction, constructed in accordance with the MRPV Fauna Sensitive Road Design Guideline (2019) • Implement the CEMP including requirements and methods for: – Egress points for fauna (particularly kangaroos) in construction fencing. Construction personnel to report fauna entrapment and traffic control to slow or stop vehicles when wildlife is sighted to minimise collision risk – Pre-clearing survey and two-stage clearing, based on the protocols in the Flora and Fauna Impact Assessment – Minimise clearing during spring where practicable – Trench management, including avoiding open trenches overnight where practicable. Where trenches cannot be closed, check trenches early in the morning – Vegetation and habitat to be removed during construction works should be phased to the relevant works wherever practicable • Strategic revegetation to minimise long term fragmentation impacts to be incorporated into the Landscape Strategy.	EPR E2 EPR E3	Possible	Moderate	Medium	The Project is likely to impact non-listed fauna through loss of habitat and mortality. This includes arboreal mammals, reptiles, larger terrestrial mammals including Eastern Grey Kangaroos, and numerous birds. Lessons learnt from Yan Yean Road Stage 1 indicated the importance of considering kangaroo exit points given the interface with traffic. This has also been highlighted in the WSP Flora and Fauna Impact Assessment.	Technical Report B1 – *Biodiversity Existing Conditions Report* Technical Report B2 – *Biodiversity Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
49	Groundwater	Potential changes to groundwater levels or flows from construction works, resulting in impacts on groundwater quality and / or beneficial uses	Civils and structures	Unlikely	Minor	Low	The Construction Environmental Management Plan will include processes and measures to manage groundwater in accordance with the relevant water objectives set out in the existing State Environment Protection Policy (Waters) and draft Environment Reference Standard under the *Environment Protection Amendment Act 2018*, Water Industry Regulations 2006 (Vic) and other relevant statutory requirements.	EPR GW1	Unlikely	Minor	Low	The Groundwater Impact Assessment (Arcadis 2020) identified the water table to be 60m below surface level, therefore it is unlikely that the water table will be intersected during the Project. In the case that shallow perched groundwater is identified or fuel or chemical spills occur, standard mitigation measures should be employed to mitigate impact.	Technical Report J – *Groundwater Impact Assessment*
50	Historical heritage	Potential impact on the values of heritage places and/or archaeological sites	Civils and structures	Likely	Moderate	Significant	Designing permanent and temporary works to avoid where possible, and otherwise minimise, adverse effects on the two Doreen River Red Gums (HO191) and St. Michael Anglican Church (HO219). As part of the Construction Environmental Management Plan, there would be an archaeological discovery protocol that specifies measures to avoid and minimise impacts on any previously unidentified historical archaeological sites and values discovered during construction. The management protocol must be consistent with the requirements of the *Heritage Act 2017* and include procedures for ceasing work if human remains or archaeological artefacts are discovered, notifying Heritage Victoria of the find, obtaining consent to deal with the find, and dealing with the find in accordance with the consent. All personnel on site must undertake a Cultural Heritage Awareness Induction prior to commencing work, which would include information on the Doreen River Red Gums.	EPR HH1 EPR HH2 EPR HH3	Unlikely	Moderate	Medium	The Aboriginal and Historical Cultural Heritage Impact Assessment (Ecology & Heritage Partners 2020) identified one Heritage Overlay (HO191) for the two Doreen River Red Gums. These trees have cultural significance to the community, and therefore must be avoided.	Technical Report F – *Aboriginal and Historical Cultural Heritage Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
51	Land use planning	Potential changes inconsistent with current or proposed future land use, including land acquisition, severance and occupation	Civils and structures	Likely	Major	High	The Project must be designed and constructed to: • Minimise the design footprint and avoid, to the extent practicable, any temporary and permanent impacts on the following land uses: – Parks and reserves – Other sensitive land uses such as educational facilities – Recreational and community facilities – Residential properties – Commercial and industrial sites. • Consolidate or minimise the fragmentation of, and provide access to, residual land parcels to support future viable land use to the extent practicable • Consultation must occur with land managers and/or authorities responsible for the implementation of the relevant strategic land use plans and policies, including City of Whittlesea, Shire of Nillumbik, Melbourne Water and Yarra Valley Water.	EPR LU1 EPR LU2	Possible	Major	Significant	WSP has completed a Planning and Land Use Impact Assessment in 2020. According to this assessment, the Project is located in predominantly low density residential and rural living area within the metropolitan Green Wedge. The northern western end of the Project is within the Whittlesea Growth Corridor which is experiencing rapid land use change from rural living to residential. The Project's impacts on existing land uses during construction have been identified as follows: • Using Yan Yean Road for a purpose than a movement corridor (i.e. temporary construction and laydown areas and temporary site offices). • Potential relocation of existing utility services. • Amenity impacts including disruption to access, air quality, noise, visual and an increase in construction traffic.	Technical Report H – *Planning and Land Use Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
52	Landscape and visual	Potential adverse impacts from construction activities on visual and/or landscape values experienced from sensitive receptors including residential areas, recreational and open spaces, hospitals, educational institutes and community facilities	Civils and structures	Likely	Moderate	Significant	To avoid where possible, and otherwise minimise adverse effects on landscape values in accordance with the Project's Landscape Strategy, through mitigation measures such as: • Develop potential and proposed design options and measures that can avoid or minimise significant direct and indirect effects on trees or other landscape elements – with a focus on high value vegetation as identified within the Landscape Strategy's 'Cultural Value of Vegetation Assessment' • Prior to construction commencing, develop a Tree Management Plan based on the recommendations of Australian Standard 4970-2009 Protection of Trees on Development Sites. This should be in consultation with the City of Whittlesea and Nillumbik Shire Council and informed by a project arborist (with a minimum qualification of Diploma in Arboriculture (AQF level 5 or equivalent) • Develop strategies to address the loss of trees or other landscape elements • Retain and reinforce key existing views as identified within the Landscape Strategy. Design permanent and temporary works to minimise adverse visual impact, particularly in relation to: • Heritage values • Existing and proposed landmark elements across the Project • High value vegetation as identified within the Landscape Strategy's 'Cultural Value of Vegetation Assessment' • Community and recreational centres and open space, including existing Council masterplans for Doreen Recreational Reserve, Yarrambat Park & Golf Course and Yarrambat Township • Residential interfaces • Business interfaces.	EPR LV1	Possible	Moderate	Medium	A Landscape Strategy is being developed in consultation with Councils and other key stakeholders to ensure that the Project fits sensitively into the built, natural and cultural environment of Doreen and Yarrambat. The strategy will ensure that the landscape response is well designed and contributes to the character and functioning of the Yan Yean Road corridor and the surrounding area, as well as the accessibility and connectivity of people within the wider region and community. The Project will seek to provide new and reinstated landscapes that are appropriate to the local conditions, consistent with the existing varied character of the area, provide opportunities to increase canopy cover wherever possible and provide improved public realm amenity.	Technical Report G – *Landscape Strategy*

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No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
53	Noise and vibration	Noise and/or vibration from construction activities potentially impacting on sensitive receptors	Civils and structures	Likely	Moderate	Significant	Implement the Construction Environmental Management Plan in accordance with the relevant noise objectives in the Environment Reference Standard under the *Environment Protection Amendment Act 2018*, EPA Publication 1254 (Noise Control Guidelines), EPA Publication 480 (EPA Environmental Guidelines for Major Construction Sites) and other relevant statutory requirements. The CEMP should include measures, such as (but not limited to): • Fit and maintain appropriate mufflers on earth-moving and other vehicles on the site • Enclose noisy equipment • Provide noise attenuation screens, where appropriate • Where an activity is likely to cause a noise nuisance to nearby residents, restrict operating hours to between 7 am and 6 pm weekdays and 7 am to 1 pm Saturday, except where, for practical reasons, the activity is unavoidable • Undertake targeted noise monitoring of construction activities that are expected to cause higher impacts (if required), and modify management actions as necessary • Advise local residents when unavoidable out-of-hours work will occur • Schedule deliveries to the site so that disruption to local amenity and traffic are minimised • Conduct a study on the impact of ground vibration from construction activities, where these operations occur within 50 metres of a building and take appropriate action • A noise and vibration communications subplan for advising on the requirements for informing the community of work scheduling and working hours.	EPR NV1	Possible	Moderate	Medium	The Noise and Vibration Impact Assessment (WSP 2020) identified that construction is likely to have adverse noise and vibration impacts to sensitive receptors, which can be mitigated with standard measures.	Technical Report I – *Noise and Vibration Impact Assessment*

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No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
54	Social	Potential impacts on social and cultural values such as community, educational, religious or recreational facilities due to changes to access or amenity	Civils and structures	Likely	Major	High	To develop and implement measures to avoid and minimise impacts on social and cultural values, including: • Designing permanent and temporary works to avoid where possible, and otherwise minimise adverse effects on the two Doreen River Red Gums • Minimising where practicable, impact to the former Post Office and General Store in consultation with the existing owners, tenants and Councils • Continue one-on-one consultation with all owners and tenants, particularly the tenants and owner of 920/920A Yan Yean Road (former Post Office and General Store and Stockfeed store), to outline the acquisition and compensation process (if required), and provide clear timelines of proposed action • Detailed design to protect and, where practicable, improve access to amenity for potentially affected residents, open space, social and community infrastructure and commercial facilities, and implementing the principles of Crime Prevention Through Environmental Design.	EPR S1 EPR S2 EPR S3	Possible	Major	Significant	Community, educational, religious or recreational facilities along the alignment with the potential to be impact by construction include: Yarrambat Park Golf Course and community groups in Yarrambat Park, Yarrambat Primary School, Plenty Valley Christian College, Butterflies and Smiling Childcare and Early Learning Centres. Community groups will be notified of impacts and where possible the works will manage service in and out of Yarrambat Park and their direct business access. WSP completed a Social and Cultural Values Impact Assessment for the Project in 2020. Overall, the Project will generate benefits for local community through increased safety, reduced congestion, and enhanced opportunities for non-vehicle transport. The Yarrambat Veterinary Hospital has been identified as a facility likely to experience the greater impacts, although they are not considered significant overall.	Technical Report D – *Social Impact Assessment*

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No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
54	Continued.	Cont.	Cont.	Cont.	Cont.	Cont.	Develop and implement a Communications and Stakeholder Engagement Plan to engage and consult the community and affected stakeholders and discuss progress of construction activities and operation. The Communications and Stakeholder Engagement Plan must consider measures to: • Maintain community safety through appropriate measures such as providing convenient and safe access across Yan Yean Road at all bus stops, activity nodes and places of community significance • Ensure that the construction program considers the use of facilities, operating hours and peak visitation times • Ensure that communities are notified of construction and changes well in advance of works commencing as approved by MRPV • Ensure that the consultation program includes provision for onsite signage of affected properties that provide a service to the local or regional community • Engage impacted residents in the preparation of a landscaping plan to offset the impacts of trees removed through acquisition and construction, and help ensure that the landscaping adds to the valued character of the local area • Attempt to contact memorial makers to organise relocation • Make provision for a twenty-four hour phone number to be available to the community to report concerns.	Cont.	Cont.	Cont.	Cont.	The Aboriginal and Historical Cultural Heritage Impact Assessment (Ecology & Heritage Partners 2020) identified a former Post Office and General Store which has no statutory protections but is of interest to locals and as such should be avoided if practicable. This risk of social impact during the civils and structures phase of the Project was considered to be significant due to construction fatigue after 12-18 months of construction.	Cont.

