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Parkes Way Corridor – Corridor Strategy

Parkes Way / South West Corridors Traffic Modelling and Options Analysis

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Executive Summary

Overview

The Territory Government has identified a need to develop corridor strategies for key transport corridors within the ACT. In response to this requirement, the Territory commissioned the preparation of a Corridor Strategy for Canberra's primary Parkes Way Corridor. In parallel, the Territory also commissioned the development of a corridor strategy for the South West Corridor (the Tuggeranong Parkway and Drakeford Drive), acknowledging the close operational relationship between the two corridors.

The primary objective of the Corridor Strategy is to develop, analyse, document, and prioritise transport corridor upgrade concepts for short, medium and long-term improvements to help achieve the long-term vision for the corridor. This includes relieving traffic congestion, enhancing transport network operations and improving safety along Parkes Way (inclusive of a short length of Willaim Hovell Drive) between the Bindubi Street in the west and the Kings Avenue Interchange in the east.

A Corridor Strategy is a plan that is intended to identify a strategic approach to managing a transport artery over a specified period of time. The purpose of the Corridor Strategy presented here is to provide a roadmap for the corridor infrastructure owner / operator (the Territory) to take necessary steps over the next 30 years to ensure that the Corridor performs appropriately in respect to its operation, safety and amenity, and continues to serve the needs of the community.

The Corridor Strategy has been informed by various streams of investigation and assessment, and is the compilation of several discrete but related studies. These assessments include:

- **Establishment of a Corridor Vision** – A Vision for the corridor was established in the initial stages of development of the Corridor Strategy to provide guiding objectives for the corridor and helped inform all subsequent stages of strategy development.
- **Transport Model Calibration and Validation** – Initial transport modelling was undertaken to construct an Aimsun Hybrid model (mesoscopic and microscopic) of the corridor and it surrounds, and have that model calibrated and validated to existing network conditions and performance.
- **Long List Identification -** A long list of potential upgrade options was identified through a combination of several different methods including stakeholder advice; traffic modelling outcomes; deficiencies in active travel connectivity; existing and potential future public transport routes; existing crash analysis; and observed safety concerns.
- **Short Listing Assessment** – The long list of upgrade options was tested against the agreed Vision for the Corridor, with upgrades identified as most aligned with the Corridor Vision short listed.
- **Strategic Design** – Preliminary strategic design was undertaken for the short listed options to identify appropriate layouts considered likely to address the underlying identified problems in the corridor.
- **Safety Analysis** – Preliminary safety analysis has been undertaken of both the Base Case (absence of Corridor upgrades) and the Upgrade Scenario to understand how the upgrades are likely to improve the safety of the Corridor.
- **Freight Assessment** – A Freight Corridor Assessment was undertaken as a complement to the Corridor Strategy, with some findings relevant to the Corridor.
- **Cost Estimation** – To understand the capital implications and level of investment required to implement the Corridor Strategy, preliminary opinions of cost have been generated based on the infrastructure layouts identified in the Strategic Design.
- **Upgrade Prioritisation and Staging** – Based on existing and forecast performance of the transport network, capital requirements, and other network and urban planning considerations, an approach to prioritisation of the upgrades was identified.
- **Transport Modelling** – Base model versions of an Aimsun Hybrid model and the CSTM were constructed and run to understand how the network would perform in 2031, 2041 and 2051 in both the absence of any upgrades to the Corridor, and in the Upgrade Scenario.

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- **Economic Analysis** – To understand the economic implications of the Corridor Strategy, and to ensure that it provides a positive return on investment to the community, a cost benefit analysis was undertaken on the staged implementation of the strategy.
- **Assessment Framework** – Finally, informed by the various streams of investigation undertaken as part of the Corridor Strategy, the proposed upgrades were run through a strategic merit test to ensure that the proposed Corridor Strategy is aligned with the Vision for the Corridor, and by extension appropriate for implementation.
- **Conclusions and Recommendations** – Based on the outcomes of the Assessment Framework and the preceding suite of assessments, the Corridor Strategy draws conclusions about the performance of the Corridor and the transport network more broadly, and provides recommendations about the implementation of the Corridor Strategy.

Corridor Vision

As part of the development of the Corridor Strategy, the need for development of a clear and coherent vision for the corridor was identified. This vision was developed in close consultation with relevant Territory and Federal stakeholders and underpinned all stages of development of the Corridor Strategy. The purpose of this Vision was to inform the development of the Corridor Strategy and provide a framework for the ongoing operation of the corridor over the next 30 years. This Vision for the Parkes Way Corridor identifies a suite of Vision Principles based on several categories:

- Corridor purpose & classification
- Urban Master Planning
- Traffic operational performance
- Safety
- Sustainability, environment & cultural heritage
- User amenity
- Land use & economic development
- Adaptability to emerging technologies

Identification of Upgrades

In order to understand which Corridor improvements that are most likely to align with the agreed Vision for the corridors, an options short listing exercise was undertaken. This process involved the following steps:

- Identification of a long list of upgrade options for the corridor
- An options workshop that sought feedback from key stakeholders and specialists on each long list option
- Formal evaluation of all long list options against the agreed Vision Principles
- Nomination of a shortlist of options based on the options evaluation outcomes, stakeholder feedback and other relevant considerations

The long list of options was identified through a combination of methods including upgrades identified by TCCS; upgrades likely to improve the operation of the corridor based on traffic modelling; identified deficiencies in active travel connectivity; existing and potential future public transport routes; existing crash analysis and observed safety concerns. In order to consider the relative merits of each option and identify a shortlist, the options were evaluated using a Strategic Merit Test (a decision framework). The Strategic Merit Test (SMT) considered whether an option was aligned with each of the Vision Principles in order to determine whether the option was appropriate for short listing. The SMT identified numerous upgrades that were considered either strongly or partly aligned with the Corridor Vision and appropriate for shortlisting. The following short list of upgrades was subsequently endorsed by TCCS and the Project Control Group:

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Upgrade		Description
PW2a	Parkes Way / Anzac Pde upgrade - at grade improvements	Addition of mainline through and circulating lanes in each direction at the roundabout. Signalisation of the eastern and northern approaches has also been provided in an effort to improve performance and extend the life of the intersection in the short term.
PW2b	Parkes Way / Anzac Pde upgrade - Underpass	A long term, capital intensive solution to grade separate the ANZAC Parade roundabout to avoid future operational failure at the site. There are various potential options for the upgrade, however depending on constraints may require a short tunnel. The upgrade has a strong interdependence with the PW3c package.
PW3a	Parkes Way / Coranderrk St upgrade - At grade improvements	Addition of a bypass lane at the roundabout to facilitate the left turn from southbound Coranderrk Street to eastbound Parkes Way in an effort to improve performance and extend life of the intersection in the short term.
PW3c	Parkes Way / Coranderrk St upgrade - grade separated interchange	A long term, capital intensive solution to grade separate the intersection and avoid future operational failure at the site. The upgrade also improves pedestrian connectivity across the Corridor, but is likely to require replacement of water quality infrastructure at or near the site. The upgrade has a strong interdependence with the PW2b package.
PW4	Parkes Way localised lowering & narrowing through CBD	The upgrade aims to create a more compact cross section through the city between Edinburgh Avenue and Coranderrk Street to improve pedestrian connectivity across the corridor and increase adjacent land yields.
PW6	Parkes Way eastbound widening	The addition of an interim third eastbound lane through widening into the median will provide improved mainline capacity through the city.
PW8	Molonglo to City Cycle Highway - Parkes Way component	Significant upgrade of active travel infrastructure in the Corridor along the lake foreshore including a dedicated commuting cycle path in addition to a recreational shared use path.
PW10	Parkes Way / Clunies Ross St interchange upgrade - west facing ramps	Addition of an eastbound exit ramp and westbound entry ramp from/to Parkes Way at the Clunies Ross Interchange. Provision of the ramps will improve network capacity and redundancy, and provide a new access point into the western part of the city. It is noted that upgrade of Clunies Ross Street may be required to improve capacity in that corridor.
PW12	Midblock capacity upgrade between Glenloch & Clunies Ross interchanges	Provision of an additional lane between the interchanges to increase mainline capacity for general traffic.
PW14	Public Transport Corridor – Interim Upgrade	Conversion of existing Parkes Way shoulders (likely with some civil works) into dedicated bus lanes. The upgrade is intended to provide a dedicated space for buses to facilitate public transport between Molonglo and the City. The upgrade has a strong interdependence with the G4 package.
PW15	Public Transport Corridor – Ultimate Upgrade	Creation of a segregated space for public transport vehicles that will allow for higher capacity public transport infrastructure such as a bus rapid transit or light rail route between Molonglo and the City. The upgrade is intended to provide a long term public transport solution for the Molonglo District and has a strong interdependence with the G5 package.
PW18	Coranderrk to ANZAC - Improved pedestrian permeability across corridor	Upgrade to existing active travel infrastructure crossings of Parkes Way at Allara St (overbridge) and near ANZAC Park West (underpass). These

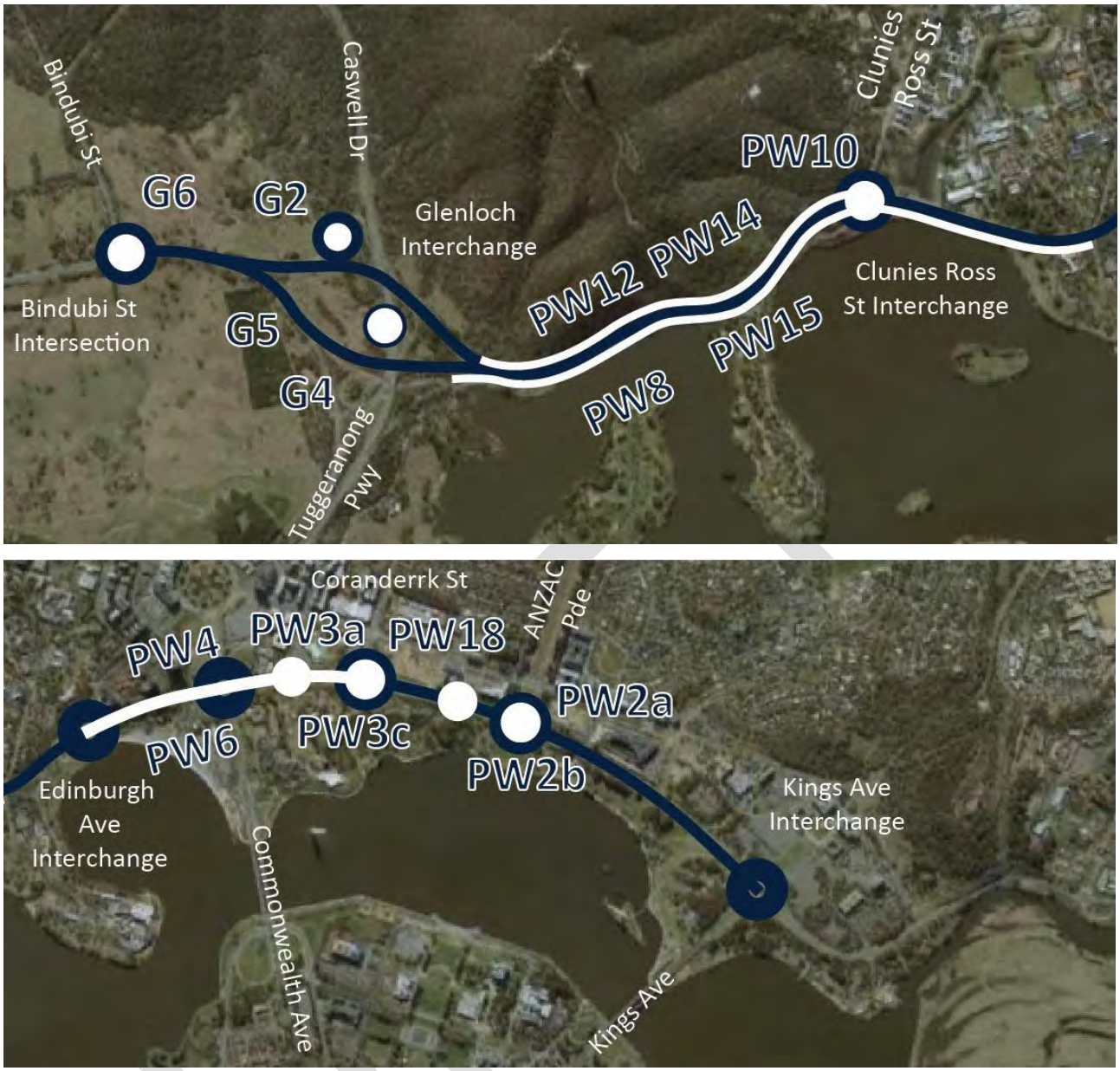
Upgrade		Description
		upgrades are intended to compliment new active travel infrastructure proposed at the Coranderrk Street Interchange and will improve the capacity and quality of these sites, and enhance movement between the City and Commonwealth Park.
G2	Glenloch Int. Upgrade - William Hovel Dr EB onto Gungahlin Dr NB ramp	The addition of a free flow ramp between eastbound William Hovell Drive to northbound Caswell Drive. Provision of the ramp improves network safety, capacity, connectivity and redundancy.
G4	Glenloch Int. – Short/medium term PT route	Conversion of existing William Hovell Drive/Parkes Way shoulders (likely with some civil works) through Glenloch Interchange into dedicated bus lanes. The upgrade is intended to provide a dedicated space for buses through the interchange to facilitate public transport between Molonglo and the City. The upgrade has a strong interdependence with the PW14 package.
G5	Glenloch Int. – Long term PT route	Creation of a segregated space for public transport vehicles through the Glenloch interchange that will allow for higher capacity public transport infrastructure such as a bus rapid transit or light rail route between Molonglo and the City. The upgrade is intended to provide a long term public transport solution for the Molonglo District and has a strong interdependence with the PW15 package.
G6	Bindubi St Interchange	With provision of a new access into Molonglo 3 East (the Bindubi Street extension) a new interchange grade separated is required to avoid failure of the mainline (Wiliam Hovell Drive) and side road (Bindubi Street)

Strategic Design

The intent of the strategic design is to develop and present road layouts that are likely to provide a feasible solution to address identified issues in the Corridor. It is focussed on key road elements that are considered most likely to influence the way the upgrade impacts on the operation of the corridor. To that end, the strategic design considered road and intersection configurations and geometry to the extent that it will facilitate testing of network performance effects of the upgrade and to understand the potential broad cost and economic implications of the upgrades.

Strategic designs have been developed for 16 upgrades in the Parkes Way Corridor that are aligned with the Vision for the corridor. These upgrades are interspersed along the length of the Parkes Way Corridor between Bindubi Street and Kings Avenue, and are a mix of infrastructure improvements at both corridor nodes (e.g. interchanges or intersections) and on corridor segments (between nodes).

The upgrades presented in the strategic design have been developed based on current available information, preliminary assessment and engineering and transport planning. It is anticipated that future phases of design development will interrogate the feasibility of proposed upgrades in greater detail, and will assess traffic performance, existing constraints (physical, environmental, planning etc) and stakeholder concerns. These investigations are expected to include a rigorous optioneering assessment process as part of future concept design development to ensure that that the most appropriate design solution for each of the upgrades is identified for the requirements at the time.



Corridor Priorities & Staging

Understanding how to best to phase implementation of the Corridor Strategy and prioritise its constituent activities and upgrades is critical consideration of the Strategy. Several factors have informed the proposed prioritisation of Corridor Strategy upgrades, including:

- **Operational Need** - Transport modelling has identified timeframes in which elements of the Corridor reach or exceed their capacity and require upgrade to prevent failure / unacceptable deterioration of performance (be it operational or safety).
- **Value for Money** - Targeting delivery of upgrades in timeframes that offer the greatest return on investment to the Territory. This may be tied to timely delivery of upgrades to prevent operational deterioration, or equally may seek to life extend or "sweat" an asset to extract the maximum value of infrastructure prior to its replacement or renewal.
- **Interdependence** – Some of the upgrades proposed in the Corridor Strategy share an interdependence with other upgrades, or other off-corridor network improvements. These interdependencies may be either sequential (triggered by the performance life of a preceding upgrade), or Concurrent (a relationship between two or more upgrades supports the concurrent delivery of the upgrades)

Based on these considerations, each of the Corridor Strategy upgrades has been assessed as being required in the Short, Medium or Long Term and collectively tested as grouped suites of work for delivery in or around the 2031, 2041, or 2051 timesteps investigated in the Corridor Strategy. Whilst acknowledging the upgrades may be delivered prior to, on, or after each of these model years, the nominated year of delivery has been adopted as a simplifying assumption for the purposes of the Corridor Strategy. Furthermore, it is noted that the most appropriate timeframes for delivery of each of the upgrades is likely to change over time in response to evolving Territory priorities, network conditions and performance, land use and population growth.

The upgrade prioritisation and groupings are indicated following, and have formed the basis of the Corridor Strategy strategic and operational transport modelling and economic analysis.

Upgrade		Prioritisation Rationale
Short Term Priorities		**Estimated Cost = $110M**
PW2a	Parkes Way / Anzac Pde upgrade - at grade improvements	The intersection currently experiences high levels of congestion and queuing in peak periods. This interim solution seeks to provide a low cost solution to improve performance in the short term, and can be delivered in a short timeframe to address the existing issues at the site. ***Vision Alignment - Moderate***
PW3a	Parkes Way / Coranderrk St upgrade - at grade improvements	The intersection currently experiences high levels of congestion and queuing in peak periods. This interim solution seeks to provide a low cost solution to improve performance in the short term, and can be delivered in a short timeframe to address the existing issues at the site. ***Vision Alignment - Moderate***
PW6	Parkes Way eastbound widening	The section of Parkes Way between Edinburgh Avenue and Coranderrk Street experiences high levels of congestion and queuing in peak periods. This interim solution seeks to provide a low cost solution to improve performance in the short term, and can be delivered in a short timeframe to address the existing issues at the site. ***Vision Alignment - Strong***
PW10	Parkes Way / Clunies Ross St interchange upgrade - west facing ramps	Parkes Way currently experiences significant congestion and is forecast to perform poorly to the east of Clunies Ross Street in the AM peak by 2031. The connectivity that this upgrade provides will reduce congestion on Parkes Way in the short term in addition to facilitating the proposed interim public transport corridor that may route along Clunies Ross St. ***Vision Alignment - Strong***
PW14	Public Transport Corridor – Interim Upgrade	The interim public transport upgrade is intended to be a low cost solution that will facilitate public transport services between the Molonglo Valley and the City. It is proposed in the short term as it is expected to be a relatively straightforward measure that can be implemented in a short timeframe in response to growth in Molonglo. ***Vision Alignment – Very Strong***
G4	Glenloch Int. – Short/medium term PT route	With a strong interdependency to PW14, the upgrade through the Glenloch Interchange is intended to be a low cost solution that will facilitate public transport services between Molonglo and the City. It is proposed in the short term as it is a low cost measure that can be implemented in a short timeframe in response to growth in Molonglo. ***Vision Alignment - Strong***
Medium Term Priorities		**Estimated Cost = $732M**
PW2b	Parkes Way / Anzac Pde upgrade - Underpass	Modelling suggests that the interim intersection upgrade will extend the operational life of the current configuration, however by 2041 the upgraded roundabout is expected to fail in both peaks. Given the anticipated 2041 performance, the ultimate upgrade to a grade separated interchange is expected to be required in the medium term. ***Vision Alignment - Strong***

Upgrade		Prioritisation Rationale
PW3c	Parkes Way / Coranderrk St upgrade - grade separated interchange	Modelling suggests that the interim intersection upgrade will extend the operational life of the current configuration, however by 2041 the upgraded roundabout is expected to fail in both peaks. Given the anticipated 2041 performance, the ultimate upgrade to a grade separated interchange is expected to be required in the medium term. ***Vision Alignment - Very Strong***
PW4	Parkes Way localised lowering & narrowing through CBD	The localised narrowing of Parkes Way through CBD has a strong interdependence with the PW3c package proposed for delivery in the medium term. In addition, modelling suggests that the increased capacity associated with additional lanes is required by 2041. ***Vision Alignment - Very Strong***
PW8	Molonglo to City Cycle Highway - Parkes Way component	The Molonglo to City Cycle Highway is proposed in the medium term in response to planned population growth in the Molonglo Valley and the anticipated need to provide robust active travel connectivity to the City. ***Vision Alignment - Moderate***
PW12	Midblock capacity upgrade between Glenloch & Clunies Ross interchanges	Modelling indicates that there is significant deterioration in performance on Corridor between the Glenloch Interchange and Clunies Ross Street by 2041 due to increased demand associated with population growth to the west. The midblock capacity upgrade proposes to provide additional lane capacity in the medium term to cater to this increased demand. ***Vision Alignment - Very Strong***
PW18	Coranderrk to ANZAC - Improved pedestrian permeability across corridor	In addition to responding to increases in active travel demand associated with adjacent land uses, this upgrade is expected to have a strong interdependence with the PW2b and PW3c packages and as such is proposed for the medium term. ***Vision Alignment - Very Strong***
G6	Bindubi St Interchange	The Bindubi Street Interchange is proposed in the medium term in anticipation of capacity and connectivity requirements associated with development of the Molonglo 3 East area. Modelling indicates that the Bindubi Street Extension connection into the trunk road network through the Bindubi Street Interchange will be required by 2041 to ensure appropriate operation of the broader transport network. ***Vision Alignment - Very Strong***
Long Term Priorities		**Estimated Cost = $277M**
PW15	Public Transport Corridor – Ultimate Upgrade	The ultimate public transport upgrade is intended to provide infrastructure that will facilitate high capacity public transport services between the Molonglo Valley and the City. It is proposed in the long term when it is anticipated that population growth is likely to surpass a threshold that warrants significant capital expenditure on major public transport infrastructure. ***Vision Alignment - Strong***
G2	Glenloch Int. Upgrade - William Hovel Dr EB onto Gungahlin Dr NB ramp	Preliminary analysis indicates that demand for this movement is moderate, and the upgrade is unlikely to be justifiable until Molonglo is largely developed. As such, the upgrade is a long term proposal for the Corridor. ***Vision Alignment - Very Strong***
G5	Glenloch Int. – Long term PT route	With a strong interdependency to the PW15 package, the ultimate public transport upgrade through the Glenloch Interchange is required to facilitate public transport services between the Molonglo Valley and the City. ***Vision Alignment - Strong***

Operational Performance

The implementation of the 16 Corridor Strategy upgrades was tested using the Hybrid traffic model. The purpose of this modelling was to interrogate a proposed delivery staging for the upgrades of packaged suites of upgrades

across both the South West Corridor Strategy and the concurrent Parkes Way Corridor Strategy, and understand their implications for the operational performance of the Corridor and the network.

The upgrades provide improved connectivity and capacity in the Corridor, and analysis indicates that in response more trips are orientated towards the Corridor. As a result, traffic volumes in the Parkes Way West Corridor are forecast to increase substantially in the future, and the operational performance (average delay, travel speeds etc) does not necessarily improve uniformly in the Corridor in response to the upgrades. Rather, changes in Corridor performance are mixed in response to increased capacity and volumes, with improvement / deterioration in performance varying across corridor segments, peak period and timeframe. However, the implementation of the Corridor Strategy was found to provide substantial network wide benefit, with significant improvement across the network forecast by the Hybrid model, leading to the following overarching conclusions:

- The proposed Corridor Strategy upgrades provide improved network connectivity and increased capacity, however this capacity is consumed by additional traffic that diverts to the Corridor
- The improved network connectivity and increased Corridor capacity associated with the upgrades attracts trips to the Corridor, reducing network travel times, concentrating trips on the trunk road network, and reducing trips on lower order roads, gifting local roads back to locals for local trips

These outcomes are considered appropriate in the context of the Orbital nature of the Parkes Way Corridor, consistent with the objectives of the ACT Transport Strategy 2020, and will provide significant benefits to the community.

Safety Performance

Further to operational improvement, safety is a key consideration of the Corridor Strategy. All proposed upgrades are intended to improve safety in the Corridor and the transport network more generally, consistent with the ACT's objectives for transport safety as articulated in its Vision Zero policy and the Corridor Vision Principles. This includes:

- Upgrades in which safety improvements and crash reduction are a key project rationale
- Upgrades that are focussed on operational performance or mode shift also have design features that are expected to improve safety
- Upgrades that are focussed on mode shift, reducing network demand and crash exposure

The upgrades have been developed with the safe systems approach at the forefront of the design process. The safe systems performance of the proposed upgrades has been assessed through an IRAP analysis of the collective upgrades across the Corridor which involved a Star Rating Assessment (SRA). This the SRA found that that implementing the Corridor Strategy will improve road safety outcomes along the Parkes Way Corridor, indicating that 97% of the Corridor would have a Star rating of 3 or above, up from 68% in the absence of the Corridor Strategy upgrades.

Furthermore, it is noted that the SRS do not assess the safety improvements on other the parts of the network due reduced crash exposure at sites external to the Corridor, and therefore are considered likely to understate the overall safety benefit resulting from the Corridor Strategy.

Investment Return

As part of the strategic design exercise, high level opinions of cost have been estimated for each of the Corridor Strategy upgrades. These estimates, combined with analysis of the project benefits have been used to assess the economic viability of the implementation of the Corridor Strategy over the 30 year Strategy horizon. This Cost Benefit Analysis indicated that delivery of the Corridor Strategy provided a Benefit Cost Ratio of 7.1, and Net Present Value of $4.0 B, leading to the conclusion that the Corridor Strategy upgrades are economically viable and would provide a strong return on investment to the community.

Assessment Framework

Informed by the various streams of investigation undertaken as part of the Corridor Strategy, the proposed upgrades were run through a final strategic merit test. The purpose of applying this assessment framework was threefold:

- Ensure that the upgrades were indeed aligned with the Vision for the Corridor
- Consider the technical, operational and economic viability of the upgrades
- Confirm that each upgrade is appropriate for inclusion in the Corridor Strategy

The final assessment framework found that the 15 of the proposed upgrades were strongly aligned with the Vision for the Corridor, and when prioritised and staged appropriately provided significant operational and safety network-wide benefits to travellers, and were collectively economically viable. One upgrade, PW2a, was deemed to require additional investigation prior to further development to ensure that it would achieve its intended outcomes.

Stakeholder Engagement

Engagement with stakeholders has been a key element of the preparation of the Corridor Strategy, including development of the strategic design. Relevant stakeholders have been consulted during several of the Corridor Strategy phases including input into the development of the Vision for the corridor, identification of short listed upgrade options in the Corridor, feedback on strategic design of the proposed upgrades, and have reviewed the Corridor Strategy. These stakeholders have included agencies such as:

- Transport Canberra and City Services (TCCS)
- Environment, Planning and Sustainable Development Directorate (EPSDD)
- Major Projects Canberra (MPC)
- Suburban Land Agency (SLA)
- Chief Minister, Treasury and Economic Development Directorate (CMTEDD)
- The National Capital Authority (NCA)

Conclusions & Recommendations

In close consultation with stakeholders, this Corridor Strategy has established a Vision for Canberra's Parkes Way transport Corridor that articulates expectations and objectives relating to the operation, performance and role that the Corridor should play in the Canberra transport network. To assist in the realisation of this Vision, the Corridor Strategy has also undertaken an assessment of current and potential future issues and threats to the operation of the Canberra transport network that relate to the Parkes Way Corridor.

To address identified operational issues, 16 infrastructure upgrades have been investigated for implementation on the Parkes Way Corridor. Initial analysis presented in this Corridor Strategy indicates that these upgrades are technically feasible solutions to address current and forecast issues on the Corridor and the transport network more broadly. Furthermore, application of a Strategic Merit Test also indicated that all nine of the proposed upgrades are strongly aligned with the agreed Vision for the corridor. And finally, these upgrades were shown to be effective in improving transport network operation in terms of both performance and safety, and their implementation provided a strong economic return to the community.

In view of these findings, it is recommended that the Corridor Strategy be progressed to its next stage of implementation, which is expected to involve the following for each individual upgrade:

- Options Analysis
- Concept Development and Design
- Constraints Analysis (including environmental, utilities, planning assessment, and heritage)
- Engineering Investigations

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- Transport modelling
- Cost estimation
- Economic Analysis

The timeframes to undertake these activities should be informed by both the identified prioritisation schedule described in the Corridor Strategy (noting many of the upgrades are proposed in the medium to long term), in addition to population and land use changes; observed travel behaviours and patterns; network operation and congestion; Government policy; network safety performance; and climate change and other environmental considerations.

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Corridor Strategy Evolution

This document constitutes the first version of the Parkes Way Corridor Strategy. By its nature, the transport network and the Corridor itself will evolve over time in response to changing land use, land release, patterns of travel, population distribution, demographics, Government policy, technological change, social trends and climate change amongst many other factors. It is anticipated that this Corridor Strategy will be a live document that is updated periodically in order to continue to meet the needs of the community as they change over time.

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1. Introduction

1.1 Background

The Territory Government has identified a need to develop corridor strategies for key transport corridors within the ACT. In response to this requirement, the Territory commissioned the preparation of a Corridor Strategy for Canberra's Parkes Way Corridor. In parallel, the Territory also commissioned the development of a corridor strategy for Canberra's primary South West Corridor (the Tuggeranong Parkway and Drakeford Drive), acknowledging the close operational relationship between the two corridors.

The development of this Corridor Strategy comprises several constituent tasks (refer Figure 1–1) that track from the establishment of a Vision for the corridor, through the preparation of baseline transport models, options assessment and identification of strategic infrastructure upgrades that will assist in the development of the corridor over the next 30 years. The creation of a Vision for each corridor early in the project provided guidance and a framework in which to develop the corridor strategy.

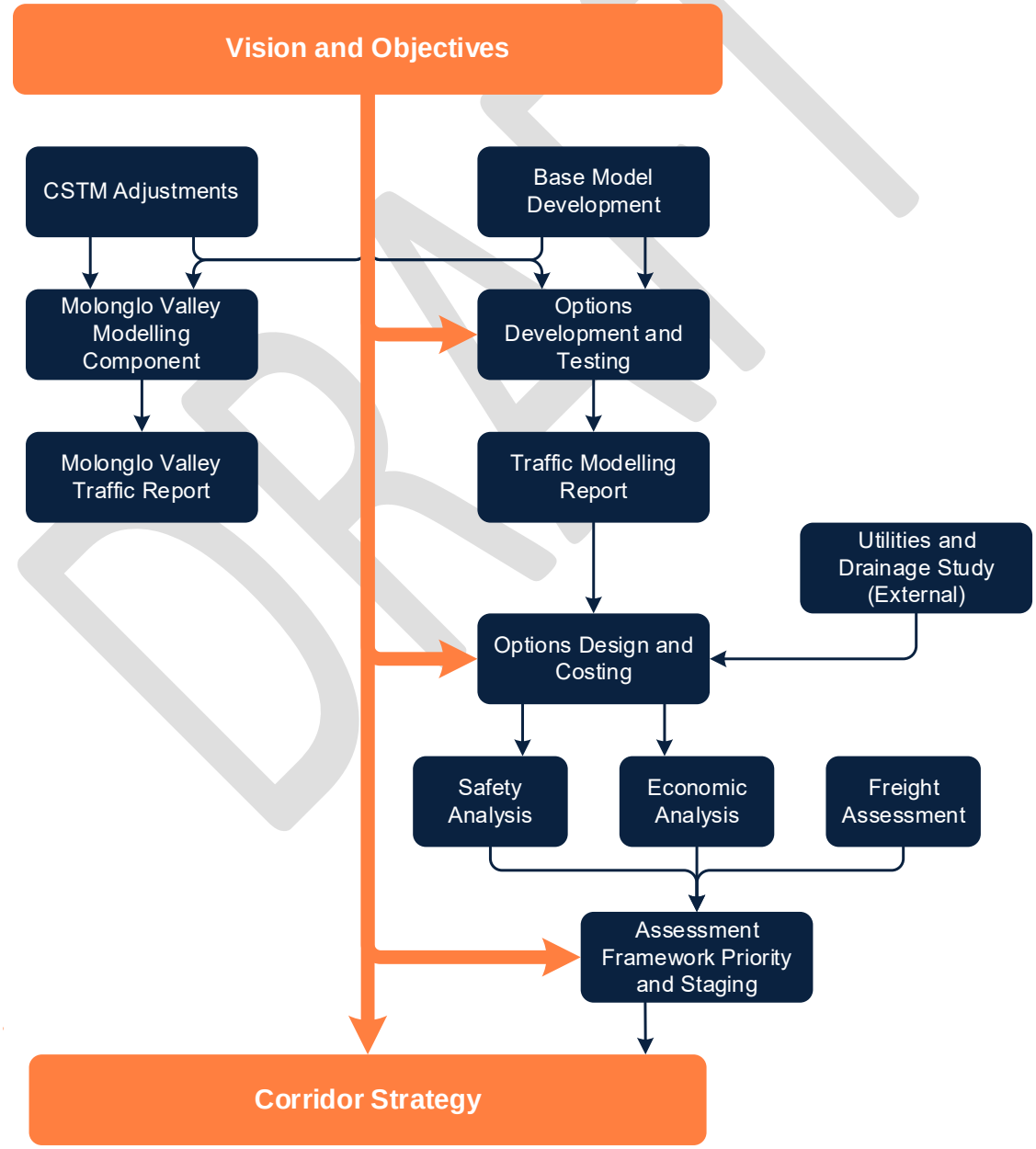

Figure 1–1: Corridor Strategy Development

1.2 Corridor Strategy Purpose

A Corridor Strategy is a document or plan that is intended to identify a strategic approach to managing a transport artery over a specified period of time. The purpose of the Corridor Strategy presented here is to provide a roadmap for the corridor infrastructure owner / operator (the Territory) to take necessary steps over the next 30 years to ensure that the Corridor performs appropriately in respect to its operation, safety and amenity, and continues to serve the needs of the community.

1.3 Strategy Objectives

The primary objective of the Corridor Strategy is to develop, analyse, document, and prioritise transport corridor upgrade concepts for short, medium and long-term improvements to help achieve the long-term Vision for the corridor including relieving traffic congestion, enhancing transport network operations and improving safety along the Parkes Way corridor from the Kings Avenue Interchange in the east extending to beyond the Glenloch Interchange to the Bindubi Street Intersection on William Hovell Drive in the west.

In addition to this primary project objective, several supporting objectives for the project have been identified for the Corridor Strategy, including:

- **City Renewal** – Facilitate urban renewal opportunities for the city centre
- **Connectivity** – Enhance City to the Lake & Commonwealth Park connectivity
- **Transport Choice** – Provide an integrated, convenient, reliable and efficient transport solution
- **Active Travel** – Provide a safe and attractive active travel network that facilitates movement across and along the corridor between the city centre, West Basin & Commonwealth Park
- **Integration** – Considers the impact of National Capital Authority plans and projects and Australian Government aspirations
- **Design Excellence** – Provides sustainable & economic infrastructure
- **Road safety** – Provide a transport network that is safe for all users and reduces serious & fatal crashes

1.4 The Parkes Way Corridor

1.4.1 ACT Transport Strategy 2020

The Parkes Way Corridor is defined as a central component part of Canberra's Orbital road network that runs in an east-west direction through the centre of the City, bisecting the CBD and Lake Burley Griffin and providing a cross connection between Canberra's two peripheral north-south freeway systems (Tuggeranong Parkway / Caswell Drive and Monaro Highway / Majura Parkway). The ACT Transport Strategy 2020 describes Orbital Links as links that:

> *Will support trips around and across the city, for private vehicles and freight. These links maintain the private vehicle journey times we all rely on to get around Canberra quickly. Road quality will be enhanced to improve safety and reliability. Intelligent technologies will help proactively manage congestion and provide people with real-time information about their journey and road condition in advance.*

The location of the component of the Parkes Way Corridor considered in this Corridor Strategy and its relationship to the overall ACT transport network as defined in the ACT Transport Strategy 2020 is indicated in Figure 1–2.

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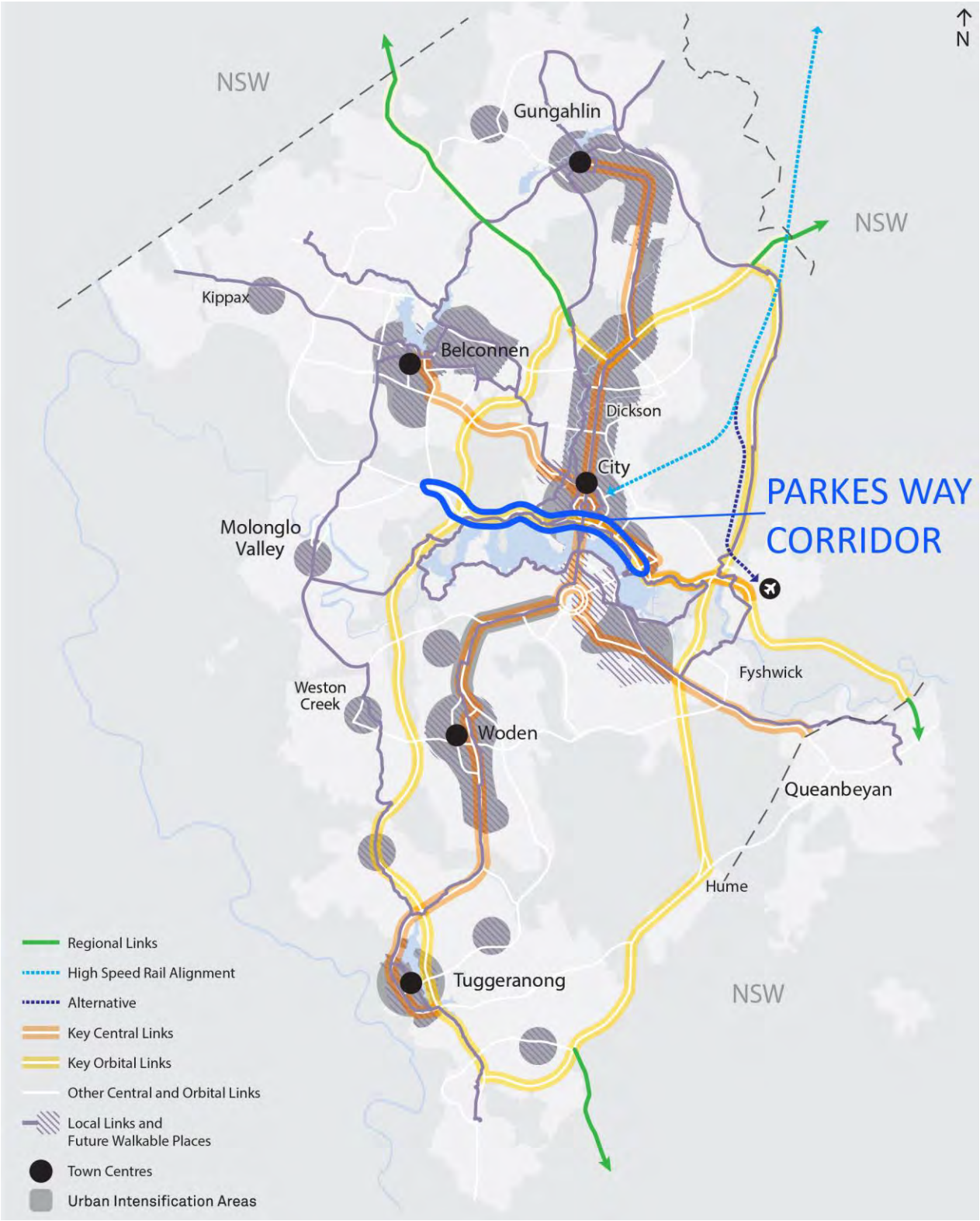

Figure 1–2: ACT Transport Policy Plan Map – Conceptual transport network 2045 (ACT Transport Strategy 2020)

1.4.2 Extent, Context and Character

The component of the Parkes Way Corridor considered in this Strategy runs from the Kings Avenue Interchange in the east extending beyond the Glenloch Interchange to the Bindubi Street Intersection on William Hovell Drive in the west. The Corridor is a key ACT transport artery that links the City Centre and many of Canberra's districts including direct connection to the Molonglo Valley, Belconnen and East Canberra, in addition to Tuggeranong, Woden, Weston Creek and Gungahlin through its connection with other important transport corridors such as the Tuggeranong Parkway and Caswell Drive. The Corridor provides commuting

access between these districts and the City, and in the 8 km zone considered in the Corridor Strategy, consists of the two distinct zones depicted in Figure 1–3:

Figure 1–3: Parkes Way Site Plan (PW West above / PW City below)

The two zones considered in the in the Corridor Strategy are as follows:

- **Parkes Way West** –The Parkes Way West zone stretches from the Bindubi Street intersection to the Acton Tunnel. A short length of William Hovell Drive immediately west of the Glenloch Interchange has been incorporated into the Corridor Strategy due to the proximity and operational interdependence between the Glenloch Interchange and the Bindubi Street Intersection / Interchange (future). It generally has three lanes in each direction which are typically separated by an intermediate width median and wire rope safety barrier, with varying width verge-side shoulders. During peak hours, up to 6,000 vehicles per hour utilise Parkes Way in the peak direction.

  To the east of Bindubi Street, the western zone of Parkes Way is a high speed motorway condition free flow environment with posted speeds of 90 km/h, and includes two interchanges - Glenloch Interchange (a system interchange) and the Clunies Ross Street Interchange (a half diamond service interchange), and can be considered a green corridor in that it is typically treelined / landscaped. It has full access control and traverses a mix of land uses including nature reserve and recreational areas routing through the confined space between Black Mountain and Lake Burley Griffin, and educational precinct of the Australian National University.

- **Parkes Way City Zone** – Between the Acton Tunnel and the Kings Avenue Interchange, the corridor has a mix of grade separated service interchanges (Edinburgh Avenue, Commonwealth Avenue, and Kings Avenue) and large annulus at-grade roundabouts (Coranderrk St and ANZAC Parade). It is a dual carriageway with two lanes in each direction (three lanes to the west of Edinburgh Avenue), typically separated by a generous grassed median.

  The City zone of the corridor is an intermediate speed zone a posted speed of 80 km/h throughout its length with full access control, and has a mix of shoulder types / widths, including areas with minimal shoulders. Although this part of the Parkes Way Corridor borders the southern edge of the Canberra CBD, traversing a mix of commercial, residential and recreational land uses, it too can be considered a green corridor as it is typically treelined and landscaped.

1.5 Corridor Strategy Elements

The Corridor Strategy has been informed by various streams of investigation and assessment, and is the compilation of several discrete but related studies. These assessments include:

- **Establishment of a Corridor Vision** – Through close collaboration and consultation with key stakeholders, a Vision for the corridor was established in the initial stages of development of the Corridor Strategy. This Vision provided guiding objectives for the Corridor and helped inform all subsequent stages of strategy development. The Vision development process is summarised in Section 3 of the Corridor Strategy and has been fully documented in the Options Shortlisting Assessment Report included as Appendix A.
- **Transport Model Calibration and Validation** – Initial transport modelling was undertaken to construct an Aimsun Hybrid model (mesoscopic and microscopic) of the corridor and its surrounds, and have that model calibrated and validated to existing network conditions and performance. This calibrated model formed the basis for development of all future year base and upgrade scenario modelling to 2051. The validation and calibration process is documented in a Technical Note included as an appendix to the Future Transport Modelling Report provided in Appendix C. The Canberra Strategic Transport Model (CSTM) Version 1.2 had been calibrated and validated as part of separate exercises and was also used to inform the Corridor Strategy.
- **Long List Identification** - A long list of potential upgrade options was identified through a combination of several different methods including advice from the ACT Government based on their knowledge of the network; traffic modelling outcomes; known deficiencies in active travel connectivity; existing and potential future public transport routes; existing crash analysis; and observed safety concerns. The identified long list is discussed in the Options Shortlisting Assessment Report included as Appendix A.
- **Short Listing Assessment** – The long list of upgrade options that were considered likely to address identified problems in the corridor was tested against the agreed Vision for the Corridor to identify which upgrades were most aligned with principles articulated in Corridor Vision. The upgrades that were found to be aligned with the Vision Principles were included on the upgrade short list for further investigation and analysis. The shortlisting process and identified short list is discussed in the Options Shortlisting Assessment Report included as Appendix A.
- **Strategic Design** – Preliminary strategic design was undertaken for the shortlisted options to identify an appropriate layout of upgrades that were considered likely to address the underlying identified problem in the Corridor. The primary purpose of these designs was to identify a suitable infrastructure configuration that could be tested in terms of its performance and allow the generation of cost estimates. The strategic design process, rationale and layouts are summarised in Section 6.6 of the Corridor Strategy and documented in the Strategic Design Report included as Appendix B.
- **Freight Assessment** – A Freight Corridor Assessment was undertaken as a complement to the Corridor Strategy. Whilst this assessment considered several corridors in addition to the Parkes Way Corridor, the analysis it contains and its findings are relevant to this Corridor Strategy and have been used to inform the assessment. The Freight Corridor Assessment is included in Appendix D and relevant findings of the assessment are discussed in Section 9.5 of the Corridor Strategy.
- **Cost Estimation** – To understand the capital implications and level of investment required to implement the Corridor Strategy, preliminary opinions of cost have been generated based on the infrastructure

layouts identified in the Strategic Design. These opinions of costs were used to inform an economic analysis of the Corridor Strategy, are summarised in Section 11, and documented in the Cost Estimate Report included as Appendix E of the Corridor Strategy.

- **Upgrade Prioritisation and Staging** – Based on existing and forecast performance of the transport network, capital outlay expectations and other network and urban planning and growth considerations, an approach to prioritisation and staging of the upgrades was identified. This temporal implementation plan was then tested both in terms of its operational appropriateness through transport modelling, and subsequently using economic modelling to ensure the staged delivery of upgrades would provide a positive return on investment. The prioritisation approach is discussed in Section 8 of the Corridor Strategy.
- **Transport Modelling** – Preliminary transport modelling was utilised to identify appropriate upgrade configurations as part of the strategic design process. Subsequently base model versions of the Aimsun Hybrid model and the CSTM were constructed and run to understand how the network would perform in 2031, 2041 and 2051 in the absence of any upgrades to the Corridor. Similarly, upgrade scenarios for each timestep were tested using these models to assess how the transport network would perform in response to implementation of the Corridor Strategy. The outcomes of this analysis is summarised in Section 9, and the modelling methodology and findings is documented in the Future Transport Modelling Report which is included in Appendix C.
- **Safety Analysis** – Preliminary safety analysis has been undertaken of both the Base Case (assumed absence of Corridor upgrades) and the Upgrade Scenario to understand how the upgrades are likely to improve the safety Star Rating and crash performance of the Corridor. This safety analysis of both the existing condition and the Upgrade Scenario are discussed in Section 10 of the Corridor Strategy.
- **Economic Analysis** – To understand the economic implications of the Corridor Strategy, and to ensure that it provides a positive return on investment to the community, a cost benefit analysis was undertaken on the staged implementation of the strategy. The outcomes of this economic modelling is summarised in Section 11, and the economic methodology and findings are documented in the Economic Analysis Report which is included in Appendix G.
- **Assessment Framework** – Finally, informed by the various streams of investigation undertaken as part of the Corridor Strategy, the proposed upgrades were run through a strategic merit test to ensure that the proposed Corridor Strategy is aligned with the Vision for the Corridor, and by extension appropriate for implementation. The assessment framework methodology and results are discussed in Section 13 of the Corridor Strategy. The detailed assessment framework scoring is included as Appendix H of the Corridor Strategy.
- **Conclusions and Recommendations** – Based on the outcomes of the Assessment Framework and the preceding suite of assessments, Section 15 of the Corridor Strategy draws conclusions about the performance of the Corridor and the transport network more broadly, and provides recommendations about the implementation of the Corridor Strategy. Section 15.2.3 of the Strategy also provides recommendations on how the corridor Strategy could be developed into the future.

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2. Strategic Alignment

2.1 Impacts of the Corridor Strategy

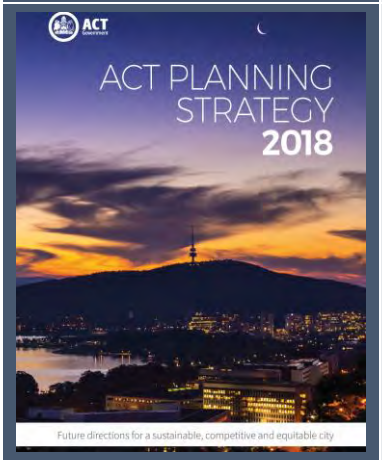
The Corridor Strategy is intended to be a transport planning document that services the needs of the local Canberra community in addition to users of the ACT transport network from outside the Territory. Whilst the Strategy focuses on improvements to the Parkes Way Corridor, it is intended and expected to enhance the operation of the broader ACT transport network.

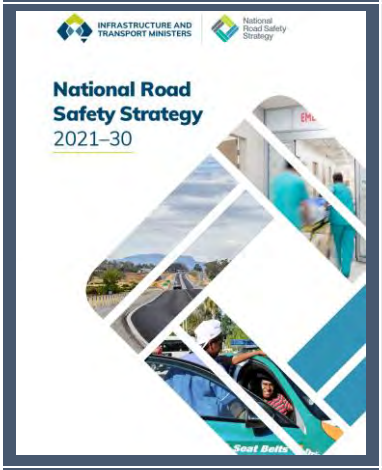
Through implementation of the Corridor Strategy, it is intended that people making commuting, freight and leisure trips will experience improved travel times, reduced travel costs, and experience fewer crashes on their journeys. Furthermore, it is anticipated that operation of the transport network will generate fewer environmental externalities (noxious emissions, greenhouse gas emissions, water quality degradation etc) as a result of Corridor Strategy, and that active travel amenity and attractiveness will be enhanced, and public transport mode share will improve.

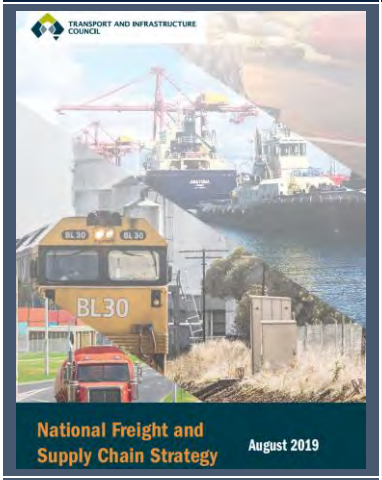
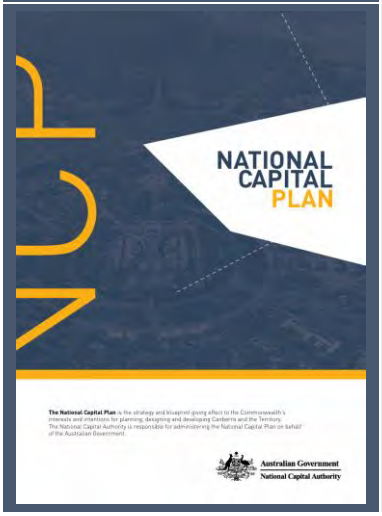
2.2 Alignment with Government Policy

All of the outcomes described above are consistent with stated ACT and Federal Government policy and strategy. Table 2–1 summaries some of the key strategic Government policy documents that the Corridor Strategy outcomes are anticipated to be consistent with, and the nature of this alignment.

Table 2–1: Strategic Alignment of Corridor Strategy

Plan or Policy	Nature of Alignment
	ACT Transport Strategy 2020 – The ACT Transport Strategy 2020 sets out the ACT Government's approach to achieve its vision for a world class transport system that supports a compact, sustainable and vibrant city, and provides a framework for planning and investment in transport for the next 20 years. This strategy outlines the current attributes of the transport network, the aspirations for the network and what needs to occur to achieve the aspirations. Through the provision of upgrades in the Corridor, the Corridor Strategy will improve the operational performance of the transport network, directly responding to the key transport outcomes identified in the ACT Transport Strategy 2020: - Managing congestion - Reducing emissions - Supporting a compact and efficient city
	**ACT Planning Strategy** - The ACT Planning Strategy 2018 recognises land-use planning as the underpinnings of the development of economic, social and environmental aspects of a city and outlines the vision, goals and directions for land use and development within the ACT. It is prepared by the ACT Government in conjunction with other policies and statutory documents, including the ACT Transport Strategy and National Capital Plan. The Corridor Strategy is consistent with the ACT Planning Strategy in that it: - Supports a compact and efficient city by improving the efficiency of transport network infrastructure and linkages to existing districts - Provides sustainable and resilient infrastructure, improving the operation of the transport network and reducing emissions

Plan or Policy	Nature of Alignment
	ACT District Strategies – The District Strategies help guide how Canberra will change and grow towards 2038 and beyond to 2050. The District Strategies look at how to manage growth in a way that is sustainable such that the community can continue to have access to services, transport, employment, health, education and nature. There is an individual Strategy for each of the districts that connect to the Parkes Way Corridor either directly or through adjacent corridors, including the City, the Molonglo Valley, Belconnen and Canberra East in addition to Tuggeranong, Woden, Weston Creek, and Gungahlin. The Corridor Strategy supports the implementation of these District Strategies by providing improved transport network connectivity and efficiency in the Parkes Way Corridor. This is particularly the case for districts such as Woden, the Molonglo Valley and Belconnen which are expected to experience significant growth over the 30 year Corridor Strategy horizon.
	**National Road Safety Strategy** – The National Road Safety Strategy 2021–30 is a policy document developed by State and Federal Transport Ministers to move towards Vision Zero by 2050. This Strategy continues a commitment to the Safe System approach and to strengthening all elements of the road transport system through improvements under 3 key themes: Safe roads, Safe vehicles and Safe road use. The National Road Safety Strategy targets a reduction in the annual number of fatalities by at least 50% and of serious injuries by at least 30% by 2030. The Corridor Strategy proposes a suite of upgrades that are expected to improve safety outcomes in the Corridor either through direct safety oriented interventions, or improvements in infrastructure standard and network operations. These improvements are expected to improve the crash performance of the Corridor and assist the Territory in reaching the targets outlined in the National Road Safety Strategy.
	ACT Freight Strategy – The 2016 Building an Integrated Transport Network – Freight recognises the important role that the freight network plays in ensuring the robustness of the overall transport system and the importance of planning and protecting freight corridors and precincts within the ACT. The vision for the ACT Freight Strategy is to deliver an efficient, safe and sustainable freight network and services for a growing ACT and regional economy and community while protecting urban amenity and freight access and reducing the emission intensity of the freight transport industry. The Corridor Strategy recognises the importance of the Parkes Way Corridor as part of Canberra's freight network, and through anticipated operational improvements resulting from the proposed upgrades. The Corridor Strategy is expected to improve freight flows, travel times and by extension reduce freight costs and emissions. This is consistent with ACT Freight Strategy's vision for efficient, sustainable and safe freight movements.
	ACT Climate Change Strategy – The ACT Climate Change Strategy 2019–25 outlines the ACT Government's climate change response and identifies actions to meet its emissions reduction targets and prepare for climate change. The ACT Climate Change Strategy is complemented by Canberra's Living Infrastructure Plan: Cooling the City, which sets the direction for maintaining and enhancing trees, soils and waterways and builds on Canberra's transition to 100% renewable electricity, the Energy Efficiency Improvement Scheme, the delivery of light rail Stage 1, and Canberra's improved cycle path network. Through improving operational efficiency of the corridor, the Corridor Strategy is expected to reduce greenhouse gas emissions consistent with the objectives of the ACT Climate Change Strategy.

Plan or Policy	Nature of Alignment
	**National Freight and Supply Chain Strategy** - The National Freight and Supply Chain Strategy (2019) outlines the agenda for coordinated and planned government and industry actions across air, rail and road freight modes over the next 20 years and beyond. The Corridor Strategy recognises the importance of the Parkes Way Corridor as part of Canberra's freight network, in addition to its role as part of interstate freight connectivity. Through anticipated operational improvements resulting from the proposed upgrades, the Corridor Strategy is expected to improve freight flows, travel times and by extension reduce freight costs and emissions, consistent with objectives of improved efficiency and sustainable freight operations outlined in the National Freight and Supply Chain Strategy
	ACT Road Safety Strategy – The ACT Road Safety Strategy 2020-2025 provides an approach to addressing road safety in the Territory and is based around four goals that establish the ACT Government's overarching road safety vision: 1) Reduce serious and fatal crashes 2) Build a community that shares responsibility for road safety 3) Change road user attitudes and behaviour through education and compliance activities 4) Strengthen collaboration across Government and with stakeholders to improve road safety in the ACT The Corridor Strategy proposes a suite of upgrades that are expected to improve safety outcomes in the Corridor either through direct safety oriented interventions, or improvements in infrastructure standard and network operations. These improvements are consistent with Goal 1 of the ACT Road Safety Strategy to reduce serious and fatal crashes.
	**National Capital Plan** – The National Capital Plan is a statutory object that ensures that Canberra and the Territory are planned and developed in accordance with their national significance. The Corridor Strategy aims to be consistent with the National Capital Plan by: - Enhancing the Central National Area which includes the National Triangle and its setting, Lake Burley Griffin and its foreshores - Emphasising the national significance of the main approach routes and avenues - Respecting the geometry and intent of the Griffins' formally adopted plan for Canberra. - Maintaining and enhance the landscape character of Canberra and the Territory as the setting for the National Capital. - Supporting and promoting environmentally responsible urban development practices.

3. Corridor Context

3.1 Overview

Canberra is the National Capital and a regional centre that was estimated to have a population of approximately 420,000 people in 2023. It consists of the nine primary districts depicted in Figure 3–1 in addition to Queanbeyan. The Parkes Way Corridor traverses the Molonglo Valley, Belconnen and the Inner North / City Districts of Canberra. Beyond these districts it also services movements from Tuggeranong, Weston Creek, the Woden Valley, Gungahlin and Canberra East facilitating access from these areas to the CBD. The Tuggeranong, Weston Creek and Woden Valley districts are well established areas of Canberra, in contrast to the Molonglo Valley which is a rapidly growing district and the major location for Canberra's greenfield future development. The Parkes Way Corridor is generally the primary east-west artery servicing many movements from these districts.

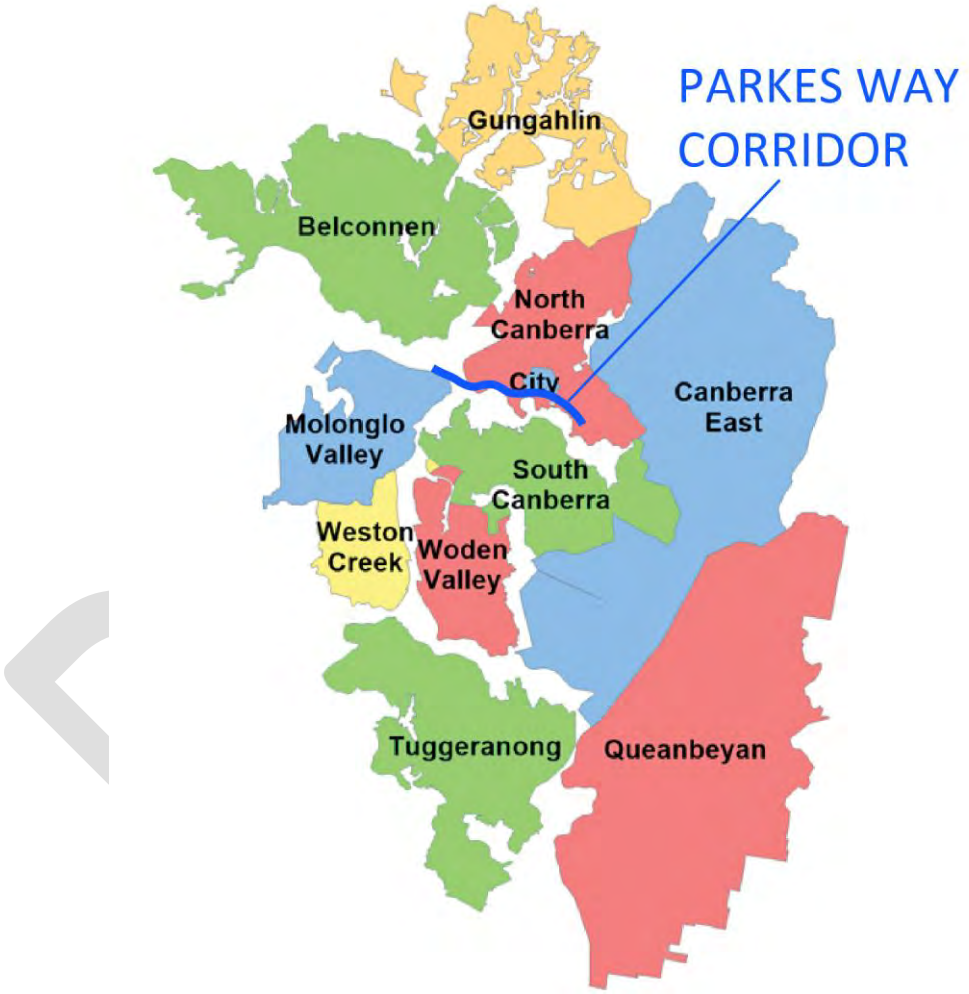


Figure 3–1: ACT Districts + Queanbeyan (based on CSTM v1.2 Transport Activity Zones)

3.2 ACT Land Use

3.2.1 Current Land Use

The nine Canberra Districts vary significantly in size, population and composition of their land uses. As demonstrated in Table 3–1, the districts that are primarily serviced by the Parkes Way Corridor (Inner North/City, Belconnen, Weston Creek, Canberra East, and the Molonglo Valley) currently contain a population of approximately 211,000 people. In addition, these five districts contain 147,000 jobs, 33,000 school enrolments, 58,000 tertiary enrolments, and 886,000 m^2 of retail space.

These values represent 46% of the ACT population, 41% of school enrolments, and 39% of retail floor space in the ACT. The five districts also include 52% of jobs in the ACT, noting that the majority of these (29% of the Territory total) are in the Inner North / City District.

Whilst both Belconnen contains a trade services area, there are no substantial industrial zones in the five districts associated with the Parkes Way Corridor. As such, the Corridor primarily provides a commuting link between urban and suburban residential areas in central and west Canberra with commercial / employment and tertiary education zones in the CBD and Parliamentary Triangle.

Table 3–1: 2023 District Populations and Land Uses

District	Population	Employment	Retail Space (m^2)	School Enrolments	Tertiary Enrolments
Belconnen	106,778	34,561	346,654	17,669	25,868
Canberra East	2,018	22,282	204,852	0	0
Gungahlin	89,538	19,386	326,261	15,053	489
Molonglo	13,965	2,069	3,300	1,017	0
City / Inner North	64,268	82,609	292,494	10,635	32,163
Inner South	32,972	64,307	657,238	11,039	2,196
Tuggeranong	88,877	22,152	233,969	13,699	564
Weston Creek	24,432	5,073	38,867	3,960	0
Woden Valley	39,419	28,555	186,727	8,411	200
ACT Total	**462,893**	**281,402**	**2,290,361**	**81,482**	**61,480**

3.2.2 Future Changes to Land Use

Whilst the nature of land use in the five districts primarily serviced by the Parkes Way Corridor is not expected to change significantly, it is expected that populations will grow substantially over the Corridor Strategy horizon to 2051.

Table 3–2 summarises Territory forecasts for land uses metrics across 2031, 2041 and 2051. These forecasts indicate that the ACT population will grow by 240,000 people over the 28 years between 2023 and 2051, with 65% of this population growth is forecast to be in the five districts primarily serviced by the Parkes Way Corridor, and notably 23% of the entire ACT population growth over this period is anticipated to occur in the Molonglo Valley district. That is, the population of the Molonglo Valley is expected to grow from its population of 14,000 in 2023 to 70,000 people in 2051 (a 400% increase). Furthermore, it is understood that the Territory is currently considering planning for an ultimate population in the Molonglo Valley of up to 80,000 people beyond 2051.

The forecast population growth in the Molonglo Valley is particularly significant for the Parkes Way Corridor as the Corridor is expected to take a substantial proportion of trips generated by these new residential areas. This combined with significant forecast increases in population and employment in the Belconnen (↑51% and ↑58% respectively) and the Inner North / City (↑61% and ↑52% respectively) is expected to considerably increase the load on the Parkes Way Corridor over the next 30 years.

Table 3–2: Forecast District Populations and Land Uses

District	Population	Employment	Retail Space (m^2)	School Enrolments	Tertiary Enrolments
2031					
Belconnen	128,891	40,582	398,712	18,334	28,815
Canberra East	2,569	29,304	235,856	0	0
Gungahlin	98,450	21,956	420,256	15,955	500
Molonglo	35,229	5,074	24,000	4,875	0
City / Inner North	75,761	95,608	362,755	11,200	32,977
Inner South	39,519	73,846	707,529	11,666	2,400
Tuggeranong	88,620	23,297	258,692	13,341	600
Weston Creek	25,847	5,442	42,807	3,709	0
Woden Valley	44,513	32,530	209,664	8,300	6,750
ACT Total	**539,877**	**328,512**	**2,660,271**	**87,380**	**72,042**
2041					
Belconnen	144,708	46,633	475,197	21,747	31,522
Canberra East	2,500	33,418	273,055	0	0
Gungahlin	102,418	23,395	488,774	18,165	500
Molonglo	61,565	8,560	43,000	6,906	0
City / Inner North	88,088	110,619	421,981	11,681	34,636
Inner South	44,350	84,693	792,439	12,114	2,500
Tuggeranong	94,935	25,905	281,115	15,166	600
Weston Creek	28,133	6,100	43,791	4,558	0
Woden Valley	53,298	38,644	234,070	9,313	7,750
ACT Total	**620,388**	**378,933**	**3,053,422**	**99,650**	**77,508**
2051					
Belconnen	161,449	54,603	475,197	22,403	33,408
Canberra East	2,528	37,025	273,055	0	0
Gungahlin	107,653	26,092	488,774	18,165	500
Molonglo	70,126	9,788	43,000	6,906	0
City / Inner North	103,750	125,581	424,695	11,681	38,517
Inner South	49,956	96,329	792,439	12,114	2,500
Tuggeranong	108,178	28,920	281,115	15,166	600
Weston Creek	31,536	7,074	43,791	4,558	0
Woden Valley	68,552	45,952	234,070	9,313	8,750
ACT Total	**704,112**	**432,480**	**3,056,136**	**100,306**	**84,275**

Another important land use consideration for the Parkes Way Corridor is the development of the Western Edge Investigation Area (WEIA) that lies to the west of the Weston Creek district. Whilst development of the WEIA is

not currently ACT policy, it is understood that there is the potential for a significant population in a new district should it be developed. Implementation of the WEIA would place further load and increase congestion on the Parkes Way Corridor.

3.3 National Capital

The Parkes Way Corridor traverses numerous nationally significant elements of Canberra, and by extension through its design and layout has the potential to positively influence or alternatively negatively impact on the National Capital. The Corridor runs through, adjacent or across key national axes, view corridors, water bodies, buildings and parklands, including but not limited to:

- Commonwealth Park
- The Canberra Land Axis (Including ANZAC Parade)
- Lake Burley Griffin
- Black Mountain
- Commonwealth Avenue
- Kings Avenue

3.4 Corridor Land Use & Adjacent Development

In addition to the nationally significant land uses and considerations discussed above, there are also several additional existing and potential future land uses important to the local community that are influenced by the presence and operation of the Parkes Way Corridor, and vice versa. These include:

- The Australian National University
- Civic Pool
- Existing CBD commercial spaces
- Existing CBD residential areas
- Significant future residential and mixed-use developments (e.g. Acton Waterfront)
- Existing CBD cultural facilities (Convention Centre, Canberra Theatre etc)
- University of NSW, Canberra (future development)
- ANZAC Park East + West (future redevelopments)
- Convention Centre (potential future development)
- Canberra Stadium (potential future development)

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4. Corridor Vision

4.1 Vision Purpose

As part of the development of the Corridor Strategy, the need for development of a clear and coherent Vision was identified. This Vision was developed in close consultation with relevant Territory and Federal stakeholders and underpinned all stages of development of the Corridor Strategy. The purpose of this Vision was to:

- Inform the development of the Corridor Strategy including transport modelling, options identification and evaluation; design development, economic evaluation; and finally upgrade prioritisation and staging
- Provide a framework for the ongoing operation of the corridor and guide upgrade and development of the corridor over the next 30 years
- Remain live over the life of the corridor strategy such that the Vision can be updated in response to the changing needs of the community.

4.2 Vision Development

The development of the vision was centred on a high degree of consultation and liaison with key stakeholders and occurred in three phases:

1. **Identification of Vision Objective Categories** – To help guide Vision Workshop the Project Team inclusive of members of TCCS, Major Projects Canberra (MPC), and the consultant team, identified a collection of Vision categories that were considered most relevant to each corridor
2. **Vision Workshop** – A Vision Workshop was held with numerous Territory and Federal government stakeholders to collectively create a set of Vision Principles for the Corridor
3. **Confirmation of Vision Principles** – Feedback from the Vision Workshop was refined into a set of agreed Vision Principles

4.3 Vision Objective Categories

In preparation for the Vision Workshop a set of categories was developed by the project team that were considered to capture the key considerations relevant to the Vision for the Corridor. The intent of these categories was to facilitate targeted discussion during the Vision Workshop and to assist the development of the Corridor Vision. The identified categories were:

- Corridor purpose & classification
- Urban Master Planning
- Traffic operational performance
- Safety
- Sustainability, environment & cultural heritage
- User amenity
- Land use & economic development
- Adaptability to emerging technologies

4.4 Vision Workshop

A Vision Workshop was held in March 2022, the purpose of which was to:

- Engage with key stakeholders to obtain input and feedback from a wide cross-section of interested parties and specialists

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- Inform the development of Vision Principles and Statements in response to agreed objectives for the Corridor

The Workshop introduced the context of the Corridor including its history, constraints, planning regime, network role, and performance (current and forecast). Attendees then provided insight and feedback on what were considered key principles that were considered relevant to each of the identified categories. The Workshop involved participation from the following stakeholders:

- City Renewal Authority
- National Capital Authority
- Project Team (TCCS, MPC, and consultant team)
- Transport Canberra – Bus Operations
- TCCS
- Major Projects Canberra
- EPSDD
- CMTEDD – ACT Treasury
- ESA

4.5 Corridor Vision

4.5.1 Vision Principles

Based on discussion and input from the stakeholder group in the Parkes Way Corridor Vision Workshop, a draft set of Vision Principles was identified and circulated to participants for review and comment. Following feedback on the draft Principles, the Vision Principles were subsequently updated and refined into the following agreed list:

- Purpose and Classification
  - P&C.1) Retention of orbital classification & movement function
  - P&C.2) Consistent standard ensuring PT priority & ESA access
  - P&C.3) Strong active travel connectivity across & along the corridor
  - P&C.4) Configured to current standards & best industry practice
- Urban Design
  - UD.1) Facilitates connectivity between city, lake, & adjacent precincts
  - UD.2) Adopts compact & adaptable x-section whilst retaining a green corridor
  - UD.3) Maintains the integrity of nationally significant axes & view corridors
  - UD.4) Contributes to the planning intent for Canberra
  - UD.5) Implements an integrated landscape treatment for the corridor
- Traffic Operational Performance
  - TOP.1) Facilitates the efficient movement of people across all modes
  - TOP.2) Operating speeds are adaptable enhancing efficiency & safety
  - TOP.3) Provides PT priority ensuring travel time reliability & minimises journey times
- Safety
  - S.1) Operation is safe & improvements are consistent with safe systems principles
  - S.2) The corridor achieves a min. 4 star IRAP rating & aligns with Vision Zero goals
  - S.3) Asset / incident management is safe for workers, emergency crew, & road users
- Sustainability, Environment and Cultural Heritage
  - SE&C.1) Sensitive to its context within the National Capital

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  - SE&C.2) Recycled material use to minimise carbon footprint & resource depletion
  - SE&C.3) Resilient to climate change & weather events including fire & flood
  - SE&C.4) Sensitive to natural environment context & traditional land custodians
  - SE&C.5) Improves outcomes for the atmosphere, waterways & local ecology
- User Amenity
  - AM.1) Retains / enhances current character with appropriate landscape treatments
  - AM.2) Ensure use of the corridor is comfortable with a high quality ride
  - AM.3) Improves community wellbeing & minimises adverse impacts
- Land Use and Economic Development
  - L&ED.1) The corridor is adaptive & evolves in response to growth & changing land uses
  - L&ED.2) Enhancements are economically sustainable & consider whole of life costs
- Adaptability to Emerging Technologies
  - ET.1) Corridor is flexible & facilitates the adoption of smart technologies

4.5.2 Vision Description

Following the identification of the Vision Principles, a Vision Description which distilled the key themes of the agreed Vision was developed. The agreed Vision Description for the Corridor was:

> *As a key part of Canberra's orbital transport network, the Parkes Way corridor is to provide an efficient, safe and reliable landscaped transport link for all modes both into and across the city. The Parkes Way corridor will promote sustainability, improve community amenity, and facilitate accessible active connectivity between the city, the lake, and surrounds. Parkes Way will evolve to enhance adjacent precincts and places, and will be improved in ways that are sensitive to its context within the National Capital, the natural environment, and the region's traditional land custodians.*

4.5.3 Vision Statement

The final product of the Vision Statement which provides a high level summary of the vision intent:

> *The Parkes Way corridor will provide an efficient, safe and reliable landscaped cross-city link for all modes of transport, whilst facilitating accessible active connectivity between the city, the lake, and key adjacent precincts.*

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5. Corridor Role

5.1 ACT Transport Network

As noted in the ACT Transport Strategy 2020, the ACT transport network is a multi modal network that consists of 3100 km of roads servicing general traffic, a public transport system that includes a bus network and light rail route, and 3500km of paths providing an active travel alternative for the community. The majority of trips on the network (approximately 75%) are undertaken in private vehicles with remainder shared between active travel (walking and cycling) and public transport (refer Figure 5–1).

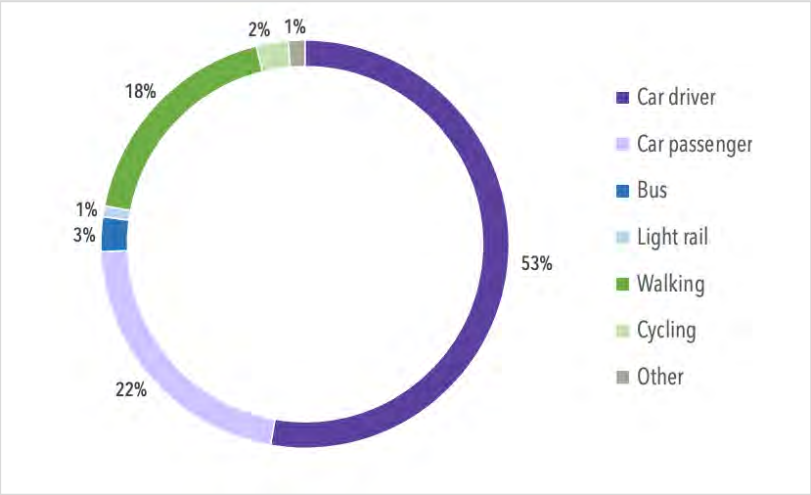

Figure 5–1: ACT Trips by mode (2022 ACT and QPRC Household Travel Survey)

The Parkes Way Corridor forms a key part of the road network in which the ACT Transport Strategy 2020 identifies a hierarchy of four road types in the network structure:

- **Local links** – Provide for short trips within local areas.
- **Central Links** – Focus on the efficient movement between centres urban intensification areas by public
- **Orbital Links** – Support trips around and across the city for private vehicles and freight, and aim to maintain the private vehicle journey times. The freight network is based on orbital links.
- **Regional Links** – Focus on enhancing regional connectivity, includes road, rail and freight routes between Canberra and Sydney and other connections to inland and coast regions.

The configuration of existing and planned orbital and regional links in the ACT network is indicated in Figure 1–2.

5.2 Movement & Place

The ACT Transport Strategy 2020 notes that the Movement and Place concept was utilised to develop the network structure described above, with a combination of central and orbital links providing the backbone of Canberra's future transport network.

The Movement and Place concept aims to consider the dual function transport corridors that both convey trips between two points, but can also act as places and destinations in and of themselves where people meet, engage and occupy. The Territory Government has developed a Movement and Place Framework for use in the ACT (refer Figure 5–2) which can be utilised for the categorisation and appropriate development of transport corridors.

Figure 5–2: ACT Movement and Place Framework

5.3 Corridor Role

5.3.1 General

The Parkes Way Corridor forms a key Orbital link in the central part of Canberra's transport network. It conveys high volumes of traffic for internal movements within the City in addition to providing a high capacity / high volume east – west connection that provides access from many parts of the city. Indeed it is the only free flow / motorway condition connection into the City, and is the primary road access for many Canberrans to and across the City. The Movement and Place function of the corridor varies slightly along its length (refer Figure 5–3 for a notional indication of where the Parkes Way lies within that framework):

- **Parkes Way West** – This section of the Parkes Way Corridor is a motorway environment that runs with a free flow condition, characterised by full grade separation of all side roads. Whilst it conveys large volumes of traffic and provides a very strong movement function, and although it is not actually a destination in and of itself, the Corridor has some frontage to the lake and has a shared use path that attracts both recreational and commuting active travel use. That is, the western part of the Corridor also serves a Place function to a degree, albeit for relatively low volumes.
- **Parkes Way City Zone** – The central City Zone of the Corridor is a mix of motorway and interrupted condition environments with several grade separated interchange in addition to two at-grade roundabouts. It too serves a very strong movement function, and whilst it is not a destination in and of itself, has substantial interface with several important City places such as Commonwealth Park, the Acton Waterfront and the CBD, in addition to more broadly impacting on important national places like the Canberra land axis and city view corridors. As such, the central part of the Parkes Way Corridor could be considered to also have place values.

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Figure 5–3: Parkes Way Corridor Notional Movement and Place Function

5.3.2 Passenger Vehicles

General traffic / private passenger vehicle movements are currently the predominant trip type in the Parkes Way Corridor, with its share of trips expected to remain similar over the 30 year Corridor Strategy horizon. The Corridor generally caters to commuting trips to the city, in addition to commercial, and tertiary educational private vehicle trips. The corridor also serves as a cross-city route and caters to some through movements that have origins and destinations outside the City / Inner North district. Future traffic volumes on the Parkes Way Corridor are discussed in Section 9.

5.3.3 Freight

The Parkes Way Corridor is a component of Canberra's road freight network providing a route for general access freight vehicles in addition to being a B-Double restricted access route. The western part of the Corridor is appropriate for general access vehicles only noting it has constraints at the Sullivans Creek Bridge (load capacity limits), and clearance limits at the Acton Tunnel. A clearance constraint also exists in the City zone of the Corridor at the Commonwealth Avenue Bridge.

The Parkes Way Corridor between Coranderrk Street and Kings Avenue in the City Zone of the Corridor is part of the ACT B-Double network, providing a link for B-Double movements between Northbourne Avenue and industrial precincts to the east at Fyshwick, Hume and Queanbeyan. It is noted however that the ACT Transport Strategy 2020 identifies this part of the Corridor as "under review", and its role as part of the B-Double network may be reconsidered in the future. The location of the Parkes Way Corridor in relation to the ACT road freight network is indicated in Figure 5–4.

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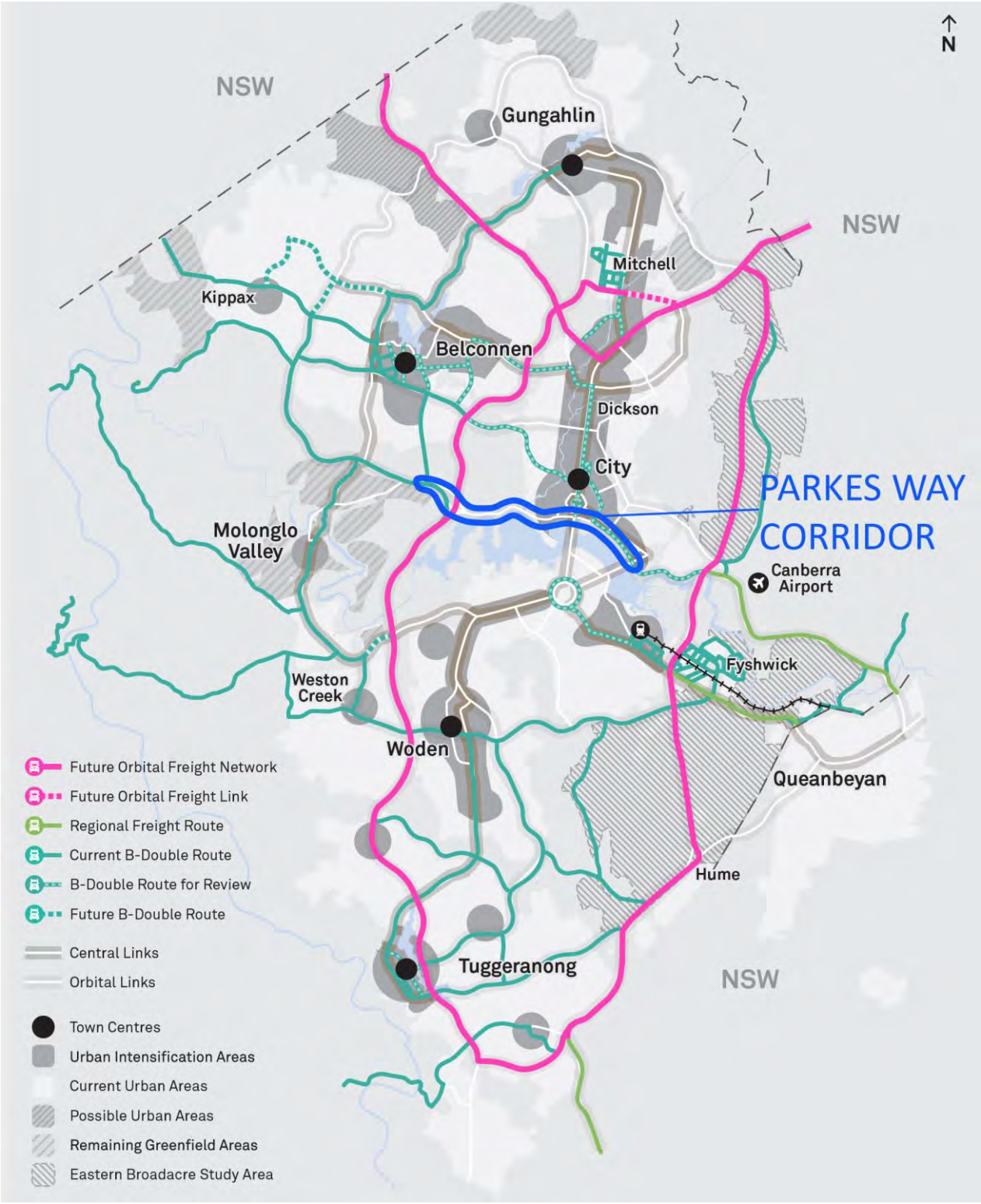

Figure 5–4: Canberra Orbital Freight Links (ACT Transport Strategy 2020)

5.3.4 Public Transport

Whilst the Parkes Way Corridor is not a currently a public transport route, and the ACT Transport Strategy 2020 does not identify it as part of the future light rail or Rapid bus network, it is noted that feedback provided by the ACT as part of the stakeholder engagement process has indicated a likely intent to use the Corridor as a public transport route at some stage in the future. As such, whilst there are no current public transport services in the Corridor, and given the context of the substantial growth panned for the Molonglo Valley, the Corridor may change its status in terms of public transport movements in the future. As indicated in Figure 5–5, primary bus routes that access the city from Belconnen, Woden, Weston Creek, Tuggeranong and the Inner South route

along Belconnen Way / Barry Drive and Adelaide Avenue, and there are currently no existing services in the Parkes Way Corridor.

Figure 5–5: Canberra Bus Route Map (Transport Canberra)

5.3.5 Active Travel

The Parkes Way Corridor currently conveys ACT Principal off road cycle routes and other shared paths along its length both within or adjacent to the Corridor boundary between the Glenloch Interchange and the Acton Tunnel (and the City CBD beyond) as indicated in Figure 5–7. Further, it is noted that the future Molonglo to City Cycle Highway may potentially route along the Corridor.

Whilst it is noted that on road cycle facilities also exist in the Parkes Way Corridor in the form of cycle lanes in mainline shoulders, it is considered a relatively hostile environment for vulnerable road users. Given the high speeds regime (80 - 90 km/h), difficult access to the cycle lanes from / through interchanges (particularly the Glenloch Interchange), and the high traffic volumes, the Parkes Way Corridor is not considered conducive to, nor safe for use by on road cyclists.

Another key active travel consideration for Parkes Way is the cross corridor permeability through the City. The Parkes Way Corridor separates the Canberra CBD from the Lake foreshore and Commonwealth Park and is a significant barrier to movement between the two. As such, active travel connections across the Corridor are important to provide connection from the City to the Lake. There are number of these connections in the City Zone of the Corridor, including at interchanges (Edinburgh Avenue, Commonwealth Avenue and Kings Avenue) in addition to several supplementary bridges and underpasses such as at Allara Street and adjacent to ANZAC Park West (refer Figure 5–6).

Figure 5–6: Cross Corridor Active Travel Connections – ANZASC Park West underpass (Left) & Allara St Overpass (right)

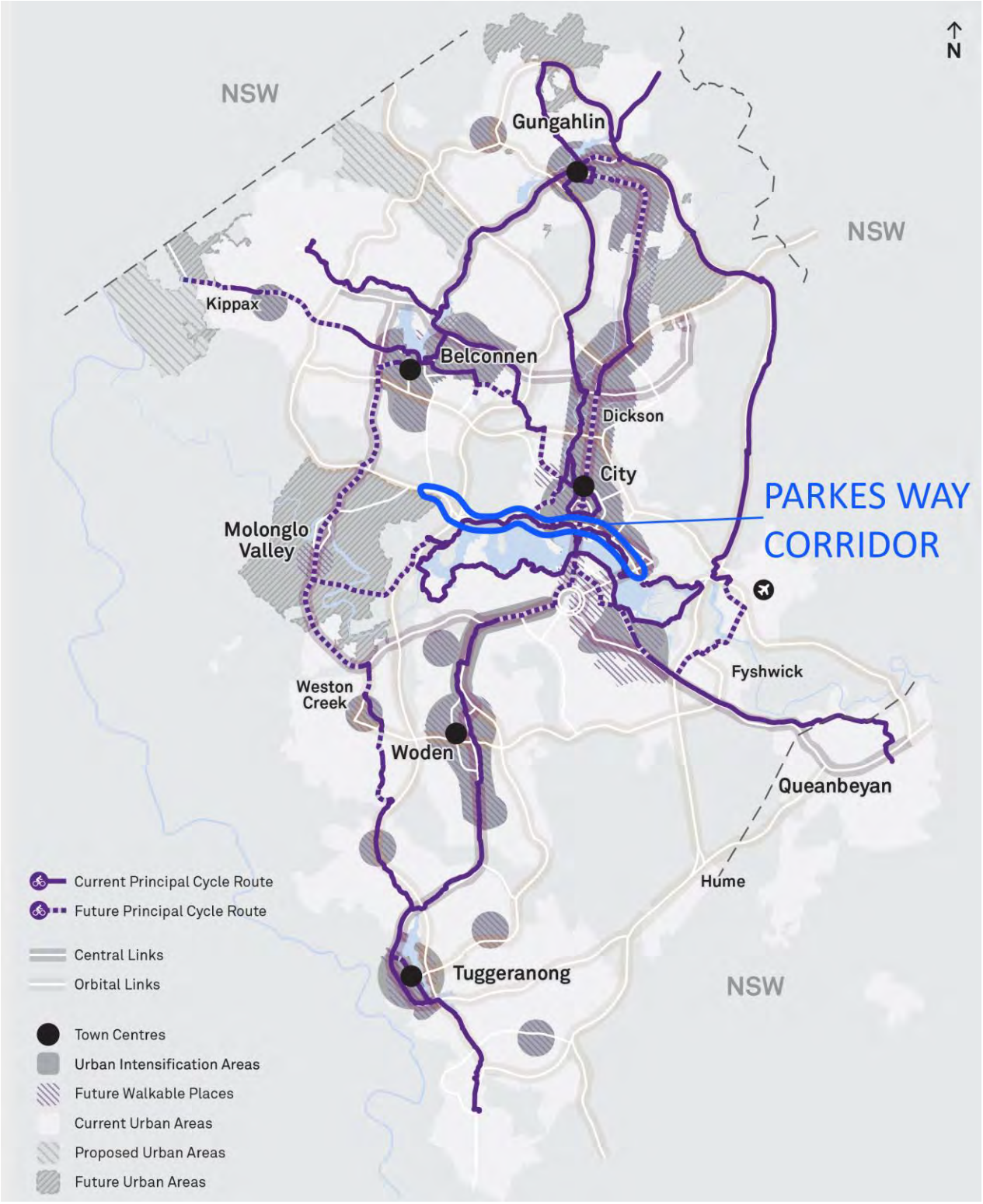

Figure 5–7: Canberra Cycle Network Map (ACT Transport Strategy 2020)

It is anticipated that active travel connectivity along and across the Corridor will continue to be a key transport consideration into the future. The corridor is expected to include pedestrian and cycling infrastructure in the long term, noting that the nature of this infrastructure may change / be upgraded.

6. Upgrade Identification & Shortlisting

6.1 Assessment Approach

In order to ensure that the Parkes Way Corridor operates appropriately into the future and services the needs of the community over the next 30 years, it is anticipated that a collection of upgrades will be required in the Corridor. These upgrade projects are expected to be a mix of road infrastructure upgrades, public transport improvements, active travel facilities, safety improvements and technology enhancements. In order to understand the most appropriate corridor improvements to implement, an option shortlisting exercise was undertaken. This process involved the following steps:

- Identification of a longlist of upgrade options for each corridor
- An options workshop that sought feedback from key stakeholders and technical specialists on each longlist option
- Formal evaluation of all longlist options against the agreed Vision Principles
- Nomination of a shortlist of options based on the options evaluation outcomes and other relevant considerations
- Endorsement of the options shortlist by the Territory and acceptance by the NCA

The options shortlisting process was conducted for both the Parkes Way Corridor Strategy and the concurrent South West Corridor Strategy, and is documented in its entirety in the Options Shortlisting Assessment Report included in Appendix A of this Corridor Strategy.

6.2 Long list Options

The long list of options was identified through a combination of several different approaches. TCCS identified a collection of options that were considered likely to benefit the community into the future. In addition, the project team identified further potential upgrade options that would likely improve the operation of the corridor based on traffic modelling outcomes, deficiencies in active travel connectivity, existing and potential future public transport routes; existing crash analysis and observed safety concerns.