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No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
55	Surface water	Potential changes to stormwater flows as a result of site works, reduction of flood conveyance or floodplain storage, and/or adverse impacts on water quality and beneficial uses including waterway health and listed Wetlands (if applicable)	Civils and structures	Unlikely	Minor	Low	The Construction Environmental Management Plan will include processes and measures to manage surface water in accordance with the relevant water objectives set out in the existing State Environment Protection Policy (Waters) and draft Environment Reference Standard under the *Environment Protection Amendment Act 2018*, Melbourne Water Performance Criteria and other relevant statutory requirements. Mitigation measures to inform the Construction Environmental Management Plan will be established in accordance with Melbourne Water and Council requirements, contract specifications, EPA Publications 275, 480 and 960 and include: • Best practice sediment and erosion control • Maintenance of existing flow paths, drainage lines and floodplain storage, or in the case where existing flow paths will be modified, mitigate the effects of changes to flow where practicable • Water quality monitoring during construction and management of drainage infrastructure to be carried out in accordance with MRPV's Integrated Water Management Guideline (2019) • Stormwater or flood modelling mitigation solutions for temporary works as required • Flood emergency management including consideration of scheduling works • Maximise the visual and aesthetic amenity of waterways having regard to any relevant development plans in consultation with Melbourne Water • Refuelling in designated areas where hardstand is present and removal of impacted soils following minor spills.	EPR SW1 EPR SW2	Unlikely	Minor	Low	The Surface Water Impact Assessment (WSP 2020) identified erosion from construction sites have the potential to contribute large sediment loads to downstream areas. Water supplies may be needed during construction for dust control and other such purposes. Depending on the quantities needed, there may be an impact on users of the water resource and aquatic fauna and flora. Regular site supervision and consultation with key stakeholders will ensure the Construction Environmental Management Plan (CEMP) is being fully implemented. In addition to this, reviews and improvements to the CEMP will be carried out when necessary to ensure Project compliance with listed published guidelines and Project specifications.	Technical Report L – *Surface Water Impact Assessment*

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No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
56	Sustainability (including greenhouse gas emissions)	Inefficient use of resources such as consumption of fossil fuels for electricity generation and operation of plant and equipment during construction resulting in the release of excess greenhouse gas emissions	Civils and structures	Likely	Minor	Medium	Integrate sustainable design and construction practices to minimise, to the extent practicable, resource use particularly greenhouse gas emissions from construction of the Project		Unlikely	Minor	Low	The Air Quality Impact Assessment (WSP 2020) found the total emissions generated through construction to total 31,314 t CO2-e over an 18-month period.	Technical Report M – *Air Quality Impact Assessment*
57	Transport – Active users	Construction activities impede the efficient movement of active users, including pedestrians, cyclists and horse riders	Civils and structures	Possible	Moderate	Medium	Optimise the design in consultation with the appropriate road management authorities to allow construction to be completed in stages and reduce impacts on active transport users where possible. To mitigate impacts associated with construction activities on active transport users, a Traffic Management Plan should be completed in consultation with the appropriate road management authorities, Nillumbik Shire Council and Whittlesea Council in accordance with AS1742.3-2009. The Traffic Management Plan should clearly outline traffic control measures that: • Minimise access restrictions and disruption to all active transport users including pedestrians, cyclists and horse riders • Consider impacts on both formal and informal pedestrian access, paths and trails • At a minimum adhere to safe construction practices in accordance with WorkSafe and road authority requirements • Consider the needs of vulnerable road users and in particular pedestrian and cyclist paths and crossings at the schools along the route. • Consider the needs of horse riders, in consultation with the Pony Club • Provide detour routes for affected active transport users • Maintain community engagement with advance warning of changed traffic conditions.	EPR TP2	Unlikely	Moderate	Medium	Construction staging and appropriate traffic management is key to maintaining safe traffic flow. • Staging details and traffic management approach will ultimately be determined by the contractor in consultation with relevant authorities. Construction staging may include: • Constructing the majority of the second carriageway offline while maintaining traffic flow on the existing carriageway. • Switching the traffic flow to the second carriageway to allow upgrade of the old carriageway. • Temporary closures (off peak times) to traffic may be required for constructing complicated intersections Community engagement • Staging is expected to have impacts on local direct access at times – communication with residents is essential	Technical Report A – *Transport Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
58	Transport – Road users	Construction activities impede the efficient movement of road traffic including general traffic, emergency services, public transport (i.e. buses)	Civils and structures	Likely	Moderate	Significant	Optimise the design in consultation with the appropriate road management authorities to allow construction to be completed in stages and reduce impacts on road users where possible. To mitigate impacts associated with construction activities on road users, a Traffic Management Plan should be completed in consultation with the appropriate road management authorities, Nillumbik Shire Council and Whittlesea Council in accordance with AS1742.3-2009. The Project should be completed in stages to minimise impact. The Traffic Management Plan should clearly outline traffic control measures that: • Minimise access restrictions and disruption to all active transport users including pedestrians, cyclists and horse riders • Consider impacts on both formal and informal pedestrian access, paths and trails • At a minimum adhere to safe construction practices in accordance with WorkSafe and road authority requirements • Consider the needs of vulnerable road users and in particular pedestrian and cyclist paths and crossings at the schools along the route. • Provide detour routes where required • Are coordinated with other works occurring in the area where construction timeframes overlap • Maintain community engagement with advance warning of changed traffic conditions.	EPR TP2	Possible	Moderate	Medium	Construction staging and appropriate traffic management is key to maintaining safe traffic flow. • Staging details and traffic management approach will ultimately be determined by the contractor in consultation with relevant authorities. Construction staging may include: • Constructing the majority of the second carriageway offline while maintaining traffic flow on the existing carriageway. • Switching the traffic flow to the second carriageway to allow upgrade of the old carriageway. • Temporary closures (off peak times) to traffic may be required for constructing complicated intersections Community engagement • Staging is expected to have impacts on local direct access at times – communication with residents is essential • Given that the project is within a growth area, coordination of detour routes, closure times, signage and communication across the project and other nearby projects under construction.	Technical Report A – *Transport Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
59	Transport – Road users	Construction activities result in access changes for adjacent residents and businesses that increase trip lengths and travel times. Examples include converting 'all movements' access to left in/left out and turn bans at intersections	Civils and structures	Likely	Minor	Medium	Optimise the design in consultation with the appropriate road management authorities to allow construction to be completed in stages and reduce impacts on access where possible. A Traffic Management Plan should be completed in consultation with the appropriate road management authorities, Nillumbik Shire Council and Whittlesea Council in accordance with AS1742.3-2009. The project should be completed in stages to minimise impact. The Traffic Management Plan should clearly outline traffic control measures that: • Minimise access restrictions • Consider the viability of alternative routes available and impacts of additional turning traffic along these routes. • At a minimum adhere to safe construction practices in accordance with WorkSafe and road authority requirements • Maintain community engagement with advance warning of changed access conditions.	EPR TP2	Likely	Insignificant	Medium	It is expected that access to some properties along Yan Yean Road will need to be altered for construction (and some will also be permanently altered as part of the design). The details of which locations and how this will be managed are not currently known and will be determined by the contractor.	Technical Report A – *Transport Impact Assessment*
60	Vegetation – Social and cultural values	Loss of or damage to remnant, planted or regenerated vegetation during construction impacting on social and cultural values	Civils and structures	Likely	Major	High	• Design permanent and temporary works to avoid where possible, and otherwise minimise adverse effects on high value vegetation as identified within the Landscape Strategy's 'Cultural Value of Vegetation Assessment'. Where required, removal of vegetation should be phased wherever practicable to temporarily reduce visual impacts • Prior to construction commencing works, develop a Tree Management Plan based on the recommendations of Australian Standard 4970-2009 Protection of Trees on Development Sites. This should be in consultation with the City of Whittlesea and Nillumbik Shire Council and informed by a project arborist (with a minimum qualification of Diploma in Arboriculture (AQF level 5 or equivalent)	EPR V1	Possible	Major	Significant	WSP prepared a Social and Cultural Values Impact Assessment (2020) which found that the majority of stakeholder submissions received during the consultation phase on the Scoping Requirements referred to the two River Red Gums and some focused on the loss of total trees along the alignment. Tree 1265 (adjacent to Yan Yean Road) is listed on the National Trust of Australia as "significant for aesthetic and social reasons at Regional level". Given these identified social and cultural values, it is considered likely that loss of damage to planted or regenerated vegetation, particularly the River Red Gums, will have a major impact on the community. The Landscape Strategy for the Project will be sympathetic to existing values and seek to mitigate impacts.	Technical Report G – *Landscape Strategy* Technical Report D – *Social Impact Assessment* Technical Report F – *Aboriginal and Historical Cultural Heritage Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
CONSTRUCTION – REINSTATEMENT													
61	Aboriginal cultural heritage	Disturbance of known or previously unrecorded Aboriginal cultural heritage potentially impacting on heritage values	Reinstatement	Possible	Moderate	Medium	Comply with the Cultural Heritage Management Plan (No.15169) when approved by Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation as the Registered Aboriginal Party under the *Aboriginal Heritage Act 2006*. All management conditions and contingencies would be adhered to.	EPR ACH1	Unlikely	Minor	Low	The Aboriginal and Historical Cultural Heritage Impact Assessment (Ecology & Heritage Partners 2020) identified two Aboriginal places within the project area. A draft Cultural Heritage Management Plan (No.15169) has been prepared in consultation with the Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation.	Technical Report F – *Aboriginal and Historical Cultural Heritage Impact Assessment*
62	Air quality	Generation of air emissions from construction works impacting on sensitive receptors such as hospitals, schools or residences	Reinstatement	Unlikely	Minor	Low	Implement the Construction Environmental Management Plan which will include processes and measures to manage air quality in accordance with the relevant air quality objectives set out in the existing State Environment Protection Policy (air quality management) and draft Environmental Reference Standard under the *Environment Protection Amendment Act 2018* and other relevant statutory requirements. Best practice measures will include, but not be limited to: • Ensure that all vehicles and machinery are fitted with appropriate emission control equipment, maintained frequently and serviced to the manufacturers' specifications • Smoke from internal combustion engines should not be visible for more than ten seconds • Cover stockpiles or use wet suppression and wind shield to control exposed dust sources • Review construction methodology in response to potential dust generation during dry and windy weather conditions, and in response to site inspection or complaints related to air and/or dust disruption.	EPR AQ1	Unlikely	Minor	Low	The Air Quality Impact Assessment (WSP 2020) found that the largest impact to air quality would mainly be associated with particulate matter emissions during site establishment, earthworks and civil works. The assessment also identified fuel combustion from construction vehicles would generate emissions. The impact on air quality will vary based on vehicle size, however impact will be low with standard mitigation measures applied.	Technical Report M – *Air Quality Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
63	Arboriculture	Loss of or damage to remnant, planted or regenerated trees, reducing canopy cover which can affect air temperature, climate, landscape, biodiversity, aesthetic, and recreational values	Reinstatement	Unlikely	Minor	Low	Reinstatement of soft and hard landscaping is to be in accordance with the Project's Landscape Strategy including: • Protecting retained trees • Ensuring new tree planting does not adversely impact existing vegetation. Implement the Tree Management Plan developed in consultation with the City of Whittlesea and Nillumbik Shire Council and informed by a project arborist (with a minimum qualification of Diploma in Arboriculture (AQF level 5 or equivalent).	EPR AR2 EPR AR4	Unlikely	Minor	Low	The Root Investigation Report (C&R Ryder 2020) states that part of the consideration for the area around the two Doreen River Red Gums at the intersection of Yan Yean Road and Bridge Inn Road should be to revegetate where possible. By underplanting the trees with indigenous species, including acacias, nutrient cycling will improve soil conditions and quality over time for the trees. This should be taken into account for the other native trees and vegetation to be retained along the Project. The report has identified mulching to have many benefits to plants including: • Soil moisture conservation • Soil compaction reduction • Grass and weed suppression • Reduction in soil erosion • Soil structure improvements • An increase in soil fertility • An improvement in the quality and diversity of soil biology • Moderation of soil temperature on a diurnal and seasonal basis.	Technical Report C – *Arboriculture Assessment*
64	Business	Potential business impacts such as displacement or acquisition, or impact to business operation due to changes in access and/or amenity	Reinstatement	Possible	Moderate	Medium	Any reduction in the level of access, amenity or function of any business or commercial facility must be mitigated where possible. Implement the Trader Engagement Plan to manage impacts to non-acquired businesses and to engage with business and property owners throughout the construction phase to ensure all stakeholders are aware of impacts.	EPR B1 EPR B2 EPR B3	Possible	Minor	Medium	Businesses along the alignment with the potential to be impacted by the site establishment phase include: Yarrambat Veterinary Hospital, Smiling Children Childcare and Early Learning Centre, Hippety Hop Childcare, M&S Franco Builders, Personal Training, Firewood, Plenty Valley Christian College, J&C Yeoman Slate Wholesalers & Homestead Farm, Welcome Boarding Kennels and Cattery, golf course (incl. mini golf and associated cafe) and businesses within the Doreen business park. The former Post Office and Doreen General Store and Hadlow and Sons Pet Supplies and Stockfeeds Store at the Bridge Inn Road intersection would be impacted by access changes.	Technical Report E – *Business Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
65	Contaminated land	Excavation, stockpiling, transport and/or disposal of known or previously unrecorded contaminated material (including acid sulfate soils) leading to potential risks to human health and the environment	Reinstatement	Unlikely	Minor	Low	Implement a Construction Environmental Management Plan which includes processes and measures to manage contaminated soil that comply with relevant legislation and guidelines, including but not limited to: • Land and water objectives set out in the existing State Environment Protection Policy (Prevention and Management of Contamination of Land) and draft Environment Reference Standard under the *Environment Protection Amendment Act 2018* and other relevant statutory requirements • EPA Publication 1827: Waste classification assessment protocol and EPA Publication 1828: Waste disposal categories – characteristics and thresholds • Environment Protection (Industrial Waste Resource) Regulations 2009 • Industrial Waste Management Policy (Waste Acid Sulfate Soils) 1999 • National Environment Protection (Assessment of Site Contamination) Measures 1999, amended 2013 (ASC NEPM) • WorkSafe Occupational Health and Safety Regulations 2007 (Asbestos). The Construction Environmental Management Plan will include measures such as: • Characterising soil prior to disposal or reuse • Identifying soil containing asbestos and if present, developing management strategies in accordance with the WorkSafe Regulations • Assessing geological formations with naturally enriched metals and applicable spoil management options and or off-site disposal to the satisfaction of EPA Victoria • Identifying suitably licensed facilities for the disposal or treatment of contaminated soil • Management of wastewater • Management of dust, potential stormwater run-off and seepage from stockpiled materials • Undertaking a baseline site assessment of areas proposed for construction laydown prior to use • Protection of the beneficial uses of land associated with current and planned future use.	EPR CL1	Unlikely	Minor	Low	The Contaminated Land Impact Assessment (Arcadis 2020) found low pH soil and elevated natural background concentrations of arsenic and fluoride within the study area, however they are consistent with background levels found in the Shire of Nillumbik. If disposal is required, leachate analysis will be required by the receiving landfill prior to disposal. With standard mitigation measures applied, the assessment identified impact from existing contaminated land to sensitive receptors to be low. The Assessment also included soil classification and disposal, with targeted sampling completed adjacent to areas which have been historically used for industrial or commercial purposes.	Technical Report K – *Contaminated Land Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
66	Ecology – Native vegetation	Potential removal, destruction or lopping of native vegetation (including patches and scattered trees)	Reinstatement	Possible	Moderate	Medium	Strategic revegetation in accordance with the Project's Landscape Strategy to minimise long term fragmentation impacts by: • Using indigenous species as appropriate from relevant ecological vegetation classes to maximise fauna habitat value and connectivity, including trees likely to be used by Swift Parrot and Grey-headed Flying-fox • Incorporating indigenous mid-storey plants as appropriate which will complement retained habitat.	EPR E6	Unlikely	Moderate	Medium	Initial vegetation mapping was undertaken by Ecology and Heritage Partners in 2017. Arcadis undertook further mapping and habitat hectare assessments in 2018 that were ground-truthed and refined by WSP in May 2019 which was updated in July 2020. SMEC undertook an impact assessment in 2020.. The likely impacts to native vegetation from the Project are the removal of 11.888 ha of vegetation, 174 large trees and 1814 scattered trees that provide habitat for a range of flora and fauna species.. Seven Ecological Vegetation Classes (EVCs) were recorded within the study area including the following: • EVC 22 Grassy Dry Forest (Least Concern) • EVC 47 Valley Grassy Forest (Vulnerable) • EVC 55 Plains Grassy Woodland (Endangered) • EVC 653 Aquatic Herbland (no status) • EVC 647 Plains Sedgy Wetland (Endangered) • EVC 821 Tall Marsh (Vulnerable) • EVC 937 Swampy Woodland (Endangered) General offset requirement (further offsets are detailed in the threatened species and communities impact pathway): The Project requires a general offset amount of 4.478 ha of general units to be provided within Port Phillip and Westernport Catchment Management Authority (CMA) or Nillumbik Shire and Whittlesea City Council. Total number of large trees that the offset must protect is 174.	Technical Report B1 – *Biodiversity Existing Conditions Report* Technical Report B2 – *Biodiversity Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
67	Ecology – Threatened species and communities, or their habitat	Potential impact on Commonwealth and/or Victorian listed threatened species and communities, or their habitat (including freshwater ecology)	Reinstatement	Possible	Moderate	Medium	Strategic revegetation in accordance with the Project's Landscape Strategy to minimise long term fragmentation impacts by: • Using indigenous species as appropriate from relevant ecological vegetation classes to maximise fauna habitat value and connectivity, including trees likely to be used by Swift Parrot and Grey-headed Flying-fox • Incorporating indigenous mid-storey plants as appropriate which will complement retained habitat.	EPR E6	Unlikely	Moderate	Medium	The Project has the potential to impact the following threatened species: • Impacts to two Matted Flax-lily listed under the EPBC Act as Endangered, Flora and Fauna Guarantee Act 1988 (FFG Act) listed, and listed as endangered on the Victorian Advisory List of Threatened Plants (VicAdv) • Loss of one Studley Park Gum Eucalyptus from direct removal listed VicAdv endangered • Loss of three Pale-flowered Crane's-bill listed under the Advisory List • Impacts to potential habitat for the following threatened fauna: – Potential foraging habitat for Swift Parrot, including the loss of up to 1693 preferred and secondary potential foraging trees (95 large trees, 1598 small trees); – Potential foraging habitat for Grey-headed Flying-fox, including loss of up to 2521 eucalypts (174 large trees, 2347 small trees); – Potential dispersal habitat for Brush-tailed Phascogale will be fragmented; and – Potential grassland habitat for Tussock Skink. An assessment was undertaken of the potential for cumulative impacts on Swift Parrot based on the Project proposing to remove preferred and secondary potential foraging trees. Swift Parrots have not been recorded using potential habitat – preferred foraging trees – in the Project area. Within the Project area, 364 preferred foraging trees are proposed to be removed. Of these, 15 are large trees (i.e. over 60 cm DBH). Of the 15 large preferred foraging trees, 14 are expected to provide potential foraging resources for Swift Parrots based on their size, health and condition.	Technical Report B1 – *Biodiversity Existing Conditions Report* Technical Report B2 – *Biodiversity Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
67	Continued.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Native vegetation species offset: Species offsets is required to be provided for Little Pink Spider orchid (1.861 species units).	Cont.
68	Ecology – Wildlife	Potential impact on wildlife or their habitat	Reinstatement	Possible	Moderate	Medium	Strategic revegetation in accordance with the Project's Landscape Strategy to minimise long term fragmentation impacts by: • Using indigenous species as appropriate from relevant ecological vegetation classes to maximise fauna habitat value and connectivity, including trees likely to be used by Swift Parrot and Grey-headed Flying-fox • Incorporating indigenous mid-storey plants as appropriate which will complement retained habitat.	EPR E6	Unlikely	Moderate	Medium	The Project is likely to impact non-listed fauna through loss of habitat and mortality. This includes arboreal mammals, reptiles, larger terrestrial mammals including Eastern Grey Kangaroos, and numerous birds. Lessons learnt from Yan Yean Road Stage 1 indicated the importance of considering kangaroo exit points given the interface with traffic. This has also been highlighted in the WSP Flora and Fauna Impact Assessment.	Technical Report B1 – *Biodiversity Existing Conditions Report* Technical Report B2 – *Biodiversity Impact Assessment*
69	Groundwater	Potential changes to groundwater levels or flows from construction works, resulting in impacts on groundwater quality and / or beneficial uses	Reinstatement	Unlikely	Minor	Low	The Construction Environmental Management Plan will include processes and measures to manage groundwater in accordance with the relevant water objectives set out in the Environment Reference Standard under the *Environment Protection Amendment Act 2018*, Water Industry Regulations 2006 (Vic) and other relevant statutory requirements.	EPR GW1	Unlikely	Minor	Low	The Groundwater Impact Assessment (Arcadis 2020) identified the water table to be 60m below surface level, therefore it is unlikely that the water table will be intersected during the Project. In the case that shallow perched groundwater is identified or fuel or chemical spills occur, standard mitigation measures should be employed to mitigate impact.	Technical Report J – *Groundwater Impact Assessment*