The draft longlist of options identified for the Parkes Way Corridor consisted of the following 27 potential upgrades, including sites on Parkes Way, William Hovell Drive and in the vicinity of the Glenloch Interchange:

- Parkes Way
  - PW1) Kings Ave Interchange upgrades
  - PW2a) Parkes Way / Anzac Pde upgrade - at grade improvements
  - PW2b) Parkes Way / Anzac Pde upgrade - Underpass
  - PW3a) Parkes Way / Coranderrk St upgrade - At grade improvements
  - PW3b) Parkes Way / Coranderrk St – Underpass / Overpass
  - PW3c) Parkes Way / Coranderrk St upgrade - grade separated interchange
  - PW4) Parkes Way localised lowering & narrowing through CBD
  - PW5) Replacement of South-East cloverleaf – Parkes Way to Commonwealth Ave
  - PW6) Parkes Way eastbound widening
  - PW7) Parkes Way Acton Waterfront upgrades
  - PW8) Molonglo to City Cycle Highway - Parkes Way component
  - PW9) Parkes Way Bridge Strengthening to SM1600
  - PW10) Parkes Way / Clunies Ross St interchange upgrade - West facing ramps
  - PW11) Clunies Ross St Duplication
  - PW12) Midblock capacity upgrade between Glenloch & Clunies Ross

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  - PW13) Mass action - Shoulder standardisation
  - PW14) Priority bus lane - Molonglo to city
  - PW15) Light Rail corridor on Parkes Way
  - PW16) Active travel connection - Edinburgh Ave to Coranderrk St
  - PW17) Commonwealth Av to Coranderrk St - Improved pedestrian permeability across corridor
  - PW18) Coranderrk to Anzac - Improved pedestrians permeability across corridor
- Glenloch Interchange
  - G1) Glenloch Int. Upgrade - Dedicated turn lane from Gungahlin Dr to city / reconfiguration
  - G2) Glenloch Int. Upgrade - William Hovel Dr EB onto Gungahlin Dr NB ramp
  - G3) Glenloch Int. – Gungahlin Dr southbound onto William Hovel Dr westbound ramp
  - G4) Glenloch Int. – Short/ medium term PT route
  - G5) Glenloch Int. – Long term PT route
  - G6) Bindubi St Interchange

6.3 Options Workshop

In December 2022, participants from TCCS, EPSDD, MPC, and the Project Team attended two Options Workshops where the longlist of upgrade options were presented and interrogated. The purpose of the workshops was to ensure the longlist was comprehensive and robust; discuss each of the options amongst the group; gain insight into the likely benefits and issues associated with each of the options; and to inform the options assessment process. Following the two workshops, the long list was finalised and circulated to all participants.

6.4 Options Assessment Process - Strategic Merit Test

In order to consider the relative merits of each option and identify a shortlist of options it was necessary to pass each option through a decision framework. The Australian Transport Assessment and Planning (ATAP) guidelines provide guidance on the options assessment process, identifying a Strategic Merit Test (SMT) as a method to consider an initiative's alignment with goals, objectives and strategic plans. Given the early stage of development and minimal information available on the options being considered, and the establishment of clear and agreed Vision Principles for the project, it was considered appropriate to apply an SMT to the long list of options in order to identify a preferred short list of options.

The SMT option evaluation considered the number of Vision Principle categories that each option was predominately aligned with in order to determine whether the option was appropriate for short listing.

6.5 Evaluation of Vision Alignment

6.5.1 Overview

Two methods of evaluation were employed to understand which options best align with the agreed Vision Principles for the Corridor. The evaluation of the alignment with each Corridor Vision Principle was undertaken by the project team and is summarised in the upgrade evaluation sheets Options Shortlisting Assessment Report included in Appendix A. Each sheet provides a location and description of the option, whether it was considered to be aligned with each discrete Vision Principle (and rationale for that finding). Alignment with a Vision Principle is consistent with legend provided in Table 6–1.

Table 6–1: Vision Principle alignment categories

Alignment	Description
Aligned	Upgrade is consistent with the objectives of the Vision Principle
Neutral	Upgrade is neither consistent or inconsistent with the Vision Principle, or alternatively the Principle is not appliable to the upgrade
Not Aligned	Upgrade is in conflict with the objectives of the Vision Principle

It is noted that this SMT evaluation does not necessarily communicate the overall relative merit of an option. Rather, it provides an indication of the degree of alignment that an option has with the Vision Principles. As such, whilst the SMT provided a substantive basis for the options short listing process, other considerations also informed the option short listing assessment.

6.5.2 Number of Aligned Principles

In this method of evaluation, the net number of aligned principles is calculated (i.e. “Aligned” – “Not Aligned”), giving an overall sense of how the option aligns with all of the Vision Principles.

6.5.3 SMT Score

The Strategic Merit Test (SMT) Score indicates the degree to which an option aligns with the Vision Principle categories. If an option is predominantly aligned with the Vision Principles in a Vision category (i.e. aligned with at least 50% of Vision Principles for a given category) it is considered aligned with the category. The SMT Score indicates the aggregate number of Vision categories an option is aligned with. This approach normalises each category such that they have equal value in the analysis.

6.6 Recommended Short List

Informed by the options evaluation process discussed above, a recommended short list of upgrade options is provided in Table 6–2. Generally, options with an SMT score of 5 or above have been identified for short listing as they are considered highly aligned with the agreed vision for the corridor. Conversely, options with an SMT score of 3 or below are considered poorly aligned with the corridor vision and as such have not been proposed for shortlisting. Options with a SMT score of 4 have been further assessed in the context of likely value for money and community benefit, and have been included / excluded from the short list based on a qualitative assessment. The rationale for inclusion (or otherwise) of each option is included in the short list summary.

Table 6–2: Parkes Way Corridor Recommended Short List

Upgrade	Discussion
PW1 Kings Ave Interchange upgrades SMT Score: 3 — Aligned Principles: +9 Shortlisted: No	**SMT Score < 4** – Relatively low scoring option and effectiveness is likely to be limited due to capacity constraints on Kings Avenue. This option may have merit in the future depending on the evolution of the network, including removal of the cloverleaf connection between Parkes Way eastbound to Commonwealth Ave southbound.
PW2a Parkes Way / Anzac Pde upgrade - at grade improvements SMT Score: 4 — Aligned Principles: +5 Shortlisted: Yes	**SMT Score = 4 (Marginal)** - This upgrade is relatively low cost and is likely to provide significant improvements in operational and crash performance in the short term, noting the heritage sensitivities of the site and the need to consult with the NCA about viable approaches.
PW2b Parkes Way / Anzac Pde upgrade - Underpass SMT Score: 5 — Aligned Principles: +14 Shortlisted: Yes	**SMT Score > 4** - High scoring option that is likely to offer significant improvement to corridor operation, again noting the heritage sensitivities of the site. Most likely to be a viable long term solution for the site.
PW3a Parkes Way / Coranderrk St upgrade - At grade improvements	

Upgrade	Discussion
SMT Score: 8 Aligned Principles: +8 Shortlisted: Yes	**SMT Score = 4 (Marginal)** - This upgrade is relatively low cost and is likely to provide significant improvements in operational and crash performance in the short term, noting the need to consult with the NCA about viable approaches.
PW3b Parkes Way / Coranderrk St – Underpass / Overpass SMT Score: 5 Aligned Principles: +12 Shortlisted: No	**SMT Score > 4** – High scoring option, although is considered inferior to PW3c at the same site as it retains a large footprint has compromised active travel outcomes.
PW3c Parkes Way / Coranderrk St upgrade - grade separated interchange SMT Score: 6 Aligned Principles: +17 Shortlisted: Yes	**SMT Score > 4** – Very high scoring option that is likely to offer significant improvement to corridor operation and support transverse active travel connectivity, noting that adjustment to footprint and corridor profile has the potential to have heritage implications. Pedestrian connectivity improvement identified in PW19 is also addressed as part of this upgrade. Stormwater / flooding issues at the site will require careful consideration and resolution.
PW4 Parkes Way localised lowering & narrowing through CBD SMT Score: 4 Aligned Principles: +10 Shortlisted: Yes	**SMT Score = 4 (Marginal)** - It is considered likely that adjustments to the Parkes Way cross section will be required to facilitate discrete projects along the corridor (e.g. Acton Waterfront / Civic Pool Site Development / UNSW / North-East Cloverleaf site etc). As such, the provision of a compact cross section it has been included in the shortlist.
PW5 Replacement of South-East cloverleaf – Parkes Way to Commonwealth Ave SMT Score: 5 Aligned Principles: +15 Shortlisted: No	**SMT Score > 4** – Modelling indicates that the south-east cloverleaf caters to a major west to south movement and its removal has significant network implications. As such it is anticipated that this connection will require retention / replacement if and when this block is developed. Previous studies of this issue have indicated that site and planning constraints make alternative arrangements highly challenging and that a horizontal stratum boundary for the block may represent the best option to retain this connection. Such an approach is entirely contingent on the development of the block and associated buildings and cannot be adequately anticipated at this stage of development. As such, this option has been excluded from the options short list, whilst acknowledging that this is a critical element of the Parkes Way corridor further work on this link will be required in the future when details of development are better understood.
PW6 Parkes Way eastbound widening SMT Score: 5 Aligned Principles: +14 Shortlisted: Yes	**SMT Score > 4** – The option is highly aligned with the Vision Principles and is expected to provide important additional capacity in a highly congested part of the network and reduce friction through the removal of the merge.
PW7 Parkes Way Acton Waterfront upgrades SMT Score: 5 Aligned Principles: +16	**SMT Score > 4** – Road upgrades in this section of the corridor will be important to unlock the potential of the Acton Waterfront development and as such were considered in the short list, acknowledging that the final development approach my affect the ultimate Parkes Way arrangement. It is further noted these improvements are very highly aligned with the Vision Principles. Notwithstanding strong alignment with the Vision Principles, engagement with the City Renewal Authority indicated that Parkes Way upgrades were not required to facilitate development of the Acton

Upgrade	Discussion
Shortlisted: No	Waterfront. Furthermore, upgrades that improve performance of the westbound carriageway adjacent to the Acton Waterfront have been incorporated into PW4.
PW8 Molonglo to City Cycle Highway - Parkes Way component SMT Score: 4 Aligned Principles: +10 Shortlisted: Yes	**SMT Score = 4 (Marginal)** – Whilst only moderately aligned with the Vision Principles, the Molonglo Cycle highway is considered an important element of Canberra's future active travel network. As such, the cycle highway is considered important to include as part of the future development of the corridor and has been included in the corridor strategy short list.
PW9 Parkes Way Bridge Strengthening to SM1600 SMT Score: 2 Aligned Principles: +8 Shortlisted: No	**SMT Score < 4** – Strengthening of Parkes Way bridges was founded to be a relatively low scoring option. Further, an assessment of freight corridors has indicated that Parkes Way is unlikely to play a key freight transport role into the future.
PW10 Parkes Way / Clunies Ross St interchange upgrade - West facing ramps SMT Score: 5 Aligned Principles: +14 Shortlisted: Yes	**SMT Score > 4** – With significant population growth forecast to the west of the city (i.e. Molonglo and West Belconnen), the proposed west facing ramps are considered likely to be important to provide additional capacity for access into the university and western parts of the city centre. Furthermore, this upgrade is strongly aligned with the Vision for the corridor.
PW11 Clunies Ross St Duplication SMT Score: 2 Aligned Principles: +8 Shortlisted: No	**SMT Score < 4** – Low scoring option, primarily as it is off corridor and as such does not align with Parkes Way-specific vision Principles. Whilst the upgrade is likely important to facilitate upgrade of the Parkes Way / Clunies Ross interchange and should be considered as part of future improvements to the network to complement the corridor strategy, it has been excluded from the short list as it is not on the Parkes Way corridor.
PW12 Midblock capacity upgrade between Glenloch & Clunies Ross SMT Score: 4 Aligned Principles: +9 Shortlisted: Yes	**SMT Score = 4 (Marginal)** – Similar to PW10, additional trips to the city from west are expected to necessitate additional capacity in the corridor to ensure it operates at an appropriate level of service. So notwithstanding that the upgrade is only modestly aligned with the Vision Principles, it was considered an important improvement to include in the Corridor Strategy short list.
PW13 Mass action - Shoulder standardisation SMT Score: 3 Aligned Principles: +8 Shortlisted: No	**SMT Score < 4** – Whilst providing a high standard of shoulders throughout the corridor will improve safety and emergency response to a degree, the upgrade is not strongly aligned with the Vision Principles and is unlikely to provide significant benefit as a standalone package of work. Therefore the option has not been included in the strategy shortlist, although full width shoulders should be included in any corridor upgrades.
PW14 Priority bus lane - Molonglo to city SMT Score: 6 Aligned Principles: +14 Shortlisted: Yes	**SMT Score > 4** – A direct public transport link from the Molonglo district (currently forecast to accommodate 70,000 people) to the city is very likely to need to use the Parkes Way corridor. In the short to medium term the PT connection is highly likely to be a rapid bus service, and such it is considered important to include the provision of a bus lane in the short list of corridor upgrades. Furthermore, the option is highly aligned with the agreed Vision Principles.
PW15 Ultimate Public Transport Corridor on Parkes Way SMT Score: 4 Aligned Principles: +11 Shortlisted: Yes	**SMT Score = 4 (Marginal)** – Based on the same rationale discussed for PW14, it is also considered important to consider a long term public transport solution for the corridor. Therefore provision of dedicated and segregated high capacity public transport route has been nominated in the options short list.

Upgrade	Discussion
PW16 Active travel connection - Edinburgh Ave to Coranderrk St SMT Score: 4 Aligned Principles: +13 Shortlisted: Yes	**SMT Score = 4 (Marginal)** – This option addresses an important gap in the active travel network in the city. However, it is considered likely that this connectivity will be addressed as part of the Acton Waterfront development and for this reason, the upgrade has not been included in the options shortlist.
PW17 Commonwealth Av to Coranderrk St - Improved pedestrian permeability across corridor SMT Score: 4 Aligned Principles: +12 Shortlisted: No	**SMT Score = 4 (Marginal)** – Whilst this option addresses a notable weakness in the active transport network, it is considered likely that the grade separation of Coranderrk St intersection (Option PW3c) will include provision of active travel connections. Acknowledging that this upgrade is part of a broader approach to active travel connectivity in this part of the corridor, the upgrade has been incorporated into PW18.
PW18 Coranderrk to Anzac - Improved pedestrian permeability across corridor SMT Score: 4 Aligned Principles: +12 Shortlisted: Yes	**SMT Score = 4 (Marginal)** – This option is aligned with the Corridor Vision Principles, and in the context of the significant developments occurring on the north of the corridor (UNSW campus, residential upgrades etc) and the amenity/ attractiveness of Commonwealth Park and Lake, improving active travel connectivity across this part of the corridor is considered important to include in the options shortlist.
G1 Glenloch Int. Upgrade - Dedicated turn lane from Gungahlin Dr to city / reconfiguration SMT Score: 3 Aligned Principles: +12 Shortlisted: No	**SMT Score < 4** – The upgrade is not strongly aligned with the Vision for the Corridor, is not expected to provide substantial benefit, and carries geometric and lane balance challenges in its current configuration.
G2 Glenloch Int. Upgrade - William Hovel Dr EB onto Gungahlin Dr NB ramp SMT Score: 6 Aligned Principles: +15 Shortlisted: Yes	**SMT Score > 4** – The option is strongly aligned with the Corridor Vision, and whilst strategic modelling indicates that it only experiences moderate demand, it is a relatively low cost and straight forward solution. However, it is noted that in the absence of provision of the return movements (refer Option G3) the option as an independent project carries concerns around network legibility.
G3 Glenloch Int. – Gungahlin Dr southbound onto William Hovel Dr westbound ramp SMT Score: 4 Aligned Principles: +13 Shortlisted: No	**SMT Score = 4 (Marginal)** – Strategic modelling indicates that there is relatively low demand for this movements during both peak periods. Given this, combined with the anticipated high cost and geometric complexity (and potential design standard compromises) of the option, it is considered a low priority over the current strategy horizon.
G4 Glenloch Int. – Short/medium term PT route SMT Score: 4 Aligned Principles: +12 Shortlisted: Yes	**SMT Score = 4 (Marginal)** – A direct public transport link from the Molonglo district (currently forecast to accommodate 70,000 people) to the city is very likely to need to use the Parkes Way corridor. In the short to medium term the PT connection is highly likely to be a rapid bus service, and such it is considered important to include the provision of a bus lane in the shortlist of corridor upgrades. Furthermore, the option is highly aligned with the agreed Vision Principles and compliments option PW14.
G5 Glenloch Int. – Long term PT route SMT Score: 4 Aligned Principles: +11 Shortlisted: Yes	**SMT Score = 4 (Marginal)** – Based on the same rationale discussed for PW15, it is also considered important to consider a long term public transport solution for the corridor. Therefore provision of dedicated and segregated high capacity public transport route has been nominated in the options short list.
G6 Bindubi St Interchange	**SMT Score > 4** – Provision of a grade separated interchange at the Bindubi St intersection site is expected to have a significant impact on the performance of the network in the context of the significant increases in traffic volumes generated to the west that are anticipated.

Upgrade		Discussion
SMT Score: 5	Aligned Principles: +16	For this reason, and noting the option's high alignment with the Vision Principles, the Bindubi St interchange has been included in the corridor shortlist as an integral part of the Glenloch interchange operation.
Shortlisted:	Yes	

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7. Proposed Corridor Upgrades

7.1 Identified Upgrades

The option shortlisting process identified 16 upgrades in the Parkes Way Corridor that have alignment with the Vision for the corridor and are considered likely to improve aspects of the Corridor's performance. Table 7–1 provides a summary of these upgrades, noting that upgrades categorised as PW are located on Parkes Way, and upgrades categorised as G whilst also on the Parkes Way / Wiliam Hovell Drive corridor, are associated with the Glenloch Interchange (either within the interchange itself or in close proximity to the Glenloch Interchange such that it operationally related to the interchange).

Table 7–1: Proposed Corridor Upgrades

Upgrade		Description
PW2a	Parkes Way / Anzac Pde upgrade - at grade improvements	Addition of mainline through and circulating lanes in each direction at the roundabout. Signalisation of the eastern and northern approaches has also been provided in an effort to improve performance and extend the life of the intersection in the short term.
PW2b	Parkes Way / Anzac Pde upgrade - Underpass	A long term, capital intensive solution to grade separate the ANZAC Parade roundabout to avoid future operational failure at the site. There are various potential options for the upgrade, however depending on constraints may require a short tunnel. The upgrade has a strong interdependence with the PW3c package.
PW3a	Parkes Way / Coranderrk St upgrade - At grade improvements	Addition of a bypass lane at the roundabout to facilitate the left turn from southbound Coranderrk Street to eastbound Parkes Way in an effort to improve performance and extend life of the intersection in the short term.
PW3c	Parkes Way / Coranderrk St upgrade - grade separated interchange	A long term, capital intensive solution to grade separate the intersection and avoid future operational failure at the site. The upgrade also improves pedestrian connectivity across the Corridor, but is likely to require replacement of water quality infrastructure at or near the site. The upgrade has a strong interdependence with the PW2b package.
PW4	Parkes Way localised lowering & narrowing through CBD	The upgrade aims to create a more compact cross section through the city between Edinburgh Avenue and Coranderrk Street to improve pedestrian connectivity across the corridor and increase adjacent land yields.
PW6	Parkes Way eastbound widening	The addition of an interim third eastbound lane through widening into the median will provide improved mainline capacity through the city.
PW8	Molonglo to City Cycle Highway - Parkes Way component	Significant upgrade of active travel infrastructure in the Corridor along the lake foreshore including a dedicated commuting cycle path in addition to a recreational shared use path.
PW10	Parkes Way / Clunies Ross St interchange upgrade - west facing ramps	Addition of an eastbound exit ramp and westbound entry ramp from/to Parkes Way at the Clunies Ross Interchange. Provision of the ramps will improve network capacity and redundancy, and provide a new access point into the western part of the city. It is noted that upgrade of Clunies Ross Street may be required to improve capacity in that corridor.
PW12	Midblock capacity upgrade between Glenloch & Clunies Ross interchanges	Provision of an additional lane between the interchanges to increase mainline capacity for general traffic.
PW14	Public Transport Corridor – Interim Upgrade	Conversion of existing Parkes Way shoulders (likely with some civil works) into dedicated bus lanes. The upgrade is intended to provide a dedicated space for buses to facilitate public transport between

Upgrade		Description
		Molonglo and the City. The upgrade has a strong interdependence with the G4 package.
PW15	Public Transport Corridor – Ultimate Upgrade	Creation of a segregated space for public transport vehicles that will allow for higher capacity public transport infrastructure such as a bus rapid transit or light rail route between Molonglo and the City. The upgrade is intended to provide a long term public transport solution for the Molonglo District and has a strong interdependence with the G5 package.
PW18	Coranderrk to ANZAC - Improved pedestrian permeability across corridor	Upgrade to existing active travel infrastructure crossings of Parkes Way at Allara St (overbridge) and near ANZAC Park West (underpass). These upgrades are intended to compliment new active travel infrastructure proposed at the Coranderrk Street Interchange and will improve the capacity and quality of these sites, and enhance movement between the City and Commonwealth Park.
G2	Glenloch Int. Upgrade - William Hovel Dr EB onto Gungahlin Dr NB ramp	The addition of a free flow ramp between eastbound William Hovell Drive to northbound Caswell Drive. Provision of the ramp improves network safety, capacity, connectivity and redundancy.
G4	Glenloch Int. – Short/medium term PT route	Conversion of existing William Hovell Drive/Parkes Way shoulders (likely with some civil works) through Glenloch Interchange into dedicated bus lanes. The upgrade is intended to provide a dedicated space for buses through the interchange to facilitate public transport between Molonglo and the City. The upgrade has a strong interdependence with the PW14 package.
G5	Glenloch Int. – Long term PT route	Creation of a segregated space for public transport vehicles through the Glenloch interchange that will allow for higher capacity public transport infrastructure such as a bus rapid transit or light rail route between Molonglo and the City. The upgrade is intended to provide a long term public transport solution for the Molonglo District and has a strong interdependence with the PW15 package.
G6	Bindubi St Interchange	With provision of a new access into Molonglo 3 East (the Bindubi Street extension) a new interchange grade separated is required to avoid failure of the mainline (Wiliam Hovell Drive) and side road (Bindubi Street)

7.2 Options Development

The upgrades included as part of the Corridor Strategy have been developed based on current available information, preliminary assessment and engineering and transport planning judgment. Whilst the proposed upgrades have been the subject of quantitative and / or qualitative transport assessment to identify an operational layout that is considered likely to address the identified performance issues at the various Corridor sites, it is noted that it has not been the subject of a detailed options analysis process.

Noting that site conditions, land use, travel demand, local constraints, the transport network and other variables are likely to evolve considerably over the course of the 30 year Corridor Strategy horizon, it is anticipated that corridor upgrades presented here will be the subject of future rigorous options assessment processes to identify the most appropriate preferred solution at the time of the development of the future concept design. Further, the feasibility of upgrades presented here requires testing through more substantial design development, traffic analysis, constraints assessment (physical, environmental, planning etc) and stakeholder consultation in future development phases.

7.3 Upgrade Sites

Upgrades proposed as part of the Corridor Strategy are interspersed along the length of the Parkes Way Corridor between Bindubi Street and ANZAC Parade. These upgrades are a mix of infrastructure improvements at both corridor nodes (e.g. interchange or intersection) and on corridor segments (between nodes). The location of the upgrade sites is indicated in Figure 7–1.

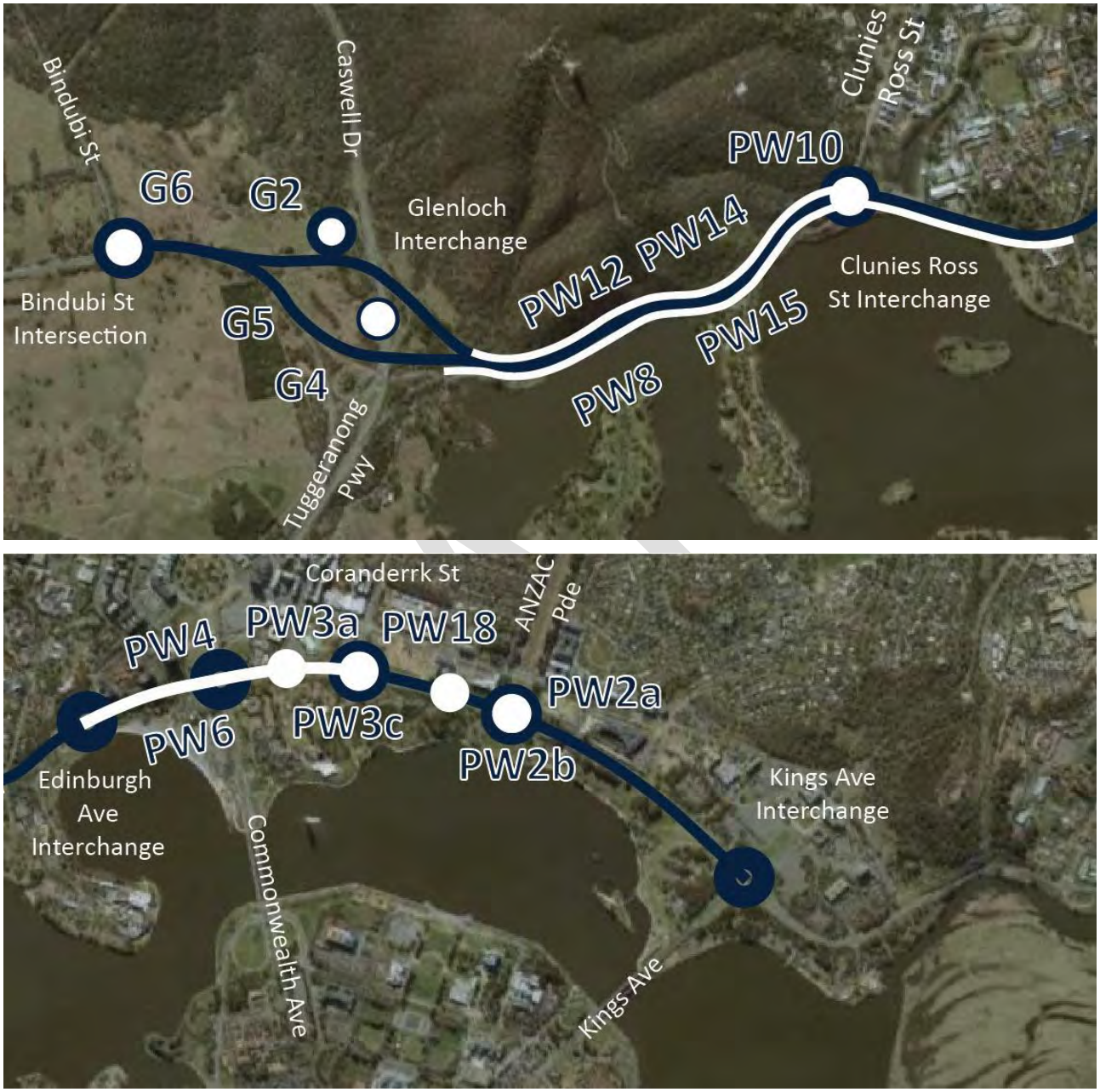

Figure 7–1: Parkes Way Corridor upgrade sites (PW Western zone above / PW City Zone below)

7.4 Upgrade Configurations

Strategic design for the 16 Parkes Way Corridor upgrades was undertaken to identify an infrastructure configuration that has the potential to address the identified problem. The intent of the layouts presented in this strategic design is to develop and present road and infrastructure layouts that are likely to provide a feasible solution to address an identified issue in the corridor. It aims to present transport network geometry and configurations to a sufficient level of detail to communicate what network changes are proposed as part of an upgrade to provide an understanding of how they may affect corridor performance and inform notional opinions of potential cost. The strategic design process considered the following design considerations:

- Problem statement
- Upgrade location
- Site characteristics
- Vision Alignment
- Considered options
- Adopted option
- Upgrade details
- Design Criteria
- Road Geometry
- Traffic Analysis
- Active Travel
- Public Transport
- Structures
- Safety
- Constructability
- Project Interdependencies
- Corridor Implications
- Corridor Character

The strategic design of each upgrade and associated design assumptions, rationale and outcomes are described in the Parkes Way Corridor Strategic Design Report included as Appendix B of the Corridor strategy. This strategic design forms the basis of opinions of cost generated for each of the proposed upgrades that is summarised in the Cost Estimate Report which is included in Appendix E. The total estimated cost of the 16 upgrades proposed as part of the Parkes Way Corridor Strategy is **$1,119 M** in $2025 AUD.

Following is a brief summary of the key assumptions that informed the development of these designs, in addition to the primary design features and considerations associated with the upgrade designs. The overall estimated project cost (in $2025 AUD) for each of the upgrades is also included in the following summaries.

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Upgrade	PW2a – ANZAC Parade Intersection – Interim Upgrade	Location	Parkes Way	Estimate Cost	$16M	Sheet	1 of 2

Problem Statement

Parkes Way is a key access route to the city centre and the parliamentary triangle, in addition to being the only free flow east-west corridor in the city. Parkes Way currently performs poorly in peak periods, with road users experiencing significant congestion and delay. Operational performance issues are expected to worsen over time with increased flows from the west resulting from development of West Belconnen and the Molonglo Valley.

The layout and at-grade nature of the ANZAC Parade intersection are a major capacity constraint on the Parkes Way corridor and the transport network more broadly. The intersection is an existing zone of congestion in both peak periods, and is forecast to experience increasing levels of failure in 2031 and beyond, with traffic volumes expected to increase by approximately 50% to 2051.

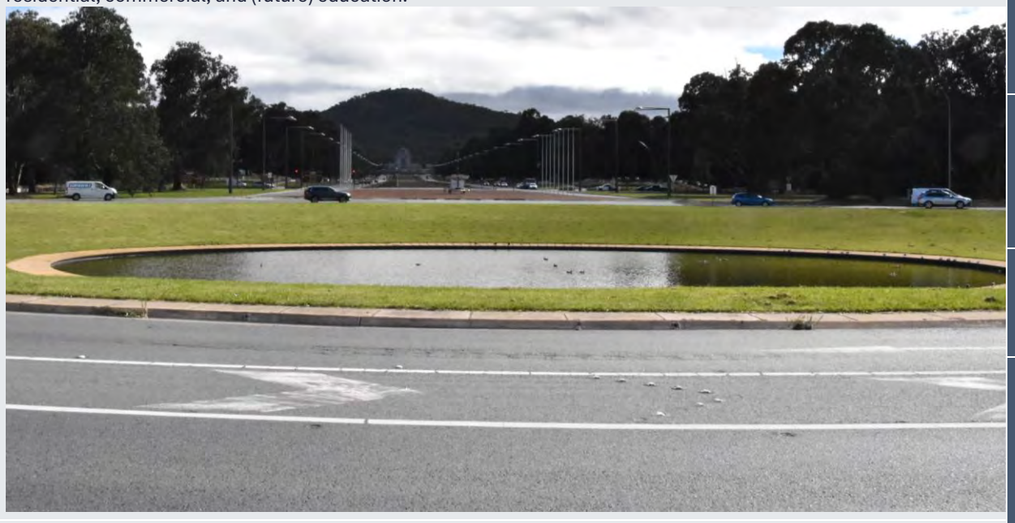
Site Description

The upgrade is proposed at the intersection of Parkes Way and ANZAC Parade. The intersection is a large radius, at-grade, three-legged roundabout that connects a primary orbital road corridor (Parkes Way) to ANZAC Parade, which is a wide ceremonial boulevard on one of the City's key axes and an important view corridor between Capital Hill and Australian War Memorial. Rather than adopting a conventional circular annulus, the roundabout is oval in shape and contains a depressed ceremonial pond (Rond Pond) in its centre.

ANZAC Parade is a dual carriageway with three lanes in each direction, separated by a wide hardstand median. The ANZAC Parade corridor has significant heritage and cultural value, lined by over a dozen memorials in addition to providing a visual link between Parliament House and the War Memorial and is considered an important part of the National Capital. The Parkes Way roundabout and the associated Rond Pond form part of this corridor and therefore also have heritage and cultural considerations, with the pond and associated grassed banks forming part of the development of this section of the corridor in 1963.

Parkes Way on both approaches to the site is a dual carriageway condition with two lanes in each direction, separated by a wide grassed median. The surrounding terrain is relatively flat, with the site flanked to the south by Commonwealth Park (another important feature of the National Capital) and ANZAC Park East and West (twin office block sites). Also located in the northern verge are the ASIO building to the east, and a residential tower and the future University of NSW site to the west.

Verges on all approaches to the intersection contain native vegetation. Furthermore, Commonwealth Park lies on the Lake Burley Griffin foreshore and features a diverse array of native and exotic plantings. The site can be considered set in an urban environment on the fringe of the Canberra City CBD, with a mix of surrounding land uses including residential, commercial, and (future) education.



Options Considered

There are several potentially viable options available to upgrade the existing ANZAC Parade intersection with Parkes Way. These include:

1) Provision of an additional westbound through / bypass lane
2) Addition of a left turn lane on the eastbound approach to the intersection
3) Addition of a left turn / through lane on the eastbound approach to the intersection
4) A combination of options 2 and 3 above – i.e. addition of both an eastbound and westbound through lane through the intersection
5) As per option 4 above, however including signalisation of the intersection

Preliminary traffic modelling indicated that only Option 5 is likely to avoid failure in both of the 2031 peak periods.

Public Transport

There are currently no public transport services that use the Parkes Way corridor in the region of the upgrade (refer extract from the 2023 Transport Canberra Network Map). Furthermore, it is understood that there are currently no plans to introduce new public transport services into this part of the corridor. As such, it is considered unlikely that the upgrade will have substantive implications for public transport operations within the corridor.

Active Travel

The existing roundabout and the local Parkes Way Corridor do not have on road cycle infrastructure, nor does the corridor have a longitudinal path network. That is, the existing Parkes Way corridor in the vicinity of the ANZAC Parade intersection does not support active travel within the corridor. Given the nature of the proposed intersection upgrade, it is not considered an appropriate or safe environment to introduce cyclists.

It is noted however, that parallel active travel routes exist in close proximity to the corridor including both on Constitution Avenue and in Commonwealth Avenue. In addition there is also transverse active travel crossings of the Corridor at Wendouree Drive and immediately west of ANZAC Park West. It is not expected that the proposed interchange will impact on the functionality of these peripheral active travel facilities.

Safety

The upgrade is primarily focused on capacity and performance improvements, however it is considered likely that congestion and queuing on Parkes Way, in addition to the configuration of the ANZAC Parade Roundabout, are at least in part responsible for a high density of crashes in and around the intersection. To that end, the safety performance of the intersection is expected to be improved by the upgrade, noting:

- The upgrade is expected to alleviate peak hour queuing on the mainline and decrease the risk of high-speed differential rear-end accidents.
- Provision of traffic signals is expected to control the interaction of turning / through vehicles at the western and northern approach thresholds, and reduce the number of crashes in these locations, noting both sites have a high density of crashes.

Structures

It is not anticipated that any existing structures will be impacted by the proposed upgrade, nor will there be a requirement for any new structures. However, the widening associated with additional Parkes Way lanes will be required over the existing pedestrian underpass near ANZAC Park West, the implications of which will need to be confirmed in future phases of design development.

Constructability

Delivery of this upgrade is expected to adopt conventional construction approaches. The works are expected to involve widening of existing carriageways that are likely to require traffic management and impact the operation of the intersection. As such, it may be appropriate to schedule construction during off peak periods only given the high demand that the intersection experiences.

Project Interdependencies

There are several upgrades proposed for the Parkes Way corridor in the vicinity of the proposed interchange that have a degree of interdependence with the proposed intersection upgrade:

- **PW2b – ANZAC Parade Interchange** – An upgrade of the existing ANZAC Parade roundabout intersection to a grade separated interchange is proposed to resolve congestion issues at that site in the long term. The performance of this interim package will influence the delivery timeframes for the ultimate interchange upgrade.
- **PW3a – Coranderrk Street Intersection - Interim Upgrade** – An upgrade of the existing Coranderrk Street intersection to provide improved performance is proposed as an interim solution at that site. Coranderrk Street is approximately 700m to the west of ANZAC Parade, and given the proximity of the two intersections, there is an interdependence of adjustments to the mainline in addition to the corridor operation across the two upgrades.
- **PW3c – Coranderrk Street Interchange** – An upgrade of the existing Coranderrk Street roundabout intersection to a grade separated interchange is proposed to resolve congestion issues at that site. There is a strong interdependence between the ultimate Coranderrk Street Interchange (PW3c) and the ANZAC Parade Interchange (PW2b), and by extension the delivery of the ultimate Coranderrk Street interchange package has the potential to be influenced by the performance of this interim package and Package PW3a.

Upgrade	PW2a – ANZAC Parade Intersection – Interim Upgrade	Location	Parkes Way	Estimate Cost	$16M	Sheet	2 of 2

Option Details

The interim upgrade of the ANZAC Parade intersection proposes an additional through lane in both directions on Parkes Way inclusive of signalisation of the northern and western approaches to the intersection. The upgrade has several important considerations and elements, including:

- **Parkes Way Mainline Approaches** – To improve the capacity of the intersection, a third through lane in each direction is proposed on Parkes Way. In the eastbound direction, this additional lane is achieved through carriageway widening and connects to a third mainline lane proposed in the PW3a package to the west. In the absence of delivery of the PW3a package, a 150 m turn/through lane would be initiated. At the intersection threshold it is proposed to provide two through lanes and one combined through/left turn lane. On intersection departure the third lane is to be dropped through a Form One Lane merge prior to the Wendouree Street Bridge to avoid the need for any structural works.

  In the westbound direction the intersection approach is to be reconfigured to provide a diverge / turn lane for the right turn movement initiated to the west of the Wendouree Street Bridge. The proposed additional lane becomes a second bypass lane through the roundabout to provide increased capacity for the through movement. On departure from the intersection carriageway widening into the median is proposed to provide the additional lane which continues as a 350m auxiliary lane that ties into the westbound Coranderrk Street intersection right turn slot. It is noted that the arrangement induces a westbound weave movement on Parkes Way between vehicles turning right from ANZAC Parade and vehicles turning right onto Coranderrk Street.

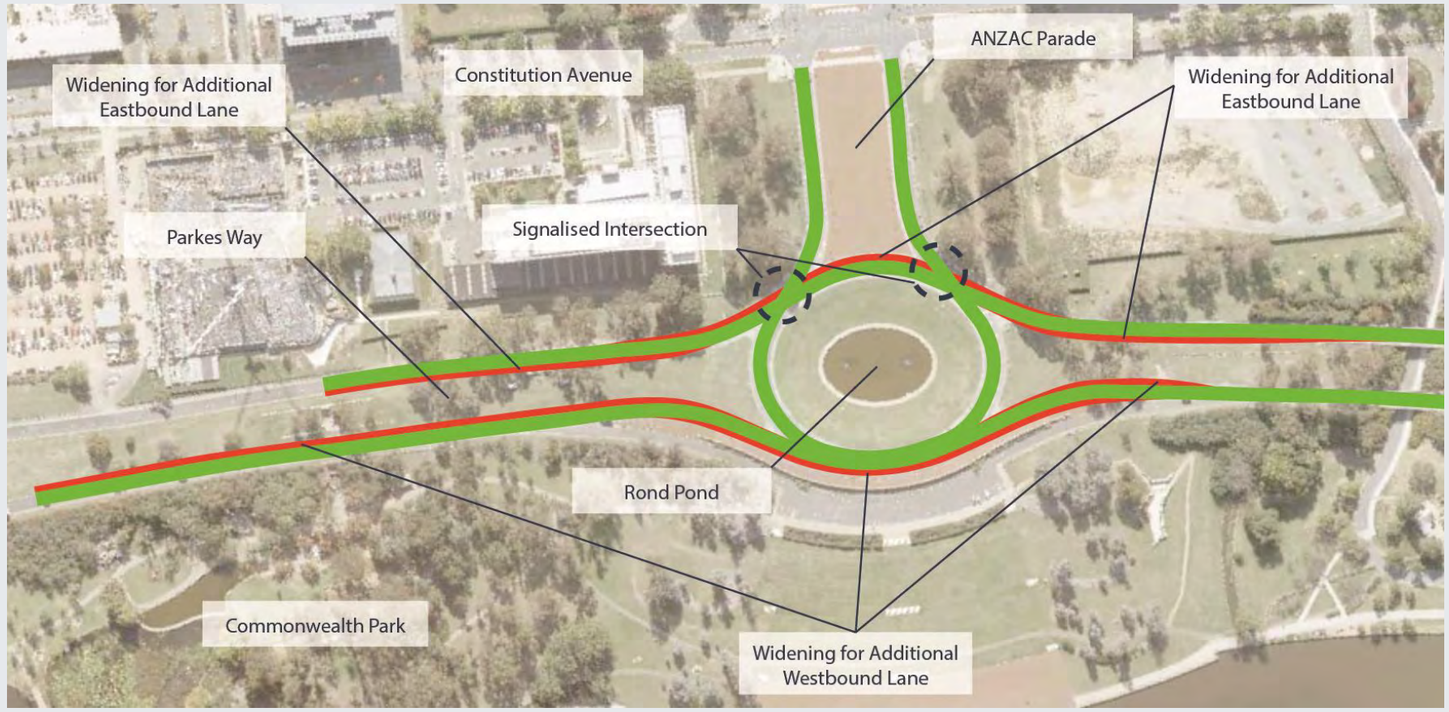
- **Roundabout Configuration** – An additional through lane is proposed on the eastbound and westbound zones of the roundabout circulating carriageway to improve intersection capacity. In the eastbound direction this reconfiguration provides three through lanes, and in the westbound direction a second bypass lane is created, providing two through lanes and right turn lane. No changes are proposed to the eastern and western parts of the circulating carriageway.

  It is proposed to signalise the intersection thresholds on the western and northern approaches to the intersection. Signalisation of these approaches is required as:

  - ***Safety*** - It is considered important to control interactions between conflicting movements at the roundabout, noting that the alternative of priority control for turning movements across three traffic lanes is considered unsafe and highly likely to worsen safety performance of the roundabout. In contrast, the proposal of providing signalisation at these two legs is expected to reduce crashes at the site.
  - ***Capacity*** – Signalisation of these two intersection legs may improve the operational performance of the intersection and increase its operational life.

- **Heritage Impacts and Mitigations** – Noting heritage advice (GML, 2024), a significant consideration for the upgrade are heritage implications of the proposed works, particularly the provision of traffic signals in ANZAC Parade corridor / view line. Noting the heritage recommendation that the introduction of visual clutter at the site should be avoided, it may be necessary to provide mitigations for the visual impacts of the proposal. Whilst the precedent of traffic signals in the ANZAC Parade corridor is noted (Constitution Avenue intersection), these mitigations may require departures from standard design practices in the Territory and could include:
  - Removal of target boards from the signal head assembly (as per the Constitution Avenue intersection) to reduce the visual presence of the traffic signals.
  - Adjustment to threshold locations to manage siting of signal heads and reduce their visual impacts
  - Adjustment to signal head locations relative to intersection thresholds.

  Any adaptations to conventional approaches to signal design and layouts would need to ensure that they do not compromise safety for road users.



Upgrade	PW2b – ANZAC Parade Interchange	Location	Parkes Way	Estimate Cost	$167M	Sheet	1 of 3

Problem Statement

Parkes Way is a key access route to the city centre and the parliamentary triangle, in addition to being the only free flow east-west corridor in the city. Parkes Way currently performs poorly in peak periods, with road users experiencing significant congestion and delay. Operational performance issues are expected to worsen over time with increased flows from the west resulting from development of West Belconnen and the Molonglo Valley.

The layout and at-grade nature of the ANZAC Parade intersection are a major capacity constraint on the Parkes Way corridor and the transport network more broadly. The intersection is an existing zone of congestion in both peak periods, and is forecast to experience increasing levels of failure in 2031 and beyond, with traffic volumes expected to increase by approximately 50% to 2051.

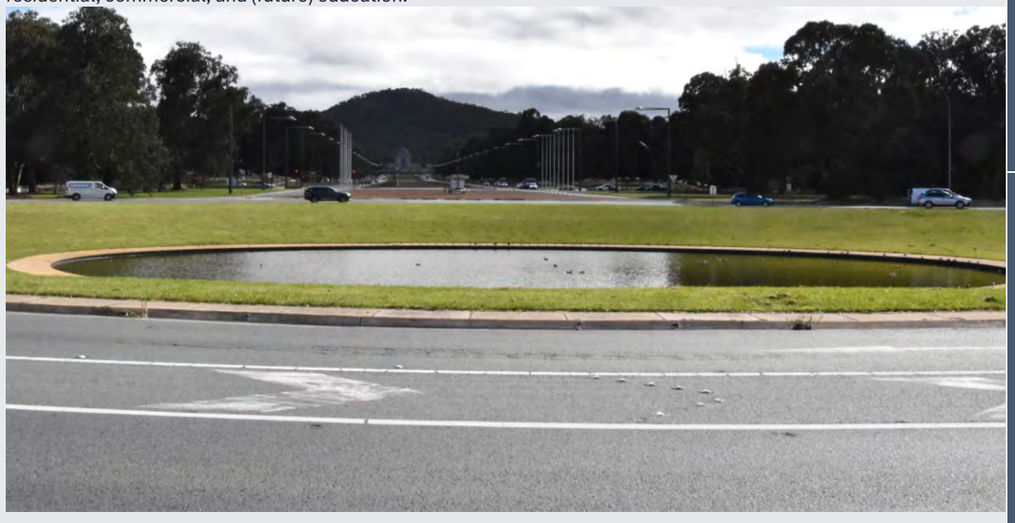
Site Description

The upgrade is proposed at the intersection of Parkes Way and ANZAC Parade. The intersection is a large radius, at-grade, three-legged roundabout that connects a primary orbital road corridor (Parkes Way) to ANZAC Parade, which is a wide ceremonial boulevard on one of the City's key axes and an important view corridor between Capital Hill and Australian War Memorial. Rather than adopting a conventional circular annulus, the roundabout is oval in shape and contains a depressed ceremonial pond (Rond Pond) in its centre.

ANZAC Parade is a dual carriageway with three lanes in each direction, separated by a wide hardstand median. The ANZAC Parade corridor has significant heritage and cultural value, lined by over a dozen memorials in addition to providing a visual link between Parliament House and the War Memorial and is considered an important part of the National Capital. The Parkes Way roundabout and the associated Rond Pond form part of this corridor and therefore also have heritage and cultural considerations, with the pond and associated grassed banks forming part of the development of this section of the corridor in 1963.

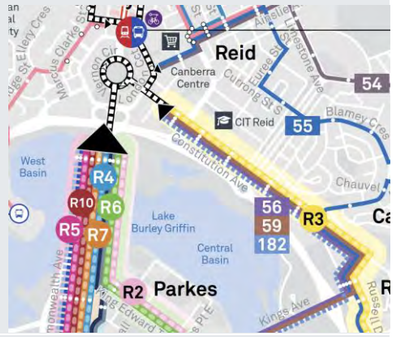
Parkes Way on both approaches to the site is a dual carriageway condition with two lanes in each direction, separated by a wide grassed median. The surrounding terrain is relatively flat, with the site flanked to the south by Commonwealth Park (another important feature of the National Capital) and ANZAC Park East and West (twin office block sites). Also located in the northern verge are the ASIO building to the east, and a residential tower and the future University of NSW site to the west.

Verges on all approaches to the intersection contain native vegetation. Furthermore, Commonwealth Park lies on the Lake Burley Griffin foreshore and features a diverse array of native and exotic plantings. The site can be considered set in an urban environment on the fringe of the Canberra City CBD, with a mix of surrounding land uses including residential, commercial, and (future) education.



Public Transport

There are currently no public transport services that use the Parkes Way corridor in the region of the upgrade (refer extract from the 2023 Transport Canberra Network Map). Furthermore, it is understood that there are currently no plans to introduce new public transport services into this part of the corridor. As such, it is considered unlikely that the upgrade will have substantive implications for public transport operations within the corridor.



Active Travel

The existing roundabout and the local Parkes Way Corridor do not have on road cycle infrastructure, nor does the corridor have a longitudinal path network. That is, the existing Parkes Way corridor in the vicinity of the ANZAC Parade intersection does not support active travel within the corridor. Given the nature of the proposed intersection upgrade, it is not considered an appropriate or safe environment to introduce cyclists.

It is noted however, that parallel active travel routes exist in close proximity to the corridor including both on Constitution Avenue and in Commonwealth Avenue. In addition there is also transverse active travel crossings of the Corridor at Wendouree Drive and immediately west of ANZAC Park West. It is not expected that the proposed interchange will impact on the functionality of these peripheral active travel facilities.

Safety

The upgrade is primarily focussed on capacity and performance improvements, however it is considered likely that the congestion and queuing on Parkes Way, in addition to the configuration of the ANZAC Parade Roundabout, are at least in part responsible for the high density of crashes in and around the intersection. To that end, the safety performance of the interchange is expected to be improved by the upgrade, noting:

- The upgrade is expected to alleviate peak hour queuing on the mainline and decreasing the risk of high speed differential rear end accidents.
- Grade separation of the interchange will significantly reduce the number of conflicting interactions between through and turning vehicles, reducing crash exposure and by extension likely crashes

Whilst the design proposal typically provides 1.0 m shoulders which is generally an improvement to the existing condition, these shoulders are not full width and do not provide a zone for emergency stopping or sufficient width for emergency service access. Shoulder width has been limited by the constraints of the site, as has the absence of emergency stopping bays.

Constructability

The ANZAC Parade interchange will require complex construction staging of various road and structural elements, likely over a significant period of time. Whilst a substantial proportion of the upgrade can be constructed within the Parkes Way median and the ANZAC Parade roundabout annulus, given the proximity of the work to live traffic, the site will occupy a confined area and require ongoing traffic management. It is also anticipated that the provision of temporary side tracks will be required in areas where on-line construction is required, and that network operation will be negatively impacted during the construction period.

Whilst it is considered more efficient and likely that the Coranderrk Street Interchange (Package PW3c) and the ANZAC Parade Interchange (this package) will be delivered concurrently, it is possible that they could be delivered as discrete projects at different times. Should the upgrades be delivered separately, there is likely to be additional construction complexities, traffic management and disruption to commuters in addition to abortive works.

Upgrade	PW2b – ANZAC Parade Interchange	Location	Parkes Way	Estimate Cost	$167M	Sheet	2 of 3

Structures

There are several structures that will be required to enable the interchange:

- **Mainline Tunnel** - The primary structure associated with the proposed interchange upgrade is a short tunnel, estimated to be approximately 120m long. Key features of the proposed tunnel may include:
  - A compact cross section consisting of four running lanes (3.5 m lanes / 2 x each direction), 1.0 m shoulders and a 2.0 m median housing support columns or a blade wall. It is expected that a 5.4 m clearance will be required in the tunnel.
  - Likely cut and cover construction using a precast concrete plank or girder superstructure to support the pond base and land bridge component of the tunnel. Given the assumed presence of a central support, the expected span is expected to be in the order of 12m.
  - Pumped stormwater drainage system noting that system inverts and tunnel base may be below the lake water level and therefore not be free draining
  - Potential tunnel systems inc. ventilation, fire suppression systems, monitoring systems and emergency egress infrastructure
  - Portal structures on each approach inclusive of retaining walls incorporated into the dive structures
  - Allowance adjacent / near the tunnel for tunnel systems, plant, controllers and connections. These items will require a spatial allocation and will potentially have visual implications

It is noted that tunnel requirements are influenced by various factors including its length and degree of enclosure. Future phases of design development should investigate alternate tunnel and / or underpass arrangements for the interchange in an effort obviate or mitigate the need for tunnel systems. Alternate approaches could include:

- A reduction in tunnel extent, targeting a length of less than 80m. This could be achieved through a reimagining of Rond Pond and / or adjustment to roundabout geometry
- Open air components or daylighting of the underpass (say between the pond and the roundabout carriageway) to create passive ventilation and shorten the effective length of the underpass

These alternative approaches have the potential to significantly influence the capital and operational costs of the interchange, and by extension impact on the financial and economic viability of the project.

- **Retaining Walls** - The interchange approaches will require dive structures on approach to the tunnel. Level differences associated with this open trench will require cut retaining walls.
- **Wendouree Drive Bridges** - The Wendouree Drive bridges (right) are existing twin precast concrete girder bridges that provide grade separation of the local road from Parkes Way. Given the realignment of Parkes Way required for the interchange, widening of both these structures into the median will be required.

Pedestrian Underpass - It is anticipated that extension of the existing concrete culvert pedestrian underpass structure to the west of ANZAC Park West will be required to suite the adjusted Parkes Way geometry.

Project Interdependencies

There are several upgrades proposed for the Parkes Way corridor in the vicinity of the proposed interchange that have a degree of interdependence with the proposed interchange including:

- **PW2a – Interim ANZAC Parade Intersection Upgrade** – The performance of this interim solution will influence the need and delivery timeframes for the ultimate interchange upgrade.
- **PW3c – Coranderrk Street Interchange** – An upgrade of the existing Coranderrk Street roundabout intersection to a grade separated interchange is proposed to resolve congestions issues at that site. Coranderrk Street is approximately 700m to the west of ANZAC Parade and given the proximity of the two proposed interchanges there is necessarily interdependence of mainline and ramp alignments and function across the two upgrades. This relationship is both geometric and operational, and the design of each interchange needs to carefully consider the ultimate arrangement of the other.
- **PW18 – Active Travel Connectivity Enhancements** – Parkes Way creates a barrier for active travel between the City and the Lake / Commonwealth Park. One element of the proposed active travel connectivity enhancements is upgrade of the existing underpass immediately west of ANZAC Park West. Whilst the vertical alignment of the ANZAC Parade interchange is intended to allow retention of this underpass, there is an opportunity to coordinate the upgrade of the underpass with the delivery of the interchange to provide construction efficiencies, avoid abortive work, and provide optimum active travel outcomes.

Options Considered

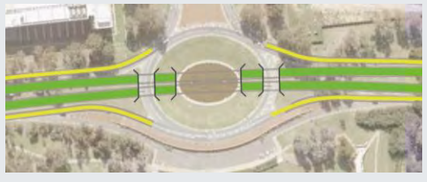
There are numerous potentially feasible options available to create an interchange and / or improve performance to an acceptable level at the current ANZAC Parade / Parkes Way intersection. Whilst an optioneering process was not undertaken as part of the Corridor Strategy, several broad approaches were considered, including the following options:

- At grade
- Underpass
- Reconfigured roundabout with underpass
- Short tunnel

Whilst an overpass alternative option would provide a feasible technical solution for the interchange, it was considered that this approach would severely compromise view lines along the Canberra Land axis and hence would likely be strongly opposed by several key stakeholders. For this reason, an overpass alternative of ANZAC Parade was not considered a viable option for the interchange and was not considered further.

At Grade Solution

As part of the ultimate upgrade of the site, consideration was given to providing an at grade solution that avoided the cost and geometric complexities of grade separation. Noting that a significant driver of congestion at the intersection is right turn movements, consideration was given to removing right turns from the intersection. It is noted however that such an approach would likely require a service road arrangement to facilitate the removed movements; would require substantial adjustment to the southern end of ANZAC Parade (with attendant heritage impacts), and would increase congestion on other parts of the network.



Underpass

There are several underpass solutions that could provide an operational interchange at the site. One option that retains Rond Pond in its current location (noting that some reconstruction the pond would be required) would be to provide three discrete underpass bridges, one of which would be under the pond (approx. 60-65 m length) and two under the roundabout. No adjustment to ANZAC Parade is proposed as part of this option.

In this scenario entry and exit ramps are routed along the existing Parkes Way alignment. The Parkes Way mainline would be realigned into the median and dive under the roundabout and pond to provide grade separation for the interchange.

Reconfigured Roundabout with Underpass

A variant of the underpass option could include the reimagining of the Rond Pond and the ANZAC Parade roundabout. This option would route entry and exit ramps along the existing Parkes Way and realign the mainline into the median and under the pond / roundabout, with alteration to the way ANZAC Parade ties into the roundabout would be required.

Reconfiguration of the roundabout to a smaller (50-55 m dia.) would allow the adoption of an underpass of less than 80m length, likely avoiding requirements associated with tunnel operation. Further, raising the pond surface level would reduce the depth of the underpass and result in several benefits relating to interchange operation.

Short Tunnel

The option of a short tunnel (120 m or less) would allow retention of the roundabout and Rond Pond in its existing configuration (noting that some reconstruction the pond would likely be required). As per other options, this option would route entry and exit ramps along the existing Parkes Way carriageway and realign the mainline into the median and under the pond and roundabout.

This option aims to minimise heritage impacts at the site by retaining the existing configuration and appearance of the pond and roundabout. However, adoption of a short tunnel would have significant capital and operational implications compared to other options.

Upgrade	PW2b – ANZAC Parade Interchange	Location	Parkes Way	Estimate Cost	$167M	Sheet	3 of 3

Option Details

The upgrade of the ANZAC Parade intersection proposes a grade separated interchange that consists of several important elements, including:

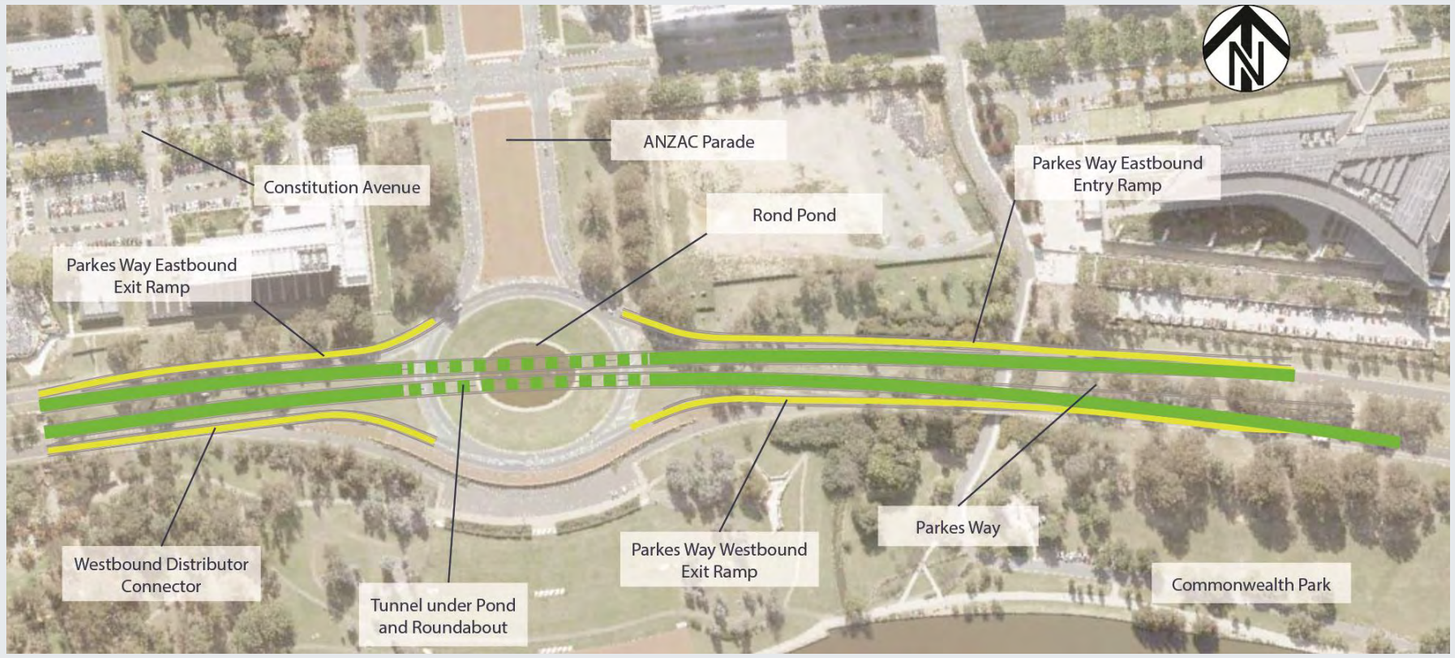
- **Parkes Way Mainline** – The Parkes Way mainline is horizontally realigned into the wide median through the interchange. Vertically, the mainline dives to a maximum depth of approximately 9 m, and is conveyed through a short tunnel under the existing roundabout and Rond Pond. The eastern extent of the Parkes Way mainline through the interchange ties into the existing Parkes Way dual carriageways, whereas the western extent of the mainline ties into the Parkes Way alignment proposed in Package PW3c.

  The proposed mainline retains two full width lanes in each direction consistent with the existing arrangement. The design targets provision of a 7.5 m median that will allow central planting and potential barrier protection, in addition to future widening should it be required. The median however narrows through the proposed tunnel zone to minimise the required extent of tunnel works.

- **Interchange Tunnel** – An important feature of the proposed interchange arrangement is the provision of a short tunnel that provides grade separation for the interchange. The estimated length of the tunnel is approximately 120 m, and the tunnel is expected to require systems typically associated with modern road tunnels.

- **Eastbound Exit Ramp** – Given the proximity of the two interchanges (Coranderrk Street and ANZAC Parade) there is insufficient distance to provide standard entry ramp merge and exit ramp diverge arrangements in the eastbound direction. In response an auxiliary lane has been provided between the two ramps, with a distance of 250m between gores. This distance is considered short noting that there is expected to be a weave manoeuvre between both ramp access movements, and weave analysis / modelling as part of future design phases will be required to ensure that the proposed weave performs acceptably. It is noted that there is scope to increase this weave length should revision to the mainline vertical alignment to the east be achievable as a result of adjustment to the configuration and / or level of Rond Pond and the associated interchange roundabout. If the performance of this auxiliary lane is found to be deficient, or future traffic growth compromises the operation of the weave, provision of an eastbound distributor road similar to that proposed for the westbound entry ramp (refer above) would provide a solution, noting this approach would route additional traffic through the ANZAC Parade roundabout. Another alternative identified in Package PW3c (refer Option 4) introduces the Coranderrk Street eastbound entry ramp to the south of the ANZAC Parade exit ramp (essentially creating a braid and removing the weave).

- **Eastbound Entry Ramp** – The eastbound entry ramp is proposed as a standard entry ramp arrangement with the merge downstream of the Wendouree Street overbridge. Given the two left turn lanes from ANZAC Parade, a short merge of two lanes into a single lane is proposed within the ramp.



- **Westbound Exit Ramp** – The westbound exit ramp is proposed as a standard entry ramp arrangement with the diverge upstream of the Wendouree Street overbridge.

- **Westbound Entry Ramp** – Given the proximity of the two interchanges (Coranderrk Street and ANZAC Parade) there is insufficient distance to provide standard entry ramp merge and exit ramp diverge arrangements in the westbound direction. In response, the design proposes provision of a distributor connector between the two interchanges, routing westbound entry ramp movements through the Coranderrk Street interchange where it enters Parkes Way, creating a partial split diamond arrangement between the two interchanges for the westbound movement.

- **Corridor Landscaping** – Acknowledging the importance of retaining Parkes Way as a green corridor, notional planting in the Parkes Way median and some verge locations has been indicated on the proposed design layouts.

- **Rond Pond** – Rond Pond is centrally located within the existing roundabout and has identified heritage value. Whilst construction of the proposed interchange and associated tunnel appears likely to physically impact on the existing pond, the proposed layout aims to allow the reestablishment of the pond in its current location and configuration and retain its current appearance.

Upgrade	PW3a – Coranderrk Street Intersection - Interim Upgrade	Location	Parkes Way	Estimate Cost	$6M	Sheet	1 of 2

Problem Statement

Parkes Way is a key access to the city centre and the parliamentary triangle, in addition to being the only free flow east-west corridor in the city (noting that free flow conditions end at the Coranderrk Street intersection). Parkes Way currently performs poorly in peak periods in the vicinity of the Coranderrk Street intersection with road users experiencing significant congestion and delay. Operational performance issues are expected to worsen over time with increased flows from the west resulting from development of West Belconnen and the Molonglo Valley.

The layout and at-grade nature of the Coranderrk Street intersection are a major capacity constraint on the Parkes Way corridor and the transport network more broadly. The intersection is an existing zone of congestion in both peak periods, and is forecast to experience increasing levels of failure in 2031 and beyond. The roundabout has metering installed on the eastern (westbound) approach to provide additional capacity for the eastbound movements along Parkes Way. Discussions with TCCS have indicated that the metering is providing an improvement to the peak congestion, but is only considered to be a temporary or interim upgrade.

Site Description

The upgrade is proposed at the intersection of Parkes Way and Coranderrk Street. The intersection is a large radius, at-grade, three-legged roundabout that connects a primary east-west arterial (Parkes Way) to Coranderrk Street. The roundabout is oval in shape and contains a depressed water quality pond (Coranderrk Pond) in its centre. Coranderrk Pond was built in 1963 as part of the development of the Parkes Way corridor, and was designed to provide treatment of urban stormwater runoff as well as having an ornamental purpose. The site is a known area for flooding, with recent analysis (Calibre, 2023) indicating that augmentation of the existing stormwater drainage system is required to address local flooding issues.

Parkes Way on both approaches to the site is a dual carriageway condition with two lanes in each direction, with additional turn lanes at the intersection. Coranderrk Street is a dual carriageway with two mainline lanes in each direction, separated by a grassed median. Both road corridors primarily serve a transport function and convey high volumes of traffic in both peak periods.

The surrounding terrain is relatively flat, with the site flanked to the south by Commonwealth Park (an important feature of the National Capital), Civic Pool to its northwest quadrant, and the future University of NSW site to the northeast. Verges on all approaches to the intersection contain a mix of native and exotic vegetation. Furthermore, Commonwealth Park lies on the Lake Burley Griffin foreshore and also features a diverse array of native and exotic plantings. The site can be considered set in an urban environment on the edge of the Canberra City CBD, with a mix of surrounding land uses including recreational, residential, commercial, and (future) educational.

Options Considered

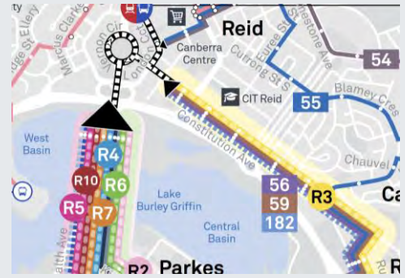
There were several potentially options available to upgrade the existing Coranderrk Street roundabout, including:

1) Provision of an additional left turn lane on the northern approach to the intersection
2) Provision of a free flow left turn slip lane on the northern approach to the intersection that turns into a lane add on eastbound Parkes Way (i.e. a third eastbound mainline lane on Parkes Way)
3) Signalisation of the existing roundabout configuration
4) Signalisation of the roundabout with an additional left turn lane on the northern approach and an additional Parkes Way through lane through the roundabout (i.e. three eastbound Parkes Way lanes)

Preliminary traffic modelling indicated that only options 2 and 4 avoided failure in the 2031 AM peak, and as such considered feasible.

Public Transport

There are currently no public transport services that use the Parkes Way corridor in the region of the upgrade (refer extract from the 2023 Transport Canberra Network Map). Furthermore, it is understood that there are currently no plans to introduce new public transport services into this part of the corridor. As such, it is considered unlikely that the upgrade will have substantive implications for public transport operations within the corridor.



Active Travel

The existing roundabout, and the local area of the Parkes Way Corridor, do not have on-road cycle infrastructure, nor does it have a longitudinal path network. That is, the existing Parkes Way corridor in the vicinity of the Coranderrk Street intersection does not support active travel within the corridor. It is noted however that parallel active travel routes exist in close proximity to the corridor including both on Constitution Avenue and in Commonwealth Park. Within the corridor, there is an existing transverse active travel crossing at Allara Street. It is not expected that the proposed intersection upgrade will impact on the functionality of this crossing.

The existing intersection site does not support active travel crossing of any of the approaches. Given that the upgrade broadly retains the existing arrangement, the existing active travel connectivity at the site is proposed to be retained.

Safety

The upgrade is primarily focussed on capacity and performance improvements, however it is considered likely that the congestion and queuing on Parkes Way in addition to the configuration of the Coranderrk Street intersection are at least in part responsible for the high density of crashes at the intersection. To that end, the safety performance of the interchange is expected to be improved by the upgrade, noting:

- The upgrade is expected to alleviate peak hour queuing and decrease the risk of high speed differential rear end accidents.
- A significant cluster of accidents occur around the Coranderrk Street entry threshold to the roundabout. The provision of the slip lane will reduce vehicle interactions in this location, and by extension is expected to lower the likelihood of crashes.

Structures

It is not anticipated that any existing structures will be impacted by the proposed upgrade, nor will there be a requirement for any new structures. However, the widening associated with additional Parkes Way lanes will be required over the existing pedestrian underpass near ANZAC Park West, the implications of which will need to be confirmed in future phases of design development.

Constructability

Delivery of this upgrade is expected to adopt conventional construction approaches. The works are expected to involve a combination of carriageway widening and an offline slip lane. Whilst the offline works will require construction in close proximity to live traffic, it is anticipated that it will not substantively impact on operation of the intersection. In contrast, the carriageway widening components of the upgrade are likely to require traffic management and impact operation of the intersection.

Project Interdependencies

There are several upgrades proposed for the Parkes Way corridor in the vicinity of the proposed upgrade, including:

- **PW3c – Coranderrk Street Interchange** – An upgrade of the existing Coranderrk Street roundabout to a grade-separated interchange is proposed to resolve congestion issues at the site in the long term. The performance of this interim package will influence the need and delivery timeframes for the ultimate interchange upgrade.
- **PW2a – ANZAC Parade Intersection – Interim Upgrade** – An upgrade of the existing ANZAC Parade intersection to provide improved performance is proposed as an interim solution at that site. Given the proximity of the two intersections and the configurations there is an interdependence of in the mainline geometry in addition to the corridor operation across the two upgrades.
- **PW6 – Parkes Way Eastbound Widening** – Due to operational performance issues associated with Parkes Way through the City Centre, it is proposed to increase the eastbound capacity of the corridor through provision of a third mainline lane. This upgrade is considered an interim solution and is expected to connect into the eastbound approach to the Coranderrk Street intersection upgrade.
- **PW2b – ANZAC Parade Interchange** – An upgrade of the existing ANZAC Parade roundabout intersection to a grade separated interchange is proposed to resolve congestion issues at that site in the long term. ANZAC Parade is approximately 700m to the east of Coranderrk Street and there is a strong interdependence between the ultimate Coranderrk Street Interchange (PW3c) and the ANZAC Parade Interchange (PW2b), and by extension the performance of this Coranderrk Street interim intersection package has the potential to influence the need and delivery timeframes for the ultimate interchange upgrade packages.

Upgrade	PW3a – Coranderrk Street Intersection - Interim Upgrade	Location	Parkes Way	Estimate Cost	$6M	Sheet	2 of 2

Option Details

The interim upgrade of the Coranderrk Street intersection proposes a left turn slip / bypass lane from the southbound Coranderrk Street carriageway onto the eastbound Parkes Way mainline. It consists of two primary elements grade separated interchange that consists of several important elements, including:

- **Left turn slip lane** – A key element of failure of the intersection in 2031 is the large delay of southbound left turning traffic on Coranderrk Street turning left onto the Parkes Way eastbound mainline. The proposed left turn lip lane allows this movement to bypass the intersection and join the Parkes Way mainline.
- **Parkes Way Mainline Additional Lane** – The proposed lane add creates a third through lane on the Parkes Way mainline. The widening associated with the third lane is proposed to be applied to the median as it is considered likely to create the lowest impact. This third lane is proposed to continue through the ANZAC Parade intersection to the east, tying into the geometry associated with the ANZAC Parade Interchange upgrade presented in Package PW2a. Barrier protection of the pedestrian underpass to the east is proposed to be upgraded to rigid concrete F-type barriers.

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Upgrade	PW3c – Coranderrk St Interchange	Location	Parkes Way	Estimate Cost	$124M	Sheet	1 of 3

Problem Statement

Parkes Way is a key access to the city centre and the parliamentary triangle, in addition to being the only free flow east-west corridor in the city. Parkes Way currently performs poorly in peak periods in the vicinity of the Coranderrk Street intersection with road users experiencing significant congestion and delay. Operational performance issues are expected to worsen over time with increased flows from the west resulting from development of West Belconnen and the Molonglo Valley.

The layout and at-grade nature of the Coranderrk Street intersection are major capacity constraint on the Parkes Way corridor and the transport network more broadly. The intersection is an existing zone of congestion in both peak periods, and is forecast to experience increasing levels of failure in 2031 and beyond. The roundabout had metering installed on the eastern (westbound) approach to provide additional capacity for the eastbound movements along Parkes Way. Discussions with TCCS have indicated that the metering is providing an improvement to the peak congestion, but is only considered to be a temporary or interim upgrade.

Site Description

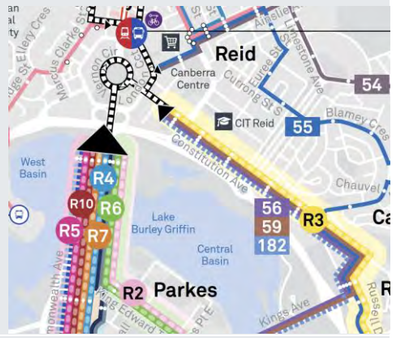
The upgrade is proposed at the intersection of Parkes Way and Coranderrk Street. The intersection is a large radius, at-grade, three-legged roundabout that connects a primary east-west arterial (Parkes Way) to Coranderrk Street. The roundabout is oval in shape and contains a depressed water quality pond (Coranderrk Pond) in its centre. Coranderrk Pond was built in 1963 as part of the development of the Parkes Way corridor, and was designed to provide treatment of urban stormwater runoff as well as having an ornamental purpose. The site is a known area for flooding, with recent analysis (Calibre, 2023) indicating that augmentation of the existing stormwater drainage system is required to address local flooding issues.

Parkes Way on both approaches to the site is a dual carriageway condition with two lanes in each direction, with additional turn lanes at the intersection. Coranderrk Street is a dual carriageway with two mainline lanes in each direction, separated by a grassed median. Both road corridors primarily serve a transport function and convey high volumes of traffic in both peak periods.

The surrounding terrain is relatively flat, with the site flanked to the south by Commonwealth Park (an important feature of the National Capital), Civic Pool to its northwest quadrant, and the future University of NSW site to the northeast. Verges on all approaches to the intersection contain a mix of native and exotic vegetation. Furthermore, Commonwealth Park lies on the Lake Burley Griffin foreshore and also features a diverse array of native and exotic plantings. The site can be considered set in an urban environment on the edge of the Canberra City CBD, with a mix of surrounding land uses including recreational, residential, commercial, and (future) educational.

Public Transport

There are currently no public transport services that use the Parkes Way corridor in the region of the upgrade (refer extract from the 2023 Transport Canberra Network Map). Furthermore, it is understood that there are currently no plans to introduce new public transport services into this part of the corridor. As such, it is considered unlikely that the upgrade will have substantive implications for public transport operations within the corridor.



Active Travel

The existing roundabout, and the local area of the Parkes Way Corridor, does not have on road cycle infrastructure, nor does it have a longitudinal path network. That is, the existing Parkes Way Corridor in the vicinity of the Coranderrk Street intersection does not support active travel within the corridor. The proposed interchange, given its free flow nature, is not considered an appropriate or safe environment to introduce cyclists.

It is noted however that parallel active travel routes exist in close proximity to the corridor including both on Constitution Avenue and in Commonwealth Park. Within the corridor, there is an existing transverse active travel crossing at Allara Street. It is not expected that the proposed interchange will impact on the functionality of this crossing.

Further to this existing crossing, it is proposed that the interchange includes an additional active travel crossing. The interchange overbridge design includes a 3.5m path (effective width of 3.0m) to improve pedestrian and cycle connectivity between the eastern part of the City and Commonwealth Park. It is noted that due to constraints of the site, the grade of this path is likely to exceed the maximum desirable grade for pedestrian movements, with the current design proposing a maximum 7% grade over approximately 20m.

Structures

There is one primary bridge structure proposed as part of the interchange, in addition to other ancillary structures such as retaining walls and major stormwater drainage infrastructure. Proposed structures include:

- **Bridge Overpass** - A single, two span bridge over Parkes Way is proposed as part of the interchange. Notional span lengths of approximately 12-15m inclusive of a central median pier will provide sufficient spatial allowance for a median, mainline through lanes and shoulders, and retained abutments. The bridge will be wide enough to accommodate two running lanes in each direction on Coranderrk Street, in addition to a median and a path in the western verge.

It is noted that structural bridge design has not been undertaken as part of the development of this Corridor Strategy. However, for the purpose of identifying potential order of capital costs, it has been assumed that the bridge will utilise either precast concrete girders or plank and in-situ concrete decking for its superstructure. The bridge construction method will need to allow live traffic operations under and around the construction site.

- **Retaining Walls –** it is anticipated that the proposed level differences associated with three of the ramp approaches, in addition to the Coranderrk Street approach to the interchange, will be achieved through provision of fill retaining walls. The type and construction of these walls will be determined in future phases of design development and informed by geotechnical investigations.
- **Drainage Infrastructure** – There is a significant amount of drainage infrastructure that conveys stormwater flows under and across the site. This infrastructure includes:
  - Culverts – Existing box culverts run under Coranderrk street into Coranderrk Pond, and the from Coranderrk Pond into an open channel that flows to Nerang Pool in Commonwealth Park. The alignment of these culverts conflict with several of the proposed retaining walls associated with the interchange, and it is assumed that diversion of these culverts will be required. It is likely that augmentation of these culverts will be required to alleviate flooding at the site.
- Overland flow infrastructure – The proposed retaining walls associated with westbound Parkes Way exit ramp induce a trapped sag and create a barrier to an overland flow path. To ensure that major event stormwater flows can relieve into the Lake, a bank of at grade precast concrete box culverts are proposed adjacent to the existing channel in Commonwealth Park.

Upgrade	PW3c – Coranderrk St Interchange	Location	Parkes Way	Estimate Cost	$124M	Sheet	2 of 3

Safety	The upgrade is primarily focussed on capacity and performance improvements, however it is considered likely that the congestion and queuing on Parkes Way in addition to the configuration of the Coranderrk Street intersection are at least in part responsible for the high density of crashes at the intersection. To that end, the safety performance of the interchange is expected to be improved by the upgrade, noting: - The upgrade is expected to alleviate peak hour queuing on the mainline and decrease the risk of high speed differential rear end accidents. - Grade separation of the interchange will significantly reduce the number of conflicting interactions between through and turning vehicles, reducing crash exposure and by extension likely crashes - The upgrade proposes removal of several operationally and geometrically substandard intersection elements including low entry angle movements on eastbound and southbound approaches to the intersection, that likely contribute to the very high occurrence of crashes at and around these thresholds.
Constructability	The Coranderrk Street Interchange will require complex construction staging of various road, structural and stormwater elements, likely over a significant period of time. Given that a substantial proportion of the bridge and retaining wall structure and drainage works are on existing carriageway, it is likely that construction of significant temporary side roads and intersections will be required to ensure that the corridor remains operational. Development of other adjacent road upgrades (such as those proposed in Package PW2b and PW4) will also require consideration and coordination. Notwithstanding mitigation measures and coordination with other works, it is anticipated that operation of both the Parkes Way corridor and Coranderrk Street will be negatively impacted during the construction period. Another consideration is stormwater quality and conveyance. As the Coranderrk Pond will require removal, any upstream or adjacent water quality infrastructure planned to mitigate the loss of the pond will require coordination with the project.
Project Interdependencies	There are several upgrades proposed for the Parkes Way corridor in the vicinity of the proposed interchange, including: - **PW3a – Interim Coranderrk Street Intersection Upgrade** – The interim upgrade of the intersection proposes provision of additional capacity at the roundabout. The performance of this interim solution will influence the need and delivery timeframes for the ultimate interchange upgrade. - **PW2b – ANZAC Parade Interchange** – An upgrade of the existing ANZAC Parade roundabout intersection to a grade separated interchange is proposed to resolve congestion issues at that site. ANZAC Parade is approximately 700m to the east of Coranderrk Street and, given the proximity of the two proposed interchanges, there is necessarily interdependence of mainline and ramp alignments and function across the two upgrades. This relationship is both geometric and operational, and the design of each interchange needs to carefully consider the ultimate arrangement of the other. - **PW4 – CBD Realignment** – Horizontal and vertical realignment of the Parkes Way carriageways is proposed between the Edinburgh Avenue interchange and Coranderrk Street. This realignment of Parkes Way through the CBD interfaces with the Coranderrk Street Interchange package through a geometric tie in at the western extent of the package. - **PW6 – Parkes Way Eastbound Widening** – Due to operational performance issues associated with Parkes Way through the City Centre, it is proposed to increase the eastbound capacity of the corridor though provision of a third mainline lane. Depending on delivery timeframes of Package PW4, there may be an interface with the carriageway geometry developed as part of PW6 and the Coranderrk Street Interchange. - **PW18 – Active Travel Connectivity Enhancements** – An upgrade of the existing active travel overpass immediately west of Coranderrk St connecting the Allara Street corridor to Commonwealth Park is proposed. This active travel overpass falls in within the Coranderrk Street Interchange site and, as a result, there is a degree of interdependence between the overpass and the interchange, both in terms of geometry, and the functional relationship with an additional transverse active travel connection proposed as part of the Interchange.
Options Considered	There are numerous potentially feasible options available to grade separate the intersection of Coranderrk Street and Parkes Way. Whilst an optioneering process was not undertaken as part of the Corridor Strategy, several broad approaches were considered, including: 1) Intersection Flyover 2) Diamond Interchange – Parkes Way Overpass 3) Diamond Interchange – Parkes Way Underpass 4) Diamond Interchange – Parkes Way Underpass + ANZAC Parade Eastbound Split Diamond 5) Diamond Interchange – Lowered Parkes Way Given the volumes forecast in the future Base Model to use the intersection, an at-grade option as an ultimate solution to address performance issues at the site was not considered viable. As such, at grade design options were not investigated for the site.

1) - Intersection Flyover

A flyover of the existing Coranderrk Street Intersection would allow retention of much of the existing transport and water quality infrastructure at the site

Whilst this option could be considered the simplest design approach, it has a significantly larger footprint than other options, is likely to require substantial structure, and retains the geometric deficiencies of the existing intersection. Furthermore, given the higher design speed of the Parkes Way mainline, the extent of vertical realignment required to achieve grade separation will be substantially longer than underpass options.

2) Diamond Interchange – Parkes Way Overpass

The provision of a compact diamond interchange with a mainline overpass of ramp terminal intersections offers a significantly reduced footprint and increased lot yield from adjacent blocks. It also offers improved clearance above drainage infrastructure and overland flow paths in the area. Furthermore, this option offers robust pedestrian connectivity to Commonwealth Park.

Whilst this arrangement provides a more conventional interchange configuration, the vertical realignment of the mainline necessary to achieve the required grade separation at the interchange lengthens entry and exit ramp requirements, forcing ramp noses closer to adjacent interchanges and increasing the likelihood of compromised mainline flow.

3) Diamond Interchange – Parkes Way Under

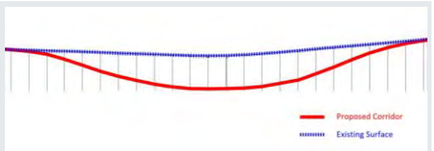
Similar to the overpass option, the provision of a diamond interchange utilising an underpass of the interchange offers a compact footprint that reduces the impact of road infrastructure on a key part of the CBD whilst providing improved operational performance at the site. The option proposes retention of Parkes Way at grade, with Coranderrk Street climbing to an interchange above the mainline.

Whilst this approach has a requirement for more significant stormwater infrastructure than other options, retaining the Parkes Way mainline at grade offers improved flexibility in ramp arrangements and interface with adjacent interchanges. This flexibility is considered critical given geometric constraints of mainline ramps.

4) - Diamond Interchange – Parkes Way Under + ANZAC Pde Eastbound Split Diamond

Similar to the diamond interchange with a Parkes Way underpass, however adopts an alternate eastbound entry ramp. This arrangement diverges the eastbound ANZAC Parade exit ramp to the east of the Coranderrk Street overbridge, and introduces the Coranderrk Street eastbound entry ramp between the ANZAC Parade entry ramp and the Parkes Way mainline. The entry ramp then has conventional merge onto the mainline and is independent of the Anzac Parade exit ramp.

Notwithstanding likely additional cost, this option has several advantages, including a reduced corridor footprint; segregation between the ANZAC Parade exit ramp and the Coranderrk Street entry ramp (removing the associated weave); and provides greater mainline flexibility.



5) Diamond Interchange – Lowered Parkes Way

Lowering of the Parkes Way mainline under the interchange bridge. Whilst this approach is the least visually intrusive option, and would allow a conventional compact diamond, it creates significant technical challenges, including:

- Longer ramps resulting from the more onerous geometric requirements of the mainline vertical alignment, creating interface issues with adjacent interchanges
- Substantial alteration to stormwater drainage infrastructure
- Requiring an open trench, and a pumped stormwater system, with a high risk of flooding during major storm events as the site severs a substantial overland flow path.

Upgrade	PW3c – Coranderrk St Interchange	Location	Parkes Way	Estimate Cost	$124M	Sheet	3 of 3

Option Details

The upgrade of the Coranderrk Street intersection proposes a grade separated interchange that consists of several important elements, including:

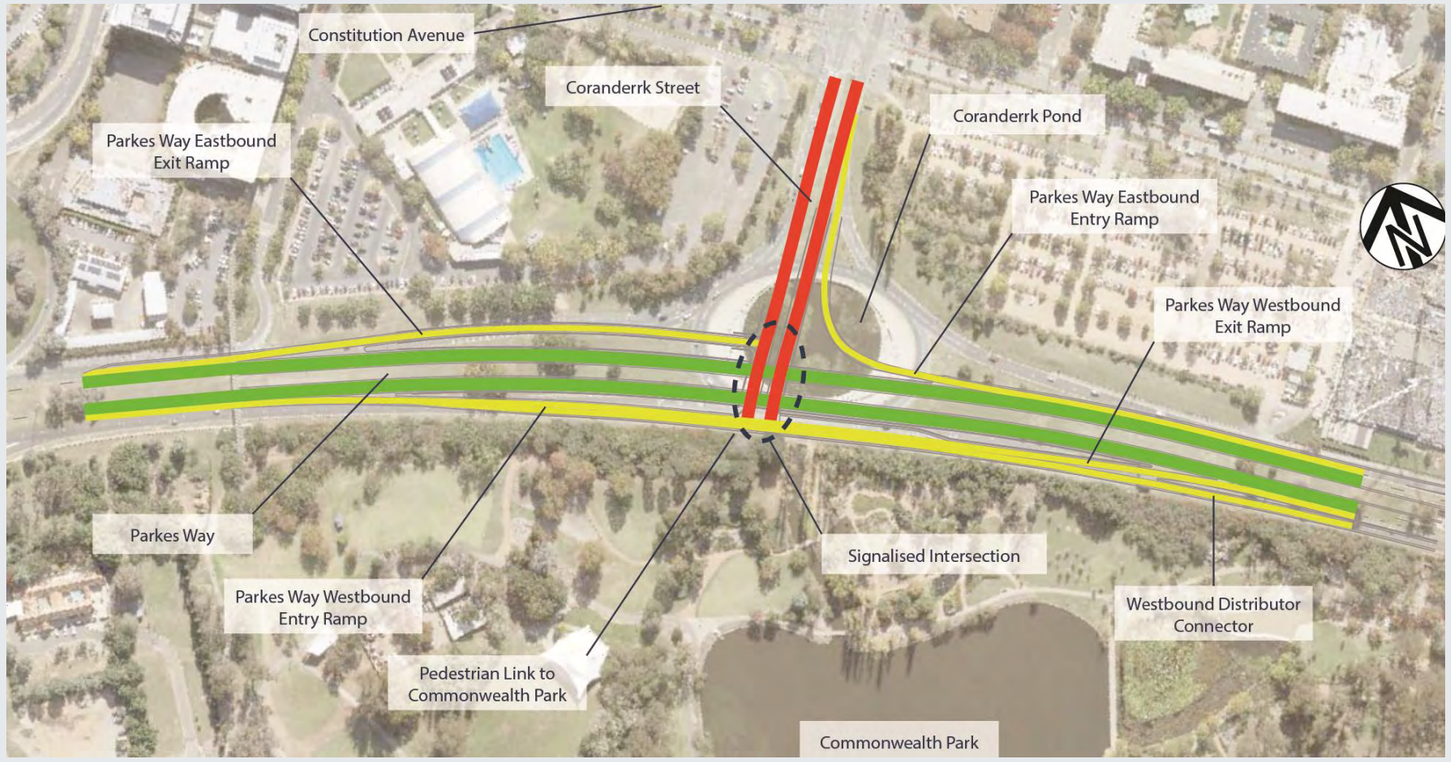
- **Parkes Way Mainline** – The Parkes Way mainline is horizontally realigned into the median and across Coranderrk Pond through the interchange. Vertically, the mainline remains generally at grade aiming to achieve flood immunity in major storm events.

  The eastern extent of the Parkes Way mainline through the interchange ties into the proposed alignment proposed in Package PW2b. Similarly, the western extent of the mainline ties into the Parkes Way alignment proposed in Package PW4.

  The proposed mainline retains a dual carriageway condition with two full width lanes in each direction consistent with the existing arrangement. The design targets provision of a 7.5 m median that will allow central planting and potential barrier protection, in addition to future widening, should it be required.
- **Coranderrk Street** – It is proposed to significantly realign Coranderrk Street. With the removal of Coranderrk Pond, Coranderrk Street adopts a straight alignment where it terminates at the ramp terminal intersection associated with the interchange. Coranderrk Street is also vertically realigned, climbing at a maximum grade of 7% to achieve the required grade separation to the mainline, achieving a clearance of 5.4m. Whilst this grade is steeper than desirable, the proximity of Constitution Avenue and the geometry of the eastbound Parkes Way entry ramp constrain the vertical tie in location of Coranderrk Street.

  Coranderrk Street remains a dual carriageway with two lanes in each direction in with additional turn lanes associated with the Constitution Avenue intersection. Coranderrk Street intersects with three of the interchange ramps, adopting signalised control configured to operate as a single signalised intersection.
- **Eastbound Entry Ramp** – The eastbound Parkes Way entry ramp is a direct free flow ramp that diverges from southbound Coranderrk Street immediately downstream of the Constitution Avenue intersection. The ramp is at grade with a small radius curve, entering a 250 m auxiliary lane that becomes trapped at the ANZAC Parade exit ramp. This arrangement provides increased length for acceleration, parallel running and merging, although it is noted there will be a substantial weave between this auxiliary lane and the Parkes Way through lane. Opportunities to increase the length of this auxiliary lane relate to the configuration of the ANZAC Parade Interchange. Should future analysis indicate that there is insufficient length for the weave to efficiently and safely operate, an alternative approach would be to provide an eastbound distributor link road similar to what is proposed for the westbound movement between the interchanges. Another alternative identified in Package PW3c (refer Option 4 above) introduces the Coranderrk Street eastbound entry ramp to the south of the ANZAC Parade exit ramp (creating a braid and removing the weave).
- **Eastbound Exit Ramp** – The eastbound Parkes Way exit ramp is proposed as a standard single lane exit ramp arrangement with the diverge immediately downstream of the Allara Street exit.
- **Westbound Entry Ramp** – Given the proximity of the Commonwealth Avenue interchange (and associated downstream exit ramp), there is insufficient distance to merge the Parkes Way westbound entry ramp and then diverge the exit ramp to Commonwealth Avenue. In response, the design proposes a two lane entry ramp, with the left hand lane being dedicated to Commonwealth Avenue southbound movements, and the right hand lane forming the Parkes Way entry and merge from the Coranderrk Street Interchange.