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No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
70	Historical heritage	Potential impact on the values of heritage places and/or archaeological sites	Reinstatement	Likely	Minor	Medium	Designing permanent and temporary works to avoid where possible, and otherwise minimise, adverse effects on the two Doreen River Red Gums (HO191) and St. Michael Anglican Church (HO219). As part of the Construction Environmental Management Plan, there would be an archaeological discovery protocol that specifies measures to avoid and minimise impacts on any previously unidentified historical archaeological sites and values discovered during construction. The management protocol must be consistent with the requirements of the *Heritage Act 2017* and include procedures for ceasing work if human remains or archaeological artefacts are discovered, notifying Heritage Victoria of the find, obtaining consent to deal with the find, and dealing with the find in accordance with the consent. All personnel on site must undertake a Cultural Heritage Awareness Induction prior to commencing work, which would include information on the Doreen River Red Gums.	EPR HH1 EPR HH2 EPR HH3	Unlikely	Minor	Low	The Aboriginal and Historical Cultural Heritage Impact Assessment (Ecology & Heritage Partners 2020) identified one Heritage Overlay (HO191) for the two Doreen River Red Gums. These trees have cultural significance to the community, and therefore must be avoided.	Technical Report F – *Aboriginal and Historical Cultural Heritage Impact Assessment*
71	Land use planning	Potential changes inconsistent with current or proposed future land use, including land acquisition, severance and occupation	Reinstatement	Likely	Moderate	Significant	The Project must be designed and constructed to: • Minimise the design footprint and avoid, to the extent practicable, any temporary and permanent impacts on the following land uses: – Parks and reserves – Other sensitive land uses such as educational facilities – Recreational and community facilities – Residential properties – Commercial and industrial sites. • Consolidate or minimise the fragmentation of, and provide access to, residual land parcels to support future viable land use to the extent practicable • Consultation must occur with land managers and/or authorities responsible for the implementation of the relevant strategic land use plans and policies, including City of Whittlesea, Shire of Nillumbik, Melbourne Water and Yarra Valley Water.	EPR LU1 EPR LU2	Possible	Moderate	Medium	WSP has completed a Planning and Land Use Impact Assessment in 2020. According to this assessment, the Project is located in predominantly low density residential and rural living area within the metropolitan Green Wedge. The northern western end of the Project is within the Whittlesea Growth Corridor which is experiencing rapid land use change from rural living to residential.	Technical Report H – *Planning and Land Use Impact Assessment*

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No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
71	Continued.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	The Project's impacts on existing land uses during construction have been identified as follows: • Using Yan Yean Road for a purpose than a movement corridor (i.e. temporary construction and laydown areas and temporary site offices). • Potential relocation of existing utility services. • Amenity impacts including disruption to access, air quality, noise, visual and an increase in construction traffic. As laydown areas are removed and land handed back in the reinstatement phase, this residual risk was considered to be medium.	Cont.
72	Landscape and visual	Potential adverse impacts from construction activities on visual and/or landscape values experienced from sensitive receptors including residential areas, recreational and open spaces, hospitals, educational institutes and community facilities	Reinstatement	Possible	Moderate	Medium	Reinstatement is to be in accordance with the Project's Landscape Strategy to the reasonable satisfaction of the relevant land manager, including: • Ensure tree planting is fully coordinated with services, easements and utilities including required height limits and offsets • Ensure new tree planting is climate resilient and suitable for the local context • Maximises the enhancement of landscape, Aboriginal and historical cultural heritage, and vegetation values, where opportunities exist.	EPR LV2	Unlikely	Moderate	Medium	A Landscape Strategy is being developed in consultation with Councils and other key stakeholders to ensure that the Project fits sensitively into the built, natural and cultural environment of Doreen and Yarrambat. The strategy will ensure that the landscape response is well designed and contributes to the character and functioning of the Yan Yean Road corridor and the surrounding area, as well as the accessibility and connectivity of people within the wider region and community. The Project will seek to provide new and reinstated landscapes that are appropriate to the local conditions, consistent with the existing varied character of the area, provide opportunities to increase canopy cover wherever possible and provide improved public realm amenity.	Technical Report G – *Landscape Strategy*