  As a result, westbound Parkes Way traffic originating from east of ANZAC Parade will need to diverge at the Coranderrk Street Interchange exit ramp to access southbound Commonwealth Avenue.



- **Westbound Exit Ramp** – The westbound Parkes Way exit ramp is proposed as a single lane exit ramp. Once fully diverged, the ramp joins the westbound distributor link road from the ANZAC Parade (refer Package PW2b) as a lane add prior to reaching the ramp terminal intersection at Coranderrk Street.

  Whilst there is potential for a weave movement for traffic using the distributor link road from ANZAC Parade, it is considered likely that the majority of this traffic will be performing a through movement at the ramp terminal intersection. Similarly, the majority of vehicles using the exit ramp are expected to turn right at the intersection. Notwithstanding, if future analysis indicates a heavy weave or long queuing, there is scope to increase the length of the exit ramp to increase weave length and storage.
- **Stormwater and Utility Infrastructure** – Significant stormwater infrastructure exists at the site, including piped drainage and multi cell box culverts. Diversion of these systems will be required to deliver the interchange. Furthermore, the interchange is located within an overland flow path, and additional stormwater infrastructure is likely to be required to safely convey major storm event flows through the site. Currently a bank of culverts is proposed on the alignment of the overland flow path to convey major surface flows under the westbound exit ramp towards Nerang Pool.
- **Water Quality Infrastructure** – A significant catchment drains to Coranderrk Pond, and the removal of the pond may have water quality implications for runoff that is directed to Nerang Pool and on to the Lake. Whilst the performance of the pond as a water quality device is unclear, it is understood that ancillary works upstream of the pond are planned to facilitate the pond's removal. Further to these works, an area has been identified at the site in the north east quadrant of the interchange within the gazetted road boundary that could be used as a small wetland or pond to treat stormwater runoff, augmenting any proposed upstream works.
- **Corridor Landscaping** – Whilst landscape design has not been undertaken as part of the development of the proposed interchange layout, the importance of retaining Parkes Way as a green corridor has been acknowledged. To this end, notional planting in the Parkes Way median and some verge locations has been indicated on the proposed design layouts.
- **Design Compliance** - Given the constraints of the site, proximity of other interchanges, and the retrofit nature of the interchange, it is anticipated that some departures from design standards will be required for this upgrade.

Upgrade	PW4 – CBD Realignment	Location	Parkes Way	Estimate Cost	$37M	Sheet	1 of 2

Problem Statement	The Parkes Way gazetted road corridor in the City centre between Edinburgh Avenue and Coranderrk Street ranges between 60-85 m wide. This cross section consists of multi-lane dual carriageways, wide verges and a wide median (max width of 25m). Given the CBD context of the corridor in this area, the corridor locally creates an expanse of transport infrastructure that has several negative implications for the city and the community. These include: - Severing the city from Lake Burley Griffin, the Acton Waterfront precinct, and Commonwealth Park, creating a physical barrier to movement between these important city places and undermining active travel permeability across the corridor - Consuming high-value land that could be utilised more appropriately and productively for city development - Consuming developable land that could contribute to the urban spaces of the Acton Waterfront In addition to these concerns, Parkes Way is a key access to the city and the parliamentary triangle, in addition to being the only free flow east-west corridor in Canberra. Parkes Way currently performs poorly in peak periods with road users experiencing significant congestion and delay. Operational issues are expected to worsen over time with increased flows from the west resulting from development of West Belconnen and the Molonglo Valley.
Site Description	The upgrade is proposed along the Parkes Way corridor between the Edinburgh Avenue Interchange and the Commonwealth Avenue Interchange. The proposed improvements will be undertaken on both mainline carriageways (eastbound + westbound) and exit and entry ramps at both Edinburgh Avenue and Commonwealth Avenue. The existing carriageway provides free flow urban motorway conditions for the length of the project site. This part of the corridor primarily serves a transport function and has several closely spaced interchanges and intersections. As the City's primary east-west road artery, this zone of the Parkes Way corridor conveys high volumes of traffic in both peak periods and currently experiences congestion. The project site extends along Parkes Way from Edinburgh Ave interchange for 650m to immediately east of Commonwealth Avenue. Parkes Way in the vicinity of the project site is typically very flat with a large radius horizontal curve. The surrounding terrain gently slopes from the north towards the lake, with the site flanked to the south by the Acton Waterfront development site and the southern edge of the City's Central Business District to the north. The Parkes Way corridor in this area has a distinct character with a tree lined southern verge and a wide grassed median, with verges of both the eastbound and westbound carriageways containing a mix of native and exotic vegetation. The site can be considered set in an urban environment on the southern fringe of the Canberra City CBD, with a mix of surrounding land uses including residential, recreational, and commercial.
Options Considered	To achieve a more compact cross section, several approaches to carriageway realignment were considered: - Aligning both carriageways in the northern or southern part of the existing Parkes Way corridor, noting that this would likely require demolition and reconstruction of up to five bridges (2 x road + 2 x pedestrian + 1 x light rail) as the required absolute minimum cross section is unlikely to be accommodated under any single bridge span. - Aligning both carriageways centrally in the corridor, balancing improved lot yields in Acton Waterfront and blocks adjacent to the northern verge including the Civic Pool site (to the east) - Various median widths ranging from a minimum of a rigid F Type barrier (i.e. no median) to a 7.5m median that can accommodate landscaping and future widening. In addition to horizontal alignment variants, consideration was given to several clearance options to existing bridges in the Commonwealth Avenue corridor. Options for the vertical realignment of Parkes Way carriageways include: - Maintaining existing clearances (surveyed as 4.74m) - Improving clearance to match the vertical corridor constraint at the Acton Tunnel (surveyed as 5.15m) - Improving clearance to achieve compliance with Austroads design guidelines and Australian Standards (minimum clearance = 5.4m)

Public Transport	There are currently no public transport services that use the Parkes Way corridor in the region of the upgrade (refer extract from the 2023 Transport Canberra Network Map). Furthermore, it is understood that there are currently no plans to introduce new public transport services into this part of the corridor. As such, it is considered unlikely that the upgrade will have substantive implications for public transport operations within the corridor.
Active Travel	The existing local Parkes Way Corridor does not have on-road cycle infrastructure, nor does the corridor have a longitudinal path network. That is, the existing Parkes Way corridor through the CBD does not support active travel within the corridor. Given the corridor's free flow nature, and lack of on road facilities at the project extents, it is not considered an appropriate or safe environment to introduce cyclists. It is noted however that a parallel active travel route exists in close proximity to the corridor through West Basin. In addition there is also transverse active travel crossings of the corridor at Commonwealth Avenue and connecting Marcus Clarke Street to West Basin. It is not expected that the proposed interchange will impact on the functionality of these peripheral active travel facilities.
Safety	The upgrade is primarily focussed on urban design, active travel permeability across the corridor and capacity and performance improvements. However it is considered likely that the congestion and queuing on Parkes Way are at least in part responsible for crashes at the site. To that end, the safety performance of the corridor is expected to be improved by the upgrade as it will provide additional mainline capacity, reducing peak hour queuing and decreasing the risk of rear end accidents.
Structures	No new bridge structures or upgrades to existing bridges are anticipated as part of the CBD realignment of Parkes Way. However the Commonwealth Avenue bridges (existing road bridges and future light rail infill bridge) are expected to be a significant constraint to the realignment. Pier / abutment locations and foundations of these bridges influence the horizontal alignment of Parkes Way options, and the haunched profile (see image of the twin bridges below) of the bridge soffits influences the degree of vertical realignment required. It is anticipated that minor adjustments to the existing retaining wall associated with the eastbound exit ramp to Edinburgh Avenue (pictured right) will require some minor realignment. Is also noted that that new retaining walls are likely to be required adjacent to the southern verge to facilitate the development of the Acton Waterfront
Constructability	The realignment of the Parkes Way carriageways through the CBD will require complex construction staging to ensure continuing operation of the corridor. Given the wide existing median, and the proposed alignment of the realigned carriageways, a substantial amount of the required civil works can be undertaken offline (albeit in close proximity to live traffic). However, given that a proportion of the works are on the existing carriageway alignment, it is likely that construction of some temporary side roads will be required to ensure that the corridor and network more broadly will remain operational. Development of other adjacent road upgrades (such as those proposed in Package PW3c) will also require consideration and coordination. Notwithstanding mitigation measures and coordination with other works, it is anticipated that operation of the Parkes Way corridor will be negatively impacted during the construction period.
Project Interdependencies	There are several upgrades proposed for the Parkes Way corridor in the vicinity of the proposed interchange. These upgrades have a degree of interdependence with the proposed interchange including: - **PW3c – Coranderrk Street Interchange** – The Coranderrk Street Interchange package abuts this package and as such there is necessarily interdependence between the two upgrades. This relationship is both geometric and operational, and the design of each upgrade needs to carefully consider the ultimate arrangement of the other. - **PW6 – Parkes Way Eastbound Widening** – Due to operational performance issues associated with Parkes Way through the city centre, it is proposed to increase the eastbound capacity of the corridor though provision of a third mainline lane. It is expected that the PW6 package will precede this package, however delivery of PW6 has the potential to influence delivery timeframes of this CBD realignment package. - **PW7 – Parkes Way Acton Waterfront Upgrades** – The proposed upgrades associated with Package PW7 are aimed at facilitating the delivery of the Acton Waterfront development. The Acton waterfront site borders the southern verge of this zone of the Parkes Way Corridor, and some of the transport network adjustments associated with the Acton Waterfront will interface with Parkes way. These interdependencies will be both geometric and operational. - **PW18 – Active Travel Connectivity Enhancements** – Parkes Way creates a barrier for active travel between the City and the Lake / Commonwealth Park. One element of the proposed active travel connectivity enhancements is an upgrade of the existing active travel overpass between Marcus Clark Street and the Acton Waterfront. This active travel overpass falls in within the upgrade site and as a result there is a degree of interdependence between the overpass and the proposed Parkes Way realignment through the CBD. Further to the above corridor strategy upgrades, it is noted that the Canberra Light Rail Stage 2A is also an interfacing project, the outcomes of which will require consideration in the development of the PW4 package. Works proposed as part of this package will need to ensure they have no impact on the operating light railway.

Upgrade	PW4 – CBD Realignment	Location	Parkes Way	Estimate Cost	$37M	Sheet	2 of 2

Option Details

The realignment of the Parkes Way carriageways through the City's CBD consists of several important elements, including:

- **Mainline Horizontal Geometry** – The proposed eastbound carriageway deletes the existing form one lane merge arrangement near Edinburgh Avenue, and runs an additional through lane to the proposed Coranderrk Street Interchange. The inclusion of this third eastbound lane locally increases the capacity of the corridor. An additional westbound lane has also been included in the upgrade to increase through capacity and improve the performance of the weave between the Commonwealth Avenue and Edinburgh Avenue Interchanges.

  Both the eastbound and westbound carriageways are horizontally realigned with adjustment to curvature in order to narrow the median to 7.5m down from a maximum of 25m. Overall, this realignment has the potential to reduce the corridor width to 40-45m (excluding areas with ramps) which represents a potential reduction in the order of 30m. This change significantly improves lot yields of adjacent development sites and reduces the scale of the physical barrier to movement across the corridor, substantially improves active travel permeability over the length of the site.
- **Mainline Vertical Geometry** – It is proposed to regrade Parkes Way by lowering the mainline carriageways under the Commonwealth Avenue bridges. The intent of this regrading is to provide 5.15m clearance to the soffit of these bridges, and is expected to require a lowering of approximately 600-700mm from existing carriageway levels. Whilst this clearance is less than the desirable minimum of 5.4m set out in Austroads guidelines and Australian Standards, it is consistent with the surveyed clearance at the Acton Tunnel which is 900m to the west of Commonwealth Avenue and is considered a hard constraint for the corridor. That is, 5.15m clearance is a substantial improvement the existing condition and is considered to balance desirable outcomes with the costs, practicality and feasibility of further lowering the carriageway relating to road geometry, depth of cut and stormwater drainage impacts.
- **Eastbound Auxiliary Lane** – The existing eastbound auxiliary lane between the entry ramp from Edinburgh Avenue and the exit ramp to Commonwealth Avenue is broadly retained, noting the length of this lane is reduced by 20m to 320m.
- **Westbound Auxiliary Lane** – The existing westbound auxiliary lane between the entry ramp from Commonwealth Avenue and the exit ramp to Edinburgh Avenue, is broadly retained. The length of this lane is similar to the current scenario, noting existing issues associated with the westbound weave of vehicles merging into the mainline from Commonwealth Avenue and mainline vehicles diverging to exit onto Edinburgh St is unresolved. There is potential to provide a second auxiliary lane in the westbound direction between interchanges to help mange capacity and safety issues associated with the weave which could be considered in future iterations of design development.
- **Parkes Way Eastbound Entry Ramp (from Edinburgh Avenue)** – The configuration of this ramp is broadly retained, although some minor realignment at the ramp gore will be required to suit the revised mainline alignment.
- **Parkes Way Eastbound Exit Ramp (to Commonwealth Avenue)** – The configuration of this ramp is broadly retained, although some minor realignment at the ramp gore will be required to suit the revised mainline alignment.
- **Parkes Way Westbound Exit Ramp (to Edinburgh Avenue)** – The configuration of this ramp is broadly retained, although some minor realignment at the ramp nose will be necessary to suit the revised mainline alignment, requiring the reconstruction of some of the existing retaining wall.

- **Parkes Way Westbound Entry Ramp (from Commonwealth Avenue)** – Whilst the configuration of this ramp is broadly retained, realignment of the ramp will be required to suit the revised mainline alignment. Similar to the existing ramp, it has a substandard design speed (approximately 60 km/h), which creates a speed differential between the ramp merge and the mainline. Verge widening will be required to achieve required visibility splays, and an acceleration length (as per the existing arrangement) may be required prior to allowing merge movements. The ultimate arrangement will require further investigation as part of future phases of design development.
- **Utility Infrastructure** – A recent Infrastructure Study on the Parkes Way corridor (KBR, 2022) indicated that several utilities exist across the site and will require management during construction. These utilities include underground power, telecommunications, gas and sewer infrastructure in addition to stormwater systems. Furthermore, it is understood that a 300mm dia. water main also runs longitudinally through the site. It is likely that at least some of these utilities will require relocation and / or protection as part of the upgrade
- **Flooding and Stormwater** – A recent Parkes Way Flood Study (Calibre, 2023) identified two flooding hotspots in the vicinity of the site. One of these hotspots is at the Coranderrk Street roundabout is beyond the eastern extent of the works is not expected to be impacted by the proposed PW4 upgrade. In contrast the second hotspot is located within the western proportion of the upgrade site from the Edinburgh Avenue Interchange to approx. CH 1100. The study proposes duplication of some elements of the existing stormwater network in the Parkes Way corridor and downstream to the lake to address flooding issues at this hotspot.

It is noted that given the existing flooding concerns in the vicinity of the proposed works, and that the proposed works create a trapped low point on the alignment, stormwater drainage is a significant consideration for the upgrade. The creation of the trapped low point around the bridge site is undesirable from a stormwater drainage perspective, both in terms of minor event run-off and major event overland flow and it is anticipated that future phases of design development will investigate alternative approaches to manage / mitigate stormwater impacts of the project. These approaches could include:

- Optimisation of the vertical geometry in this area to grade out the low point
- Inversion of the Parkes Way crossfalls towards the median (noting potential challenges with resultant carriageway edge / surface grades and aquaplaning through zones of rotating cross fall)
- Retention of the existing bridge clearances to reduce the amount of lowering required
- Augmentation of the existing stormwater network, including but in addition to what is proposed in the Parkes Way Flood Study to provide high capacity inlets and increased system capacity.
- A combination of some or all of the above approaches

Upgrade	PW6 - Parkes Way Eastbound Widening	Location	Parkes Way	Estimate Cost	$20M	Sheet	1 of 2

Problem Statement

The Parkes Way gazetted road corridor in the city centre between Edinburgh Avenue is an important city transport artery and a key access to the city centre and the parliamentary triangle, in addition to being the only free flow east-west corridor in the city. Parkes Way currently performs poorly in peak periods with road users experiencing significant congestion and delay. Operational performance issues are expected to worsen over time with increased flows from the west resulting from development of West Belconnen and the Molonglo Valley.

Site Description

The upgrade is proposed along the Parkes Way corridor between the Edinburgh Avenue Interchange and the Coranderrk Street roundabout. Currently, this section of the corridor provides grade separated, free flow urban motorway conditions over the length of the project site through to the Coranderrk Street roundabout which has priority control for mainline movements.

This segment of the corridor primarily serves a transport function and has several closely spaced interchanges and intersections. As the City's primary east-west road artery, this zone of the Parkes Way corridor conveys high volumes of traffic in both peak periods and currently experiences congestion.

Parkes Way in the vicinity of the project site is typically very flat with a large radius horizontal curve. The surrounding terrain gently slopes from the north towards the lake, with the site flanked to the south by the Acton Waterfront development site and Commonwealth Park, and the southern edge of the City's Central Business District (CBD) to the north.

The Parkes Way corridor in this area has a distinct character with a tree lined southern verge and a wide grassed median, with verges of both the eastbound and westbound carriageways containing a mix of native and exotic vegetation. The site can be considered set in an urban environment on the southern fringe of the Canberra City CBD, with a mix of surrounding land uses including residential, recreational, and commercial.

Options Considered

The intent of widening the eastbound carriageway through the CBD is to improve the capacity and performance of the Parkes Way mainline in this section of the corridor. Various options have the potential to achieve this outcome and were considered when developing the package. These alternatives included:

- Various adaptions of the cross section to provide a third lane
- Provision of Intelligent Transport System (ITS) / Smart motorway technologies including Variable Speed Limit Signs (VSLS) and a Lane Use Management System (LUMS), noting that there are numerous overpass structures (road and pedestrian) in this part of the corridor that could be used to mount ITS infrastructure.

Noting that the works proposed in this package are potentially an interim solution to an ultimate configuration for major upgrades to this part of the corridor, the option identification process targeted a low cost alternative that would be relatively straightforward to implement.

Safety

The upgrade is primarily focussed on corridor and capacity and performance improvements. However, it is considered likely that the congestion and queuing on Parkes Way are a contributing factor for crashes at the site. To that end, the safety performance of the corridor is expected to be improved by the upgrade as it will provide additional mainline capacity, reducing peak hour queuing and decreasing the risk of rear end accidents. As the proposed design reduces lateral clearance from running lanes to existing bridge piers, provision of safety barriers may be required to protect against errant vehicle.

Public Transport

There are currently no public transport services that use the Parkes Way corridor in the region of the upgrade (refer extract from the 2023 Transport Canberra Network Map).

Furthermore, it is understood that there are currently no plans to introduce new public transport services into this part of the corridor. As such, it is considered unlikely that the upgrade will have substantive implications for public transport operations within the corridor.

Active Travel

The existing local Parkes Way corridor does not have on-road cycle infrastructure, nor does the corridor have a longitudinal path network. That is, the existing Parkes Way corridor through the CBD does not support active travel within the corridor. Given the corridor's free flow nature, and lack of on-road facilities at the project extents, it is not considered an appropriate or safe environment to introduce cyclists.

However, a parallel active travel route exists in close proximity to the corridor through West Basin. In addition, there are also transverse active travel crossings of the corridor at Commonwealth Avenue, Marcus Clarke Street to West Basin, and at Allara Street to Commonwealth Park. It is not expected that the provision of the third eastbound lane will impact on the functionality of these peripheral and transverse active travel facilities.

Structures

No new bridge structures or upgrades to existing bridges are anticipated as part of the eastbound widening of Parkes Way though the CBD. However, the Commonwealth Avenue bridges (existing road bridges and future light rail infill bridge) have the potential to be a constraint to the widening.

The haunched profile (see image of the twin bridges below) of the bridge soffits influences the proposed widening. An initial preliminary analysis indicates that the new (third lane) is likely to have in order of 4.5-4.6 m clearance (TBC through further detailed assessment) to the existing Commonwealth Avenue Road bridges and the proposed light rail infill bridge.

Constructability

The provision of an additional through lane on the existing Parkes Way eastbound carriageway will require construction immediately adjacent to live traffic on what is already a busy and congested transport artery. In addition, there is a potential requirement for some local adjustments to the existing carriageway to achieve required clearances to the Commonwealth Avenue bridges.

Given the proposed upgrade, it is anticipated that the work will require staging and traffic management that minimises impact on road users including temporary diversions, lane and shoulder narrowing, reduced speed limits, and lane closures to enable the required construction. Whilst scheduling of works outside peak periods will also assist in mitigating construction impacts, it is anticipated that operation of the Parkes Way corridor will be negatively impacted during the construction period.

Project Interdependencies

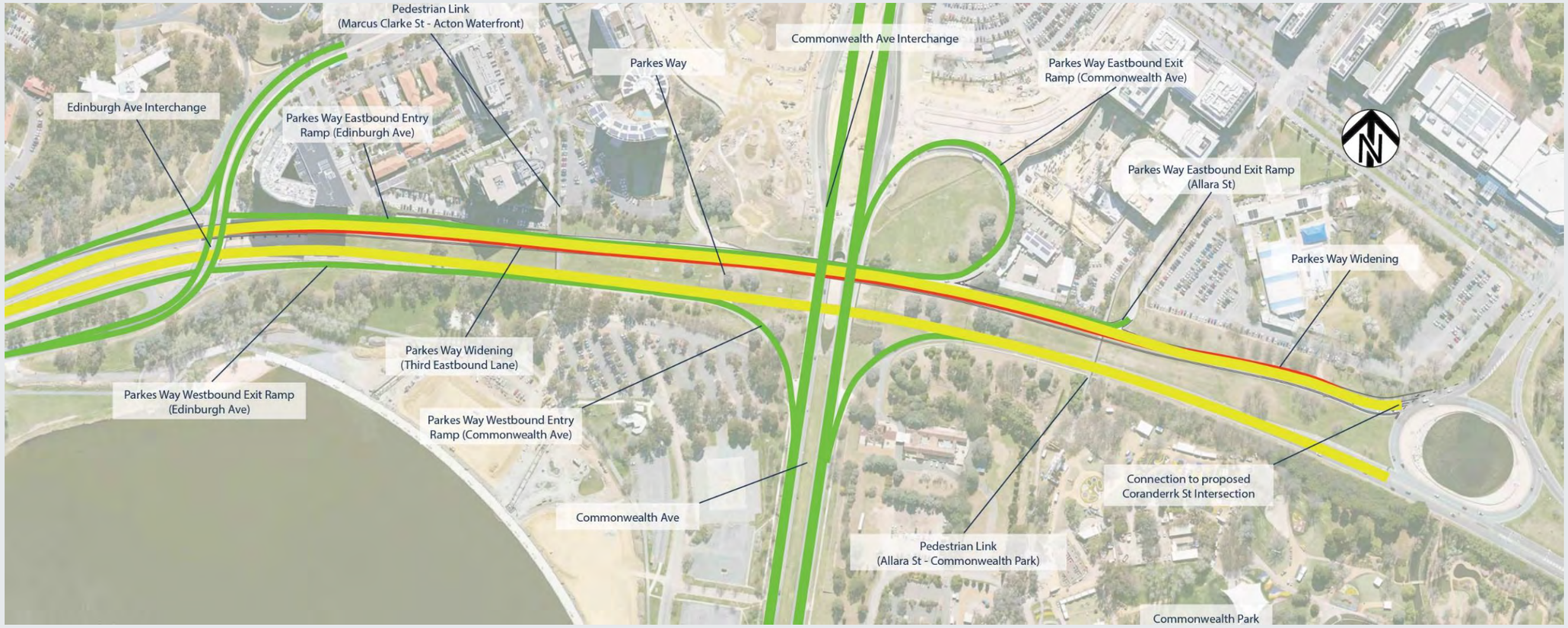
There are several upgrades proposed for the Parkes Way corridor in the vicinity of the proposed widening, including:

- **PW3a – Coranderrk Street Upgrade – At grade improvements** – The interim Coranderrk Street intersection upgrade package abuts this package and as such there is interdependence between the two upgrades. This relationship is both geometric and operational, and the design of each upgrade needs to carefully consider the ultimate arrangement of the other.
- **PW3c – Coranderrk Street Interchange** – The Coranderrk Street Interchange package abuts this package and as such is potentially interdependent with the eastbound widening package depending on delivery timeframes of both packages and the CBD realignment package (PW4).
- **PW4 – CBD Realignment** – This package is primarily focussed on urban design outcomes and improved active travel permeability across the corridor. However, it also proposes a third lane in each direction through the corridor. It is anticipated that this package (PW6) will precede Package PW4, however if the CBD realignment is pursued relatively early, it would supersede the need to deliver Package PW6.
- **PW18 – Active Travel Connectivity Enhancements** – One element of the proposed active travel connectivity enhancements in the Corridor is an upgrade of the existing active travel overpasses between Allara Street and Commonwealth Park. This overpass falls in within the upgrade site.

In addition to the Corridor Strategy upgrades identified above, other significant projects proposed for the city are likely to influence the proposed upgrade. These are likely to include, but not be limited to, the Acton Waterfront development and the Canberra Light Rail Stage 2 project. Works proposed as part of this package will need to ensure they have no impact on the operating light railway.

Upgrade		Location	Parkes Way	Estimate Cost	$20M	Sheet	2 of 2

Option Details



The widening of the Parkes Way carriageway provides a third eastbound through lane in the City's CBD. The proposed approach aims to provide a relatively low cost solution that can be implemented without major construction requirements or impacts to the existing road network. This approach retains all existing eastbound connections and aims to avoid any impact or change to the following corridor access points / elements:

- Parkes Way eastbound entry ramp from Edinburgh Avenue
- Eastbound auxiliary lane between Edinburgh Avenue and Commonwealth Ave
- Parkes Way eastbound exit ramp to Commonwealth Avenue
- Parkes Way eastbound exit ramp to Allara Street
- Coranderrk St roundabout including the Parkes Way eastbound threshold

No changes are proposed to the Parkes Way westbound carriageway. The primary design elements and considerations associated with the upgrade include the following:

- **Mainline Geometry** – The proposed eastbound carriageway removes the existing 'Form One Lane' merge arrangement near Edinburgh Avenue, and runs an additional through lane to the existing three lane approach at the Coranderrk Street intersection. The inclusion of this third lane locally increases the capacity of the corridor.

  The provision of this third lane requires widening by up to 3.5m into the existing wide median of Parkes Way. As a direct widening of the existing carriageway, it is proposed to typically adopt an extension of the crossfall and superelevation of the existing carriageway. In addition, the proposed eastbound carriageway alignment broadly adopts the reverse curvilinear arrangement on approach the Coranderrk Street roundabout to manage approach speeds to the intersection.

  Other than localised regrading to accommodate clearance requirements at Commonwealth Avenue bridges (refer below) it is not anticipated that vertical realignment associated with the proposed widening will be required to improve clearances at other bridge sites along the corridor (i.e. Allara Street and Marcus Clark Street pedestrian bridges). However, this will require confirmation in future phases of design development.

- **Commonwealth Avenue Bridges** – The proposed carriageway widening passes under the existing Commonwealth Avenue road bridges in addition to the proposed future light rail infill bridge. Existing clearances at the bridge have been surveyed at approximately 4.74 m westbound and 4.7m eastbound, and it is noted that it is currently signed as having a westbound clearance of 4.5m (westbound). The eastbound carriageway does not have any low clearance signage, and a preliminary analysis of existing surfaces indicates that it currently has a minimum clearance in the order of 4.7m.

  It is noted that the carriageway with a standard cross fall extension would reduce this clearance to approximately 4.42m for the proposed third lane. This clearance is less than both the desirable clearance for this section of the corridor, and what is considered the absolute minimum clearance. To address this deficiency, localised lowering of the eastbound carriageway profile is proposed, targeting a no-worsening of the clearance by retaining a clearance of 4.7 m. This is achieved through a regrading of the eastbound carriageway over 200m and a localised slackening of crossfall to 2%.

  Whilst this reduced clearance is broadly consistent with the existing clearance of the eastbound carriageway, possible mitigations to manage / improve the clearance under the bridges are recommended for investigation in future phases of design development including:

  - Detailed analysis of the existing surfaces / clearances and stakeholder engagement / value management activities to understand acceptable clearances
  - Crowning between the centre and proposed third lane, noting similar retrofit solutions have been adopted on the M4 and M5 motorways in Sydney
  - Further focalised slackening of the carriageway crossfall under the bridge
  - Further regrading under / on approach to and departure from the bridge
  - A combination of the above

- **Stormwater** – Whilst the Coranderrk intersection is identified as a flooding hotspot in a recent flood study of Parkes Way (Calibre, 2023), the proposed lowering is relatively minor and is not expected to substantively change the existing level of flood immunity of the corridor. It is noted however, that the existing longitudinal drainage system may require upgrade as part of the project to suit revised kerb alignments and increased pavements areas. In addition, resultant surface grades will require assessment in future phases of design development to ensure sheet flow depths are acceptable and achieve aquaplaning requirements.

Upgrade	PW8 – Molonglo to City Cycle Highway - Parkes Way Zone	Location	Parkes Way	Estimate Cost	$74M	Sheet	1 of 2

Problem Statement

The Molonglo to City Cycle Highway was originally considered in the Molonglo Valley to City Trunk Cycleway Feasibility Study (*MV2CTC Feasibility Study* - AECOM 2014). The study envisioned a 4m wide shared use path that facilitated cycling between the Molonglo Valley District and the city, and investigated routes and infrastructure details for the Cycleway identifying a preferred alignment that routes along the Parkes Way corridor between the Glenloch Interchange and the City.

Whilst there is an existing SUP on the southern edge of the Parkes Way corridor, it is generally of a low to moderate standard path with a width of 2.5 – 3.0m. The existing SUP is lacking shoulders and verges, and has retaining walls, vegetation, street furniture and objects immediately adjacent to the path. Furthermore, the path over much of its length in this zone is generally cut into a the side slope of the Lady Denman Drive batter that has hazardous verge-side slopes down to the lake foreshore.

The proposal seeks to provide a high standard cycle highway path and associated infrastructure generally on a similar alignment to the existing SUP that provides an attractive route for cyclists, offering high speed geometry free of path side hazards and segregated pedestrian movements.

Site Description

The upgrade is a proposed major cycle path, referred to as a "cycle highway", on the western portion of the Parkes Way / Lady Denman Drive corridor between the Glenloch Interchange and the Acton Tunnel, broadly on the alignment of the existing shared use path located on the southern edge of Lady Denman Drive (refer site photos – right). The site is located between the Molonglo Valley / Belconnen Districts in the west and the Canberra City precinct in the east.

The proposed cycle highway will link the Molonglo Town Centre to the Canberra City Centre, which is expected to route along this part of the Parkes Way corridor between the mainline and Lake Burley Griffin. The path will also connect to an existing cycle route between Belconnen and Civic near the eastern portion of Glenloch Interchange. Located at the toe of Black Mountain, the surrounding topography is relatively steep, however the alignment generally follows the lake edge and as a result is flat, excepting two locations (Black Mountain Peninsula and the Australian National University (ANU) campus) where the existing shared use path (SUP) climbs relatively steeply in response to local terrain.

The site is bounded to the north by the Black Mountain Nature Reserve and Lake Burley Griffin to the south. The Black Mountain Nature Reserve is steep and densely wooded with native woodland over the length of the site, acting as a major constraint to the proposed upgrade. Similarly, the lake is also a significant constraint to the proposal, resulting in a narrow envelope defined by physical constraints in which to provide the cycle highway. Vegetation on the current SUP alignment is a mix of exotic and native vegetation.

There are currently no residential, commercial, or industrial land uses near the site, however part of the route has adjacent recreational uses (Black Mountain Peninsula parkland) and an educational precinct (the ANU campus).

Public Transport

Whilst the proposed infrastructure is unrelated to public transport in and of itself, it is noted that provision of improved active travel infrastructure is considered required to facilitate other public transport related upgrades in the corridor.

It is also noted that the upgrade is aimed at encouraging mode shift to active travel, and as such may have minor impact on demand for other modes, potentially reducing private vehicle use and public transport trips. However, the upgrade is considered unlikely to have substantive impact on public transport patronage.

Active Travel

An existing 2.5 – 3.0m shared use path exists on the Pakes Way corridor, and forms a critical part of the active travel network providing connectivity from western parts of Canberra to the City centre. However, while the path is in reasonably condition, the presence of numerous path-side hazards and deficiencies in its effective width (i.e. cross sectional width adjusted for required clearances to hazards) is substandard for a high-volume shared use path that is a key part of the active travel network.

In addition, there are also on-road cycle lanes in the Parkes Way shoulders between the Glenloch interchange and the Acton Tunnel. This is a high speed, free flow environment with cyclists required to cross free flow ramps, with high risk to vulnerable road users due to the high operating speed and high volumes in the corridor.

The upgrade proposes to enhance active travel facilities in the corridor by providing a high standard, high capacity dedicated cycle way in addition to a segregated shared use path, creating an attractive commuting link in the cycle network. In addition the upgrade proposes a separate shared use path to improve recreational cycle and pedestrian infrastructure in the corridor on the lake foreshore, noting that it forms part of the Lake Burley Griffin circuit (see Route LBG in the extract of the Transport Canberra CBR Cycle Route Map below). As a Lake circuit the route contributes to the Principal Recreational Trail network that is identified in the ACT MIS 05 standard and caters to all active travel users.

Structures

The upgrade proposes the widening of the existing Sullivans Creek bridge to accommodate both the cycle highway and the SUP. The existing Sullivans Creek Bridge is a concrete girder bridge that was widened into the median 2013 as part of the Parkes Way Widening project, and it is assumed that similar construction approach involving additional piles, pile cap widening, additional piers and superstructure widening will be adopted to accommodate the proposed active travel infrastructure. The widening is expected to require an additional 6-7m of bridge deck width.

An alternative approach would be to provide a new, discrete structure that is on an independent alignment. This approach would allow a lighter structure on an alignment that is more responsive to the proposed path geometry, potentially resulting in a lower cost structure.

In the zone of proposed reclamation, it is anticipated that some retaining wall will be required to limit the extent of necessary foreshore adjustment. It is estimated that approximately 500m of fill retaining wall will be required, likely constructed of precast or in-situ concrete.

Noting the steep grades on the approach to Black Mountain Peninsula, an alternative path alignment has been considered that provides grade separation between the cycle highway and the peninsula road. Should this alternate geometry be preferred, it is expected that this will require construction of a 6.0 x 3.0m (w x h) concrete box culvert underpass of the road.

Safety

Information is not available on active travel safety incidents in the area of the proposed upgrade (the ACT OpenData portal provides crash details for on-road cycling only). However, with the proximity of numerous hazards immediately adjacent to the existing SUP (non frangible objects and steep batters), and the mix of pedestrians, tourists, recreational and commuting cyclist there is considered to be a relatively high potential active travel accidents at the site.

The proposed upgrade is expected to significantly improve safety for active travellers by providing a high standard and wide dedicated cycle path, segregating faster moving cyclists from pedestrians and slow moving recreational cyclists, providing shoulders / clearance from path-side objects, and cycle rails / fencing from hazards.

Another safety consideration is the isolated nature of parts of the alignment, particularly between CH500-1100 where the active travel paths will not be visible from any properties or active roadway. The lack of passive surveillance create security concerns relating to crime prevention through environmental design (CPTED). Whilst the proposed infrastructure improvements are expected to induce more active travel trips on the route, and hence mitigate this security concern to a degree, consideration should be given in future phases of design development to enhance CPTED for the upgrade. Such refinements could include improving the relationship and mutual visibility between Lady Denman Drive and the proposed active travel paths through adjustments to vertical geometry.

Upgrade	PW8 – Molonglo to City Cycle Highway - Parkes Way Zone	Location	Parkes Way	Estimate Cost	$74M	Sheet	2 of 2

Constructability

All construction elements of the upgrade are considered conventional, and construction is unlikely to require novel construction techniques. However, it is noted that minor reclamation will be required in constrained areas where there is minimal space between the Lady Denman Drive and the lake foreshore, and staging in these areas will be required to ensure that a functional active travel path is retained over the period of construction.

Options Considered

Given the constraints of the site, it is assumed that the cycle highway alignment will broadly follow the existing SUP geometry. Various cross-sectional options to incorporate the cycle highway into the available envelope within the corridor were considered for the upgrade, including:

- Provision of retaining walls between Lady Denman Drive and the cycle highway to accommodate the widened path footprint
- Removing pedestrian segregation, combining pedestrian and cycle movements, and reducing path footprint
- Provision of lakeside retaining wall to accommodate the widened path footprint
- Minor reclamation along the lake foreshore to accommodate the widened path footprint

Provision of a boardwalk structure on the lake edge to accommodate the cross section proposed for the active travel paths, whilst minimising the impact of the upgrade on the lake edge

Project Interdependencies

There are several upgrades proposed for the Parkes Way corridor between the Glenloch Interchange and the Acton Tunnel. All of the upgrades have a degree of interdependence with the proposed Cycle Highway including:

- **PW10 - Clunies Ross St Interchange Upgrade** – The proposed cycle highway will need to provide connectivity with changes to the active travel network associated with the interchange upgrade
- **PW12 - Midblock Capacity Upgrade - Glenloch to Clunies Ross St** – Geometric and cross sectional changes to the Parkes Way corridor associated with the capacity upgrade will require coordination with the alignment of the cycle highway
- **PW14 - Public Transport Corridor - Interim Solution** – The proposed interim public transport solution removes existing on road cycle lanes on Parkes Way. The cycle highway will provide alternative dedicated cycle infrastructure in the corridor which is considered essential to the viability to the of the proposed public transport upgrade.
- **PW15 - Public Transport Corridor – Ultimate Solution** – Geometric and cross sectional changes to the Parkes Way corridor associated with the ultimate public transport upgrade will require coordination with the alignment of the cycle highway.

Option Details

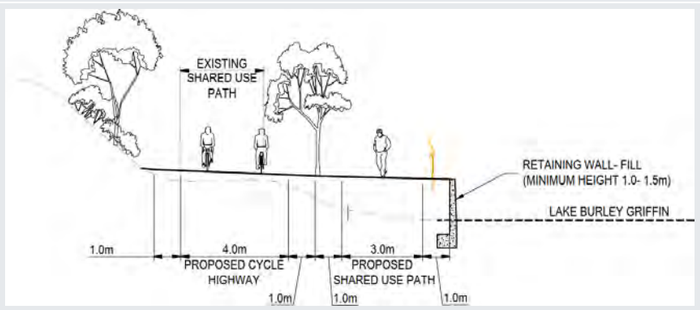
The proposed upgrade to active travel infrastructure in the corridor includes provision of two discrete elements:

- **Cycle Highway** – A dedicated and segregated cyclist-only path that is a component of the broader Molonglo to City Cycle Highway that provides a high-speed commuting link between the two districts. The path is proposed to be 4m wide (2m in each direction) + 1m shoulder / verge. The path will offset the loss of cycle lanes on Parkes Way proposed in PW14.
- **Shared Use Path** – In addition to the cycle highway it is proposed to provide a 3m wide shared use path for pedestrians and recreational cyclists, maintaining the Lake Burley Griffin Loop Path.

The provision of these active travel paths will consist of several key design features, including:

- **Route Alignment** – The route generally follows the alignment of the existing shared use path, with some vertical and horizontal adjustments to achieve the desired design speed for the cycle highway (50 km/h). It is noted that stopping sight distance at crest curves for cyclists create onerous geometric requirements which can be difficult to achieve, and there are several locations along the route where departures from guidelines relating to vertical geometry have been incorporated into the design.
- **Shared use path connectivity** – The shared use path will connect to the existing SUPs along the route including:
  - At both boundaries of the upgrade
  - The Glenloch Interchange SUP
  - The Black Mountain Peninsula loop
  - The Clunies Ross Street SUP
  - The Sullivans Creek SUP access into ANU
  - ANU paths including on Liversidge Street
- **Lake Foreshore** – A large portion of the proposed paths will route along the Lake Burley Griffin foreshore. While the majority of this route is not expected to impact on the foreshore alignment, a stretch of the path between Acacia Inlet and the Black Mountain Peninsula will require minor reclamation. Approximately 500m of foreshore adjustment in this zone is proposed, with 0 – 4.0m of reclamation expected, utilising a fill retaining wall on the lake edge to minimise the width of required reclamation. An alternative treatment using a fill batter could be considered in future design iterations which will create a more naturalised, landscaped lake edge. Similarly, steepening of non-path zones in the cross section (between the cycle highway / shared use path) could be investigated in future phases of design development to refine the retaining wall or batter height on the lake edge.
- **Australian National University** – Both paths route through the ANU campus in the vicinity of the Acton Tunnel. Close consultation with the ANU will be required to ensure agreement for the path alignment in this area.

- **Foreshore Landscaping** – The proposed dual paths will have a wider footprint than the existing SUP, and as a result the upgrade is expected to require some vegetation removal. However, the upgrade is considered to provide the opportunity to enhance landscape quality along the lake foreshore through the provision of new, appropriate plantings. Further, it is anticipated that there will likely be the opportunity to include other recreational features into the design such fishing platforms etc in addition to water fountains to further enhance community amenity on the foreshore.
- **Sullivans Creek** – It is proposed that both paths will cross Sullivans Creek, utilising a widening of the existing Parkes Way Bridge of approximately 6-7m, depending on the preferred cross section at the bridge.
- **Garryowen Drive Crossing** – The paths cross Garryowen Drive in the Black Mountain Peninsula. This at-grade crossing will require delineation of the road and path alignment and clear identification of user priority. An alternative arrangement of the crossing has been investigated as part of the upgrade that involves a cycle underpass for the cycle highway that will both improve path geometry (flatter grades) and grade separation between cyclists and vehicles.



- **Path Boundary Connections** – The shared use path is proposed to connect into the existing SUP at each end of the proposed upgrade. Whilst the Cycle Highway alignment is defined within the Parkes Way corridor, the route at both the western and eastern extent of the upgrade is to be determined as part of future design investigations into the broader Molonglo to City Cycle Highway.

Upgrade	PW10 – Clunies Ross St Interchange Upgrade	Location	Parkes Way	Estimate Cost	$35M	Sheet	1 of 2

Problem Statement

Parkes Way is a key access to the city centre and the parliamentary triangle, in addition to being the only free flow east-west corridor in the city. Parkes Way currently performs poorly in peak periods with road users experiencing significant congestion and delay. Operational performance issues are expected to worsen over time with increased flows from the west resulting from development of West Belconnen and the Molonglo Valley.

There is limited opportunity to increase capacity of the corridor east of Clunies Ross Street due to the existing constraint of the Acton Tunnel. Provision of west facing ramps at the Clunies Ross Street interchange provides an additional access from the west into the ANU Campus, CSIRO, and the western CBD, increasing network capacity and providing more direct routing to numerous attractors, noting that Clunies Ross Street in its current configuration (single lane in each direction) may be a capacity constraint and require upgrade to ensure the full operational potential of the upgraded interchange is realised. The ramps would also provide the opportunity to route public transport vehicles from Parkes Way to the existing City-Belconnen busway on Barry Drive, avoiding congestion on Parkes Way to the east of Clunies Ross Street.

Site Description

The upgrade is proposed at the existing Clunies Ross Street interchange with Parkes Way on the western edge of the Canberra City district. It is currently a service interchange with a half diamond configuration consisting of east facing single lane ramps, utilising a combination of signalised and priority ramp terminal intersections.

Parkes Way at the interchange is a freeway condition dual carriageway with three lanes in each direction. The Parkes Way mainline flies over Clunies Ross Street with twin concrete bridges, with the east facing ramps merging /diverging from the mainline to the east of the adjacent Sullivans Creek. Both bridges have a 24 m (approx.) primary single span and two back spans over spill through abutments. Clunies Ross Street is a single carriageway two-way road that transitions into Lady Denman Drive immediately south of the interchange.

The site is bounded to the north by the Black Mountain Nature Reserve, Lake Burley Griffin to the south and Sullivans Creek to the east. The Black Mountain Nature Reserve is steep and densely wooded with native woodland over the length of the site, acting as a major constraint to the proposed upgrade. Vegetation around the interchange is predominantly native woodland with some exotic plantings on waterway edges.

There are currently no residential, commercial, or industrial land uses near the site, however part of the route has adjacent recreational uses (Australian National Botanical Gardens) and an educational precinct (the ANU campus).

Project Interdependencies

There are several upgrades proposed for the Parkes Way corridor between the Glenloch interchange and the Clunies Ross Street Interchange which have an interdependence with the Clunies Ross Street Interchange upgrade, including:

- **PW8 - Molonglo to City Cycle Highway - Parkes Way Zone** – This Cycle Highway facilitates the removal of the removal of existing shoulders / on-road cycle lanes on Parkes Way, and therefore influences the design of the interchange upgrade insofar as it removes the need to incorporate cyclist facilities on the proposed ramps
- **PW12 - Midblock Capacity Upgrade - Glenloch to Clunies Ross St** – Geometric and cross sectional changes to the Parkes Way corridor associated with the capacity upgrade will require coordination / consideration of the proposed interchange upgrade
- **PW14 - Public Transport Corridor - Interim Solution** – The interim public transport solution proposes the conversion of existing shoulders into bus lanes. These bus lanes interface with the merge / diverge zones of the proposed ramps and associated auxiliary lanes and require coordination across the two design packages.
- **PW15 - Public Transport Corridor – Ultimate Solution** – Geometric and cross sectional changes to the Parkes Way corridor associated with the ultimate public transport upgrade will require coordination / consideration in the development of the proposed interchange upgrade

The interchange upgrade proposes to direct significantly more traffic and public transport vehicle movements along Clunies Ross Street. Whilst upgrade of the Clunies Ross Street corridor is not part of the Parkes Way Corridor Strategy, it is noted that enhancements to Clunies Ross Street are likely to be required to ensure that it, and the interchange, operates at an acceptable level of service. These upgrades will require independent investigation.

Public Transport

There are currently no public transport services that route through this part of the Parkes Way corridor or on Clunies Ross Street. However, related upgrades (PW14 and potentially PW15) propose to adapt existing infrastructure to facilitate use of the Parkes Way corridor by public transport services. The interim public transport solution for the corridor proposes routing bus services along Clunies Ross Street to the Barry Drive bus corridor. This has implications for the interchange upgrade, including:

- **Ramps** – It is expected that buses could potentially route along both ramps connecting into the proposed bus lanes on Parkes Way. It is currently proposed that these bus services use general traffic lanes and it will therefore be important to ensure that the left turn movement from the eastbound exit ramp onto Clunies Ross Street and the right turn movement onto the proposed westbound entry ramp operate efficiently.
- **Clunies Ross St** – It is anticipated that Clunies Ross Stret will require upgrade to accommodate public transport and ensure it operates at an appropriate level of service. Whilst upgrade of the Clunies Ross Street corridor is not part of the Parkes Way Corridor Strategy, it is noted that these upgrades will require investigation as part of a separate exercise.

Active Travel

A shared user path currently runs in the eastern verge of Clunies Ross Street (refer image below). This path is an important link in the cycle network as it connects the Lake loop path to Barry Drive and provides access into ANU. It is proposed to retain this path, noting it will require realignment to suit the revised ramp terminal intersection configurations and revised Clunies Ross Street cross section. Safety and amenity for active travellers will be improved at the northern intersection where a zebra crossing and crossing signalisation will be provided across the eastern leg of the intersection.

No on road cycle infrastructure is proposed for the entry ramps as it is assumed that the cycle highway and upgraded shared path (refer PW8) will be delivered prior to or concurrently with this upgrade.

Safety

The safety performance of the existing interchange appears to be reasonably good with only three identified crashes at the ramp terminal intersections between 2017 and 2021. There were also crashes in the merge / diverge zones of the eastern interchange ramps on the Parkes Way mainline.

The introduction of the proposed western ramps will direct significantly more traffic through the interchange and onto Clunies Ross Street. As a result, it can be expected the number of crashes at the interchange will increase, noting there can be expected to be a reduction in crashes on other parts of the network. In future phases of design development it will be important to ensure that ramp and intersection design complies with design guidelines and geometric requirements to the extent that site constraints permit to ensure that it operates safely.

Structures

Whilst the existing twin three span bridges over Clunies Ross Street at the interchange are a constraint to upgrade configuration, no works on the bridge are currently proposed as part of the project, noting that a safety barrier is proposed for pier protection of the bridge, and that adjustment to the spill through abutment may be required (requirement to be confirmed in future phases of design development).

The proposed upgrade involves the retrofit of two ramps at the interchange in relatively steep topography. To provide the ramps within the existing site constraints, and to avoid excessive construction footprint and environmental impacts / vegetation removal, it is proposed to provide three retaining walls. These three walls will all be on cut faces, with retaining wall type and construction methodology to be confirmed in future phases of design development following the completion of geotechnical investigations at the site.

Constructability

Delivery of this upgrade is expected to adopt conventional construction approaches. Whilst the works are largely offline and can be undertaken without impact on the mainline, construction of merge / diverge zones and associated auxiliary lanes will require work immediately adjacent to the live mainline carriageway and will require traffic management on the Parkes Way mainline with potential impact on operation

Furthermore, these works will require substantial adjustment to the ramp terminal intersections and mainline on Clunies Ross Street and Lady Denman Drive and are likely to adversely impact on the operation of these roads and existing interchange, requiring traffic management during construction.

Options Considered

Recognising the need to provide west facing ramps at the intersection, consideration of options was focussed on identifying intersection and ramp arrangements that are likely to provide an optimal outcome that balances operational performance against the cost and scale of the upgrade. To this end, preliminary assessment of options considered included:

- Various configurations for the ramp terminal intersections that considered different turn and through lane arrangements and lengths on Clunies Ross Street
- Proposed ramp arrangements including lane number requirements, ramp alignment and geometry, and interface with the Parkes Way mainline
- Any required adjustments to the existing east facing ramps at the interchange

Upgrade	PW10 – Clunies Ross St Interchange Upgrade	Location	Parkes Way	Estimate Cost	$35M	Sheet	2 of 2

Option Details

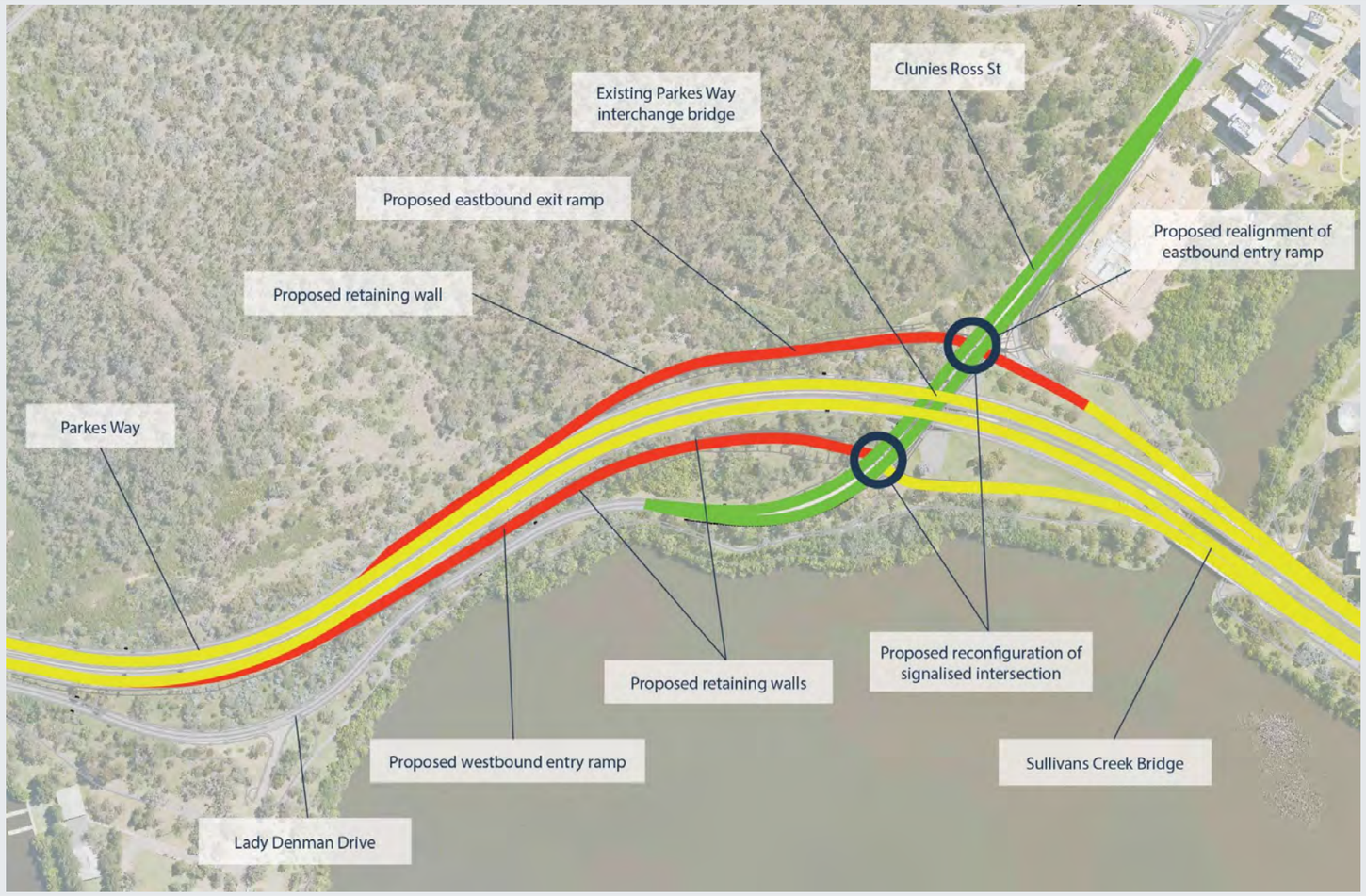
The proposed interchange upgrade has been developed to provide access from Parkes Way to Clunies Ross Street and Lady Denman Drive. The upgrade of the Clunies Ross Street interchange consists of the following primary elements:

- **Westbound Entry Ramp** – Dual right turn lanes are required from the southbound Clunies Ross Street to ensure the interchange operates at an acceptable level of service. The ramp merges these two lanes down to one to create a single lane entry onto the westbound Parkes Way mainline. In its current configuration, assuming the delivery of the PW14 upgrade, the entry ramp auxiliary lane transitions into a bus lane where vehicles will be required to merge into the Parkes Way mainline. It is noted that some interchange sight parameters specified in Austroads may require relaxation the context of the existing road geometry of the Parkes Way mainline.

  As Clunies Ross Street is on a skew to the Parkes Way mainline and ramps, the ramp terminal is at an angle, resulting in the northbound left slip lane from Lady Denman Drive failing to achieve a high angle entry, however this geometric departure from guidelines has been adopted in the context of the low expected demand for the movement, the site constraints and the retrofit nature of the upgrade
- **Eastbound Exit Ramp** – Assuming the delivery of the PW14 upgrade, vehicles will diverge from the Parkes Way mainline at the transition from the bus lane to the exit ramp auxiliary lane. The ramp alignment navigates through steep existing terrain and requires significant depth of cut and a retaining wall. Non-standard geometry for the ramp nose diverge taper has been adopted to minimise the retaining wall height and cut requirements, and it is anticipated that further optimisation of the ramp geometry and / or design departures from guidelines will require assessment in future design phases. It is noted that some interchange sight parameters specified in Austroads may require relaxation in the context of the existing road geometry of the Parkes Way mainline.

  The siting of the ramp terminal intersection has been established to achieve the required turn lane storage lengths whilst minimising the amount / height of cut and associated retaining wall adjacent to the ramp. It is noted however that should traffic modelling in future iterations of design development indicate more required storage, this ramp terminal intersection will likely need to shift to the north, with implications for the cut associated with the ramp.

  It is anticipated that the ramp alignment and associated infrastructure alignment will incur into Black Mountain Nature Reserve, albeit on blocks that have Territory custodianship. The planning implications and requirements associated with this wall alignment will require further investigation in future iterations of design development.
- **Clunies Ross Street** – The road and associated ramp terminal intersections have been reconfigured to accommodate the proposed west facing ramps in addition to locally widening the cross section to increase capacity of the interchange and improve operational performance. The configuration includes:
  - Southern intersection - Provision of 2 x southbound right turn lanes (1x 40m turn slot + a trapped lane) and 1 x through lane + 2 x northbound through lanes and a left turn slot to provide sufficient capacity to access the proposed westbound entry ramp
  - Northern intersection - Provision of 1 x northbound right turn lane (40m) and 2 x through lanes + 2 x southbound through lanes and a left turn slot to provide access to the eastbound entry ramp and sufficient capacity to access the proposed westbound entry ramp
  - Mainline – Provision of two through lanes in each direction



A key constraint to the reconfiguration of Clunies Ross Street are the existing piers for the Parkes Way overbridge, which limit what can be achieved with the cross section under the bridge. A concrete F Type barrier is proposed in the western verge of Clunies Ross Street to protect the pier from impact by errant vehicles. It is noted that the proposed cross section is marginal in terms of this constraint, and future design iterations may need to consider narrower turn and through lanes (i.e. <3.5m) under the bridge, or alternatively cutting back the eastern spill through abutment by providing a retaining wall and routing the shared use path behind the pier to provide more space for the required road cross section.

- **Existing Ramps** – It is proposed to realign the eastbound entry ramp to suit the reconfigured ramp terminal intersection arrangement. No adjustment to the westbound exit ramp is proposed other than minor alteration at the ramp terminal intersection.
- **Paths** – The existing active travel path on Clunies Ross Street will require realignment to suit the revised configuration of the interchange. As part of the realignment and upgrade of the ramp terminal intersections it is proposed to provide a signalised crossing eastbound entry ramp (currently uncontrolled). The functionality of the shared use path will otherwise be unaffected by the upgrade.

- **Stormwater** –Flooding occurs on Clunies Ross Street under the Parkes Way bridges, and augmentation of the existing drainage system is required. If not implemented prior to the delivery of the PW10 upgrade, it is anticipated that the proposed augmentation of the stormwater drainage system will be incorporated into the upgrade package, noting that the changes proposed as part of the PW10 upgrade increase pavement areas and may require revision to the required stormwater augmentation.

Upgrade	PW12 – Midblock Capacity Upgrade - Glenloch to Clunies Ross St	Location	Parkes Way	Estimate Cost	$86M	Sheet	1 of 2

Problem Statement

Parkes Way is a key access route to the city centre and the parliamentary triangle, in addition to being the only free flow east-west corridor in the city. Parkes Way currently performs poorly in peak periods with road users experiencing significant congestion and delay. Operational performance issues are expected to worsen over time with increased flows from the west resulting from development of West Belconnen and the Molonglo Valley.

There is limited opportunity to increase capacity of the corridor east of Clunies Ross Street due to the existing constraint of the Acton Tunnel. However, the provision of west facing ramps at the Clunies Ross Street interchange (refer to Package PW10) provides an additional access from the west into the ANU Campus, CSIRO, and the western CBD, increasing network capacity and providing more direct routing to numerous attractors. However, access to and from these ramps is constrained by the existing capacity of Parkes Way between the Glenloch Interchange and the Clunies Ross Street Interchange. As such, improvement to network capacity in this part of the corridor will be important to realise benefits associated with the proposed Clunies Ross Street Interchange and improve operational performance of the network more generally.

Site Description

The upgrade is proposed for the western portion of the Parkes Way / Lady Denman Drive corridor between the Glenloch Interchange and the Clunies Ross Street Interchange on both mainline carriageways. Parkes Way over the length of the 2 km site is a freeway condition, dual carriageway with three lanes in each direction. The site is located between the Molonglo Valley / Belconnen Districts in the west and the Canberra City precinct in the east.

The proposed infrastructure will provide additional lane capacity in the corridor to address increasing demand between the Molonglo Town Centre and the Canberra City Centre. Located at the toe of Black Mountain, the surrounding topography is relatively steep, however the existing Parkes Way carriageway alignment is relatively flat across the proposed site extent.

The site is bounded to the north by the Black Mountain Nature Reserve and Lake Burley Griffin to the south. The Black Mountain Nature Reserve is steep with dense native woodland over the length of the site, acting as a constraint to the proposed upgrade. Similarly, the lake is also a significant constraint to the proposal, resulting in a confined cross section in which to provide the proposed transport infrastructure associated with the capacity upgrade.

There are currently no residential, commercial, or industrial land uses near the site, however a portion of the corridor has adjacent recreational uses (Black Mountain Peninsula parkland).

Options Considered

There are numerous potentially feasible options available to improve capacity for general traffic on the Parkes Way Corridor between the Glenloch interchange and the Clunies Ross Street Interchange. Various cross-sectional options and the use of ITS were considered as part of the Corridor Strategy:

1) Removal of Lady Denman Drive
2) Smart Motorway with Lane Use Management including Transit / Bus Lanes
3) Additional General Traffic Lane with no Impact on Lady Denman Drive
4) Smart Motorway with Lane Use Management including Public Transport Corridor and Hard Shoulder Running
5) Additional General Traffic Lane including Public Transport Corridor and Narrow Shoulders
6) Smart Motorway with Lane Use Management including Public Transport Corridor and 1m Shoulders
7) Additional General Traffic Lane including Public Transport Corridor with no Impact on Lady Denman Drive
8) Additional General Traffic Lane + Wide Shoulders with allowance for Future Public Transport Corridor with no Impact on Lady Denman Drive

Public Transport

There are currently no public transport services that route through the Parkes Way corridor. In response to the development of the Molonglo Valley district, it is understood that public transport services including rapid, high frequency, direct services between the district and the CBD may be introduced, likely routing along Parkes Way.

If these services were to be realised, it is anticipated that they would be conveyed in the interim on dedicated bus lanes (refer Package PW14). However, the proposed capacity improvements as currently conceived in this upgrade (PW12) will see the transition of these bus lanes into general traffic lanes (with some geometric adjustment). As a result, the PW12 upgrade may require change to how public transport services operate within the corridor (should they be active). Potential implications for public transport services include:

- Bus services transitioning to use general traffic lanes, noting anticipated improvement in mainline performance and traffic flow that will result from the upgrade
- Triggering the need (or delivered in conjunction with) the ultimate public transport corridor upgrade. which includes provision of a dedicated and segregated zone for public transport movements

It is noted however that given the proposed cross section and provision of retaining wall located to accommodate the ultimate public transport corridor in Package PW15 (refer Option Details below), there is also scope to provide additional carriageway widening that will allow retention of bus lanes in addition to the fourth general traffic lane. This approach avoids the need for removal of a dedicated bus lane prior to the construction of the ultimate transport corridor which may be considered a more appropriate outcome in the context of the Territory's public transport patronage objectives.

Safety

Between 2017 and 2021, numerous property damage accidents were recorded on Parkes Way between Glenloch and Clunies Ross Street Interchanges, in addition to several injury crashes (refer below). By improving flow conditions in both directions on the corridor, the upgrade is expected to reduce the likelihood for crashes, particularly rear end crashes resulting from speed differentials associated with congestion.

Structures

The proposed configuration of the Parkes Way upgrade, which includes provision of an additional lane in each direction through widening into the northern verge. The existing carriageway edge in the northern verge is typically at the toe of an over-steep hillside with slopes of up to 1.45H:1V. The objective of the design approach is to facilitate the required widening whilst minimising incursion of Parkes Way infrastructure into the Black Mountain Nature Reserve and environmental impacts / vegetation removal.

To achieve the proposed cross section, it is expected that approximately 1200m of cut retaining wall will be required into the toe of the Black Mountain hillside. This retaining wall is expected to range from approximately 0 – 7.5 m high. No geotechnical information is currently available to inform the design of this wall, however it is noted from site observations that the nature of the hillside is variable along the length of the proposed wall length. Some sections include exposed, weathered rock on the batter slope face, while other areas are covered in dense vegetation, indicating a soil layer of unknown depth. Given these observations, it is considered likely that engineering measures such as soil nails and rock anchors will be required to ensure the integrity of the wall. Furthermore, depending on geotechnical conditions, benching and / or rockfall fencing may be required to augment the retaining wall.

Project Interdependencies

There are several upgrades proposed for the Parkes Way corridor between the Glenloch interchange and the Clunies Ross Street Interchange which have an interdependence with the proposed Corridor capacity improvements:

- **PW8 - Molonglo to City Cycle Highway - Parkes Way Zone** – This Cycle Highway facilitates the removal of the existing shoulders / on-road cycle lanes on Parkes Way, and therefore influences the design of the upgrade insofar as it removes the need to incorporate cyclist facilities on the mainline carriageways.
- **PW10 - Clunies Ross St Interchange Upgrade** – The provision of west facing ramps at the Clunies Ross Street Interchange has a relationship with the capacity upgrade. The full operational potential of the capacity upgrade is unlikely to be unlocked without provision of the west facing ramps due to capacity constraints to the east of Clunies Ross Street. Similarly, it is anticipated that the full capacity of the of the proposed west facing ramps at the Clunes Ross Street Interchange will not be realised without the provision of the PW12 upgrade.
- **PW14 - Public Transport Corridor - Interim Solution** – The interim public transport solution proposes the conversion of existing shoulders into bus lanes. As these proposed bus lanes occupy the same cross-sectional space as the proposed upgrade, the bus lanes would be replaced by the additional general traffic lane proposed in the PW12 capacity upgrade. An alternative to this approach would be further widen the cross section to accommodate these bus lanes. As such there is an interdependency with the PW14 upgrade as buses conveyed in the bus lanes will be required to use general traffic lanes.
- **PW15 - Public Transport Corridor – Ultimate Solution** – The ultimate public transport corridor has a substantial cross sectional footprint. Geometric and cross-sectional changes to the Parkes Way corridor associated with the ultimate public transport upgrade will require coordination / consideration in the development of the proposed PW12 capacity upgrade. Furthermore, as noted above, implementation of the PW12 upgrade may trigger the requirement to deliver Package PW15 to ensure that a dedicated public transport corridor is retained if considered required by the Territory following delivery of Package PW12.

Upgrade	PW12 – Midblock Capacity Upgrade - Glenloch to Clunies Ross St	Location	Parkes Way	Estimate Cost	$86M	Sheet	2 of 2

Active Travel

Whilst the proposed upgrade is unrelated to active travel infrastructure, it may involve conversion of the mainline shoulder / cycle lane on Parkes Way in both directions into general traffic lanes. Whilst these cycle lanes anecdotally have very low demand, they are situated in an unattractive high speed / high volume freeway condition vehicle environment, with poor cycle access requiring cyclists to cross free flow interchange ramps. This proposal may reduce cycle infrastructure in the corridor. As such, the provision of Package PW8 either prior to, or concurrently with this upgrade is considered important to provide improvement in active travel infrastructure in the corridor.

Constructability

The provision of additional lanes and associated reconfiguration of general traffic lanes and median, in addition to construction of 1200 m of linear retaining wall, will require carriageway widening adjacent to operating traffic lanes. In addition augmentation of stormwater drainage systems is also likely to require work in operational carriageways.

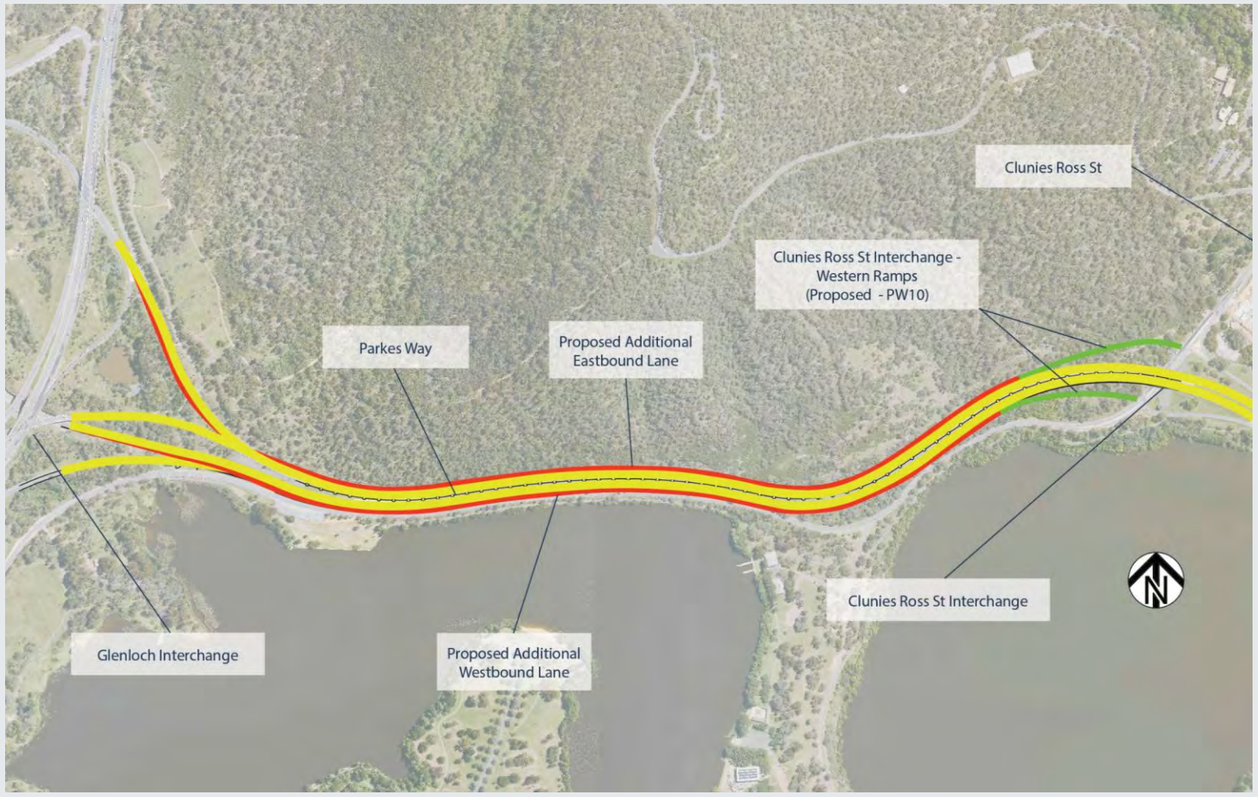
- This will necessitate ongoing traffic management and likely reduced speed zones for extended periods. Whilst widening of this type is not unusual on significant urban motorways nationally, it is likely to cause disruption to both eastbound and westbound movements on Parkes Way.

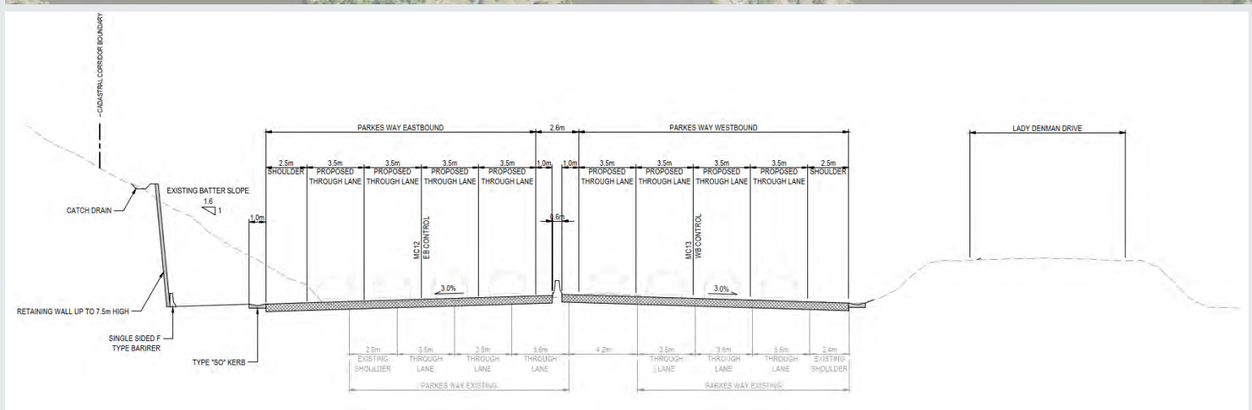
Option Details

The proposed capacity upgrade provides an additional general traffic lane in both the eastbound and westbound directions of the Parkes Way corridor. The capacity upgrade consists of the following primary elements:

- **Road Geometry** – The proposed widening adopts the existing vertical and horizontal geometry of the Parkes Way carriageways, inclusive of any associated existing deficiencies from current standards (e.g. the R306m curve at CH13,300 - 13,550m does not comply with Austroads guidance for a design speed of 90 km/h). Furthermore, it is noted that some widening of shoulders or verges may be required on the inside of curves to achieve required sightlines for the proposed design speed. Additionally, consideration could be given to potential narrowing on straights noting lane widening is on tight radius curves may be necessary (e.g. 200mm per lane on the existing R300m curve to accommodate buses and 19.0 m semi-trailers) should compliance with standards be required. These design refinements will require investigation in future phases of design delivery.
- **Cross Section** – The majority of the site has a high degree of spatial constraint, with the steep Black Mountain hillside (and associated Black Mountain Nature Reserve) to the north and the Lady Denman Drive carriageway and Lake Burley Griffin foreshore to the south. To that end, the proposed design seeks to minimise the corridor footprint whilst accommodating all of the required design features associated with the corridor upgrade. Features of the cross section include:
  - ***Additional Lanes*** – An additional general traffic lane in each direction to improve the capacity of the corridor
  - ***Full Width Shoulders*** – Full 2.5 m shoulders are proposed to allow for errant vehicle recovery, page of emergency vehicles, and emergency stopping. As noted in Austroads GRD, shoulder width is influenced by several factors including traffic volumes and operating speed, and full width shoulders (2.5-3.0 m) are generally preferable from a safety and operational perspective, including on both sides of the carriageway when there are three or more traffic lanes.
  - ***Narrow Median*** – A narrow median consisting of a rigid, double sided concrete F-type barrier is proposed with 1.0m median shoulders in place of the existing median. Whilst it generally considered preferable to utilise wider medians, this approach has been adopted to minimise corridor footprints for similar reasons to the adoption of narrow shoulders discussed above.
  - ***Widening in the Northern Verge*** – The National Capital Authority have indicated a desire to retain the Lady Denman Drive embankment in its current form to ensure that a vegetated buffer between the Parkes Way and Lady Denman Drive carriageways is retained. To this end, the proposed capacity upgrade retains the existing westbound road edge (leaving the embankment untouched) and proposes that all required widening associated with the upgrade is carried out in the northern verge.
  - ***Retaining Walls*** – The proposed widening in the northern verge impacts native vegetation and the toe of the Black Mountain hillside. In order to minimise this impact, the upgrade proposes a retaining wall adjacent to the eastbound carriageway. The wall alignment is proposed in its ultimate location in order to accommodate the final Parkes Way Corridor cross section without further adjustment or abortive works.

    It is noted that this wall will retain the toe of an over-steep hill face and is likely to require additional anchoring to ensure its stability (refer below for further discussion). Notwithstanding the intent of utilising a retaining wall to minimise corridor footprint, it is anticipated that the wall alignment will incur into Black Mountain Nature Reserve, albeit on blocks that have Territory custodianship. The planning implications and requirements associated with this wall alignment will require further investigation in future iterations of design development.
- **Public Transport** – The proposed cross section is intended to accommodate future upgrade to allow for the provision of the ultimate public transport corridor, likely in the southern verge. There is also latent space in the cross section in its interim configuration in the northern verge that could potentially allow further carriageway widening to accommodate bus lanes in the shoulder similar to the interim public transport upgrade proposed in Package PW14.





Upgrade	PW14 – Public Transport Corridor – Interim Solution	Location	Parkes Way	Estimate Cost	$14M	Sheet	1 of 2

Problem Statement	The current ACT Transport Strategy 2020 does not provide a direct Rapid public transport link between the Molonglo Valley and the City. Instead the strategy proposes indirect routing through / interchange at Belconnen and Cotter Road/Adelaide Avenue. The indirect nature of these proposed routes does not appear to be well aligned with the ACT's objective of encouraging mode shift to public transport, particularly for a new district such as the Molonglo Valley which is understood to be intended as an exemplar of sustainable development. The Parkes Way corridor represents an ideal direct link between the Molonglo Valley and the City. However, it is understood that historic public transport planning exercises have been reluctant to route public transport in the corridor due to concerns about existing and forecast congestion on Parkes Way, and implications it will have for public transport operation and journey times. As a result, the proposal seeks to identify an infrastructure upgrade that will facilitate the use of the corridor to provide a rapid bus route that utilises dedicated infrastructure which is independent of general traffic lanes and will therefore not be compromised by any performance issues that exist on Parkes Way or may intensify in the future. The upgrade is intended to provide a relatively low cost solution that can be implemented relatively easily to allow the provision of rapid bus services in the short to medium term, providing high standard public transport options for residents of the Molonglo Valley as it develops.	Public Transport	There are currently no public transport services that route through the Parkes Way corridor. However, the upgrade is intended to adapt existing infrastructure to facilitate use of the corridor for public transport services. Whilst the likely type and number of services that will route along the Parkes Way corridor is uncertain at this time, for the purpose of the corridor strategy it is assumed that as a minimum at least one Rapid service (running at least once every 15 minutes) between the Molonglo Town Centre and the Canberra City Centre will use the proposed infrastructure / bus lanes.
		Active Travel	Whilst the proposed upgrade is unrelated to active travel infrastructure in and of itself, the upgrade proposes the conversion of the mainline shoulder / cycle lane on Parkes Way in both directions into bus lanes. Whilst these cycle lanes anecdotally have very low demand, and are in an unattractive high speed / high volume freeway environment, and have poor cycle access requiring cyclists to cross free flow interchange ramps, the proposal reduces cycle infrastructure in the corridor. As such, the provision of Package PW8 either prior to, or concurrently with this upgrade is considered important to provide improvement in active travel infrastructure in the corridor.
		Structures	The proposed upgrade in its current form is not expected to require any adjustment to existing structures, nor is it anticipated that any new bridge structures will be required. However, it is anticipated that approximately 650m of relatively low height retaining wall (0-2m) will be required adjacent to the westbound carriageway.
Site Description	The upgrade is proposed on the western portion of the Parkes Way / Lady Denman Drive corridor between the Glenloch Interchange and the Clunies Ross Street Interchange. The upgrade is proposed on both mainline carriageways (eastbound + westbound), broadly in carriageway shoulders (refer site photos – right). The site is located between the Molonglo Valley / Belconnen Districts in the west and the Canberra City precinct in the east. The proposed infrastructure will facilitate a public transport connection between the Molonglo Town Centre and the Canberra City Centre. Located at the toe of Black Mountain, the surrounding topography is relatively steep, however the existing Parkes Way carriageway alignment is relatively flat over the proposed site extent. The site is bounded to the north by the Black Mountain Nature Reserve and Lake Burley Griffin to the south. The Black Mountain Nature Reserve is steep and densely wooded with native woodland over the length of the site, acting as a major constraint to the proposed upgrade. Similarly, the lake is also a significant constraint to the proposal, resulting in a confined cross section in which to provide the proposed public transport infrastructure. There are currently no residential, commercial, or industrial land uses near the site, however part of the route has adjacent recreational uses (Black Mountain Peninsula parkland) and an educational precinct (the ANU campus). 	Constructability	Construction of the eastbound bus lane will involve minor widening into the existing median adjacent to live traffic and will require careful staging and traffic management to minimise impact on the operation of Parkes Way, particularly in the AM peak. The westbound bus lane will require carriageway widening and potentially a retaining wall immediately adjacent to live traffic on both Lady Denman Drive and Parkes Way. Given the complexity of this construction, it is anticipated that delivery of the westbound bus lane will require careful staging and traffic management on both Parkes Way and Lady Denman Drive, and is likely to impact on the operation of both these roads for a substantial period.
		Safety	Between 2017 and 2021, there were numerous property damage accidents recorded on Parkes Way between Glenloch and Clunies Ross Street Interchanges, in addition to several injury crashes. By encouraging mode shift to public transport, the proposed upgrade is anticipated to reduce the number of private vehicle trips on Parkes Way which by extension, can be expected to reduce the number of single vehicle crashes due to reduced crash exposure, in addition to reducing the number of multi vehicle crashes as result of decreased vehicle interactions. It is noted however, the project proposes the removal of the carriageway shoulder in both directions. Whilst the bus lane will provide a zone for errant vehicle recovery for general traffic lanes, the shoulder functionality for emergency stopping will be lost as a result of the upgrade, increasing safety risk in the corridor. Whilst not included in the design at this stage of project development, future iterations of design development may consider provision of emergency stopping bays in locations where the terrain suits to offset this risk.
Options Considered	Given the constraints of the site, there were considered limited options to widen the Parkes Way Cross section without significant investment. As such, the upgrade sought to broadly adopt the existing cross section with various alternative approaches considered, including: - Conversion of existing Parkes Way shoulders to dedicated bus lanes with minor cross sectional adjustments undertaken where required to achieve minimum lane widths - Readjust the Parkes Way Cross section to provide a segregated and dedicated public transport corridor that is isolated from general traffic movements - Route public transport movements onto the proposed western ramps at Clunies Ross Street, and along Clunies Ross Street to existing dedicated Rapid bus lanes on Barry Drive - Route public transport movements along Lady Denman Drive - Route the public transport movements along the Parkes Way Corridor over Clunies Ross Street and Sullivans Creek, through the Acton Tunnel and into the City via Edinburgh Avenue or another alternative CBD access	Project Interdependencies	There are several upgrades proposed for Parkes Way between the Glenloch interchange and Clunies Ross Street which have an interdependence with the proposed interim public transport upgrade in the corridor, including: - **PW8 - Molonglo to City Cycle Highway - Parkes Way Zone** – This public transport upgrade proposes the removal of existing shoulders / on-road cycle lanes on Parkes Way, and therefore relies on the provision of upgraded cycle infrastructure within the corridor to offset this loss of active travel infrastructure. - **PW10 - Clunies Ross St Interchange Upgrade** – The proposed allowance for an interim public transport link in the corridor may require west facing ramps at the interchange to allow access for bus movements from Parkes Way to Clunies Ross Street. - **PW12 - Midblock Capacity Upgrade - Glenloch to Clunies Ross St** – Geometric and cross sectional changes to the Parkes Way corridor associated with the capacity upgrade will require coordination / consideration of the proposed interim public transport upgrade - **PW15 - Public Transport Corridor - Ultimate Solution** – Geometric and cross sectional changes to the Parkes Way corridor associated with the ultimate public transport upgrade will require coordination / consideration in the development of the proposed interim public transport upgrade - **G4 - Glenloch Interchange - Interim Public Transport Route** – The upgrade connects into the western extent of the G4 package, and as a result there is a geometric interdependence between the two packages. It is also noted that there would be construction and performance efficiencies in delivering both packages concurrently. - **PW12 - Midblock Capacity Upgrade - Parkes Way West** – The provision of infrastructure to improve capacity of the Parkes Way corridor between the Glenloch Interchange and the Clunies Ross Street Interchange has the potential to impact on the operation and infrastructure associated with the proposed bus lanes depending on the proposed preferred solution. This interim public transport solution proposes to potentially direct public transport vehicle movements along Clunies Ross Street. Whilst upgrade of the Clunies Ross Street corridor is not part of the Parkes Way Corridor Strategy, it is noted that enhancements to Clunies Ross Street are likely to be required to ensure that public transport operates at an acceptable level of service. These upgrades will require independent investigation.

Upgrade	PW14 – Public Transport Corridor – Interim Solution	Location	Parkes Way	Estimate Cost	$14M	Sheet	2 of 2

Option Details

The proposed interim approach to providing public transport infrastructure in the Parkes Way corridor involves provision of dedicated bus lanes in each direction that will operate independent of general traffic lanes in the corridor and provide free flow conditions for public transport vehicles whilst on Parkes Way. The upgrade consists of the following primary elements:

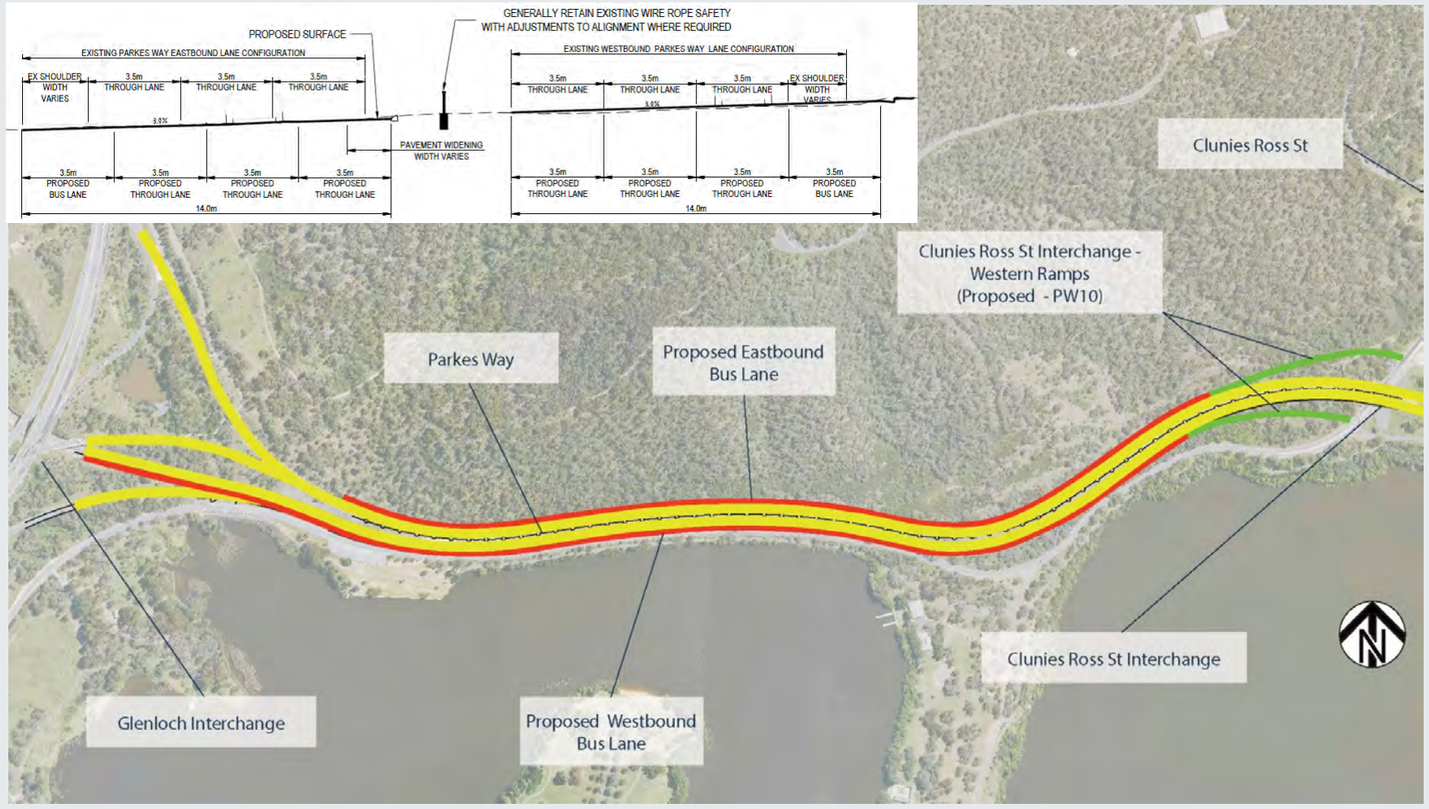
- **Cross Section** – It is proposed to convert the existing Parkes Way shoulders into 3.5 m bus lanes in both the eastbound and westbound directions. It is noted that Transport Canberra generally prefers that kerbside bus lanes have a width of 4.0 m where there is no adjacent cycle lane / shoulder, however given the high standard of the Parkes Way geometry, and the absence of on road cyclists and, a 3.5m bus lane is considered appropriate to operate safely, although it is acknowledged that close consultation with Transport Canberra will be required.

  The existing shoulders vary in width and in some locations will be insufficient to contain the proposed 3.5 m bus lane. In these locations carriageway widening will be required to achieve the proposed cross section. The general approach to cross section on each carriageway is as follows:

  - ***Eastbound*** – The shoulder is generally wide and only localised widening into the median (and revised lane delineation) will be required. Adjustment to the median wire rope safety barrier may be required locally, and depending on the extent of carriageway adjustment the safety barrier deflection zone may incur into the opposing running lane. Risk assessment and potential departures from standard may require investigation in future design iterations.
  - ***Westbound*** – The westbound shoulder has insufficient width to accommodate the proposed bus lane, and as a result the carriageway will require widening into the existing verge. Given the proximity of the Lady Denman Drive carriageway, it is considered unlikely that there will be sufficient space for a batter between CH500 – 1150, and as such it is proposed to provide a retaining wall over this length. It is expected that this will be a relatively low height retaining wall and depending on height at any given location could potentially be a mix of fill retaining wall, backfilled Rigid F type barrier (with foundations as required), slip formed special kerb and / or batter steepening (subject to geotechnical investigation in future phases of design development).

    As an alternative, and in an effort to avoid abortive work in the future, consideration could be given to adopt a retaining wall alignment that facilitates the provision of an ultimate public transport corridor (refer Package PW15) should it be adopted in the future, noting that this expected to require significantly more work and cost earlier in the delivery cycle.

- **Glenloch Interchange** – The bus lanes are proposed to tie into the existing Parkes Way carriageway at the Glenloch interchange:
  - ***Eastbound*** – Public transport vehicles will use general traffic lanes through the interchange, with the eastbound bus lane being initiated immediately downstream of the southbound Caswell Drive to Parkes Way ramp. It is noted that there is potential to reconfigure the southbound Tuggeranong Parkway entry ramp such that the auxiliary turn lane be converted into a through lane (with geometric adjustments to the ramp and associated turn slot). The feasibility of such an approach could be considered in future iterations of design development to provide a dedicated bus lane through the interchange and improve public transport journey times and performance.
  - ***Westbound*** – The westbound bus lane is proposed to terminate downstream of the Tuggeranong Parkway southbound entry ramp, with public transport vehicles using general traffic lanes through the interchange (without the provision of the Package G4 upgrade). The locations of this termination, and the nearby general traffic Form One Lane merge zone will require refinement in future phases of design development to ensure safe operation of all movements



- **Clunies Ross Street Interchange** – There are two feasible options for routing the bus services into the city from the Clunies Ross Street Interchange:
  - ***Parkes Way*** – The bus lanes terminate at the west facing Clunies Ross Street Interchange western ramps with the bus route continuing in general traffic through to the city in the Parkes Way corridor. There is considered minimal benefit in extending bus lanes through the Clunies Ross Interchange and beyond as the lanes would likely need to terminate prior the interchange eastern ramps given the ramp merge / diverge interactions and the Acton Tunnel constraint, and the anticipated high capital costs associated with earthworks, widening of four bridges and additional retaining wall works.
  - ***Clunies Ross Street*** – Bus lanes are proposed to terminate (eastbound) / initiate (westbound) immediately west of the Clunies Ross Street Interchange west facing ramp tapers (proposed in Package PW10), with bus movements routing along the ramps with general traffic. Consideration may be given in future iterations of design development to extending the bus lanes onto the interchange ramps (particularly the exit ramp) to allow public transport vehicles to avoid queuing that may develop on the ramps. The City bus route would then run on Clunies Ross Street (either in general traffic or on dedicated infrastructure) and connect into the Barry Drive bus lanes.
  - **Delivery Staging** – A significant proportion of the overall upgrade cost is associated with delivering the westbound bus lane. Furthermore, it is noted that the AM peak (i.e. eastbound direction) experiences greater congestion than the PM peak, and therefore provision of the eastbound bus lane is likely to provide greater benefit. Hence there may be benefit is staging delivery of the bus lanes and prioritisation of the eastbound bus lane has the potential to provide substantially more value.

- **Other Design Considerations** – It is noted that the narrowing of the median will reduce the working width of the central wire rope safety barrier. As a result, it is possible that upgrade of this barrier to a TL4 system may be required. Alternatively, provision of the double-sided F type median barrier could be considered, noting that it could be located on the alignment proposed in Package PW15, thus avoiding future abortive works.

  Another important consideration is management of stormwater flows in the corridor. The increase in impervious area combined with the loss of shoulders is expected to require upgrade to the drainage system, particularly the introduction of additional inlets, to manage flow widths in the bus lane. Kerb realignment will also necessitate alteration to drainage infrastructure. It is noted that the recent Parkes Way Flood Study (Calibre, 2023) considered part of the Package PW14 site and did not identify any flooding hotspots in this area.

  It is also noted that the proposed road alignment retains existing road geometry which contains some departures from current standards (e.g. back to back horizontal reverse and compound curves and curves below minimum desirable radius). As such, the proposed design inherits these deficiencies. Furthermore, dedicating the shoulder to use by buses increases risks associated with these deficiencies, and there is potential for a reduction in stopping sight distance in some locations as a result of some of the proposed design elements. In response, there may be merit in operating buses at a maximum speed of 80 km/h when using the bus lane to mitigate these risks.

  It is anticipated that these additional design considerations will be investigated in future phases of design development.

Upgrade	PW15 – Ultimate Public Transport Corridor	Location	Parkes Way	Estimate Cost	$134M	Sheet	1 of 3

Problem Statement

The current ACT Transport Strategy 2020 does not provide a direct Rapid public transport link between the Molonglo Valley and the City. Instead, the strategy proposes indirect routing through / interchange at Belconnen and Cotter Road/Adelaide Avenue. The indirect nature of these proposed routes does not appear to be well aligned with the ACT's objective of encouraging mode shift to public transport, particularly for a new district such as the Molonglo Valley which is understood to be intended as an exemplar of sustainable development.

The Parkes Way corridor represents an ideal direct link between the Molonglo Valley and the City. However, it is understood that historic public transport planning exercises have been reluctant to route public transport in the corridor due to concerns about existing and forecast congestion on Parkes Way, and implications it will have for public transport operation and journey times.

As a result, and consistent with ongoing discussions within the Territory, as a potential alternative option the proposal seeks to identify an infrastructure upgrade that will facilitate the use of the corridor to provide a rapid transit route that utilises discrete and fully segregated infrastructure which is independent of general traffic lanes and will therefore not be compromised by any performance issues that exist on Parkes Way or may intensify in the future. The upgrade is intended to provide a dedicated corridor that can accommodate a direct, rapid and high frequency service between the two centres, allowing for bus rapid transit or light rail services in the long term, providing high standard public transport options for residents of the Molonglo Valley as it develops. It is noted that the ACT transport strategy and goals may require a revisiting in parallel to the development of this upgrade to ensure consistency between Territory policy, the Corridor Strategy, and its associated upgrades.

Site Description

The upgrade is proposed on the western portion of the Parkes Way corridor between the Glenloch Interchange and the Acton Tunnel. The upgrade proposes a discrete corridor for public transport that is fully segregated from general traffic within the Parkes Way corridor cross section. The site is located between the Molonglo Valley / Belconnen Districts in the west and the Canberra City precinct in the east.

The proposed infrastructure will facilitate a high quality rapid public transport connection between the Molonglo Town Centre and the Canberra City Centre. Located at the toe of Black Mountain, the surrounding topography is generally steep, however the existing Parkes Way carriageway alignment is relatively flat over the proposed site extent.

The site is bounded to the north by the Black Mountain Nature Reserve and Lake Burley Griffin to the south. The Black Mountain Nature Reserve is steep and densely wooded with native woodland over the length of the site, acting as a major constraint to the proposed upgrade. Similarly, the lake is also a significant constraint to the proposal, resulting in a confined cross section in which to provide the proposed public transport infrastructure. In addition, the eastern extent of the upgrade routes through the ANU campus.

There are currently no residential, commercial, or industrial land uses near the site, however part of the route has adjacent recreational uses (Black Mountain Peninsula parkland) and an educational precinct (the ANU campus).

Structures

The proposed upgrade is expected to require several new structures to create the segregated public transport corridor. It is anticipated that these will include:

- **Sullivans Creek Bridge** – The existing westbound road bridge over Sullivans Creek (refer right) will require widening (or alternatively a new, independent structure will be required) to accommodate the proposed ultimate public transport corridor. Should widening already have been undertaken for the Cycle Highway (project PW8), it may be possible to dedicate this deck area to the public transport corridor and construct a new additional structure to retain the Cycle Highway.
- **Retaining Walls** – It is anticipated that provision of the ultimate public transport corridor will require the provision of substantial retaining wall, including approximately 1200m of relatively high retaining wall (0-7.5m) adjacent to the eastbound carriageway at the tow of Black Mountain, if not constructed prior as part of the proposed PW12 upgrade. No geotechnical information is currently available to inform the design of this wall, however it is noted from site observations that the nature of the hillside is variable along the length of the proposed wall length. Some sections include exposed, weathered rock on the batter slope face, while other areas are covered in dense vegetation, indicating a soil layer of unknown depth. Given these observations, and noting that the retaining wall will cut into the toe of a steep hillside, it is considered likely that ground treatment including engineering measures such as soil nails and rock anchors will be required to ensure the integrity of the wall. Furthermore, depending on geotechnical conditions (to be investigated in future phases of design development), benching and / or rockfall fencing may be required to augment the retaining wall to protect road users.

In addition it is expected that a fill retaining wall will be required on the corridor approach to Acton Tunnel if a city route is preferred for the ultimate public transport corridor.

Active Travel

Whilst the proposed upgrade is unrelated to active travel infrastructure in and of itself, the upgrade proposes the facilitation of high frequency public transport services between the Molonglo Valley and the City which is expected to encourage mode shift to public transport. Public transport trips often have an associated active travel element, and as such the upgrade is considered likely to induce active travel with associated positive transport and health outcomes.

Safety

Between 2017 and 2021, there were numerous property damage accidents (green) recorded on Parkes Way between Glenloch and Clunies Ross Street Interchanges, in addition to several injury crashes.

By encouraging mode shift to public transport, the proposed upgrade is anticipated to reduce the number of private vehicle trips on Parkes Way which by extension, can be expected to reduce the number of vehicle crashes due to reduced crash exposure, in addition to reducing the number of multi vehicle crashes as result of decreased vehicle interactions.

However, it is noted that the project proposes minimal (1.0 m) shoulders. Whilst these shoulders provide some allowance for errant vehicle recovery, they are insufficient for emergency stopping or for emergency service vehicle access. Future iterations of design development may consider provision of emergency stopping bays in locations where the terrain suits to offset this risk.

Public Transport

There are currently no public transport services that route through the Parkes Way corridor. Package PW14 proposes an interim public transport upgrade to the corridor that will provide infrastructure intended to facilitate bus use of the corridor by creating dedicated bus lanes between the Glenloch Interchange and the Clunies Ross Street Interchange.

This ultimate upgrade (Package PW15) is intended to adapt existing infrastructure to facilitate use of the corridor for public transport services in the long term, including provision for light rail services. Whilst the likely type and number of services that will route along the Parkes Way corridor is uncertain at this time, for the purpose of the corridor strategy it is assumed that a high frequency service (with minimum headways of 10 minutes) between the Molonglo Town Centre and the Canberra City Centre will use the proposed infrastructure during peak periods.

Upgrade	PW15 – Ultimate Public Transport Corridor	Location	Parkes Way	Estimate Cost	$134M	Sheet	2 of 3

Options Considered

Notwithstanding several significant constraints to the development of the upgrade, there are key variants / alternatives of the design proposal that were considered in the identification of the ultimate public transport corridor on Parkes Way. Some of the key alternative options for the transport corridor that were considered included:

- **Median corridor** – The current upgrade proposal locates the ultimate transport corridor in the west bound verge of the Parkes Way corridor. An alternative approach that was considered located the corridor in the Parkes Way median. Whilst this approach is likely to have less onerous cross sectional requirements, accessing the alignment from both the east and western ends of the corridor was considered challenging and unlikely to provide an optimum solution.
- **Clunies Ross Street Corridor** – For the purpose of the corridor strategy it has been assumed that an ultimate public transport corridor between the Molonglo Valley and the City will route along Parkes Way corridor into the CBD. However, it is noted that a viable alternative could involve directing the ultimate public transport route along the Clines Ross Street corridor (similar to PW14) to connect into the Belconnen – City public transport corridor.
- **Clunies Ross Street Interchange** – Whilst the proposed design approach assumes that the ultimate public transport corridor routes at-grade across Lady Denman Drive at the Clunies Ross Street interchange, a viable alternative considered was to provide a grade separated crossing of the roadway. Whilst a grade separated solution is anticipated to have a substantially higher cost, it is expected that it would operate more efficiently for both public transport services and vehicles using the road network, and would provide a more desirable geometry for public transport vehicles through the interchange and towards the Sullivans Creek bridge. Notwithstanding, given the capital cost implications, a grade separated approach was preferred.
- **Acton Tunnel** – The current proposal provides corridor geometry that climbs at 5% up to Liversidge Street, requiring a 4m high retaining wall. Whilst this alignment meets the maximum desirable grade advised by the Territory for a light rail geometry, the route passes through the ANU campus and in close proximity to ANU buildings and residences. Furthermore, the alignment passes over the Acton Tunnel land bridge, and as such the structural feasibility and acceptability of the proposal requires confirmation. An alternative to this approach that was considered in development of the design was the provision of a new public transport tunnel adjacent to the existing Acton Tunnel. However, given the likely capital requirements of such a tunnel it has not been adopted in current design proposal.
- **Lady Denman Drive** – As an alternative to the proposed alignment of the ultimate public transport corridor between the Lonely Deck carpark and the Black Mountain Peninsula, closing Lady Denman Drive to private vehicles and converting it into a dedicated public transport corridor was considered. However, noting the Tourist Drive status of the Lady Denman Drive corridor, and the loss of network capacity associated with its closure, this approach was not preferred.
- **Southern verge corridor** – In order to minimise the impact in the northern verge associated with the widening of the corridor footprint, an option that aligned the public transport corridor in the vegetated embankment / buffer between Lady Denman Drive and the Parkes Way southern verge. This option requires a retaining wall between Lady Denman Drive and the public transport corridor in addition to a reduction in the Lady Denman Drive cross section width and likely reduction in the speed limit in that corridor. It is noted that stakeholder feedback indicated strong opposition to the loss of the landscaped buffer between these two roads.
- **Northern verge widening** – To accommodate the full ultimate proposed cross sectional footprint (inclusive of four general traffic lanes + public transport corridor), this option proposes widening into the northern verge. Whilst this approach avoids impact on Lady Denman Drive and its landscaped batter in the southern verge of Parkes Way, it requires a substantial length of high retaining wall at the toe of Black Mountain, including associated vegetation removal.

Constructability

Construction of the ultimate transport corridor will consist of two distinct zones:

- **Glenloch Interchange to Clunies Ross Street** – The proposed corridor alignment is immediately adjacent to the westbound Parkes Way carriageway. As such, construction in this zone will include works associated with the public transport corridor infrastructure on the southern edge of Parkes Way including hardstand / pavement / track slab / barrier immediately adjacent to live traffic on Parkes Way

  In addition, widening in the northern verge and the associated high retaining wall (if not already constructed as part of the PW12 upgrade) will be undertaken, requiring construction in close proximity to the eastbound carriageway of Parkes Way.

  Given the complexity of this construction, it is anticipated that delivery of the ultimate transport corridor will require careful staging and traffic management on Parkes Way and is likely to impact on the operation of this road for a substantial period.
- **Clunies Ross Street to Acton Tunnel** – The corridor will cross over the Lady Denman Drive requiring construction of an overbridge (or alternatively at-grade works) and potential night time closures to allow construction. Between Sullivans Creek and the ANU campus, the corridor alignment will again be in close proximity to the westbound Parkes Way carriageway and will have similar construction requirement as those to the west of Clunies Ross Street described above. Construction of the eastern end of the corridor extent proposed in this upgrade are in close proximity to ANU buildings and construction methodologies will need to consider the proximity of these sensitive receivers.

Project Interdependencies

There are several upgrades proposed for the Parkes Way corridor between the Glenloch interchange and the Acton tunnel. All of these upgrades have a degree of interdependence with the proposed ultimate public transport upgrade in the corridor, including:

- **PW8 - Molonglo to City Cycle Highway - Parkes Way Zone** – Geometric and cross sectional changes to the Parkes Way corridor associated with the ultimate public transport solution have the potential to impact the proposed Cycle Highway.
- **PW10 - Clunies Ross St Interchange Upgrade** – The configuration of the proposed upgrade of the Clunies Ross Street interchange may be influenced by the ultimate public transport solution depending on the preferred approach to routing the corridor through / around the interchange.
- **PW12 - Midblock Capacity Upgrade - Glenloch to Clunies Ross St** – Geometric and cross sectional changes to the Parkes Way corridor associated with the capacity upgrade will require coordination / consideration of the proposed capacity upgrades in the corridor. The PW12 design proposes construction of a retaining wall in the northern verge of the corridor on its ultimate alignment (i.e. to suit the cross sectional requirements of the PW15 package). Should the ultimate retaining wall alignment for PW15 be delivered as part of the PW12 package, a robust level of design development will be required on PW15 to ensure the alignment is appropriate.
- **PW14 - Public Transport Corridor – Interim Solution** – Geometric and cross sectional changes to the Parkes Way corridor associated with the ultimate public transport upgrade will require coordination / consideration in the development of the proposed interim public transport upgrade. The performance of this interim solution will also influence the need for the ultimate upgrade.
- **G5 - Glenloch Interchange – Ultimate Public Transport Corridor** – The proposed upgrade connects into the eastern extent of the G5 package, and as a result there is a geometric interdependence between the two packages, noting that they are likely to require a concurrent delivery to provide an operational public transport service.
- **PW12 – Midblock Capacity Upgrade – Parkes Way West** – A capacity upgrade of the Parkes Way corridor between the Glenloch Interchange and Clunies Ross Street has the potential to influence the geometry and cross section of both Parkes Way carriageways, and may be influenced the changes proposed as part of the ultimate public transport corridor upgrade.

The proposed solution crosses the Clunies Ross Street / Lady Denman Drive corridor. However, it is noted that one alternative could route the ultimate public transport corridor along the Clunies Ross Street corridor to join the established Belconnen – City corridor. These corridors are not part of the Parkes Way Corridor Strategy, and enhancements to Clunies Ross Street are likely to be required to ensure that public transport operates at an acceptable level of service should it be routed along this corridor in its ultimate configuration. These upgrades will require investigation as part of a separate exercise.

Upgrade	PW15 – Ultimate Public Transport Corridor	Location	Parkes Way	Estimate Cost	$134M	Sheet	3 of 3

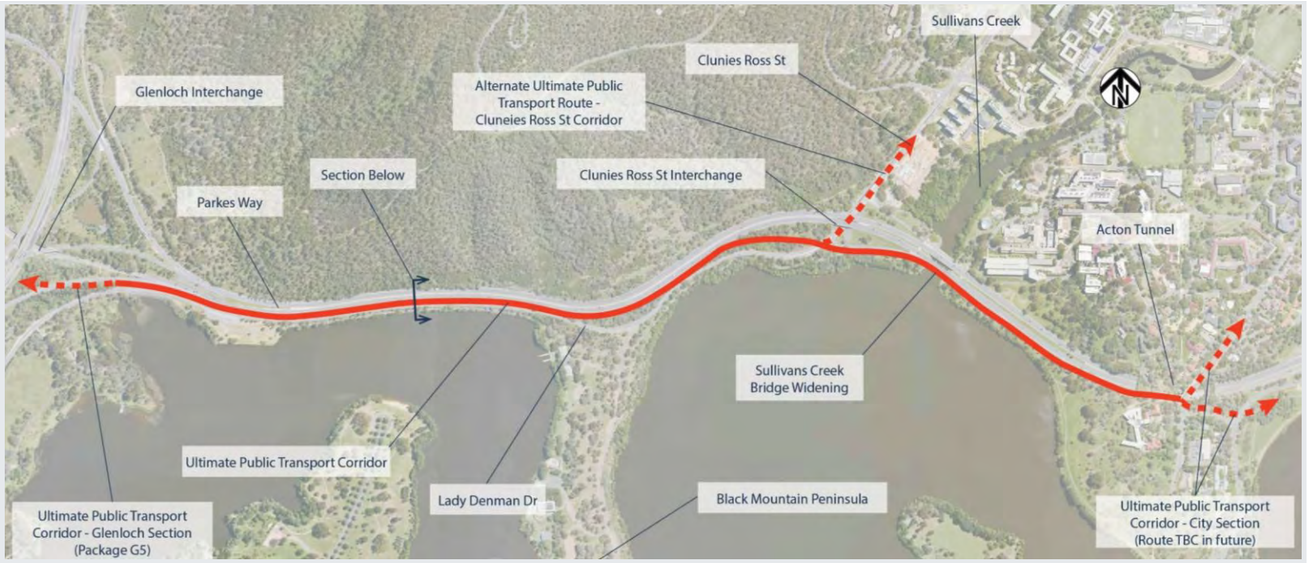
Option Details

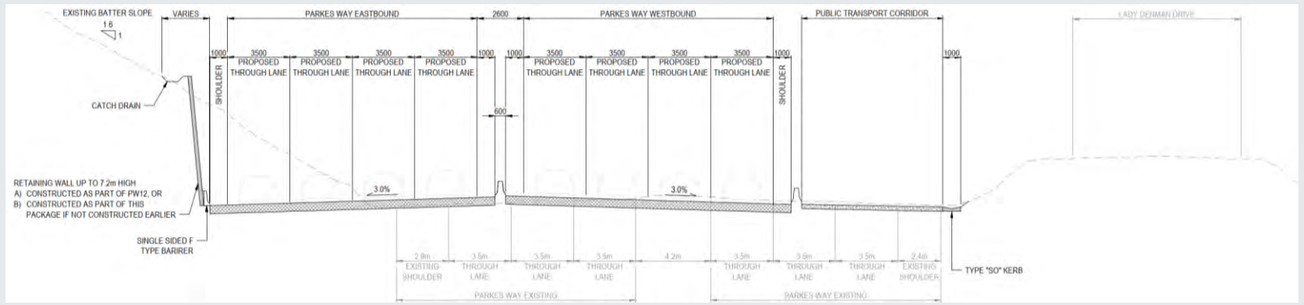
The proposed ultimate approach to providing public transport infrastructure in the Parkes Way corridor involves provision of a dedicated and segregated public transport corridor that will operate independent of general traffic lanes and provide free flow conditions for public transport vehicles whilst in the Parkes Way corridor. The upgrade assumes that a minimum clear 8.4 m wide corridor is required to accommodate public transport vehicles, and is proposed across several distinct zones:

- **Glenloch Interchange** – Routing of the ultimate public transport corridor through the Glenloch Interchange presents significant geometric challenges. The proposed approach is presented in Package G5.
- **Glenloch to Clunies Ross Street** – The provision of the public transport corridor through this zone is highly constrained by local natural features (Black Mountain and Lake Burley Griffin) and existing transport infrastructure (Parkes Way and Lady Denman Drive). Key design elements include:
  - ***Parkes Way*** – It is proposed to widen the Parkes Way corridor into the northern verge Black Mountain hillside toe, accommodating the four lanes of general traffic as proposed in Package PW12. Due to the spatial requirements of the public transport corridor the design proposes narrowing of the mainline median to provide 1 m offside shoulders and a central rigid (concrete F Type) barrier. Similarly, it is proposed to utilise 1 m nearside shoulders.

    As noted in Austroads GRD, shoulder width is influenced by several factors including traffic volumes and operating speed, and full width shoulders (2.5-3.0 m) are general preferable from a safety and operational perspective, including on both sides of the carriageway when there are three or more traffic lanes. However, the adoption of these narrow shoulders is a design compromise in response to the spatial constraint of the site. This aims to minimise the carriageway footprint, impacts on adjacent land and vegetation, in addition to minimising the height, complexity and cost of required retaining walls. Notwithstanding, future phases of design development will need to consider shoulder width in the context of the operating speed of the corridor, noting that a reduction in posted speed may be warranted for safety reasons.
  - ***Public Transport Corridor*** – The proposed ultimate public transport corridor is aligned on the southern edge of Parkes Way at the toe of the Lady Denman Drive batter. In order to minimise the spatial requirements for the corridor it is proposed:
    a) To use rigid F-Type Barriers between the Parkes Way mainline and the public transport corridor
    b) To provide cut retaining walls (approx. 0 – 7.5m high) at the toe of the Black Mountain hillside.

    The proposed alignment of the ultimate public transport corridor is subject to several physical constraints and typically adopts the geometry of the existing Parkes Way carriageways. This approach, in addition to some localised requirements, results in some design deficiencies and non-conformances such as a proposed R170m curve at the Sullivans Creek Bridge western approach. As a result, there may be a requirement for localised operational speed restrictions at selected locations along the corridor where geometry is non-compliant or where specific mode requirements dictate (e.g. coincident vertical and horizontal curve restrictions associated with light rail). It is expected that future phases of design development will adapt the proposed corridor geometry when more information on the requirements of the preferred public transport mode and vehicle type and specifications is available. Should light rail ultimately be the preferred mode in the corridor, spatial allowance for operational and maintenance requirements will require investigation and incorporation into future design development.
  - ***Lady Denman Drive*** – It is proposed to retain Lady Denman Drive on its current alignment and configuration.
- **Retaining Walls** – The proposed widening in the northern verge impacts native vegetation and the toe of the Black Mountain hillside. In order to minimise this impact, the upgrade proposes a retaining wall adjacent to the eastbound carriageway. It is noted that the PW12 Package proposes construction of the wall on its ultimate alignment proposed in this package (PW15). The wall alignment is proposed in its ultimate location in order to accommodate the final Parkes Way Corridor cross section without further adjustment or abortive works.





It is noted that this wall will retain the toe of an over-steep hill face and is likely to require additional anchoring to ensure its stability (refer below for further discussion). Notwithstanding the intent of utilising a retaining wall to minimise corridor footprint, it is anticipated that the wall alignment will incur into Black Mountain Nature Reserve, albeit on blocks that have Territory custodianship. The planning implications and requirements associated with this wall alignment will require further investigation in future iterations of design development

- **Clunies Ross Street**– The upgrade has notable implications for various parts of the Clunies Ross Street corridor, including:
  - ***Interchange*** – The westbound interchange ramps impact on the alignment of the proposed public transport corridor. Furthermore, the current proposal routes the public transport corridor through the interchange and will require incorporation into the westbound ramp terminal intersection, inclusive of intersection priority to ensure that public transport service journey times are optimised.
  - ***Alternate corridor*** – The Clunies Ross Street corridor offers an alternate route for the public transport corridor. Whilst the corridor is relatively narrow, and its adoption would face spatial challenges, it would allow public transport services to link into the Belconnen – City (Barry Drive) trunk public transport route, and avoid significant constraints to the east including Sullivans Creek, the Acton Tunnel, the ANU campus, and the highly constrained CBD road network. The viability of this alternate corridor would require investigation as part of a separate assessment.
- **Clunies Ross Street to Acton Tunnel** – Similar to the corridor design to the west, it is proposed to align the route immediately adjacent to the Parkes Way westbound carriageway. The corridor in this zone would be required to fly over Sullivans Creek, and climb over the Acton Tunnel land bridge through the ANU campus. It is anticipated that realignment of the proposed Cycle Highway will be required to accommodate the proposed corridor, depending on the preferred option to route both cyclists and public transport into the city.
- **City Zone** – There are several options for the route of the public transport corridor into the city, including several outside the Parkes Way corridor. Numerous factors outside / not considered by the Corridor Strategy will influence the preferred route in the city zone, and will require investigation as part of a separate assessment.
- **Stormwater and Utility Infrastructure** – Given the realignment of some carriageway edge lines (particularly in the westbound direction) proposed in the upgrade, it is anticipated that adjustment to the local stormwater drainage system will be required. It is noted that the recent Parkes Way Flood Study (Calibre, 2023) assessed part of the Parkes Way corridor considered in this upgrade package, and identified a flooding hotspot on Clunies Ross Street in the vicinity of the interchange. The flood study proposes augmentation of the existing stormwater system to address local flooding issues. It is considered that these stormwater upgrades will require delivery prior to (or as part of) delivery of Package PW15, and it is noted that further augmentation may be required depending on the flood immunity requirements of the ultimate public transport corridor.

Upgrade	PW18 – City Cross-corridor Active Travel Improvements	Location	Parkes Way	Estimate Cost	$30M	Sheet	1 of 2

Problem Statement

Currently there are only two pedestrian crossings of the 1.5 km stretch of Parkes Way corridor between the Commonwealth Avenue bridge and the Wendouree Drive underpass. As a result, the dual carriageways of Parkes Way are a significant physical barrier between the City and Commonwealth Park / the lake foreshore. Furthermore the standard of these two crossing locations is considered inconsistent with their importance and role within the active travel network.

The Allara St bridge is relatively narrow, has steep grades and relatively low handrails for a shared pedestrian / cycle route. In addition, the ANZAC Park West underpass is relatively narrow, has limited vertical clearance and subsequently is relatively dark. Notwithstanding the additional crossing location proposed as part of the Coranderrk Street Interchange upgrade, the current low standard of pedestrian connectivity across this section of the corridor compromises safety and the attractiveness of active travel in the city.

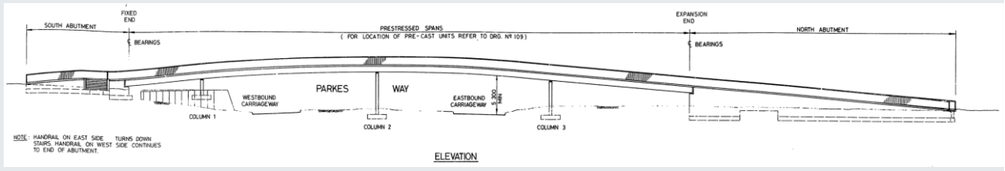
Site Description

The upgrade is proposed at two locations across Parkes Way on either side of the Coranderrk Street intersection. The sites are located at the two existing pedestrian crossings of the Parkes Way corridor, adjacent to Allara Street (overbridge - below right) and ANZAC Park West (underpass - right), and are intended to maintain service of the existing routes between the city and Commonwealth Park.

Parkes Way on both approaches to the sites is a dual carriageway condition with two lanes in each direction. The Parkes Way corridor in this area has a distinct character with a tree-lined southern verge and a wide grassed median. The road corridor primarily serves a movement function and conveys high volumes of traffic in both AM and PM peak periods.

The existing Parkes Way overpass bridge at Allara Street is a precast concrete active travel bridge, constructed in 1979 (refer below). It has a maximum span of 27.0m that provides a 2.4m wide path over the corridor, with a maximum grade of 8% and an approximate clearance of 5.3m (as per the work-as-executed drawings). The bridge connects the path on Allara Street adjacent to the Civic Pool site into Commonwealth Park. The ANZAC Park West site utilises a concrete box culvert underpass structure under the Parkes Way mainline, with a minimal longitudinal fall (approximately 0.4%) and a gap in the central median to daylight the underpass.

The surrounding terrain is relatively flat, with the site flanked to the south by Commonwealth Park (an important feature of the National Capital), with Civic Pool, the future University of NSW (UNSW) site and ANZAC Park West to the north. Verges on approaches to both sites contain a mix of native and exotic vegetation. Furthermore, Commonwealth Park lies on the Lake Burley Griffin foreshore and also features a diverse array of native and exotic plantings. The sites can be considered set in an urban environment on the edge of the Canberra City CBD, with a mix of surrounding land uses including recreational, residential, commercial, and (future) educational.



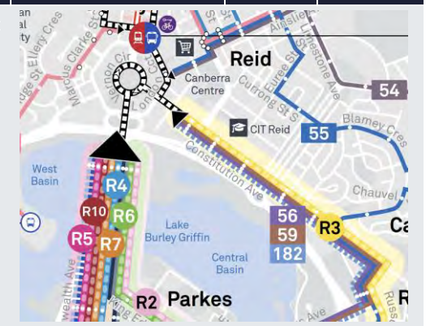
Active Travel

There are two significant active travel routes that exist in close proximity to the corridor, including both on Constitution Avenue and in Commonwealth Park. Furthermore, the Civic Cycle loop incorporates dedicated cycle infrastructure on Allara Street that extends across the existing Allara Street bridge - see Route C8 in the extract of the CBR Cycle Route Map (Transport Canberra –right).

The Allara Street bridge therefore provides an important link in the active travel network for cyclists and pedestrians looking to access Commonwealth Park from the City. As such, existing shortcomings of the bridge in the context of current standards create important safety, amenity, accessibility and capacity deficiencies. The design proposal attempts to address these deficiencies to the extent possible within the constraints of the site.

Similarly, the ANZAC Park West site provides an important connection between the Constitution Avenue path / the City and Commonwealth Park. Whilst the existing structure is marginal in terms of path width in the context of current standards, it is relatively dark, long and low with poor passive surveillance and is generally unattractive for pedestrians and cyclists. Furthermore, with a substantial increase in both pedestrian and cyclist demand expected from proposed adjacent developments, particularly the UNSW campus, the existing underpass is considered unlikely to be an appropriate standard in the long term. The proposed upgrade will provide a wider link that has a shorter structure with increased clearance, improving the capacity, urban design, safety and CPTED (Crime Prevention through Environmental Design) characteristics of the connection.

Public Transport



It is also noted that the upgrade is aimed at encouraging mode shift to active travel, and as such may have a minor impact on demand for other modes, potentially reducing private vehicle use and public transport trips. However, the upgrade is considered unlikely to have a substantive impact on public transport patronage.

In terms of public transport services, there are currently no public transport services that use the Parkes Way corridor in the region of the upgrade (refer to the extract from the 2023 Transport Canberra Network Map). Furthermore, it is understood that there are currently no plans to introduce new public transport services into this part of the corridor. As such, it is considered unlikely that the upgrade will have substantive implications for public transport operations within the corridor.

Constructability

All construction elements of the upgrade are considered conventional, and construction is unlikely to require novel construction techniques. However, it is noted that the Allara Street bridge will require substructure construction adjacent to live traffic and may necessitate traffic management at certain points during construction. Furthermore, lifting of the span elements / girders into place will be required over the Parkes Way carriageways and will likely require temporary off-peak closures (likely evening) and detours and/or contraflow operation of the mainline carriageways.

In contrast, the upgrade of the ANZAC Park West underpass will have a significant impact on the operation of the Parkes Way mainline as it will require demolition and then construction under the existing operational carriageway. It is anticipated that it will require the provision of substantial traffic management and side track running during construction. However, as noted above, if not constructed prior to the PW2b and PW3c packages, it is considered likely that the upgrade of this underpass will be included as part of the delivery of one, if not both, of these other packages, providing substantial construction efficiencies and reducing relative impact on road users.

A recent Infrastructure Study on the Parkes Way corridor (KBR, 2022) indicated that several utilities exist across both sites and will require management, and potentially relocation during construction. These utilities include underground power, telecommunications, gas and water infrastructure in addition to stormwater systems.

Structures

The upgrade proposes two new bridge structures across the corridor to replace existing structures. An active travel overpass carrying pedestrians and cyclists is proposed over the Parkes Way carriageways adjacent to Allara Street. This bridge is expected to have several spans with an anticipated maximum span in the order of 25-30m. Given the location and prominence of the renewed overpass, consideration could also be given to including architectural elements as part of the bridge's design.

The underpass structure near ANZAC Park West is also on the alignment of the existing structure. It is expected that this structure will be a short span bridge or box culvert, potentially utilising precast planks or cast in-situ concrete. A precast concrete arch structure may also be considered as an alternative approach to the structure.

It is expected that both structures will have associated retaining walls. The overpass structure at Allara Street will require retained fill on both approaches to the bridge. Retaining walls will also be required to retain the carriageway formation at both entrances to the ANZAC Park West underpass and also in the median.

It is noted that structural design has not been undertaken as part of the development of this Corridor Strategy, and structure types and configurations will require confirmation in future iterations of design development.

Project Interdependencies

There are two upgrades proposed for the Parkes Way corridor in the vicinity of the proposed interchange. These upgrades have a degree of interdependence with the proposed interchange including:

- **PW2b – ANZAC Parade Interchange** – An upgrade of the existing ANZAC Parade roundabout intersection to a grade separated interchange is proposed to resolve congestion issues at that site. The road geometry proposed in the PW2b upgrade, and the associated narrowing of the corridor footprint, impacts the length of underpass required at the proposed ANZAC Park West upgrade site.
- **PW3c – Coranderrk Street Interchange** – An upgrade of the existing Coranderrk Street roundabout to a grade separated interchange is proposed to resolve congestion issues at that site and will provide an additional active travel crossing of the corridor. Coranderrk Street is approximately 300 m to the east of the Allara Street bridge and 400 m west of ANZAC Park west underpass. This new active travel crossing will enhance the active travel network and permeability across the corridor, and it is noted that provision of the Coranderrk Street Interchange crossing may obviate the need for, or alternatively delay the delivery of, the Allara Street Bridge.

  Furthermore, the road geometry proposed in the PW3c upgrade, and the associated narrowing of the median and the overall corridor footprint, impacts the length of underpass required at the proposed ANZAC Park West upgrade site and potentially the siting of the Allara Street bridge substructure elements.

Given the nature and interdependence of the two above packages and the ANZAC Park West underpass, it is considered likely that there will also be concurrent delivery of these packages.

Upgrade	PW18 – City Cross-corridor Active Travel Improvements	Location	Parkes Way	Estimate Cost	$30M	Sheet	2 of 2

Options Considered

There were various options considered to improve active travel connectivity with the City, Commonwealth Park and the Lake. Variants of options considered include:

- Relocating active travel crossing sites
- Retaining and enhancing existing active travel infrastructure (e.g. improving/retaining handrails on the Allara Street Bridge)
- Various structure types, sizes and width

Further to these options, there is an expectation that the Civic Pool site will be the subject of a significant civic development at some stage in the future. It is possible that this development will incorporate notable public domain features, which could include a shared path bridge access over Parkes Way and into Commonwealth Park. Such infrastructure would supersede the options considered here.

Safety

Given the standard of the existing active travel infrastructure, including the relatively narrow widths, steep grades and low handrail heights of the Allara Street bridge (and mix of pedestrians and cyclists) and the long and poorly lit nature of the ANZAC Park West underpass, the proposed improvements at these sites are expected to improve safety by:

- Increasing path widths, allowing pedestrians and cyclists to more safely pass
- Increasing handrail heights to provide a more robust barrier for cyclists to a vertical drop over live traffic
- Increasing underpass height and width, creating a safer environment with improved passive surveillance

It is noted that a broad safe systems assessment will be undertaken as part of the Parkes Way Corridor Strategy, which will include consideration of the safety implications of this upgrade. This assessment will be documented separately in the Corridor Strategy.

Option Details

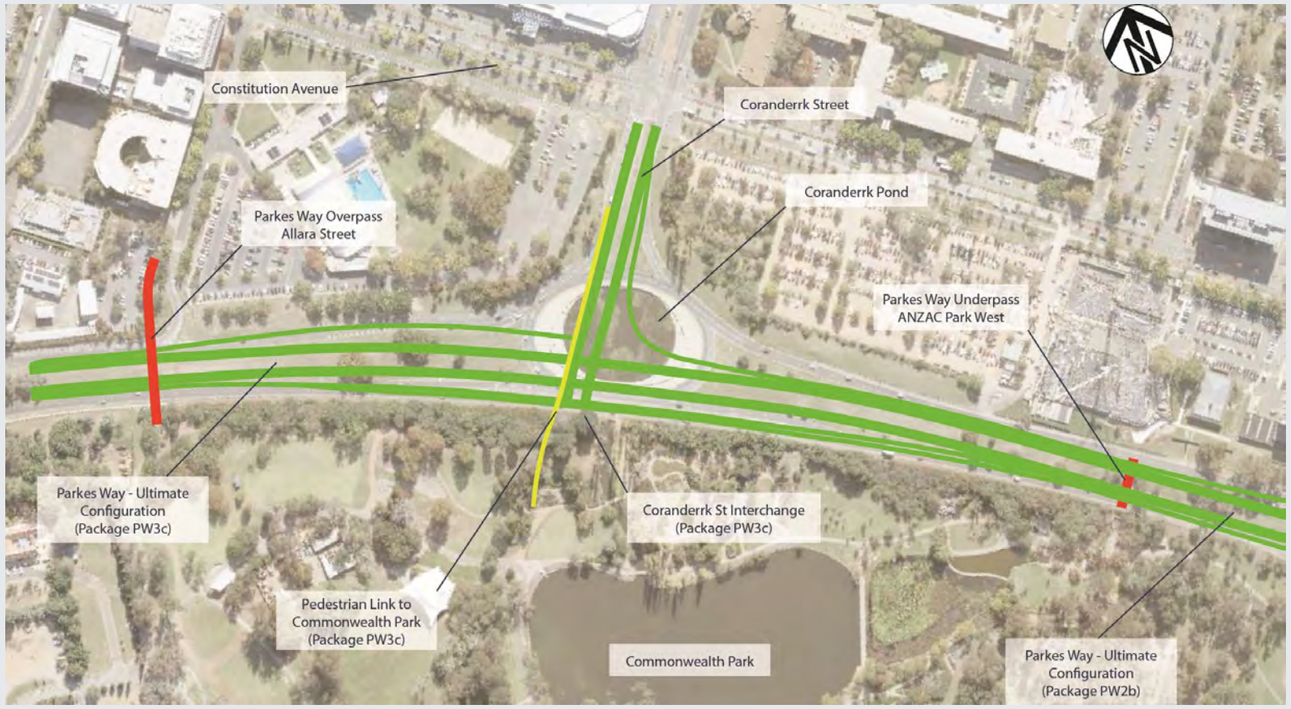
It is proposed to upgrade two existing active travel crossings of the Parkes Way corridor between Commonwealth Avenue and ANZAC Parade. It is intended that these upgrades will complement a proposed new active travel crossing in the Coranderrk Street corridor that will be delivered as part of the Coranderrk Street Interchange. The details of the two proposed upgrades are as follows:

- **Parkes Way Overpass - Allara Street** – The existing Parkes Way overpass at Allara St does not meet current standards in terms of grade, width and handrail height. As one of only two existing connections into Commonwealth Park for the 1.5 km stretch east of Commonwealth Avenue, and as part of the City Cycle Loop, it is an important link in the active travel network and in the context of the pedestrian and cyclist mix that use the bridge, it is a relatively unsafe and unattractive connection.

  In the absence of a major development of the Civic Pool site that incorporates a new active travel overpass access into Commonwealth Park, the upgrade aims to address these deficiencies to the extent possible given the site constraints by renewing the existing structure, noting that it has utilised approximately 45 years of its design life.

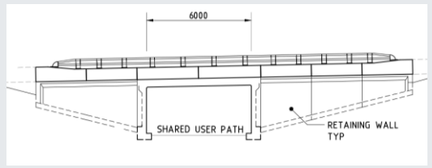
  The design proposal involves the provision of a new bridge on the existing alignment, which features the following elements and design characteristics:

  - ***Cross Section -*** A wide cross section that provides 4 m clear width between barrier railings. This width is wider than general Territory requirements for shared paths but acknowledges the importance of the route, likely demand and capacity requirements, and makes improved allowance for interaction between pedestrians and cyclists in the context of the relatively steep grades of the overpass.
  - ***Grades -*** Given an existing carpark access on Allara Street, the vertical geometry of the proposed bridge necessarily needs to tie into the existing surface around its current location. Noting the vertical clearance requirements over Parkes Way, it is anticipated that the shared path on the bridge will require grades in the order of 7-8%. This is higher than the desirable maximum of 5% recommended in guidelines, however this departure from standard appears unavoidable given the constraints of the site.
  - ***Railings*** - Noting that the bridge will contain a shared path and forms part of the City Cycle Loop, and given the expectation of relatively high cycle demand, it is proposed to provide 1.4 m high railings on the bridge.
  - ***Throw screens*** - Depending on the outcome of a risk assessment in future phases of design development, protective screens to prevent projectiles being launched from the overpass bridge may be incorporated into the upgrade.
- **Parkes Way Underpass – ANZAC Park West** – The existing Parkes Way underpass is relatively low, narrow and long. Whilst the underpass daylights in the Parkes Way median, it is dark, has poor passive surveillance and is an unattractive active travel connection across the corridor (refer below).



Noting future local developments to the north of Parkes Way, including the proposed UNSW Canberra campus, there is expected to be a significant increase in active travel demand across the corridor at this site, and the existing underpass is unlikely to be suitable or appropriate to cater to this demand.

Furthermore, given the works proposed as part of the ANZAC Parade Interchange (Package PW2b) and the Coranderrk Street Interchange (Package PW3c), the future Parkes Way footprint is expected to be narrower than existing, rendering the existing underpass substantially longer than necessary, in addition to requiring extension of the existing concrete culvert structure in the median, and reducing natural daylight within the underpass. The provision of a renewed underpass at the site, coordinated with other Parkes Way upgrades, would provide the opportunity to construct a shorter, wider and higher underpass structure at the site.



The design proposal involves the provision of a new concrete structure (box or bridge) on the existing underpass alignment, which features the following elements and design characteristics:

- ***Cross Section*** - The underpass would have a notional width of 6.0 m and a height ranging between 3.6 – 4.0 m (TBC in future iterations of design development)***Grades*** - The proposed underpass design aims to retain the existing longitudinal grade of 0.4 - 0.5% along approximate underpass lengths of 13.0 m and 20.0 m under the eastbound and westbound Parkes Way carriageways, respectively.
- ***Barriers*** - A combination of flexible and rigid barriers will be required on approach and over the structure to the protect the vertical drop associated with the underpass.
- ***Retaining Walls*** – New retaining walls will be required to retain earth at the underpass entrances and in the median.

It is noted that nearby flooding issues have been identified at the Coranderrk Pond site. Given the guidance provided in the flood study it is not anticipated that the upgraded active travel crossings will have implications for the flood regime in the area.

Upgrade	G2 – Glenloch Interchange – Eastbound to Northbound Ramp	Location	Parkes Way	Estimate Cost	$27M	Sheet	1 of 2

Problem Statement

The Glenloch interchange is a system interchange between two of the most significant transport corridors in Canberra - the east-west Parkes Way (and its extension William Hovell Drive), and the north-south Tuggeranong Parkway / Caswell Drive corridor. Whilst being a system interchange, it does not provide all movement connectivity including an appropriate connection from the west (William Hovell Drive) to the north (Caswell Drive). It is understood that this network planning decision pre-dated planned development of the Molonglo Valley district.

Whilst there is an existing link at the interchange for eastbound to northbound movements, this connection has significant departures from standards with no auxiliary deceleration lane on departure, deficient geometry, and a priority controlled entry to a high speed, high volume freeway environment. With development in the Molonglo Valley and West Belconnen, this connection is expected to experience increasing demand, and existing safety concerns will be exacerbated.

Site Description

The upgrade is a proposed in the north west quadrant of the Glenloch Interchange, broadly on the alignment of the existing road connection between William Hovell Drive and Caswell Drive. The site is located in the south east corner of the Belconnen District, bordering both the Molonglo Valley and Central Canberra.

The proposed ramp will link eastbound William Hovell Drive (currently a dual carriageway with two lanes in each direction) to Caswell Drive northbound (also a dual carriageway with two lanes in each direction), extending for approximately 1.2 km. Site topography can be described as rolling over the length of the ramp, with William Hovell Drive on approximately a 4.6% decline at the ramp diverge, and Caswell Drive on a 3.3% incline at the ramp merge.

There is an existing two way road access to the GDE Memorial carpark (also known as the Nature Reserve parking) that links William Hovell Drive to Caswell Drive within the proposed upgrade site. In addition there is a shared user path through the site that routes from paths in the east (on William Hovell Drive and from the Arboretum through to an active travel underpass of the Glenloch interchange. There is also a substantial drainage line running through the site.

The site is surrounded by the Aranda Bushland Nature Reserve which has a mix of grassland and woodland. There are currently no residential, commercial, or industrial land uses near the site.

Active Travel

The existing mainline carriageways on William Hovell Drive and Caswell Drive have 2 – 2.5 m wide on-road cycle lanes. Furthermore, there is a 2.5 m shared path in the north-west quadrant of the Glenloch Interchange that connects an offroad cycle network to the west towards Bindubi St and east to the Parkes Way corridor and on into the city.

It is intended to divert the 2.5 m wide off road shared path to suit the proposed ramp alignment. This is expected to involve path realignment, including a grade separated culvert underpass of the ramp and connection to the Bicentennial National Trail. The path realignment is proposed to incorporate removal of an existing culvert underpass and introduction of an at-grade crossing of the carpark access road, noting that the existing underpass is not compatible with the proposed ramp alignment and that the carpark access is expected to experience very low vehicular traffic volumes.

Management of on-road cyclists on both William Hovell Drive and Caswell Drive across ramp diverge and merge auxiliary lanes will be achieved by the provision of standard at grade ramp crossings.

Public Transport

There are currently no public transport services that route through the proposed site. In response to the development of the Molonglo Valley district, it is understood that public transport services including Rapid, high frequency direct services between the district and the CBD may be introduced, likely routing along Parkes Way. If this was to be realised it is likely that these services would pass the proposed ramp. It is unclear if any public transport services would use the ramp, however given the ramp is expected to have substantial latent capacity, it is considered that the ramp could comfortably support bus services if required.

Options Considered

Given that there are limited practicable options for alternative ramp arrangements at this site, only a direct ramp connection between William Hovell Drive and Caswell Drive was considered in the development of the Corridor Strategy.

Project Interdependencies

Given its proximity to the existing Bindubi St intersection, provision of the ramp is likely to impact on the operation of the proposed Bindubi St Interchange considered in Package G6. In particular, the auxiliary lane associated with the Bindubi St interchange eastbound entry ramp extends past the proposed location of the diverge taper of the G2 ramp and as such directly interfaces with this project.

Furthermore, the project influences demand on the corridor and therefore impacts on the operation of the Glenloch Interchange and Parkes Way to the east. Therefore, any upgrades on the corridor proposed immediately to the east of the G2 site are likely to have operational interdependencies with this project.

Safety

Between 2017 and 2021 there were no recorded crashes on the existing William Hovell Drive to Caswell Drive link road. Furthermore, only two property damage accidents were recorded at the access points to this connection. Notwithstanding this accident history, the existing access arrangements are considered highly substandard and unsafe in the context of their configuration, speed regime of both roads, and current traffic volumes. Furthermore, with significant forecast changes to demand on the link as the Molonglo Valley and West Belconnen are developed, such historical crash patterns are likely to underrepresent what will happen in the future.

The proposed upgrade is expected to significantly improve the safety of this connection.

The safe systems implications of the proposed upgrade have been further considered and assessed in an International Road Assessment Programme (iRAP) analysis of the corridor that has been documented separately in the Corridor Strategy report.

Structures

One structure is considered likely to be required as part of the delivery of the proposed ramp. A skewed box culvert (or alternatively precast concrete arch) active travel underpass of the proposed ramp will be required to safely convey pedestrians, cyclists and equestrian users of the path network across the ramp alignment without interacting with vehicles travelling at high speeds. This underpass will also serve to retain access to the Aranda Bushland Nature Reserve from the GDE Memorial Carpark. Given the proximity to the William Hovell Dr underpass and spatial constraints, it is considered likely that retaining wall will be required at the culvert face.

It is anticipated that the existing culvert underpass of the GDE Memorial Carpark access road will be demolished (unless also required for drainage) as its location is not appropriate given the alignment of the proposed ramp.

It is noted that structural design has not been undertaken as part of the development of this corridor strategy, and structure types and configurations will require confirmation in future iterations of design development.

Constructability

All construction elements of the upgrade are considered conventional, and construction is unlikely to require novel or complex staging. Auxiliary lanes on Wiliam Hovell Drive and Caswell Drive will require construction adjacent to live traffic and implementation of an appropriate traffic management regime will be required. Otherwise, all construction is off-line and can be constructed using standard construction approaches.

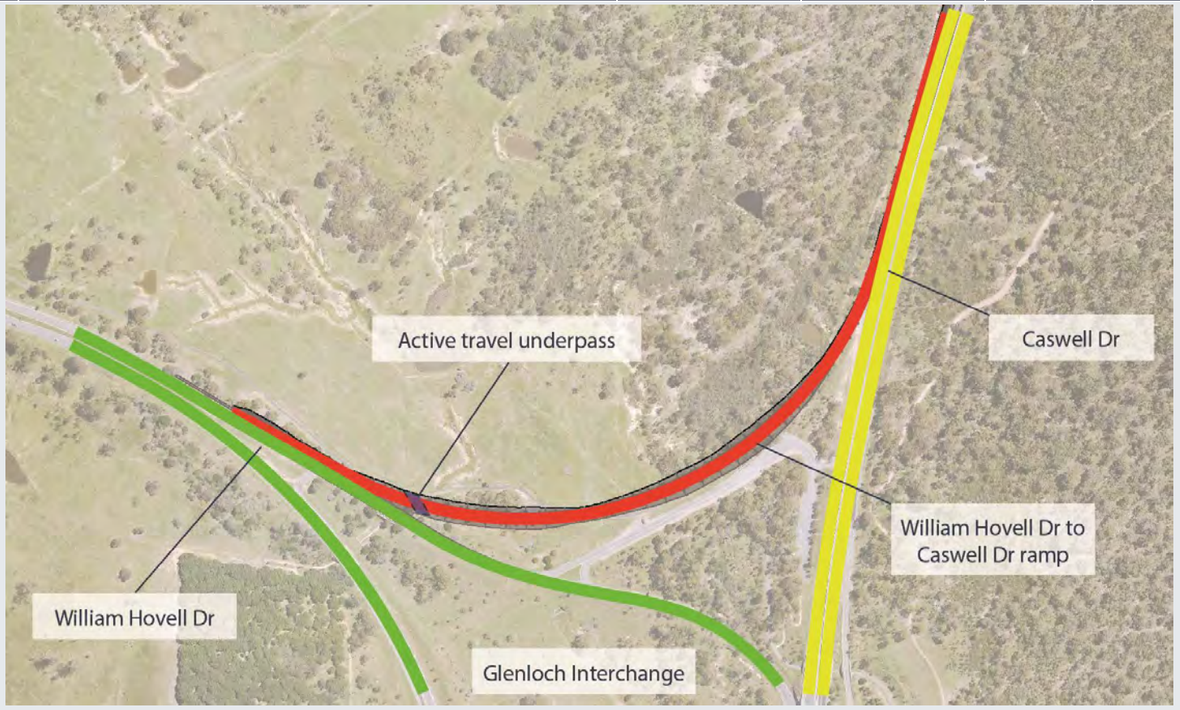
Upgrade	G2 – Glenloch Interchange – Eastbound to Northbound Ramp	Location	Parkes Way	Estimate Cost	$27M	Sheet	2 of 2

Option Details

The ramp design has been developed to enhance safety and operational performance of the connection from William Hovell Drive to Caswell Drive. The ramp design consists of the following primary elements:

- **Ramp Access and Egress** – Auxiliary lanes have been proposed to facilitate diverge and merge movements on William Hovell Drive and Caswell Drive. The auxiliary ramp on entry to Caswell Drive will require pavement widening and minor earthworks. It is noted that in the context of the relatively low forecast demand on the ramp, and the proximity to the proposed Bindubi St entry ramp (Package G6), a minimum treatment exit ramp diverge (i.e. exit ramp diverge without an auxiliary lane) may be appropriate and should be considered in future design iterations.
- **Ramp Geometry** – The single lane ramp is expected to convey relatively low volumes, however has been designed to allow vehicles to retain the existing / potential future operating speed (100 km/h) of the two mainline carriageways throughout the ramp to avoid the need for deceleration/acceleration through the ramp, reducing travel times, vehicles operating costs and safety. Furthermore, the alignment allows retention of the Old Caswell Drive access to the GDE carpark.

  However, it is noted that the proposed alignment requires native vegetation removal with attendant environmental implications. This environmental impact could be mitigated through adoption of a smaller radius horizontal curve radii for the ramp, noting that a departure from standard would likely be required. Furthermore, a revised alignment and a lower standard of geometry (i.e. tighter curve radii / lower design speed) has the potential to allow for the reuse of part of the existing carriageway and associated pavement / road infrastructure. This approach will require further investigation in future design iterations, noting that it may compromise access to the GDE carpark from William Hovell Drive.
- **GDE Memorial Carpark** – To improve safety outcomes, it is proposed to remove direct access to / from the GDE Memorial Carpark from Caswell Drive, such that access to the carpark is only from William Hovell Drive. Safety could be further improved by providing deceleration / acceleration auxiliary lanes to this access from William Hovell Drive. Alternatively, access could be retained from Caswell Drive, with safety improved through the provision of a northbound deceleration lane.
- **Active Travel Path** – The existing active travel path at the site is compromised by the introduction of the ramp and will require realignment. Given the relatively high speed and free flow nature of the ramp, an at-grade crossing of the ramp for active travellers is considered inappropriate and grade separation has been proposed through the provision of an underpass.
- **Stormwater** – The proposed ramp alignment crosses several drainage lines. It is anticipated that a number of transverse drainage culverts will be required to convey stormwater flows (number and size to be confirmed in future phases of design development) across the ramp alignment.



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Upgrade	G4 - Glenloch Interchange – Interim Public Transport Corridor	Location	Parkes Way	Estimate Cost	$20M	Sheet	1 of 2

Problem Statement

The current ACT Transport Strategy 2020 does not provide a direct Rapid public transport link between the Molonglo Valley and the City. Instead, the strategy proposes indirect routing through / interchange at Belconnen and Cotter Road/Adelaide Avenue. The indirect nature of these proposed routes does not appear to be well aligned with the ACT's objective of encouraging mode shift to public transport, particularly for a new district such as the Molonglo Valley which is understood to be intended as an exemplar of sustainable development.

The Parkes Way corridor represents an ideal direct link between the Molonglo Valley and the City. However, it is understood that historic public transport planning exercises have been reluctant to route public transport in the corridor due to concerns about existing and forecast congestion on Parkes Way, and the implications it will have for public transport operation and journey times.

As a result, the proposal seeks to identify an infrastructure upgrade that will facilitate the use of the corridor to provide a rapid bus route that utilises dedicated road space which is independent of general traffic lanes through the Glenloch Interchange and will therefore not be compromised by any performance issues that exist on Parkes Way or may intensify in the future. The upgrade is intended to provide a comparatively low cost solution that can be implemented relatively easily to allow the provision of rapid bus services in the short to medium term, providing high standard public transport options for residents of the Molonglo Valley as it develops.

Site Description

The upgrade is proposed through the Glenloch Interchange at the western end of the Parkes Way corridor where it transitions into William Hovell Drive (WHD). The upgrade proposes an interim arrangement along the existing corridor for public transport largely using existing infrastructure through the Glenloch Interchange. The site is located in the south-east corner of the Belconnen District, bordering both the Molonglo Valley and Central Canberra.

The Glenloch Interchange is a system interchange with a triple tier arrangement of direct and loop free flow ramps and mainline carriageways between two motorway condition corridors:

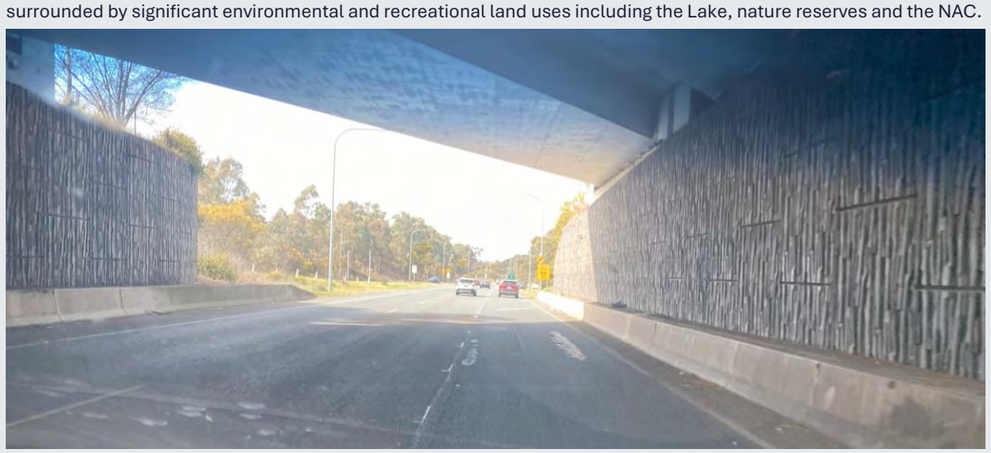
- Tuggeranong Parkway / Caswell Drive (north-south)
- Parkes Way / William Hovell Drive (east-west)

The proposed infrastructure will facilitate a rapid public transport connection between the Molonglo Town Centre and the Canberra City Centre. Located at the toe of Black Mountain, the surrounding topography is generally steep in the north-east quadrant of the interchange, rolling to the west, with Lake Burley Griffin located in the south east quadrant of the interchange.

The site is bounded in all four quadrants by significant constraints to the proposed upgrade, including:

- **North-East - Black Mountain Nature Reserve** – The Black Mountain Nature Reserve is steep and densely wooded with native woodland
- **South-East – Lake Burley Griffin** – The lake foreshore and adjacent Lady Denman Drive constrain the alignment of the ultimate public transport infrastructure
- **North-West - Aranda Bushland Nature Reserve** – This nature reserve is rolling with a mix of grassland and woodland
- **South-West – National Arboretum Canberra (NAC)** – With a diverse range of arboretum plantings, the NAC boundary has substantial impact on the proposed alignment of ultimate public transport corridor through the interchange

There are currently no residential, commercial, or industrial land uses near the site, however the interchange is surrounded by significant environmental and recreational land uses including the Lake, nature reserves and the NAC.



Public Transport

There are currently no public transport services that route along the Parkes Way corridor. However, the upgrade is intended to adapt existing infrastructure to facilitate use of the corridor for public transport services. Whilst the likely type and number of services that will route along the Parkes Way corridor is uncertain at this time, for the purpose of the corridor strategy it is assumed that as a minimum at least one Rapid service (running at least once every 15 minutes) between the Molonglo Town Centre and the Canberra City Centre will use the proposed infrastructure / bus lanes.

Active Travel

Whilst the proposed upgrade is unrelated to active travel infrastructure in and of itself, the upgrade proposes the facilitation of high frequency public transport services between the Molonglo Valley and the City which is expected to encourage mode shift to public transport. Public transport trips often have an associated active travel element, and as such the upgrade is considered likely to induce active travel with associated positive transport and health outcomes.

The proposed upgrade is not expected to have any impact on off road active travel infrastructure in its current configuration. However, extension of the Bebo arch structure combined with the works associated with the eastbound William Hovell Drive to northbound Caswell Drive ramp (Package G2) results in a narrow area between carriageway formations and associated retaining walls at the northern Bebo arch face that makes routing the shared path through this area challenging. The design of this package and / or Package G2 may require geometric adjustment (such as shifting the ramp nose west or an alternate carriageway widening / Bebo arch extension to the south) in future phases of design development to generate a feasible shared path solution in this area.

The proposal does not substantively impact on the operation of eastbound on road cycle operation. However, the proposed reduction of shoulder width on westbound Parkes Way will impact on potential on road cycle movements, although it is noted given the presence of several high-speed free-flow interchange ramps in the area, this local part of the network is considered highly inappropriate for cyclists and cycle movements through this part of the interchange should be discouraged.

Safety

Between 2017 and 2021, there were numerous property damage accidents recorded at the Glenloch Interchange, in addition to several injury crashes. Furthermore, with forecast traffic growth through the interchange it is anticipated that the aggregate number of crashes will increase in the absence of improvements at the site.

By encouraging mode shift to public transport, the proposed upgrade is anticipated to reduce the number of private vehicle trips through the interchange which, by extension, can be expected to reduce the number of vehicle crashes due to reduced crash exposure, in addition to reducing the number of multi vehicle crashes as result of decreased vehicle interactions.

It is noted however that the upgrade design proposes a reduction in standard of diverge arrangements on the Parkes Way exit ramps in both directions through the interchange. There is potential for this outcome to worsen the crash performance in this location, and it is recommended that future design phases investigate approaches that improve the safety of these locations, inclusive of a road safety audit process to ensure that the design provides an acceptable crash risk.

Project Interdependencies

There are several upgrades proposed for the western Parkes Way corridor and the Glenloch Interchange that have a degree of interdependence with the proposed Interim Public Transport Corridor through the Glenloch Interchange, including:

- **PW12 - Midblock Capacity Upgrade – Parkes Way West** – The additional transport capacity provided by a high frequency rapid public transport service will influence the private vehicle capacity requirements of the Parkes Way corridor.
- **PW14 - Public Transport Corridor – Interim Solution** – The proposed upgrade connects into the western extent of the PW14 package, and as a result there is a geometric interdependence between the two packages. It is also noted that there would be construction and performance efficiencies in delivering both packages concurrently.
- **PW15 - Public Transport Corridor – Ultimate Solution** – The performance of this interim solution will influence the need and delivery timeframes for the ultimate upgrade.
- **G2 – Glenloch Interchange – Eastbound to Northbound Ramp** – The proposed upgrade connects into the eastern extent of the G2 package, and as a result there is a geometric interdependence between the two packages.
- **G5 - Glenloch Interchange – Ultimate Public Transport Corridor** – The performance of this interim solution will influence the need and delivery timeframes for the ultimate upgrade. Once implemented, the provision of Package G5 will potentially render the interim bus lane infrastructure redundant, and may create the opportunity provide a capacity improvement for general traffic through the interchange.

Upgrade	G4 - Glenloch Interchange – Interim Public Transport Corridor	Location	Parkes Way	Estimate Cost	$20M	Sheet	2 of 2

Options Considered

Given the constraints of the site and the existing interchange configuration, there were considered limited options for a low cost interim solution to provide dedicated bus lanes through the interchange. As such, the upgrade sought to broadly adopt the existing pavement extents through the interchange, adopting minor carriageway widening and realignment where existing infrastructure constraints allowed. To this end, and in the context of the retrofit nature of the upgrade, consideration of options was limited to investigating various approaches to mainline carriageway widening and diverge arrangements for the Parkes Way exit ramps.

Constructability

West of the Tuggeranong Parkway, construction in both directions of WHD will involve widening into the existing verge adjacent to live traffic and will require careful staging and traffic management to minimise impact on the operation of corridor. Similarly, adjustment to the Parkes Way exit ramps, associated auxiliary lanes and required reconstruction of adjacent retaining walls will require construction in a relatively confined part of the corridor and will need traffic management and likely speed reductions over the course of these parts of the works, and is therefore expected to impact on the performance of the interchange during construction.

Further, it is noted that should Package G2 be progressed prior to delivery of this upgrade, construction of elements of Package G4 (particularly the Bebo arch extension and associated works) will likely be difficult and costly. Similarly, proposed realignments of existing retaining walls will present technical and constructability challenges.

Structures

Whilst no new structures are proposed as part of the upgrade, it is expected that the Interim Public Transport Corridor through the Glenloch Interchange will require adjustment to the following structures:

- **Bebo arch** – In order to provide desirable geometry of the eastbound Parkes Way carriageway at the western extent of the upgrade it appears likely that extension of the existing Bebo Arch structure will be required to accommodate the proposed carriageway widening. It is noted however, that there may be an opportunity to eliminate the need for these structural works through a value management process / revised alignment of the carriageway widening.
- **Retaining walls** – The alignment of two retaining walls associated with the abutments of Tuggeranong Parkway overpass bridges will require adjustment to suit the proposed revised alignment of the two Parkes Way exit ramp auxiliary lanes.

Option Details

The proposed interim approach to providing public transport infrastructure in the Parkes Way corridor through the Glenloch Interchange involves provision of dedicated bus lanes in each direction of the corridor, providing free flow conditions for public transport vehicles whilst on Parkes Way. The upgrade consists of the following primary elements:

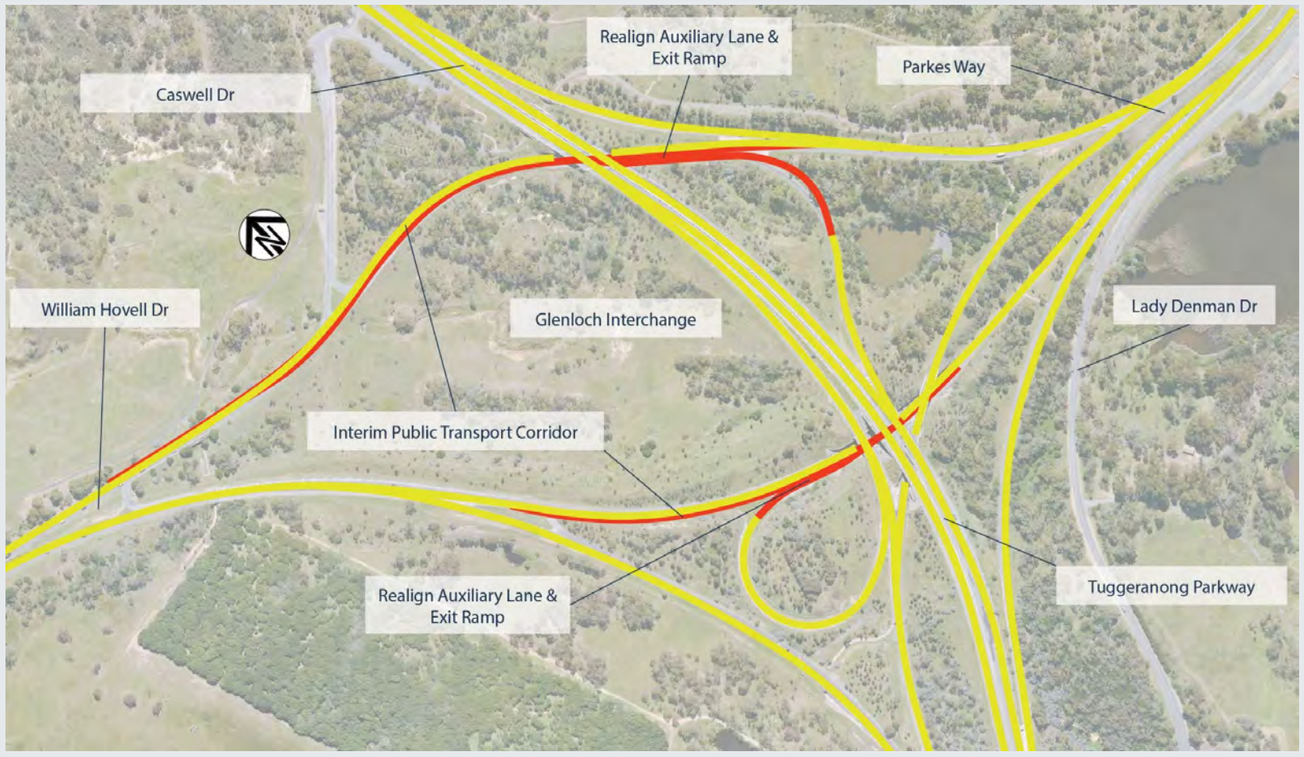
- **Eastbound Parkes Way** – The proposed eastbound bus lane on Parkes Way ties into the third through lane proposed in Package G2 at this project's western extent, and requires carriageway widening between this tie in and the Tuggeranong Parkway underpass. This widening requires extension of an existing Bebo Arch structure (although it may be possible to design this requirement out of the upgrade depending on the degree of geometric compromise required), and likely extension of an existing stormwater culvert. In addition, whilst the work in this area adopts the existing WHD horizontal geometry, it is noted that lane widening on the curve approach to the Caswell Drive underpass or alternatively a departure from standard is likely to be required.

  To facilitate the eastbound bus lane under the Tuggeranong Parkway, it is proposed to convert the auxiliary lane associated with the Parkes Way exit ramp into a through lane. This in turn requires widening to provide a new auxiliary slip lane alignment for the ramp and some minor ramp realignment, inclusive of realignment of the existing bridge abutment retaining wall. Whilst the proposed revised auxiliary lane meets minimum length requirements to allow the diverge at an acceptable rate, the downstream ramp has a lower design speed than the through carriageway, and as such deceleration will be required in the auxiliary lane, which may also potentially cause some deceleration in the through carriageway. As such, there may be benefit in lowering the posted speed on eastbound Parkes Way to 80 km/h depending on the crash performance of the diverge movement.

  East of this exit ramp, the Parkes Way entry ramp from southbound Caswell Drive is required to merge into the bus lane, resulting in a mix of private and public transport vehicles for a short length of the corridor. Beyond the end of the ramp merge taper, drivers are provided 100 m to diverge out of the bus lane into the general traffic lanes. Whilst this arrangement mixes light vehicles and public transport vehicle traffic, it is noted that the low bus volumes will provide light vehicles the opportunity to merge into a largely empty lane prior to merging into the main traffic stream. This increases parallel running and merge distances, and is expected to improve the safety performance of the merge.

- **Westbound Parkes Way** – The proposed westbound bus lane on Parkes Way ties into the third through lane proposed in Package PW14 at this project's eastern extent. To facilitate the westbound bus lane under the Tuggeranong Parkway, it is proposed to convert the auxiliary lane associated with the Parkes Way exit ramp into a through lane. This in turn requires widening to provide a new auxiliary slip lane alignment for the ramp and some minor ramp realignment, inclusive of realignment of the existing bridge abutment retaining wall.

  The proposed revised auxiliary lane does not meet minimum length requirements to allow the diverge at a standard rate, and as such reduction in the posted speed limit to 80 km/h westbound through the interchange is proposed. Notwithstanding this reduction, the auxiliary lane length and downstream deceleration distance for the westbound exit loop ramp will be deficient and will require departures from current standards. Risk assessment, Road Safety Audits and design refinements in future phases of design development will be required to ensure that an appropriate level of safety can be achieved whilst providing the westbound bus lane.



It is noted that future assessments may conclude that the safety risks (in the context of public transport service performance in the PM peak) do not warrant the delivery of this element of the upgrade, or alternatively replacement of the Tuggeranong Parkway overbridge with a longer span structure may allow provision of a sufficient auxiliary lane lengths (albeit for a high level of capital investment and disruption).

West of this exit ramp, carriageway widening will be required to provide the bus lane up to the point where it merges into general traffic immediately east of the WHD entry ramp merge from the northbound Tuggeranong Parkway.

Upgrade	G5 – Glenloch Interchange – Ultimate Public Transport Corridor	Location	Parkes Way	Estimate Cost	$116M	Sheet	1 of 3

Problem Statement	The current ACT Transport Strategy 2020 does not provide a direct Rapid public transport link between the Molonglo Valley and the City. Instead, the strategy proposes indirect routing through / interchange at Belconnen and Cotter Road/Adelaide Avenue. The indirect nature of these proposed routes does not appear to be well aligned with the ACT's objective of encouraging mode shift to public transport, particularly for a new district such as the Molonglo Valley which is understood to be intended as an exemplar of sustainable development. The Parkes Way corridor represents an ideal direct link between the Molonglo Valley and the City. However, it is understood that historic public transport planning exercises have been reluctant to route public transport in the corridor due to concerns about existing and forecast congestion on Parkes Way, and implications it will have for public transport operation and journey times. As a result, and consistent with ongoing discussions within the Territory, as a potential alternative option, the proposal seeks to identify an infrastructure upgrade that will facilitate the use of the corridor to provide a rapid transit route that utilises discrete and fully segregated infrastructure which is independent of general traffic lanes and will therefore not be compromised by any performance issues that exist on Parkes Way or may intensify in the future. The upgrade is intended to provide a dedicated physical corridor through the Glenloch Interchange that can accommodate a direct, rapid and high frequency service between the two centres. This corridor could allow for bus rapid transit or light rail services in the long term, providing high standard public transport options for residents of the Molonglo Valley as it develops.
Site Description	The upgrade is proposed through the Glenloch Interchange at the western end of the Parkes Way corridor where it transitions into William Hovell Drive (WHD). The site is located in the south-east corner of the Belconnen District, bordering both the Molonglo Valley and Central Canberra. The upgrade proposes a discrete corridor for public transport that is fully segregated from general traffic through the Glenloch Interchange. The Glenloch Interchange is a system interchange with a triple tier arrangement of direct and loop free flow ramps and mainline carriageways between two motorway condition corridors: - Tuggeranong Parkway / Caswell Drive (north-south) - Parkes Way / William Hovell Drive (east-west) The proposed infrastructure will facilitate a high quality rapid public transport connection between the Molonglo Town Centre and the Canberra City Centre. Located at the toe of Black Mountain, the surrounding topography is generally steep in the north-east quadrant of the interchange, rolling to the west, with Lake Burley Griffin located in the south east quadrant of the interchange. The site is bounded in all four quadrants by significant constraints to the proposed upgrade, including: - **North-East - Black Mountain Nature Reserve** – The Black Mountain Nature Reserve is steep and densely wooded with native woodland - **South-East – Lake Burley Griffin** – The lake foreshore and adjacent Lady Denman Drive constrain the alignment of the ultimate public transport infrastructure - **North-West - Aranda Bushland Nature Reserve** – This nature reserve is rolling with a mix of grassland and woodland - **South-West – National Arboretum Canberra (NAC)** – With a diverse range of arboretum plantings, the NAC boundary has substantial impact on the proposed alignment of the ultimate public transport corridor through the interchange There are currently no residential, commercial, or industrial land uses near the site, however the interchange is surrounded by significant environmental and recreational land uses including the Lake, nature reserves and the NAC.
Public Transport	There are currently no public transport services that route through the Parkes Way corridor. However, the upgrade is intended to adapt existing infrastructure to facilitate use of the corridor for public transport services. Whilst the likely type and number of services that will route through the interchange and along the Parkes Way corridor is uncertain at this time, for the purpose of the corridor strategy it is assumed that a high frequency service (with minimum headways no higher than 10 minutes) between the Molonglo Town Centre and the Canberra City Centre will use the proposed infrastructure during peak periods.
Structures	Given the site constraints, complex ramp arrangements, potential geometric requirements of the public transport corridor, and the need for grade separation between carriageways and the Ultimate Public Transport Corridor, there is a need to provide several structures as part of the upgrade. These structures include: - **WHD Westbound Entry Ramp Underpass** – It is proposed to realign the westbound WHD entry ramp from the northbound Tuggeranong Parkway. This revised ramp alignment crosses over the proposed Ultimate Public Transport Corridor at a high skew, and is proposed to use a large concrete box or precast girder/plank construction for the crossing. - **Tuggeranong Parkway Northbound Exit Ramp Underpass** – It is proposed to provide a bridge underpass for the public transport corridor to the northbound exit ramp from the Tuggeranong Parkway to the eastbound Parkes Way mainline. It is proposed to use a large concrete box culvert or precast girder/plank construction for the crossing. - **Tuggeranong Parkway Mainline Underpass** – A significant underpass structure will be required to cross the Tuggeranong Parkway mainline alignment. Given the traffic volumes in both direction on this part of the Tuggeranong Parkway, closing the carriageway / construction of a diversion appears impractical. As such, construction of a structure that can be constructed whilst minimising impact on the mainline will be required. To this end, construction techniques such as jacking or a mined underpass are considered feasible, with the preferred approach being determined in future phases of design subject to confirmation of final underpass length and ground conditions at the site assessed as part of future geotechnical investigations. - **Parkes Way Westbound Exit Ramp Underpass** – It is proposed to realign the westbound Parkes Way exit ramp from the to the southbound Tuggeranong Parkway. This revised ramp alignment also crosses over the proposed Ultimate Public Transport Corridor at a high skew, and it is proposed to use a large concrete box culvert or precast girder/plank construction for the crossing. - **Retaining walls** – Numerous retaining walls are proposed throughout the interchange to accommodate the Ultimate Public Transport Corridor. These retaining walls are generally in cut and in several locations are provided to create a sunk trench, allowing the corridor to navigate horizontally and vertically between interchange ramps whilst minimising footprint. The type/nature of these retaining walls will be determined in future phases of design development based on the outcome of future geotechnical investigations.
Project Interdependencies	There are several upgrades proposed for the western Parkes Way corridor and the Glenloch Interchange that have a degree of interdependence with the proposed Ultimate Public Transport Upgrade through the Glenloch Interchange, including: - **PW8 - Molonglo to City Cycle Highway - Parkes Way Zone** – The current proposal for the Public Transport Corridor through the Glenloch Interchange appears likely to require minor realignment of the active travel paths proposed in Package PW8. Whilst the ultimate public transport corridor is likely to be delivered significantly later than the Cycle Highway, allowance for the future public transport corridor in the design of Package PW8 may avoid abortive work into the future. - **PW12 - Midblock Capacity Upgrade – Parkes Way West** – The additional transport capacity provided by a high frequency rapid public transport service will influence the private vehicle capacity requirements of the Parkes Way corridor. - **PW14 - Public Transport Corridor – Interim Solution** – The performance of this interim solution will influence the need and delivery timeframes for the ultimate upgrade. - **PW15 - Public Transport Corridor – Ultimate Solution** – The proposed upgrade connects into the western extent of the PW15 package, and as a result there is a geometric interdependence between the two packages, noting that they are likely to require a concurrent delivery to provide an operational public transport service. - **G6 – Bindubi Street Interchange** – The ultimate public transport corridor will route through or adjacent to the proposed Bindubi Street interchange. Whilst its configuration at the Bindubi Street Interchange is yet to be determined, it is possible that future iterations of this package will need to consider an Ultimate Public Transport Corridor that routes from the Bindubi Street Extension (from Molonglo 3 East) onto the William Hovell Drive corridor. - **G4 - Glenloch Interchange – Interim Public Transport Route** – The performance of this interim solution will influence the need and delivery timeframes for the ultimate upgrade. Furthermore, the provision of Package G5 will potentially render the interim bus lane infrastructure redundant, and may create the opportunity provide a capacity improvement for general traffic through the interchange.

Upgrade	G5 – Glenloch Interchange – Ultimate Public Transport Corridor	Location	Parkes Way	Estimate Cost	$116M	Sheet	2 of 3

Options Considered

There are numerous potentially feasible options available to route the Ultimate Public Transport Corridor through the Glenloch Interchange. Whilst an optioneering process was not undertaken as part of the Corridor Strategy, several broad approaches were considered:

- Central Route
- Southern Route
- Southern Periphery
- Overpass

Routing the corridor around the northern periphery of the interchange was not explored as the site was considered highly constrained in this area (primarily topography and environmental constraints) and it would not link efficiently into the likely corridor alignment to the east.

Central Route

Should a median alignment for the Ultimate Public Transport Corridor be preferred in the future, a central route through the Glenloch Interchange would likely be appropriate. This route is expected to require:

- Grade separation of the corridor and the WHD westbound entry ramp from the Tuggeranong Parkway (over or underbridge)
- A tunnel under the Tuggeranong Parkway mainline
- Grade separation of the corridor and the Parkes Way eastbound entry ramp from the Tuggeranong Parkway (overbridge)

This option was not adopted as it does not connect efficiently to the current proposed corridor alignment to the east.

Southern Route

The southern route proposes a corridor alignment that passes to the south of the majority of interchange ramps. Notwithstanding, the route still requires grade separation between three ramps (expected to be bridge underpasses) and the Tuggeranong Parkway mainline (through an underpass).

This route provides a relatively direct link between the expected corridor alignments to the east and west.

Southern Periphery

This option broadly adopts a similar approach proposed for the southern route, however proposes a corridor alignment that routes further to the south. By routing further south, the corridor avoids interfacing /impact with some existing stormwater drainage infrastructure and eliminates one ramp crossing/underpass.

However, it is anticipated that this option would require a short tunnel under the Tuggeranong Parkway mainline. Furthermore, and most critically, it looks likely that the alignment of this option will increase corridor length by a minimum of approximately 250m, impacting on journey times and operating costs.

Overpass

A flyover of the interchange would provide increased latitude in terms horizontal alignment of the corridor, however would require significant length of structure and fill embankments. Additionally, and critically, a fly over of the interchange by the public transport corridor is likely to have significant visual and planning implications and there is a very high risk that it would not be supported by various stakeholders such as the NCA, and may be not consistent with relevant planning legislation (TBC by further analysis in the future if required).

Upgrade	G5 – Glenloch Interchange – Ultimate Public Transport Corridor	Location	Parkes Way	Estimate Cost	$116M	Sheet	3 of 3

Constructability

The construction of the Ultimate Public Transport Corridor through the Glenloch Interchange will require a complex series of construction stages, with several confined construction areas and a significant amount of traffic management and temporary diversions. Key construction elements are expected to include:

- **WHD Westbound Entry Ramp** – The realignment of the ramp will allow offline construction of the ramp and associated bridge, which, when complete will facilitate a switch of traffic allowing construction of the adjacent open trench for the Ultimate Public Transport Corridor.
- **Tuggeranong Parkway Northbound Exit Ramp + Parkes Way Westbound Exit Ramp Underpasses** – As these structures are on the existing ramp alignments, it is anticipated that provision of a temporary offline side track to allow construction of the bridge and associated approaches will be required. These side tracks would likely operate with a reduced speed environment, and as a result are likely to impact on the performance of the associated movements.
- **Tuggeranong Parkway Mainline Underpass** – Construction of the Tuggeranong Parkway underpass is expected to be a significant construction activity. Given the proposed underpass location and depth, interchange configuration, local topography, and demand on the mainline, provision of temporary side tracks to allow construction of the underpass does not appear feasible. As such, it is anticipated that the underpass is likely to be some form of mined or jacked structure. This construction approach should allow ongoing operation of the Tuggeranong Parkway with minimal disruption.

The remainder of the corridor alignment is expected to be constructed with standard construction techniques, noting that the proposed open trench zone of the corridor will be in close proximity to live carriageways and will require construction in confined spatial areas.

Active Travel

Whilst the proposed upgrade is unrelated to active travel infrastructure in and of itself, the upgrade proposes the facilitation of high frequency public transport services between the Molonglo Valley and the City which is expected to encourage mode shift to public transport. Public transport trips often have an associated active travel element, and as such the upgrade is considered likely to induce active travel with associated positive transport and health outcomes.

It is also noted that there is existing travel infrastructure at the interchange that will be impacted by the proposed corridor. Generally this infrastructure will be realigned to accommodate the proposal whilst retaining the functionality and connectivity of the existing active travel network.

- However, it is noted that the existing on-road cycling link for northbound movements from the Tuggeranong Parkway through to the eastbound Parkes Way is proposed for deletion. The rationale for this approach relates to the unsafe nature of cycle movements through the interchange; the provision of the proposed Cycle Highway renders this link redundant; and the link conflicts with the alignment of the proposed Public Transport Corridor and associated drainage infrastructure realignment.

Safety

Between 2017 and 2021, there were numerous property damage accidents recorded at the Glenloch Interchange, in addition to several injury crashes. Furthermore with forecast traffic growth through the interchange it is anticipated that the aggregate number of crashes will increase in the absence of improvements at the site.

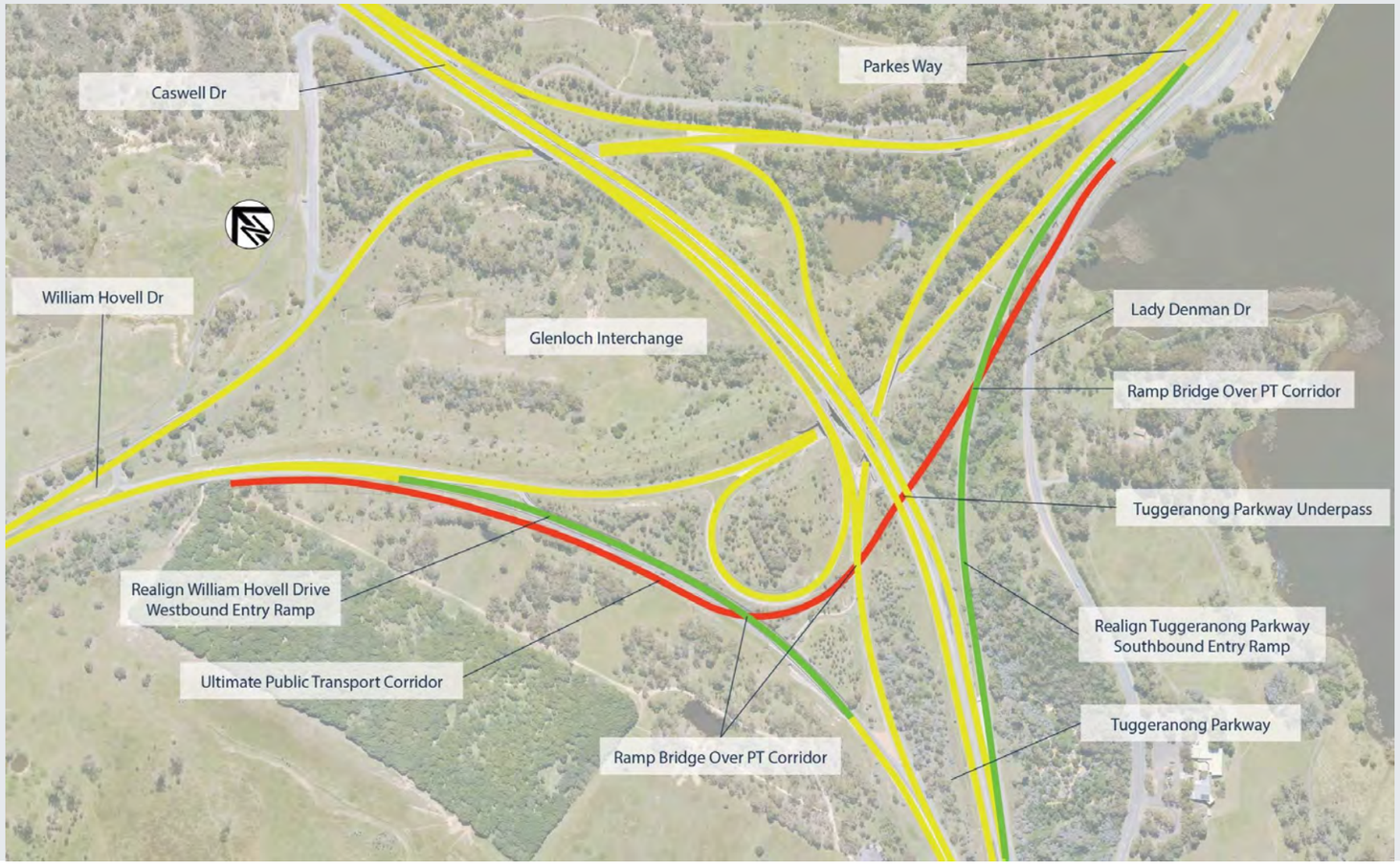
- By encouraging mode shift to public transport, the proposed upgrade is anticipated to reduce the number of private vehicle trips through the interchange which, by extension, can be expected to reduce the number of vehicle crashes due to reduced crash exposure, in addition to reducing the number of multi vehicle crashes as result of decreased vehicle interactions.

Option Details

Routing the Ultimate Public Transport Corridor through the Glenloch Interchange carries a high degree of design and construction complexity, and will require significant capital investment. The corridor routes through several distinct parts of the interchange:

- **West of the Interchange (CH6100 - 6600)** – The Ultimate Public Transport Corridor is expected to be located in the Bindubi Street Extension corridor, with a preferred route through the Bindubi Street Interchange being identified as part of development of the Molonglo 3 East Precinct works. The corridor is proposed to route in the western verge of the WHD westbound entry ramp where it will dive into a sunken trench to allow a grade separated crossing under the ramp. This ramp will require horizontal realignment to provide sufficient space to the NAC boundary for the corridor.
- **Western Interchange Ramps (CH6600 - 6800)** – Having passed under the WHD entry ramp, the corridor is proposed to continue in an open trench immediately adjacent to the northbound Caswell Drive entry loop ramp prior to passing under the northbound Tuggeranong Parkway exit ramp to Parkes Way. The geometry of the corridor in this location requires a substandard horizontal curve that is unlikely to achieve the proposed design speed for the corridor, requiring lower operational speeds for public transport vehicles locally. Furthermore, localised widening of the open trench is likely to be required to achieve appropriate sight distances.

  The alignment in this zone will require realignment of a drainage channel and downstream headwall to accommodate the proposed corridor, and it is noted that the trench is expected to be lower than the invert of the channel / culvert headwall, requiring substantial drainage infrastructure to ensure that the corridor maintains appropriate flood immunity.
- **Tuggeranong Parkway Mainline (CH6800 - 6900)** – After passing under the Tuggeranong Parkway exit ramp, the corridor is again located in a short open trench prior to passing under the Tuggeranong Parkway mainline in an underpass structure approximately 60 m in length.
- **Eastern Interchange Ramps (CH6900 - 7100)** – On the eastern side of the Tuggeranong Parkway mainline the corridor remains in cut, allowing it to pass under a vertically realigned westbound Parkes Way exit ramp to the Tuggeranong Parkway. The corridor ties into an ultimate alignment for a Public Transport Corridor identified in Package PW15.