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No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
73	Noise and vibration	Noise and/or vibration from construction activities potentially impacting on sensitive receptors	Reinstatement	Possible	Minor	Medium	Implement the Construction Environmental Management Plan in accordance with the relevant noise objectives in the Environment Reference Standard under the *Environment Protection Amendment Act 2018*, EPA Publication 1254 (Noise Control Guidelines), EPA Publication 480 (EPA Environmental Guidelines for Major Construction Sites) and other relevant statutory requirements. The CEMP should include measures, such as (but not limited to): • Fit and maintain appropriate mufflers on earth-moving and other vehicles on the site • Enclose noisy equipment • Provide noise attenuation screens, where appropriate • Where an activity is likely to cause a noise nuisance to nearby residents, restrict operating hours to between 7 am and 6 pm weekdays and 7 am to 1 pm Saturday, except where, for practical reasons, the activity is unavoidable • Undertake targeted noise monitoring of construction activities that are expected to cause higher impacts (if required), and modify management actions as necessary • Advise local residents when unavoidable out-of-hours work will occur • Schedule deliveries to the site so that disruption to local amenity and traffic are minimised • Conduct a study on the impact of ground vibration from construction activities, where these operations occur within 50 metres of a building and take appropriate action • A noise and vibration communications subplan for advising on the requirements for informing the community of work scheduling and working hours.	EPR NV1	Unlikely	Minor	Low	The Noise and Vibration Impact Assessment (WSP 2020) identified that construction is likely to have adverse noise and vibration impacts to sensitive receptors, which can be mitigated with standard measures.	Technical Report I – *Noise and Vibration Impact Assessment*

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No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
74	Social	Potential impacts on social and cultural values such as community, educational, religious or recreational facilities due to changes to access or amenity	Reinstatement	Likely	Moderate	Significant	To develop and implement measures to avoid and minimise impacts on social and cultural values, including: • Designing permanent and temporary works to avoid where possible, and otherwise minimise adverse effects on the two Doreen River Red Gums • Minimising where practicable, impact to the former Post Office and General Store in consultation with the existing owners, tenants and Councils • Continue one-on-one consultation with all owners and tenants, particularly the tenants and owner of 920/920A Yan Yean Road (former Post Office and General Store and Stockfeed store), to outline the acquisition and compensation process (if required), and provide clear timelines of proposed action • Detailed design to protect and, where practicable, improve access to amenity for potentially affected residents, open space, social and community infrastructure and commercial facilities, and implementing the principles of Crime Prevention Through Environmental Design. Develop and implement a Communications and Stakeholder Engagement Plan to engage and consult the community and affected stakeholders and discuss progress of construction activities and operation.	EPR S1 EPR S2 EPR S3	Unlikely	Moderate	Medium	Community, educational, religious or recreational facilities along the alignment with the potential to be impact by construction include: Yarrambat Park Golf Course and community groups in Yarrambat Park, Yarrambat Primary School, Plenty Valley Christian College, Butterflies and Smiling Childcare and Early Learning Centres. Community groups will be notified of impacts and where possible the works will manage service in and out of Yarrambat Park and their direct business access. WSP completed a Social and Cultural Values Impact Assessment for the Project in 2020. Overall, the Project will generate benefits for local community through increased safety, reduced congestion, and enhanced opportunities for non-vehicle transport. The Yarrambat Veterinary Hospital has been identified as a facility likely to experience the greater impacts, although they are not considered significant overall.	Technical Report D – *Social Impact Assessment*

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No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
74	Continued.	Cont.	Cont.	Cont.	Cont.	Cont.	The Communications and Stakeholder Engagement Plan must consider measures to: • Maintain community safety through appropriate measures such as providing convenient and safe access across Yan Yean Road at all bus stops, activity nodes and places of community significance • Ensure that the construction program considers the use of facilities, operating hours and peak visitation times • Ensure that communities are notified of construction and changes well in advance of works commencing as approved by MRPV • Ensure that the consultation program includes provision for onsite signage of affected properties that provide a service to the local or regional community • Engage impacted residents in the preparation of a landscaping plan to offset the impacts of trees removed through acquisition and construction, and help ensure that the landscaping adds to the valued character of the local area • Attempt to contact memorial makers to organise relocation • Make provision for a twenty-four hour phone number to be available to the community to report concerns.	Cont.	Cont.	Cont.	Cont.	The Aboriginal and Historical Cultural Heritage Impact Assessment (Ecology & Heritage Partners 2020) identified a former Post Office and General Store which has no statutory protections but is of interest to locals and as such should be avoided if practicable.	Cont.