Upgrade	G6 – Bindubi St Interchange	Location	Parkes Way	Estimate Cost	$214M	Sheet	1 of 2

Problem Statement	The development of the Molonglo Valley and West Belconnen is expected to introduce significant additional demand onto William Hovell Drive, the Glenloch Interchange and Parkes Way. In addition, an extension of Bindubi St is proposed to the south to provide access to the Molonglo 3 East zone of the Molonglo Valley district. The forecast volumes associated with William Hovell Drive west, Bindubi St and the Bindubi St extension are projected to be well in excess of the capacity of a feasible four-way at grade intersection. More broadly, an at-grade intersection with very high demand also carries an increased risk of crashes. As such, it is anticipated that a grade separated interchange will be required for this location to ensure it operates at an appropriate level of service and safe operation. Complicating the configuration of this interchange is its proximity to the Glenloch system interchange, its south/east facing ramps, and vehicle interactions between the two interchanges, which are considered likely to have substantial operational and safety implications in the future.
Site Description	The upgrade is proposed at the existing at-grade intersection of Bindubi St and William Hovell Drive on the boundary of the Molonglo Valley and Belconnen districts of Canberra. The existing intersection is a signalised T intersection with a seagull configuration. William Hovell Drive is the major leg of the intersection and is dual carriageway with two lanes in each direction, with Bindubi St being a single carriageway approach on the minor leg of the intersection. The project site extends approximately along William Hovell Drive 700 m to the west of the existing intersection and 700 m to the east. The site also extends approximately 700 m north along Bindubi St, including the north-west quadrant zone of the intersection. William Hovell Drive has a gentle incline on both approaches to the existing intersection and is generally straight to the west. To the east William Hovell Drive has a curvilinear alignment into Glenloch interchange which is located immediately to the east of the existing intersection site with a westbound entry ramp gore approximately 700 m from the intersection and an eastbound exit ramp diverge approximately 1km to the east. The site is surrounded by nature reserve to the north (Mt Painter Nature Reserve and Aranda Bushland Nature Reserve). Active farmland is located to the south of the project site although it is noted that future development is planned in this area in the short to medium term. The William Hovell Drive corridor has native vegetation, and the north-west quadrant of the intersection site has previously been identified as having environmental constraints. There are currently no residential, commercial, or industrial land uses near the site, although it is noted that with the development of the Molonglo 3 East precinct, residential zones are expected to be established on the southern boundary of the project site.
Project Interdependencies	Given its proximity to the Glenloch interchange, the project is likely to be impacted by any proposed changes to the interchange. In particular, Option G2, investigated as part of the Corridor Strategy, considers a potential free flow exit ramp from eastbound William Hovell Drive to northbound on-ramp of Caswell Drive. The auxiliary lane associated with the Bindubi St interchange eastbound entry extends past the proposed location of the diverge taper of the G2 ramp and therefore directly interfaces with this project. It is noted that if G2 was not implemented, a direct eastbound entry ramp from southbound Bindubi Street may be feasible and improve interchange performance. In addition, there is an interdependence between the staging of the Bindubi Street Interchange and the East West Arterial Interchange and associated packages (SW1, SW2 and SW3), depending on land release in the Molonglo Valley.

Public Transport	There are currently no public transport services that route through the Bindubi St intersection site. In response to the development of the Molonglo Valley district, it is understood that public transport services including Rapid, high frequency direct services between the district and the CBD may be introduced, likely routing along Bindubi Street and Parkes Way. In addition, it is possible that the IPT route between Molonglo and Belconnen will use Bindubi St as currently indicated in the current ACT Transport Strategy 2020. If either of these routes were to be realised, these services would traverse the proposed interchange. Allowance for public transport infrastructure has not been incorporated into the preliminary design presented here as the infrastructure requirements would depend on the nature, mode, vehicle type, geometric requirements and routes. It is noted however that provision of an efficient interchange with a good level of service as proposed will support future public transport outcomes. Further, adaption of the interchange in future design phases may be required in order to incorporate bus priority or to make allowance for a dedicated and segregated IPT route that may route along either or both the Bindubi Street and William Hovell Drive / Parkes Way corridors, noting that previous studies (AECOM, 2019) proposed a general 12.0 m median to accommodate future provision of light rail.
Active Travel	The existing intersection approach roads to the intersection (William Hovell Drive and Bindubi St) have 2 – 2.5 m wide on road cycle lanes. Furthermore, there is a 2.5 m shared path in the northeast quadrant of the intersection. In addition, the ACT Active Travel Plan 2024-30 indicates that an additional cycle network link is planned for William Hovell Drive to the west of the intersection. A challenge associated with active travel is management of eastbound on-road cyclists on William Hovell Drive through the interchange. As the dual eastbound entry ramp is unsafe for on-road cyclists to navigate, it is anticipated that future iterations of the design will develop a vertical geometry of the ramp that will allow an underpass for cyclists that have been temporarily diverted off the mainline shoulder. The shoulders of Bindubi Street are also proposed to accommodate on-road cycling, with intersection arrangements at ramp terminals to be configured in future design phases to ensure safe movements for cyclists. It is also proposed to provide off-road active travel connections throughout the interchange to link the existing Bindubi St / William Hovell Drive east path to future path networks on William Hovell Drive west and into Molonglo 3 East through the Bindubi St interchange with full grade separation.
Safety	Whilst the existing intersection has experienced numerous property and injury accidented between 2017 and 2021, it is noted the configuration, demand and movement pattens will change significantly as the Molonglo Valley and West Belconnen are developed, and such historical crash patterns are unlikely to be representative of what will happen in the future. Whilst the upgrade is primarily focussed on capacity and performance improvements, it is noted that providing grade separation at the intersection site significantly reduces the number of vehicles that are required to navigate a signalised intersection, and by extension reduces crash exposure.
Structures	Twin, two span bridges over William Hovell Drive are proposed as part of the interchange. Notional span lengths of approximately 35-40 m inclusive of a central median pier will provide sufficient spatial allowance for a median, mainline through lanes, auxiliary ramp lanes, shoulders and spill through abutments. It is noted that structural bridge design has not been undertaken as part of the development of this corridor strategy. However, for the purpose of identifying potential order of capital costs, it has been assumed that the bridge will utilise precast concrete super-T girders and in-situ concrete decking for its superstructure. The bridge construction method will need to allow live traffic operations under and around the construction site. In addition, two box culvert (or alternatively precast concrete arches) active travel underpasses of the proposed eastbound ramps will be required to safely convey pedestrians and cyclists across the ramp alignment without interacting with vehicles.
Constructability	As the Bindubi St interchange will require construction of a new interchange in and around an operational intersection on a key transport route, constructability will be a key consideration for the delivery of this upgrade. Some key construction considerations associated with the interchange include: - All ramps can be constructed off line and without disruption to network operation - It appears likely that Bindubi St will require diversion for a significant proportion of the construction period to facilitate construction of fill embankments and bridges. Given current demand on William Hovell Drive, it is considered unlikely that the corridor will operate to an appropriate level of service under single carriageway contraflow conditions during peak periods. As such, peak period carriageway closure on William Hovell Drive during construction does not appear feasible and construction of the interchange bridges over the mainline William Hovell Drive will require nightworks / closures for girder installation. It is noted that the recent Parkes Way Flood Study (Calibre, 2023) does not extend to this part of the corridor. Similarly, the recent Parkes Way Infrastructure Study (KBR, 2022) does not extend to this part of the corridor, although it is noted that significant water supply infrastructure is understood to exist in the site including a bulk supply main (900 mm dia.) that crosses the WHD corridor in addition to a trunk main in the Bindubi Street corridor, either of which may require protection as part of the works.

Upgrade	G6 – Bindubi St Interchange	Location	Parkes Way	Estimate Cost	$214M	Sheet	2 of 2

Options Considered

Several potential upgrade options were considered to provide access into the Molonglo 3 East precinct and address the forecast increase in demand that will be experienced at the existing Bindubi St intersection stie. The initial options identification process was informed by previous investigations, noting that traffic volumes / patterns have significantly changed over time as a result of substantial changes to land use forecasts in the Territory. The considered options included:

At-grade intersection – An at grade intersection solution would involve provision of a southern leg at the existing intersection site to form the Bindubi St extension along with reconfiguration of through and turn lanes on all approaches. Whilst this would provide the lowest cost solution, it is considered unlikely that an at grade option could feasibly operate with an appropriate level of service given the forecast demand in future years.

Diamond / Half Diamond Interchange – A conventional diamond service interchange would provide the most compact option for a grade separated interchange at the site. Whilst this would likely represent the most cost-effective interchange solution, the proximity of the Glenloch interchange and its westbound entry ramp (merge taper 400m to the east of the Bindubi St intersection) leaves insufficient distance between ramps to allow efficient traffic flow conditions. It is noted that whilst shifting the Northbound Tuggeranong Parkway to William Hovell Drive westbound entry ramp nose would increase this length, the distance the nose could be moved appears limited and was considered unlikely to substantially improve the potential performance. Similar concerns exist in the eastbound direction to a possible future exit ramp at the Glenloch interchange.

Half Folded Diamond – To address the proximity of the Glenloch interchange, a half-folded diamond interchange option was considered utilising a minimum radius (R55) westbound loop ramp. This westbound ramp configuration increases the distance between ramp merge and diverge locations in an effort to improve the efficiency of the traffic flow. However, concerns remain with the capacity of the of the eastbound diamond ramp arrangement and its proximity to the Glenloch interchange, particularly in the context of the very high on-load volumes that are forecast for the eastbound entry ramp.

Twin Folded Diamond – In response to the concern about eastbound on-load ramp capacity and proximity to the Glenloch interchange, a twin folded diamond arrangement was also considered. Whilst this arrangement provides additional length between eastbound interchange ramps, the tight radius of the eastbound loop limits capacity of the on-load ramp which is a critical consideration for the interchange. Furthermore, this loop ramp looks likely to have a significant impact on an area mapped as environmentally sensitive in previous studies. For these reasons the twin folded ramp arrangement was not preferred.

Half Folded Diamond with Quadrant – An adaptation of the twin folded diamond was investigated that used a quadrant arrangement for the eastbound ramps, providing a larger radius loop for the on-load ramp with a higher design speed and greater capacity in order to better meet the anticipated demand of the movement. This arrangement also significantly reduced the impact on the environmentally sensitive zone. This arrangement has some similarities with the preferred arrangement identified in the 2019 AECOM study (albeit with a larger radius loop on the quadrant), although avoids the inclusion of signalised right turn across the William Hovell Drive mainline proposed in the previous study due to concerns about intersection capacity and performance. This option was adopted as the preferred approach for the purposes of the Corridor Strategy.

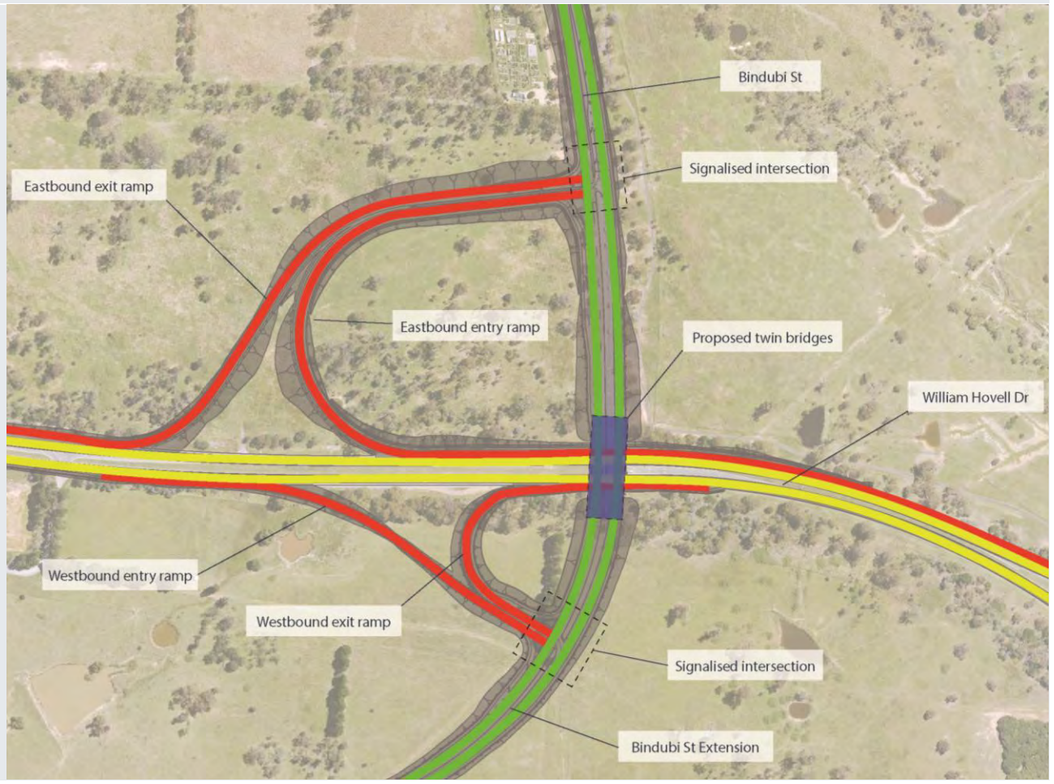
Option Details

The upgrade configuration was developed to enhance operation of the intersection, consists of the following primary elements:

- **Eastbound exit ramp** – The single lane ramp is expected to convey relatively low volumes. Reverse curves with mid-level design speeds will require a degree of deceleration in the auxiliary lane.
- **Eastbound entry ramp –** The ramp is expected to convey nearly 3000 vehicles in the 2041 AM peak, which requires two lanes to provide sufficient capacity. Utilising a loop ramp configuration, a large radius loop has been adopted to maximise operating speed and, by extension, capacity of the ramp. It is intended that signalisation of both access points to the ramp (left turn from Bindubi St northbound and right turn from Bindubi St southbound) will control flow from the ramp onto the mainline. The loop arrangement is preferred as it increases distance between the Glenloch interchange and Bindubi St interchange ramp noses, improving the efficiency of ramp and mainline operation.

  The operation of the merge zone of this ramp on the eastbound mainline will be critical for the performance of the intersection. Given the high forecast ramp and mainline volumes, the ramp utilises a combination of a lane add and an extended auxiliary lane. This prolonged auxiliary lane length has been developed to provide ramp flows with an extended opportunity to merge / weave with the mainline. Additionally, provision of a large radius loop provides the opportunity for vehicles to approach mainline operating speeds, reducing speed differentials, which improves the efficiency of merge movements, and reduces the likelihood / severity of crashes. Further analysis and adjustment of this loop ramp arrangement may be required in future design iterations.
- **Westbound exit ramp** – The single lane westbound exit ramp is heavily loaded during PM peaks. It adopts a minimum radius loop arrangement and a significant amount of deceleration is required in the auxiliary lane. The loop arrangement is preferred as it increases distance between the Glenloch interchange and Bindubi St interchange ramp noses, improving the efficiency of ramp and mainline operation.

  It is also acknowledged that this loop ramp configuration has a small impact on developable area of the M3E area.
- **Westbound entry ramp –** The single lane ramp is expected to convey relatively low volumes to the west. Whilst the ramp has a conventional arrangement, it is noted that the design currently omits southbound access from Bindubi St. Analysis indicated that demand for this movement was relatively low and the movement was serviced by alternative routes. Furthermore, provision of this right turn would require an additional signal phase, with modelling indicating that a third right turn from the westbound exit ramp would be required to avoid intersection failure in the 2041 PM peak. Notwithstanding, it is recommended that this approach be confirmed in future design phases, and that allowance been made in the gazetted road corridor and/or the embankment formation to allow for future addition of right turn lanes to support a retrofit should it be required in the future.



8. Corridor Priorities & Staging

8.1 Overview

A key consideration of the Corridor Strategy is identification of an appropriate approach to delivery staging of the upgrade works. Understanding how to best to phase implementation of the Corridor Strategy and prioritise its constituent activities and upgrades is critical for several reasons, including:

- Each upgrade responds to specific needs of the transport network that change over time, ensuring optimal network performance
- Each upgrade responds to the long term ACT land release program which is phased over time, ensuring optimal network performance
- Staged delivery of Corridor Strategy upgrades ensures that capital and operational costs associated with the upgrade are incurred at appropriate times and maximise economic value to the community
- The upgrades are capital intensive and are likely to place fiscal pressure on the Territory if not appropriately phased over time

Given these considerations, the Corridor Strategy proposes phased delivery of the identified upgrades.

8.2 Approach

Several factors have informed the prioritisation of Corridor Strategy upgrades. The approach to identifying an appropriate delivery staging of upgrades has been developed in the context of the following considerations:

- **Operational Need** - The primary trigger for delivering the Corridor Strategy upgrades is operational need. As adjacent land uses change over time, and population growth and associated trip attraction (employment, educational, commercial, etc) grow, the transport network inclusive of the South West Corridor will experience increasing load and congestion. Transport modelling has identified timeframes in which elements of the Corridor reach or exceed their capacity and require upgrade to prevent failure / unacceptable deterioration of performance (be it operational or safety).
- **Value for Money** - Targeting delivery of upgrades in timeframes that offer the greatest return on investment to the Territory. This may be tied to timely delivery of upgrades to prevent operational deterioration, or equally may seek to life extend or “sweat” an asset to extract the maximum value of infrastructure prior to its replacement or renewal.
- **Interdependence** – Some of the upgrades proposed in the Corridor Strategy share an interdependence with other upgrades, or other off-corridor network improvements. These interdependencies may be:
  - Sequential - The need for an upgrade is triggered by the performance life of a preceding upgrade
  - Concurrent - A relationship between two or more upgrades supports the concurrent delivery of the upgrades. This interdependence may be operational (there are network operational or performance benefits in concurrent delivery), physical (e.g. the upgrades physically connect to each other such as having a common interface point), or delivery related (e.g. there may be substantial cost and/or constructability efficiencies in concurrent delivery)

Based on these considerations, each of the Corridor Strategy upgrades has been assessed as being required in the Short, Medium or Long Term and collectively tested as grouped suites of work for delivery in or around the 2031, 2041, or 2051 timesteps investigated in the Corridor Strategy. Whilst acknowledging the upgrades may be delivered prior to, on, or after each of these model years, the nominated year of delivery has been adopted as a simplifying assumption for the purposes of the Corridor Strategy. Furthermore, it is noted that the most appropriate timeframes for delivery of each of the upgrades is likely to change over time in response to evolving Territory priorities, network conditions and performance, land use and population growth.

The upgrade prioritisation and groupings described following have been tested in the Corridor Strategy strategic and operational transport modelling described in Section 9, and informed the economic analysis discussed in Section 11.

8.3 Short Term Priorities

Upgrades that were identified as having an urgent operational need, and are considered likely to require delivery in the short term are summarised in Table 8–1. The associated justification and rationale for their prioritisation has also been provided.

Table 8–1: Short Term Corridor Priorities

Upgrade		Prioritisation Rationale
PW2a	Parkes Way / Anzac Pde upgrade - at grade improvements	The intersection currently experiences high levels of congestion and queuing in peak periods. This identified performance issue is supported by operational modelling which indicates that the intersection in its current configuration will fail by 2031. This interim solution seeks to provide a low cost solution to improve performance in the short term, and can be delivered in a short timeframe to address the existing issues at the site.
PW3a	Parkes Way / Coranderrk St upgrade - At grade improvements	The intersection currently experiences high levels of congestion and queuing in peak periods. This identified performance issue is supported by operational modelling which indicates that the intersection in its current configuration will fail by 2031. This interim solution seeks to provide a low cost solution to improve performance in the short term, and can be delivered in a short timeframe to address the existing issues at the site.
PW6	Parkes Way eastbound widening	The section of Parkes Way between Edinburgh Avenue and Coranderrk Street includes merge / diverge movements associated with Edinburgh Avenue, Commonwealth Venue and Allara Street ramps that perform poorly. This identified performance issue is supported by operational modelling which indicates that the eastbound mainline experiences low average travel speeds in the 2031 AM peak. This interim solution seeks to provide a low cost solution to improve performance in the short term, and can be delivered in a short timeframe to address the existing issues at the site.
PW10	Parkes Way / Clunies Ross St interchange upgrade - west facing ramps	This package is a network capacity upgrade tied to the development of the Molonglo Valley. Parkes Way currently experiences significant congestion and is forecast to perform poorly to the east of Clunies Ross Street in the AM peak by 2031. The connectivity that this upgrade provides will reduce congestion on Parkes Way in the short term in addition to facilitating the proposed interim public transport corridor that may route along Clunies Ross St and utilise these ramps.
PW14	Public Transport Corridor – Interim Upgrade	The interim public transport upgrade is intended to be a low cost solution that will facilitate public transport services between the Molonglo Valley and the City. It is proposed in the short term as it is expected to be a relatively straightforward measure that can be implemented in a short timeframe in response to growth in the Molonglo Valley.
G4	Glenloch Int. – Short/medium term PT route	With a strong interdependency to the PW14 package, the interim public transport upgrade through the Glenloch Interchange is intended to be a low cost solution that will facilitate public transport services between the Molonglo Valley and the City. It is proposed in the short term as it is expected to be a relatively straightforward measure that can be implemented in a short timeframe in response to growth in the Molonglo Valley.

The total estimated cost of the prosed suite of short term priorities is **$110M** in $2025 AUD.

8.4 Medium Term Priorities

Upgrades that were identified as required in the next 10-20 years are summarised in Table 8–2. The associated justification and rationale for their prioritisation has also been provided.

Table 8–2: Medium Term Corridor Priorities

Upgrade		Prioritisation Rationale
PW2b	Parkes Way / Anzac Pde upgrade - Underpass	Preliminary operational modelling suggests that the interim upgrade of the intersection will extend the operational life of the current intersection configuration, however by 2041 the upgraded roundabout is expected to fail in both peak periods. Given the anticipated 2041 performance issues at the intersection, the ultimate upgrade to a grade separated interchange is expected to be required in the medium term. Furthermore, the upgrade has a strong interdependence with the PW3c package proposed for delivery in the medium term.
PW3c	Parkes Way / Coranderrk St upgrade - grade separated interchange	Preliminary operational modelling suggests that the interim upgrade of the intersection will extend the operational life of the current intersection configuration, however by 2041 the upgraded roundabout is expected to fail in both peak periods. Given the anticipated 2041 performance issues at the intersection, the ultimate upgrade to a grade separated interchange is expected to be required in the medium term. Furthermore, the upgrade has a strong interdependence with the PW2b package proposed for delivery in the medium term.
PW4	Parkes Way localised lowering & narrowing through CBD	The localised narrowing of Parkes Way through the CBD has a strong interdependence with the PW3c package proposed for delivery in the medium term. In addition, operational modelling suggests that the increased capacity associated with additional eastbound and westbound lanes is required by 2041.
PW8	Molonglo to City Cycle Highway - Parkes Way component	The Molonglo to City Cycle Highway is proposed in the medium term in response to planned population growth in the Molonglo Valley and the anticipated need to provide robust active travel connectivity to the City. Furthermore, there are considered likely economies in constructing this package at the same time as other works on Parkes Way in this part of the corridor that are also proposed for delivery in the medium term such as PW12.
PW12	Midblock capacity upgrade between Glenloch & Clunies Ross interchanges	Operational modelling indicates that there is significant deterioration in performance on Corridor between the Glenloch Interchange and Clunies Ross Street by 2041 due to increased demand associated with population growth to the west. The midblock capacity upgrade proposes to provide additional lane capacity in the medium term to cater to this increased demand and address forecast performance issues.
PW18	Coranderrk to ANZAC - Improved pedestrian permeability across corridor	In addition to responding to increases in active travel demand associated with adjacent land uses, this upgrade is expected to have a strong interdependence with the PW2b and PW3c packages and as such is proposed for the medium term.
G6	Bindubi St Interchange	The Bindubi Street Interchange is proposed in the medium term in anticipation of capacity and connectivity requirements associated with development of the Molonglo 3 East area. Strategic and operational modelling indicates that the Bindubi Street Extension connection into the trunk road network through the Bindubi Street Interchange will be required by 2041 to ensure appropriate operation of the broader transport network including within Molonglo Valley District and its associated access points such as John Gorton Drive (north and south) and the East West Arterial.

The total estimated cost of the prosed suite of medium term priorities is **$732M** in $2025 AUD.

8.5 Long Term Priorities

Upgrades that are considered long term prospects to improve the performance of the transport network are summarised in Table 8–3. The associated justification and rationale for their prioritisation has also been provided.

Table 8–3: Long Term Corridor Priorities

Upgrade		Prioritisation Rationale
PW15	Public Transport Corridor – Ultimate Upgrade	The ultimate public transport upgrade is intended to provide infrastructure that will facilitate high capacity public transport services between the Molonglo Valley and the City. It is proposed in the long term when it is anticipated that population growth is likely to surpass a threshold that warrants significant capital expenditure on major public transport infrastructure.
G2	Glenloch Int. Upgrade - William Hovel Dr EB onto Gungahlin Dr NB ramp	Preliminary analysis indicates that demand for this movement is moderate, and the upgrade is unlikely to be justifiable until the Molonglo Valley is largely developed. As such, the upgrade is considered a long term proposal for the Corridor.
G5	Glenloch Int. – Long term PT route	With a strong interdependency to the PW15 package, the ultimate public transport upgrade through the Glenloch Interchange is required to facilitate public transport services between the Molonglo Valley and the City.

The total estimated cost of the prosed suite of long term priorities is **$277M** in $2025 AUD.

DRAFT

9. Corridor Operational Performance

9.1 Transport Analysis Approach

9.1.1 Modelling Approach

Two scenarios, being Do Minimum and Upgrade Scenario, were initially tested using the CSTM (version 1.2) to generate Origin-Destination matrices for the Canberra network, and to estimate growth in trips over the Corridor Strategy horizon. This growth was then used to estimate network demand flows for future years (2031, 2041 and 2051) that informed operational modelling of the Corridor and its surrounds. The operational modelling was developed using an Aimsun Hybrid (mesoscopic / microscopic) model to allow assessment of the two scenarios to understand how the Corridor Strategy would impact operation of the network. The modelling for the Parkes Way Corridor was part of a broader transport analysis that also included the concurrent assessment of the South West Corridor Strategy, and is documented in the Future Transport Modelling Report included as Appendix C of the Corridor Strategy. The study area for the operational modelling included the two primary transport corridors in addition to the surrounding adjacent transport network as indicated in Figure 9–1.

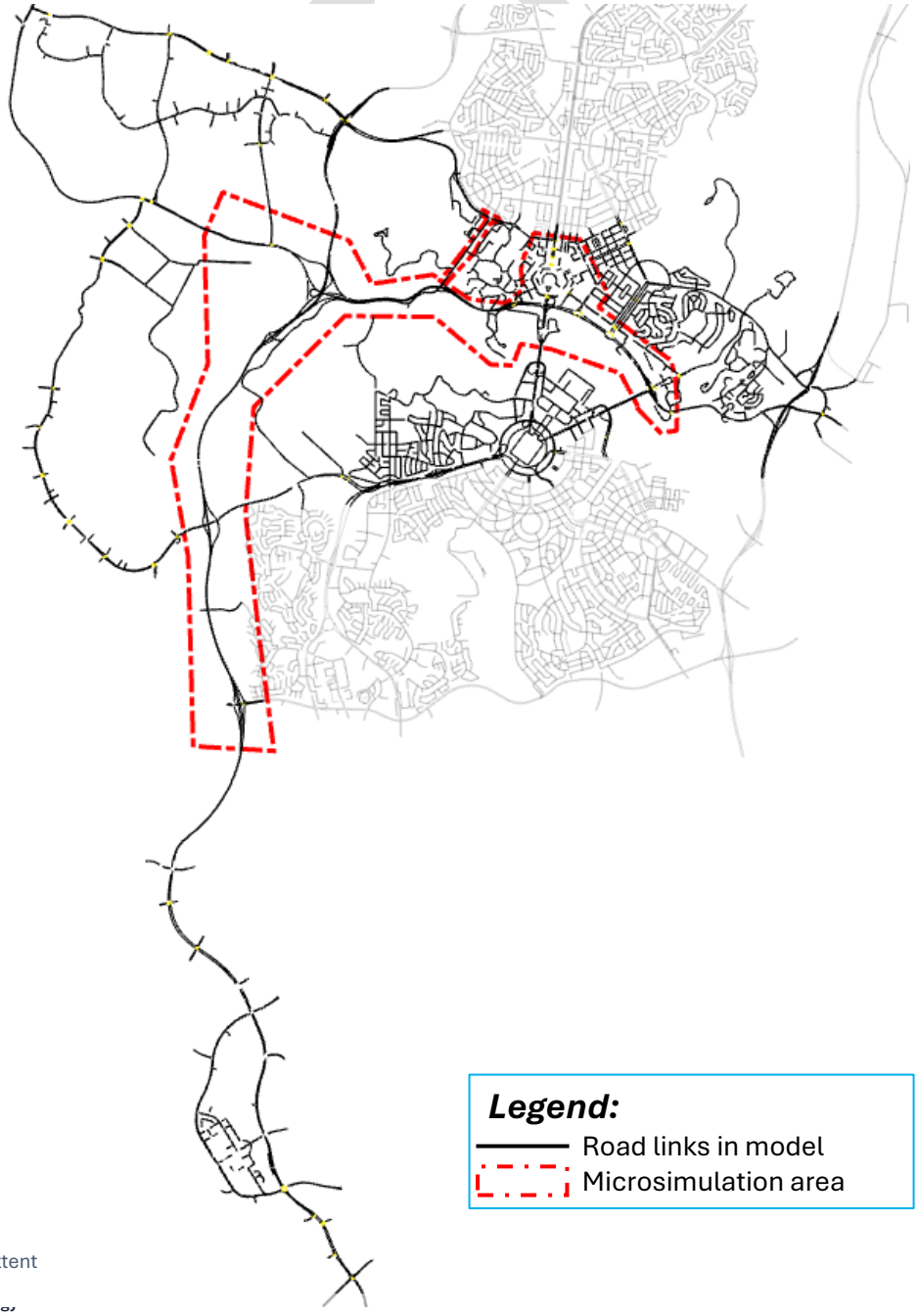


Figure 9–1: Aimsun Hybrid Model Extent

9.1.2 Operational Scenarios

In order to understand the likely future performance of the Corridor in response to changing land use and traffic conditions across the Canberra network, strategic and operational transport modelling was undertaken. This transport modelling considered two discrete scenarios for the future 2031, 2041 and 2051 Canberra transport network:

1) **Do Minimum** – The Base Case scenario refers to a Do Minimum approach adopted within the Corridor and is characterised by retention of the Corridor's infrastructure in its current form, with the minimum required operational and maintenance interventions undertaken to ensure that its existing configuration (intersection / interchange arrangements, lane configurations, speed regime etc) are retained. It is noted however that the Do Minimum scenario does include network enhancements and alterations outside the Corridor, consistent with Territory's anticipated adaption of the network over the Corridor Strategy horizon (as identified in future year versions of the CSTM). The Do Minimum scenario forms the Base Case for the Corridor Strategy, against which the Upgrade Scenario has been compared and tested.
2) **Upgrade Scenario** – The Project Case scenario is intended to investigate the potential impacts of the upgrades proposed in the Corridor Strategy. The scenario assumes that the upgrades identified in Section 7 have been implemented. To ensure consistency between the Base and Project scenarios, the transport network outside the Corridor is assumed to be the same in the Upgrade Scenario as that adopted in the Do Minimum scenario. That is, off-corridor transport infrastructure is consistent with Territory's anticipated network over the Corridor Strategy horizon as identified in future year versions of the CSTM. This approach ensures that any identified changes in network operation and performance can be attributed entirely to the implementation of the Corridor Strategy.

9.2 Operational Performance

9.2.1 Network Operation

In addition to investigating the performance of the Corridor, the operational model also tested the implications of the proposed Corridor Strategy on the network in the vicinity of the Corridors. This analysis was undertaken acknowledging that the Corridor is an integral part of the transport network, and the implications of its operation extend well beyond the Corridor itself.

To understand the operation of the Corridor and the surrounding transport network, and the impacts of the proposed upgrades, various performance metrics were assessed. These metrics for the AM and PM peak hours included:

- **Total Demand** – Total number of generated trips that are forecast to travel through the model, providing a sense of model scale
- **Uncompleted Trips** – The number of trips in the model that failed to reach their destination which is an indicator of congestion in the model (↑ uncompleted trips ≡ ↑ congestion)
- **Total VKT** – Aggregate number of Vehicle Kilometres Travelled provides insight into total distance travelled by vehicles in the peak hour across the model
- **Total VHT** – Aggregate number of Vehicle Hours Travelled provides insight into total time spent in transit by vehicles in the peak hour across the model
- **Average Speed (km/h)** – A measure of how fast vehicles travel on average in the peak hour across the model (typically Average Speed = VKT/VHT with (↑ speed ≡ improved network performance)
- **Average delay per vehicle** – A measure of the delay vehicles experience on average (↑ delay ≡ ↑ congestion)
- **% of demand unreleased** – Unreleased demand is the proportion of trips that are unable to enter the model during the peak hour which is an indicator of congestion in the model (↑ congestion ≡ ↑ unreleased demand)

The network statistics associated with these metrics for both the Do Minimum and Corridor Strategy Upgrade Scenario are summarised in Table 9–1.

Table 9–1: Network Statistics (South West Corridor + Parkes Way Corridor)

Network Statistics*	AM		PM	
	Base Case	Project Case	Base Case	Project Case
2031				
Total Demand	68,735	68,735	80,402	80,402
Uncompleted Trips	16,798	16,992	19,455	18,712
Total VKT	352,811	354,335	387,619	389,652
Total VHT	11,295	11,575	11,632	11,685
Average Speed (km/h)	27	27	26	26
Average Delay per Vehicle	1:14	1:16	1:20	1:18
% of Demand Unreleased	5.90%	4.70%	4.70%	4.50%
2041				
Total Demand	79,041	79,041	90,740	90,740
Uncompleted Trips	22,303	18,907	31,404	20,742
Total VKT	354,499	392,765	325,450	434,300
Total VHT	12,035	12,495	11,912	12,747
Average Speed (km/h)	24	27	22	26
Average Delay per Vehicle	1:28	1:14	1:47	1:19
% of Demand Unreleased	12.80%	5.60%	12.50%	6.40%
2051				
Total Demand	87,111	87,111	97,090	97,090
Uncompleted Trips	20,578	22,659	31,570	21,411
Total VKT	637,232	638,657	603,527	672,986
Total VHT	26,095	25,689	30,402	24,844
Average Speed (km/h)	25	26	24	27
Average Delay per Vehicle	01:26	01:23	01:42	01:17
% of Demand Unreleased	12.9%	7.3%	10.5%	7.8%

There were numerous important network level findings that were observed from the operational modelling that provided insight into the implications of implementing the combined Parkes Way Corridor and South West Corridor Strategies. These findings included:

- The proportion of unreleased demand in the Project Case is lower (significantly lower in the case of 2041 and 2051) than the Base Case. This indicates that the proposed upgrades were providing increased network capacity which allowed more traffic to enter the road network compared to the Base Case.
- The number of uncompleted trips in the Project Case is lower (again, significantly lower in the case of 2041 and 2051 PM) than the Base Case. This indicates that the proposed upgrades provided improved accessibility for traffic to arrive at their destinations within a shorter time period.
- Whilst the 2031 average network travel speeds remained similar in both the Base and Project Cases, when considered in the context of the reduced unreleased demand in the Project Case, the results indicate that although the upgrades would not substantively reduce average delays along the corridors during the peak hour, the proposed 2031 upgrades provide benefits in other areas of the road network outside the modelled area that are not captured in the operational model results.

- Significant improvements to average delay and average travel speeds in 2041 and 2051, combined with improvements in unreleased demand, suggest that the proposed upgrades would provide increased road capacity for traffic to enter the road network, as well as allowing traffic to arrive at their destinations within a shorter duration.

9.2.2 Intersection Performance

The performance of an intersection can be measured by the average delay per vehicle, which corresponds to a Level of Service (LoS) measure for the intersection. The performance of an intersection in this modelling report was measured in accordance with the Transport for New South Wales (TfNSW) LoS definition shown in Table 9–2. For signalised intersections, the average delay over every movement was used to define the LoS of the intersection. For roundabouts and priority-controlled intersections, the delay on the worst movement was used to define the LoS of the intersection.

Table 9–2: LoS Criteria (TfNSW)

LoS	Delay
A	d <= 14
B	14 < d <=28
C	28 < d <= 42
D	42 < d <= 56
E	56 < d <= 70

Generally, an intersection that performs at LoS D or better is considered to be performing acceptably and does not require any improvements. When intersections reach LoS E, the performance becomes unstable and indicates improvements would be beneficial, while LoS F indicates the intersection is performing unsatisfactorily and would benefit from physical capacity upgrades.

The Hybrid model was used to assess the performance implications of four upgrades that are sited at intersections or interchanges on the Parkes Way Corridor. The analysis made several findings based on the delay and LoS impacts summarised in Table 9–3. These findings included:

- The interim upgrade of the ANZAC Parade roundabout in 2031 would significantly improve performance in the PM peak (from LoS F to D), but result in operational deterioration in the AM peak (albeit at LoS F in both scenarios). The AM increase in delay relates to both the introduction of signals at the roundabout, and turbulence at the eastbound downstream merge on Parkes Way. Introducing widening to a third eastbound lane between ANZAC Parade and Kings Avenue was found to improve performance to a degree, however this improvement was not considered significant enough to warrant its adoption, noting the associated requirement to widen the Wendouree Drive bridge and interim nature of the upgrade.
- The performance of the interim upgrade proposed at the Coranderrk Street roundabout also sees a deterioration in the 2031 AM peak, noting that this reduction in performance is considered to be a result of eastbound performance issues / queuing from the ANZAC Parade interim upgrade discussed above. PM performance in 2031 is largely unchanged as a result of the proposed Coranderrk Street upgrade.
- The 2031 performance of the upgraded Clunies Ross interchange reduces in the AM peak, again as a result of queuing and network congestion from downstream intersections to the east (Coranderrk Street and ANZAC Parade), in addition to increased demand (↑ 25%), and signal phasing requirements (additional phases). The performance of the interchange in the 2031 PM peak remains broadly unchanged at the interchange. These outcomes are similar in 2041 with a reduction in performance in the AM peak Upgrade Scenario due to a significant increase in demand (↑ 65%), and largely unchanged performance in the PM peak. There was significant deterioration in the 2051 AM performance at the interchange resulting from downstream congestion associated with the Edinburgh and Commonwealth Avenue Interchanges in addition to a ↑ 47% in demand at the interchange in the Upgrade Scenario.
- The implementation of the of the Bindubi Street Interchange in 2041 significantly improves performance at the site through to 2051 in both peak periods, noting that the forecast failure at the interchange in the AM peak relates to downstream performance issues associated with the Edinburgh and Commonwealth Avenue Interchanges.
- Grade separation of the ANZAC Parade Interchange significantly improves the performance at that site in both peaks in 2041 and 2051, although it is noted that there is still overall failure in the 2041 AM peak. A major contributor to this outcome is eastbound entry ramp merge at the interchange which causes turbulence and queuing on the both the ramp and the mainline. Whilst this would likely be relieved to an extent by the provision of a third eastbound lane to the Kings Avenue Interchange and potentially upgrades the Kings Avenue exit ramp, upgrades outside the ANZAC Parade interchange were not tested in the Hybrid model. A further contributor to the LoS is that the modelled demand through the interchange is significantly higher in the Upgrade Scenario (↑ 27%) than the Base Case.

- The grade separation of the Coranderrk Street Interchange similarly improves performance at that site in 2041, although it is noted that the modelling indicates mainline congestion associated with ANZAC eastbound entry ramp merge compromises the operation of Parkes Way in the AM peak. Furthermore, demand through the interchange is significantly higher in the Upgrade Scenario (↑ 28%) than the Base Case.

Based on these intersection results, it is clear that whilst intersection performance improvements resulting from the Corridor Strategy are mixed, the upgraded Parkes Way is taking significantly more load and reducing congestion on other parts of the network.

Table 9–3: Intersection Performance – Delay (sec) + LoS

Intersection Site	AM				PM			
	Base Case		Project Case		Base Case		Project Case	
	Delay	LoS	Delay	LoS	Delay	LoS	Delay	LoS
2031								
Parkes Way / Anzac Parade*	104	F	151	F	117	F	51	D
Parkes Way / Coranderrk Street*	123	F	185	F	42	C	41	C
Parkes Way / Clunies Ross Street	19	B	72	F	13	A	18	B
Parkes Way / Bindubi Street*	>200	F	>200	F	79	F	90	F
2041								
Parkes Way / Anzac Parade*	123	F	94	F	>200	F	62	E
Parkes Way / Coranderrk Street*	162	F	128	F	187	F	106	F
Parkes Way / Clunies Ross Street	42	D	86	F	38	C	38	C
Parkes Way / Bindubi Street*	>200	F	115	F	180	F	38	C
2051								
Parkes Way / Anzac Parade*	65	E	42	D	>200	F	59	E
Parkes Way / Coranderrk Street*	40	C	90	F	>200	F	121	F
Parkes Way / Clunies Ross Street	18	B	198	F	39	C	84	F
Parkes Way / Bindubi Street*	>200	F	123	F	>200	F	59	E

* mainline movements included in Delay/LoS calculations

9.2.3 Corridor Travel Time

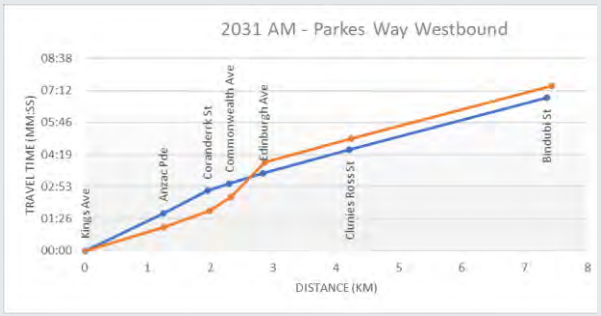
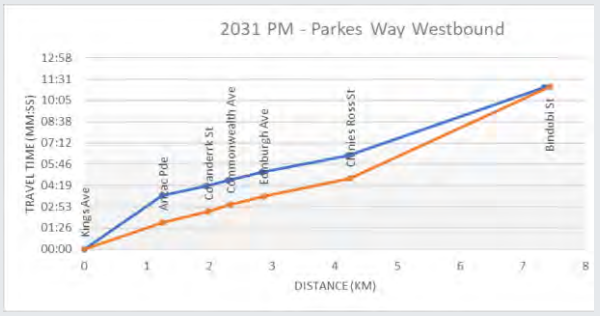
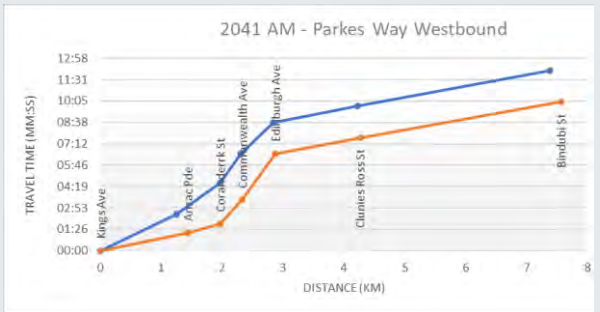
The time spent in transit is considered a cost to travellers as it consumes time that could have otherwise been spent on productive or leisure activities. As such, trip journey time is an important metric when assessing operational performance of transport networks. Trip journey times were extracted from the microscopic area of the Hybrid model to provide an understanding of comparative travel times and the impact of the Corridor Strategy, noting that the analysis only assesses the part of a journey that occurs within the Corridor, and that broader network impacts of the Strategy are not captured in this metric. The Corridor travel times for 2031 and 2041 are shown in Table 9–4. The results of the Corridor travel time modelling provided several findings:

- In the 2031 AM eastbound direction, weighted average travel times appear similar (Base vs Project Case) between Bindubi Street and Commonwealth Avenue, however increase substantially in the Upgrade Scenario beyond Commonwealth Avenue likely due to performance issues associated with the ANZAC Parade Intersection discussed above. In the westbound direction, weighted average travel times improve as a result of the Corridor Strategy for most of the City Zone, however deteriorate between Commonwealth Avenue and Edinburgh Avenue, likely due performance issues at the westbound exit ramp terminal intersection.
- In the 2031 PM peak travel times are similar in the eastbound direction, however improve substantially for most of the length of the Corridor in the westbound direction as a result of the Corridor Strategy.

- In 2041, weighted average AM peak travel times on Parkes Way in the eastbound direction for the Project Case are shown to increase significantly compared to the Base Case. Contributors to this increase in travel time likely include increased mainline demand, stress at the Bindubi Street Interchange entry ramp, increased capacity delivering traffic more quickly to off-corridor constraints, resulting in queuing back into the corridor, and weaving / merging turbulence in several locations. In the westbound direction travel times improve substantially through the City as a result of the Corridor Strategy upgrades.
- In the 2041 PM peak travel times are forecast to improve significantly in both directions as a result of the Corridor Strategy upgrades.

Further to these results, it is noted that the road network as a whole is forecast to have improved performance as result of the Corridor Strategy with lower average delay per vehicle and unreleased demand at the end of the peak hour periods.

Table 9–4: 2031 forecast corridor performance – Average peak travel times

	Eastbound	Westbound
2031		
AM		
PM		
2041		
AM		
PM		

9.2.4 Corridor Travel Speed

Corridor travel speeds provide insight into the flow conditions and by extension performance of the Corridor. Weighted average travel speeds were extracted from the Hybrid model for segments along the Parkes Way Corridor for both the Base and Project scenarios in each direction for the 2031, 2041 and 2051 timesteps. The forecast average travel speeds have been depicted in Table 9–5 to Table 9–7 based on the legend indicated in Figure 9–2, with higher travel speeds indicative of better performance of the corridor.

The results of the modelling provided several findings in relation to average travel speeds in the Corridor. These findings included:

- Travel speeds and performance of the Corridor eastbound carriageway deteriorates in the City Zone during 2031 AM peak due to modelled performance issues associated with the ANZAC Parade intersection upgrade discussed above. In contrast, travel speeds improve throughout the Corridor in the westbound direction in 2031 AM peak as a result of the proposed upgrades.
- In the 2031 PM peak travel speeds are forecast to be relatively similar between Base and Project cases in the eastbound direction. In the westbound direction performance generally deteriorates in the Project Case compared to the Base, noting that volumes are forecast to be substantially higher in the Upgrade Scenario.
- In 2041 the implementation of the Corridor Strategy results in improved average travel speeds in the westbound direction in the AM peak. Travel speeds are forecast to deteriorate in the eastbound direction in the 2041 AM peak, largely due to turbulence and queuing associated with the ANZAC Parade Interchange entry ramp merge discussed in Section 9.2.2.
- In the 2041 PM peak, modelling indicates that implementation of the Corridor Strategy will improve average travel speeds in both directions, despite significant increases in anticipated demand on the Corridor. This is particularly the case for the westbound direction, where average speeds are forecast to be <10 km/h in the Do Minimum scenario in the both the City and western zones of the Corridor.
- Modelling of the 2051 PM peak provides similar outcomes to 2041, with significant improvements in average travel speeds forecast as a result of the Corridor Strategy upgrades, notwithstanding substantial increases in anticipated demand.
- In the 2051 AM peak, modelling suggests that eastbound travel speeds will be lower in the Project Case. Further to substantially higher forecast traffic volumes in Project Case, this is believed to be the result of the ANZAC Parade entry ramp merge discussed above, and turbulence at several interchanges, particularly between Edinburgh Avenue and Commonwealth Avenue. In the westbound direction, travel speeds generally improve as a result of the Corridor Strategy upgrades, excluding between Commonwealth Avenue and Edinburgh Avenue where turbulence associated with entry ramp traffic and the associated weave is forecast to reduce travel speeds.

Considering the average travel speeds results, combined with the network statistics discussed above, it is noted that the road network as a whole is forecast to have improved performance as result of the Corridor Strategy with higher average speeds per vehicle and reduced unreleased demand at the end of the peak hour periods.

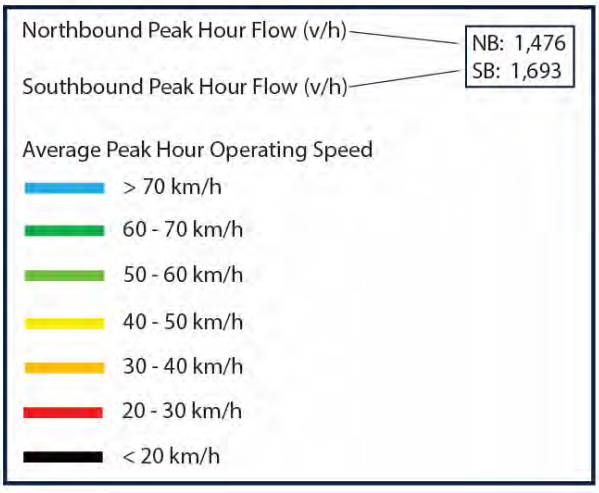


Figure 9–2: Average Travel Speed Assessment Legend

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Table 9–5: 2031 forecast corridor performance – Average peak hour speeds

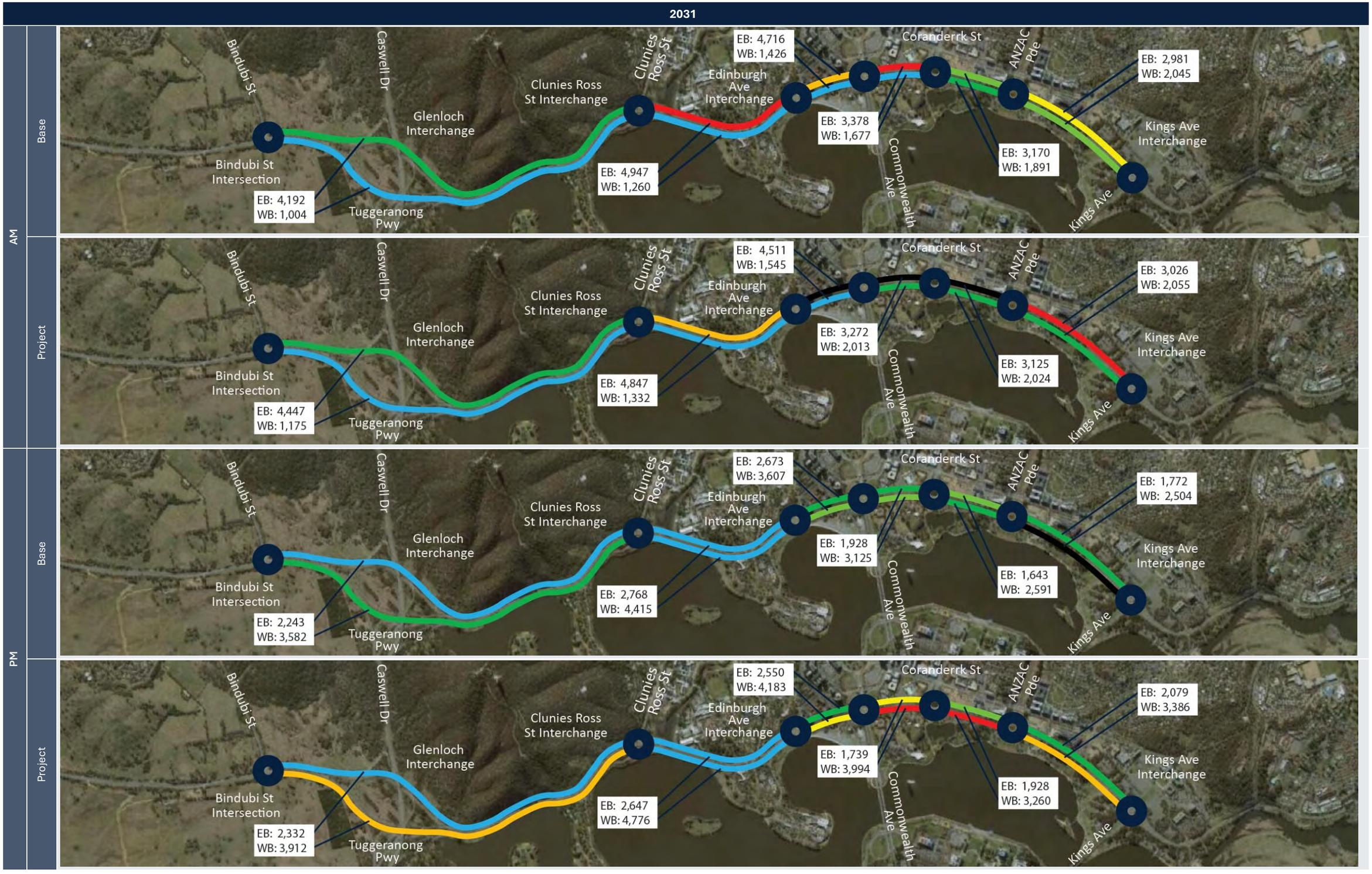


Table 9–6: 2041 forecast corridor performance – Average peak hour speeds

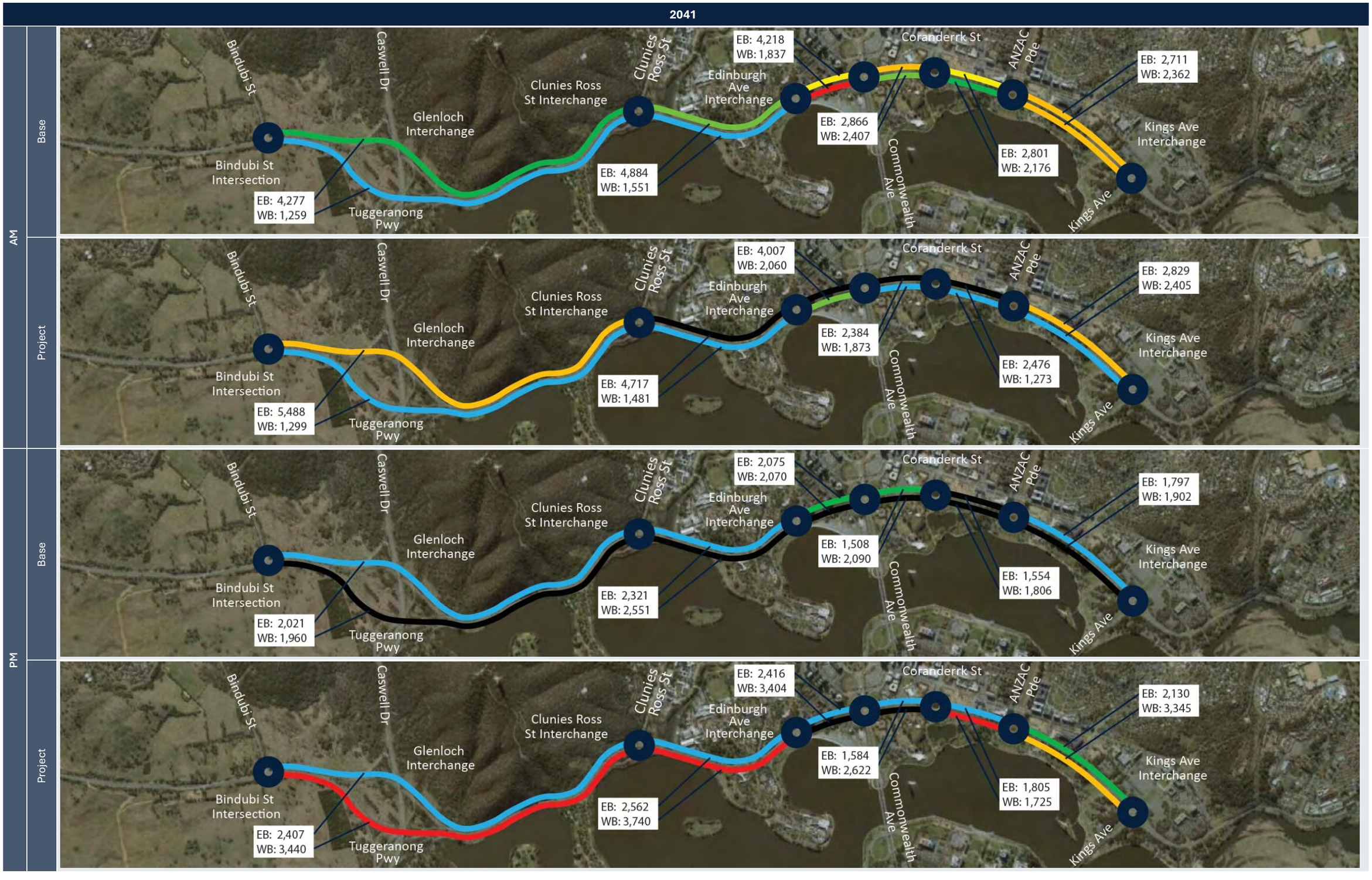
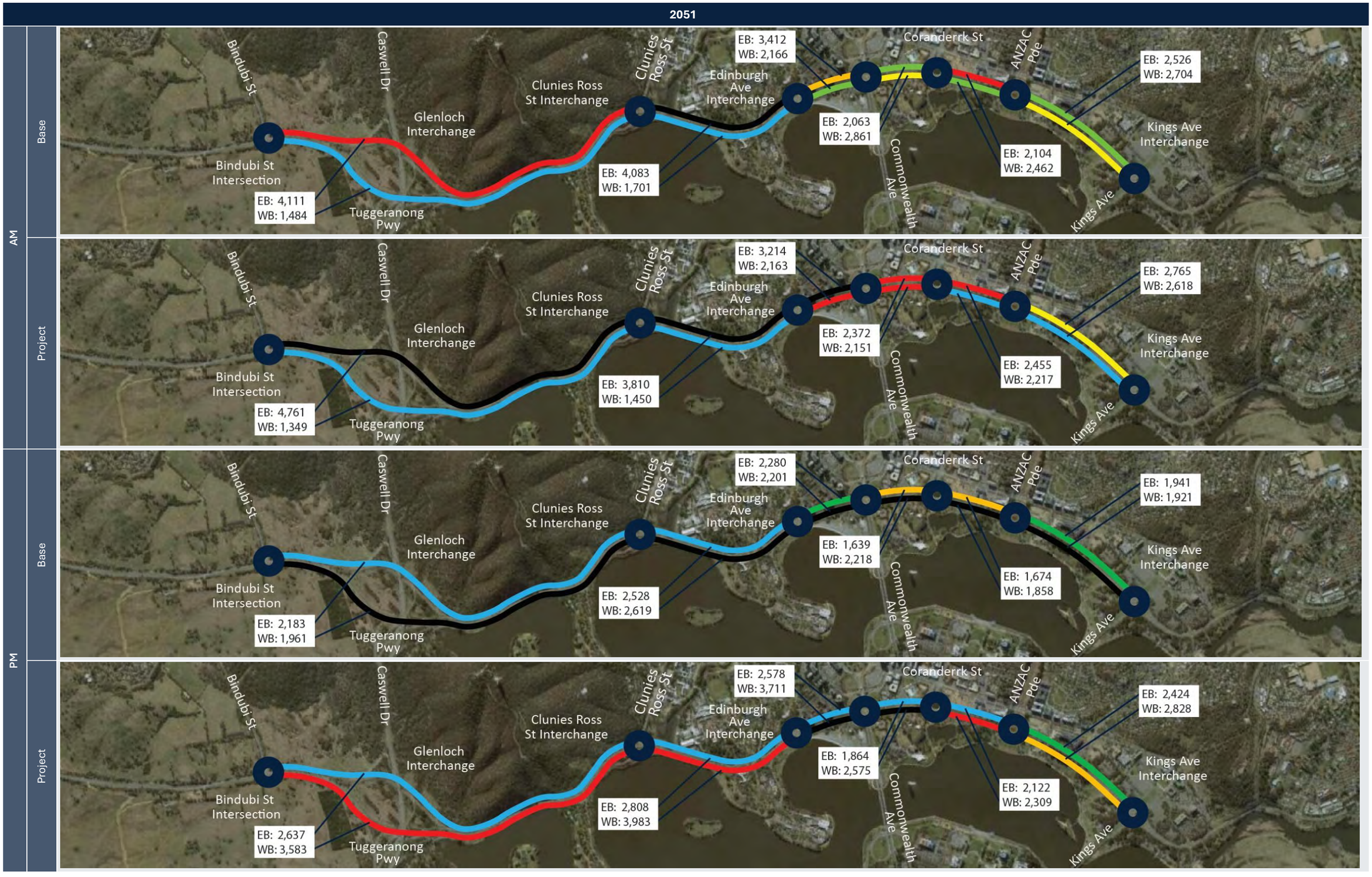


Table 9–7: 2051 forecast corridor performance – Average peak hour speed



9.3 Public Transport Operation

The Parkes Way Corridor currently conveys no public transport routes. However the Molonglo Valley will require significant increases in public transport services given the substantial population growth planned for the district. In the Do Minimum scenario, high capacity public transport services between Molonglo Valley and the City are expected to either route along:

A) John Gorton Drive / Cotter Road (current approach defined in ACT Transport Strategy 2020)

B) Bindubi Street with interchange at Belconnen (future approach identified in the ACT Transport Strategy 2020)

C) Parkes Way (understood to be a current consideration of the Territory)

Alternatives A and B are current ACT policy, noting they provide highly indirect routes for commuting trips to the City, with significant travel times and distances. Furthermore, these routes are congested and are expected to operate with relatively poor travel speeds, and in the case of Alternative B will also incur a transfer penalty for commuters.

Whilst Alternative C, provides a substantially shorter and more direct pathway to the city, it necessarily would utilise general traffic lanes which current experience congestion. Given that congestion is forecast to increase with the growth of the Molonglo Valley and West Belconnen, it is anticipated that travel times will be poor for these public transport trips.

The Corridor Strategy is expected to significantly improve the operational performance of public transport trips, and reduce travel times for commuters. These improvements are expected to be a result of:

- **General Corridor Improvement** – The modelling discussed above indicates that Upgrades to the Corridor will typically improve the operation of the corridor (noting some exceptions to this in the City Zone). General improvements to the operation of the Corridor will allow public transport vehicles using the to operate more safely and with reduced travel times.
- **Public Transport Infrastructure** – The Corridor Strategy proposes several public transport specific upgrades. These upgrades will provide dedicated public transport infrastructure (namely interim bus lanes, and ultimately an entirely segregated corridor) that will minimise public transport interaction with general traffic, substantially increasing travel speeds and reducing journey times, and subsequently inducing mode shift away from private vehicles.

9.4 Active Travel

The Corridor Strategy includes two upgrades that target improvements to the active travel network. These upgrades will enhance active travel operation, safety and mode share:

- **PW8 - Molonglo to City Cycle Highway - Parkes Way Component** – This upgrade will provide a high standard segregated commuting link for cyclists between the Molonglo Valley district and the CBD. It will improve active travel operation by providing a high speed dedicated route for cyclists, reducing journey times, improving safety and encouraging mode shift. Further to this, the proposal includes a secondary shared path that provides an attractive recreational route on the Lake foreshore for both pedestrians and cyclists.
- **PW18 - Coranderrk to ANZAC - Improved pedestrian permeability across corridor** – The Corridor Strategy proposes improvement to cross corridor active travel connectivity in the City at two sites. These improvements will enhance the active travel network, making it safer, more accessible and attractive, whilst reducing the barrier that Parkes Way creates between the City, the Lake, and Commonwealth Park.

Further to these upgrades, it is anticipated active travel connectivity and operation will also be improved through the provision of active travel infrastructure incorporated into interchange upgrades such as the Bindubi Street Interchange and the Coranderrk Street Interchange. These upgrades will improve cross-corridor connectivity for pedestrians and cyclists, encouraging mode shift and improving safety for vulnerable road users. Improvements in public transport services and patronage is also expected to encourage mode shift to active travel as many public transport trips include an active travel component.

9.5 Freight

The Parkes Way Corridor forms part of Canberra's freight network. The City Zone of Corridor to the east of Coranderrk Street provides B-Double access to industrial areas in the east in addition to connectivity to regional freight links such as the Monaro Highway and the Kings Highway.

The Parkes Way Corridor was considered in the recent Freight Corridor Assessment of Canberra's transport network included as Appendix D. The assessment assessed five alternative ACT corridors to identify which were most suitable for conveying road freight in and through the Territory. One of these corridors (Route 1) included routing of freight vehicles in the Parkes Way Corridor. Route 1 considered a freight corridor along the Barton Highway, Gungahlin Drive, Caswell Drive, Parkes Way, and Pialligo Avenue.

A suitability assessment was undertaken on the alternative freight corridors considered in the study utilising a Multi Criteria Analysis. The suitability assessment made several findings in relation to the potential freight routes relevant to the Parkes Way Corridor:

- **Preferred Freight Route** – The analysis indicated that Canberra's existing primary freight corridor that routes through Barton Highway/Federal Highway/Majura Parkway is the most suitable for carrying large freight vehicles across Canberra. This corridor passes through/near the three major industrial areas (Hume, Mitchell and Fyshwick), provides the best north/south connection and the best east/west connection. The analysis indicated that this had a high degree of suitability for freight movements and is fully aligned with the Future Orbital Freight Network defined in the ACT Transport Strategy 2020.
- **Route 1** – The east-west component of this route (predominantly Parkes Way) was assessed as having poor suitability as a freight corridor. This finding was based on the proximity of nationally significant landmarks and the disruption to vistas from key landmarks, proximity to future significant high density residential and educational precincts, coupled with the high traffic volumes.

Given the above, the Freight Corridor Assessment recommended a focus on the preferred freight route to convey freight through the Territory and to key freight attractors including Hume, Mitchell and Fyshwick, and that freight network enhancements to the ACT transport network should target this Corridor. Given the findings relating to the preferred freight route, and the assessed poor suitability of the Parkes Way Corridor for freight movements, the appropriateness of retaining Parkes Way as a freight / B Double route requires further consideration.

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10. Corridor Safety Performance

10.1 Current Crash History

The Parkes Way Corridor is one of the busiest road corridors in the ACT. The Corridor's nature and speed regime varies significantly over its length with implications for safety, crash potential, crash exposure and crash severity. The Corridor is characterised by two distinct zones:

- **Parkes Way West** – A motorway condition road with full access control and grade separation. It is a high volume / high speed free flow environment (posted speed 90 km/h). With full median barrier separation, there is minimal likelihood of head-on or side impact crashes, but potential for side-swipe crashes with high volumes in merge/diverge zones, high speed run off road crashes, high speed collision with numerous roadside hazards (trees etc) in the verges, and high-speed differential rear-end crashes.
- **Parkes Way City Zone** – A mixed road typology, being predominantly a freeway condition road with an intermediate posted speed of 80 km/h, however interrupted by two at grade roundabouts (at Coranderrk Street and ANZAC Parade). The Corridor in this zone typically has a very wide median reducing the likelihood of head-on crashes, although there are numerous roadside hazards (trees, vertical drops etc) in both the verge and median, some of which are protected by barriers. Crash types of concern in this part of the Corridor include side impact (at intersections), run off road / hit object, high-speed differential rear end crashes, and crashes involving vulnerable road users.

The Parkes Way Corridor has a substantial crash history, having experienced over 1000 crashes including 43 injury crashes in the five years to December 2024, although notably has not had a fatal accident in that time. Of these crashes, 96% were property damage only, and 4% were injury crashes. A summary of the crash history in the Parkes Way Corridor between the Glenloch Interchange (east) and Kings Avenue for the five years between January 2020 through to December 2024 by crash type is shown in Table 10–1.

Table 10–1: 5 year Crash History - 2020-2024 (ACT Open Data Portal)

Corridor Segment	Fatal	Injury	Property Damage	Total
Glenloch Int. - Clunies Ross St	0	4	55	59
Clunies Ross St - Edinburgh Ave	0	7	130	137
Edinburgh Ave - Commonwealth Ave	0	4	64	68
Commonwealth Ave - Coranderrk St	0	11	393	404
Coranderrk St - ANZAC Pde	0	11	318	329
ANZAC Pde - Kings Ave	0	6	70	76
TOTAL	0	43	1030	1073

10.2 iRAP Safety Analysis

The International Road Assessment Program (iRAP) was established in order to minimise the significant social and economic cost of road crashes. It is the umbrella organisation for road assessment programs around the world, and works with governments, road authorities and other organisations to improve road safety outcomes in over 100 countries. The primary goal of the iRAP organisation is to improve the safety of all road users around the world, which it aims to achieve using the following four consistent protocols to assess and improve road safety.

1) **Risk Maps** – use detailed crash data to illustrate the actual number of deaths and injuries on a road network
2) **Star Ratings** – Provide a simple and objective measure of the level of safety provided by a road's design
3) **Safer Roads Investment Plans** – Draw on approximately 90 proven road improvement options to generate affordable and economically sough infrastructure options for saving lives

4) **Performance Tracking** – Enables the use of Star Ratings and Risk Maps to track road safety performance and establish policy positions

10.2.1 AusRAP

AusRAP is the Australian version of the iRAP and was introduced to Australia in 2000. It has been managed by Austroads since 2021, and aims to maximise road safety outcomes and reduce road trauma by assisting local governments and managing the effective investment in Australian roads.

10.2.2 The Safe System

The Safe System is a road safety philosophy that requires roads to be designed and managed so that death and serious injury are avoidable. The basic principles are:

- Humans are fallible, and will inevitably make mistakes when driving, riding or walking.
- Despite this, road trauma should not be accepted as inevitable. No one should be killed or seriously injured on our roads.
- To prevent serious trauma, the road system must be forgiving, so that the forces of collisions do not exceed the limits that the human body can tolerate.

The Safe System philosophy is divided into four core interrelated pillars (shown in):

- **Safer Roads:** Relates to both the road itself and the roadside. This considers ways to reduce the chance of a crash occurring as well as the consequence when one does occur.
- **Safer Speeds:** Relates to the speed at which vehicles are likely to travel on the road. Factors that influence operating speeds includes posted speed limits, the level of compliance with the speed limit and physical constraints. Unsafe speeds can increase both likelihood and consequence of a crash.
- **Safer Vehicles:** Relates to the safety features, including intelligent technologies that are incorporated into vehicles of different types, which contribute to crash avoidance and/or reduced crash severity.
- **Safer Road Users:** Relates to road user behaviour, driver/rider training and licensing, levels of compliance and personal safety equipment in the case of vulnerable road users such as cyclists and motorcyclists.
- **Post-Crash Care:** Relates to emergency medical and rescue response, trauma care (both at the scene and in hospital) and injury rehabilitation.

Figure 10–1: The Safe System (source: Austroads Guide to Road Safety Part 6, 2022)

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The *Austroads Safe System Assessment Framework (AP-R509-16)* details the Safe System Assessment (SSA) that can be used to subjectively analyse a project's alignment with the safe system. However these qualitative assessments are typically high-level and therefore more useful at the planning stages of projects. The Austroads framework notes that when a high degree of precision is required, the standard SSA can be replaced by a more detailed, quantitative assessment.

The Australian National Risk Assessment Model (ANRAM) is identified as an example of a more detailed assessment of the safe system. ANRAM was a precursor to AusRAP, with a lot of the functionality relating to Fatal and Serious Injury (FSI) estimations having been incorporated into the iRAP/AusRAP process. Therefore, iRAP assessments are consistent with the Safe System approach and principles, while providing a more detailed analysis of road conditions compared to a standard SSA.

The key benefits of an iRAP/AusRAP assessment over a standard SSA are as follows:

- iRAP assessments have a global standard and is highly repeatable between users
- iRAP assessments are scalable to a network level
- iRAP assessments can be used to produce economic analysis for safety countermeasures and can be used to predict FSI on a road network

10.3 Star Ratings

As noted above, Star Ratings are one of the key iRAP/AusRAP protocols and provide a simple measure of the level of safety provided by a road's design. By inspecting more than 50 different road infrastructure attributes that are known to have an impact on the likelihood and/or severity of different crash types, a Star Rating Assessment (SRA) provides an objective measure of the level of safety the road provides for vehicle occupants, pedestrians, bicyclists and motorcyclists. Between 1 and 5 stars are awarded depending on the level of safety which is 'built in' to the road, with each star rating increment representing approximately half the road safety risk of the previous band.

An SRA forms part of an iRAP/AusRAP assessment. The aim of iRAP is to minimise the number of 1 and 2 star roads, which do not have the required safety attributes for the prevailing speed. The primary goal of AusRAP is to ensure that at least 80% of all vehicle travel across Australia is on 3-star roads or better by 2030.

10.4 Star Rating Assessment

The Star Rating Assessment (SRA) process involves dividing the road corridor into 100m sections, and then coding more than 50 different road infrastructure attributes along each section in accordance with the *iRAP Coding Manual – drive on the left edition*. The road attribute coding data is then then uploaded to the ViDA online software tool to produce Star Rating Scores, Risk Maps and Risk Worms, all of which provide a quantitative picture of the level of road safety for different road users.

As part of the Parkes Way Corridor Strategy, an SRA has been undertaken to assess the road safety outcomes that are expected from the proposed corridor upgrade. As vehicles represent the vast majority of traffic along this corridor, only the impact on vehicle SRS have been considered in the assessment. Further detail on the SRA include assumptions and results is included in Appendix F.

10.4.1 Relevant Design Packages

A number of strategic design packages are included in the proposed Corridor Strategy. While some of the proposed upgrades will directly impact the SRS and Star Rating along Parkes Way, others will not.

A summary of the proposed design packages and their potential are expected to impact on SRS and Star Rating is shown in Table 10–2. The upgrades proposed that are not expected to have an impact on the vehicle SRS and Star Rating along the Parkes Way Corridor have not been included in the SRA assessment.

Table 10–2: Upgrade package summary

Upgrade Package		Will the Upgrade impact the SRS and Star Rating?
PW2a	Parkes Way / Anzac Pde upgrade - at grade improvements	-
PW2b	Parkes Way / Anzac Pde upgrade - Underpass	✓
PW3a	Parkes Way / Coranderrk St upgrade - At grade improvements	-
PW3c	Parkes Way / Coranderrk St upgrade - grade separated interchange	✓
PW4	Parkes Way localised lowering & narrowing through CBD	✓
PW6	Parkes Way eastbound widening	-
PW8	Molonglo to City Cycle Highway - Parkes Way component	-
PW10	Parkes Way / Clunies Ross St interchange upgrade - west facing ramps	✓
PW12	Midblock capacity upgrade between Glenloch & Clunies Ross interchanges	✓
PW14	Public Transport Corridor – Interim Solution	-
PW15	Public Transport Corridor – Ultimate Solution	-
PW18	Coranderrk to ANZAC - Improved pedestrian permeability across corridor	-
G2	Glenloch Int. Upgrade - William Hovel Dr EB onto Gungahlin Dr NB ramp	-
G4	Glenloch Int. – Short/medium term PT route	✓
G5	Glenloch Int. – Long term PT route	-
G6	Bindubi St Interchange	✓

10.4.2 Road Attribute Coding – Existing Conditions

In 2018, ARRB (NTRO) undertook road attribute coding for the entire ACT road network, including Parkes Way and the Glenloch Interchange. This coding was provided by the Territory in order to undertake the SRA of the existing conditions, hereby referred to as the Do Minimum Scenario (Base Case). Whilst reviewing this coding it was noted that a number of inconsistencies between the observed and coded network existed. These inconsistencies, the associated analysis approach, and general analysis assumptions are discussed in detail in Appendix F.

10.4.3 Star Rating Coding – Upgrade Scenario

The design coding was undertaken based initially on the original ARRB existing conditions coding and changing the relevant sections and attributes as per the proposed upgrades in the strategic design packages. The approach to coding and analysing the Upgrade Scenario (Project Case) included:

- **Unchanged Sections** – Only the sections of Parkes Way and the Glenloch Interchange being upgraded were reviewed and the coding modified accordingly. The coding for sections remaining unchanged from the existing conditions were not reviewed and therefore also left unchanged, noting that forecast 2041 traffic flows (refer discussion below) have been adopted for comparison purposes.
- **2041 Upgrade Scenario** – In order to assess the long term safety impacts of the Parkes Way Corridor, the proposed upgrades have been assessed based on 2041 traffic conditions. Actual 2041 AADT traffic flows along Parkes Way, Glenloch Interchange and intersecting roads were unavailable for this assessment, as it is a future year. Therefore, for the 2041 design coding, the average of the AM and PM peak volumes from the 2041 CSTM (Version 1.2) estimates was calculated and then expanded by a factor of x10 to create a high level estimate of the daily traffic flow.

10.5 Star Rating Assessment Results

10.5.1 Vehicle Star Rating Score (SRS)

Table 10–3 presents the Vehicle SRS from the assessment, noting that the score represent an overall average for each Corridor segment or site, in contrast to the scores indicated on the risk worms which provide SRS scores for 100m segments along the Corridor. Note that lower scores indicate a safer outcome from a road safety perspective.

Table 10–3: Summary of Star Rating Scores

Corridor Segment	Base 2041	Design 2041	Diff
Overall Corridor Segments (with all proposed upgrades)			
Glenloch Interchange (West)	20.33	4.71	15.62
Glenloch Interchange (South East)	18.84	5.46	13.38
Parkes Way (Eastbound)	9.43	3.93	5.50
Parkes Way (Westbound)	7.70	4.63	3.07
Parkes Way	8.56	4.28	4.29
William Hovell Drive (Eastbound)	24.41	7.86	16.55
William Hovell Drive (Westbound)	18.30	5.23	13.07
William Hovell Drive	21.35	6.54	14.81
TOTAL CORRIDOR	**12.43**	**4.74**	**7.70**
Upgrade Sites			
G6	18.30	5.23	13.07
G4	22.62	4.68	17.94
PW12	14.12	3.99	10.14
PW10	11.69	9.04	2.65
PW4	6.16	2.38	3.78
PW3	11.40	2.76	8.64
PW2	11.47	2.10	9.37
TOTAL – UPGRADE SITES	**13.68**	**4.31**	**9.37**

10.5.1 Star Rating Tables

Figure 10–2 to Figure 10–5 present the Star Rating Tables from the assessment, which indicate the percentage of Parkes Way, William Hovel Drive and Glenloch Interchange that falls into each star rating category.

William Hovel Drive

Star Ratings	Vehicle Occupant Length (km)	Percent
3 star or better	0.3	14%
5 Stars	0.0	0%
4 Stars	0.1	4.5%
3 Stars	0.2	9.1%
2 Stars	1.1	50%
1 Star	0.8	36%
Not applicable	0.0	0%
Totals	2.2	100%

Star Ratings	Vehicle Occupant Length (km)	Percent
3 star or better	2.1	95%
5 Stars	0.2	9.1%
4 Stars	0.6	27%
3 Stars	1.3	59%
2 Stars	0.0	0%
1 Star	0.1	4.5%
Not applicable	0.0	0%
Totals	2.2	100%

Figure 10–2: William Hovell Star Rating Tables – base 2041 (top) and design 2041 (bottom)

Glenloch Interchange – West

Star Ratings	Vehicle Occupant Length (km)	Percent
3 star or better	0.7	39%
5 Stars	0.0	0%
4 Stars	0.0	0%
3 Stars	0.7	39%
2 Stars	0.4	22%
1 Star	0.7	39%
Not applicable	0.0	0%
Totals	1.8	100%

Star Ratings	Vehicle Occupant Length (km)	Percent
3 star or better	1.8	100%
5 Stars	0.4	22%
4 Stars	0.7	39%
3 Stars	0.7	39%
2 Stars	0.0	0%
1 Star	0.0	0%
Not applicable	0.0	0%
Totals	1.8	100%

Figure 10–3: Glenloch Interchange (West) Star Rating Tables – base 2041 (top) and design 2041 (bottom)

Glenloch Interchange – South East

Star Ratings	Vehicle Occupant Length (km)	Percent
3 star or better	0.8	44%
5 Stars	0.0	0%
4 Stars	0.0	0%
3 Stars	0.8	44%
2 Stars	0.4	22%
1 Star	0.6	33%
Not applicable	0.0	0%
Totals	1.8	100%

Star Ratings	Vehicle Occupant Length (km)	Percent
3 star or better	1.7	94%
5 Stars	0.4	22%
4 Stars	0.5	28%
3 Stars	0.8	44%
2 Stars	0.1	5.6%
1 Star	0.0	0%
Not applicable	0.0	0%
Totals	1.8	100%

Figure 10–4: Glenloch Interchange (South East) Star Rating Tables – base 2041 (top) and design 2041 (bottom)

Parkes Way

Star Ratings	Vehicle Occupant Length (km)	Percent
3 star or better	10.2	86%
5 Stars	0.4	3.4%
4 Stars	3.8	32%
3 Stars	6.0	50%
2 Stars	1.0	8.4%
1 Star	0.7	5.9%
Not applicable	0.0	0%
Totals	11.9	100%

Star Ratings	Vehicle Occupant Length (km)	Percent
3 star or better	11.5	97%
5 Stars	5.8	49%
4 Stars	2.9	24%
3 Stars	2.8	24%
2 Stars	0.3	2.5%
1 Star	0.1	0.84%
Not applicable	0.0	0%
Totals	11.9	100%

Figure 10–5: Parkes Way Star Rating Tables – base 2041 (top) and design 2041 (bottom)

10.5.2 Risk Maps

Figure 10–6 to Figure 10–9 present the Risk Maps from the assessment, which indicate the Star Ratings of each individual section of Parkes Way and Glenloch Interchange/William Hovell Drive.

William Hovel Drive

Figure 10–6: William Hovell Drive Risk Maps – base 2041 (left) and design 2041 (right)

Glenloch Interchange – West

Figure 10–7: Glenloch Interchange (West) Risk Maps – base 2041 (left) and design 2041 (right)

Glenloch Interchange – South East

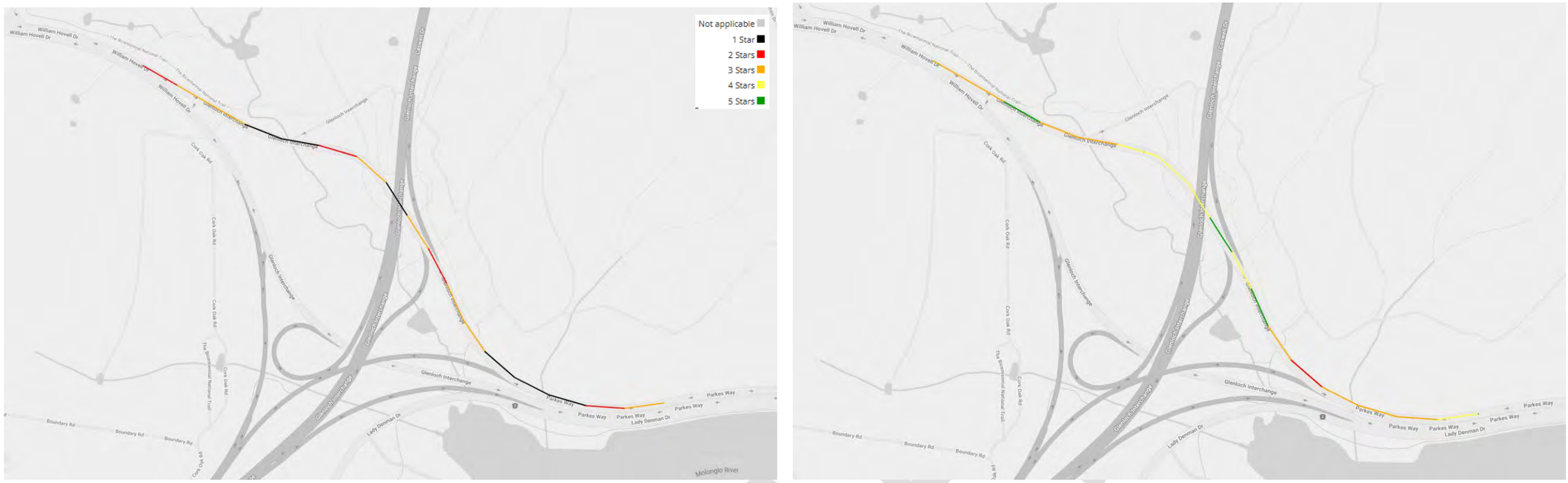

Figure 10–8: Glenloch Interchange (South East) Risk Maps – base 2041 (left) and design 2041 (right)

Parkes Way

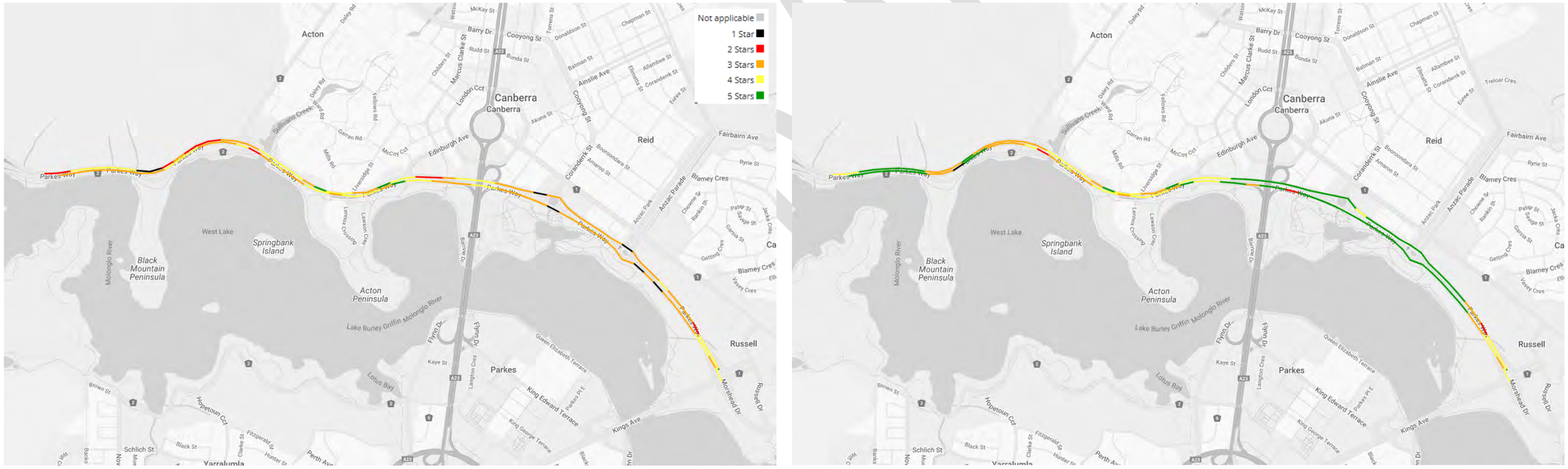

Figure 10–9: Parkes Way Risk Maps – base 2041 (left) and design 2041 (right)

10.5.3 Risk Worms

Figure 10–10 to Figure 10–13 present the Risk Worms from the assessment, which indicate the Star Ratings of each individual section of Parkes Way and Glenloch Interchange/William Hovell Drive.

William Hovell Drive

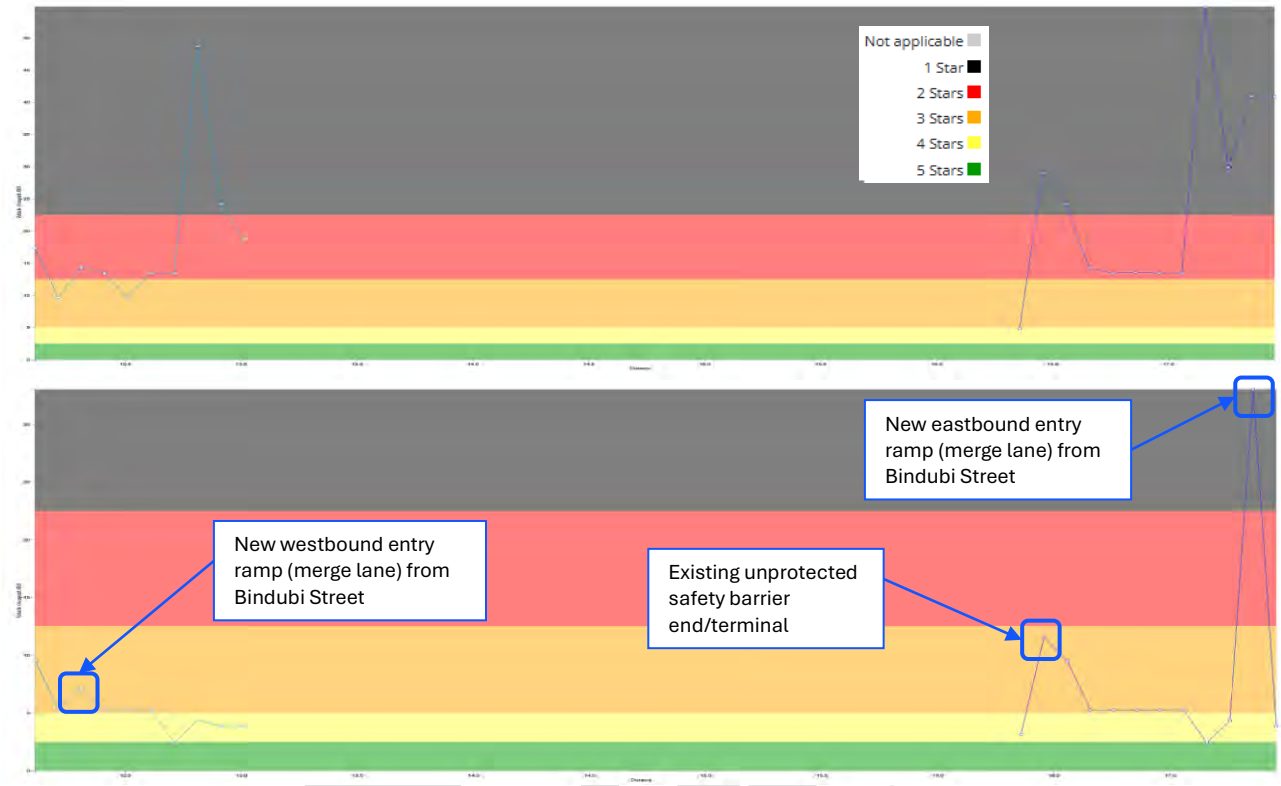

Figure 10–10: William Hovell Drive Risk Worms – base 2041 (top) and design 2041 (bottom)

Glenloch Interchange – West

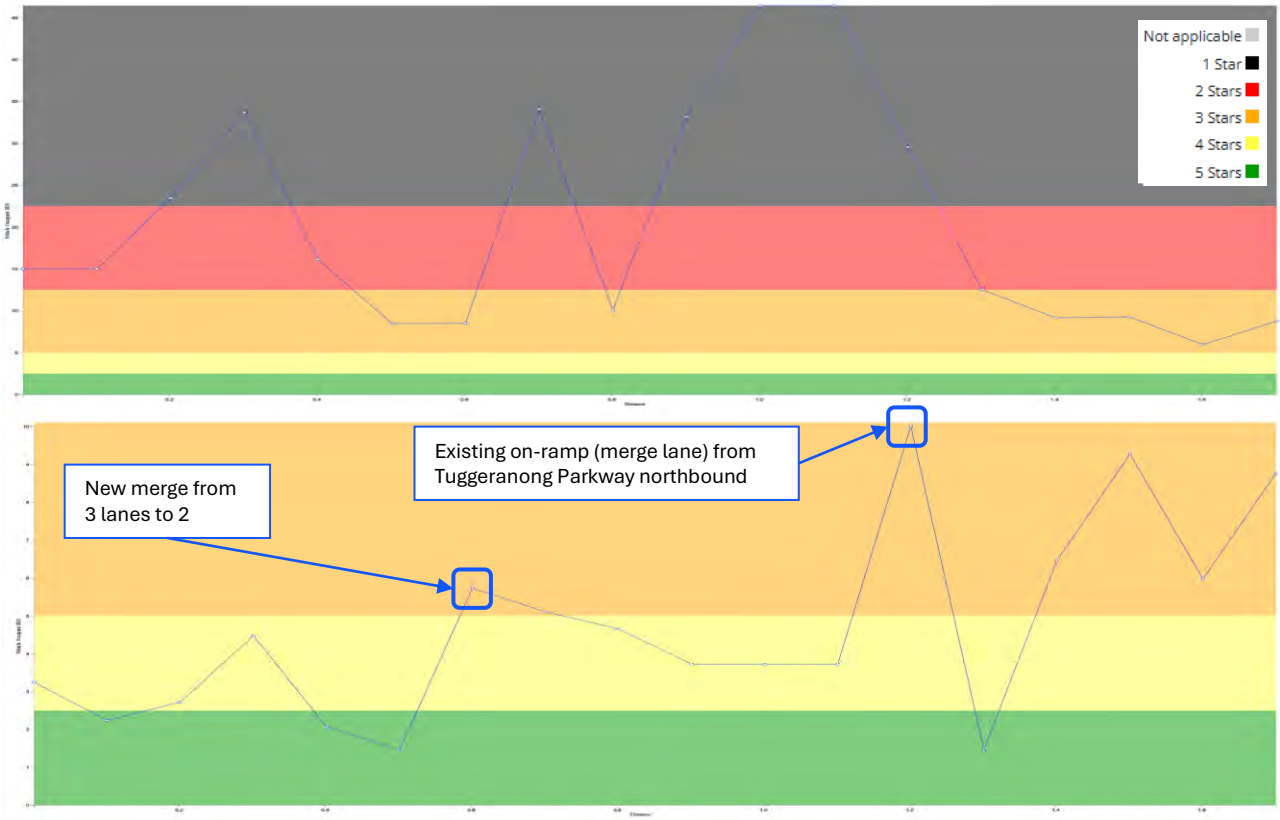

Figure 10–11: Glenloch Interchange (West) Risk Worms – base 2041 (top) and design 2041 (bottom)

Glenloch Interchange – South East

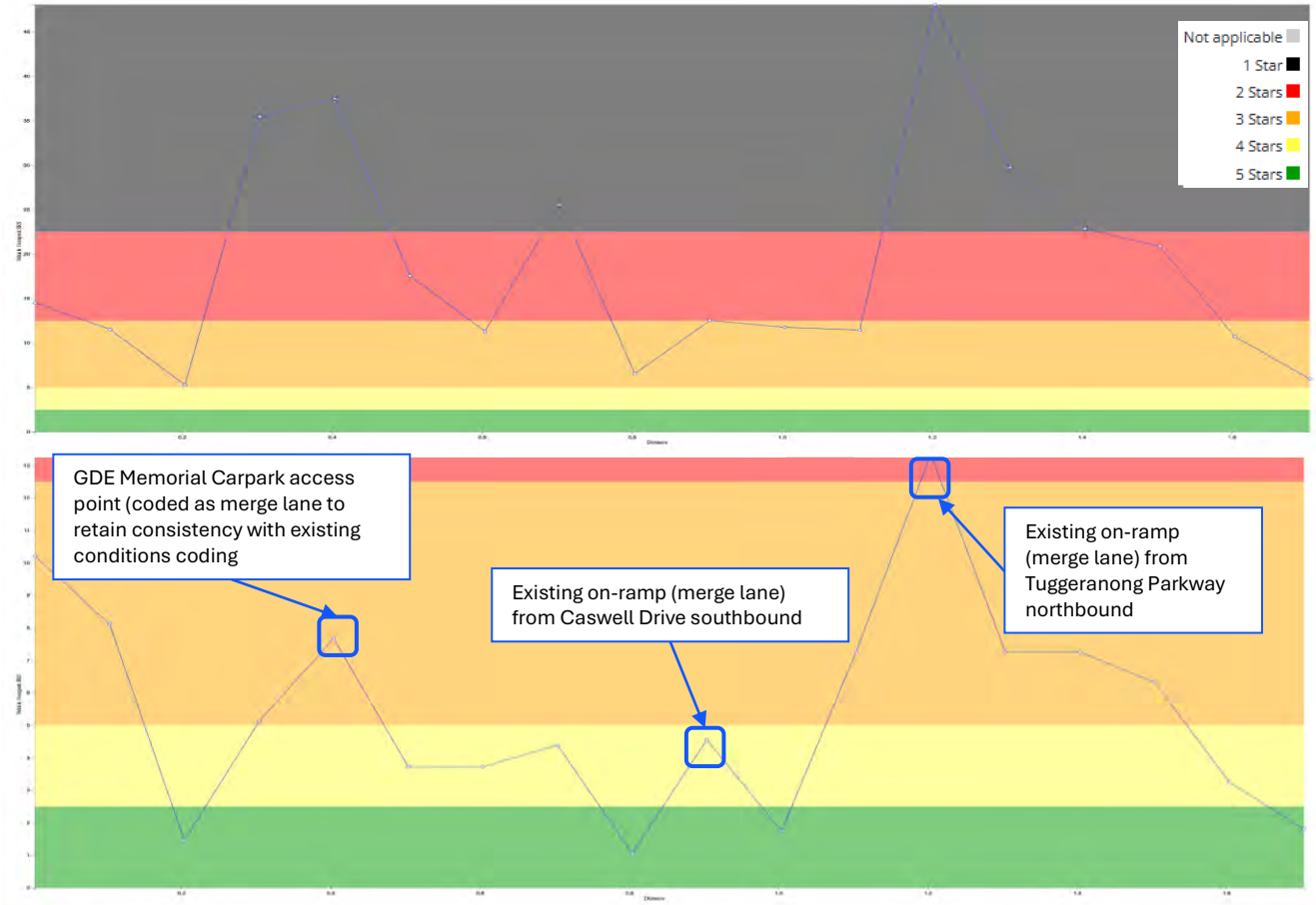

Figure 10–12: Glenloch Interchange (South East) Risk Worms – base 2041 (top) and design 2041 (bottom)

Parkes Way

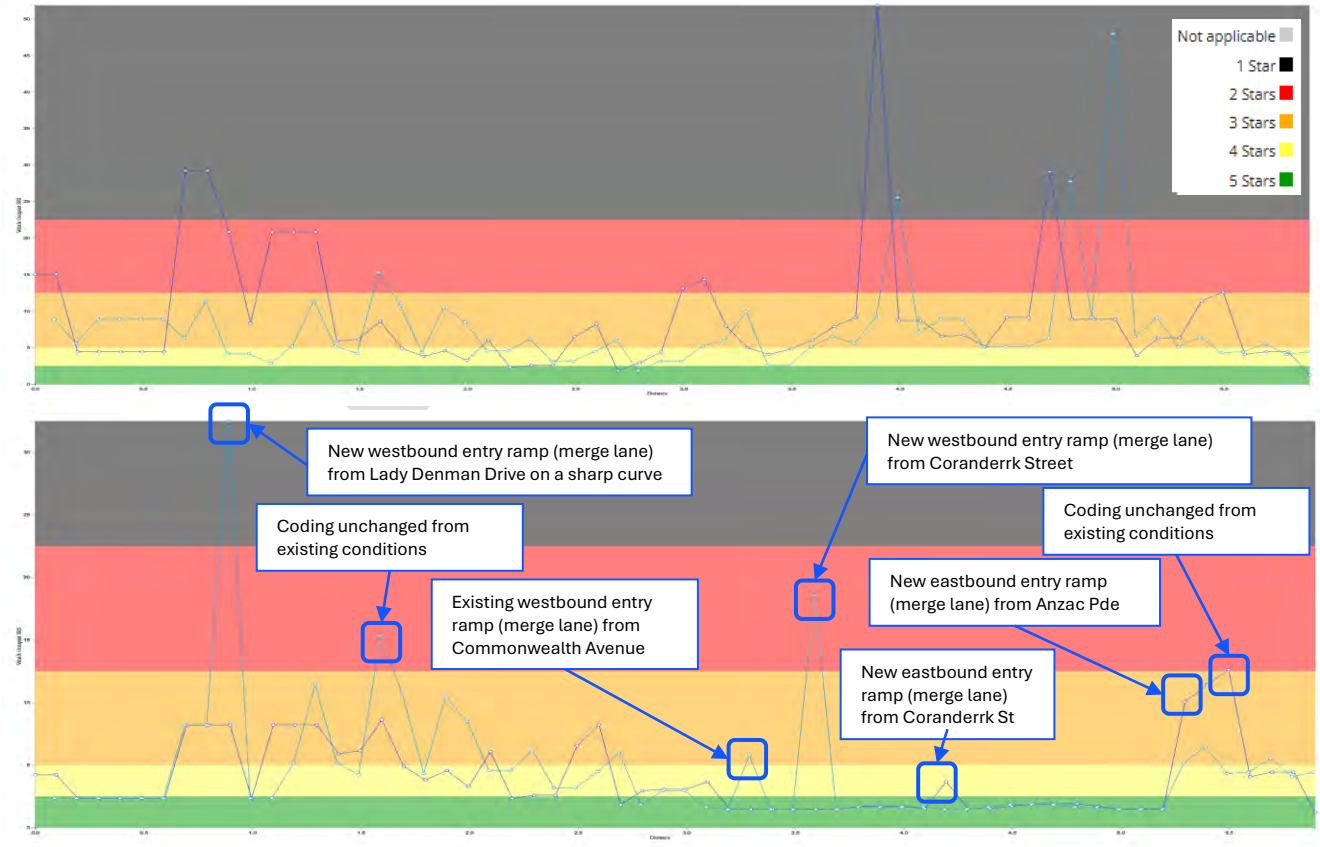

Figure 10–13: Parkes Way Eastbound (dark blue) and Westbound (light blue) Risk Worms – base 2041 (top) and design 2041 (bottom)

10.6 Discussion of SRA Results

The following sections provide a high level analysis of the SRS results for each vehicle crash type (refer to individual safety category results in Appendix F). Note that a reduction in SRS indicates an improvement in road safety outcomes.

The iRAP/AusRAP process considers the following three vehicle crash types:

- **Run-Off-Road –** Loss Of Control (LOC) to the driver side and to the passenger side
- **Head-On –** Loss Of Control (LOC) and Overtaking
- **Junction –** Intersection and Property Access

10.6.1 Run-Off LOC Driver Side

All carriageways see a reduction in SRS from the Do Minimum Scenario (existing conditions) to the Upgrade Scenario, which is primarily due to the assumed median safety barrier that will be installed along most sections. The carriageways that see the greatest SRS reduction (safety improvement) are Glenloch Interchange west and south east.

From a strategic design perspective, PW10 sees an increase in SRS from the Do Minimum Scenario to the Upgrade Scenario, indicating reduced safety outcomes. This is due to the narrowing of the median along these sections, meaning it is assumed that the existing wire-rope safety barrier will be replaced with less forgiving concrete barrier. However all other design packages see a reduction in SRS (with G4 showing the greatest decrease), resulting in an overall safety improvement across all packages.

10.6.2 Run-Off LOC Passenger Side

All carriageways see a reduction in SRS from the Do Minimum Scenario to the Upgrade Scenario, which is primarily due to the assumed roadside safety barrier that will be installed along all sections. The carriageways that see the greatest SRS reduction (safety improvement) are William Hovel Drive eastbound and westbound, and Glenloch Interchange west and south east.

From a strategic design perspective, all design packages see a reduction in SRS (with G4 and PW12 showing the greatest decrease), resulting in an overall safety improvement across all packages.

10.6.3 Head-On LOC

The Do Minimum Scenario SRS along Parkes Way and Glenloch Interchange is already very low. This is due to the separated carriageways and objects in the median (such as barriers or non-frangible objects) along most sections, that greatly reduces the likelihood of errant vehicles crossing into the opposing carriageway. However the SRS still sees a reduction (safety improvement) in the Upgrade Scenario, due to the assumed installation of median barriers along all upgraded sections, as well as the conversion of existing at-grade intersections to grade separated interchanges.

The Do Minimum Scenario SRS along William Hovell Drive is significantly greater than the rest of the Corridor, due to the lack of barrier or objects (such as light poles and trees) in the median, which means errant vehicles are more likely to cross into the opposing carriageway. However the assumed installation of median barrier along some of the route, along with the conversion of the Bindubi Street at-grade intersection to a grade separated interchange results in the noticeable reduction (safety improvement) in the Upgrade Scenario SRS.

From a strategic design perspective, William Hovell Drive (G6) sees a reduction in SRS for the reasons stated above. PW3 sees a reduction in SRS to 0.00 in the proposed design due to the overpass at Anzac Parade, allowing traffic on the main Parkes Way carriageways to bypass the existing roundabout entirely. All other design packages have Do Minimum Scenario to the Upgrade Scenario SRS of 0, indicating there is already minimal risk of head-on collisions due to loss of control along these sections, which remains unchanged under the proposed design.

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10.6.4 Head-On Overtaking

All carriageways and design packages have Do Minimum Scenario to the Upgrade Scenario SRS of 0.00. This indicates that there is already minimal risk of head-on collisions due to overtaking manoeuvres along these sections, which remains unchanged under the proposed design.

10.6.5 Intersection

All carriageways see a reduction in SRS from the Do Minimum Scenario to the Upgrade Scenario. The greatest SRS reduction (safety improvement) is along William Hovell Drive westbound, due to the replacement of the Bindubi Street at-grade intersection with a grade-separated interchange. While these changes also impact the eastbound carriageway, the new entry ramp (merge lane) from Bindubi Street has a significantly higher estimated traffic volume compared with the new entry ramp onto the westbound carriageway. Therefore the eastbound carriageway experiences less safety improvement compared with the westbound carriageway.

Parkes Way also experiences a reduction in SRS (safety improvement) due to the replacement of at-grade intersections with grade-separated interchanges at Coranderrk Street and Anzac Parade. While these changes also impact both carriageways, the introduction of new high volume merge lanes from Clunies Ross Street and Coranderrk Street along the westbound carriageway results in a significantly lower safety improvement when compared to the eastbound carriageway.

As a result of these new westbound merge lanes along Parkes Way in the Upgrade Scenario, the SRS for PW10 sees a noticeable increase compared to the Do Minimum Scenario, as shown on the risk worm. However this negative impact is outweighed by the SRS reduction to all other design packages, resulting in an overall SRS reduction (safety improvement) across all packages.

It is also noted that the SRA does not consider reduced crash exposure at sites external to the Corridor. The Upgrade Scenario will encourage more traffic along the Corridor and reduce traffic volumes on other parts of the road network in 2041, resulting in a greater overall safety benefit to the wider road network.

10.6.6 Property Access

All carriageways and design packages have Do Minimum Scenario SRS and Upgrade Scenario SRS of near 0.00. This indicates that there is already minimal risk of collisions involving vehicles departing/entering property access points, which remains unchanged under the proposed design.

10.7 Overall Vehicle Star Rating Improvements

Works are proposed in a total of 126 individual sections along William Hovell Drive, Glenloch Interchange and Parkes Way, each of them 100m in length. Out of these, 111 sections see an increase in Star Rating under the Upgrade Scenario, while only the 2 sections with the new high volume merge lanes from Lady Denman Drive and Coranderrk Street respectively see a reduced Star Rating from the Do Minimum Scenario.

A total of 122 sections feature a Star Rating of 3 or more under the Upgrade Scenario, which represents 97% of the total sections being upgraded. Furthermore as shown on the risk worms, the proposed design sees the majority of sections in PW2, PW3 and PW4 achieving a 5 star safety rating.

The overall smoothed Star Rating along the entire Parkes Way Corridor for the Upgrade Scenario is 3 or more, indicating that the design option will result in a measurable safety benefit when compared to the Do Minimum Scenario and result in more positive road safety outcomes.

It is also noted that the SRA does not consider reduced crash exposure at sites external to the Corridor. The Upgrade Scenario will encourage more traffic along the Corridor and reduce traffic volumes on other parts of the road network in 2041, resulting in a greater overall safety benefit to the wider road network.

10.8 Proportion of Corridor with a 3+ Star Rating

Analysis indicates that 68% of the Parkes Way Corridor is rated at 3 stars or above in the Do Minimum Scenario. A significant increase in the number of 5 star sections under the Upgrade Scenario sees the total percentage of the Corridor rated at 3 stars or above increase to 97%.

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As noted above, the primary goal of AusRAP is to ensure that at least 80% of all vehicle travel across Australia is on 3-star roads or better by 2030. Therefore, the Parkes Way Corridor achieves this primary AusRAP goal under the Upgrade Scenario.

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11. Corridor Strategy Investment Return

11.1 Overview

The delivery of the Parkes Way Corridor package of works will require significant infrastructure investment over the next 30 years. With the current constrained funding environment, it is essential that this infrastructure investment provides value for money for the ACT Government. A high-level cost benefit analysis (also known as a rapid economic appraisal) has therefore been undertaken to estimate the socio-economic benefits of the implementation of the Corridor Strategy compared to the investment cost for delivery and operation. Subsequent stages of planning and design will then provide a more detailed assessment of the cost and benefits of each individual project.

Due to the inter-related nature of the Parkes Way and South West Corridor Strategies, the rapid economic appraisal has initially been completed for the delivery of the full package of works along both corridors. The economic merit of the individual corridor package of works has then been estimated through a benefit apportionment process.

The results of the rapid economic appraisal are summarised following, with further details provided in the Rapid Economic Appraisal Report included in Appendix G.

11.2 Methodology

The rapid economic appraisal has been prepared using Australian Transport and Assessment Planning (ATAP) guidelines and the application of respective economic parameters. The methodology has been tailored for the proposed package of works along both the Parkes Way Corridor and South West Corridor, with consideration of the impacts on general traffic, freight, public transport and active travel. The following key economic performance measures have been calculated to estimate the economic viability:

- **Benefit Cost Ratio (BCR)** – a measure of the magnitude of net benefit to society derived from the capital investment in the package of works
- **Net Present Value (NPV)** – a measure of the magnitude of net benefit to society from the package of works, equal to the present value of benefits less the present value of costs of the package of works

Analysis of the results considers the BCR and NPV using the conventional cost benefit analysis method as the primary measure of economic viability. Other economic metrics such as Internal Rate of Return (IRR), Net Present Value per Dollar of Capital Investment (NPVI), and First year rate of return (FYRR) are discussed in the Rapid Economic Appraisal Report included in Appendix G. With the rapid nature of the appraisal, the focus has been on the main monetised benefits and costs. Other costs and benefits expected from the initiatives are then discussed qualitatively.

A key input into the appraisal has been the results of the hybrid (mesoscopic and microsimulation) models discussed in Section 9. This modelling indicates that gridlock will occur at several locations in the road network during both the mesoscopic assignment and hybrid model runs in the 2041 and 2051 Base Case ('Do Minimum' Scenario). Due to the significant traffic demands forecast by 2051, the microscopic model runs are considered too congested to provide meaningful results for this economic appraisal. Key performance metrics have therefore been extracted from the higher-level mesoscopic assignment and normalised to allow for a like-for-like comparison of the base case and project cases. For the purposes of the appraisal, modelling results have been interpolated between 2031 and 2041, as well as 2041 and 2051. For further details on these model extracts and the rapid appraisal methodology, refer to Appendix G.

11.3 Costs

The P50 capital cost estimates for the Parkes Way Corridor package of works have been used for this rapid economic appraisal. These costs are shown in Table 11–1 and exclude escalation, with further details provided in Appendix E.

Table 11–1: Project capital cost summary ($2025 prices)

Initiative	Cost Estimate (P50)
PW2a	$15,683,000
PW2b	$166,970,100
PW3a	$5,749,700
PW3c	$123,552,000
PW4	$37,264,000
PW6	$19,646,000
PW8	$73,885,500
PW10	$35,040,000
PW12	$86,153,700
PW14	$13,895,600
PW15	$134,132,700
PW18	$29,943,000
G2	$26,915,000
G4	$20,001,600
G5	$116,391,600
G6	$214,100,400
Total	**$1,119,323,900**

As no escalation has been applied to these costs (prices current as of April 2025), a delivery timeframe has been assumed for each initiative over the next 30 years to identify the present value. Given the rapid nature of this appraisal, no reduction in maintenance savings have been estimated.

Table 11–2 summarises the present value of capital and public transport related operational costs for the Parkes Way Corridor upgrades in comparison to the Base Case scenario, as well as the present value of both the South West Corridor and Parkes Way Corridor combined.

Table 11–2 : Summary of present value costs of project ($2025 prices)

Costs	Parkes Way Corridor	Combined Package of Works
Capital expenditure	$650.1	$966.2
Operational cost savings (public transport)	-$1.4	-$1.4
Total costs	**$648.7**	**$964.8**

11.4 Benefits

To determine the benefits of the proposed options, the Upgrade Scenario (Parkes Way Corridor and Combined Corridors) have been compared to the 'Do Minimum' Base Case for future years. The difference in benefits between the base case and project case provides the net benefits arising from the project.

The key benefits that have been quantified as part of the Parkes Way Corridor appraisal are travel time savings, vehicle operating costs and environmental (externality) benefits. The benefits attributable to the Parkes Way Corridor have been estimated using a benefit apportionment process based on the VKT change on each corridor.

Table 11–3 provides a summary of the present value of the benefits for the Parkes Way Corridor and combined package of works. It is important to note that these results are derived from the hybrid traffic model developed as part of this project, and that the proposed initiatives are expected to deliver wider network benefits outside of the hybrid traffic model extent.

Table 11–3 : Summary of present value benefits of project a 5% discount rate ($2025 prices)

Benefit	Parkes Way Corridor	Combined Package of Works
Travel time savings (general traffic and freight)	$3,562.5	$6,477.2
Travel time savings (public transport users)	$32.2	$32.2
Vehicle Operating Cost savings (Stop-Start)	$1,272.7	$2,313.9
Environmental benefits (externalities)	-$283.3	-$515.1
Active travel benefits	$40.9	$40.9
Total benefits	**$4,625.0**	**$8,349.2**

Key findings from the quantitative analysis of the Parkes Way Corridor are summarised below:

- Travel time savings for general traffic and freight are the main driver of benefits for both corridors followed by vehicle operating cost savings.
- Negative environmental impacts have been estimated due to the network becoming more efficient, allowing greater movements of higher volumes of vehicles and greater total kilometres travelled overall. This is based on VKT solely within the hybrid model, so does not capture wider VKT improvements throughout the network and also does not recognise the improved efficiency in the project scenarios, including reduced congestion and higher/more efficient operating speeds. As such, environmental benefits are likely to be understated in the analysis.

There are several other economic impacts from the proposed corridor upgrades that have not been monetised due to the rapid nature of the appraisal. These include:

- **Safety benefits** – The proposed package of works has been developed with a 'Safe Systems approach', which uses the ACT's design standards and other relevant guidance to ensure high-quality infrastructure is delivered that minimises the number and severity of crashes throughout the ACT. Based on the IRAP assessment undertaken during the development of the Corridor Strategy, there is expected to be a significant safety benefit.
- **Increased travel time reliability** – The proposed package of works is expected to improve reliability for private vehicle trips, i.e. the variation in journey times that individuals are unable to predict.
- **Construction disbenefits** – Construction of the proposed package of works is anticipated to have a negative impact on traffic performance, including increased travel times and a potential increase in crash rates during construction.
- **Modal shift from private vehicle to public transport** – Several initiatives are targeted at improving the travel time and reliability of public transport services (i.e. PW14, PW15, G4 and G5). While direct benefits have been estimated from these initiatives through the operational cost savings and travel time savings, there are several benefits that have not been quantified relating to potential modal shift from private vehicle to public transport. These include increased fare revenue, reduced road maintenance costs, reduced car parking costs and avoided car ownership.
- **Other benefits associated with modal shift from private vehicle to active transport** – several initiatives are targeted at improving active transport infrastructure to encourage modal shift from private vehicle to active transport (i.e. PW4, PW8 and PW18). While health benefits from this modal shift have been estimated as part of this rapid appraisal, there are several additional benefits relating to modal shift that have not been quantified such as congestion cost savings, vehicle operating cost savings, crash savings, reduced externalities, roadway provision cost savings and parking cost savings.
- **Cost of carbon emissions** – The proposed package of works is expected to result in upfront carbon emissions during the initial stages of each project, including raw material extraction, transportation, manufacturing, and construction. Additional in use carbon emission disbenefits are also expected with the forecast increase in VKT.
- **Residual value** – The asset design life for the proposed package of works will generally exceed the economic analysis time horizon (30 years for this analysis), with the residual value of this infrastructure providing a project benefit.

11.5 Summary of Cost-Benefit Analysis

The results of the economic appraisal are shown in Table 11–4 at the 5% discount rate with P50 costs. The appraisal has applied flat lining of benefits from 2051 for each project case.

Table 11–4 : Summary of Cost Benefit Analysis ($2025 prices, discounted)

	Parkes Way Corridor	Combined Package of Works
Costs		
Capital expenditure	$650.1	$966.2
Operational savings (public transport)	-$1.4	-$1.4
Total costs	**$648.7**	**$964.8**
Benefits		
Travel time savings (general traffic and freight)	$3,562.5	$6,477.2
Travel time savings (public transport users)	$32.2	$32.2
Vehicle Operating Cost savings (Stop-Start)	$1,272.7	$2,313.9
Environmental benefits (externalities)	-$283.3	-$515.1
Active travel benefits	$40.9	$40.9
Total benefits	**$4,625.0**	**$8,349.2**
Economic Return		
NPV	$3,976.3	$7,384.4
BCR	**7.1**	**8.6**

Key findings from the rapid economic appraisal are:

- Benefits from the Parkes Way Corridor initiatives are expected to significantly outweigh the costs, with the BCR indicating that the full package of works will achieve ‘very high’ value for money. This is considered a conservative assessment as the results are derived from the hybrid traffic model developed as part of this project, with the proposed initiatives expected to deliver wider network benefits outside of the hybrid traffic model extent.
- Sensitivity testing has shown that the rapid appraisal is robust in its findings, indicating that the Parkes Way Corridor package of works is consistently viable from an economic perspective at 4%, 5% and 7% discount rates. Several additional economic benefits are also expected from the Parkes Way Corridor package of works that have not been quantified, such as safety benefits, increased travel time reliability, and benefits associated with modal shift from private vehicle to public transport or active travel.
- Delivery of the combined South West Corridor package of works and Parkes Way Corridor package of works is also expected to generate benefits that significantly outweigh the costs.

12. Additional Corridor Considerations

12.1 Overview

The Corridor Strategy is primarily focussed on detecting threats to the operation of the Corridor over the next 30 years and identifying infrastructure upgrades within the Corridor that are likely to remedy forecast issues. However, beyond these infrastructure upgrades there remain numerous other additional considerations that will also influence the operation and performance of the Corridor. These include policy considerations, mass action regimes, off corridor works, and alternative infrastructure upgrades. Following is a summary of additional considerations that may influence the Corridor over the next 30 years.

12.2 Glenloch Interchange

The Glenloch Interchange is a system interchange (Freeway to Freeway) that lies at the intersection of two of Canberra most important heavily trafficked road corridors – the Tuggeranong Parkway / Caswell Drive and Parkes Way / William Hovell Drive corridors. The interchange, particularly its ramps and Parkes Way component has limited latent capacity and is a major network constraint. Furthermore, the configuration of the interchange is a complex and constrained triple deck arrangement which presents challenges to implementing capacity upgrades at the interchange.

It is noted that modelling indicates that the through lane capacity, ramp capacity, and the operation of the merge and diverge zones are likely to be a considerable operational constraint on the network, the influence of which feed back onto Parkes Way and negatively impact on its operation. As such, and notwithstanding any constructability and operational difficulties with delivery of capacity upgrades at the interchange, capacity and / or connectivity upgrades to the Glenloch Interchange may be required (either within the Corridor Strategy horizon or beyond) if found to be viable.

12.3 South West Corridor

There is a high degree of operational interdependence between the Parkes Way Corridor and the South West Corridor, particularly the Tuggeranong Parkway. Performance of the South West Corridor impacts the operation of ramps to and from Parkes Way and by extension influences the traffic flow on the Parkes Way Corridor in the vicinity of the Glenloch Interchange. That is, modelling indicates that capacity constraints and congestion on the Tuggeranong Parkway is likely to extend into the Parkes Way Corridor and compromise performance of the Corridor.

A Corridor Strategy for the South West Corridor between the Glenloch Interchange and Tharwa Drive is being undertaken concurrently with this Corridor Strategy. The findings of the South West Corridor Strategy and implementation of its recommendations will have a significant impact on the Parkes Way Corridor. Upgrades to the South West Corridor are likely to impact the Parkes Way Corridor in two primary ways:

- **Increased Demand** – Tuggeranong Parkway upgrades are likely to alter traffic patterns in the Territory transport network. Improved conditions and increased capacity in the South West Corridor are anticipated to draw more trips into the Orbital network and reduce traffic on lower order and local roads. This is expected to result in more trips along Parkes Way, increasing demand on the Corridor. This increase however is expected to be offset to a degree by the implementation of proposed public transport and active travel projects on the Corridor which will cause mode shift away from private vehicle trips and ameliorate some of this increased demand.
- **Referred Congestion** – Performance issues and congestion on the Tuggeranong Parkway can disrupt and constrain flow on Parkes Way. Capacity upgrades associated with the South West Corridor Strategy aim to address congestion issues on the Tuggeranong Parkway and by extension are expected to improve flow conditions in the Parkes Way Corridor.

12.4 Territory Land use

This Corridor Strategy responds to anticipated Territory land release and planned land use over the Corridor Strategy horizon at the time of the publication of this report. This intended ACT land use and its implications for the transport network is captured in the CSTM which has been the basis for trip generation and attraction assumed in this Corridor Strategy. It is noted however that land use planning by its nature is constantly evolving in response to various factors including population growth, community expectations, and physical, planning and environmental constraints in addition to many other factors.

Given the nexus between land use and transport need, and the changing nature of land use planning, there is by extension a relationship between ACT land development and the implementation of the Corridor Strategy. As such, Territory planning policy over the Corridor Strategy horizon will have a substantial influence on the transport needs of the ACT and affect the need and trigger points for the implementation timing of upgrades proposed in the Corridor Strategy.

12.5 Alternative Upgrades

12.5.1 Long List Upgrades

Whilst the upgrades proposed in the Corridor Strategy were identified as most likely to achieve outcomes aligned with the Vision for the Corridor, there remain numerous other opportunities to enhance network operation in and around the Corridor. That is, alternative infrastructure upgrades may become more attractive, viable or necessary in the context of changing community expectations, evolving land use, varying performance of the transport network, climate change, market conditions, and other external factors.

The Corridor Strategy identified numerous potential upgrades within the Corridor in its upgrade long list generated part of the options identification process outlined in the Options Shortlisting Assessment Report included as Appendix A. It is possible that some of the non-short listed upgrades identified in the process may become increasingly appropriate for adoption as network needs change.

12.5.2 Clunies Ross Street Corridor

With increasing network demand originating from the west, and with the introduction of west facing ramps at the Clunies Ross Street Interchange, the Clunies Ross Street corridor is expected to experience significant growth in traffic volumes over the Corridor Strategy horizon. The Clunies Ross Street Interchange ramp terminal intersection performance, and by extension Parkes Way mainline operation, will be influenced by the capacity and performance of the Clunies Ross Street corridor. Furthermore, the Corridor Strategy proposes the potential routing of public transport services onto the Clunies Ross Street corridor from Parkes Way, which would also rely on the appropriate operation of Clunies Ross Street.

Clunies Ross Street is a relatively low volume, single carriageway road with limited capacity. Given the above considerations, it is considered likely that Clunies Ross Street will require upgrade at some stage in the future (potentially duplication and / or provision of bus priority infrastructure) to ensure that the interchange and Parkes Way operate appropriately. It is understood that duplication of Clunies Ross Street is in the long term planning of the Territory.

12.5.3 Parkes Way EB to Commonwealth Avenue SB Cloverleaf Ramp

The Parkes Way eastbound to Commonwealth Avenue southbound cloverleaf ramp provides a critical connection in the ACT road network, providing a commuting link between the City's north-western population centres (primarily Belconnen and Gungahlin) and the Parliamentary Triangle employment zone. The ramp's role is expected to become increasingly important with growth in the Molonglo Valley.

Notwithstanding the importance of the ramp, it occupies the site of a central City block with substantial development potential. Should the Territory elect to develop this block, the removal of the ramp has significant network implications, and as such it is considered likely that this connection will require retention / replacement.

Previous studies of this issue have indicated that site and planning constraints make alternative ramp arrangements highly challenging. Whilst the ramp is a key element of the Parkes Way Corridor, any proposed alteration to its configuration will be largely contingent on the associated development proposal, which

cannot be adequately anticipated by this Corridor Strategy. As such consideration and assessment of alternative ramp approaches will be required in the future when details of any proposed development are better understood.

12.6 Non-Infrastructure Solutions

12.6.1 General

Provision of infrastructure is often a costly and disruptive exercise. As an alternative it can sometimes be possible to achieve desired transport outcomes using non-infrastructure solutions such as policy levers, regulation, standards, education and technology. Some broad approaches and considerations that have the potential to improve the operation and performance of the Parkes Way Corridor are summarised below:

12.6.2 Speed Regimes

The Parkes Way Corridor currently adopts a mix of high and intermediate speed zones. The Western Zone of the Corridor currently is a high speed environment with 90 km/h posted speed limits, whilst the Central Zone has 80 km/h speed posting. Whilst the Corridor Strategy hasn't explicitly investigated the implications of changes to speed zoning, other than some proposed localised adjustments in response to changed network conditions, adjustments to posted speeds could be considered to achieve the following outcomes:

- **Operating Speed Reduction** – assuming community compliance, potentially with the support of policing, the lowering of speed limits is likely to reduce the operating speeds (typically defined as the 85th percentile speed) of the Corridor. Reduced operating speeds are generally expected to improve safety performance as they reduce both the likelihood and severity of crashes, and are consistent with the Safe Systems approach to road safety.
- **Address Localised Safety Concerns** – Should a localised hazard (roadside objects / poorly protected vertical drops, increasing present of vulnerable road users etc) be identified in the Corridor that cannot be easily rectified, the implementation of reduced speed limits could be adopted to lower operating speeds and mitigate the risk associated with the hazard.

Notwithstanding the safety benefits discussed above, it is also noted that adjustments to speed limits also have other economic and productivity implications. Reductions in speed limits increase travel times and impose economic costs on the community, and conversely increased operating speeds improve productivity and save on travel time costs.

12.6.3 Government Policy

Territory and Commonwealth Government policy has the potential to influence the operation of the Parkes Way Corridor. Such policy areas could be specific to transport or conversely may not directly relate to transport operation. It is noted that there are many areas of government policy that could influence the operation of the corridor – indeed much of government decision making influences community behaviour and by extension people's need to make trips and how /when they are likely to make those trips. Whilst outside the scope of this Corridor Strategy, the influence of Government policy on travel behaviour is noted.

12.6.4 Technology / Vehicle Automation

Transport technology is rapidly evolving and influencing the way in which transport networks operate. Developing transport technology is expected to improve the efficiency of the ACT transport network and the safety of travellers. Some examples of developing technology may affect the operation of the Parkes Way Corridor include:

- Vehicle automation
- Vehicle to vehicle communications
- Improving vehicle safety features
- Mobility as a service
- Evolving power trains (electrification, hydrogen, bio/synthetic fuels)

- Alternative public transport technologies

12.6.5 Public Transport

Public transport policy and investment can provide non-infrastructure transport solutions and has the potential to substantially impact on the operation of the Corridor. Public Transport is discussed in greater detail in Section 12.9.

12.7 Safety Black Spot Programs

The Federal Government provides funding to assist State and Territories to address safety black spots on the road network. Similarly the ACT Government also implements a program of safety assessments and infrastructure upgrades to address safety concerns on the transport network.

Noting the crash performance of the corridor (discussed in Section 10), it is anticipated that the Territory will continue to monitor the safety performance of the Corridor to identify any areas of need that warrant rectification works or upgrade. This could include sites with high crash rates, areas with unprotected hazards, changing vulnerable road user presence, and substandard safety infrastructure such as roadside barriers. It is expected that such programs, whilst independent of the Corridor Strategy, will assist in achieving the Vision for the Corridor and the objectives of the Corridor Strategy.

12.8 Intelligent Transport Systems

Implementation of ITS systems both in the Corridor and the transport network more generally has the potential to enhance the safety and operational performance of the Parkes Way Corridor. Such systems could include:

- Comprehensive ITS infrastructure in the Corridor (VMS and VSLS), noting stakeholder concerns in the Parkes Way Corridor relating to urban design and heritage considerations.
- Implementation of Lane Use Management Systems
- Variable message signs at major entry points to the Corridor (such as Cotter Road, Hindmarsh Drive and the East West Arterial

12.9 Public Transport

The operation of the ACT public transport system, both within the corridor and the broader network, will influence the operation of the Corridor, and vice versa. Patronage or increased mode share of public transport, whether it be for journeys within the corridor, across the corridor, or external to the Corridor, will reduce the number of private vehicle trips generally across the network and likely within the Corridor. This reduction in the trips will improve Corridor performance by reducing congestion, travel times, vehicle operating costs, environmental emissions and crashes within the Corridor.

Similarly, improving Corridor performance will enhance operation of the public transport vehicles using the Corridor and its associated interchanges. Further to reducing travel times for bus routes on the Corridor, additional public transport focused upgrades at interchanges could have positive outcomes for public transport operation and mode share. For example, consideration could be given to providing public transport priority such as bus lanes or bus jump (bus priority) signals through intersections or interchanges along the Corridor. ACT public transport policy, bus routing and network performance will dictate the appropriateness of including public transport priority upgrades in the Corridor.

13. Assessment Framework

13.1 Overview

As part of the Options Short listing process outlined in Section 6, various upgrades were assessed and tested through the employment of Strategic Merit Test. The SMT is a preliminary decision framework that allows a proposal to be assessed against a set of criteria to determine if it aligns with an intended set of goal or objectives. The initial pass of the SMT was undertaken in order to identify which potential upgrades were most aligned with the Vision for the Corridor to allow for the creation of shortlist of projects to be further developed and interrogated.

Subsequent to the initial SMT and the shortlisting process, 16 Parkes Way Corridor upgrades were identified and subject of the following activities:

- Strategic design
- Cost Estimation
- Prioritisation and packaging of upgrades
- Transport modelling, and
- Economic analysis

These assessments provided insight into an upgrade configuration that was considered likely to address an identified issue on the Corridor, the potential capital requirements to deliver the upgrade, an appropriate packaging and delivery staging of upgrades; how the transport network is likely to operate based on the implementation of the upgrade in combination with other upgrades in the South West Corridor and the Parkes Way Corridor, and finally if delivery of the upgrades was economically viable.

Informed by the outcomes of these assessments, a second SMT was applied to the 16 Corridor Strategy upgrades. The purpose of applying this second assessment framework was threefold:

- Ensure that the upgrades were indeed aligned with the Vision for the Corridor
- Consider the technical, operational and economic viability of the upgrades
- Confirm that each upgrade is appropriate for inclusion in the Corridor Strategy

13.2 Assessment Outcomes

The SMT utilised the same assessment framework as originally undertaken as part of the options short listing process. Consistent with the methodology outlined in Section 6.5, the assessment used two scoring systems that tested the degree of Vision alignment of the upgrade:

- **SMT Score** - Indicates the degree to which an option aligns with the Vision Principle categories, aggregating the number of categories where there is alignment with at least 50% of Vision Principles in the category
- **Aligned Principles** - The net number of aligned principles (i.e. “Aligned” – “Not Aligned”), giving an overall sense of how the option aligns with all of the Vision Principles.

The outcomes of the final SMT assessment have been captured in Table 13–1. These outcomes include the following considerations:

- SMT scoring for each upgrade
- The Vision Principle categories which the upgrade is considered aligned
- A determination on whether the upgrade should form part of the Corridor Strategy based on the SMT framework
- A rationale explaining the reasons for the upgrade’s inclusion / exclusion in the Corridor Strategy, including discussion on notable considerations for the upgrade

The SMT analysis detailing the basis for the scoring of each of the assessed upgrades is included in Appendix H.

Table 13–1: Parkes Way Corridor Strategic Merit Test Outcomes

Upgrade	Discussion		
PW2a	Parkes Way / Anzac Pde upgrade - at grade improvements	SMT Score: 5	Aligned Principles: +7
Vision Alignment	The provision of the ANZAC Parade intersection upgrade is considered to be aligned with the Vision for the Parkes Way corridor as it is expected to: - Improve the operational performance of the corridor and the broader network - Improve user amenity - Enhance safety of the corridor - Support economic development in the Territory - Enhance corridor flexibility and facilitate the adoption of smart technologies		
Strategy Inclusion	Requires further assessment		
Inclusion Rationale	1) The SMT assessment indicated that the upgrade is aligned with the Corridor Vision 2) The upgrade address PM peak performance issues at the site in the short term. 3) Modelling indicates that the proposal, as configured may result in performance deterioration in the AM peak. Further, more detailed analysis and optioneering is required in future design stages to identify an approach that provides an improvement to performance. 4) When packaged with other 2031 upgrades across the South West Corridor and Parkes Way Corridor, the upgrade offers a strong economic return on investment.		
PW2b	Parkes Way / Anzac Pde upgrade - Underpass	SMT Score: 5	Aligned Principles: +14
Vision Alignment	The provision of the ANZAC Parade Interchange is considered to be aligned with the Vision for the Parkes Way corridor as it is expected to: - Support the corridor classification and purpose - Significantly improve operational performance of the corridor and the broader network - Enhance safety of the corridor - Improve user amenity - Enhance corridor flexibility & facilitate the adoption of smart technologies		
Strategy Inclusion	Yes		
Inclusion Rationale	1) The SMT assessment indicated that the upgrade is strongly aligned with the Corridor Vision 2) The upgrade provides grade separation of the mainline, significantly improving operation and safety in the corridor. 3) When packaged with other 2041 upgrades, the upgrade relieves off-corridor congestion and significantly improves overall network performance. 4) Whilst the upgrade is capital intensive, when packaged with other 2041 upgrades has been demonstrated to offer a strong economic return on investment.		
PW3a	Parkes Way / Coranderrk St upgrade - At grade improvements	SMT Score: 5	Aligned Principles: +10
Vision Alignment	The provision of the Coranderrk Street intersection upgrade is considered to be aligned with the Vision for the Parkes Way corridor as it is expected to: - Improve operational performance of the corridor and the broader network - Enhance safety of the corridor - Improve user amenity - Support economic development in the Territory - Enhance corridor flexibility and facilitate the adoption of smart technologies		
Strategy Inclusion	Yes		
Inclusion Rationale	1) The SMT assessment indicated that the upgrade is aligned with the agreed Corridor Vision 2) The upgrade provides operational performance improvements to the Corridor. 3) When packaged with other 2031 upgrades, the upgrade relieves off-corridor congestion and significantly improves overall network performance. 4) When packaged with other 2041 upgrades across the South West Corridor and Parkes Way Corridor, the upgrade offers a strong economic return on investment..		

Upgrade	Discussion		
PW3c	Parkes Way / Coranderrk St upgrade - grade separated interchange	SMT Score: 6	Aligned Principles: +17
Vision Alignment	The provision of the Coranderrk Street Interchange is considered to be aligned with the Vision for the Parkes Way corridor as it is expected to: - Support the corridor classification and purpose - Enhance the planning and urban design characteristics of the corridor - Significantly improve operational performance of the corridor and the broader network - Enhance safety of the corridor - Improve user amenity - Enhance corridor flexibility & facilitate the adoption of smart technologies		
Strategy Inclusion	Yes		
Inclusion Rationale	1) The SMT assessment indicated that the upgrade is very strongly aligned with the agreed Vision for the Corridor 2) The upgrade provides grade separation of the mainline, significantly improving operation and safety in the corridor. 3) When packaged with other 2041 upgrades, the upgrade relieves off-corridor congestion and significantly improves overall network performance. 4) Whilst the upgrade is capital intensive, when packaged with other 2041 upgrades has been demonstrated to offer a strong economic return on investment.		
PW4	Parkes Way localised lowering & narrowing through CBD	SMT Score: 5	Aligned Principles: +15
Vision Alignment	The provision of the realignment of the Parkes Way carriageways through the City's CBD is considered to be aligned with the Vision for the Parkes Way corridor as it is expected to: - Support the corridor classification and purpose - Enhance the planning and urban design characteristics of the corridor - Improve operational performance of the corridor and the broader network - Enhance safety of the corridor - Support improved land use and facilitate economic development		
Strategy Inclusion	Yes		
Inclusion Rationale	1) The SMT assessment indicated that the upgrade is very strongly aligned with the agreed Vision for the Corridor 2) The upgrade provides improved active travel outcomes in the City, and enhances operational efficiency of the Corridor 3) The compact cross section improves development potential adjacent to the Corridor and urban design outcomes 4) When packaged with other 2041 upgrades across the Parkes Way Corridor, the upgrade relieves off-corridor congestion and significantly improves overall network performance. 5) When packaged with other 2041 upgrades across the South West Corridor and Parkes Way Corridor, has been demonstrated to offer a strong economic return on investment.		

Upgrade	Discussion		
PW6	Parkes Way eastbound widening	SMT Score: 5	Aligned Principles: +16
Vision Alignment	The provision of the widening of the Parkes Way eastbound carriageway through the City's CBD is considered to be aligned with the Vision for the Parkes Way corridor as it is expected to: - Support the corridor classification and purpose - Improve the operational performance of the corridor - Enhance safety of the corridor - Support improved land use and facilitate economic development - Enhance corridor flexibility & facilitate the adoption of smart technologies		
Strategy Inclusion	Yes		
Inclusion Rationale	1) The SMT assessment indicated that the upgrade is very strongly aligned with the agreed Vision for the Corridor 2) The upgrade improves eastbound operation of the Corridor. 3) When packaged with other 2031 upgrades, the upgrade relieves off-corridor congestion and significantly improves overall network performance. 4) When packaged with other 2031 upgrades across the South West Corridor and Parkes Way Corridor, has been demonstrated to offer a strong economic return on investment.		
PW8	Molonglo to City Cycle Highway - Parkes Way component	SMT Score: 4	Aligned Principles: +11
Vision Alignment	The provision of the Cycle Highway is considered to be aligned with the Vision for the Parkes Way corridor as it is expected to: - Support the corridor classification and purpose - Improve operational performance of the corridor - Significantly improve user amenity - Provide positive land use and economic development outcomes		
Strategy Inclusion	Yes		
Rationale	1) The SMT assessment indicated that the upgrade is aligned with the agreed Vision for the Corridor 2) The upgrade improves active travel amenity and will encourage mode shift. 3) When packaged with other 2041 upgrades across the South West Corridor and Parkes Way Corridor, the upgrade offers a strong economic return on investment.		
PW10	Parkes Way / Clunies Ross St interchange upgrade - west facing ramps	SMT Score: 5	Aligned Principles: +14
Vision Alignment	The upgrade of the interchange is considered to be aligned with the Vision for the Parkes Way Corridor as it is expected to: - Support the corridor classification and purpose - Significantly improve operational performance of the corridor and the broader network - Enhance safety of the corridor - Provide positive land use and economic development outcomes - Enhance corridor flexibility & facilitate the adoption of smart technologies		
Strategy Inclusion	Yes		
Inclusion Rationale	1) The SMT assessment indicated that the upgrade is strongly aligned with the agreed Vision for the Corridor 2) The upgrade offers significant local operational improvement in 2031 and may be important to facilitate public transport operation in the Corridor . 3) When packaged with other 2031 upgrades, the upgrade relieves congestion and significantly improves overall network performance. 4) When packaged with other 2031 upgrades across the South West Corridor and Parkes Way Corridor, the upgrade offers a strong economic return on investment.		

Upgrade	Discussion		
PW12	Midblock capacity upgrade between Glenloch & Clunies Ross interchanges	SMT Score: 4	Aligned Principles: +11
Vision Alignment	The provision of this capacity is considered to be aligned with the Vision for the Parkes Way Corridor as it is expected to: - Support the corridor classification and purpose - Improve operational performance of the corridor - Enhance safety of the corridor - Improve user amenity		
Strategy Inclusion	Yes		
Inclusion Rationale	1) The SMT assessment indicated that the upgrade is very strongly aligned with the agreed Vision for the Corridor 2) The upgrade offers significant operational improvement in the Corridor. 3) When packaged with other 2041 upgrades, the upgrade relieves congestion and significantly improves overall network performance. 4) When packaged with other 2041 upgrades across the South West Corridor and Parkes Way Corridor, the upgrade offers a strong economic return on investment.		
PW14	Public Transport Corridor – Interim Upgrade	SMT Score: 6	Aligned Principles: +17
Vision Alignment	The provision of interim infrastructure to facilitate public transport in the corridor is considered to be aligned with the Vision for the Parkes Way Corridor as it is expected to: - Support the corridor classification and purpose - Improve operational performance of the corridor - Enhance safety of the corridor - Improve user amenity - Provide positive land use and economic development outcomes - Enhance corridor flexibility & facilitate the adoption of smart technologies		
Strategy Inclusion	Yes		
Inclusion Rationale	1) The SMT assessment indicated that the upgrade is very strongly aligned with the Corridor Vision 2) The upgrade requires modest capital input, however provides significant public transport benefit in 2031. 3) The upgrade will encourage mode shift to public transport, and when packaged with other 2031 upgrades, significantly improves overall network performance. 4) When packaged with other 2031 upgrades across the South West Corridor and Parkes Way Corridor, the upgrade offers a strong economic return on investment.		
PW15	Public Transport Corridor – Ultimate Upgrade	SMT Score: 5	Aligned Principles: +13
Vision Alignment	The provision of infrastructure to facilitate public transport in its ultimate configuration is considered to be aligned with the Vision for the Parkes Way Corridor as it is expected to: - Support the corridor classification and purpose - Improve operational performance of the corridor - Enhance safety of the corridor - Improve user amenity - Enhance corridor flexibility & facilitate the adoption of smart technologies		
Strategy Inclusion	Yes		
Inclusion Rationale	1) The SMT assessment indicated that the upgrade is strongly aligned with Corridor Vision 2) The upgrade provides significant public transport benefit in the long term. 3) The upgrade will encourage mode shift to public transport, and when packaged with other 2051 upgrades, significantly improves overall network performance. 4) When packaged with other 2051 upgrades across the South West Corridor and Parkes Way Corridor, the upgrade offers a strong economic return on investment.		

Upgrade	Discussion		
PW18	Coranderrk to ANZAC - Improved pedestrian permeability across corridor	SMT Score: 5	Aligned Principles: +17
Vision Alignment	The upgrade of the active travel crossings on Parkes Way is considered to align with the Vision for the Parkes Way corridor as it is expected to: - Support the corridor's classification and purpose - Enhance the planning and urban design intent for the corridor - Improve sustainability, the environment, and cultural heritage in the corridor - Improve user amenity - Support economic development in the corridor		
Strategy Inclusion	Yes		
Inclusion Rationale	1) The SMT assessment indicated the upgrade is very strongly aligned with the Corridor Vision 2) The upgrade requires modest capital input, however improves active travel connectivity. 3) The upgrade has modest capital requirements, however when packaged with other 2041 upgrades has been demonstrated to offer a strong economic return on investment.		
G2	Glenloch Int. Upgrade - William Hovel Dr EB onto Gungahlin Dr NB ramp	SMT Score: 6	Aligned Principles: +15
Vision Alignment	The provision of this ramp is considered to be aligned with the vision for the Parkes Way Corridor as it is expected to: - Support the corridor classification and purpose - Significantly improve operational performance of the corridor - Enhance safety of the corridor - Improve user amenity - Provide positive land use and economic development outcomes - Enhance corridor flexibility & facilitate the adoption of smart technologies		
Strategy Inclusion	Yes		
Inclusion Rationale	1) The SMT assessment indicated the upgrade is very strongly aligned with the Corridor Vision 2) The upgrade offers local operational improvement in the long term. 3) When packaged with other 2051 upgrades, the upgrade relieves congestion and significantly improves overall network performance. 4) When packaged with other 2051 upgrades across the South West Corridor and Parkes Way Corridor, the upgrade offers a strong economic return on investment.		
G4	Glenloch Int. – Short/medium term PT route	SMT Score: 5	Aligned Principles: +13
Vision Alignment	The provision of this public transport corridor is considered to be aligned with the Vision for the Parkes Way Corridor as it is expected to: - Support the corridor classification and purpose - Improve operational performance of the corridor - Improve user amenity - Provide positive land use and economic development outcomes - Enhance corridor flexibility & facilitate the adoption of smart technologies		
Strategy Inclusion	Yes		
Inclusion Rationale	1) The SMT assessment indicated that the upgrade is strongly aligned with the Corridor Vision 2) The upgrade requires modest capital input, however provides significant public transport benefit in 2031. 3) The upgrade will encourage mode shift to public transport, and when packaged with other 2031 upgrades, significantly improves overall network performance. 4) When packaged with other 2031 upgrades across the South West Corridor and Parkes Way Corridor, the upgrade offers a strong economic return on investment.		

Upgrade	Discussion		
G5	Glenloch Int. – Long term PT route	SMT Score: 5	Aligned Principles: +13
Vision Alignment	The provision of this ramp is considered to be aligned with the Vision for the Parkes Way Corridor as it is expected to: - Support the corridor classification and purpose - Improve operational performance of the corridor - Improve user amenity - Enhance safety of the corridor - Enhance corridor flexibility & facilitate the adoption of smart technologies		
Strategy Inclusion	Yes		
Inclusion Rationale	1) The SMT assessment indicated that the upgrade is strongly aligned with Corridor Vision 2) The upgrade provides significant public transport benefit in the long term. 3) The upgrade will encourage mode shift to public transport, and when packaged with other 2051 upgrades, significantly improves overall network performance. 4) When packaged with other 2051 upgrades across the South West Corridor and Parkes Way Corridor, the upgrade offers a strong economic return on investment.		
G6	Bindubi St Interchange	SMT Score: 6	Aligned Principles: +16
Vision Alignment	The upgrade of this interchange is considered to be aligned with the Vision for the Parkes Way Corridor as it is expected to: - Support the corridor classification and purpose - Significantly improve operational performance of the corridor - Enhance safety of the corridor - Significantly improve user amenity - Provide positive land use and economic development outcomes - Enhance corridor flexibility & facilitate the adoption of smart technologies		
Strategy Inclusion	Yes		
Inclusion Rationale	1) The SMT assessment indicated that the upgrade is very strongly aligned with the Corridor Vision 2) The upgrade provides grade separation of the mainline, significantly improving operation and safety in the corridor. 3) When packaged with other 2041 upgrades, the upgrade relieves off-corridor congestion and significantly improves overall network performance. 4) Whilst the upgrade is capital intensive, when packaged with other 2041 upgrades has been demonstrated to offer a strong economic return on investment.		

14. Stakeholder Engagement

14.1 Overview

Engagement with stakeholders has been a key element of the preparation of the Corridor Strategy. Relevant stakeholders have been consulted during several of the Corridor Strategy phases including input into the development of the Vision for the corridor and identification of shortlisted upgrade options in the Corridor. Stakeholders have also provided comment on strategic design of the proposed upgrades, in addition to supplying feedback on the Corridor Strategy. These stakeholders have included ACT agencies such as:

- Transport Canberra and City Services (TCCS)
- Environment, Planning and Sustainable Development Directorate (EPSDD)
- Major Project Canberra (MPC)
- Suburban Land Agency (SLA)

14.2 Corridor Vision

A diverse range of stakeholders were consulted during the development of the Corridor Vision. This engagement was undertaken through a workshop held in March 2022 that obtained stakeholder input and feedback that informed the development of Vision Principles and Statements in response to agreed objectives for the corridor. The Workshop introduced the context of the corridor including its history, constraints, planning regime, network role, and performance (current and forecast). Attendees then provided insight and feedback on what were considered key principles relevant to each of the identified categories. The Workshop was facilitated by the Project Team (TCCS, MPC, and consultant team) and involved participation from the following stakeholders:

- City Renewal Authority
- National Capital Authority
- Transport Canberra – Bus Operations
- Major Projects Canberra - Light Rail
- TCCS (Active Travel specialist)
- Major Projects Canberra
- TCCS City Services & Roads ACT
- TCCS Development Coordination / Major Project Support
- TCCS Infrastructure Planning & Infrastructure Delivery
- EPSDD - City Plan
- EPSDD – Infrastructure
- EPSDD - Urban Planning
- CMTEDD – ACT Treasury (Budget Bids / Business Cases)
- ESA (Emergency Services)

14.3 Options Shortlisting

In December 2022, participants from TCCS, EPSDD, MPC, and the Project Team attended two Options Workshops where a longlist of potential upgrade options were presented and interrogated. The purpose of the workshops was to ensure the longlist was comprehensive and robust; discuss each of the options amongst the group; gain insight into the likely benefits and issues associated with each of the options; and to inform the options assessment process. Following the two workshops the longlist was finalised and circulated to all

participants. Based on the feedback provided by participating stakeholders, options were subsequently rated in terms of their alignment with the Vision Principles, and a shortlist of upgrades was identified that consisted of corridor improvements that were considered most aligned with the Vision for the Corridor.

14.4 Strategic Design Development

The strategic design has been developed in close consultation with numerous stakeholders across the ACT and Federal Government Departments and Agencies. Primary amongst these is ACT's project team which included TCCS Infrastructure Planning and Infrastructure Delivery teams. These TCCS stakeholders provided ongoing input into the design development process, and supplied formal feedback on each of the design packages that was recorded in Design Comment Registers which are included in Appendix B.

Further to this input from the Territory project team, the upgrade design proposals for the Corridor were presented to relevant stakeholders in a series of design workshops in September and October 2024. The purpose of these workshops was to brief stakeholders on the design proposals (including upgrade need, design rationale, upgrade configuration / details) and to afford stakeholders the opportunity to provide feedback and input into the design process and proposed upgrade configurations. A summary of the stakeholders that attended upgrade design workshops is provided in Table 14–1 below.

Table 14–1: Proposed Corridor Upgrades

Workshop		Stakeholders
Date	Upgrade Packages	
30/09/24	- SW1 - Tuggeranong Parkway - Additional northbound lane - SW10 - Tuggeranong Pkwy / Cotter Rd Interchange Upgrade	- TCCS Development Planning - TCCS Development Coordination - TCCS Infrastructure Planning - TCCS Infrastructure Delivery - TCCS (Traffic Management & Safety) - Suburban Land Agency - EPSDD – Development & Implementation
14/10/24	- SW5 - Tuggeranong Pkwy - VSLS & VMS upgrades - SW8 - Drakeford Dr / Athllon Dr / Isabella Dr intersection upgrade	- Major Projects Canberra - TCCS Development Planning - TCCS Development Coordination - TCCS Infrastructure Planning - TCCS Infrastructure Delivery - TCCS (Traffic Management & Safety) - TCCS (Roads ACT) - TCCS (Road Safety & Active Travel)
18/10/24	- SW2 - East West Arterial / Tuggeranong Pkwy interchange - SW3 - Auxiliary southbound lane upgrades to facilitate East West Arterial	- Major Projects Canberra - TCCS Development Planning - TCCS Development Coordination - TCCS Infrastructure Planning - TCCS Infrastructure Delivery - TCCS (Traffic Management & Safety) - TCCS (Roads ACT) - Suburban Land Agency - EPSDD – Development & Implementation
21/10/24	- SW4a - Tuggeranong Pkwy / Hindmarsh Dr Interchange upgrades – Interim Solution - SW4b - Tuggeranong Pkwy / Hindmarsh Dr Interchange upgrades – Ultimate Solution	- Major Projects Canberra - TCCS Development Planning - TCCS Development Coordination - TCCS Infrastructure Planning - TCCS Infrastructure Delivery - TCCS (Traffic Management & Safety)

Workshop		Stakeholders
Date	Upgrade Packages	
		- TCCS (Road Safety & Active Travel) - Suburban Land Agency - EPSDD – Development & Implementation
29/10/24	G8 - Upgrade of Tuggeranong Pkwy SB off-ramp Intersection with Lady Denman Dr	- TCCS Development Planning - TCCS Development Coordination - TCCS Infrastructure Planning - TCCS Infrastructure Delivery - TCCS (Traffic Management & Safety) - TCCS (Road Safety & Active Travel) - TCCS (Roads ACT) - TCCS (Business Improvement) - Suburban Land Agency - EPSDD – Development & Implementation

A summary of stakeholder feedback on the proposed upgrade design provided in or subsequent to these workshops was recorded in a Stakeholder Comment Register which is included in Appendix B.

14.5 Assessment Framework & Recommendations

Section to be completed upon circulation of draft Corridor Strategy and receipt of feedback from relevant stakeholders.

15. Conclusions & Recommendations

15.1 Conclusions

15.1.1 Background

The Parkes Way Corridor is one of Canberra's busiest and most import transport corridors. It conveys high volumes of traffic during peak periods, and forms part of the City's Orbital network. It experiences on average 0.6 crashes a day over its 7km length between the Glenloch Interchange and Kings Avenue. That is to say, the corridor currently experiences congestion and has safety concerns. Furthermore, the Corridor is adjacent to the Molonglo Valley, a district that is Canberra's primary zone of greenfield development and is forecast to grow from a population of 14,000 people in 2023 to 70,000 people in 2051. This growth, in conjunction with the anticipated development in West Belconnen and general background population growth, has significant implications for the transport network, including:

- A significant increase in load on existing connections to the Molonglo Valley District, noting that these connections (John Gorton Drive and Cotter Road) currently experience high levels of congestion
- Introduction of more traffic and congestion into the trunk and Orbital road network, including the Parkes Way Corridor
- Introduction of more traffic and congestion on key arterial roads that provide connections to the Parkes Way Corridor and impact on its operation, primarily the Tuggeranong Parkway and William Hovell Drive

Whilst not currently ACT planning policy, it is noted that should the Western Edge Investigation Area be developed, traffic generation from this new district would also add to congestion on the Parkes Way Corridor.

15.1.2 Transport Analysis

Transport modelling of the future years over the Corridor Strategy horizon indicate that the forecast growth in population has significant implications for the Corridor and the transport network more broadly in its current form. The Hybrid modelling of the existing transport network investigated the operation of the Corridor and its immediate surrounds (microscopic component of the model) and a larger network footprint that included the Corridor and adjacent areas (mesoscopic component).

For the local network, this modelling indicated increases in average delay, total travel time, and unreleased demand (a metric suggesting congestion in the model), and reductions in travel speeds between 2031 and 2041. A further performance deterioration was observed from 2041 to 2051. Furthermore, it was observed from strategic modelling using the CSTM that deterioration in performance of the network more broadly (i.e. outside the Hybrid model area) can also be expected.

The observed degradation in Corridor and network performance is considered attributable to general growth in ACT population, but primarily as a result of significant concentrated growth in the Molonglo Valley. Given that the Parkes Way Corridor is a primary access to this District, the load and stress on the Corridor is forecast to increase substantially. It was noted however that as the Corridor reaches capacity, growth in traffic flows plateau, and demand (and congestion) on other parts of the network increase.

15.1.3 Proposed Upgrades

In response to existing identified issues on the Corridor, in addition to forecast traffic performance problems identified in transport modelling of future years, the Corridor Strategy considers several infrastructure upgrades. Through a short listing process, the following 16 upgrade solutions were found to be most aligned with the intended Vision for the Corridor:

- PW2a) Parkes Way / Anzac Pde upgrade - at grade improvements
- PW2b) Parkes Way / Anzac Pde upgrade - Underpass
- PW3a) Parkes Way / Coranderrk St upgrade - At grade improvements
- PW3c) Parkes Way / Coranderrk St upgrade - grade separated interchange
- PW4) Parkes Way localised lowering & narrowing through CBD

- PW6) Parkes Way eastbound widening
- PW8) Molonglo to City Cycle Highway - Parkes Way component
- PW10) Parkes Way / Clunies Ross St interchange upgrade - West facing ramps
- PW12) Midblock capacity upgrade between Glenloch & Clunies Ross
- PW14) Priority bus lane - Molonglo to city
- PW15) Light Rail corridor on Parkes Way
- PW18) Coranderrk to Anzac - Improved pedestrians permeability across corridor
- G2) Glenloch Int. Upgrade - William Hovel Dr EB onto Gungahlin Dr NB ramp
- G4) Glenloch Int. – Short/ medium term PT route
- G5) Glenloch Int. – Long term PT route
- G6) Bindubi St Interchange

A strategic design process identified design configurations for these upgrades that are considered technically feasible and are intended to appropriately address the identified transport problems in the Corridor, noting that the proposed arrangements have not been the subject of constraints analysis (planning, environmental etc). That is, the overall viability of the delivery of the upgrades requires further investigation and confirmation in future iterations of design development.

15.1.4 Corridor Strategy Impacts

The implementation of the 16 Corridor Strategy upgrades was tested using the Hybrid traffic model. The purpose of this modelling was to interrogate a proposed delivery staging for the upgrades of packaged suites of upgrades across both the Parkes Way Corridor Strategy and the concurrent South West Corridor Strategy, and understand their implications for the operational performance of the Corridor and the network.

The upgrades provide improved connectivity and capacity in the Corridor, and analysis indicates that in response more trips utilise the Corridor. As a result, traffic volumes in the Parkes Way Corridor are forecast to increase substantially in the future, and the operational performance (average delay, travel speeds etc) does not necessarily improve uniformly in the Corridor in response upgrades. Rather, changes in Corridor performance are mixed in response to increased capacity and volumes, with improvement / deterioration in performance varying across corridor segments, peak periods and timeframes. The network wide benefit however is unambiguous, with significant improvement across the network forecast by the Hybrid model, leading to the following conclusions:

- The proposed Corridor Strategy upgrades provide improved network connectivity and increased capacity, however this capacity is consumed by additional traffic that diverts to the Corridor
- The improved network connectivity and increased Corridor capacity associated with the upgrades attracts trips to the Corridor, reducing network travel times, concentrating longer trips on the trunk road network, and reducing traffic volumes on lower order roads

These outcomes are considered appropriate in the context of the Orbital nature of the Parkes Way Corridor, consistent with the objectives of the ACT Transport Strategy 2020, and will provide significant benefits to the community. It is important to note that these operational outcomes reflect the dual implementation of both the South West Corridor Strategy and the Parkes Way Corridor Strategy, noting that the forecast benefits are only likely to be realised to their full extent if all upgrades across both corridors are delivered.

The safety performance of the upgrades was also investigated using an iRAP model of the corridor. This analysis indicated that the Corridor Strategy upgrades are expected to provide significant improvement to safety on the corridor, increasing the proportion of the Corridor with a Star Rating of 3 or above from 68% in the Do Minimum scenario to 97% with the implementation of the Corridor Strategy. As such, the Corridor Strategy is anticipated to substantially improve both the operational and safety performance of the Canberra transport network.

15.1.5 Corridor Strategy Viability

As part of the strategic design exercise, high level opinions of cost have been estimated for each of the Corridor Strategy upgrades. These estimates, combined with analysis of the project benefits have been used

to assess the economic viability of the implementation of the Corridor Strategy over the 30 year Strategy horizon. This Cost Benefit Analysis indicated that delivery of the Corridor Strategy provided a Benefit Cost Ratio of 7.1, and Net Present Value of $4.0B, leading to the conclusion that the Corridor Strategy upgrades are economically viable and would provide a strong return on investment to the community.

It is important to note that whilst these economic outcomes relate to the Parkes Way Corridor, they reflect the performance outcomes of implementation of both the South West Corridor Strategy and the Parkes Way Corridor Strategy, noting that the forecast benefits are only likely to be realised to their full extent if all upgrades across both corridors are delivered.

15.2 Recommendations

15.2.1 General

In close consultation with ACT stakeholders, this Corridor Strategy has established a Vision for Canberra's Parkes Way transport Corridor that articulates expectations and objectives relating to the operation, performance and role that the Corridor should play in the Canberra transport network. To assist in the realisation of this Vision, the Corridor Strategy has also undertaken an assessment of current and potential future issues and threats to the operation of the Canberra transport network that relate to the Parkes Way Corridor.

To address identified operational issues, 16 infrastructure upgrades have been investigated for implementation on the Parkes Way Corridor. Initial analysis presented in this Corridor Strategy indicates that these upgrades are technically feasible solutions to address current and forecast issues on the Corridor and the transport network more broadly. Furthermore, application of a Strategic Merit Test also indicated that all 16 of the proposed upgrades are aligned with the agreed Vision for the corridor. And finally, these upgrades were shown to be effective in improving transport network operation, and their implementation provided a strong economic return to the community.

In view of these findings, it is recommended that the Corridor Strategy be progressed to its next stage of implementation, noting the upgrade-specific recommendations outlined in Section 15.1. The next stage of implementation is expected to involve the following for each individual upgrade:

- **Options Analysis** – The strategic design presented in this Corridor Strategy represent a potential solution to an identified transport problem. The nominated configurations are not the product of an options assessment exercise and do not necessarily constitute the most appropriate, efficient or best value solution to address the identified issue. As such, it is recommended that a robust optioneering assessment be undertaken to ensure that the most appropriate design solution is pursued for each upgrade.
- **Concept Development and Design** – As part of the optioneering process, and subsequent to the identification of a preferred option, it is recommended that concept design development be undertaken to identify and conceptually articulate the configuration and engineering requirements of the upgrade.
- **Constraints Analysis** – The options analysis and concept development activities should be informed by a constraints analysis. The analysis is likely to include (but not limited to) desktop environmental assessments, utilities investigations, planning assessment, and heritage assessments. Some field validation of desktop assessments may be required.
- **Engineering Investigations** – Depending on the level and detail of available information, engineering investigations such geotechnical investigations and topographic survey may be required to inform the concept design development.
- **Transport modelling** - In parallel to the option analysis and concept design development, it is expected that further transport modelling will be required to identify the most appropriate upgrade configuration and quantify its anticipated performance.
- **Cost estimation** – Cost estimation of the preferred concept for each upgrade is recommended to inform budgetary requirements, economic analysis and business case development.
- **Economic Analysis** – To ensure that each proposed upgrade provides value for money, it is recommended that an economic analysis be undertaken based on the estimated whole of life cost of each upgrade, and the anticipated transport benefits that it is forecast to provide to the community.

The timeframes to undertake these activities should be informed by both the identified prioritisation schedule described in the Corridor Strategy (noting many of the upgrades are proposed in the medium to long term), in addition to:

- ACT population growth
- ACT land release and development patterns
- Observed travel behaviours and patterns in the ACT
- Transport network operation and congestion
- ACT Government policy
- Monitoring of network safety performance and crash blackspots
- Climate change response and other environmental considerations

15.2.2 Corridor Upgrades

Further to the general recommendations provided above, each of the individual upgrades carry the following specific recommendations:

PW2a – Parkes Way / Anzac Pde upgrade - at grade improvements

Whilst transport modelling indicates that the proposed upgrade configuration would provide considerable performance benefits in the 2031 PM peak, it forecast that operational failure would still occur in the 2031 AM peak. Given this outcome, in addition to identified heritage concerns, it is recommended that further preliminary investigation of this upgrade be undertaken to identify if a more optimal solution can be identified, and whether there is warrant in pursuing the upgrade in short term, or alternatively whether implementing the ultimate grade separated solution at the site would provide a more appropriate solution for the community and the City in the short term.

PW2b – Parkes Way / Anzac Pde upgrade – Underpass

Grade separation of the intersection is forecast to provide significant operational and safety improvements in the Corridor. It is noted however that modelling indicates that associated Corridor improvements to the east may be required to ensure that the upgrade realises its full operational potential. It is recommended that future investigations assess the need for related upgrades on the eastbound Parkes Way mainline and the Kings Avenue Interchange.

Given the physical proximity and high degree of interdependence between this package and the PW3c upgrade, it is recommended that a holistic design approach is adopted and that these packages be developed together. It is also noted that there is likely to be significant construction synergies and efficiencies associated with concurrent delivery of these two projects.

It is further recommended that close consultation with the NCA be undertaken as part of the design development process as there is likely to be significant operational and capital benefits associated with exploring alternatives at the interchange surface level.

PW3a – Parkes Way / Coranderrk St upgrade - At grade improvements

Transport modelling indicates that the proposed upgrade configuration would provide considerable performance benefits in the 2031 PM peak. Whilst this modelling forecast failure of the intersection in the PM peak, this is considered largely due to performance issues at the ANZAC Parade roundabout to the east. It is therefore recommended that this option be progressed in the short term to the next phase of development, but that this development be informed by outcomes of the PW2a package.

PW3c – Parkes Way / Coranderrk St upgrade - grade separated interchange

Grade separation of the intersection is forecast to provide significant operational and safety improvements in the Corridor. It is noted however that modelling indicates that performance issues to the east and west impact on the interchange's operation. Given the physical proximity and high degree of interdependence between this package and the PW2b and PW4 upgrades, it is recommended that a holistic design approach is adopted and that these packages be developed together as this approach will allow optimisation of performance across

this part of the Corridor in the medium term. It is also noted that there is likely to be significant construction synergies and efficiencies associated with concurrent delivery of these two projects.

It is also noted that eastbound exit ramp operation is marginal and that alternative ramp configurations should be considered in future phases of design development to improve interchange performance. It is further recommended that close consultation with the NCA be undertaken as part of the design development process as there is likely to be significant operational and capital benefits associated with exploring interchange alternatives.

PW4 – Parkes Way localised lowering & narrowing through CBD

Noting the dual drivers of this upgrade relate to a) urban design considerations and cross corridor permeability, and b) mainline and ramp operational performance, the following recommendations are made:

1) The upgrade is delivered in response to urban design need and adjacent land development / land release
2) Additional lane capacity has been provided to improve mainline performance. However, ramp merge / diverge / weave performance in this part of the Corridor remains of concern and as such requires careful consideration and thorough investigation. Reconfiguration of Edinburgh Avenue Interchange elements may be required to achieve appropriate performance.
3) Given the physical proximity and high degree of interdependence between this package and the PW3c upgrade, a holistic design approach is adopted and these packages be developed together as this approach will allow optimisation of performance across this part of the Corridor. It is also noted that there is likely to be significant construction synergies and efficiencies associated with concurrent delivery of these two projects.

PW6 – Parkes Way eastbound widening

The eastbound widening is forecast to improve network performance in the short term for relatively modest capital expenditure. However, the operational outcomes of this interim upgrade are likely to be replicated by the subsequent delivery of the PW4 package. As such, and in an effort to avoid abortive work, it is recommended that a robust understanding of the likely PW4 delivery timeframes is achieved prior to delivery of the eastbound widening.

PW8 – Molonglo to City Cycle Highway - Parkes Way component

The Cycle Highway provides a significant piece of active travel infrastructure that will service both commuting and recreational cyclists and pedestrians. As the upgrade only forms one segment of the overall Cycle Highway, it is recommended that the upgrade design be developed as part of the overall concept for the cycle route to ensure that an optimum active travel outcome is achieved.

The delivery timeframe of the Cycle Highway is largely contingent on the growth of the Molonglo Valley and the active travel need that that growth generates. Notwithstanding, it is considered likely that this upgrade is a medium term priority, and it is recommended that concurrent delivery with the adjacent package PW12 be considered due to likely construction synergies and efficiencies.

PW10 – Parkes Way / Clunies Ross St interchange upgrade - west facing ramps

The proposed interchange ramps provide an important upgrade to the Corridor and the transport network more broadly by improving network connectivity and redistribution of traffic load. In addition to providing operational benefits for light vehicles, it also has the potential to facilitate public transport movements on the Corridor. Modelling however highlighted potential issues in the short term at the ramp merge zones. As such, it is recommended that the interaction between the ramp and mainline flow be thoroughly investigated in the next phase of design development, noting that delivery of mainline capacity improvements to the west (Package PW12) may be required to ensure appropriate operation of the interchange.

Noting the potential operational interdependence with the interim public transport upgrade (PW14), it is recommended that these packages be developed together to ensure they are appropriately coordinated. Furthermore, concurrent delivery of these packages should be considered due to likely construction synergies and efficiencies. In addition, it is recommended that the implications of the upgrade for the Clunies Ross Street corridor be assessed as part of future design development, noting that upgrades on Clunies Ross Street may be required to ensure that the interchange operates as intended.

PW12 – Midblock capacity upgrade between Glenloch & Clunies Ross interchanges

The capacity upgrade is forecast to provide significant operational benefit in the Corridor. It is noted however, that the upgrade is expected to have substantial capital requirements, primarily due to significant retaining wall construction required to achieve the proposed widening at the toe of the Black Mountain hillside. Noting this, it is recommended that geotechnical investigation be undertaken early in the development of this package as geotechnical conditions will play a significant role in determining the height, type and extent of retaining walls, and by extension the anticipated cost, impact and potentially the feasibility of the upgrade.

Given the environmental and urban character implications of the upgrade, it is recommended that close engagement with the NCA be pursued to ensure the upgrade has acceptable outcomes in the context of the National Capital.

Furthermore, given the potential operational interdependence with Package PW10 discussed above, it is recommended that concept work for these packages be developed together.

PW14 – Public Transport Corridor – Interim Solution

The interim public transport upgrade on Parkes Way provides a relatively low cost approach, is implementable in the short term, and will provide a high quality public transport service to residents of the Molonglo Valley. Given this, it is recommended that close consultation be undertaken with Transport Canberra to understand potential routing and servicing requirements associated with the upgrade prior to further development.

Given feedback from the NCA about key Corridor concerns, it is recommended that alternative cross sectional approaches be investigated to limit impact on the on the vegetated batter between Parkes Way and Lady Denman Drive, including assessment of potential median narrowing. The interdependence between this upgrade and the G4 package is also noted, and it is recommended that these two upgrade be developed together to ensure appropriate coordination.

Another important consideration that should be explored as part of the upgrade is staged implementation, noting that there may be value in delivering the eastbound bus lane first as the eastbound carriageway experiences more congestion in the AM peak (compared to the westbound PM peak), is likely easer to implement, and the related G4 upgrade has some geometric compromises in the westbound direction.

PW15 – Public Transport Corridor – Ultimate Solution

The ultimate public transport upgrade provides infrastructure that will facilitate a high capacity public transport services between the Molonglo Valley and the City. This upgrade is fundamentally tied to the preferred approach for corridor routing through the Glenloch Interchange and as such will necessarily require concurrent development with the G5 package. An understanding of the ultimate corridor routing to the east will also be required (Clunies Ross Street vs various City options) as part of the concept development of this option.

In addition, a strong understanding of the preferred vehicle type (e.g. light rail vehicles, bus rapid transit etc) will be required prior to further development of this upgrade as it has significant implications in terms of geometric and infrastructure requirements, noting that implementation of this upgrade is not anticipated until the long term.

PW18 – Coranderrk to ANZAC - Improved pedestrian permeability across corridor

Improved active travel connectivity across the corridor in the City will be important to address growing pedestrian demand anticipated in the medium term. Given its proximity to other upgrade sites, it is recommended that the PW18 works be undertaken at least in part concurrently with upgrades such as PW2b and PW3c due to likely construction synergies and efficiencies. Further, implementation warrant and priority will also be strongly influenced by adjacent developments such as the UNSW Canberra and the Civic Pool site, and as such it is recommended that close engagement with relevant ACT coordination agencies be maintained as part of the development process for this upgrade.

G2 – Glenloch Interchange Upgrade - William Hovel Drive eastbound to Gungahlin Drive northbound ramp

The need for this ramp connection is expected to be driven by growth in the Molonglo Valley. Whilst the connection is anticipated to reduce load on Parkes Way, modelling indicates that demand for the connection is moderate in the long term. As such, it is recommended that network performance be monitored and the upgrade progressed when future modelling indicates its necessity.

G4 – Glenloch Interchange – Short/medium term PT route

Similar to Package PW14, the interim public transport route through the Glenloch interchange provides a relatively low cost approach, is implementable in the short term, and will provide a high quality public transport service to residents of the Molonglo Valley. Given this, it is recommended that close consultation be undertaken with Transport Canberra to understand potential routing and servicing requirements associated with the upgrade prior to further development. The interdependence between this upgrade and the PW14 package is also noted, and it is recommended that these two upgrade be developed together to ensure appropriate coordination.

Another important consideration that should be explored as part of the upgrade is staged implementation, noting that there may be value in delivering the eastbound bus lane first as the eastbound carriageway experiences more congestion in the AM peak (compared to the westbound PM peak). Furthermore, it is noted that some of the geometry associated with the westbound diverge at the exit ramp to northbound Caswell Drive is likely to require departures from standard, the safety of which will require more detailed assessment and confirmation in future phases of design development.

G5 – Glenloch Interchange – Long term PT route

The ultimate public transport infrastructure upgrade facilities a high capacity public transport service between the Molonglo Valley and the City. There are numerous options for routing the corridor through the interchange, and it is recommended that a robust options analysis process be undertake in future phases of design development to ensure that the most appropriate solution is adopted in terms of constructability, cost and public transport operation.

This upgrade is fundamentally tied to the PW15 package corridor and as such will necessarily require concurrent development with the PW15 package. In addition, a strong understanding of the preferred vehicle type will be required prior to further development of this upgrade as it has significant implications in terms of geometric and infrastructure requirements, noting that implementation of this upgrade is not anticipated until the long term.

G6 – Bindubi St Interchange

Grade separation of the intersection is forecast to provide significant operational and safety improvements in the Corridor. It is noted however that notwithstanding significant operational advantages associated with the grade separation, modelling indicates that the interchange will experience high demand, and it will be important to identify a configuration that operates at an appropriate level of service, particularly given the proximity of the Glenloch Interchange. Noting forecast performance of proposed interchange configuration to 2051 has concerns, it is recommended that alternative interchange elements be considered as part of future design development, including investigation into a potential free flow ramp connection from Bindubi Street southbound to Wiliam Hovell Drive eastbound to improve interchange performance.

Freight Corridor

The findings of the Freight Corridor Assessment recommended a focus on a preferred freight route to the north and west that conveys heavy vehicles to key freight attractors including Hume, Mitchell and Fyshwick. Further, the Freight Corridor Assessment found that Parkes Way had poor suitability as a freight corridor based on the proximity of nationally significant landmarks, the disruption to vistas from key landmarks, proximity to future significant high density residential and educational precincts, coupled with the high light vehicle traffic volumes.

Given these findings, the appropriateness of retaining Parkes Way as a freight / B Double route appears questionable, and as such it is recommended that an assessment be undertaken, in consultation with relevant Government and industry stakeholders, into the potential delisting of the Parkes Way Corridor as a gazetted B-Double route.

15.2.3 Future Evolution of the Corridor Strategy

This document constitutes the first version of the Parkes Way Corridor Strategy. By its nature, the transport network and the Corridor itself will evolve over time in response to changing land use, land release, patterns of travel, population distribution, demographics, Government policy, technological change, social trends and climate change amongst many other factors. It is anticipated that this Corridor Strategy will be a live

document that is updated periodically in order to continue to meet the needs of the community as they change over time.

Appendix A

Options Shortlisting Assessment Report

Appendix B

Strategic Design Report

Appendix C

Future Transport Modelling Report

Appendix D

Freight Corridor Assessment

Appendix E

Cost Estimate Report

Appendix F

Star Rating Assessment

Appendix G

Economic Analysis

Appendix H

Assessment Framework

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South West Corridor – Corridor Strategy

Parkes Way / South West Corridors Traffic Modelling and Options Analysis

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Executive Summary

Overview

The Territory Government has identified a need to develop corridor strategies for key transport corridors within the ACT. In response to this requirement, the Territory commissioned the preparation of a Corridor Strategy for Canberra's primary South West Corridor (the Tuggeranong Parkway and Drakeford Drive). In parallel, the Territory also commissioned the development of a Corridor Strategy for the Parkes Way corridor, acknowledging the close operational relationship between the two corridors.

The primary objective of the Corridor Strategy is to develop, analyse, document, and prioritise transport corridor upgrade concepts for short, medium and long-term improvements to help achieve the long-term vision for the corridor. This includes relieving traffic congestion, enhancing transport network operations and improving safety along the Tuggeranong Parkway and Drakeford Drive between the Glenloch Interchange in the north and Tharwa Drive in the south.

A Corridor Strategy is a plan that is intended to identify a strategic approach to managing a transport artery over a specified period of time. The purpose of the Corridor Strategy presented here is to provide a roadmap for the corridor infrastructure owner / operator (the Territory) to take necessary steps over the next 30 years to ensure that the Corridor performs appropriately in respect to its operation, safety and amenity, and continues to serve the needs of the community.

The Corridor Strategy has been informed by various streams of investigation and assessment, and is the compilation of several discrete but related studies. These assessments include:

- **Establishment of a Corridor Vision** – A Vision for the corridor was established in the initial stages of development of the Corridor Strategy to provide guiding objectives for the corridor and helped inform all subsequent stages of strategy development.
- **Transport Model Calibration and Validation** – Initial transport modelling was undertaken to construct an Aimsun Hybrid model (mesoscopic and microscopic) of the corridor and its surrounds, and have that model calibrated and validated to existing network conditions and performance.
- **Long List Identification -** A long list of potential upgrade options was identified through a combination of several different methods including stakeholder advice; traffic modelling outcomes; deficiencies in active travel connectivity; existing and potential future public transport routes; existing crash analysis; and observed safety concerns.
- **Short Listing Assessment** – The long list of upgrade options was tested against the agreed Vision for the Corridor, with upgrades identified as most aligned with the Corridor Vision included in the shortlist.
- **Strategic Design** – Preliminary strategic design was undertaken for the short listed options to identify appropriate layouts considered likely to address the underlying identified problems in the corridor.
- **Safety Analysis** – Preliminary safety analysis was undertaken for both the Base Case (absence of Corridor upgrades) and the Upgrade Scenario to understand how the upgrades are likely to improve the safety of the Corridor.
- **Freight Assessment** – A Freight Corridor Assessment was undertaken as a complement to the Corridor Strategy, with some findings relevant to the Corridor.
- **Cost Estimation** – To understand the capital implications and level of investment required to implement the Corridor Strategy, preliminary opinions of cost have been generated based on the infrastructure layouts identified in the Strategic Designs.
- **Upgrade Prioritisation and Staging** – Based on existing and forecast performance of the transport network, capital requirements, and other network and urban planning considerations, an approach to prioritisation of the upgrades was identified.

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- **Transport Modelling** – Base model versions of an Aimsun Hybrid model and the CSTM were constructed and run to understand how the network would perform in 2031, 2041 and 2051 in both the absence of any upgrades to the Corridor, and in the Upgrade Scenario.
- **Economic Analysis** – To understand the economic implications of the Corridor Strategy, and to ensure that it provides a positive return on investment to the community, a cost benefit analysis was undertaken on the staged implementation of the strategy.
- **Assessment Framework** – Finally, informed by the various streams of investigation undertaken as part of the Corridor Strategy, the proposed upgrades were run through a strategic merit test to ensure that the proposed Corridor Strategy is aligned with the Vision for the Corridor, and by extension appropriate for implementation.
- **Conclusions and Recommendations** – Based on the outcomes of the Assessment Framework and the preceding suite of assessments, the Corridor Strategy draws conclusions about the performance of the Corridor and the transport network more broadly, and provides recommendations about the implementation of the Corridor Strategy.

Corridor Vision

As part of the development of the Corridor Strategy, the need for development of a clear and coherent vision for the corridor was identified. This vision was developed in close consultation with relevant Territory and Federal stakeholders and underpinned all stages of development of the Corridor Strategy. The purpose of this Vision was to inform the development of the Corridor Strategy and provide a framework for the ongoing operation of the corridor over the next 30 years. This Vision for the South West Corridor identifies a suite of Vision Principles based on several categories:

- Corridor purpose & classification
- Traffic operational performance
- Safety
- Sustainability, environment & cultural heritage
- User amenity
- Land use & economic development
- Adaptability to emerging technologies

Identification of Upgrades

In order to understand which Corridor improvements that are most likely to align with the agreed Vision for the corridors, an options short listing exercise was undertaken. This process involved the following steps:

- Identification of a long list of upgrade options for the corridor
- An options workshop that sought feedback from key stakeholders and specialists on each long list option
- Formal evaluation of all long list options against the agreed Vision Principles
- Nomination of a shortlist of options based on the options evaluation outcomes, stakeholder feedback and other relevant considerations

The long list of options was identified through a combination of methods including upgrades identified by TCCS; upgrades likely to improve the operation of the corridor based on traffic modelling; identified deficiencies in active travel connectivity; existing and potential future public transport routes; existing crash analysis and observed safety concerns. In order to consider the relative merits of each option and identify a shortlist, the options were evaluated using a Strategic Merit Test (a decision framework). The Strategic Merit Test (SMT) considered whether an option was aligned with each of the Vision Principles in order to determine whether the option was appropriate for short listing. The SMT identified numerous upgrades that were considered either strongly or partly aligned with the Corridor Vision and appropriate for shortlisting. The following short list of upgrades was subsequently endorsed by TCCS and the Project Control Group:

Option		Description
SW1	Tuggeranong Parkway - Additional northbound lane	Provision of third northbound lane between the Cotter Road Interchange and the Lakeside Interchange. The primary intent of this upgrade is to provide additional capacity to address congestion in the corridor.
SW2	East West Arterial (EWA) / Tuggeranong Pkwy interchange	The upgrade provides a new interchange on the corridor to provide access into the developing Molonglo Valley district of Canberra through the future East West Arterial (EWA). Analysis indicates that this additional connection into the district is required to keep the network operational.
SW3	Auxiliary southbound lane upgrades to facilitate East West Arterial	The provision of a third southbound (auxiliary lane between the proposed EWA Interchange and the Cotter Road Interchange). This additional capacity is required to ensure appropriate corridor operation.
SW4a	Tuggeranong Pkwy / Hindmarsh Dr Interchange upgrades – Interim Upgrade	Improvements to the interchange layout on Hindmarsh Drive is proposed to improve short term performance and avoid operational failure.
SW4b	Tuggeranong Pkwy / Hindmarsh Dr Interchange upgrades – Ultimate Upgrade	Upgrade to the Hindmarsh Drive Interchange is proposed to address significant increases in future demand at the site to ensure long term performance and avoid operational failure of the interchange.
SW5	Tuggeranong Pkwy - VSLS & VMS upgrades	Provision of ITS infrastructure between the Heysen Street overpass and the Lakeside Interchange to assist in the management of speed and safety during incidents and maintenance activities.
SW8	Drakeford Dr / Athllon Dr / Isabella Dr intersection upgrade	Conversion of the Drakeford Drive / Athllon Drive / Isabella Drive intersection to improve operational performance, active travel amenity in addition to targeted crash reduction.
SW10	Tuggeranong Pkwy / Cotter Rd Interchange Upgrade	Improvements to the interchange ramps and associated ramp terminal intersection configurations (including side road approaches) to improve interchange performance in the context of increased demand in the Molonglo Valley district and changing traffic patterns associated with the introduction of the EWA interchange.
G8	Upgrade of Tuggeranong Pkwy SB off-ramp Intersection with Lady Denman Dr	Reconfiguration of the Tuggeranong Parkway southbound exit ramp at the Lakeside interchange in addition to improvements at the ramp terminal intersections and the Lady Denman Drive / Forest Drive intersection to improve operational performance at the site.

Strategic Design

The intent of the strategic design is to develop and present road layouts that are likely to provide a feasible solution to address an identified issue in the Corridor. It is focussed on key road elements that are considered most likely to influence the way the upgrade impacts on the operation of the corridor. To that end, the strategic design considered road and intersection configurations and geometry to the extent that it facilitated testing of network performance effects of the upgrade and understanding of the potential broad cost and economic implications of the upgrades.