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
75	Surface water	Potential changes to stormwater flows as a result of site works, and/or adverse impacts on water quality and beneficial uses including waterway health and listed Wetlands (if applicable)	Reinstatement	Unlikely	Minor	Low	The Construction Environmental Management Plan will include processes and measures to manage surface water in accordance with the relevant water objectives set out in the existing State Environment Protection Policy (Waters) and draft Environment Reference Standard under the *Environment Protection Amendment Act 2018*, Melbourne Water Performance Criteria and other relevant statutory requirements. Mitigation measures to inform the Construction Environmental Management Plan will be established in accordance with Melbourne Water and Council requirements, contract specifications, EPA Publications 275, 480 and 960 and include: • Best practice sediment and erosion control • Maintenance of existing flow paths, drainage lines and floodplain storage, or in the case where existing flow paths will be modified, mitigate the effects of changes to flow where practicable • Water quality monitoring during construction and management of drainage infrastructure to be carried out in accordance with MRPV's Integrated Water Management Guideline (2019) • Stormwater or flood modelling mitigation solutions for temporary works as required • Flood emergency management including consideration of scheduling works • Maximise the visual and aesthetic amenity of waterways having regard to any relevant development plans in consultation with Melbourne Water • Refuelling in designated areas where hardstand is present and removal of impacted soils following minor spills.	EPR SW1 EPR SW2	Unlikely	Minor	Low	The Surface Water Impact Assessment (WSP 2020) identified the placement of temporary works, stockpiles, equipment and plant can result in a reduction in flood conveyance or floodplain storage, potentially leading to increases to flood levels, flow velocities and flood frequency.	Technical Report L – *Surface Water Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
76	Sustainability (including greenhouse gas emissions)	Inefficient use of resources such as consumption of fossil fuels for electricity generation and operation of plant and equipment during construction resulting in the release of excess greenhouse gas emissions	Reinstatement	Possible	Minor	Medium	Integrate sustainable design and construction practices to minimise, to the extent practicable, resource use particularly greenhouse gas emissions from construction of the Project		Unlikely	Minor	Low	The Air Quality Impact Assessment (WSP 2020) found the total emissions generated through construction to total 31,314 t CO2-e over an 18-month period.	Technical Report M – *Air Quality Impact Assessment*
77	Transport – Active users	Construction activities impede the efficient movement of active users, including pedestrians, cyclists and horse riders	Reinstatement	Possible	Minor	Medium	Optimise the design in consultation with the appropriate road management authorities to allow construction to be completed in stages and reduce impacts on active transport users where possible. To mitigate impacts associated with construction activities on active transport users, a Traffic Management Plan should be completed in consultation with the appropriate road management authorities, Nillumbik Shire Council and Whittlesea Council in accordance with AS1742.3-2009. The Traffic Management Plan should clearly outline traffic control measures that: • Minimise access restrictions and disruption to all active transport users, including pedestrians, cyclists and horse riders • Consider impacts on both formal and informal pedestrian access, paths and trails • At a minimum, adhere to safe construction practices in accordance with WorkSafe and road authority requirements • Consider the needs of vulnerable road users and in particular pedestrian and cyclist paths and crossings at the schools along the route. • Consider the needs of horse riders, in consultation with the Pony Club • Provide detour routes for affected active transport users • Maintain community engagement with advance warning of changed traffic conditions.	EPR TP2	Unlikely	Minor	Low	Construction staging and appropriate traffic management is key to maintaining safe traffic flow. • Staging details and traffic management approach will ultimately be determined by the contractor in consultation with relevant authorities. Construction staging may include: • Constructing the majority of the second carriageway offline while maintaining traffic flow on the existing carriageway. • Switching the traffic flow to the second carriageway to allow upgrade of the old carriageway. • Temporary closures (off peak times) to traffic may be required for constructing complicated intersections Community engagement • Staging is expected to have impacts on local direct access at times – communication with residents is essential.	Technical Report A – *Transport Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
78	Transport – Road users	Construction activities impede the efficient movement of road traffic including general traffic, emergency services, public transport (i.e. buses)	Reinstatement	Possible	Minor	Medium	Optimise the design in consultation with the appropriate road management authorities to allow construction to be completed in stages and reduce impacts on road users where possible. To mitigate impacts associated with construction activities on road traffic users, a Traffic Management Plan should be completed in consultation with the appropriate road management authorities, Nillumbik Shire Council and Whittlesea Council in accordance with AS1742.3-2009. The Project should be completed in stages to minimise impact. The Traffic Management Plan should clearly outline traffic control measures that: • Minimise disruption to road traffic • At a minimum, adhere to safe construction practices in accordance with WorkSafe and road authority requirements • Consider crossing routes for kangaroos to avoid entrapment on the roadway and collision with vehicles • Include planned haulage routes for construction equipment and materials and where possible schedules these movements to occur at times that minimise impacts on other road users • Consider the needs of vulnerable road users and in particular pedestrian and cyclist paths and crossings at the schools along the route • Provide detour routes where required • Are coordinated with other works occurring in the area where construction timeframes overlap • Maintain community engagement with advance warning of changed traffic conditions.	EPR TP2	Unlikely	Minor	Low	Construction staging and appropriate traffic management is key to maintaining safe traffic flow. • Staging details and traffic management approach will ultimately be determined by the contractor in consultation with relevant authorities. Construction staging may include: • Constructing the majority of the second carriageway offline while maintaining traffic flow on the existing carriageway. • Switching the traffic flow to the second carriageway to allow upgrade of the old carriageway. • Temporary closures (off peak times) to traffic may be required for constructing complicated intersections Community engagement • Staging is expected to have impacts on local direct access at times – communication with residents is essential.	Technical Report A – *Transport Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
79	Transport – Road users	Construction activities result in access changes for adjacent residents and businesses that increase trip lengths and travel times. Examples include converting 'all movements' access to left in/left out and turn bans at intersections	Reinstatement	Likely	Minor	Medium	Optimise the design in consultation with the appropriate road management authorities to allow construction to be completed in stages and reduce impacts on access where possible. A Traffic Management Plan should be completed in consultation with the appropriate road management authorities, Nillumbik Shire Council and Whittlesea Council in accordance with AS1742.3-2009. The project should be completed in stages to minimise impact. The Traffic Management Plan should clearly outline traffic control measures that: • Minimise access restrictions • Consider the viability of alternative routes available and impacts of additional turning traffic along these routes. • Consider crossing routes for kangaroos to avoid entrapment on the roadway and collision with vehicles • Include planned haulage routes for construction equipment and materials and where possible schedules these movements to occur at times that minimise impacts on other road users • Consider the needs of vulnerable road users and in particular pedestrian and cyclist paths and crossings at the schools along the route • Provide detour routes where required • Are coordinated with other works occurring in the area where construction timeframes overlap • Maintain community engagement with advance warning of changed traffic conditions.	EPR TP2	Likely	Insignificant	Medium	It is expected that access to some properties along Yan Yean Road will need to be altered for construction (and some will also be permanently altered as part of the design). The details of which locations and how this will be managed are not currently known and will be determined by the contractor.	Technical Report A – *Transport Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
80	Vegetation – Social and cultural values	Loss of or damage to remnant, planted or regenerated vegetation during construction impacting on social and cultural values	Reinstatement	Likely	Major	High	Reinstatement to be in accordance with the Project's Landscape Strategy to maximise the enhancement of vegetation values where opportunities exist including: • Provide replacement screening vegetation where feasible to reduce impacts to visual amenity • Enhance existing vegetation along the road corridor and around infrastructure elements • Provide contextual planting along roads and walking and cycling paths where feasible to achieve tree canopy cover for shade, shelter and habitat creation • Seek to improve user amenity through identifying opportunities within public open space in accordance with relevant Council masterplans • Enhance intersections and identified gateways with distinctive native plantings to act as visual marker along the road corridor.	EPR V1	Possible	Major	Significant	WSP prepared a Social and Cultural Values Impact Assessment (2020) which found that the majority of stakeholder submissions received during the consultation phase on the Scoping Requirements referred to the two River Red Gums and some focused on the loss of total trees along the alignment. Tree 1265 (adjacent to Yan Yean Road) i s listed on the National Trust of Australia as "significant for aesthetic and social reasons at Regional level". Given these identified social and cultural values, it is considered likely that loss of damage to planted or regenerated vegetation, particularly the River Red Gums, will have a major impact on the community. The Landscape Strategy for the Project will be sympathetic to existing values and seek to mitigate impacts.	Technical Report G – *Landscape Strategy* Technical Report D – *Social Impact Assessment* Technical Report F – *Aboriginal and Historical Cultural Heritage Impact Assessment*
OPERATIONS													
81	Aboriginal cultural heritage	Disturbance of known or previously unrecorded Aboriginal cultural heritage by operation and maintenance activities potentially impacting on heritage values	Operations	Rare	Insignificant	Low	Comply with the Cultural Heritage Management Plan (No.15169) when approved by Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation as the Registered Aboriginal Party under the *Aboriginal Heritage Act 2006*. All management conditions and contingencies would be adhered to.	EPR EMF5	Rare	Insignificant	Low	The Aboriginal and Historical Cultural Heritage Impact Assessment (Ecology & Heritage Partners 2020) identified two Aboriginal places within the project area. A draft Cultural Heritage Management Plan (No.15169) has been prepared in consultation with the Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation.	Technical Report F – *Aboriginal and Historical Cultural Heritage Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
82	Air quality	Generation of air emissions from operation impacting on sensitive receptors such as hospitals, schools or residences	Operations	Possible	Minor	Medium	Operational air emission impacts are managed at source through air emission standards, vehicle maintenance and regulatory testing. These measures are outside MRPV's control. Any potential impacts during operation and maintenance will be managed in accordance with the Department of Transport's standards for managing declared roads in Victoria.	EPR EMF5	Unlikely	Minor	Low	The Air Quality Impact Assessment (WSP 2020) identified 24-hour and annual Ground Level-Concentrations of PM10 and NO2 are below relevant Environmental Quality Objectives in the 2021 and 2031 prediction models. However, the assessment found PM¬¬2.5 exceeds the 25µg/m3 Environmental Quality Objective in the 2021 scenario and exceeds the 20µg/m3 objective in the 2031 scenario. Analysis of the results indicate that cumulative 24-hour and annual concentrations decrease from 2021 to 2031 for the Project scenario. Reductions in air emissions from vehicles are expected to occur through state or federal initiatives such as progressive tightening of fuel emission standards and air quality standards, frequent in-service inspections and government incentives for switching to less polluting vehicles.	Technical Report M – *Air Quality Impact Assessment*
83	Arboriculture	Loss of or damage to remnant, planted or regenerated trees, reducing canopy cover which can affect air temperature, climate, landscape, biodiversity, aesthetic, and recreational values	Operations	Unlikely	Minor	Low	Mitigation measures have been applied during the design and construction phases (i.e. avoidance of trees, minimisation of footprint). As such, the risk of impact on arboriculture during operation of Yan Yean Road Stage 2 is considered to be low. Any potential impacts during operation and maintenance will be managed in accordance with the Department of Transport's standards for managing declared roads in Victoria.	EPR EMF5	Unlikely	Minor	Low	C&R Ryder Consulting Pty Ltd completed an Arboriculture Assessment (2020) identified that of the 7,279 trees assessed within the project area, 3,851 are indigenous, 1,875 are Australian native and 1,553 are exotic specimens. The report found 15 trees to have very high retention value, 388 to have high retention value and a further 2,232 to have moderate retention value.	Technical Report C – *Arboriculture Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
83	Continued.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	C&R Ryder also completed a non-destructive Root Investigation Assessment (2019) near two large River Red Gums at the intersection of Yan Yean Road and Bridge Inn Road. Based on this assessment, the health of the River Red Gum tree adjacent to the northern boundary of Bridge Inn Road (east side of intersection) is declining, whereas the one on the east side of Yan Yean Road (north of intersection) is in good health. The assessment concluded that very little root damage is expected based on the proposed alignment in 2019 subject to the excavation not exceeding 600-800mm without additional investigation.	Cont.
84	Business	Potential business impacts such as changes to amenity, or changed road conditions affecting businesses as a result of operation	Operations	Possible	Moderate	Medium	All permanent access to business and commercial facilities affected by the works is to be restored, or relocated as negotiated with the relevant land owner, including associated landscaping and restoration works, and temporary access arrangements put in place for the duration of construction must be removed when construction has ceased.	EPR EMF5	Unlikely	Minor	Low	Some businesses along Yan Yean Road will have permanently changed access patterns to left in, left out instead of being able to turn from the opposite side of the road. This is an inconvenience, but not a significant impact for businesses not relying extensively on opportunistic custom, but whose customers who plan their visits. The former Post Office and Doreen General Store and Hadlow and Sons Pet Supplies and Stockfeeds Store at the Bridge Inn Road intersection would be impacted by access changes.	Technical Report E – *Business Impact Assessment*
85	Contaminated land	Operational activities that require excavation, stockpiling, transport and/or disposal of known or previously unrecorded contaminated material (including acid sulfate soils) leading to potential risks to human health and the environment	Operations	Rare	Insignificant	Low	Any potential impacts during operation and maintenance will be managed in accordance with the Department of Transport's standards for managing declared roads in Victoria.	EPR EMF5	Rare	Insignificant	Low	The Contaminated Land Impact Assessment (Arcadis 2020) found low pH soil and elevated natural background concentrations of arsenic and fluoride within the study area, however they are consistent with average levels found in the Shire of Nillumbik. If disposal is required, leachate analysis will be required by the receiving landfill prior to disposal. With standard mitigation measures applied, the assessment identified any impact from existing contaminated land to sensitive receptors to be considered low.	Technical Report K – *Contaminated Land Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
86	Ecology – Native vegetation	Potential removal, destruction or lopping of native vegetation (including patches and scattered trees)	Operations	Possible	Minor	Medium	Minimise weed establishment following construction through: • Post-construction weed survey of the project area • Follow-up monitoring and control within road reserve, annually for two years, with targeted control of noxious or environmental weeds as required under the Catchment and Land Protection Act 1994.	EPR E8 EPR EMF5	Unlikely	Minor	Low	Risk to native vegetation from road operation include from weeds, increased edge effects, particularly as native vegetation is re-establishing in temporarily disturbed areas.	Technical Report B1 – *Biodiversity Existing Conditions Report* Technical Report B2 – *Biodiversity Impact Assessment*
87	Ecology – Threatened species and communities, or their habitat	Potential impact on Commonwealth and/or Victorian listed threatened species and communities, or their habitat (including freshwater ecology)	Operations	Possible	Minor	Medium	• Utilising the MRPV Fauna Sensitive Road Design Guideline (2019), such as through: – Use of fauna-friendly fencing where fencing is required (avoidance of chain-mesh fencing and barbed wire). If chain mesh fencing is required, it must be designed to minimise collision risk – Use of fauna-sensitive lighting where lighting is required – Avoidance of transparent materials in the construction of bus shelters, barriers, fencing, and signage to minimise the potential for birds or other fauna to collide with them – Targeted signage to minimise roadkill and investigation of other measures during detailed design which may be trialled to minimise collision risk, particularly for Eastern Grey Kangaroos • Installation of rope bridges in key connectivity areas for arboreal mammals, to be installed as early as practicable during construction.	EPR E8 EPR EMF5	Unlikely	Minor	Low	The Project has the potential to impact the following threatened species: • Impacts to two Matted Flax-lily listed under the EPBC Act as Endangered, Flora and Fauna Guarantee Act 1988 (FFG Act) listed, and listed as endangered on the Victorian Advisory List of Threatened Plants (VicAdv) • Loss of one Studley Park Gum Eucalyptus from direct removal listed VicAdv endangered • Loss of three Pale-flowered Crane's-bill listed under the Advisory List • Impacts to potential habitat for the following threatened fauna: – Potential foraging habitat for Swift Parrot, including the loss of up to 1693 preferred and secondary potential foraging trees (95 large trees, 1598 small trees); – Potential foraging habitat for Grey-headed Flying-fox, including loss of up to 2521 eucalypts (174 large trees, 2347 small trees); – Potential dispersal habitat for Brush-tailed Phascogale will be fragmented; and – Potential grassland habitat for Tussock Skink.	Technical Report B1 – *Biodiversity Existing Conditions Report* Technical Report B2 – *Biodiversity Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
87	Continued.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	An assessment was undertaken of the potential for cumulative impacts on Swift Parrot based on the Project proposing to remove preferred and secondary potential foraging trees. Swift Parrots have not been recorded using potential habitat – preferred foraging trees – in the Project area. Within the Project area, 364 preferred foraging trees are proposed to be removed. Of these, 15 are large trees (i.e. over 60 cm DBH). Of the 15 large preferred foraging trees, 14 are expected to provide potential foraging resources for Swift Parrots based on their size, health and condition. Native vegetation species offset: Species offsets is required to be provided for Little Pink Spider orchid (1.861 species units).	Cont.
88	Ecology – Wildlife	Potential impact on wildlife or their habitat	Operations	Likely	Major	High	• Utilising the MRPV Fauna Sensitive Road Design Guideline (2019), such as through: – Use of fauna-friendly fencing where fencing is required (avoidance of chain-mesh fencing and barbed wire). If chain mesh fencing is required, it must be designed to minimise collision risk – Use of fauna-sensitive lighting where lighting is required – Avoidance of transparent materials in the construction of bus shelters, barriers, fencing, and signage to minimise the potential for birds or other fauna to collide with them – Targeted signage to minimise roadkill and investigation of other measures during detailed design which may be trialled to minimise collision risk, particularly for Eastern Grey Kangaroos • Installation of rope bridges in key connectivity areas for arboreal mammals, to be installed as early as practicable during construction.	EPR E8 EPR EMF5	Possible	Major	Significant	The Project is likely to impact non-listed fauna through loss of habitat and road mortality, as well as potential impacts from lighting and loss of connectivity. This includes arboreal mammals, reptiles, larger terrestrial mammals including Eastern Grey Kangaroos, and numerous birds.	Technical Report B1 – *Biodiversity Existing Conditions Report* Technical Report B2 – *Biodiversity Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
89	Groundwater	Potential changes to groundwater levels or flows from operation, resulting in impacts on groundwater quality and / or beneficial uses	Operations	Unlikely	Minor	Low	Mitigation measures have been applied during the design and construction phases. As such, the risk of impact on groundwater during operation of Yan Yean Road is considered to be low. Any potential impacts during operation and maintenance will be managed in accordance with the Department of Transport's standards for managing declared roads in Victoria.	EPR EMF5	Rare	Minor	Low	The Preliminary Groundwater Impact Assessment (Arcadis 2020) indicated that that it is unlikely that groundwater will be impacted by fuel or chemical spills during operation, given the depth of the water table.	Technical Report J – *Groundwater Impact Assessment*
90	Historical heritage	Potential impact on the values of heritage places and/or archaeological sites	Operations	Rare	Insignificant	Low	Mitigation measures have been applied during the design and construction phases. As such, the risk of impact on historical heritage during operation of Yan Yean Road is considered to be low. Any potential impacts during operation and maintenance will be managed in accordance with the Department of Transport's standards for managing declared roads in Victoria.	EPR EMF5	Rare	Insignificant	Low	The Aboriginal and Historical Cultural Heritage Impact Assessment (Ecology & Heritage Partners 2020) identified one Heritage Overlay (HO191) for the two Doreen River Red Gums. These trees have cultural significance to the community, and therefore must be avoided.	Technical Report F – *Aboriginal and Historical Cultural Heritage Impact Assessment*
91	Land use planning	Potential changes inconsistent with current or proposed future land use, including land acquisition, severance and occupation	Operations	Possible	Minor	Medium	Mitigation measures have been applied during the design and construction phases of the Project and use of the existing road is expected to continue. As such, the residual risk of impact on land use during operation of Yan Yean Road is considered to be low. Where permanent land acquisition is unavoidable: • Early and consistent consultation with affected land owners and tenants must occur • Compensation for interests in acquired land must be assessed in accordance with Land Acquisition and Compensation Act 1986.	EPR EMF5	Unlikely	Minor	Low	WSP Planning and Land Use Impact Assessment (2020) states the potential operation impacts relate to: • Acquisition of land results in a permanent loss of revenue and closure of commercial premises • Potential disruption to ongoing use of land due to land acquisition • Acquisition of land results in residential properties no longer being viable and useable for existing purposes Resolution of compensation claims can be protracted.	Technical Report H – *Planning and Land Use Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
92	Landscape and visual	Potential adverse impacts from operation on visual and/or landscape values experienced from sensitive receptors including residential areas, recreational and open spaces, hospitals, educational institutes and community facilities	Operations	Unlikely	Minor	Low	Mitigation measures have been applied during the design and construction phases (i.e. avoidance of trees, minimisation of footprint). As such, the risk of impact on landscape and visual values during operation of Yan Yean Road Upgrade – Stage 2 is considered to be low. Any potential impacts during operation and maintenance will be managed in accordance with the Department of Transport's standards for managing declared roads in Victoria.	EPR EMF5	Unlikely	Minor	Low	A Landscape Strategy is being developed in consultation with Councils and other key stakeholders to ensure that the Project fits sensitively into the built, natural and cultural environment of Doreen and Yarrambat. The strategy will ensure that the landscape response is well designed and contributes to the character and functioning of the Yan Yean Road corridor and the surrounding area, as well as the accessibility and connectivity of people within the wider region and community. The Project will seek to provide new and reinstated landscapes that are appropriate to the local conditions, consistent with the existing varied character of the area, provide opportunities to increase canopy cover wherever possible and provide improved public realm amenity.	Technical Report G – *Landscape Strategy*
93	Noise and vibration	Noise and/or vibration from operational road traffic noise potentially impacting on sensitive receptors	Operations	Unlikely	Minor	Low	The operational noise will be addressed through detailed design in accordance with the VicRoads Traffic Noise Reduction Policy (2005).	EPR NV2 EPR EMF5	Unlikely	Minor	Low	The Noise and Vibration Impact Assessment (WSP 2020) found future projections showed minimal increases in traffic volume between the Project and no-project scenarios, therefore no mitigation required.	Technical Report I – *Noise and Vibration Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
94	Social	Potential impacts on social and cultural values such as isolation of community, educational, religious or recreational facilities, changes to amenity, or changed road conditions affecting access as a result of operation	Operations	Possible	Minor	Medium	To mitigate impact to community facilities and the community after construction, driveway and access should be reinstated. Where this is not possible, engage with the community to organise alternatives.	EPR S3	Unlikely	Minor	Low	Community, educational, religious or recreational facilities along the alignment with the potential to be impact by construction include: Yarrambat Park Golf Course and community groups in Yarrambat Park, Yarrambat Primary School, Plenty Valley Christian College, Butterflies and Smiling Childcare and Early Learning Centres. Community groups will be notified of impacts and where possible the works will manage service in and out of Yarrambat Park and their direct business access. WSP completed a Social and Cultural Values Impact Assessment for the Project in 2020. Overall, the Project will generate benefits for local community through increased safety, reduced congestion, and enhanced opportunities for non-vehicle transport. The Yarrambat Veterinary Hospital has been identified as a facility likely to experience the greater impacts, although they are not considered significant overall. The Aboriginal and Historical Cultural Heritage Impact Assessment (Ecology & Heritage Partners 2020) identified a former Post Office and General Store which has no statutory protections but is of interest to locals and as such should be avoided if practicable.	Technical Report D – *Social Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
95	Surface water	Potential changes to stormwater flows as a result of operation, and/or adverse impacts on water quality and beneficial uses including waterway health and listed Wetlands (if applicable), due to changes to ground levels, ground surface imperviousness or increases in stormwater pollutants	Operations	Possible	Moderate	Medium	To mitigate changes to the hydrologic and / or hydraulic regime of waterways and stormwater risks, the following will be completed: • Develop a detail drainage model based on the 3D road detail design to comply with AustRoads, Council and Melbourne Water guidelines. A spill risk assessment should be conducted for each outfall based on the likelihood of a spill, which is estimated based on the road characteristics (geometry) of the outfall catchment, and its proximity to the downstream water sensitive receptors (i.e. consequence of the spill). Outfalls with a high spill risk are to provide spill containment • Detailed design drainage works in accordance with Melbourne Water, Austroads and Council requirements • Discharge and runoff to meet the relevant water objectives set out in the Environment Reference Standard under the *Environment Protection Amendment Act 2018*, Melbourne Water Performance Criteria and other relevant statutory requirements • For outfalls to major main drains or waterways, Melbourne Water will be consulted to determine specific requirements • An assessment and provision of flood mitigation measures during detailed design where the works result in an increase to flood risk • Investigate and mitigate interfaces with private, Council and Melbourne Water drainage assets • Comply with Melbourne Water Stormwater Quality Performance Criteria Yan Yean Road Upgrade – Stage 2 publication and MRPV's Integrated Water Management Guideline (2019) • In accordance with Emergency Response Procedures, complete spills risk assessment during detail design and provide spill containment for high risk locations.	EPR EMF5	Unlikely	Minor	Low	The Surface Water Impact Assessment (WSP 2020) identified erosion from construction sites to have the largest impact on sediment loads. The assessment also identified the need for water supplies for dust control and other such purposes. Depending on the quantities needed, there may be an impact on users of the water resource.	Technical Report L – *Surface Water Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
96	Sustainability (including greenhouse gas emissions)	Inefficient use of resources such as consumption of fossil fuels for electricity generation and operation of plant and equipment during operation resulting in the release of excess greenhouse gas emissions	Operations	Possible	Minor	Medium	Integrate sustainable design and construction practices to minimise, to the extent practicable, resource use particularly greenhouse gas emissions from operation and maintenance of the Project.		Unlikely	Minor	Low	The Air Quality Impact Assessment (WSP 2020) predicts that the impact from traffic for the 2031 with-Project scenario would produce 4,150 t CO2-e per year, while the without-project scenario would produce 3,765 t CO2-e per year. The assessment also estimates the emissions generated from lighting to be 3,747 t CO2-e per year.	Technical Report M – *Air Quality Impact Assessment*
97	Transport – Active users	Design layout and inefficient operation of the road impedes the movement of active users, including pedestrians, cyclists and horse riders	Operations	Unlikely	Minor	Low	Optimise the design in consultation with appropriate road management authorities, Nillumbik Shire Council and Whittlesea City Council to: • Design the road, walking and cycling elements and other recreation activities to meet relevant road and transport authority requirements • Maintain, and where practicable, enhance pedestrian movements, bicycle connectivity, and walking and cycling paths, including access to public open space and reserves.	EPR EMF5	Unlikely	Minor	Low	While traffic analysis can be carried out through design development (and to assess any design changes), forecasting traffic demands and operational performance is always subject to uncertainty. For this reason the consequence and impact ratings have been held constant.	Technical Report A – *Transport Impact Assessment*
98	Transport – Road users	Inefficient operation of the road impedes the movement of road users, including emergency services, public transport (e.g. buses), active users and private vehicles	Operations	Unlikely	Minor	Low	Traffic analysis to be carried out during detailed design development to demonstrate design performance under forecast demands.	EPR EMF5	Unlikely	Minor	Low	While traffic analysis can be carried out through design development (and to assess any design changes), forecasting traffic demands and operational performance is always subject to uncertainty. For this reason the consequence and impact ratings have been held constant.	Technical Report A – *Transport Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
99	Transport – Road users	Local access movements are adversely impacted by the Project due to the design layout such as changes in permanent access to adjacent businesses, residential properties and local roads	Operations	Almost Certain	Insignificant	Medium	To minimise the impact on road users, optimise the design in consultation with appropriate road management authorities, Nillumbik Shire Council and Whittlesea City Council to: • Design the road elements to meet relevant road and transport authority requirements • Where existing traffic movements are altered by the Project, ensure that alternative movements are incorporated into the design to the satisfaction of relevant road authorities.	EPR EMF5	Almost Certain	Insignificant	Medium	• Access changes included in design are consistent with road functionality • Permanent access changes will occur but adequate alternative provisions should assist in managing impacts.	Technical Report A – *Transport Impact Assessment*
100	Vegetation – Social and cultural values	Loss of or damage to remnant, planted or regenerated vegetation during operation impacting on social and cultural values	Operations	Unlikely	Minor	Low	Mitigation measures have been applied during the design and construction phases (i.e. avoidance of vegetation, minimisation of footprint). As such, the risk of impact on remnant, planted or regenerated vegetation during operation of Yan Yean Road Stage 2 is considered to be low. Any potential impacts during operation and maintenance will be managed in accordance with the Department of Transport's standards for managing declared roads in Victoria.	EPR EMF5	Unlikely	Minor	Low	WSP prepared a Social and Cultural Values Impact Assessment (2020) which found that the majority of stakeholder submissions received during the consultation phase on the Scoping Requirements referred to the two River Red Gums and some focused on the loss of total trees along the alignment. Tree 1265 (adjacent to Yan Yean Road) is listed on the National Trust of Australia as "significant for aesthetic and social reasons at Regional level". Given these identified social and cultural values, it is considered likely that loss of damage to planted or regenerated vegetation, particularly the River Red Gums, will have a major impact on the community. The Landscape Strategy for the Project will be sympathetic to existing values and seek to mitigate impacts.	Technical Report G – *Landscape Strategy* Technical Report D – *Social Impact Assessment* Technical Report F – *Aboriginal and Historical Cultural Heritage Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
MAINTENANCE													
101	Aboriginal cultural heritage	Disturbance of known or previously unrecorded Aboriginal cultural heritage by maintenance activities potentially impacting on heritage values	Maintenance	Rare	Insignificant	Low	Comply with the Cultural Heritage Management Plan (No.15169) when approved by Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation as the Registered Aboriginal Party under the *Aboriginal Heritage Act 2006*. All management conditions and contingencies would be adhered to.	EPR EMF5	Rare	Insignificant	Low	The Aboriginal and Historical Cultural Heritage Impact Assessment (Ecology & Heritage Partners 2020) identified two Aboriginal places within the project area. A draft Cultural Heritage Management Plan (No.15169) has been prepared in consultation with the Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation.	Technical Report F – *Aboriginal and Historical Cultural Heritage Impact Assessment*
102	Air quality	Generation of air emissions from maintenance works impacting on sensitive receptors such as hospitals, schools or residences	Maintenance	Unlikely	Minor	Low	Any potential impacts during operation and maintenance will be managed in accordance with the Department of Transport's standards for managing declared roads in Victoria.	EPR EMF5	Unlikely	Minor	Low	The Air Quality Impact Assessment (WSP 2020) found that the largest impact to air quality would mainly be associated with particulate matter emissions during site establishment, earthworks and civil works. The assessment also identified fuel combustion from construction vehicles would generate emissions. The impact on air quality will vary based on vehicle size, however impact will be low with standard mitigation measures applied.	Technical Report M – *Air Quality Impact Assessment*