Strategic designs have been developed for nine upgrades in the South West Corridor that have alignment with the Vision for the corridor. These upgrades are interspersed along the length of the South West Corridor between Glenloch Interchange and Tharwa Drive comprising the Tuggeranong Parkway (a fully grade separated 11 km dual carriageway motorway) and the full length of Drakeford Drive (a 9 km dual carriageway urban arterial with roundabouts and signalised intersections). These upgrades are a mix of infrastructure improvements at both corridor nodes (e.g. interchanges or intersections) and on corridor segments (between nodes).

The upgrades presented in the strategic design have been developed based on current available information, preliminary assessment and engineering and transport planning judgement. It is anticipated that future phases of design development will interrogate the feasibility of proposed upgrades in greater detail, and will assess traffic performance, existing constraints (physical, environmental, planning etc) and stakeholder concerns. These investigations are expected to include a rigorous optioneering assessment process as part of future concept design development to ensure that that the most appropriate design solution for each of the upgrades is identified for the requirements at the time.

Corridor Priorities & Staging

Understanding how best to phase implementation of the Corridor Strategy and prioritise its constituent activities and upgrades is a critical component of the Strategy. Several factors have informed the proposed prioritisation of Corridor Strategy upgrades, including:

- **Operational Need** - Transport modelling has identified timeframes in which elements of the Corridor reach or exceed their capacity and require upgrade to prevent failure / unacceptable deterioration of performance (be it operational or safety).
- **Value for Money** - Targeting delivery of upgrades in timeframes that offer the greatest return on investment to the Territory. This may be tied to timely delivery of upgrades to prevent operational deterioration, or equally may seek to life extend or "sweat" an asset to extract the maximum value of infrastructure prior to its replacement or renewal.
- **Interdependence** – Some of the upgrades proposed in the Corridor Strategy share an interdependence with other upgrades, or other off-corridor network improvements. These interdependencies may be either sequential (triggered by the performance life of a preceding upgrade), or concurrent (a relationship between two or more upgrades supports the concurrent delivery of the upgrades)

Based on these considerations, each of the Corridor Strategy upgrades has been assessed as being required in the Short, Medium or Long Term and collectively tested as grouped suites of work for delivery in or around the 2031, 2041, or 2051 timesteps investigated in the Corridor Strategy. Whilst acknowledging the upgrades may be delivered prior to, on, or after each of these model years, the nominated year of delivery has been adopted as a simplifying assumption for the purposes of the Corridor Strategy. Furthermore, it is noted that the most appropriate timeframes for delivery of each of the upgrades is likely to change over time in response to evolving Territory priorities, network conditions and performance, land use and population growth.

The upgrade prioritisation and groupings are indicated following, and have formed the basis of the Corridor Strategy strategic and operational transport modelling and economic analysis.

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Upgrade		Prioritisation Rationale
Short Term Priorities		**Estimated Cost = $61M**
SW4a	Tuggeranong Pkwy / Hindmarsh Dr Interchange upgrade – Interim Solution **Est. Cost = $7M**	Site observations and modelling indicates that the interchange currently experiences high levels of congestion / queuing and will fail by 2031. This interim solution seeks to provide a low cost solution to improve performance in the short term. ***Vision Alignment - Strong***
SW10	Tuggeranong Pkwy / Cotter Rd Interchange Upgrade **Est. Cost = $31M**	The site currently experiences congestion to the west, likely at least in part attributable to the interchange. Whilst the upgrade is primarily intended to complement EWA Interchange upgrades (medium term priorities), it is prioritised in the short term in an effort to address the current network performance issues. ***Vision Alignment - Strong***
G8	Upgrade of Tuggeranong Pkwy SB off-ramp Intersection with Lady Denman Dr **Est. Cost = $23M**	The southbound exit ramp experiences high levels of congestion, with queuing spilling into the Tuggeranong Parkway interfering with mainline flows. Operational modelling indicates the interchange will fail prior to 2031. This upgrade seeks to address these performance issues in the short term. ***Vision Alignment - Very Strong***
Medium Term Priorities		**Estimated Cost = $331M**
SW1	Tuggeranong Parkway - Additional northbound lane **Est. Cost = $132M**	The northbound carriageway of the Tuggeranong Parkway experiences congestion in the AM peak, particularly in the merge zone of the Cotter Road Interchange entry ramp. Additionally, operational modelling indicates that the additional lane is required as part of the EWA Interchange to ensure that merge, diverge and weave movements perform appropriately, and that the corridor has sufficient capacity between interchanges. ***Vision Alignment - Strong***
SW2	East West Arterial / Tuggeranong Pkwy interchange **Est. Cost = $138M**	Implementation of the EWA is expected in the medium term in response to the anticipated land release and development of the eastern zone of the Molonglo Valley. Traffic modelling indicates that the EWA Interchange is required by 2041 to ensure appropriate operation of the broader transport network. ***Vision Alignment – Very Strong***
SW3	Auxiliary southbound lane upgrades to facilitate East West Arterial **Est. Cost = $13M**	The southbound auxiliary lane on the Tuggeranong Parkway has a strong interdependence with the EWA interchange, with traffic modelling indicating that it is required as part of the delivery of the EWA Interchange to ensure that merge, diverge and weave movements in addition to mainline flow performs appropriately. ***Vision Alignment – Very Strong***
SW5	Tuggeranong Pkwy - VSLS & VMS upgrades **Est. Cost = $12M**	The rationale for this upgrade relates to operational safety of the corridor, and as such the delivery timeframes for the upgrade are not tied to performance objectives, but rather depends on the safety priorities of the Territory. It is proposed in the medium term given its likely relationship to EWA related upgrades and in order to avoid abortive work. ***Vision Alignment – Very Strong***
SW8	Drakeford Dr / Athllon Dr / Isabella Dr intersection upgrade **Est. Cost = $36M**	The intersection is known to experience high levels of congestion during peak periods. Operational modelling indicates that the intersection is expected to fail by 2041, and as such the upgrade is proposed for implementation in the medium term. ***Vision Alignment - Strong***
Long Term Priorities		**Estimated Cost = $205M**
SW4b	Tuggeranong Pkwy / Hindmarsh Dr Interchange upgrade – Ultimate Upgrade **Est. Cost = $205M**	Operational modelling suggests that the Interim upgrade proposed at the Hindmarsh Drive interchange is forecast to extend the operational life of the interchange to 2051. However, by 2051, modelling indicates that the Interim upgrade will no longer provide appropriate performance at the interchange, and that the Ultimate upgrade will be required. ***Vision Alignment – Very Strong***

Operational Performance

The implementation of the nine Corridor Strategy upgrades was tested using the Hybrid traffic model. The purpose of this modelling was to interrogate a proposed delivery staging for the upgrades of packaged suites of upgrades across both the South West Corridor Strategy and the concurrent Parkes Way Corridor Strategy, and understand their implications for the operational performance of the Corridor and the network.

The upgrades provide improved connectivity and capacity in the Corridor, and analysis indicates that in response more trips are orientated towards the Corridor. As a result, traffic volumes in the South West Corridor are forecast to increase substantially in the future, and the operational performance (average delay, travel speeds etc) does not necessarily improve uniformly in the Corridor in response to the upgrades. Rather, changes in Corridor performance are mixed in response to increased capacity and volumes, with improvement / deterioration in performance varying across corridor segments, peak period and timeframe. However, the implementation of the Corridor Strategy was found to provide substantial network wide benefit, with significant improvement across the network forecast by the Hybrid model, leading to the following overarching conclusions:

- The proposed Corridor Strategy upgrades provide improved network connectivity and increased capacity, however this capacity is consumed by additional traffic that diverts to the Corridor
- The improved network connectivity and increased Corridor capacity associated with the upgrades attracts trips to the Corridor, reducing network travel times, concentrating trips on the trunk road network, and reducing trips on lower order roads, gifting local roads back to locals for local trips

These outcomes are considered appropriate in the context of the Orbital nature of the South West Corridor, consistent with the objectives of the ACT Transport Strategy 2020, and will provide significant benefits to the community.

Safety Performance

Further to operational improvement, safety is a key consideration of the Corridor Strategy. All proposed upgrades are intended to improve safety in the Corridor and the transport network more generally, consistent with the ACT's objectives for transport safety as articulated in its Vision Zero policy and the Corridor Vision Principles. This includes:

- Upgrades in which safety improvements and crash reduction are a key project rationale
- Upgrades that are focussed on operational performance or mode shift also have design features that are expected to improve safety
- Upgrades that are focussed on mode shift, reducing network demand and crash exposure

The upgrades have been developed with the safe systems approach at the forefront of the design process. The safe systems performance of the proposed upgrades has been assessed through an iRAP analysis of the collective upgrades across the Corridor which involved a Star Rating Assessment (SRA). This SRA found that that implementing the Corridor Strategy will improve road safety outcomes along the South West Corridor, indicating that 78% of the Corridor would have a Star rating of 3 or above, up from 73% in the absence of the Corridor Strategy upgrades.

While the risk of intersection crashes was assessed to increase due to the proposed new entry ramps from East West Arterial Interchange and conversion of a major roundabout to signalised intersection, the risk of other vehicle crash types will reduce under the implemented Corridor Strategy. These benefits outweigh the higher intersection crash risk, resulting in an overall net-positive road safety outcome. Furthermore, it is noted that the SRAs do not assess the safety improvements on other the parts of the network due reduced crash exposure at sites external to the Corridor, and therefore are considered likely to understate the overall safety benefit resulting from the Corridor Strategy.

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Investment Return

As part of the strategic design exercise, high level opinions of cost have been estimated for each of the Corridor Strategy upgrades. These estimates, combined with analysis of the project benefits have been used to assess the economic viability of the implementation of the Corridor Strategy over the 30 year Strategy horizon. This Cost Benefit Analysis indicated that delivery of the Corridor Strategy provided a Benefit Cost Ratio of 11.8, and Net Present Value of $3.4 B, leading to the conclusion that the Corridor Strategy upgrades are economically viable and would provide a strong return on investment to the community.

Assessment Framework

Informed by the various streams of investigation undertaken as part of the Corridor Strategy, the proposed upgrades were run through a final strategic merit test. The purpose of applying this assessment framework was threefold:

- Ensure that the upgrades were indeed aligned with the Vision for the Corridor
- Consider the technical, operational and economic viability of the upgrades
- Confirm that each upgrade is appropriate for inclusion in the Corridor Strategy

The final assessment framework found that the nine proposed upgrades were all strongly aligned with the Vision for the Corridor, and when prioritised and staged appropriately provided significant operational and safety network-wide benefits to travellers, and were collectively economically viable.

Stakeholder Engagement

Engagement with stakeholders has been a key element of the preparation of the Corridor Strategy, including development of the strategic design. Relevant stakeholders have been consulted during several of the Corridor Strategy phases including input into the development of the Vision for the corridor, identification of short listed upgrade options in the Corridor, feedback on strategic design of the proposed upgrades, and have reviewed the Corridor Strategy. These stakeholders have included ACT agencies such as:

- Transport Canberra and City Services (TCCS)
- Environment, Planning and Sustainable Development Directorate (EPSDD)
- Major Projects Canberra (MPC)
- Suburban Land Agency (SLA)
- Chief Minister, Treasury and Economic Development Directorate (CMTEDD)

Conclusions & Recommendations

In close consultation with ACT stakeholders, this Corridor Strategy has established a Vision for Canberra's South West Corridor that articulates expectations and objectives relating to the operation, performance and role that the Corridor should play in the Canberra transport network. To assist in the realisation of this Vision, the Corridor Strategy has also undertaken an assessment of current and potential future issues and threats to the operation of the Canberra transport network that relate to the South West Corridor.

To address identified operational issues, nine infrastructure upgrades have been investigated for implementation on the South West Corridor. Initial analysis presented in this Corridor Strategy indicates that these upgrades are technically feasible solutions to address current and forecast issues on the Corridor and the transport network more broadly. Furthermore, application of a Strategic Merit Test also indicated that all nine of the proposed upgrades are strongly aligned with the agreed Vision for the corridor. And finally, these upgrades were shown to be effective in improving transport network operation in terms of both performance and safety, and their implementation provided a strong economic return to the community.

In view of these findings, it is recommended that the Corridor Strategy be progressed to its next stage of implementation, which is expected to involve the following for each individual upgrade:

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- Options Analysis
- Concept Development and Design
- Constraints Analysis (including environmental, utilities, planning assessment, and heritage)
- Engineering Investigations
- Transport modelling
- Cost estimation
- Economic Analysis

The timeframes to undertake these activities should be informed by both the identified prioritisation schedule described in the Corridor Strategy (noting many of the upgrades are proposed in the medium to long term), in addition to population and land use changes; observed travel behaviours and patterns; network operation and congestion; Government policy; network safety performance; and climate change and other environmental considerations.

Corridor Strategy Evolution

This document constitutes the first version of the South West Corridor Strategy. By its nature, the transport network and the Corridor itself will evolve over time in response to changing land use, land release, patterns of travel, population distribution, demographics, Government policy, technological change, social trends and climate change amongst many other factors. It is anticipated that this Corridor Strategy will be a live document that is updated periodically in order to continue to meet the needs of the community as they change over time.

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1. Introduction

1.1 Background

The Territory Government has identified a need to develop corridor strategies for key transport corridors within the ACT. In response to this requirement, the Territory commissioned the preparation of a Corridor Strategy for Canberra's primary South West Corridor (the Tuggeranong Parkway and Drakeford Drive). In parallel, the Territory also commissioned the development of a corridor strategy for the Parkes Way Corridor, acknowledging the close operational relationship between the two corridors.

The development of this Corridor Strategy comprises several constituent tasks (refer Figure 1–1) that track from the establishment of a Vision for the corridor, through the preparation of baseline transport models, options assessment and identification of strategic infrastructure upgrades that will assist in the development of the corridor over the next 30 years. The creation of a Vision for each corridor early in the project provided guidance and a framework in which to develop the corridor strategy.

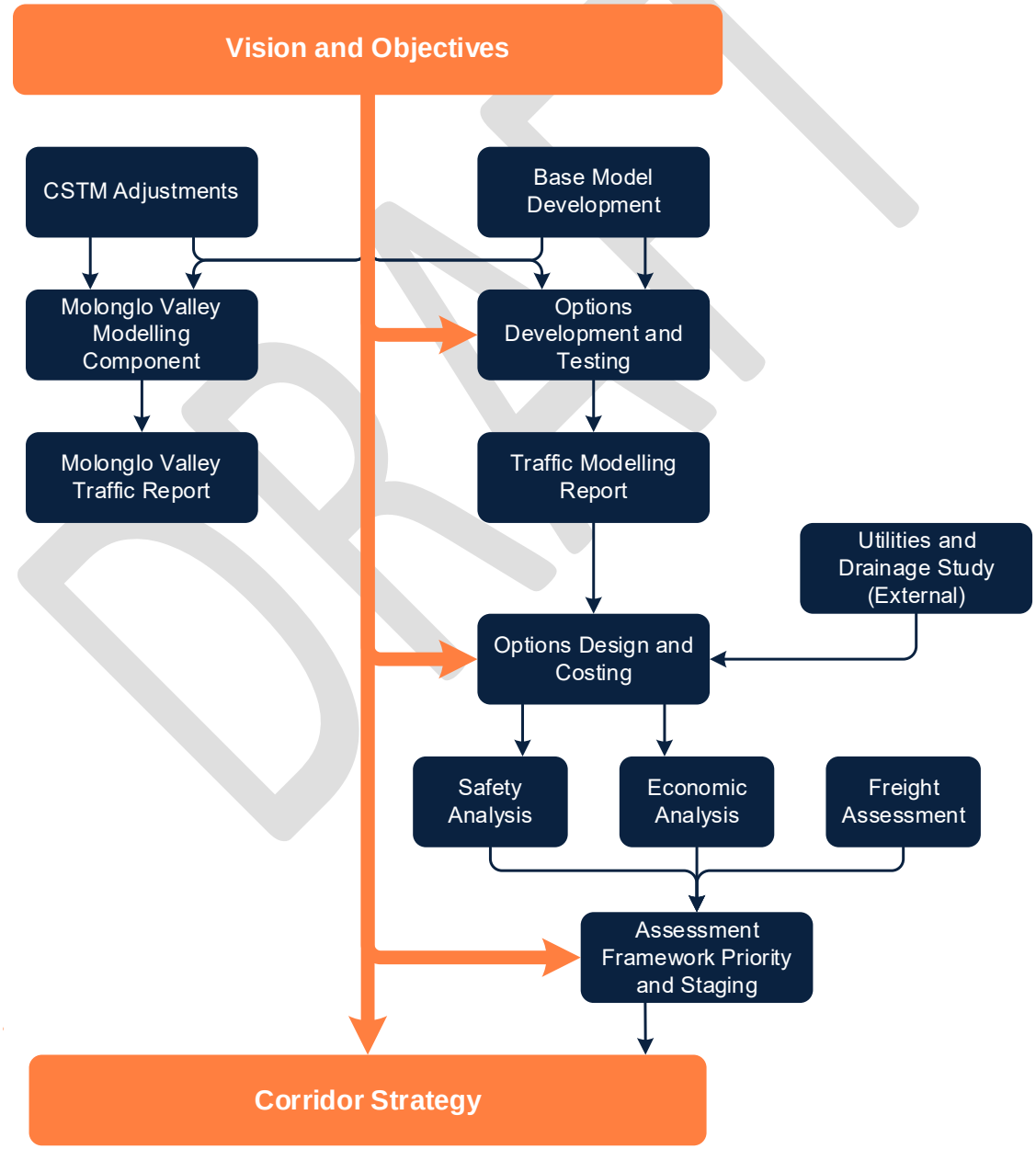

Figure 1–1: Corridor Strategy Development

1.2 Corridor Strategy Purpose

A Corridor Strategy is a document or plan that is intended to identify a strategic approach to managing a transport artery over a specified period of time. The purpose of the Corridor Strategy presented here is to provide a roadmap for the corridor infrastructure owner / operator (the Territory) to take necessary steps over the next 30 years to ensure that the Corridor performs appropriately in respect to its operation, safety and amenity, and continues to serve the needs of the community.

1.3 Strategy Objectives

The primary objective of the Corridor Strategy is to develop, analyse, document, and prioritise transport corridor upgrade concepts for short, medium and long-term improvements to help achieve the long-term Vision for the corridor including relieving traffic congestion, enhancing transport network operations and improving safety along the Tuggeranong Parkway and Drakeford Drive between the Glenloch Interchange in the north and Tharwa Drive in the south.

In addition to this primary project objective, several supporting objectives for the project have been identified for the Corridor Strategy, including:

- **Transport Choice** – Provide an integrated, convenient, reliable and efficient transport solution
- **Active Travel** – Provide a safe and attractive active travel network that facilitates movement across and along the corridor
- **Integration** – Considers the impact of National Capital Authority plans and projects and Australian Government aspirations
- **Design Excellence** – Provides sustainable & economic infrastructure
- **Road safety** – Provide a transport network that is safe for all users and reduces serious & fatal crashes

1.4 The South West Corridor

1.4.1 ACT Transport Strategy 2020

The South West Corridor is defined as the component of Canberra's Orbital road network that runs along the south western periphery of the City. The ACT Transport Strategy 2020 describes an Orbital Links as links that:

> *Will support trips around and across the city, for private vehicles and freight. These links maintain the private vehicle journey times we all rely on to get around Canberra quickly. Road quality will be enhanced to improve safety and reliability. Intelligent technologies will help proactively manage congestion and provide people with real-time information about their journey and road condition in advance.*

The location of the South West Corridor and its relationship to the overall ACT transport network as defined in the ACT Transport Strategy 2020 is indicated in Figure 1–2.

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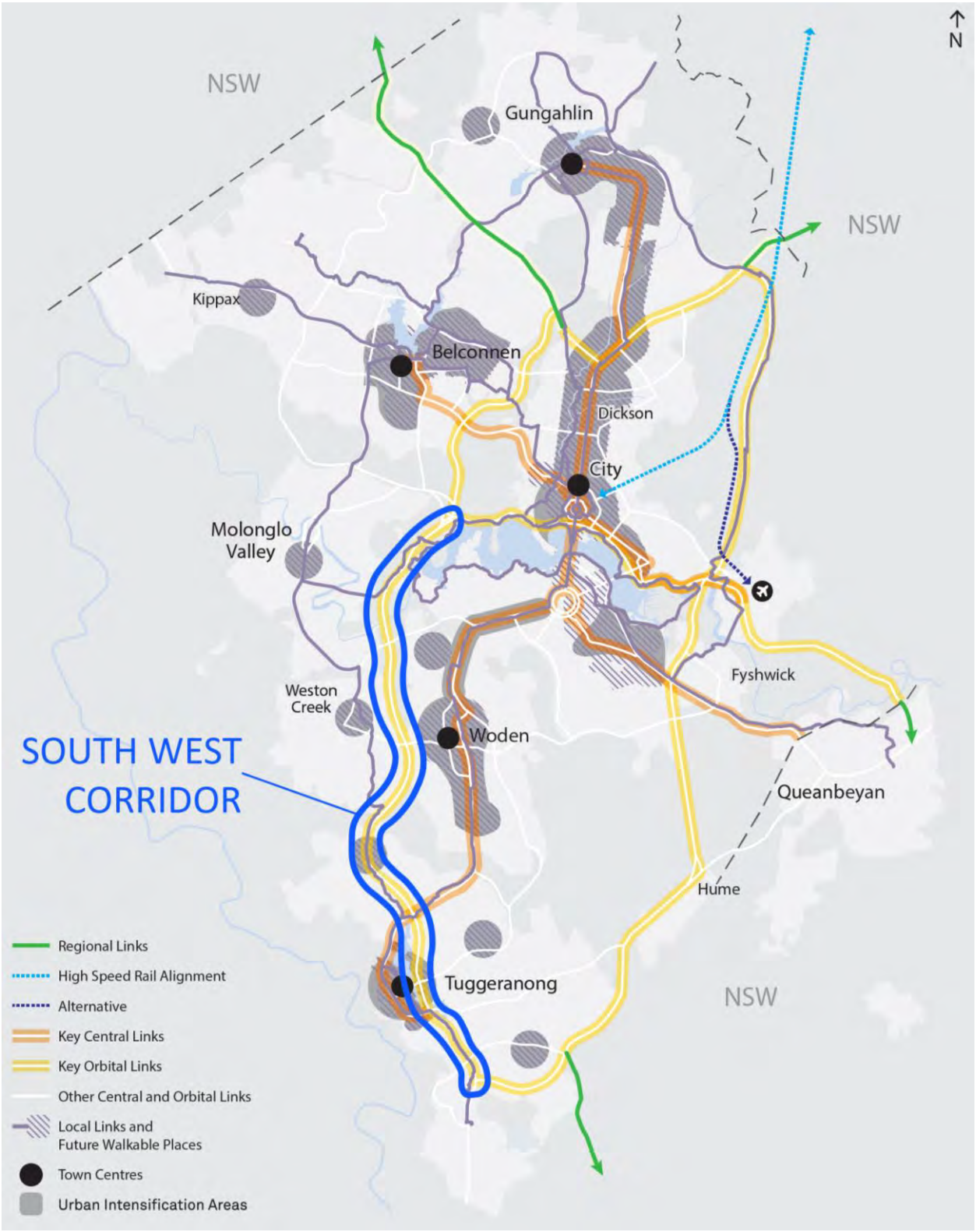

Figure 1–2: ACT Transport Policy Plan Map – Conceptual transport network 2045 (ACT Transport Strategy 2020)

1.4.2 Extent, Context and Character

The South West Corridor runs between the Glenloch Interchange in the north and Tharwa Drive in the south. It is a key ACT transport artery that links the City Centre and many of Canberra's districts including Tuggeranong, Woden, the Molonglo Valley, Belconnen and Gungahlin through its connection with other important transport corridors such as Parkes Way, Hindmarsh Drive and Caswell Drive. The Corridor provides commuting access between these districts and to the City, in addition to being an important freight corridor in the City's west. The South West Corridor is depicted in Figure 1–3 and consists of two distinct zones:

- **Tuggeranong Parkway** – A fully grade separated 11 km dual carriageway motorway that runs between the Glenloch Interchange in the north and Sulwood Drive in the south. It generally has two lanes in each direction with varying width shoulders which are typically separated by a narrow median (minimal median shoulders and rigid barrier) with the exception of the Hindmarsh Drive Interchange where the carriageways diverge to provide a wide median for approximately 1.2km. During peak hours, over 4,000 vehicles per hour utilise the Tuggeranong Parkway in the peak direction and over 40,000 vehicles use the road daily.

  The Parkway is a high speed, free flow environment with posted speeds of 90 – 100 km/h, and includes three interchanges (Hindmarsh Drive, Cotter Road and Lakeside) between its extents, and can be considered a green corridor in that it is typically treelined / landscaped. It traverses a mix of land uses including residential areas, nature reserves and nationally significant facilities (such as the National Zoo and Aquarium, and the National Arboretum Canberra).

- **Drakeford Drive** – A 9 km dual carriageway urban arterial road with roundabouts / signalised intersections to numerous collector and arterial side roads that provide access into residential areas and the Tuggeranong town centre. It runs from Sulwood Drive in the north to Tharwa Drive in the south and generally consists of three mainline lanes in each direction between Sulwood Drive and Taverner Street (adjacent to the Town Centre). South of Taverner Street it reduces to two mainline lanes in each direction.

  Drakeford Drive can also be considered a green corridor, generally incorporating a wide landscaped / grassed median and generous tree-lined verges. It has a posted speed of 80 km/h throughout its length and has a mix of shoulder types / widths, including areas with no shoulders. The corridor traverses a mix of land uses primarily including residential and commercial areas.

Figure 1–3: South West Corridor Site Plan

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1.5 Corridor Strategy Elements

The Corridor Strategy has been informed by various streams of investigation and assessment, and is the compilation of several discrete but related studies. These studies include:

- **Establishment of a Corridor Vision** – Through close collaboration and consultation with key stakeholders, a Vision for the corridor was established in the initial stages of development of the Corridor Strategy. This Vision provided guiding objectives for the Corridor and helped inform all subsequent stages of strategy development. The Vision development process is summarised in Section 3 of the Corridor Strategy and has been fully documented in the Options Shortlisting Assessment Report included as Appendix A.
- **Transport Model Calibration and Validation** – Initial transport modelling was undertaken to construct an Aimsun Hybrid model (mesoscopic and microscopic) of the Corridor and its surrounds, and have that model calibrated and validated to existing network conditions and performance. This calibrated model formed the basis for development of all future year base and upgrade scenario modelling to 2051. The validation and calibration process is documented in a Technical Note included as an appendix to the Future Transport Modelling Report provided in Appendix C. The Canberra Strategic Transport Model (CSTM) Version 1.2 had been calibrated and validated as part of separate exercises and was also used to inform the Corridor Strategy.
- **Long List Identification -** A long list of potential upgrade options was identified through a combination of several different methods including advice from the ACT Government based on their knowledge of the network; traffic modelling outcomes; known deficiencies in active travel connectivity; existing and potential future public transport routes; existing crash analysis; and observed safety concerns. The identified long list is discussed in the Options Shortlisting Assessment Report included as Appendix A.
- **Short Listing Assessment** – The long list of upgrade options that were considered likely to address identified problems in the corridor was tested against the agreed Vision for the Corridor to identify which upgrades were most aligned with principles articulated in Corridor Vision. The upgrades that were found to be aligned with the Vision Principles were included on the upgrade short list for further investigation and analysis. The shortlisting process and identified short list is discussed in the Options Shortlisting Assessment Report included as Appendix A.
- **Strategic Design** – Preliminary strategic design was undertaken for the shortlisted options to identify an appropriate layout of upgrades that were considered likely to address the underlying identified problem in the Corridor. The primary purpose of these designs was to identify a suitable infrastructure configuration that could be tested in terms of its performance and allow the generation of cost estimates. The strategic design process, rationale and layouts are summarised in Section 6.6 of the Corridor Strategy and documented in the Strategic Design Report included as Appendix B.
- **Freight Assessment** – A Freight Corridor Assessment was undertaken as a complement to the Corridor Strategy. Whilst this assessment considered several corridors in addition to the South West Corridor, the analysis it contains, and its findings are relevant to this Corridor Strategy and have been used to inform the assessment. The Freight Corridor Assessment is included in Appendix D and relevant findings of the assessment are discussed in Section 9.5 of the Corridor Strategy.
- **Cost Estimation** – To understand the capital implications and level of investment required to implement the Corridor Strategy, preliminary opinions of cost have been generated based on the infrastructure layouts identified in the Strategic Design. These opinions of costs were used to inform an economic analysis of the Corridor Strategy, are summarised in Section 11, and documented in the Cost Estimate Report included as Appendix E of the Corridor Strategy.
- **Upgrade Prioritisation and Staging** – Based on existing and forecast performance of the transport network, capital outlay expectations and other network and urban planning and growth considerations, an approach to prioritisation and staging of the upgrades was identified. This temporal implementation plan was then tested both in terms of its operational appropriateness through transport modelling, and subsequently using economic modelling to ensure the staged delivery of upgrades would provide a positive return on investment. The prioritisation approach is discussed in Section 8 of the Corridor Strategy.
- **Transport Modelling** – Preliminary transport modelling was utilised to identify appropriate upgrade configurations as part of the strategic design process. Subsequently, base model versions of the Aimsun

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Hybrid model and the CSTM were constructed and run to understand how the network would perform in 2031, 2041 and 2051 in the absence of any upgrades to the Corridor. Similarly, upgrade scenarios for each timestep were tested using these models to assess how the transport network would perform in response to implementation of the Corridor Strategy. The outcomes of this analysis is summarised in Section 9, and the modelling methodology and findings is documented in the Future Transport Modelling Report which is included in Appendix C.

- **Safety Analysis** – Preliminary safety analysis has been undertaken of both the Base Case (assumed absence of Corridor upgrades) and the Upgrade Scenario to understand how the upgrades are likely to improve the safety Star Rating and crash performance of the Corridor. This safety analysis of both the existing condition and the Upgrade Scenario are discussed in Section 10 of the Corridor Strategy.
- **Economic Analysis** – To understand the economic implications of the Corridor Strategy, and to ensure that it provides a positive return on investment to the community, a cost benefit analysis was undertaken on the staged implementation of the strategy. The outcomes of this economic modelling is summarised in Section 11, and the economic methodology and findings are documented in the Economic Analysis Report which is included in Appendix G.
- **Assessment Framework** – Finally, informed by the various streams of investigation undertaken as part of the Corridor Strategy, the proposed upgrades were run through a strategic merit test to ensure that the proposed Corridor Strategy is aligned with the Vision for the Corridor, and by extension appropriate for implementation. The assessment framework methodology and results are discussed in Section 13 of the Corridor Strategy. The detailed assessment framework scoring is included as Appendix H of the Corridor Strategy.
- **Conclusions and Recommendations** – Based on the outcomes of the Assessment Framework and the preceding suite of assessments, Section 15 of the Corridor Strategy draws conclusions about the performance of the Corridor and the transport network more broadly, and provides recommendations about the implementation of the Corridor Strategy. Section 15.2.3 of the Strategy also provides recommendations on how the corridor Strategy could be developed into the future.

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2. Strategic Alignment

2.1 Impacts of the Corridor Strategy

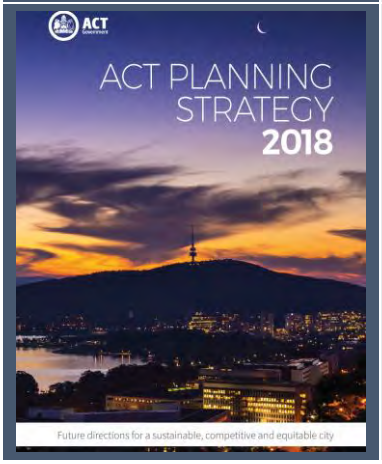
The Corridor Strategy is intended to be a transport planning document that services the needs of the local Canberra community in addition to users of the ACT transport network from outside the Territory. Whilst the Strategy focuses on improvements to the South West Corridor, it is intended and expected to enhance the operation of the broader ACT transport network.

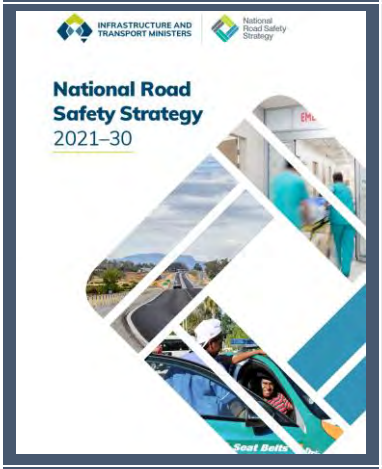
Through implementation of the Corridor Strategy, it is intended that people making commuting, freight and leisure trips will experience improved travel times, reduced travel costs, and experience fewer crashes on their journeys. Furthermore, it is anticipated that operation of the transport network will generate fewer environmental externalities (noxious emissions, greenhouse gas emissions, water quality degradation etc) as a result of Corridor Strategy.

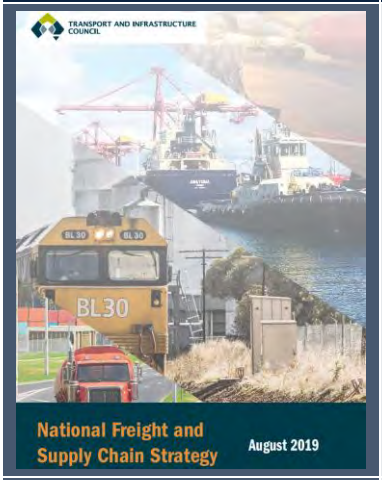
2.2 Alignment with Government Policy

All of the outcomes described above are consistent with stated ACT and Federal Government policy and strategy. Table 2–1 summaries some of the key strategic Government policy documents that the Corridor Strategy outcomes are anticipated to be consistent with, and the nature of this alignment.

Table 2–1: Strategic Alignment of Corridor Strategy

Plan or Policy	Nature of Alignment
	ACT Transport Strategy 2020 – The ACT Transport Strategy 2020 sets out the ACT Government's approach to achieve its vision for a world class transport system that supports a compact, sustainable and vibrant city, and provides a framework for planning and investment in transport for the next 20 years. This strategy outlines the current attributes of the transport network, the aspirations for the network and what needs to occur to achieve the aspirations. Through the provision of upgrades in the Corridor, the Corridor Strategy will improve the operational performance of the transport network, directly responding to the key transport outcomes identified in the ACT Transport Strategy 2020: - Managing congestion - Reducing emissions - Supporting a compact and efficient city
	**ACT Planning Strategy** - The ACT Planning Strategy 2018 recognises land-use planning as the underpinnings of the development of economic, social and environmental aspects of a city and outlines the vision, goals and directions for land use and development within the ACT. It is prepared by the ACT Government in conjunction with other policies and statutory documents, including the ACT Transport Strategy and National Capital Plan. The Corridor Strategy is consistent with the ACT Planning Strategy in that it: - Supports a compact and efficient city by improving the efficiency of transport network infrastructure and linkages to existing districts - Provides sustainable and resilient infrastructure, improving the operation of the transport network and reducing emissions

Plan or Policy	Nature of Alignment
	ACT District Strategies – The District Strategies help guide how Canberra will change and grow towards 2038 and beyond to 2050. The District Strategies examine how to manage growth in a way that is sustainable such that the community can continue to have access to services, transport, employment, health, education and nature. There is an individual Strategy for each of the districts that connect to the South West Corridor, including Tuggeranong, Woden, Weston Creek, the Molonglo Valley and Belconnen. The Corridor Strategy supports the implementation of these District Strategies by providing improved transport network connectivity and efficiency in the South West Corridor. This is particularly the case for districts such as Woden, the Molonglo Valley and Belconnen which are expected to experience significant growth over the 30 year Corridor Strategy horizon.
	**National Road Safety Strategy** – The National Road Safety Strategy 2021–30 is a policy document developed by State and Federal Transport Ministers to move towards Vision Zero by 2050. This Strategy continues a commitment to the Safe System approach and to strengthening all elements of the road transport system through improvements under three key themes: Safe roads, Safe vehicles and Safe road use. The National Road Safety Strategy targets a reduction in the annual number of fatalities by at least 50% and of serious injuries by at least 30% by 2030. The Corridor Strategy proposes a suite of upgrades that are expected to improve safety outcomes in the Corridor either through direct safety oriented interventions, or improvements in infrastructure standard and network operations. These improvements are expected to improve the crash performance of the Corridor and assist the Territory in reaching the targets outlined in the National Road Safety Strategy.
	ACT Freight Strategy – The 2016 Building an Integrated Transport Network – Freight recognises the important role that the freight network plays in ensuring the robustness of the overall transport system and the importance of planning and protecting freight corridors and precincts within the ACT. The vision for the ACT Freight Strategy is to deliver an efficient, safe and sustainable freight network and services for a growing ACT and regional economy and community while protecting urban amenity and freight access and reducing the emission intensity of the freight transport industry. The Corridor Strategy recognises the importance of the South West Corridor as part of Canberra's freight network, and through anticipated operational improvements resulting from the proposed upgrades. The Corridor Strategy is expected to improve freight flows, travel times and by extension reduce freight costs and emissions. This is consistent with ACT Freight Strategy's vision for efficient, sustainable and safe freight movements.
	ACT Climate Change Strategy – The ACT Climate Change Strategy 2019–25 outlines the ACT Government's climate change response and identifies actions to meet its emissions reduction targets and prepare for climate change. The ACT Climate Change Strategy is complemented by Canberra's Living Infrastructure Plan: Cooling the City, which sets the direction for maintaining and enhancing trees, soils and waterways and builds on Canberra's transition to 100% renewable electricity, the Energy Efficiency Improvement Scheme, the delivery of light rail Stage 1, and Canberra's improved cycle path network. Through improving operational efficiency of the corridor, the Corridor Strategy is expected to reduce greenhouse gas emissions consistent with the objectives of the ACT Climate Change Strategy.

Plan or Policy	Nature of Alignment
	**National Freight and Supply Chain Strategy** – The National Freight and Supply Chain Strategy (2019) outlines the agenda for coordinated and planned government and industry actions across air, rail and road freight modes over the next 20 years and beyond. The Corridor Strategy recognises the importance of the South West Corridor as part of Canberra's freight network, in addition to its role as part of interstate freight connectivity. Through anticipated operational improvements resulting from the proposed upgrades, the Corridor Strategy is expected to improve freight flows, travel times and by extension reduce freight costs and emissions, consistent with objectives of improved efficiency and sustainable freight operations outlined in the National Freight and Supply Chain Strategy
	ACT Road Safety Strategy – The ACT Road Safety Strategy 2020-2025 provides an approach to addressing road safety in the Territory and is based around four goals that establish the ACT Government's overarching road safety vision: 1) Reduce serious and fatal crashes 2) Build a community that shares responsibility for road safety 3) Change road user attitudes and behaviour through education and compliance activities 4) Strengthen collaboration across Government and with stakeholders to improve road safety in the ACT The Corridor Strategy proposes a suite of upgrades that are expected to improve safety outcomes in the Corridor either through direct safety oriented interventions, or improvements in infrastructure standard and network operations. These improvements are consistent with Goal 1 of the ACT Road Safety Strategy to reduce serious and fatal crashes.

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3. Corridor Context

3.1 Overview

Canberra is the National Capital and a regional centre that was estimated to have a population of approximately 420,000 people in 2023. It consists of the nine primary districts depicted in Figure 3–1 in addition to Queanbeyan. The South West Corridor traverses the Tuggeranong district adjacent to the Town Centre and separates the Weston Creek / Woden Valley districts and the Molonglo Valley / Inner South districts in the western part of Canberra. The Tuggeranong, Weston Creek, Woden Valley and Inner South districts are well established areas of Canberra, in contrast to the Molonglo Valley which is a rapidly growing district and the major location for Canberra's future greenfield development. The South West Corridor is generally the primary north-south transport artery servicing these districts.

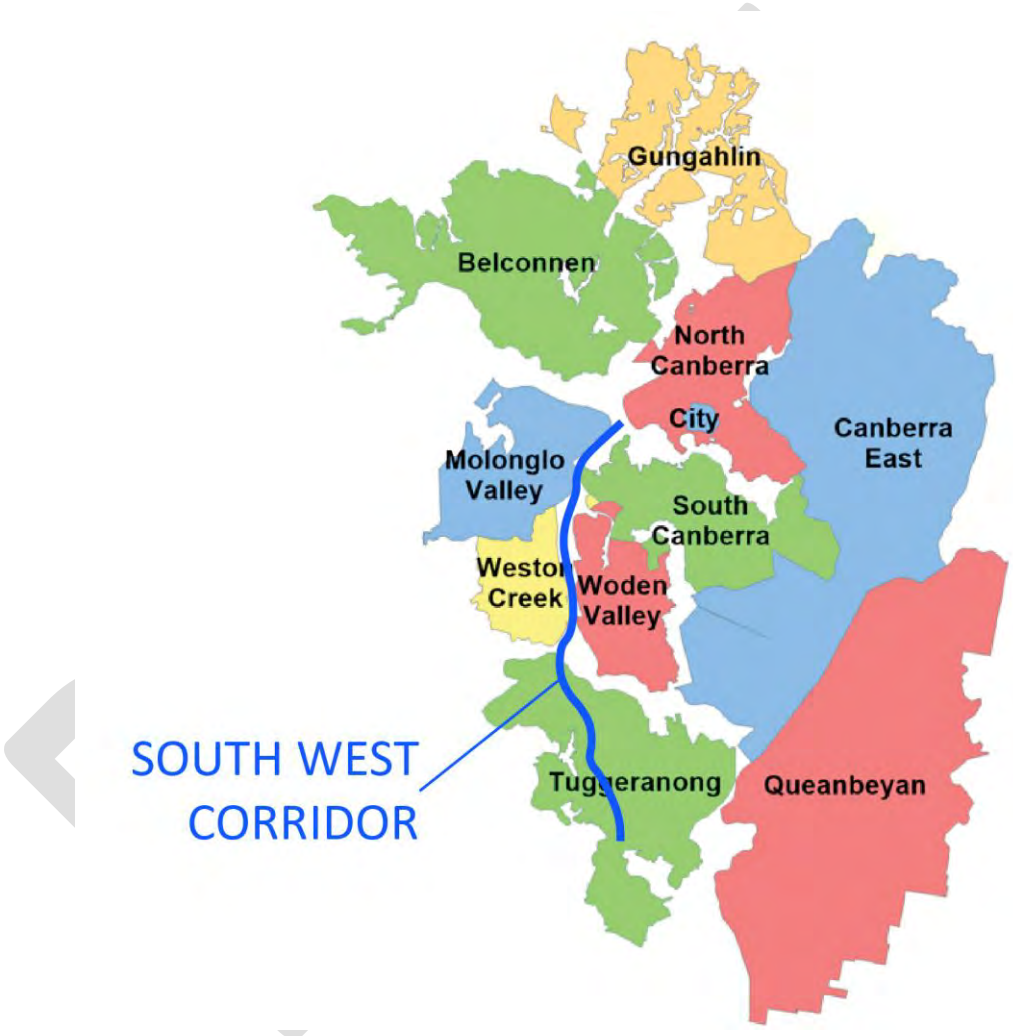

Figure 3–1: ACT Districts + Queanbeyan (based on CSTM v1.2 Transport Activity Zones)

3.2 ACT Land Use

3.2.1 Current Land Use

The nine Canberra Districts vary significantly in size, population and composition of their land uses. As demonstrated in Table 3–1, the five districts that are directly serviced by the South West Corridor (Tuggeranong, Weston Creek, Woden Valley, Inner South districts and the Molonglo Valley) currently contain a population of approximately 200,000 people. In addition, Belconnen at the northern extent of the corridor accommodates a further 107,000 people. In addition, these five districts contain 122,000 jobs, 38,000 school enrolments, 3,000 tertiary enrolments, and 1,100,000 m^2 of retail space.

These values represent 43% of the ACT population, 47% of school enrolments, and 49% of retail floor space in the ACT. The five districts also include 43% of jobs in the ACT, although it is noted that approximately half of these jobs are sited in Inner South where employment densities are dominated by the Parliamentary Triangle which situated in the far eastern part of this district and is distant from the South West Corridor. Similarly, over half of the retail space associated with these districts is also located in the Inner South orientated away from the South West Corridor.

Whilst both Woden and Tuggeranong Town Centres contain some trade services areas, there are no substantial industrial zones in the vicinity of the South West Corridor, noting that whilst Fyshwick is a key Canberra industrial zone (in Canberra's Inner South), it is at the eastern extremity of the District and unlikely to contribute many trips to the Corridor. As such, the South West Corridor primarily services suburban residential areas in south and west Canberra, providing a commuting link to employment and activity centres in Woden, the Parliamentary Triangle, the City Centre and Belconnen.

Table 3–1: 2023 District Populations and Land Uses (Source: CSTM 1.2 Land Use)

District	Population	Employment	Retail Space (m^2)	School Enrolments	Tertiary Enrolments
Belconnen	106,778	34,561	346,654	17,669	25,868
Canberra East	2,018	22,282	204,852	0	0
Gungahlin	89,538	19,386	326,261	15,053	489
Molonglo	13,965	2,069	3,300	1,017	0
City / Inner North	64,268	82,609	292,494	10,635	32,163
Inner South	32,972	64,307	657,238	11,039	2,196
Tuggeranong	88,877	22,152	233,969	13,699	564
Weston Creek	24,432	5,073	38,867	3,960	0
Woden Valley	39,419	28,555	186,727	8,411	200
ACT Total	**462,893**	**281,402**	**2,290,361**	**81,482**	**61,480**

3.2.2 Future Changes to Land Use

Whilst the nature of land use in the five South West Corridor districts is not expected to change significantly (ie they will remain predominantly suburban residential areas with comparatively low employment, retail space (excluding the eastern Inner South) and tertiary enrolments) it is expected that populations will grow substantially over the Corridor Strategy horizon to 2051.

Table 3–2 summarises Territory forecasts for land uses values across 2031, 2041 and 2051. These forecasts indicate that the ACT population will grow by 240,000 people over the 28 years between 2023 and 2051, with 53% of this population growth forecast to be in the five South West Corridor districts. Notably, 23% of the entire ACT population growth over this period is anticipated to occur in the Molonglo Valley district. That is, the population of the Molonglo Valley is expected to grow from its population of 14,000 in 2023 to 10,000 people in 2051 (a 500% increase). Furthermore, it is understood that the Territory is currently considering planning for an ultimate population in the Molonglo Valley of up to 80,000 people beyond 2051.

The forecast population growth in the Molonglo Valley is particularly significant for the South West Corridor as the Corridor is expected to take a substantial proportion of trips generated by these new residential areas. This combined with significant forecast increases in population and employment in the Woden Valley (↑74% and ↑61% respectively) is expected to considerably increase the load on the South West Corridor over the next 30 years.

Another important land use consideration for the South West Corridor is the potential development of the Western Edge Investigation Area (WEIA) that lies to the west of the Weston Creek district. Whilst development of the WEIA is not currently ACT policy, it is understood that there is the potential for additional population in a new district should it be developed. Implementation of the WEIA would place further load and increase congestion on the South West Corridor.

Table 3–2: Forecast District Populations and Land Uses (Source: CSTM 1.2 Land Use)

District	Population	Employment	Retail Space (m^2)	School Enrolments	Tertiary Enrolments
2031					
Belconnen	128,891	40,582	398,712	18,334	28,815
Canberra East	2,569	29,304	235,856	0	0
Gungahlin	98,450	21,956	420,256	15,955	500
Molonglo	35,229	5,074	24,000	4,875	0
City / Inner North	75,761	95,608	362,755	11,200	32,977
Inner South	39,519	73,846	707,529	11,666	2,400
Tuggeranong	88,620	23,297	258,692	13,341	600
Weston Creek	25,847	5,442	42,807	3,709	0
Woden Valley	44,513	32,530	209,664	8,300	6,750
ACT Total	**539,877**	**328,512**	**2,660,271**	**87,380**	**72,042**
2041					
Belconnen	144,708	46,633	475,197	21,747	31,522
Canberra East	2,500	33,418	273,055	0	0
Gungahlin	102,418	23,395	488,774	18,165	500
Molonglo	61,565	8,560	43,000	6,906	0
City / Inner North	88,088	110,619	421,981	11,681	34,636
Inner South	44,350	84,693	792,439	12,114	2,500
Tuggeranong	94,935	25,905	281,115	15,166	600
Weston Creek	28,133	6,100	43,791	4,558	0
Woden Valley	53,298	38,644	234,070	9,313	7,750
ACT Total	**620,388**	**378,933**	**3,053,422**	**99,650**	**77,508**
2051					
Belconnen	161,449	54,603	475,197	22,403	33,408
Canberra East	2,528	37,025	273,055	0	0
Gungahlin	107,653	26,092	488,774	18,165	500
Molonglo	70,126	9,788	43,000	6,906	0
City / Inner North	103,750	125,581	424,695	11,681	38,517
Inner South	49,956	96,329	792,439	12,114	2,500
Tuggeranong	108,178	28,920	281,115	15,166	600
Weston Creek	31,536	7,074	43,791	4,558	0
Woden Valley	68,552	45,952	234,070	9,313	8,750
ACT Total	**704,112**	**432,480**	**3,056,136**	**100,306**	**84,275**

4. Corridor Vision

4.1 Vision Purpose

As part of the development of the Corridor Strategy, the need for development of a clear and coherent Vision was identified. This Vision was developed in close consultation with relevant Territory and Federal stakeholders and underpinned all stages of development of the Corridor Strategy. The purpose of this Vision was to:

- Inform the development of the Corridor Strategy including transport modelling; options identification and evaluation; design development; economic evaluation; and upgrade prioritisation and staging
- Provide a framework for the ongoing operation of the corridor and guide upgrade and development of the corridor over the next 30 years
- Remain live over the life of the corridor strategy such that the Vision can be updated in response to the changing needs of the community.

4.2 Vision Development

The development of the vision was centred on a high degree of consultation and liaison with key stakeholders and occurred in three phases:

1. **Identification of Vision Objective Categories** – To help guide the Vision Workshop the Project Team inclusive of members of TCCS, Major Projects Canberra (MPC), and the consultant team, identified a collection of Vision categories that were considered most relevant to each corridor
2. **Vision Workshop** – A Vision Workshop was held with numerous Territory and Federal government stakeholders to collectively create a set of Vision Principles for the Corridor
3. **Confirmation of Vision Principles** – Feedback from the Vision Workshop was refined into a set of agreed Vision Principles

4.3 Vision Objective Categories

In preparation for the Vision Workshop a set of categories was developed by the project team that were considered to capture the key considerations relevant to the Vision for the Corridor. The intent of these categories was to facilitate targeted discussion during the Vision Workshop and to assist the development of the Corridor Vision. The identified categories were:

- Corridor purpose & classification
- Traffic operational performance
- Safety
- Sustainability, environment & cultural heritage
- User amenity
- Land use & economic development
- Adaptability to emerging technologies

4.4 Vision Workshop

A Vision Workshop was held in March 2022, the purpose of which was to:

- Engage with key stakeholders to obtain input and feedback from a wide cross-section of interested parties and specialists
- Inform the development of Vision Principles and Statements in response to agreed objectives for the Corridor

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The Workshop introduced the context of the Corridor including its history, constraints, planning regime, network role, and performance (current and forecast). Attendees then provided insight and feedback on what were considered key principles relevant to each of the identified categories. The Workshop involved participation from the following stakeholders:

- Project Team (TCCS, MPC, and consultant team)
- Transport Canberra – Bus Operations
- TCCS
- Major Projects Canberra
- EPSDD
- CMTEDD – ACT Treasury
- ESA
- National Arboretum Canberra

4.5 Corridor Vision

4.5.1 Vision Principles

Based on discussion and input from the stakeholder group in the South West Corridor Vision Workshop, a draft set of Vision Principles was identified and circulated to participants for review and comment. Following feedback on the draft Principles, the Vision Principles were subsequently updated and refined into the following agreed list:

- Purpose and Classification
  - P&C.1) Retention of orbital classification & movement function
  - P&C.2) Consistent standard of cross section on the Tuggeranong Parkway
  - P&C.3) Promote active travel through strong cross - corridor connectivity
  - P&C.4) Support emergency response & primary evacuation route
  - P&C.5) Configured to current standards & best industry practice
- Traffic Operational Performance
  - TOP.1) Facilitates the efficient movement & travel time reliability for road users
  - TOP.2) Operating speeds are adaptable enhancing efficiency & safety
  - TOP.3) Support PT along & across Drakeford Dr + flexibility for PT throughout corridor
- Safety
  - S.1) Operation is safe & improvements are consistent with safe systems principles
  - S.2) The corridor achieves a min. 4 star iRAP rating & aligns with Vision Zero goals
  - S.3) Asset / incident management is safe for workers, emergency crew, & road users
- Sustainability, Environment and Cultural Heritage
  - SE&C.1) Improves outcomes for the atmosphere, waterways & local ecology
  - SE&C.2) Recycled material use to minimise carbon footprint & resource depletion
  - SE&C.3) Resilient to climate change & weather events including fire & flood
  - SE&C.4) Sensitive to natural environment context & traditional land custodians
  - SE&C.5) Sensitive to its context within the National Capital
- User Amenity
  - AM.1) Retains / enhances current character with appropriate landscape treatments

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  - AM.2) Ensure use of the corridor is comfortable with a high quality ride
  - AM.3) Improves community wellbeing & minimises adverse impacts
- Land Use and Economic Development
  - L&ED.1) The corridor is adaptive & evolves in response to growth & changing land uses
  - L&ED.2) Facilitates the efficient movement of freight for western Canberra
  - L&ED.3) Enhancements are economically sustainable & consider whole of life costs
- Adaptability to Emerging Technologies
  - ET.1) Corridor is flexible & facilitates the adoption of smart technologies

4.5.2 Vision Description

Following the identification of the Vision Principles, a Vision Description which distilled the key themes of the agreed Vision was developed. The agreed Vision Description for the Corridor was:

> *As key parts of Canberra's orbital transport network, Drakeford Drive and the Tuggeranong Parkway are to provide an efficient, safe and reliable transport artery for Canberrans. The corridor will promote sustainability, improve community amenity, and enrich the local economy, whilst retaining its Parkway character through the surrounding landscape. As the corridor evolves, it will be enhanced in ways that are sensitive to its context within the National Capital and the region's traditional land custodians.*

4.5.3 Vision Statement

The final product of the Vision Statement which provides a high level summary of the vision intent:

> *Drakeford Drive and the Tuggeranong Parkway will be an efficient, safe and reliable transport artery with a distinct green landscaped character.*

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5. Corridor Role

5.1 ACT Transport Network

As noted in the ACT Transport Strategy 2020, the ACT transport network is a multi modal network that consists of 3100 km of roads servicing general traffic, a public transport system that includes a bus network and light rail route, and 3500km of paths providing an active travel alternative for the community. The majority of trips on the network (approximately 75%) are undertaken in private vehicles with remainder shared between active travel (walking and cycling) and public transport (refer Figure 5–1).

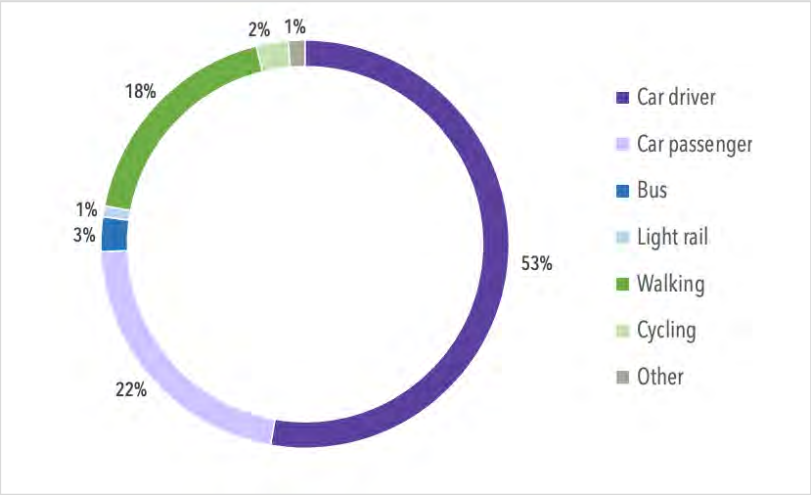

Figure 5–1: ACT Trips by mode (2022 ACT and QPRC Household Travel Survey).

The South West Corridor forms a key part of the road network in which the ACT Transport Strategy 2020 identifies a hierarchy of four road types in the network structure:

- **Local links** – Provide for short trips within local areas.
- **Central Links** – Focus on the efficient movement between centres urban intensification areas by public
- **Orbital Links** – Support trips around and across the city for private vehicles and freight, and aim to maintain the private vehicle journey times. The freight network is based on orbital links.
- **Regional Links** – Focus on enhancing regional connectivity, includes road, rail and freight routes between Canberra and Sydney and other connections to inland and coast regions.

The configuration of existing and planned orbital and regional links in the ACT network is indicated in Figure 1–2.

5.2 Movement & Place

The ACT Transport Strategy 2020 notes that the Movement and Place concept was utilised to develop the network structure described above, with a combination of central and orbital links providing the backbone of Canberra's future transport network.

The Movement and Place concept aims to consider the dual function transport corridors that both convey trips between two points, but can also act as places and destinations in and of themselves where people meet, engage and occupy. The Territory Government has developed a Movement and Place Framework for use in the ACT (refer Figure 5–2) which can be utilised for the categorisation and appropriate development of transport corridors.

Figure 5–2: ACT Movement and Place Framework

5.3 Corridor Role

5.3.1 General

The South West Corridor forms a key Orbital link on the western edge of the Canberra transport network. It conveys high volumes of traffic for internal movements within the Tuggeranong District in addition to providing a high capacity / high volume north – south connection between numerous districts on the western side of Canberra. The Movement and Place function of the corridor varies slightly along its length (refer Figure 5–3 for a notional indication of where the South West Corridor lies within that framework):

- **Tharwa Drive – Sulwood Drive** – This section of the South West Corridor (Drakeford Drive) is an arterial road with interrupted flow conditions, induced by at-grade intersections with side roads including priority controlled (generally left in left out) and signalised intersections in addition to roundabouts. Whilst Drakeford Drive services a strong movement function, it also has a degree of active travel activity and has some (limited) school, commercial and leisure frontages (noting all access are on side roads).
- **Sulwood Drive – Glenloch Interchange** – The Tuggeranong Parkway zone of the South West Corridor is a motorway environment that runs with a free flow conditions, characterised by full grade separation of all side roads. It serves an entirely Movement function and nowhere along its length within the Corridor is considered a destination or serves a substantive place function. That is, all destinations adjacent to the South West Corridor (eg the National Arboretum Canberra or the National Zoo and Aquarium) are considered off-corridor.

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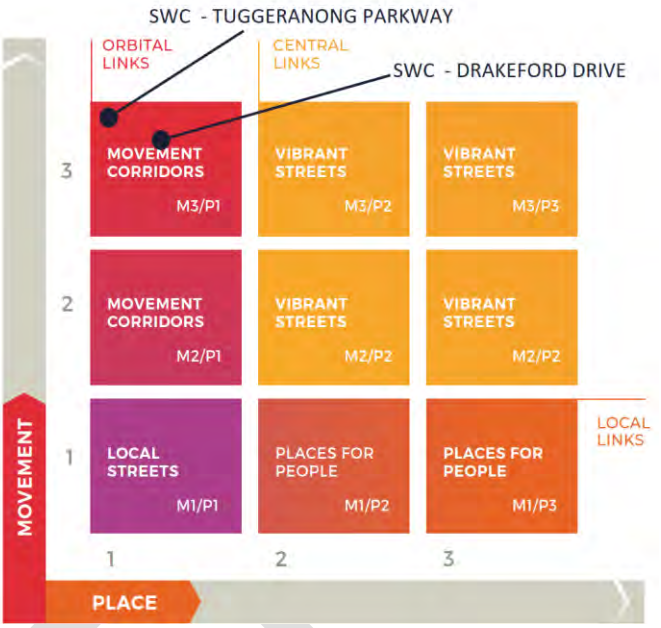

Figure 5–3: South West Corridor Notional Movement and Place Function

5.3.2 Passenger Vehicles

General traffic / private passenger vehicle movements are currently the predominant trip type in the South West Corridor, with its share of trips expected to remain similar over the 30 year Corridor Strategy horizon. The southern part of the Corridor within the Tuggeranong District generally caters to a mix of trip types including commuting, commercial, and educational private vehicle trips. In contrast, the Tuggeranong Parkway zone of the South West Corridor more heavily conveys commuting trips in addition to inter-district journeys. Future traffic volumes on the South West Corridor are discussed in Section 9.

5.3.3 Freight

The South West Corridor is an important component of Canberra's road freight network providing a high capacity route for general access freight vehicles in addition to being a B-Double restricted access route. It facilitates freight movements and access to the western and southern parts of Canberra in addition to supporting regional freight linkages to the north via the Federal Highway and the Barton Highway, and to the south via the Monaro Highway. It is anticipated that the corridor will retain its status as a key freight route into the future and continue to convey freight vehicles. The location of the South West Corridor in relation to the ACT road freight network is indicated in Figure 5–5.

Figure 5–4: Freight Movements on Drakeford Drive

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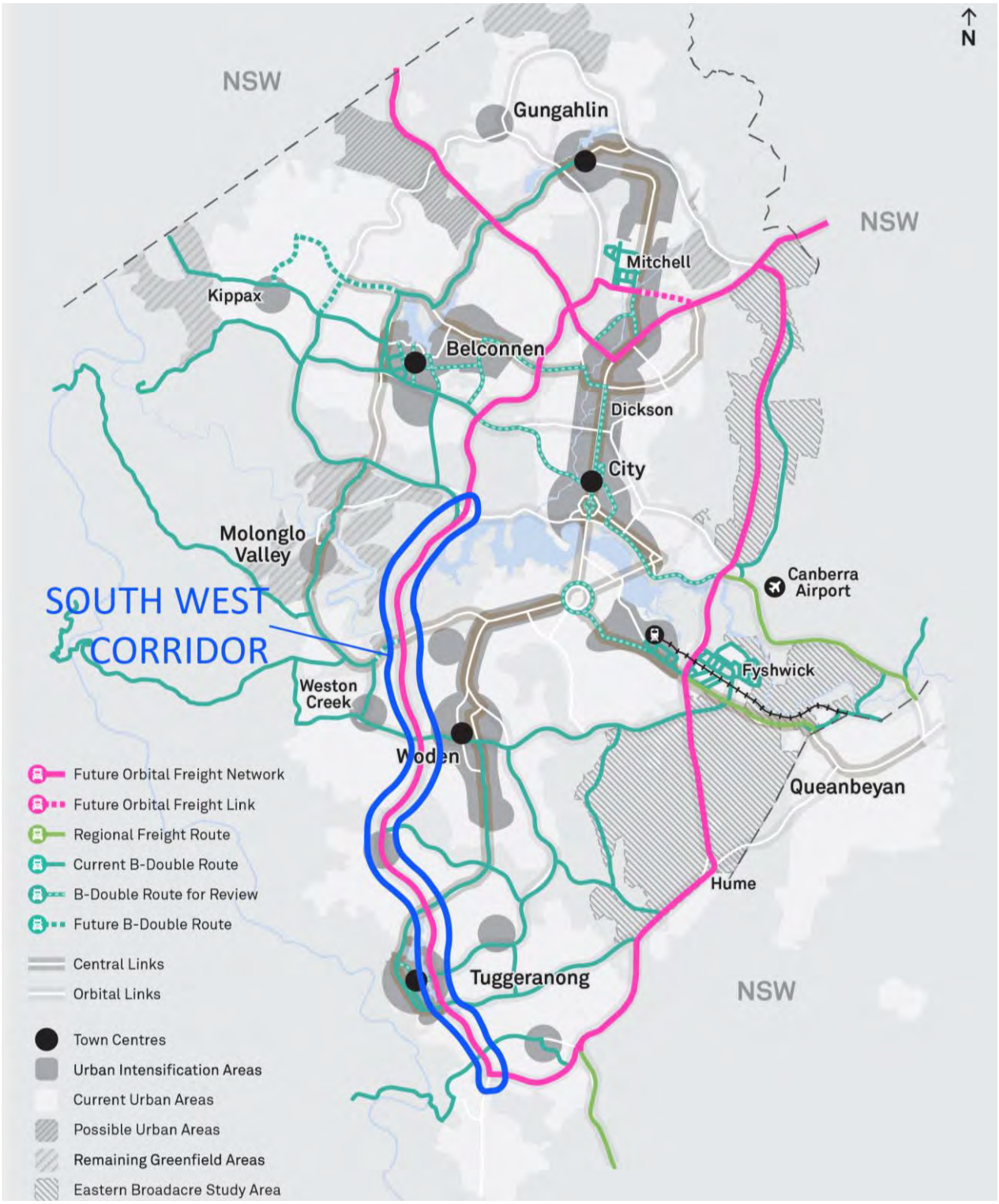

Figure 5–5: Canberra Orbital Freight Links (ACT Transport Strategy 2020)

5.3.4 Public Transport

Whilst the South West Corridor is not a primary public transport route, it does convey several local and peak bus routes along parts of its length between Tharwa Drive and Cotter Road, noting there are no public transport services on the Tuggeranong Parkway between Cotter Road and the Glenloch Interchange. Furthermore, there are numerous transverse crossings of the corridor by rapid, peak and local bus routes including at Isabella Drive, Erindale Drive, Athlon Drive, Summerland Circuit, Marconi Crescent and Cotter Road. Whilst the number and nature of public transport routes on the Corridor may change over time, it is understood that there are currently no plans to significantly change the public transport character of the Corridor from its current operation. The bus routes that cross or are on the South West Corridor are indicated in Figure 5–6.

Figure 5–6: Canberra Bus Route Map (Transport Canberra)

5.3.5 Active Travel

The South West Corridor currently conveys ACT Principal off road cycle routes and other shared paths intermittently within or adjacent to the corridor boundary between Hindmarsh Drive to Summerland Circuit and Isabella Drive to Tharwa Drive. No active travel paths are located within the northern zone of the Corridor between Hindmarsh Drive and the Glenloch Interchange (excluding transverse crossings at numerous locations). It is noted however that the future Molonglo to City Cycle Highway may potentially route along the Corridor between Cotter Road and the Glenloch Interchange in the future.

On road cycle facilities in the South West Corridor are also inconsistent along the length of the Corridor. The South West Corridor has on road cycle lanes along the majority of Drakeford Drive, although these lanes intermittently terminate such that there is not an established safe cycle on road cycle facility along its length. Similarly, shoulders along the length of the Tuggeranong Parkway vary from full width to zero (refer image of the southbound approach to the Hindmarsh Drive Interchange in Figure 5–7), and as such the Tuggeranong Parkway is not considered a safe or appropriate environment for on road cycling. Further, it is understood that the ACT is not intending to introduce on road cycling into the Corridor.

Figure 5–7: Tuggeranong varying width Shoulder

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6. Upgrade Identification & Shortlisting

6.1 Assessment Approach

In order to ensure that the South West Corridor operates appropriately into the future and services the needs of the community over the next 30 years, it is anticipated that a collection of upgrades will be required in the Corridor. These upgrade projects are expected to be a mix of road infrastructure upgrades, public transport improvements, active travel facilities, safety improvements and technology enhancements. In order to understand the most appropriate corridor improvements to implement, an option shortlisting exercise was undertaken. This process involved the following steps:

- Identification of a longlist of upgrade options for each corridor
- An options workshop that sought feedback from key stakeholders and technical specialists on each longlist option
- Formal evaluation of all longlist options against the agreed Vision Principles
- Nomination of a shortlist of options based on the options evaluation outcomes and other relevant considerations
- Endorsement of the options shortlist by the Territory

The options shortlisting process was conducted for both the South West Corridor Strategy and the concurrent Parkes Way Corridor Strategy, and is documented in its entirety in the Options Shortlisting Assessment Report included in Appendix A of this Corridor Strategy.

6.2 Long List Options

The long list of options was identified through a combination of several different approaches. TCCS identified a collection of options that were considered likely to benefit the community into the future. In addition, the project team identified further potential upgrade options that would likely improve the operation of the corridor based on traffic modelling outcomes, deficiencies in active travel connectivity, existing and potential future public transport routes; existing crash analysis and observed safety concerns.

The draft long list of options identified for the South West Corridor consisted of the following 16 potential upgrades, including sites on Drakeford Drive, the Tuggeranong Parkway and in the vicinity of the Glenloch Interchange:

- Tuggeranong Parkway
  - SW1) Tuggeranong Parkway - Additional northbound lane
  - SW2) East West Arterial / Tuggeranong Pkwy interchange
  - SW3) Auxiliary southbound lane upgrades to facilitate East West Arterial
  - SW4a) Tuggeranong Pkwy / Hindmarsh Dr Interchange – Interim Upgrade
  - SW4b) Tuggeranong Pkwy / Hindmarsh Dr Interchange – Ultimate Upgrade
  - SW5) Tuggeranong Pkwy - VSLS & VMS upgrades
  - SW10) Tuggeranong Pkwy / Cotter Rd Interchange Upgrade
- Drakeford Drive Dr
  - SW6) Drakeford Drive Dr / Boddington Cres / Marconi Cres intersection safety upgrade
  - SW7) Drakeford Drive Dr / Erindale Dr / Soward Way intersection safety upgrade
  - SW8) Drakeford Drive Dr / Athllon Dr / Isabella Dr intersection upgrade
  - SW9) Drakeford Drive Dr / Sulwood Dr intersection safety upgrade
  - SW11) Mass action - cross section improvements (shoulder & medians)
  - SW12) Bus priority at intersections on Drakeford Dr

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  - SW13) On road cycling on Drakeford Dr
- Glenloch Interchange
  - G7) Tuggeranong Pkwy - Northbound midblock upgrade (Forest Dr to Caswell Dr)
  - G8) Upgrade of Tuggeranong Pkwy SB off-ramp Intersection with Lady Denman Dr

6.3 Options Workshop

In December 2022, participants from TCCS, EPSDD, MPC, and the Project Team attended two Options Workshops where the longlist of upgrade options were presented and interrogated. The purpose of the workshops was to ensure the longlist was comprehensive and robust; discuss each of the options amongst the group; gain insight into the likely benefits and issues associated with each of the options; and to inform the options assessment process. Following the two workshops the longlist was finalised and circulated to all participants.

6.4 Options Assessment Process - Strategic Merit Test

In order to consider the relative merits of each option and identify a short list of options it was necessary to pass each option through a decision framework. The Australian Transport Assessment and Planning (ATAP) guidelines provide guidance on the options assessment process, identifying a Strategic Merit Test (SMT) as a method to consider an initiative's alignment with goals, objectives and strategic plans. Given the early stage of development and minimal information available on the options being considered, and the establishment of clear and agreed Vision Principles for the project, it was considered appropriate to apply an SMT to the longlist of options in order to identify a preferred shortlist of options.

The SMT option evaluation considered the number of Vision Principle categories that each option was predominately aligned with in order to determine whether the option was appropriate for short listing.

6.5 Evaluation of Vision Alignment

6.5.1 Overview

Two methods of evaluation were employed to understand which options best align with the agreed Vision Principles for the Corridor. The evaluation of the alignment with each Corridor Vision Principle was undertaken by the project team and is summarised in the upgrade evaluation sheets included in the Options Shortlisting Assessment Report included in Appendix A. Each sheet provides a location and description of the option, whether it was considered to be aligned with each discrete Vision Principle (and rationale for that finding). Alignment with a Vision Principle is consistent with the legend provided in Table 6–1.

Table 6–1: Vision Principle alignment categories

Alignment	Description
Aligned	Upgrade is consistent with the objectives of the Vision Principle
Neutral	Upgrade is neither consistent or inconsistent with the Vision Principle, or alternatively the Principle is not appliable to the upgrade
Not Aligned	Upgrade is in conflict with the objectives of the Vision Principle

It is noted that this SMT evaluation does not necessarily communicate the overall relative merit of an option. Rather, it provides an indication of the degree of alignment that an option has with the Vision Principles. As such, whilst the SMT provided a substantive basis for the options short listing process, other considerations also informed the option short listing assessment.

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6.5.2 Number of Aligned Principles

In this method of evaluation, the net number of aligned principles is calculated (i.e. “Aligned” – “Not Aligned”), giving an overall sense of how the option aligns with all of the Vision Principles.

6.5.3 SMT Score

The Strategic Merit Test (SMT) Score indicates the degree to which an option aligns with the Vision Principle categories. If an option is predominantly aligned with the Vision Principles in a Vision category (i.e. aligned with at least 50% of Vision Principles for a given category) it is considered aligned with the category. The SMT Score indicates the aggregate number of Vision categories an option is aligned with. This approach normalises each category such that they have equal value in the analysis.

6.6 Recommended Shortlist

Informed by the options evaluation process discussed above, a recommended shortlist of upgrade options is provided in Table 6–2. Generally, options with an SMT score of 5 or above have been identified for short listing as they are considered highly aligned with the agreed vision for the corridor. Conversely, options with an SMT score of 3 or below are considered poorly aligned with the corridor vision and as such have not been proposed for short listing. Options with a SMT score of 4 have been further assessed in the context of likely value for money and community benefit, and have been included / excluded from the shortlist based on a qualitative assessment. The rationale for inclusion (or otherwise) of each option is included in the short list summary.

Table 6–2: South West Corridor Recommended Short List

Upgrade	Discussion
SW1 Tuggeranong Parkway - Additional northbound lane SMT Score: 4 Aligned Principles: +11 Shortlisted: Yes	**SMT Score = 4 (Marginal)** – Whilst only moderately aligned with the Vision Principles, this option is expected to make a significant difference to the performance of the Tuggeranong Parkway in addition to supporting the provision of the East West Arterial interchange.
SW2 East West Arterial / Tuggeranong Pkwy interchange SMT Score: 5 Aligned Principles: +17 Shortlisted: Yes	**SMT Score > 4** – The East West Arterial link to the South West Corridor is a critical connection for the proposed Molonglo district and is required to ensure that the road network within the district including arterial connections such as John Gorton Drive and Cotter Road do not fail in the future. The strong alignment of the option with the Vision Principles also supports its inclusion on the short list.
SW3 Auxiliary southbound lane upgrades to facilitate East West Arterial SMT Score: 5 Aligned Principles: +13 Shortlisted: Yes	**SMT Score > 4** – The successful operation of the East West Arterial interchange relies in part on the southbound auxiliary lane between EWA interchange and the Cotter Road interchange to manage weaving and operate effectively. Given the importance of the EWA interchange to network performance, the auxiliary lane has been included in the shortlist.
SW4a Tuggeranong Pkwy / Hindmarsh Dr Interchange upgrades – Interim Solution SMT Score: 4 Aligned Principles: +15 Shortlisted: Yes	**SMT Score = 4 (Marginal)** – Whilst only moderately aligned with the Vision Principles, this option is expected to make a significant difference to the performance of the Tuggeranong Parkway interchange in the short term for a relatively modest investment.
SW4b Tuggeranong Pkwy / Hindmarsh Dr Interchange upgrades – Ultimate Solution SMT Score: 5 Aligned Principles: +11 Shortlisted: Yes	**SMT Score > 4** – The interchange currently experiences high levels of congestion in both the AM and PM peaks, and network performance is expected to deteriorate further in the future. The proposed upgrade at the interchange is aligned with the Vision Principles and is expected play an important role in improving performance of the corridor.
SW5 Tuggeranong Pkwy - VSLS & VMS upgrades	

Upgrade	Discussion
SMT Score: 7 Aligned Principles: +18 Shortlisted: Yes	**SMT Score > 4** – The provision of variable message and speed limit signage offers the opportunity to manage the corridor in peak periods and improve the efficiency of its operation. This option is very highly aligned with the Vision Principles for the corridor.
SW6 Drakeford Dr / Boddington Cres / Marconi Cres intersection safety upgrade SMT Score: 1 Aligned Principles: +7 Shortlisted: No	**SMT Score < 4** – The proposed upgrade is poorly aligned with the Vision Principles, and whilst it will potentially provide a degree of improvement in localised crash performance, it is considered a lower priority action than the options identified for shortlisting. It is recommended that performance of the intersection continue to be monitored and the upgrade be implemented outside the corridor strategy if appropriate in the future.
SW7 Drakeford Drive Dr / Erindale Dr / Soward Way intersection safety upgrade SMT Score: 1 Aligned Principles: +8 Shortlisted: No	**SMT Score < 4** – The proposed upgrade is poorly aligned with the Vision Principles, and whilst it will potentially provide a degree of improvement in localised crash performance, it is considered a lower priority action than the options identified for shortlisting. It is recommended that performance of the intersection continue to be monitored and the upgrade be implemented outside the corridor strategy if appropriate in the future.
SW8 Drakeford Dr / Athllon Dr / Isabella Dr intersection upgrade SMT Score: 5 Aligned Principles: +13 Shortlisted: Yes	**SMT Score > 4** – Upgrade of this intersection is expected to address both significant performance issues at the site into the future and a poor crash history that is likely to further deteriorate over time. Given this and its strong alignment with the Vision Principles, the options was considered appropriate for inclusion in the shortlist.
SW9 Drakeford Drive Dr / Sulwood Dr intersection safety upgrade SMT Score: 1 Aligned Principles: +8 Shortlisted: No	**SMT Score < 4** – The proposed upgrade is only mildly aligned with the Vision Principles, and whilst it will potentially provide a degree of improvement in localised crash performance, it is considered a lower priority action than the options identified for shortlisting. It is recommended that performance of the intersection continue to be monitored and the upgrade be implemented outside the corridor strategy if appropriate in the future.
SW10 Tuggeranong Pkwy / Cotter Rd Interchange Upgrade SMT Score: 4 Aligned Principles: +13 Shortlisted: Yes	**SMT Score = 4 (Marginal)** – The interchange currently experiences high levels of congestion associated with the north facing ramps in the peak periods, and network performance is expected to deteriorate further in the future with the development of the Molonglo Valley. The proposed upgrade at the interchange is strongly aligned with the Vision Principles and is expected to play an important role in improving performance of the corridor.
SW11 Mass action - cross section improvements (shoulder & medians) SMT Score: 2 Aligned Principles: +7 Shortlisted: No	**SMT Score < 4** – Whilst providing a high standard of shoulders and median throughout the corridor will improve safety and emergency response to a degree, the upgrade is not strongly aligned with the Vision Principles and is unlikely to provide significant benefit as a standalone package of work. Therefore the option has not been included in the strategy shortlist, although full width shoulders and median should be included in any future corridor upgrades.
SW12 Bus priority at intersections on Drakeford Dr	**SMT Score < 4** – Bus priority at intersections along Drakeford Drive is considered unlikely to offer substantial benefit given the low number of movements that travel along the corridor and the absence of a corridor bus lane (limiting access to bus priority features at intersections during red signal phases). It is noted that, while the Soward Way / Erindale Dr intersection would likely benefit from a similar arrangement, it is considered a lower priority action than the options identified for

Upgrade	Discussion
SMT Score: 1 Aligned Principles: +7 Shortlisted: No	shortlisting. It is recommended that the need for bus priority be monitored and the upgrade be implemented outside the corridor strategy if appropriate in the future.
SW13 On road cycling on Drakeford Dr SMT Score: 2 Aligned Principles: +7 Shortlisted: No	**SMT Score < 4** – The lack of consistency of bike lanes on the Drakeford Drive part of the corridor is a concern cyclist safety. However, the upgrade is not strongly aligned with the Vision Principles and is unlikely to provide significant benefit as a standalone package of work. Therefore the option has not been included in the strategy shortlist, although consistent cycle lanes, particularly through intersections, should be provided as part of any upgrades in the future.
G7 Tuggeranong Pkwy - Northbound midblock upgrade (Forest Dr to Caswell Dr) SMT Score: 3 Aligned Principles: +10 Shortlisted: No	**SMT Score < 4** – The option is considered only loosely aligned with the Corridor Vision. Given this, combined with the geometric complexity (and potential design standard compromises) of the option, it is considered a low priority over the current strategy horizon.
G8 Upgrade of Tuggeranong Pkwy SB off-ramp Intersection with Lady Denman Dr SMT Score: 6 Aligned Principles: +15 Shortlisted: Yes	**SMT Score > 4** – The operation of the off ramp has significant performance and safety history in the AM peak and is considered important to resolve to improve congestion and crash performance. This upgrade is expected to improve outcomes in this regard and is also highly aligned with the Vision Principles. For this reason, the option has been included in the shortlist.

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7. Proposed Corridor Upgrades

7.1 Short Listed Upgrades

The option short listing process identified nine upgrades in the South West Corridor that have alignment with the Vision for the corridor and are considered likely to improve aspects of the Corridor's performance. Table 7–1 provides a summary of these upgrades, noting that upgrades categorised as SW are located on the Tuggeranong Parkway or Drakeford Drive, and upgrades categorised as G whilst also on the Tuggeranong Parkway, are associated with the Glenloch Interchange (either within the interchange itself or in close proximity to the Glenloch Interchange such that it is operationally related to the interchange).

Table 7–1: Proposed Corridor Upgrades

Upgrade		Description
SW1	Tuggeranong Parkway - Additional northbound lane	Provision of third northbound lane between the Cotter Road Interchange and the Lakeside Interchange. The primary intent of this upgrade is to provide additional capacity to address congestion in the corridor.
SW2	East West Arterial / Tuggeranong Pkwy interchange	The upgrade provides a new interchange on the corridor to provide access into the developing Molonglo Valley district of Canberra through the future East West Arterial (EWA). Analysis indicates that this additional connection into the district is required to keep the network operational.
SW3	Auxiliary southbound lane upgrades to facilitate East West Arterial	The provision of a third southbound (auxiliary lane between the proposed EWA Interchange and the Cotter Road Interchange). This additional capacity is required to ensure appropriate corridor operation.
SW4a	Tuggeranong Pkwy / Hindmarsh Dr Interchange – Interim Upgrade	Improvements to the interchange layout on Hindmarsh Drive is proposed to improve short term performance and avoid operational failure.
SW4b	Tuggeranong Pkwy / Hindmarsh Dr Interchange – Ultimate Upgrade	Upgrade to the Hindmarsh Drive Interchange is proposed to address significant increases in future demand at the site to ensure long term performance and avoid operational failure of the interchange.
SW5	Tuggeranong Pkwy - VSLS & VMS upgrades	Provision of ITLS infrastructure between the Heysen Street overpass and the Lakeside interchange to assist in the management of speed and safety during incidents and maintenance activities.
SW8	Drakeford Dr / Athllon Dr / Isabella Dr intersection upgrade	Conversion of the Drakeford Drive / Athllon Drive / Isabella Drive intersection to improve operational performance, active travel amenity in addition to targeted crash reduction.
SW10	Tuggeranong Pkwy / Cotter Rd Interchange Upgrade	Improvements to the interchange ramps and associated ramp terminal intersection configurations (including side road approaches) to improve interchange performance in the context of increased demand in the Molonglo Valley district and changing traffic patterns associated with the introduction of the EWA interchange.
G8	Upgrade of Tuggeranong Pkwy SB off-ramp Intersection with Lady Denman Dr	Reconfiguration of the Tuggeranong Parkway southbound exit ramp at the Lakeside interchange in addition to improvements at the ramp terminal intersections and the Lady Denman Drive / Forest Drive intersection to improve operational performance at the site.

7.2 Options Development

The upgrades included as part of the Corridor Strategy have been developed based on current available information, preliminary assessment and engineering and transport planning judgment. Whilst the proposed upgrades have been the subject of quantitative and / or qualitative transport assessment to identify an operational layout that is considered likely to address the identified performance issues at the various corridor sites, it is noted that the upgrades have not been the subject of a detailed options analysis process.

Noting that site conditions, land use, travel demand, local constraints, the transport network and other variables are likely to evolve considerably over the course of the 30 year Corridor Strategy horizon, it is anticipated that proposed upgrades presented here will be the subject of future rigorous options assessment processes to identify the most appropriate preferred solution at the time of the development of the future concept design. Further, the feasibility of upgrades presented here requires testing through more substantial design development, traffic analysis, constraints assessment (physical, environmental, planning etc) and stakeholder consultation in future development phases.

7.3 Upgrade Sites

Upgrades proposed as part of the Corridor Strategy are distributed along the length of the South West corridor between Glenloch Interchange and Tharwa Drive and are located from Isabella Drive in the south to the Lakeside interchange in the north. These upgrades are a mix of infrastructure improvements at both corridor nodes (eg interchanges or intersections) and on corridor segments (between nodes). The locations of the upgrade sites are indicated d Figure 7–1.

Figure 7–1: South West Corridor upgrade sites

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7.4 Upgrade Configurations

Strategic design for the nine South West Corridor upgrades was undertaken to identify an infrastructure configuration that has the potential to address the identified problem. The intent of the layouts presented in this strategic design is to develop and present road and infrastructure layouts that are likely to provide a feasible solution to address an identified issue in the corridor. It aims to present transport network geometry and configurations to a sufficient level of detail to communicate what network changes are proposed as part of an upgrade to provide an understanding of how they may affect corridor performance and inform notional opinions of potential cost. The strategic design process considered the following design considerations:

- Problem statement
- Upgrade location
- Site characteristics
- Vision Alignment
- Considered options
- Adopted option
- Upgrade details
- Design Criteria
- Road Geometry
- Traffic Analysis
- Active Travel
- Public Transport
- Structures
- Safety
- Constructability
- Project Interdependencies
- Corridor Implications
- Corridor Character

The strategic design of each upgrade and associated design assumptions, rationale and outcomes are described in the South West Corridor Strategic Design Report included as Appendix B. This strategic design forms the basis of opinions of cost generated for each of the proposed upgrades that is summarised in the Cost Estimate Report which is included in Appendix E. The total estimated cost of the nine upgrades proposed as part of the South West Corridor Strategy is **$595M** in $2025 AUD.

Following is a brief summary of the key assumptions that informed the development of these designs, in addition to the primary design features and considerations associated with the upgrade designs. The overall estimated project cost (in $2025 AUD) for each of the upgrades is also included in the following summaries.

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Upgrade	SW1 – Additional Northbound Lane	Location	Tuggeranong Parkway	Estimate Cost	$132M	Sheet	1 of 2

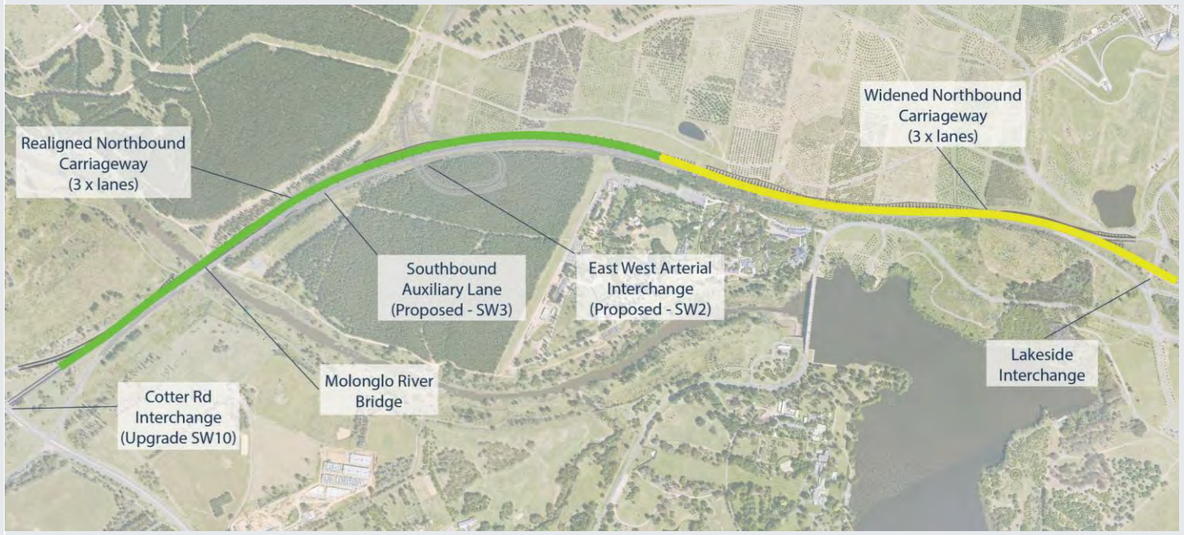
Problem Statement	Significant congestion is currently observed in peak periods (particularly the AM peak) on the Tuggeranong Parkway northbound carriageway. Average operating speeds and level of service are generally considered poor during peak periods, particularly in the vicinity of the Cotter Road entry ramp merge. Future year modelling has indicated a further deterioration of performance over the strategy horizon in response to forecast population growth in the Molonglo Valley and associated increases in traffic volumes along the corridor and from the proposed East West Arterial interchange. The safety performance of the northbound Cotter Road interchange entry ramp is also a concern with the Cotter Road merge demonstrating a poor crash history.	Public Transport	There are currently no public transport services that use the northbound carriageway of the Tuggeranong Parkway in the region of the upgrade. Furthermore, it is understood that there are currently no plans to introduce new public transport services into this part of the corridor. As such, it is considered unlikely that the upgrade will have substantive implications for public transport operations within the corridor. However, it is noted that Cotter Road is a key public transport corridor with several bus services currently in operation along the route. The addition of the third northbound lane on the Tuggeranong Parkway is likely to improve the performance of the northbound entry ramp at the Cotter Road interchange, the associated ramp terminal intersection and, by extension, has the potential to improve the performance of public transport services along the Cotter Road corridor.
Site Description	The proposed upgrade applies to 3.7 km of the northbound carriageway of the Tuggeranong Parkway from the Cotter Road Interchange to the Lakeside Interchange (Forest Drive / National Arboretum Canberra access). The existing carriageway provides free flow motorway conditions for the length of the project site. The site provides two continuous lanes through a curvilinear alignment over its length with a posted speed of 100 km/h for the majority of its length, reducing to 90 km/h immediately south of the Lakeside Interchange. The carriageway generally has full width nearside shoulders, but has minimum width median shoulders with a continuous central concrete barrier. In addition to the mainline carriageway, the site includes two interchange ramps: - **Cotter Road entry ramp** – a single lane ramp with a simple merge onto the mainline (i.e. no auxiliary lane / parallel running prior to merge) - **Lakeside exit ramp** – a minimum treatment single lane exit ramp (i.e. direct diverge taper with no auxiliary lane / parallel running prior to diverge) There are several notable features / constraints along the site that impact the proposed upgrade. These key features of the site include: - **Molonglo River** – the existing carriageway crosses the Molonglo River with a multi-span concrete bridge approximately 190 m in length that was recently strengthened - **National Zoo and Aquarium underpass** – A short underpass bridge providing pedestrian access between the Zoo and National Arboretum Canberra that was recently strengthened - **National Arboretum Canberra (NAC)** – Planting associated with the NAC is within the Tuggeranong Parkway road reserve and may be impacted by the upgrade The terrain surrounding the site is rolling with various landscape types including native woodland, a diverse range of arboretum plantings, in addition to pine plantation. The land uses surrounding the corridor are generally recreational including the National Arboretum Canberra and the National Zoo and Aquarium. 	Active Travel	There are currently no active travel facilities in the Tuggeranong Parkway corridor for the length of the proposed upgrade. As part of the upgrade, new full width shoulders are proposed adjacent to the entire length of the additional proposed lane. This shoulder is intended to provide for emergency access, emergency stopping and errant vehicle recovery, and is not proposed as an on-road cycle lane. The Molonglo Cycle Highway is proposed for inclusion in part of the corridor, and if progressed may potentially cross the corridor at the East West Arterial. The location and alignment of the Cycle Highway is yet to be determined, however is considered likely to be independent of the additional third lane. Additionally, it is noted that the new Molonglo River crossing could provide the opportunity to include a new active travel link across the River. This link could be incorporated into the new northbound bridge structure, or alternatively it may be possible to accommodate it as part of the southbound reconfiguration of existing bridge structure. The feasibility of these approaches will require investigation in future phases of design development.
		Safety	The upgrade is primarily focussed on capacity and performance improvements, however several features of the proposed configuration are likely to improve the crash performance of the corridor. These improvements include: - The merge zone of the northbound Cotter Road interchange entry ramp has poor crash record. Removal of this merge movement is expected to improve crash performance locally at the entry ramp. - The upgrade is expected to alleviate AM peak congestion on the northbound mainline, improving flow and reducing the likelihood of crashes - Provision of full width shoulders in the southern zone of the upgrade extent, in addition to the provision of a median, facilitating emergency stopping, access for emergency vehicles, and facilitating errant vehicles recovery, all of which collectively improve both crash likelihood and severity
		Options Considered	In order to increase capacity of the northbound carriageway of the Tuggeranong Parkway, widening to provide a third lane was investigated. The provision of this additional lane is the primary element of the upgrade, although several variations of the additional lane configuration were tested, including: - Merge options at the Cotter Road interchange entry ramp - Diverge options at the EWA interchange exit and entry ramps, including a lane drop through the interchange. - Diverge options at the Lakeside interchange exit ramp - Provision of a northbound distributor link between the Cotter Road and EWA interchanges Preliminary microsimulation modelling was utilised to identify what was likely to provide the best operational performance for the Parkway given the availability information at this stage of the design development process.
		Constructability	As the additional northbound lane is generally offline in the southern region of the upgrade, construction is considered likely to be conventional as the majority of work can be undertaken away and independent of the existing operating carriageway. However, the northern zone of the upgrade will require carriageway widening adjacent to operating traffic lanes and will require ongoing traffic management and likely reduced speed zones for substantial durations. Whilst widening of this type is not unusual on significant urban motorways nationally, it is likely to cause disruption to northbound movements on the Tuggeranong Parkway.
Structures	There are three notable structures that are impacted as part of the proposed works. These include: - **Molonglo River Bridge** – Duplication of the existing 190m Molonglo River Bridge, providing the northbound carriageway on the new bridge and dedicating the existing bridge to southbound movements. - **National Zoo and Aquarium underpass** – There is an existing approx. 15m span concrete pedestrian underpass bridge between the NAC and the National Zoo and Aquarium. It is anticipated that the bridge will require widening to the west accommodate the carriageway widening associated with the additional northbound lane. - **Lakeside interchange bridge** – To accommodate the necessary run out area immediately downstream of the proposed northbound mainline merge at the Lakeside interchange, widening of the 25 m precast concrete girder bridge and reconfiguration of the associated retaining walls will be required.	Project Interdependencies	Whilst the additional northbound lane is considered required regardless of other upgrades proposed as part of the Corridor Strategy, it is noted that there is a high degree of interdependence with other proposed upgrades, including: - **SW2 - East West Arterial Interchange** – The EWA Interchange significantly changes traffic patterns on the Tuggeranong Parkway and influences the operation and need additional lane. Furthermore, the layout of the interchange upgrade impacts the geometric requirements of the additional northbound lane. - **SW3 - Southbound Auxiliary Lane** – The southbound auxiliary lane impacts the feasibility of carriageway and bridge widening, and will influence decisions associated with northbound carriageway realignment. - **SW10 - Cotter Road Upgrade Interchange** – The additional capacity provided by the third northbound lane on the Tuggeranong Parkway improves the performance of the mainline, the Cotter Road entry ramp, and the ramp terminal intersection, impacting on the requirements associated with the Cotter Road Interchange upgrade.