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No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
103	Arboriculture	Loss of or damage to remnant, planted or regenerated trees, reducing canopy cover which can affect air temperature, climate, landscape, biodiversity, aesthetic, and recreational values	Maintenance	Unlikely	Minor	Low	The road upgrade will be maintained in accordance with the Landscape Management Strategy. During maintenance work, measures such as fencing off the tree protection zones must be undertaken to avoid and minimise impacts to trees, particularly the two Doreen River Red Gums. Any potential impacts during operation and maintenance will be managed in accordance with the Department of Transport's standards for managing declared roads in Victoria.	EPR EMF5	Unlikely	Minor	Low	C&R Ryder Consulting Pty Ltd completed an Arboriculture Assessment (2020) identified a total of 7,030 trees and shrubs were recorded in the project area and a 20-metre buffer zone adjacent to the project area, comprising 2,775 native trees, 707 understorey trees, 2,113 planted native or indigenous trees, and 1,435 exotic trees. The report found 12 trees to have very high retention value, 346 to have high retention value and a further 2,169 to have moderate retention value. C&R Ryder also completed a non-destructive Root Investigation Assessment (2019) near two large River Red Gums at the intersection of Yan Yean Road and Bridge Inn Road. Based on this assessment, the health of the River Red Gum tree adjacent to the northern boundary of Bridge Inn Road (east side of intersection) is declining, whereas the one on the east side of Yan Yean Road (north of intersection) is in good health. The assessment concluded that very little root damage is expected based on the proposed alignment in 2019 subject to the excavation not exceeding 600-800mm without additional investigation.	Technical Report C – *Arboriculture Assessment*
104	Business	Potential business impacts such as changes to amenity, or changed road conditions affecting businesses as a result of maintenance activities	Maintenance	Possible	Minor	Medium	All permanent access to business and commercial facilities affected by the works is to be restored, or relocated as negotiated with the relevant land owner, including associated landscaping and restoration works, and temporary access arrangements put in place for the duration of construction must be removed when construction has ceased. Any reduction in the level of access, amenity or function of any business or commercial facility must be minimised to the duration necessary to carry out the relevant maintenance works.	EPR EMF5	Unlikely	Minor	Low	Access will have changed for some businesses, however this will be communicated prior to and during construction.	Technical Report E – *Business Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
105	Contaminated land	Maintenance activities that require excavation, stockpiling, transport and/or disposal of known or previously unrecorded contaminated material (including acid sulfate soils) leading to potential risks to human health and the environment	Maintenance	Unlikely	Minor	Low	Any potential impacts during operation and maintenance will be managed in accordance with the Department of Transport's standards for managing declared roads in Victoria.	EPR EMF5	Unlikely	Minor	Low	The Contaminated Land Impact Assessment (Arcadis 2020) found low pH soil and elevated natural background concentrations of arsenic and fluoride within the study area, however they are consistent with background levels found in the Shire of Nillumbik. If disposal is required, leachate analysis will be required by the receiving landfill prior to disposal. With standard mitigation measures applied, the assessment identified any impact from existing contaminated land to sensitive receptors to be considered low.	Technical Report K – *Contaminated Land Impact Assessment*
106	Ecology – Native vegetation	Potential removal, destruction or lopping of native vegetation (including patches and scattered trees)	Maintenance	Possible	Moderate	Medium	The maintenance of fences, signage and fauna crossings, and soil hygiene controls for areas of retained native vegetation will be in accordance with Department of Transport standards for declared roads in Victoria.	EPR E8 EPR EMF5	Unlikely	Minor	Low	Biodiversity Impact Assessment (SMEC 2020) states that impacts may arise from maintenance activities such as weed control and slashing of ground covers adjacent the road corridor. If undertaken during wet or windy conditions, herbicides applied to control roadside weeds may drift into areas of retained vegetation, causing dieback. Slashing of roadside vegetation may also occur in areas of vegetation retention.	Technical Report B1 – *Biodiversity Existing Conditions Report* Technical Report B2 – *Biodiversity Impact Assessment*
107	Ecology – Threatened species and communities, or their habitat	Potential impact on Commonwealth and/or Victorian listed threatened species and communities, or their habitat (including freshwater ecology)	Maintenance	Possible	Moderate	Medium	The maintenance of fences, signage and fauna crossings, and soil hygiene controls for areas of retained native vegetation will be in accordance with Department of Transport standards for declared roads in Victoria.	EPR E8 EPR EMF5	Unlikely	Minor	Low	The Project has the potential to impact the following threatened species: • Impacts to two Matted Flax-lily listed under the EPBC Act as Endangered, Flora and Fauna Guarantee Act 1988 (FFG Act) listed, and listed as endangered on the Victorian Advisory List of Threatened Plants (VicAdv) • Loss of three Pale-flowered Crane's-bill listed under the Advisory List • Loss of one Studley Park Gum Eucalyptus from direct removal listed VicAdv endangered	Technical Report B1 – *Biodiversity Existing Conditions Report* Technical Report B2 – *Biodiversity Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
108	Continued.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.	• Impacts to potential habitat for the following threatened fauna: – Potential foraging habitat for Swift Parrot, including the loss of up to 1693 preferred and secondary potential foraging trees (95 large trees, 1598 small trees); – Potential foraging habitat for Grey-headed Flying-fox, including loss of up to 2521 eucalypts (174 large trees, 2347 small trees); – Potential dispersal habitat for Brush-tailed Phascogale will be fragmented; and – Potential grassland habitat for Tussock Skink. An assessment was undertaken of the potential for cumulative impacts on Swift Parrot based on the Project proposing to remove preferred and secondary potential foraging trees. Swift Parrots have not been recorded using potential habitat – preferred foraging trees – in the Project area. Within the Project area, 364 preferred foraging trees are proposed to be removed. Of these, 15 are large trees (i.e. over 60 cm DBH). Of the 15 large preferred foraging trees, 14 are expected to provide potential foraging resources for Swift Parrots based on their size, health and condition. Native vegetation species offset: Species offsets is required to be provided for Little Pink Spider orchid (1.861 species units).	Cont.

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
108	Ecology – Wildlife	Potential impact on wildlife or their habitat	Maintenance	Possible	Minor	Medium	The maintenance of fences, signage and fauna crossings, and soil hygiene controls for areas of retained native vegetation will be in accordance with Department of Transport standards for declared roads in Victoria.	EPR E8 EPR EMF5	Possible	Minor	Medium	The Project is likely to impact non-listed fauna through loss of habitat and road mortality. This includes arboreal mammals, reptiles, larger terrestrial mammals including Eastern Grey Kangaroos, and numerous birds. During the maintenance phase, further degradation of habitat may occur.	Technical Report B1 – *Biodiversity Existing Conditions Report* Technical Report B2 – *Biodiversity Impact Assessment*
109	Groundwater	Potential changes to groundwater levels or flows from maintenance, resulting in impacts on groundwater quality and / or beneficial uses	Maintenance	Unlikely	Minor	Low	Any potential impacts during operation and maintenance will be managed in accordance with the Department of Transport's standards for managing declared roads in Victoria.	EPR EMF5	Unlikely	Minor	Low	The Groundwater Impact Assessment (Arcadis 2020) indicated that that it is unlikely that groundwater will be impacted by fuel or chemical spills during maintenance, given the depth of the water table.	Technical Report J – *Groundwater Impact Assessment*
110	Historical heritage	Potential impact on the values of heritage places and/or archaeological sites	Maintenance	Rare	Insignificant	Low	Mitigation measures have been applied during the design and construction phases. No-go zones should be implemented if maintenance works are to occur in proximity of the two Doreen River Red Gums at the Bridge Inn Road intersection. Any potential impacts during operation and maintenance will be managed in accordance with the Department of Transport's standards for managing declared roads in Victoria.	EPR EMF5	Rare	Insignificant	Low	The Aboriginal and Historical Cultural Heritage Impact Assessment (Ecology & Heritage Partners 2020) identified one Heritage Overlay (HO191) for the two Doreen River Red Gums. These trees have cultural significance to the community, and therefore must be avoided.	Technical Report F – *Aboriginal and Historical Cultural Heritage Impact Assessment*
111	Land use planning	Potential changes inconsistent with current or proposed future land use, including land acquisition, severance and occupation	Maintenance	Possible	Minor	Medium	Mitigation measures have been applied during the design and construction phases of the Project and use of the existing road is expected to continue. As such, the residual risk of impact on land use during operation of Yan Yean Road is considered to be low. Where permanent land acquisition is unavoidable: • Early and consistent consultation with affected land owners and tenants must occur • Compensation for interests in acquired land must be assessed in accordance with Land Acquisition and Compensation Act 1986.	EPR EMF5	Unlikely	Minor	Low	Potential maintenance impacts relate to temporary or permanent land acquisition and potential land uses changes for landowners, occupiers and land users.	Technical Report H – *Planning and Land Use Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
112	Landscape and visual	Potential adverse impacts from maintenance activities on visual and/or landscape values experienced from sensitive receptors including residential areas, recreational and open spaces, hospitals, educational institutes and community facilities	Maintenance	Unlikely	Minor	Low	The road upgrade will be maintained in accordance with the Landscape Management Strategy. Any potential impacts during operation and maintenance will be managed in accordance with the Department of Transport's standards for managing declared roads in Victoria.	EPR EMF5	Unlikely	Minor	Low	A Landscape Strategy is being developed in consultation with Councils and other key stakeholders to ensure that the Project fits sensitively into the built, natural and cultural environment of Doreen and Yarrambat. The strategy will ensure that the landscape response is well designed and contributes to the character and functioning of the Yan Yean Road corridor and the surrounding area, as well as the accessibility and connectivity of people within the wider region and community. The Project will seek to provide new and reinstated landscapes that are appropriate to the local conditions, consistent with the existing varied character of the area, provide opportunities to increase canopy cover wherever possible and provide improved public realm amenity.	Technical Report G – *Landscape Strategy*
113	Noise and vibration	Noise and/or vibration from maintenance potentially impacting on sensitive receptors	Maintenance	Unlikely	Minor	Low	Regular maintenance will aid in reduction of unnecessary noise (through potholes, corrugations, clogging of pores on pavement). Any potential impacts during operation and maintenance will be managed in accordance with the Department of Transport's standards for managing declared roads in Victoria.	EPR EMF5	Unlikely	Minor	Low	The Noise and Vibration Impact Assessment (WSP 2020) identified that construction is likely to have adverse noise and vibration impacts to sensitive receptors, which can be mitigated with standard measures.	Technical Report I – *Noise and Vibration Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
114	Social	Potential impacts on social and cultural values such as isolation of community, educational, religious or recreational facilities, changes to amenity, or changed road conditions affecting access as a result of maintenance activities	Maintenance	Possible	Minor	Medium	To mitigate impact to community facilities and the community after construction, driveway and access should be reinstated. Where maintenance works will affect access, engage with the community to organise alternatives.	EPR EMF5	Unlikely	Minor	Low	Community, educational, religious or recreational facilities along the alignment with the potential to be impact by construction include: Yarrambat Park Golf Course and community groups in Yarrambat Park, Yarrambat Primary School, Plenty Valley Christian College, Butterflies and Smiling Childcare and Early Learning Centres. Community groups will be notified of impacts and where possible the works will manage service in and out of Yarrambat Park and their direct business access. WSP completed a Social and Cultural Values Impact Assessment for the Project in 2020. Overall, the Project will generate benefits for local community through increased safety, reduced congestion, and enhanced opportunities for non-vehicle transport. The Yarrambat Veterinary Hospital has been identified as a facility likely to experience the greater impacts, although they are not considered significant overall. The Aboriginal and Historical Cultural Heritage Impact Assessment (Ecology & Heritage Partners 2020) identified a former Post Office and General Store which has no statutory protections but is of interest to locals and as such should be avoided if practicable.	Technical Report D – *Social Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
115	Surface water	Potential changes to stormwater flows as a result of maintenance activities such as weed control spraying, and/or adverse impacts on water quality and beneficial uses including waterway health and listed Wetlands (if applicable)	Maintenance	Unlikely	Minor	Low	Any potential impacts during operation and maintenance will be managed in accordance with the Department of Transport's standards for managing declared roads in Victoria.	EPR EMF5	Unlikely	Minor	Low	The Surface Water Impact Assessment (WSP 2020) identified based on the 1% AEP plus climate change (largest required design flood event to be considered): • Flood risk at outfalls to Melbourne Water watercourses, Melbourne Water wetland and Yarrambat lake is minor and mitigation during detail design can manage this risk • No properties were at increased flood risk (based on the road design option modelled and proposed transverse crossings) • Flood impacts for a range of more frequent AEPs should be confirmed during detail design. The preliminary drainage impact assessment identified that proposed WSRD onsite treatment to include: • Upgrading drains at the base of proposed embankments to grassed swales and providing connections to the kerb and channel network • Provide bioretention upstream of Yarrambat Lake Best Practice Environmental Management Guidelines targets for urban stormwater are achieved at project level and upstream of sensitive receptors.	Technical Report L – *Surface Water Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
116	Sustainability (including greenhouse gas emissions)	Inefficient use of resources such as consumption of fossil fuels for electricity generation and operation of plant and equipment during maintenance resulting in the release of excess greenhouse gas emissions	Maintenance	Unlikely	Minor	Low	Integrate sustainable design and construction practices to minimise, to the extent practicable, resource use particularly greenhouse gas emissions from operation and maintenance of the Project.		Unlikely	Minor	Low	The Air Quality Impact Assessment (WSP 2020) predicts that resurfacing would produce 6,547 t CO2-e over a 50-year maintenance life.	Technical Report M – *Air Quality Impact Assessment*
117	Transport – Active users	Maintenance activities impede the efficient movement of active users, including pedestrians, cyclists and horse riders	Maintenance	Unlikely	Minor	Low	During maintenance activities: • Provide detour routes for active users • Where formal vehicle or pedestrian access is altered by the Project, such access must be replaced • Maintain community engagement with advance warning of changed traffic conditions.	EPR EMF5	Unlikely	Minor	Low	Maintenance activities could range from very minor works with little traffic impact (e.g. replacement of a sign) through to full closures e.g. for resurfacing works.	Technical Report A – *Transport Impact Assessment*
118	Transport – Road users	Maintenance activities impede the efficient movement of road traffic including general traffic, emergency services, public transport (i.e. buses)	Maintenance	Unlikely	Minor	Low	During maintenance activities: • Provide detour routes for active users • Where formal vehicle or pedestrian access is altered by the Project, such access must be replaced • Maintain community engagement with advance warning of changed traffic conditions.	EPR EMF5	Unlikely	Minor	Low	Maintenance activities could range from very minor works with little traffic impact (e.g. replacement of a sign) through to full closures e.g. for resurfacing works.	Technical Report A – *Transport Impact Assessment*
119	Transport – Road users	Maintenance activities results in access changes for adjacent residents and businesses that increase trip lengths and travel times	Maintenance	Unlikely	Minor	Low	During maintenance activities: • Provide detour routes for active users • Where formal vehicle or pedestrian access is altered by the Project, such access must be replaced • Maintain community engagement with advance warning of changed traffic conditions.	EPR EMF5	Unlikely	Minor	Low	Maintenance activities could range from very minor works with little traffic impact (e.g. replacement of a sign) through to full closures e.g. for resurfacing works.	Technical Report A – *Transport Impact Assessment*

				INITIAL RISK					RESIDUAL RISK				
No	Aspect	Impact Pathway	Activity	Likelihood	Consequence	Inherent Risk Rating	Mitigation measures to inform Environmental Performance Requirement	EPR	Likelihood	Consequence	Residual Risk Rating	Rationale	Relevant impact assessment
120	Vegetation – Social and cultural values	Loss of or damage to remnant, planted or regenerated vegetation during maintenance impacting on social and cultural values	Maintenance	Unlikely	Minor	Low	The road upgrade will be maintained in accordance with the Landscape Management Strategy. Any potential impacts during operation and maintenance will be managed in accordance with the Department of Transport's standards for managing declared roads in Victoria.	EPR EMF5	Unlikely	Minor	Low	WSP prepared a Social and Cultural Values Impact Assessment (2019) which found that the majority of stakeholder submissions received during the consultation phase on the Scoping Requirements referred to the two River Red Gums and some focused on the loss of total trees along the alignment. Tree 1265 (adjacent to Yan Yean Road) is listed on the National Trust of Australia as "significant for aesthetic and social reasons at Regional level". Given these identified social and cultural values, it is considered likely that loss of damage to planted or regenerated vegetation, particularly the River Red Gums, will have a major impact on the community. The Landscape Strategy for the Project will be sympathetic to existing values and seek to mitigate impacts.	Technical Report G – *Landscape Strategy* Technical Report D – *Social Impact Assessment* Technical Report F – *Aboriginal and Historical Cultural Heritage Impact Assessment*

Appendix III-B: Consequence criteria

Aspect	Insignificant	Minor	Moderate	Major	Critical
Aboriginal cultural heritage	No impact on cultural heritage places or values.	Destruction of place(s) and associated cultural values in a deteriorated condition with a high degree of disturbance evident and some cultural materials remaining.	Destruction of a common occurrence place(s)and/or associated cultural values. A place with a limited range of cultural materials and a place in a fair to good condition with some degree of disturbance evident.	Destruction of rare occurrence place(s) and/or associated cultural values. A place with a large number and diverse range of cultural materials A place with stratified deposits and/or surface spatial patterning that reflects the way in which cultural materials were deposited.	Destruction of place(s) and/or associated cultural values with exceptional value. A place identified by Aboriginal Victoria and/or cultural values identified by Traditional Owners of exceptional value that the destruction would be catastrophic A burial.
Air quality	Limited duration and localised impact on air quality.	Impact on air quality not causing exceedance of applicable air quality objectives (as set out in the Environmental Reference Standards).	Localised impacts on air quality causing marginal exceedance of applicable air quality objectives (as set out in the Environmental Reference Standards).	Widespread short-term impacts on air quality causing significant exceedances of applicable air quality objectives (as set out in the Environmental Reference Standards).	Widespread long-term impacts on air quality causing significant exceedances of applicable air quality objectives (as set out in the Environmental Reference Standards) and resulting in adverse impacts on human health.
Arboriculture	Loss of less than 10 remnant, planted or regenerated trees.	Loss of > 10 remnant, planted or regenerated trees.	Loss of >100 remnant, planted, or regenerated trees.	Loss of >1,000 remnant, planted or regenerated trees.	Loss of >10,000 remnant, planted or regenerated trees.
Business	Limited and temporary reduction in local business accessibility/ functionality (within usual business fluctuations) in a localised area.	Reduced accessibility/ functionality within a localised area. Short-term (i.e. 6 to 12 months) reduction in business functionality.	Reduced accessibility/ functionality for a number of local businesses. Medium-term (i.e. one to two years) reduction in business functionality.	Reduced accessibility/ functionality to a single key business area, or multiple local businesses. Long-term (i.e. over two years) reduction in business functionality.	Permanently reduced accessibility/ functionality of multiple key business areas.

Aspect	Insignificant	Minor	Moderate	Major	Critical
Contaminated land	No disturbance of contaminated soils, acid sulfate soils / rocks.	Handling (including transportation, treatment and/or disposal) of contaminated soil and/or acid sulphate soils or rock with negligible risk to human health and/or the environment.	Handling (including transportation, treatment and/or disposal) of contaminated soil and/or acid sulphate soils or rock, with localised risk to human health and/or the environment.	Handling (including transportation, treatment and/or disposal) of contaminated soil and/or sulphate soils or rock with risk to human health and/or the environment in a number of localised areas.	Widespread irreversible risk to human health and/or the environment from handling (including transportation, treatment and/or disposal) of contaminated soil and/or acid sulphate soils or rock.
Ecology	Insignificant loss of native vegetation (<0.1 ha). No direct loss of large remnant trees. Loss of some common plants or individuals. No net loss achievable. No impacts to FFG listed communities. Insignificant loss of fauna individuals or minor behavioural changes. Impacts not considered detectable.	Limited impact on native vegetation (0.1–1.0 ha), or site of local ecological significance. Loss of 1-10 large remnant trees. No net loss achievable. No impacts to FFG listed communities. Limited impacts to common species. No detectable impact on rare or near-threatened species.	Moderate loss of native vegetation (1.0–5 ha). Loss of 10-50 large remnant trees. No net loss achievable. Loss (<1% of total distribution) of an FFG listed community. Moderate impact on a population that is significant at a local or regional level for listed-threatened species.	Substantial impact on native vegetation or (5– 25 ha). Loss of 50-200 large remnant trees. No net loss achievable. Loss (<5% of total distribution) of an FFG listed community. Substantial impact on individuals of a population that is threatened at a State or Commonwealth level.	Significant impact on native vegetation or (> 25 ha). Loss of >200 large remnant trees. No net loss not achievable. Significant Loss (>5% of total distribution) of an FFG listed community. Significant change in a population and impact on the population viability of a species threatened at a State or Commonwealth level.
Groundwater	Changes to groundwater levels or flows, or release or movement of contaminants have no measurable effect for groundwater uses.	Changes to groundwater levels or flows, or release or movement of contaminant is measurable but is within range of typical natural variation or does not result in a loss of one or more beneficial uses of the groundwater.	Changes to groundwater levels or flows, or release of contaminants into the environment causes temporary and reversible loss of one or more beneficial uses of the groundwater.	Changes to groundwater levels or flows, or release of contaminants into the environment causes permanent loss of one or more beneficial uses of the groundwater on a localised scale.	Changes to groundwater levels or flows, or release of contaminants into the environment causes permanent loss of one or more beneficial uses of the groundwater across a large geographic area.

Aspect	Insignificant	Minor	Moderate	Major	Critical
Historical heritage	No detectable impact on the values of heritage places. No disturbance of archaeological sites.	Partial reduction in the heritage values of a locally significant place. Detectable impact on a state significant heritage place but overall heritage values retained intact.	Significant reduction or complete loss of the heritage values of one or more local significant places. Partial reduction in the heritage values of a State significant place.	Significant reduction or complete loss of the heritage values of a State significant heritage place.	Widespread loss of heritage values of locally or State significant places.
Land use planning	No fragmentation of land uses or land holdings.	Some minor fragmentation and / acquisition of land uses but properties still able to be used for existing purposes.	Fragmentation / acquisition of land results in 1-10 properties no longer being viable / accessible / useable for existing purpose.	Fragmentation / acquisition of land results in 10-20 properties no longer being viable / accessible / useable for existing purpose.	Fragmentation / acquisition of land results in 20+ properties no longer being viable / accessible / useable for existing purpose.
Landscape and visual	The project would have an indiscernible effect on views and will not affect the composition, the appreciation of the landscape character, or the ability to take in or enjoy the view.	The project would cause a low degree of visual change, but would not materially affect the composition, the appreciation of landscape character or the ability to take in or enjoy the view.	The project would cause a complete temporary change or clearly noticeable permanent change to the view that would affect the composition, the appreciation of landscape character or the ability to take in or enjoy the view.	The project would cause a complete permanent change to the composition of the view, the appreciation of landscape character, or the ability to take in or enjoy the view.	The proposal would result in a substantial permanent alteration to a view of recognised national importance and the appreciation of landscape character, the ability to take in or enjoy the view.
Noise and vibration	Applicable noise standards met. No detectable effects.	Isolated exceedance of applicable noise standards that are short lived (over a 48 hour period or less). Minor number of complaints. Localised exceedance of applicable vibration standards resulting in annoyance that is short lived (over a 48 hour period or less). Minor number of complaints.	Isolated exceedance of applicable noise standards which are short or medium term in a local area (long than 48 hours). Significant number of complaints. Localised exceedance of applicable vibration standards resulting in annoyance for an extended period (more than two nights). Significant number of complaints.	Exceedance of applicable noise standards resulting in annoyance which requires temporary relocation of some sensitive receptors. Exceedance of applicable vibration standards resulting in annoyance that requires temporary relocation of some sensitive receptors.	Exceedance of applicable noise standards resulting in significant and widespread annoyance necessitating relocation of many sensitive receptors. Exceedance of applicable vibration standards resulting in significant and widespread annoyance necessitating relocation of many sensitive receptors.

Aspect	Insignificant	Minor	Moderate	Major	Critical
Social	Local, small-scale, easily reversible change in access to community, educational, religious or recreational facilities and the communities of interest can easily adapt or cope with change.	Short-term (less than 1 year), recoverable changes in access to community, educational, religious or recreational facilities and the community has substantial capacity to adapt and cope with change.	Medium-term (1-5 years), recoverable changes in access to community, educational, religious or recreational facilities and the community has substantial capacity to adapt and cope with change.	Long-term (5-25 years), recoverable changes in access to community, educational, religious or recreational facilities and the community has limited capacity to adapt and cope with change.	Irreversible changes in access to community, educational, religious or recreational facilities and the community has no capacity to adapt and cope with change.
Surface water	Negligible change to river health, waterway, floodplain function or flow regime.	Changes to river health, waterway, floodplain function or flow regime with minor implications.	Changes to river health, waterway, floodplain function or flow regime with moderate implications.	River health, waterway, floodplain function or flow regime significantly compromised.	Extensive impact on river health or waterway, floodplain function, or flow regime irreversibly disturbed.
Sustainability (including greenhouse gas emissions)	Construction or operational resource use is insignificant that is, the project is near to or on par with the 'no project' scenario.	Construction or operational resource use is marginal that is, the project is below the National Greenhouse and Energy Reporting scheme requirements.	Construction or operational resource use is measurable that is, the project triggers, or is over, the National Greenhouse and Energy Reporting scheme requirements.	Construction or operational resource use is substantial such as the project increases Victoria's annual transportation sector's GHG emissions by more than 1%.	Construction or operational resource use is significant such as the project increases Victoria's annual transportation sector's GHG emissions by more than 10%.
Transport (both road users and active users)	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.	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 efficiency of the transport network.
Vegetation – Social and cultural values	Insignificant loss of remnant, planted or regenerated vegetation (<0.1 ha).	Limited impact on remnant, planted or regenerated vegetation (0.1–1.0 ha).	Moderate loss of remnant, planted or regenerated vegetation (1.0–5 ha).	Substantial impact on remnant, planted or regenerated vegetation (5– 25 ha).	Significant impact on remnant, planted or regenerated vegetation (> 25 ha).