Upgrade	SW1 – Additional Northbound Lane	Location	Tuggeranong Parkway	Estimate Cost	$132M	Sheet	2 of 2

Option Details

The upgrade was developed to enhance operational performance of the corridor between Cotter Road and the Lakeside interchanges. The upgrade consists of the following primary alterations:

- **Carriageway realignment** – To accommodate the future provision of the EWA interchange, and the required capacity between the two interchanges, three lanes are required in each direction between the EWA and Cotter Road. Previous investigation of the EWA concluded that provision of a new northbound bridge was more appropriate than attempting to widen the existing bridge, given the nature of the existing structure. To accommodate the new bridge, realignment of the northbound carriageway is proposed from the Cotter Road Interchange entry ramp to beyond the EWA Interchange northbound entry ramp merge. This realignment allows for provision of a median (nominally 9 m) consistent with the vision for the corridor, and future reconfiguration of the existing carriageway from two lanes in each direction to three southbound lanes with full width shoulders (refer upgrade Package SW3).
- **Carriageway Widening** – Between the EWA northbound entry ramp and the Lakeside Interchange, the northbound mainline carriageway returns to the existing alignment and the additional third lane is provided through widening of the existing formation by the width of one lane. This will require fill embankment in several locations (2H:1V) and a steep cutting batter face thorough the existing cutting to the south of the Lakeside Interchange.
- **Ramp Configurations** – The third northbound lane is initiated through a lane add from the Cotter Road Interchange entry ramp, thus avoiding the need for a merge on entry. This configuration does however create the need for a weave manoeuvre from the mainline through lanes to the EWA exit ramp. Ramps associated with the EWA have conventional merge and diverge arrangements and are considered in more detail in Upgrade Package SW2. A conventional diverge has been provided at the Lakeside Interchange exit ramp, with the lane drop provided immediately downstream of the diverge nose.



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Upgrade	SW2 – East West Arterial Interchange	Location	Tuggeranong Parkway	Estimate Cost	$138M	Sheet	1 of 2

Problem Statement

The need for the EWA interchange has been generated by the broader requirement for an additional access into the Molonglo Valley District identified in several preceding studies. As such, the EWA is assumed in future year base network by the ACT Government. The proposed interchange connects the EWA (and the Molonglo Valley road network) to the external trunk road system via the Tuggeranong Parkway, providing the required additional access. Without this connection, forecast traffic volumes in the Molonglo valley suggests that the road network in the district will fail by 2041. If the EWA interchange is not built, it is expected that all access/egress points will operate well over their expected capacities in the 2041 AM and PM peak periods.

Site Description

The upgrade is proposed on the Tuggeranong Parkway immediately north of the Molonglo River, and is situated on the eastern boundary of the Molonglo Valley District. The proposed East West Arterial (EWA) is a greenfield road development that will provide access the eastern portion of the future Molonglo Valley development, John Gorton Drive, and the Molonglo Town Centre. The EWA has been identified as a key element of the District's transport infrastructure and is forecast to convey significant traffic volumes in both peak periods.

The Tuggeranong Parkway at the proposed interchange is a freeway condition dual carriageway with two lanes in each direction. The proposed interchange site footprint extends from immediately north of the Molonglo River Bridge north along the Parkway for approximately 1.3km, in addition to 150m east and 350 west of the Tuggeranong Parkway.

There are several notable features / constraints along the site that impact the proposed upgrade. These key features of the site include:

- **Molonglo River Bridge** – The proximity of the bridge provides a southern constraint to the interchange layout.
- **Cotter Road Interchange** – The proximity of the interchanges creates operational challenges to ensuring efficient mainline flow is maintained during peak periods.
- **National Arboretum Canberra (NAC)** – The NAC plantings and boundary prevent the interchange being sited any further north to what is currently proposed. Further, planting associated with the NAC is within the Tuggeranong Parkway road reserve and may be impacted by the upgrade

The terrain surrounding the site is rolling with various landscape types including a range of arboretum plantings in addition to pine plantation. The land uses surrounding the corridor are generally recreational including the National Arboretum Canberra and the National Zoo and Aquarium.

Project Interdependencies

There is a high degree of interdependence between the EWA interchange and other proposed upgrades included in the South West Corridor Strategy:

- **SW1 - Additional Northbound Lane** – Without the provision of the additional northbound lane proposed in SW1, it is expected that there will be insufficient capacity between the two interchanges for the mainline or the interchanges to operate without failure. The alignment of the northbound Tuggeranong Parkway mainline proposed in SW1 is adjusted to suit the interchange and impacts on interchange geometry.
- **SW3 - Southbound Auxiliary Lane** – Without the provision of this auxiliary lane proposed in SW3, it is expected that there will be insufficient capacity between the two interchanges for the mainline or the interchanges to operate without failure.

It is anticipated that the delivery of these two upgrades will be required to facilitate the EWA interchange.

Public Transport

There are currently no public transport services that use the Tuggeranong Parkway in the region of the upgrade. Furthermore, it is understood that there are currently no plans to introduce new public transport services into this part of the corridor. Similarly, it is understood from previous discussions with TCCS, whilst Public Transport is projected to use the EWA, it is likely to route into the Molonglo 3 East precinct and is unlikely to use the EWA interchange. As such, it is considered unlikely that the upgrade will have substantive implications for public transport operations within the corridor.

Active Travel

There are currently no active travel facilities on the Tuggeranong Parkway for the length of the proposed upgrade site. The Molonglo to City Cycle Highway is proposed for the corridor, and if progressed, may potentially cross the corridor at the East West Arterial Interchange. The location and alignment of the of the Cycle Highway is yet to be determined, however is considered likely to be incorporated into the interchange arrangement including grade separation of cycle movements and widening of the Tuggeranong Parkway overbridge to accommodate the Cycle Highway.

Safety

The upgrade creates a new interchange on the Tuggeranong Parkway where there is not one currently. As such, there are several new conflict points and vehicle interactions that will be introduced into the corridor, creating crash potential. It is noted however that anticipated operational efficiency of the proposed arrangement, the free flow nature of all interchange ramps, and the extended southbound auxiliary lane (refer Package SW3) that facilities weaving are considered likely to offer a better safety performance than alternative arrangements for the interchange.

Similarly, failure to provide the EWA interchange would divert traffic flow to other parts of the network that have less capacity to manage increased volumes, and would by extension be expected to result in worse safety outcomes than would be achieved by providing EWA interchange.

Constructability

As the EWA Interchange will require construction of a new interchange in and around an operational key transport route, constructability will be a key consideration for the delivery of this upgrade. Some key construction considerations associated with the interchange include:

- The majority of all interchange ramps can be constructed off line and without disruption to network operation
- Ramp merge and diverse locations interface with the mainline and will impact on Tuggeranong Parkway operation / require traffic management. The number of interfaces with the live Tuggeranong Parkway will depend on the delivery staging of other upgrade packages, namely SW1 and SW3.
- Given current demand on the Tuggeranong Parkway, it is considered unlikely that the corridor will operate to an appropriate level of service under single carriageway contraflow conditions during peak periods. As such, peak period carriageway closure on the Tuggeranong Parkway during construction does not appear feasible and construction of the interchange bridges over the mainline will require nightworks / closures for girder installation.

It is noted that there is potential for improved construction and scope efficiencies in the current layout that will require investigation as part of value management activities in future design phases of the project, which may result in more optimal construction outcomes (noting that it may require design compromises). Similarly, there may be delivery efficiencies associated with combining the project with other related upgrade packages.

Structures

A single, two span bridge over the Tuggeranong Parkway is proposed as part of the interchange. Notional span lengths of approximately 30-35 m inclusive of a central median pier will provide sufficient spatial allowance for a median, mainline through lanes, auxiliary ramp lanes, shoulders and spill through abutments. The bridge will be wide enough to accommodate three running lanes (2 x southbound entry ramp lanes + 1 x southbound exit ramp lane), shoulders, a narrow median and potentially the Molonglo to City Cycle Highway (4m path + 2 x 1m shoulders).

It is noted that structural bridge design has not been undertaken as part of the development of this Corridor Strategy. However, for the purpose of identifying potential order of capital costs, it has been assumed that the bridge will utilise precast concrete super-T girders and in-situ concrete decking for its superstructure. The bridge construction method will need to allow live traffic operations under and around the construction site.

In addition, the EWA alignment crosses over the existing River Road alignment. Consistent with the previous EWA Feasibility Study, it is proposed to provide a concrete box culvert 6 m wide by 3.5 m high structure to maintain a grade separated underpass in this location that will allow passage for emergency vehicles.

Upgrade	SW2 – East West Arterial Interchange	Location	Tuggeranong Parkway	Estimate Cost	$138M	Sheet	2 of 2

Options Considered

Several potential interchange options were considered as part of the Molonglo East-West Arterial Road Feasibility Study undertaken in the 2021. These options included:

- Free flow ramps including loop ramp
- Direct free flow ramps
- Diamond interchange
- Free flow ramps including teardrop loop ramp

Free Flow Ramps including Loop Ramp

All ramps / movements at the interchange operate with a free flow condition. The southbound entry ramp is a conventional minimum radius loop ramp, with all other ramps direct ramps between the EWA and the Tuggeranong Parkway. The arrangement provides limited southbound distance between the EWA interchange entry ramp and Cotter Road Interchange exit ramp noses.

Direct Free Flow Ramps

All ramps / movements at the interchange operate with a free flow condition. All ramps are direct ramps between the EWA and the Tuggeranong Parkway, requiring a triple deck arrangement for the interchange. The arrangement provides minimal southbound distance between the EWA interchange entry ramp and Cotter Road Interchange exit ramp noses.

Diamond Interchange

All ramps / movements at the interchange are controlled at the ramp terminals by signals. The arrangement provides minimal southbound distance between the EWA interchange entry ramp and Cotter Road Interchange exit ramp noses.

Free Flow Ramps incl. Teardrop Loop Ramp

All ramps / movements at the interchange operate with a free flow condition. The southbound entry ramp is a teardrop shaped loop ramp, with all other ramps direct ramps between the EWA and the Tuggeranong Parkway. The elongated loop ramp provides additional southbound distance between the EWA interchange entry ramp and Cotter Road Interchange exit ramp noses to improve mainline operation.

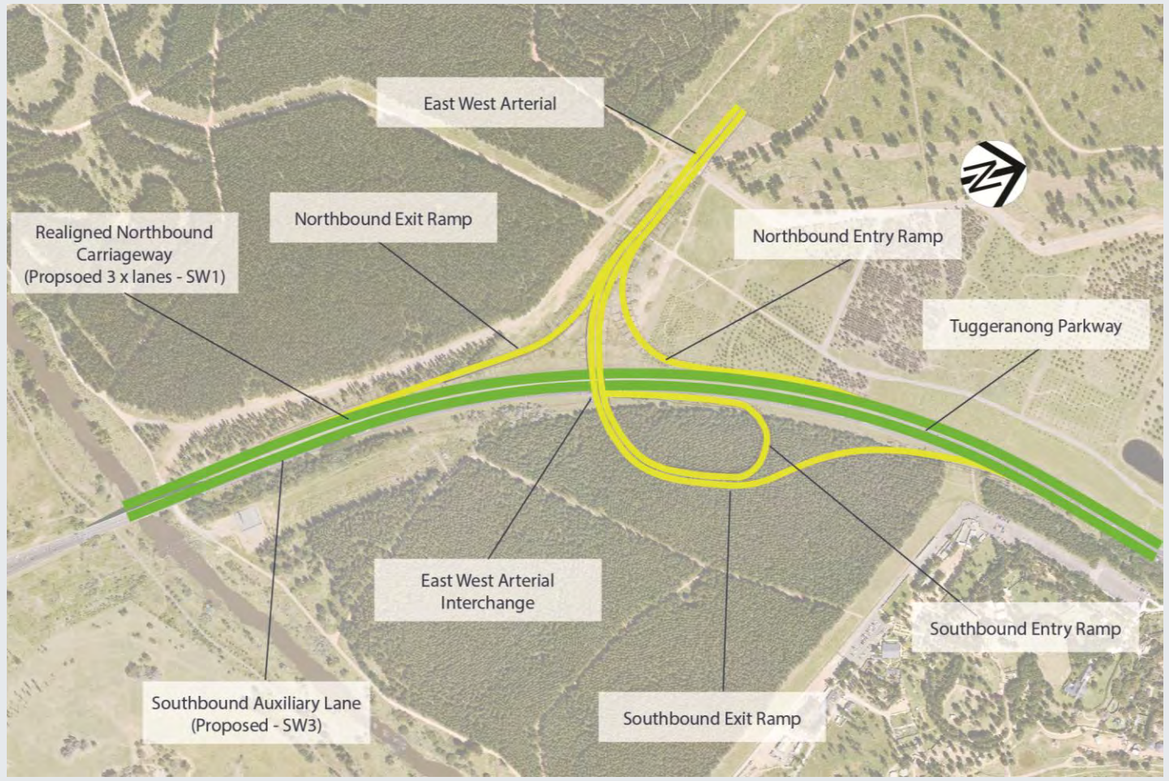
Option Details

The upgrade configuration was developed to provide efficient interchange between the existing Tuggeranong Parkway and the proposed EWA. The interchange consists of the following primary elements:

- **Northbound Exit Ramp** – The single lane ramp from the Tuggeranong Parkway utilises an auxiliary lane that allows deceleration to the proposed posted speed. It is noted that if the northbound weave between the Cotter Road and EWA interchanges is identified as an issue in future phases of design development, consideration could be given to converting this ramp to a two lane ramp with a simple diverge for the second lane increasing the weave length between interchange ramps. Alternatively an upgrade of the Cotter Road interchange with a conversion of the northbound entry ramp to a south facing loop ramp could also be considered to increase the distance between interchange noses.
- **Northbound Entry Ramp** – The single lane ramp to the Tuggeranong Parkway utilises a standard merge arrangement with a short auxiliary lane that facilitates acceleration to the mainline operating speed. Due to the constraints of the NAC boundary, a tight horizontal curve is proposed on this ramp. Curve warning signs such as chevron alignment markers may be required to alert drivers of the deficient geometry.
- **Southbound Exit Ramp** – The single lane ramp from the Tuggeranong Parkway utilises a diverge arrangement with an auxiliary lane that allows deceleration to the proposed posted speed. Consistent with Austroads guidance for exit ramps over 600m in length, an overtaking lane has been provided on the ramp. However, noting the low expected heavy vehicle volumes on this ramp, there may be an the opportunity to consider removal of this overtaking lane in value management exercises associated with future phases of design development.
- **Southbound Entry Ramp** – The two-lane free-flow entry loop ramp is a continuation of the eastbound EWA mainline and conveys a high volume of movements from the EWA to Cotter Road. It is noted that mainline carriageways that feed directly into loop ramps can be hazardous as there is a high risk that approach speeds may be excessive for the loop ramp radii. For this reason, an intermediate speed curve (ie design speed that is lower than the EWA mainline, but higher than the ramp loop) has been introduced upstream of the loop to control approach speeds. A tangent between this curve and the loop has been provided to ensure that these successive curves don't operate as compound curves.

  The loop ramp adopts the minimum radius stipulated in the guidelines with two lanes proposed on the loop ramp that merge downstream of the exit tangent point in order to maintain ramp capacity through the loop. A teardrop shape for the loop ramp has been adopted in an effort to maximise the weave length between the EWA and the Cotter Rd interchange. The entry ramp enters the Tuggeranong Parkway Mainline as a lane add that forms the southbound auxiliary lane proposed in the SW3 package.

It is noted that if the south weave between the EWA and Cotter Road and interchanges becomes problematic as volumes increase beyond the Strategy horizon, consideration could be given to an upgrade of the Cotter Road interchange with a conversion of the southbound exit ramp to a south facing loop ramp in order to increase the distance between interchange noses.



Upgrade	SW3 – Southbound Auxiliary Lane	Location	Tuggeranong Parkway	Estimate Cost	$13M	Sheet	1 of 2

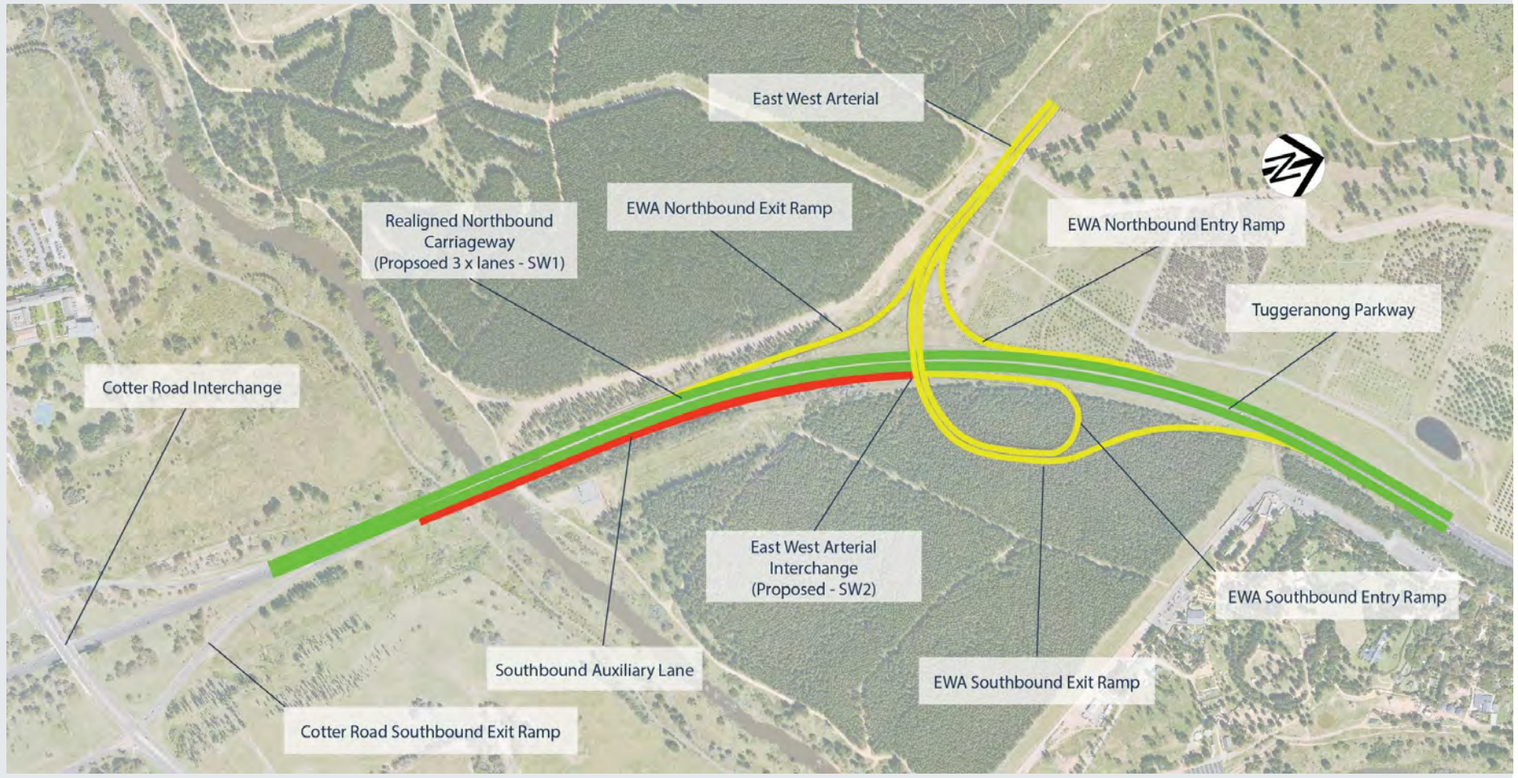
Problem Statement	The need for the EWA Interchange has been generated by the broader requirement for an additional access into the Molonglo Valley District identified in several preceding studies. The EWA Interchange connects the EWA (and the Molonglo Valley road network) to the external trunk road system via the Tuggeranong Parkway, providing the required additional access. Without this connection modelling of forecast traffic volumes in the Molonglo valley suggests that the road network in the district will fail. The proposed southbound auxiliary lane is required to ensure that the EWA Interchange and southbound mainline carriageway operates appropriately in the context of the forecast demand. The additional capacity required on Tuggeranong Parkway is linked to the construction of the EWA interchange.	Public Transport	There are currently no public transport services that use the southbound carriageway of the Tuggeranong Parkway in the region of the upgrade. Furthermore, it is understood that there are currently no plans to introduce new public transport services into this part of the corridor. As such, it is considered unlikely that the upgrade will have substantive implications for public transport operations within the corridor.
Site Description	The upgrade is proposed on the Tuggeranong Parkway southbound carriageway between the proposed EWA Interchange and the existing Cotter Road interchange, being situated on the eastern boundary of the Molonglo Valley District. The proposal is intended to facilitate the delivery of the East West Arterial. The proposed EWA is a greenfield road development that is independent of the South West Corridor Strategy, and will provide access the eastern portion of the future Molonglo Valley development, John Gorton Drive, and the Molonglo Town Centre. The EWA has been identified as a key element of the District's transport infrastructure and is forecast to convey significant traffic volumes in both peak periods. The Tuggeranong Parkway for the length of the 1.5 km site is a freeway condition dual carriageway with two lanes in each direction. There are several notable features / constraints along the site that impact the proposed upgrade. These key features of the site include: - **Molonglo River Bridge** – The proposal utilises the existing Tuggeranong Parkway Bridge over the Molonglo River. The dimensions and configuration of the bridge are a constraint on the proposed upgrade. It is noted however, that the project relies on duplication of this bridge as part of the SW1 upgrade. - **Cotter Road Interchange** – The proximity of the two interchanges (EWA and Cotter Road) creates operational challenges to ensuring efficient mainline flow is maintained during peak periods. - **National Arboretum Canberra (NAC)** – The NAC plantings and boundary impact on the northbound carriageway realignment which the southbound auxiliary lane proposal relies on. Planting associated with the NAC is within the Tuggeranong Parkway road reserve and may be impacted by the collective EWA related upgrades. The terrain surrounding the site is rolling with various landscape types including a range of arboretum plantings in addition to pine plantation. The land uses surrounding the corridor are generally recreational including the National Arboretum Canberra and the National Zoo and Aquarium. 	Active Travel	There are currently no active travel facilities on the Tuggeranong Parkway for the length of the proposed upgrade site. The Molonglo Cycle Highway is proposed for the corridor, and if progressed may potentially cross the corridor at the East West Arterial Interchange. The location and alignment of the of the Cycle Highway is yet to be determined, however is considered likely to be independent of the southbound auxiliary lane.
		Safety	The upgrade is primarily focussed on capacity and performance improvements, however it is considered likely that crashes at the existing interchange associated with the southbound diverge at the Cotter Road Interchange and queuing on the southbound ramp will be reduced by the proposed upgrade arrangement. The safety improvements generated by the upgrade are expected to be realised as a result of: - The provision of a southbound lane add (the auxiliary lane) from the EWA Interchange, avoiding the need for a merge of interchange traffic onto the mainline. - Provision of a trapped exit lane add (the auxiliary lane) to the Cotter Road interchange, avoiding the need for a diverge manoeuvre from the mainline to the ramp and potential mainline deceleration.
		Options Considered	In order to increase capacity of the southbound carriageway of the Tuggeranong Parkway, and ensure that the mainline and EWA Interchange operates without failure, the provision of a third southbound lane between interchanges was investigated. The provision of this auxiliary lane is the primary element of the upgrade, although several variations of the additional lane configuration were considered, including: - Merge options at the EWA interchange entry ramp - Diverge options at the Cotter Road interchange exit ramp, including a lane drop downstream of the nose Preliminary microsimulation modelling was utilised to identify what was likely to provide the best operational performance outcome for the Parkway given the available information at this stage of the design development process.
		Constructability	Provision of the southbound auxiliary lane is expected to require relatively minor new construction. However, works including central median rigid barrier removal, new pavement regulation courses and surfacing, and line marking and signage will be required on the existing carriageway to accommodate the upgrade. As such, traffic management will be required to facilitate construction, likely involving contraflow use of the proposed realigned northbound carriageway and / or nightworks.
Structures	The proposed upgrade is not anticipated to require any new structures. Reconfiguration of the Tuggeranong Parkway mainline carriageways will be required to accommodate the southbound auxiliary lane, and minor works are expected to be required on the Molonglo River Bridge to accommodate the proposed reconfiguration, including removal of the central median rigid concrete barrier. It is assumed that this bridge has a single crossfall on the deck (to be confirmed in future phases of design development).	Project Interdependencies	There is a high degree of interdependence between the southbound auxiliary lane and two other proposed upgrades included in the South West Corridor Strategy: - **SW1 - Additional Northbound Lane** – The current southbound auxiliary lane proposal relies on the provision of the additional northbound lane and the associated realignment of the northbound carriageway including a new bridge over the Molonglo River to create the spatial allowance for the upgrade. As such it is anticipated that these two upgrades will be packaged and delivered together. - **SW2 - East West Arterial Interchange** – The southbound auxiliary lane facilitates delivery of the EWA interchange, and by extension, the requirement for this upgrade responds to the delivery of the EWA interchange. Furthermore, the southbound auxiliary lane ties into the EWA interchange and therefore is influenced by the interchange configuration and geometry. Again, it is anticipated that these two upgrades will be packaged and delivered together.

Upgrade	SW3 – Southbound Auxiliary Lane	Location	Tuggeranong Parkway	Estimate Cost	$13M	Sheet	2 of 2

Option Details

The southbound auxiliary lane configuration was developed to enhance operational performance of the Tuggeranong Parkway mainline and the EWA and Cotter Road interchanges. The upgrade consists of the following primary alterations:

- **EWA Interchange lane add** – The southbound entry ramp at the EWA interchange transitions from the ramp into a dedicated auxiliary lane, avoiding the need for a merge into the mainline
- **Additional mainline lane** – The southbound auxiliary lane creates an additional (third) southbound lane on the Tuggeranong Parkway. Southbound movements from the EWA interchange entry ramp to the Cotter Road exit ramp (forecast to be a heavy movement) will remain in the auxiliary lane. Southbound mainline vehicles wishing to exit at the Cotter Road interchange are required to diverge into the auxiliary lane, and similarly vehicles wishing to join the mainline from the EWA interchange will need to diverge out of the auxiliary lane. These two competing movements create a weave which influences the required length of the auxiliary lane. Whilst the auxiliary lane length has been maximined for operational efficiency of the mainline and adjacent interchanges, further assessment will be required in future design phases to better understand the likely performance of the weave and auxiliary lane requirements in the context of future traffic patterns. There are also potential efficiencies in infrastructure reuse (pavement, drainage etc) associated with geometric refinement that are to be investigated in future iterations of design development.
- **Cotter Road Interchange** – The southbound auxiliary lane acts as a trapped lane that transitions into the Cotter Road exit ramp.



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Upgrade	SW4a – Hindmarsh Drive Interchange – Interim Solution	Location	Tuggeranong Parkway	Estimate Cost	$7M	Sheet	1 of 2

Problem Statement

Significant queuing and congestion are currently observed in peak periods on several approaches to the interchange. Future year modelling has indicated severe failure of the interchange over the Strategy horizon with particular concerns relating to the PM peak and operation of the westbound access to the northbound entry ramp, and extensive queues generated for this movement.

The safety performance of the interchange is also a concern with a high density of accidents mapped between 2017-2021 at the site on Hindmarsh Dr and on the north facing interchange ramps and associated merge / diverge areas.

Another consideration raised by stakeholders was the footprint of the interchange and development potential of the site. Through early phase consultation of the shortlisting process, the Suburban Land Authority (SLA) noted the desire to develop a solution that will facilitate land release around the interchange.

Site Description

The upgrade is proposed at the Hindmarsh Dr Interchange with the Tuggeranong Parkway on the boundary of the Woden Valley and Weston Creek districts of Canberra. It is currently a service interchange with diamond configuration utilising signalised ramp terminal intersections. Capacity of the interchange is limited by turn lane geometry constraints between ramp terminals and the need for movements to pass through closely spaced signalised intersections in the interchange itself.

The Tuggeranong Parkway at the interchange is a freeway condition dual carriageway with two lanes in each direction. The Parkway mainline flies over Hindmarsh Drive with twin precast concrete girder bridges. Both bridges have two spans of approximately 25m. Hindmarsh Dr is an arterial dual carriageway with three through lanes in each direction and dedicated turn lanes provided to access the Parkway entry ramps.

The interim upgrade project site extends along Hindmarsh Dr between Badimara St in the west through to Launceston St in the east. Hindmarsh Dr is relatively straight and flat through the project site. The site is surrounded by native woodland in and around the interchange, although residential land uses are located in close proximity to the interchange on all four quadrants.

Constructability

Delivery of this upgrade is expected to adopt conventional construction approaches. Some of the works will be online and is likely to adversely impact on the operation of the interchange, however these online works are likely to be a relatively minor component of the upgrade and expected to be a relatively short duration. Works that are likely to impact on operation of the right turn movement onto the northbound Tuggeranong Parkway entry ramp will likely need to be completed outside of peak periods.

Public Transport

Several bus routes currently use the Hindmarsh Drive interchange travelling between the Weston Creek and Woden Districts. Furthermore, as the Woden district is further developed, it is possible that the number of services and service frequency on the Hindmarsh Drive corridor will grow. Whilst no specific public transport enhancements are proposed at the interchange, it is noted that the significant improvement to intersection performance will improve journey times for public transport users.

In addition, should it be identified that public transport services through the interchange would benefit from specific public transport infrastructure such as bus priority features at the intersection, related infrastructure could be included as part of the upgrade. This need and public transport infrastructure inclusion should be considered in future phases of design development of the upgrade.

Active Travel

The existing interchange provides 2.0 m on-road cycle lanes in each direction on Hindmarsh Drive, a 2.5 m shared path in the northern verge and a 1.5m path in the southern verge of Hindmarsh Drive. It is proposed to retain the standard of active travel infrastructure as part of the upgrade. se Active travel facilities are not provided on the Tuggeranong Parkway and its associated interchange ramps.

Access and connectivity of the existing active travel infrastructure at the interchange is considered broadly appropriate given the adjacent land uses. As part of the upgrade, it is proposed to provide an improved, wider path in the southern verge. The westbound on-road cycle lane has also been adapted to suit the reconfigured intersection. No change is proposed to active travel infrastructure in the eastbound direction (both path and on-road cycle lanes). Notwithstanding, the operation of active transport through the interchange will not substantively change as a result of the upgrade.

Safety

The upgrade is primarily focussed on capacity and performance improvements, however it is considered likely that the congestion and queuing on Hindmarsh Dr and the Tuggeranong Parkway are at least in part responsible for the high density of crashes in and around the interchange site between 2017 and 2021, noting that there was fatal accident on the southbound exit ramp. To that end the safety performance of the interchange is expected to be improved by the upgrade, noting that improvements to the capacity of the interchange will reduce queuing on Hindmarsh Dr, reducing the likelihood of rear end accidents.

Options Considered

Acknowledging that the key movement causing failure of the interchange is the westbound right turn into the Tuggeranong Parkway northbound entry ramp, several variants of turn and through lane configurations and storage lengths were tested. The intent of investigating these options was to identify a relatively low-cost / impact upgrade solution that will provide relief in the short term to congestion at the interchange. Upon selection of the adopted configuration, consideration was given to alignment alternatives, including adjustment to the median width / kerb, and realignment of the verge-side kerb inclusive of potential adjustment to the existing spill through batters.

Structures

There is an existing approx. 10m span concrete plank pedestrian underpass bridge immediately to the east of the interchange. It is anticipated that the bridge will require widening, potentially on both sides to accommodate the carriageway realignment associated with the extension of the westbound right turn lane. It is noted that there may be scope to limit the widening of this bridge to one side only, albeit likely accepting provision of slightly non-compliant lane geometry, which will require assessment in future phases of design development.

In addition, the two main interchange bridges utilise stone pitched spill through abutments. It is expected that the realignment of the westbound carriageway will require construction of a low height retaining wall at the toe of the southern abutment batter.

Project Interdependencies

This project is located at a discrete site and is not considered to have any significant interdependencies with any other upgrades identified in the corridor strategy. However, works associated with this interim solution may have minor impacts on the ultimate works. Similarly, the improvement in operational performance provided by the upgrade may delay the need to pursue the ultimate upgrade at the interchange proposed in Package SW4b.

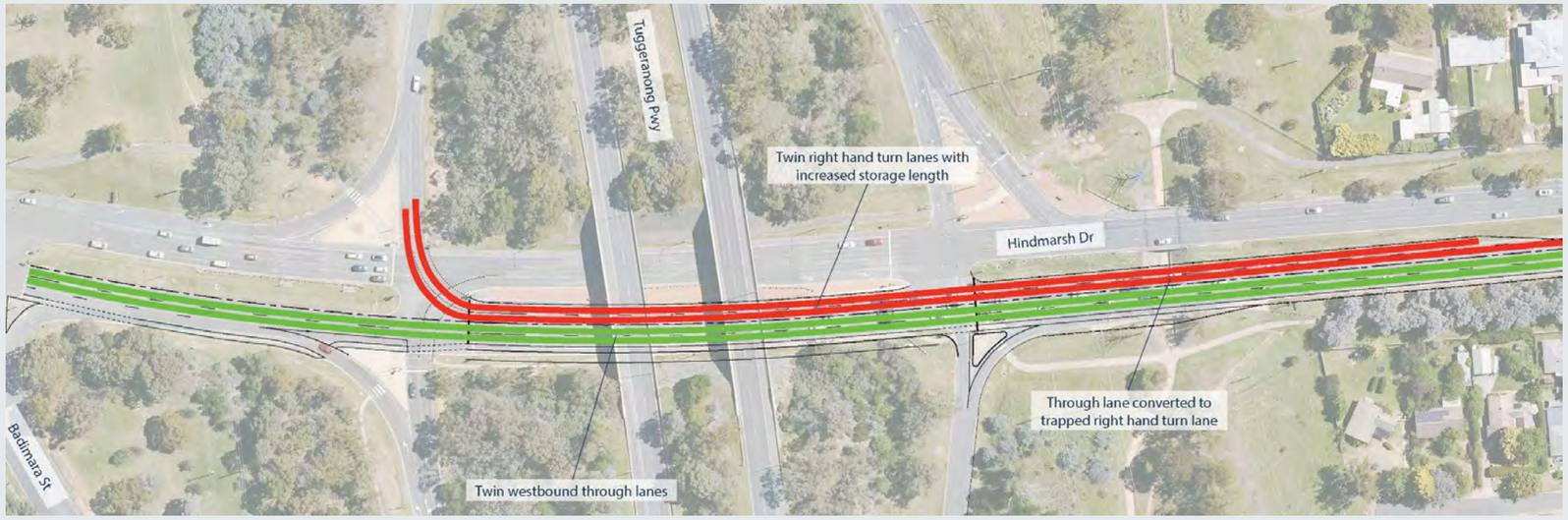
Upgrade	SW4a – Hindmarsh Drive Interchange – Interim Upgrade	Location	Tuggeranong Parkway	Estimate Cost	$7M	Sheet	2 of 2

Option Details

The upgrade configuration was developed to enhance operational performance of the intersection. The interim upgrade of the Hindmarsh Dr interchange consists of the following primary alterations:

- **Westbound Right Turn Movement** – The capacity of the westbound right turn on the Tuggeranong Parkway northbound entry ramp has been significantly increased through:
  - Increased storage length of the right turn slot to 160 m
  - Conversion of the third through lane into a trapped right turn lane

  Intersection geometry will require refinement in future design iterations to avoid any required works on the northbound entry ramp. It is noted however that traffic modelling indicated that improvements to the northbound entry ramp may be required to improve the efficiency of the merge zone and ensure continuing acceptable performance of the interchange in the PM peak prior to implementation of the ultimate upgrade of the interchange.
- **Through Lane Reconfiguration** – Analysis indicated that the reduction of westbound Hindmarsh Drive through lanes from three down to two did not compromise operation of the intersection, however allowed reallocation of a lane to the heavy right turn movement.
- **Northbound Exit Ramp Terminal** – The left hand turn at the Tuggeranong Parkway northbound exit ramp terminal has been converted from a priority controlled arrangement into a free flow movement. Whilst this is anticipated to improve performance of the left turn movement, future iterations of modelling and design development will need to ensure that the weave movement of left turning vehicles onto Badimara St will operate safely and efficiently, noting that future analysis may find that a high angle entry at this location is a more appropriate solution.



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Upgrade	SW4b – Hindmarsh Drive Interchange – Ultimate Upgrade	Location	Tuggeranong Parkway	Estimate Cost	$203M	Sheet	1 of 2

Problem Statement

Significant queuing and congestion are currently observed in peak periods on several approaches to the interchange. Future year modelling has indicated severe failure of the interchange over the strategy horizon with particular concerns relating to the PM peak and operation of the westbound access to the northbound entry ramp, and extensive queues generated for this movement.

The safety performance of the interchange is also a concern with a high density of accidents mapped between 2017-2021 at the site on Hindmarsh Dr and on the north facing interchange ramps and associated merge / diverge areas.

Another consideration raised by stakeholders was the footprint of the interchange and development potential of the site. Through early phase consultation of the shortlisting process, the Suburban Land Authority (SLA) noted the desire to develop a solution that will facilitate land release around the interchange.

Site Description

The upgrade is proposed at the Hindmarsh Drive interchange with the Tuggeranong Parkway on the boundary of the Woden Valley and Weston Creek districts of Canberra. It is currently a service interchange with diamond configuration utilising signalised ramp terminal intersections. Capacity of the interchange is limited by turn lane geometry constraints between ramp terminals and the need for movements to pass through closely spaced signalised intersections in the interchange itself.

The Tuggeranong Parkway at the interchange is a freeway condition dual carriageway with two lanes in each direction. The Parkway mainline flies over Hindmarsh Drive with twin precast concrete girder bridges. Both bridges have two spans of approximately 25m. Hindmarsh Drive is an arterial dual carriageway with three through lanes in each direction and dedicated turn lanes provided to access the Parkway entry ramps.

The project site extends along Hindmarsh Drive between Badimara Steet in the west through to Launceston Street in the east. The upgrade also proposes adjustments to the Tuggeranong Parkway mainline and interchange ramps between ramp tapers.

Hindmarsh Drive is relatively straight and flat through the project site, and the Tuggeranong Parkway navigates rolling terrain. Whilst the site is surrounded by native woodland in and around the interchange, it is noted that residential land uses are located in close proximity to the interchange on all four quadrants.

Project Interdependencies

This project is located at a discrete site and is not considered to have any significant interdependencies with any other upgrades identified in the corridor strategy.

In response to queries by the SLA, it is noted that the compact nature of the proposed solution facilitates potential land release around the interchange by liberating developable urban infill parcels of land. Revenue generated from this land release could potentially be used to offset part of the likely high capital cost of the upgrade.

Public Transport

Several bus routes currently use the Hindmarsh Drive interchange between the Weston Creek and Woden Districts. Furthermore, as the Woden district is further developed, in addition to the potential future provision of light rail services through to Woden as part of the Light Rail Stage 2 project, it is possible that the number of services and service frequency on the Hindmarsh Dr corridor will grow. Furthermore, whilst no specific public transport enhancements are proposed at the interchange, it is noted that improvement to intersection performance will improve journey times for public transport users.

In addition, should it be identified that public transport services through the interchange would benefit from specific public transport infrastructure such as bus priority features at the intersection, related infrastructure could be included as part of the upgrade. This need and public transport infrastructure inclusion should be considered in future phases of design development of the upgrade.

Active Travel

The existing interchange provides 2.0 m on-road cycle lanes in each direction on Hindmarsh Drive, a 2.5 m shared path in the northern verge and a 1.5m path in the southern verge of Hindmarsh Drive. Active travel facilities are not provided on the Tuggeranong Parkway and its associated interchange ramps.

Access and connectivity of the existing active travel infrastructure at the interchange is considered broadly appropriate given the adjacent land uses. As part of the upgrade, it is proposed to improve path cross sections to provide greater amenity and safety for active travellers and to adjust path geometry to suit the revised interchange configuration. Notwithstanding, the operation of active transport through the interchange will not substantively change as a result of the upgrade.

Safety

The upgrade is primarily focussed on capacity and performance improvements, however it is considered likely that the congestion and queuing on Hindmarsh Drive and the Tuggeranong Parkway are at least in part responsible for the high density of crashes in and around the interchange site between 2017 and 2021, noting that there was fatal accident on the southbound exit ramp. To that end the safety performance of the interchange is expected to be improved by the upgrade, noting:

- The upgrade is expected to alleviate AM peak queuing on the southbound exit ramp, reducing the likelihood of queuing back into the mainline, and decreasing the risk of high speed differential rear end accidents.
- Improvements to the capacity of the interchange will reduce queuing on Hindmarsh Drive, reducing the likelihood of rear end accidents.
- The removal of the northbound reverse curve immediately south of the interchange reduces the likelihood of run off road accidents.
- The removal of central bridge piers on Hindmarsh Drive removes a non-frangible hazard in the road median

Constructability

Constructability is a key concern for the delivery of this upgrade. The project is a significant undertaking and is expected to require a long construction period and will impact on the operation of the network for an extended period of time. To investigate whether the project is constructable with acceptable impacts on network operation, the following basic construction sequencing has been developed:

1) Construct new northbound mainline in existing Tuggeranong Parkway median + new interchange ramps
2) Divert southbound movements onto new carriageway and demolish / rebuild new southbound carriageway and bridge
3) Divert traffic onto final carriageways and demolish existing northbound carriageway

In addition to management of road network operation, and noting the urban nature of the Hindmarsh Drive corridor, construction of the upgrade has the potential to have significant impact on utilities. Coordination with utility authorities will be another key consideration for upgrade of the interchange.

Structures

The existing twin, two span (25m) Tuggeranong Parkway bridges over Hindmarsh Dr will require demolition and replacement with new twin bridges. It is estimated that a single span of approximately 55 m will be required to accommodate the proposed Hindmarsh Dr intersection configuration, with an assumed superstructure depth of approximately 2.7m.

It is noted that structural bridge design has not been undertaken as part of the development of this Corridor Strategy, however for the purpose of identifying potential order of capital costs it has been assumed that the bridge will have post tensioned concrete box girder superstructure. The bridge construction method will need to allow live traffic operations under and around the construction site.

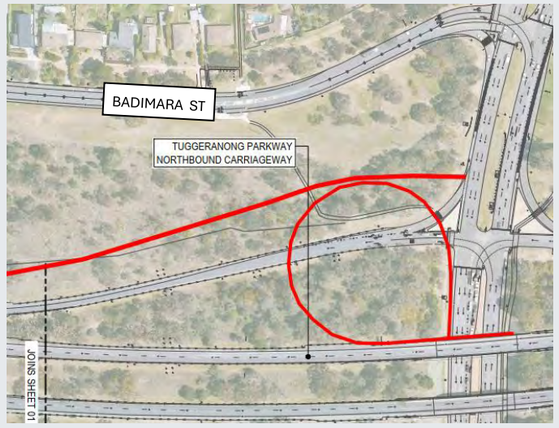
Upgrade	SW4b – Hindmarsh Drive Interchange – Ultimate Upgrade	Location	Tuggeranong Parkway	Estimate Cost	$203M	Sheet	2 of 2

Options Considered

Several potential upgrade options were considered to provide a long term solution to the identified performance issues at the Hindmarsh Dr interchange. The considered options included:

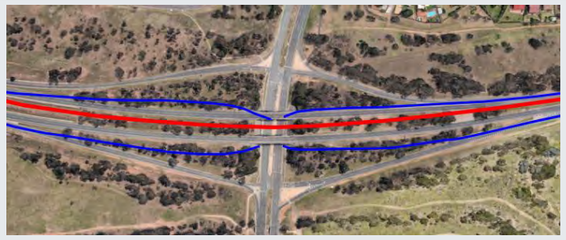
Free flow ramps including loop ramp

- Loop ramp
- Single Point Urban Interchange
- Direct Ramp



Loop ramp

Whilst a two lane westbound to northbound loop ramp was considered likely to provide sufficient capacity to manage PM peak volumes, and noting that it is likely lower cost than other options, there were concerns around the resultant intersection proximity to Badimara Street, the performance of the ramp in the context of anticipated demand, operational safety of the ramp, and safe access / conveyance of active travellers in the southern verge of Hindmarsh Drive. It is noted that a potential variant of this option would be to terminate the northbound exit ramp at an intersection with Badimara Street, removing the proximity issues between intersections, although potentially creating complications with the traffic mix on Badimara Street and an increase in crash potential. It also noted that this option increases the footprint of the interchange.



Single Point Urban Interchange

A SPUI (similar to the Belconnen Way Interchange – pictured below) appears likely to provide the required performance outcomes for the interchange within a compact site footprint. This solution however requires a complete interchange reconfiguration with a significant capital expenditure commitment required and complex construction staging.

Direct Ramp

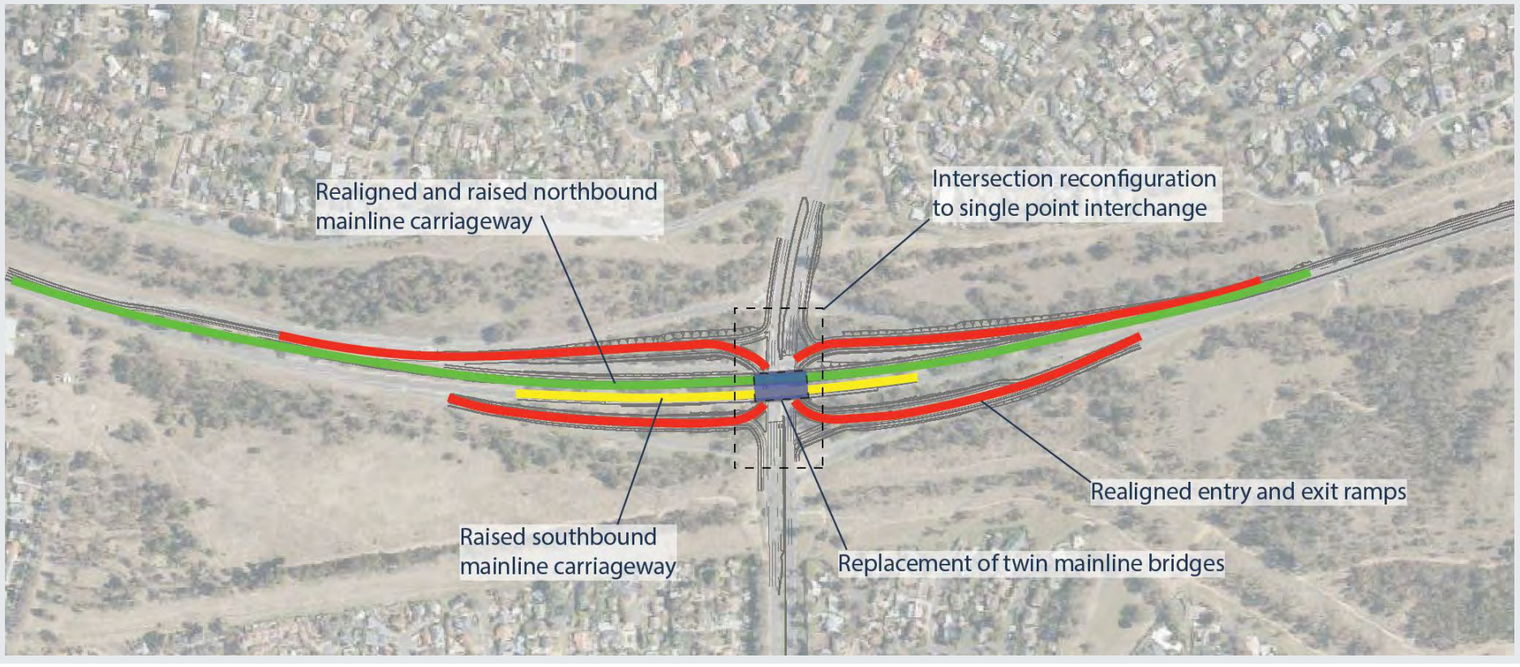
A direct westbound to northbound onload ramp was considered likely to provide sufficient capacity for the PM peak demand. However the ramp would require a three-level interchange with a significant length of structure including high skews / long span lengths. This approach would attract high capital expenditure and has potential urban design and community concerns given its residential site context.

Option Details

The upgrade configuration was developed to enhance operational performance of the intersection. The upgrade of the Hindmarsh Drive Interchange consists of the following primary alterations:

- **Intersection reconfiguration** – The ramp terminal intersections will be rationalised into a fully signalised Single Point Urban Intersection (SPUI) with dedicated left and right turn lanes designed to provide sufficient capacity to meet peak hour demand to 2051 and beyond.
- **Ramp realignment –** In order to achieve the necessary geometry of the SPUI intersection, realignment of all exit and entry ramps was required. This realignment has resulted in a tighter layout for the interchange with a more compact footprint, necessitating the use of retaining walls.
- **Mainline realignment** – In order achieve the necessary geometry of the SPUI intersection, horizontal realignment of the northbound mainline carriageway was also required. This realignment has been proposed in the median in a manner that would allow off-line construction of the proposed northbound bridge. It is noted that the southern tie-in of the alignment is proposed to be located to address an adverse reverse curve immediately to the south of the exit ramp diverge.

  Both carriageways of the mainline also require vertical realignment to accommodate a deeper superstructure associated with the increased span length of bridges at the interchange.



Upgrade	SW5 - Tuggeranong Parkway VSLS & VMS Upgrades	Location	Tuggeranong Parkway	Estimate Cost	$12M	Sheet	1 of 2

Problem Statement

In 2020-21 the ACT Government commissioned a study into a Tuggeranong Parkway Variable Speed Limit System and Travel Time / Variable Message Signs. An Options Design Report identified the following targeted outcomes as a result of the Intelligent Transport System (ITS) project for various elements:

- **Variable Speed Limit Signs (VSLS) –**
  - Maintaining appropriate speeds
  - Increased safety
  - Improved traffic flow reliability and safer driving behaviour
  - Community satisfaction due to a decrease in traffic delays
- **Variable Message Signs (VMS)** – Whilst no specific VMS related objectives are identified in the VMS/VSLS Study, it is noted that the project incorporates VMS infrastructure on eastbound and southbound approach to the Cotter Road Interchange as part of the broad approach to ITS in the corridor.

Site Description

The proposed upgrade applies to 4.5 km of the Tuggeranong Parkway from the Heysen Street overbridge to the Lakeside Interchange (Forest Drive / National Arboretum Canberra access). The existing carriageway provides free flow motorway conditions for the length of the project site. The site provides two continuous lanes through a curvilinear alignment over its length with a posted speed of 100 km/h over the extent of the site. The carriageway generally has full width nearside shoulders, but has minimum width median shoulders with a continuous central concrete barrier. In addition to the mainline carriageway, the site includes four interchange ramps at the Cotter Road interchange that cater to all movements.

There are several notable features / constraints along the site that impact the proposed upgrade. These key features of the site include:

- **Molonglo River** – The existing carriageway crosses the Molonglo River with a multi-span concrete bridge approximately 190 m in length that was recently strengthened
- **National Zoo and Aquarium underpass** – A short underpass bridge providing pedestrian access between the Zoo and National Arboretum Canberra that was recently strengthened
- **National Arboretum Canberra (NAC)** – Planting associated with the NAC is within the Parkway road reserve

The terrain surrounding the site is rolling with various landscape types including native woodland, a diverse range of arboretum plantings, in addition to pine plantation. The land uses surrounding the corridor are generally recreational including the National Arboretum Canberra and the National Zoo and Aquarium.

Project Interdependencies

There is a high degree of interdependence between the proposed VSLS/VMS infrastructure and three other proposed upgrades included in the South West Corridor Strategy:

- **SW1 - Additional Northbound Lane** – The alignment of this northbound carriageway proposed in the SW1 package will impact the set out of much of the proposed ITS infrastructure if it is constructed concurrently or after SW1. Conversely, if constructed prior the provision of the SW1 upgrade, it is expected that much of proposed ITS infrastructure will require relocation.
- **SW2 - East West Arterial Interchange** – The EWA interchange provides a new point of access to the Tuggeranong Parkway. As such additional ITS infrastructure will be required at the interchange to ensure that vehicles entering the mainline are doing so at the same speed as the main stream flow. Furthermore, as a decision point on the corridor, exit ramps may also require upstream VMS to allow motorists to make informed journey decisions.
- **SW3 - Southbound Auxiliary Lane** – The southbound auxiliary lane provides an additional lane between the EWA and the Cotter Road Interchange. The change in lane numbers resulting from this upgrade will influence the proposed configuration of ITS components.

Public Transport

There are currently no public transport services that use the Tuggeranong Parkway north of Cotter Road, and it is understood that there are currently no plans to introduce new public transport services into this part of the corridor.

Two bus services utilise the corridor through the proposed VMS site near the Heysen Street overpass, however these services are considered unlikely to be substantively impacted by the operation of the VMS. As such, it is considered unlikely that the upgrade will have implications for public transport operations within the corridor.

Active Travel

There are currently no active travel facilities on the Tuggeranong Parkway for the length of the proposed upgrade site. The Molonglo to City Cycle Highway is proposed for the corridor, and if progressed may potentially cross the corridor at the East West Arterial Interchange. The location and alignment of the of the Cycle Highway is yet to be determined, however is considered likely to be independent of any ITS infrastructure or its operation.

Structures

It is not expected that the provision of VMS and VSLS infrastructure will impact any existing structures or require any major new structures. However, ancillary structures will be required in the upgrade, noting that that the VMS/VSLS Study identifies gantry structures as the preferred approach to mount VSLS signage on the Tuggeranong Parkway mainline and a cantilever structure to mount the electronic VMS sign on the Tuggeranong Parkway northbound approach to the Cotter Road interchange.

Safety

The Tuggeranong Parkway between Heysen Street and the Lakeside Interchange experiences numerous crashes. The provision of ITS infrastructure in the corridor is intended to improve the crash performance of the corridor in this region. The upgrade proposes to provide drivers with real time information on network operation in addition to implementing variable speed limits to control mainline flow both in peak periods and in response to planned or emergency traffic management. In doing this, ITS infrastructure is expected to improve safety by:

- Allowing drivers to divert off the corridor, reducing congestion during planned and emergency closures, and by extension:
  - Reduce the potential for rear end accidents at the tail of queues
  - Reduce exposure of emergency service personnel and works crews to passing vehicles
- Managing the speed environment to improve flow during peak periods and reduce speed differentials between vehicles
- Managing the speed environment during planned maintenance and emergencies to:
  - Reduce the potential for rear end accidents at the tail of queues
  - Reduce approach speeds to emergency and work sites in order to create a safer work environment for emergency service personnel and works crews
- Utilising VMS to provide general safety warnings and alerts to drivers and the community to improve awareness of pertinent road safety issues

Furthermore, the potential future use of the proposed ITS infrastructure for lane use management will additionally improve safety for emergency service personnel and work crews during scheduled and emergency lane closures.

Options Considered

The upgrade adopts design recommendations set out in the Tuggeranong Parkway Variable Speed Limit System and Variable Message Sign project, as described in the Options Design Report. The VMS/VSLS Study investigated ITS solutions on the Tuggeranong Parkway between the Heysen Street overpass and the Lakeside interchange, and considered design options that relate to:

- VMS sign locations
- VSLS spacing and location
- VMS and VSLS mounting structure alternatives (posts / cantilever / gantries)

Noting that the VMS/VSLS Study proposed solutions for the existing condition, there has been a need to subsequently consider proposed future upgrades in the corridor and their implications for the proposed ITS infrastructure. To this end, options to adapt the design proposed in the VMS/VSLS Study have been considered in the Corridor Strategy, particularly relating to the introduction of the East West Arterial Interchange (Package SW2) and its implications for the proposed ITS including the need and siting of additional VSLSs.

Constructability

Constructability of the ITS infrastructure will be strongly influenced by its staging and coordination with other upgrade packages. Should VSLS signage and associated structures be delivered as part of other corridor upgrades including SW1 (Additional Northbound Lane), SW2 (East West Arterial Interchange) and SW3 (the Southern Auxiliary Lane), construction will be partly offline and coordinated with other works and associated traffic management, mitigating the impact on road users. However, if delivered prior to (or after) these upgrades, the installation of ITS infrastructure will be immediately adjacent to live traffic and is expected to require traffic management and scheduling of construction works outside peak periods.

Upgrade	SW5 - Tuggeranong Parkway VSLS & VMS Upgrades	Location	Tuggeranong Parkway	Estimate Cost	$12M	Sheet	2 of 2

Option Details

Several elements of ITS infrastructure are proposed in the Tuggeranong Parkway between the Heysen Street overpass and the Lakeside Interchange. The nature, siting and rationale for this infrastructure is broadly derived from the VMS/VSLS Study, noting adaption to suit what is considered likely to be the ultimate configuration of the corridor assuming the delivery of the East West Arterial Interchange and associated works on the Tuggeranong Parkway:

- **Variable Message Sign Infrastructure** – A cantilever mounted VMS is proposed on the northbound carriageway near the Heysen Street overpass in advance of the Cotter Road Interchange exit ramp. This VMS will provide information that will allow drivers to make route choice and other decisions in advance of the interchange.

  In addition to this VMS, the introduction of the EWA Interchange to the corridor has the potential to alter the optimal VMS layout in the corridor. As an additional decision point in the corridor, there may be benefit in providing additional VMS infrastructure on approach to the EWA Interchange, noting the limited distance between it and the Cotter Road Interchange and the challenges this presents for appropriate siting of VMS. It is expected that future iterations of design development will further investigate the need for additional VMS in the corridor.

- **Variable Speed Limit Sign Infrastructure** – Gantry mounted VSLS are proposed on both carriageways:

  1) To the north of the Cotter Road Interchange northbound entry ramp, and
  2) To the south of the Lakeside Interchange southbound entry ramp

  These gantries are spaced at approximately 2.2 km apart and proposed VSLS will provide management of speed zoning between these two points. As noted in the VMS/VSLS Study, the use of gantry mounted VSLS was considered the only alternative that would fully address all the long term ITS objectives of the ACT Government in this part of the corridor. However, it is noted that the proposed provision of a median associated with the Package SW1 would allow for the installation of post mounted VSLS in the median, and it is anticipated that this alternative be investigated in future iterations of design development.

  In addition to VSLS proposed in the VMS/VSLS Study, the introduction of the EWA Interchange to the corridor alters the required VSLS infrastructure required to manage mainline speeds. In particular, speeds at access points from the interchange (ie northbound and southbound entry ramps) will also require VSLS to ensure that variable speed limits are communicated to drivers upon entry to the Tuggeranong Parkway mainline. As such, it is proposed to provide post mounted VSLS on each side of both entry ramps (ie additional 4 x VSLS). Furthermore, in an effort to ensure that mainline and entry speeds from the EWA interchange are consistent, it is proposed to provide a single additional VSLS repeater gantry sited upstream of both entry points, providing approximately a 1km distance between upstream and downstream VSLS gantries, consistent with the desirable spacing outlined in the VMS/VSLS Study Options Report.

- **Lane Use Management** – Whilst the VMS/VSLS Study notes the benefits of a lane use management system on the Tuggeranong Parkway, and the potential upgradability of the proposed gantry mounted VSLS system to accommodate lane use management, the design proposal outlined in the VMS/VSLS Study does not include lane use management. Notwithstanding, the potential for lane use management is recommended for further consideration as part of future phases of design development, noting that the provision of the proposed additional intermediate gantry is expected to further support provision of lane use management.
- **Related ITS Infrastructure** – There is generally additional associated infrastructure required to fully implement VMS and VSLS. Provision of VMS and VSLS on the Tuggeranong Parkway may potentially include the following associated infrastructure:
  - Closed circuit television cameras
  - Detector loops
  - Telecommunication and power system/connections

  It is also noted that provision of VSLS may require changes to the operation of the ACT Traffic Management Centre (TMC) including hours of operation and development of policies / procedures for the operation of VSLS when the TMC is not operating.

Upgrade	SW8 – Drakeford Drive / Athllon Drive / Isabella Drive Intersection Upgrade	Location	Tuggeranong Parkway	Estimate Cost	$36M	Sheet	1 of 1

Problem Statement

There are several issues identified at the intersection that require addressing to achieve the Vision for the South West Corridor, including:

- **Operational Performance –** Congestion is currently an issue at the site during peak periods, and the intersection is forecast to experience significant congestion in the 2031 PM peak and fail in the 2041 PM peak period, leading to significant delays and extensive queueing. The flow failures are worst on the north (southbound) approach with delays in excess of 400 seconds, and the westbound approach with delays in excess of 100 seconds.
- **Safety** – The intersection has a significant crash history with numerous injury and property damage crashes recorded between 2017 and 2021.
- **Active Travel** – The existing roundabout is a relatively large, high speed environment and is an unattractive and unsafe environment for active travellers to traverse the intersection.

Site Description

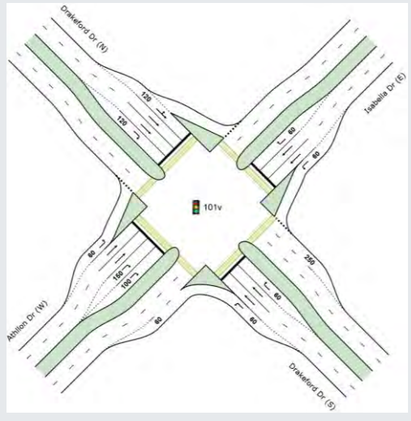
The intersection is located at the crossing of two arterial roads at the southern corner of the Tuggeranong Town Centre. The existing intersection is a large radius roundabout with signalised metering on its eastern and western approaches to manage operation during peak periods. The corridor in this location is a designated B Double route.

All approaches to the intersection are relatively flat, however have horizontal curves in close proximity to the intersection. Whilst there is a residential zone in the south-west quadrant of the intersection, the other quadrants feature parklands / water bodies and are relatively unconstrained with all approaches sitting within a generous corridor. There are however bridges on the northern and western approach that constrain road geometry.

Option Details

The upgrade configuration was developed to enhance operational performance of the intersection. Generally two mainline through lanes are provided on all legs although preliminary traffic modelling indicated that performance was substantially improved by the addition of a third southbound through lane to cater to the PM peak demand.

Through and right turn movements are signal controlled, with turn lanes provided for all right turn movements. The intersection is designed to accommodate double diamond overlap phasing, which provides the best flexibility for unbalanced traffic flows. Left turn movements also have dedicated turn lanes, but are generally priority controlled, with the exception of the northbound left turn which is proposed as a free flow movement with a downstream merge on Athllon Drive.



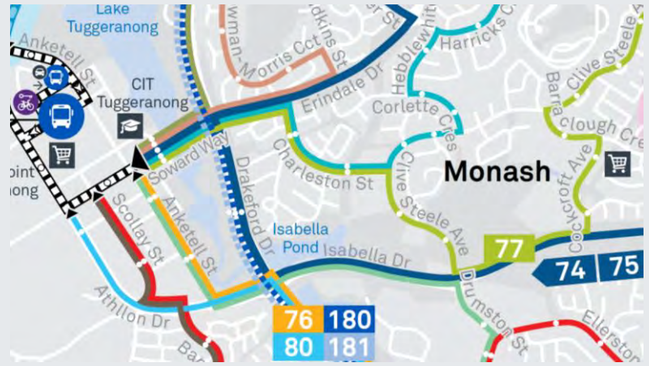
It is proposed to retain the existing speed regime through the intersection, however future phases of design development are expected to identify any necessary changes to posted speed limits, particularly the location of the westbound transition from 80m/h on Isabella Drive to 60km/h on Athllon Drive, including a potential intermediate speed zone on Isabella Drive of 70 km/h.

A recent Infrastructure Study on the Parkes Way corridor (KBR, 2022) indicated that several utilities exist across the site and will require management and potentially relocation or protection during construction. These utilities include underground power, telecommunications, gas, water and potentially infrastructure in addition to stormwater systems.

The design aims to minimise reconstruction of approaches, however future phases of design development should consider minor reorientation of the intersection to remove the skew of approaches, in addition to considering accommodation of the duplication of Isabella Drive.

Public Transport

Several bus routes use the intersection (currently seven routes - refer excerpt from the current Transport Canberra Network Map) through all intersection approaches. Conversion to a signalised four-way intersection will improve intersection performance and, by extension, journey times for public transport users. Furthermore, removal of the roundabout is expected to improve journey amenity for bus patrons.



As the bus routes are mostly local / service routes, bus priority has not been proposed as part of the design. However, it is noted that conversion of the intersection to a signalised four way intersection facilitates the provision of bus priority should it be assessed as prudent in future analysis and design phases.

Active Travel

Existing off road active travel facilities at the site are relatively limited and consist primarily of a 3 m shared path in the verge of the south west quadrant of the intersection. Athllon Drive and Drakeford Drive have on road cycle lanes, however Isabella Drive has no on road cycle facilities. The proposed design improves active travel connectivity across the intersection through the provision of signalised crossing of mainline carriageways and pedestrian crossings of slip lanes on all approaches

The proposed design realigns / connects shared use paths to the revised crossing locations, with an additional shared use path provided to in the northern verge of Athllon Drive to improve the local active travel network. Furthermore, the proposed design provides connectivity into a potential future active travel network connection to the path network to the west of the site, and also aligns with the ACT Walking and Cycling Practitioners Tool which identifies a future cross-corridor active travel connection across the southern leg of the intersection.

Constructability

Delivery of this upgrade is expected to adopt conventional construction approaches, although it will require online construction on all intersection approaches. As a result, these works are expected to adversely impact on the operation of the intersection and will require complex construction staging and traffic management during to ensure the intersection operates at an acceptable level of service.

Safety

The intersection currently has poor safety performance with numerous property damage and injury crashes recorded at the site between 2017 and 2021.

As roundabouts significantly reduce the probability of high speed, side impact (high severity) crashes, they are generally considered a safer arrangement than four way / cross road intersections. However, given the large radius annulus of the roundabout, high traffic volumes, compromised sight lines and the poor crash performance of the current configuration, the conversion to a fully signal controlled intersection is intended to improve the crash performance of the intersection

Options Considered

Three options were considered for the upgrade, with multiple variations of the preferred arrangement being the subject of preliminary traffic modelling to test its viability and potential performance:

- **Grade separated interchange** – Ruled out on anticipated capital expense requirements and poor relative return on investment given the viability of cheaper options
- **Full roundabout signalisation** – The existing layout is considered marginal in terms of its ability to provide suitable geometry (annulus radii) that will allow an appropriate configuration that could accommodate appropriate siting, separation, and orientation of traffic signal heads. Operational performance was also considered likely to be deficient.
- **Signalised four-way intersection** – At grade replacement of the roundabout with a traffic signal controlled cross road intersection. Several configurations of this arrangement were considered as part of the development of the upgrade.

Structures

No new structures are proposed as part of this upgrade. It is proposed to tie road geometry into existing prior to interface with existing adjacent bridge structures in order to avoid impact on existing structures.

Project Interdependencies

The proposed upgrade is at the southern end of the corridor and is isolated from other upgrades proposed in the Corridor Strategy. It is physically and operationally independent of other proposed upgrades and is not considered to have project interdependencies.

Upgrade	SW10 – Cotter Road Interchange Upgrade	Location	Tuggeranong Parkway	Estimate Cost	$31M	Sheet	1 of 2

Problem Statement

There have been identified deficiencies in the future associated with the operation of the Cotter Road interchange, particularly at the southbound exit ramp terminal in addition to more general issues associated with the operation of the ramp terminals intersections. Corridor base modelling of future timestep years indicates that congestion will worsen over time resulting in significant congestion and possible operational failure before 2041 in both peak periods.

Site Description

The upgrade is proposed at the Cotter Road interchange with the Tuggeranong Parkway on the boundary of the Woden Valley and Weston Creek districts of Canberra immediately south of the Molonglo River. It is currently a service interchange with diamond configuration, albeit with divergent skewed ramps creating a large distance (~240m) between signalised ramp terminal intersections.

The Tuggeranong Parkway at the interchange is a freeway condition dual carriageway with two lanes in each direction and is relatively narrow under the Cotter Road overpass bridge that consists of a single ~25m span. Cotter Road is an arterial dual carriageway with two through lanes in both directions and single right hand turn lanes provided to access the Parkway entry ramps.

The project site extends on Cotter Road midblock between Kirkpatrick Street and the interchange in the west through to the Equestrian Park access road in the east. The upgrade also proposes improvements to the Tuggeranong Parkway southbound exit ramp between the ramp nose and terminal.

Cotter Road has mildly curvilinear alignment through the gently rolling terrain of the site. The site is surrounded by grassland with native vegetation in and around the interchange, with the nearest residential receivers ~270m to the west.

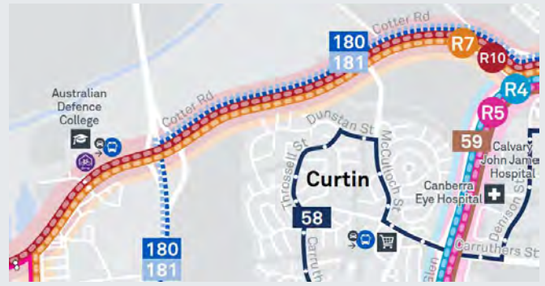
Options Considered

In an effort to minimise project cost and utilise existing infrastructure to the extent possible, investigation of options for the upgrade of the interchange were limited to augmentation / enhancements of the existing interchange configuration. Various improvements to the interchange were considered to enhance the performance of the interchange, including:

- Retention of two westbound through lanes, with upgrade to other intersection elements to increase capacity
- Double westbound right turn lanes onto the Tuggeranong Parkway northbound entry ramp
- Various turn configurations at the ramp terminal of the Tuggeranong Parkway southbound exit ramp
- Provision of a third eastbound through lane to increase intersection capacity
- Various alternatives for initiation and termination of the third westbound lane including location and configuration

Extension of the eastbound left turn lane onto the northbound entry ramp to allow access to the ramp in the event of mainline queuing from the western approach to the interchange

Public Transport



Several bus routes currently use the Cotter Road corridor including two rapid routes from the Molonglo Valley. Furthermore, as the Molonglo Valley is further developed it is likely that the number of services and service frequency on the Cotter Road corridor will grow. Whilst no specific public transport enhancements are proposed at the interchange, it is noted that improvement to intersection performance will improve journey times for public transport users.

In addition, should it be identified that public transport services through the interchange would benefit from specific public transport infrastructure such as bus priority features at intersection, related infrastructure could be included as part of the upgrade. This need and public transport infrastructure inclusion should be considered in future phases of design development of the upgrade.

Active Travel

The existing interchange provides 2.0 m on-road cycle lanes in each direction on Cotter Road and a 3.0m shared path in the southern verge of Cotter Road. Active travel facilities are not provided on the Tuggeranong Parkway and its associated interchange ramps.

The existing active travel infrastructure at the interchange is considered broadly appropriate given the adjacent land uses and whilst minor adjustments to active travel facilities are proposed to accommodate local changes in road geometry, significant changes to active travel infrastructure are not proposed as part of the upgrade. As such, the operation of active transport through the interchange will not substantively change as a result of the upgrade.

Safety

The upgrade is primarily focussed on capacity and performance improvements, and it is noted that the nature of the interchange and its broad configuration will remain largely the same post upgrade. To that end the safety performance of the interchange is expected to be improved by the upgrade, noting:

- The deletion of the westbound right lane merge from the Equestrian Park access will remove a hazardous conflict between slow moving vehicles (many towing horse floats) and vehicles in the fast lane.
- Improvements to the capacity of the southbound exit ramp and associated terminal intersection will enhance performance and mitigate the risk of queuing back into the Tuggeranong Parkway mainline, lowering the likelihood of crashes.
- These safety improvements will be offset to a degree by the introduction of the westbound merge downstream of the western intersection which creates a new conflict point on the Cotter Road corridor.

Constructability

Delivery of this upgrade is expected to adopt conventional construction approaches. Whilst no works are proposed to the corridor mainline, parts of the upgrade will require online construction on the Tuggeranong Parkway ramps and Cotter Road. These works are likely to adversely impact on the operation of the interchange and Cotter Road and will require traffic management during construction to ensure the interchange operates at an acceptable level of service.

Given the volumes on both road corridors, peak period carriageway closure on both the Tuggeranong Parkway and Cotter Road during construction does not appear feasible and construction of the Cotter Road bridge widening over the Tuggeranong Parkway is likely to require nightworks / closures for girder installation.

Structures

The existing Cotter Road bridge over the Tuggeranong Parkway will require widening to accommodate the new third westbound through lane, a cycle lane, and the realigned shared use path. It is expected that this work will consist of a 6 m widening of the 25 m span bridge, utilising precast girders for the bridge superstructure similar to existing. Bridge abutments will be located behind reinforced earth retaining wall that will require extension to suit the widened bridge configuration.

Project Interdependencies

There are several upgrades proposed for the South West Corridor near the Cotter Road Interchange which have a degree of interdependence with the proposed upgrade, including:

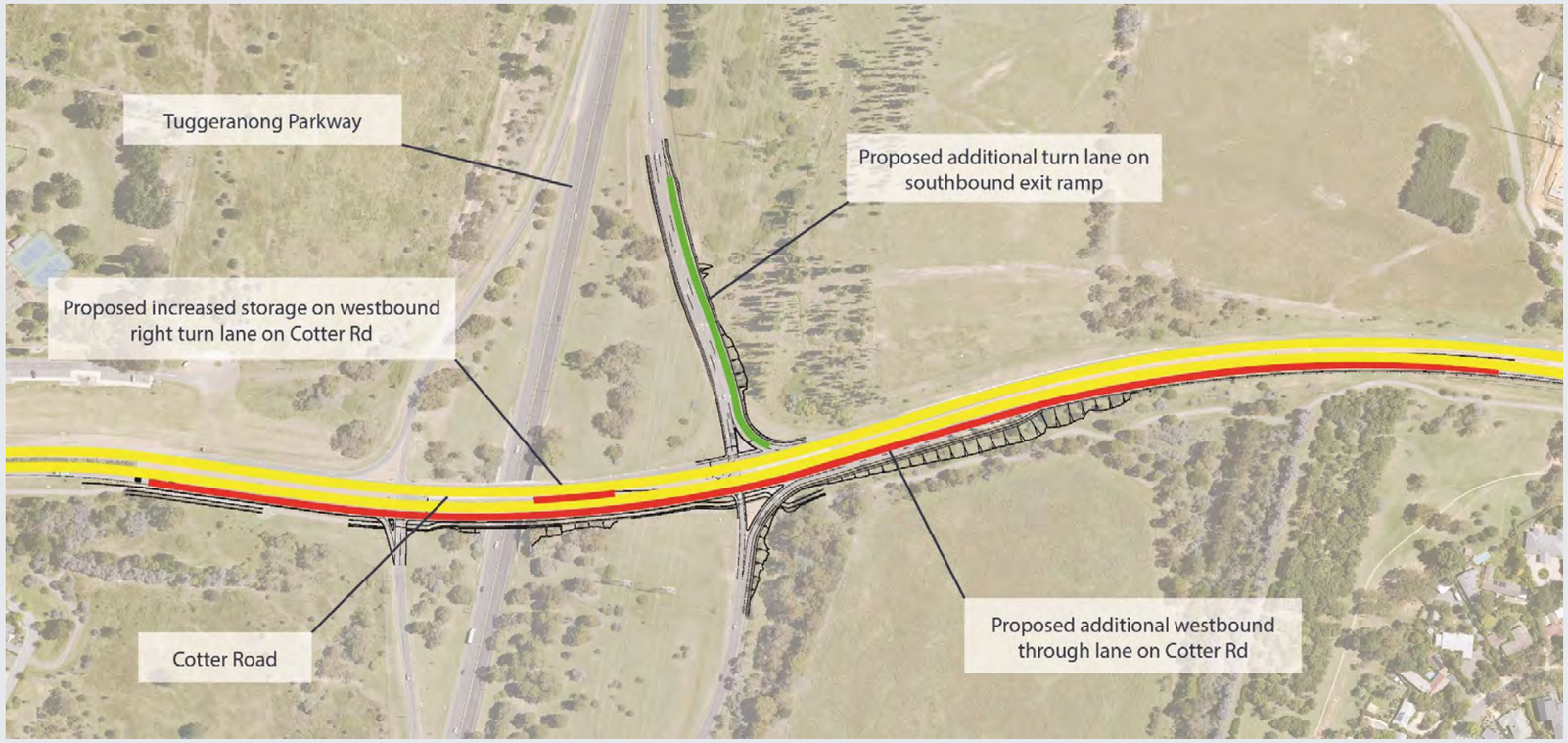
- **SW1 – Additional Northbound Lane** – Mainline operational improvements resulting from this project are likely to improve performance of the interchange and influence the required upgrade requirements and configuration.
- **SW2 – Southbound Auxiliary Lane** – The increased southbound capacity resulting from the proposed auxiliary lane is likely to improve mainline operation and redistribute traffic locally, which will subsequently influence the upgrade requirements and configuration.
- **SW3 – East West Arterial Interchange** – The provision of the EWA and its associated interchange alters traffic routing and patterns on the network. This redistribution is likely to improve network performance and influence the required upgrade requirements and configuration.

Upgrade	SW10 – Cotter Road Interchange Upgrade	Location	Tuggeranong Parkway	Estimate Cost	$31M	Sheet	2 of 2

Option Details

The upgrade configuration was developed to enhance operational performance of the intersection. The upgrade of the Cotter Road interchange consists of the following primary alterations to the interchange inclusive of signalised ramp terminal intersections, ramps, and the Cotter Road mainline:

- **Additional ramp turn lane** – Traffic modelling indicated that the addition of a fourth turn lane on the Tuggeranong Parkway southbound exit ramp was necessary to increase capacity in future years and prevent queueing back onto the Parkway in the AM peak, particularly after the construction of EWA, which provides a more direct route from northern parts of Molonglo Valley to Cotter Road eastbound than the current route along John Gorton Drive.
- **Cotter Road widening** – Widening of the westbound Cotter Road carriageway to provide a third through lane has been proposed to increase capacity of both Cotter Road signalised intersections. Traffic modelling indicated that this third through lane was required to prevent intersection failure no later than 2041, but possibly in 2031 as development in Molonglo continues. Intersection failure in this case occurs when westbound through movement queues are excessively long and block access to the right turning lanes for right turning vehicles, which reduces the capacity and leads to uncontained queueing and excess delay.
- **Westbound right turn lane** - Increase length of the westbound right turn lane accessing the northbound Tuggeranong Parkway entry ramp to increase capacity for the movement. Traffic modelling indicated that the additional storage was required to prevent intersection failure no later than 2041. Development in Molonglo, along with the EWA Interchange, has a significant effect on right turning traffic at the Cotter Road interchange as vehicles use Tuggeranong Parkway to travel from Cotter Road westbound to northern parts of Molonglo Valley via EWA, rather than continuing along John Gorton Drive. In this case, intersection failure occurs when the right turn movement queues outside the right turn lane and blocks one of the westbound through lanes, which then leads to uncontained queueing and excess delay.
- **Signal Phasing** – Revision to signal phasing and timing has been adopted to optimise the performance of the intersection in the context of the revised to address changes in traffic patterns in the future.



Upgrade	G8 – Lakeside Interchange Upgrade	Location	Tuggeranong Parkway	Estimate Cost	$23M	Sheet	1 of 2

Problem Statement

Significant queuing and congestion is currently observed at the interchange in peak periods on the southbound exit ramp and approach. This queuing backs up into the auxiliary lane and impacts on mainline flow.

Future year modelling has indicated severe failure of the interchange over the Corridor Strategy horizon with particular concerns relating to queuing on the southbound exit ramp and subsequent impacts on mainline operation in the AM peak.

The safety performance of the interchange is also a concern with a high density of accidents mapped between 2017-2021 at the site on southbound auxiliary lane approach to the interchange, the southbound interchange ramp, the interchange ramp terminals and the Lady Denman Drive intersection.

Site Description

The upgrade is proposed at the Lakeside Interchange between Forest Drive and the Tuggeranong Parkway. It is a service interchange with diamond configuration utilising priority controlled ramp terminal intersections. Capacity of the interchange is limited primarily by the arrangement of the southbound exit ramp terminal, and the proximity of the Lady Denman Drive at-grade signalised intersection to the east.

The Tuggeranong Parkway at the interchange is a freeway condition dual carriageway with two lanes in each direction, with an auxiliary lane in each direction on approach / departure to the north. The Parkway mainline flies over Forest Drive with a single span precast concrete girder bridge of approximately 25m. Forest Drive is a single carriageway road with one lane in each direction. Forest Drive has several curves throughout the site and is generally skewed to ramp and Lady Denman Drive alignments.

The project site is confined to Forest Drive, interchange ramps and associated ramp terminals, and the Lady Denman Drive intersection. No works are proposed on the Tuggeranong Parkway mainline.

The terrain surrounding the site is rolling with various landscape types including native vegetation and a diverse range of arboretum plantings. The land uses surrounding the corridor are generally recreational including the National Arboretum Canberra (NAC), and lakeside parklands.

Options Considered

Recognising that the key issue causing failure at the interchange is the arrangement of ramp terminal intersections and the proximity of / interaction with the Lady Denman Drive intersection, various configurations of through and turn lanes were considered for the ramp terminal intersections and the Lady Denman Drive intersection.

The intent of investigating alternative lane arrangements was to identify a layout that most improved the operational performance of the interchange. It is further noted that the existing southbound exit ramp diverge arrangement has a minimum treatment, for which improvement was considered.

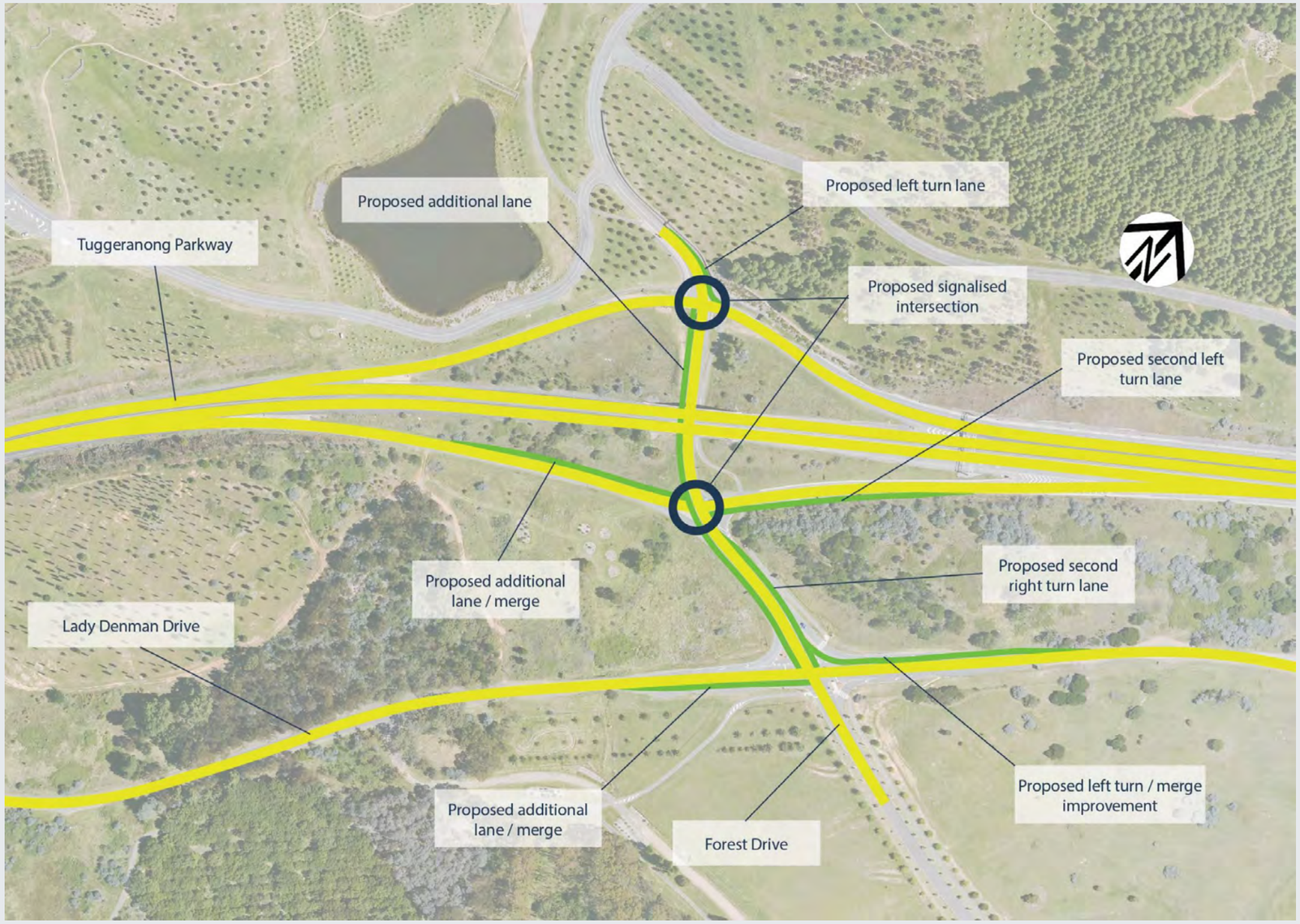
Public Transport	There are currently no public transport services that use the Tuggeranong Parkway in the region of the upgrade. Furthermore, it is understood that there are currently no plans to introduce new public transport services into this part of the corridor. As such, it is considered unlikely that the upgrade will have substantive implications for public transport operations within the corridor.
Active Travel	There are currently no active travel facilities on the Tuggeranong Parkway for the length of the proposed upgrade site. However there is an existing shared path on Forest Drive through the interchange that provides active travel connectivity between the Arboretum and the Lake shared path and beyond. It is proposed to retain this shared path, noting that provision of signalised crossings at the ramp terminals will improve safety for vulnerable road users.
Safety	The upgrade is primarily focussed on capacity and performance improvements. However, it is considered likely that the congestion and queuing on the southbound exit ramp that extends into the Tuggeranong Parkway auxiliary lane are substantially responsible for the high density of crashes in and around the interchange site between 2017 and 2021. To that end, the safety performance of the interchange is expected to be improved by the upgrade, noting that improvements to the capacity of the interchange will reduce queuing on exit ramp, reducing the likelihood of rear end accidents.
Constructability	Delivery of this upgrade is expected to adopt conventional construction approaches. Whilst no works are proposed to the corridor mainline, parts of the upgrade will require online construction on the Tuggeranong Parkway ramps, Forest Drive and Lady Denman Drive. These works are likely to adversely impact on the operation of the interchange and Lady Denman Drive and will require traffic management during construction to ensure the interchange operates at an acceptable level of service. Given the relatively modest scale of the upgrade, consideration could be given to scheduling construction during holiday period / times of lower demand.
Structures	There is an existing approx. 25m span precast concrete girder bridge at the interchange that supports the Tuggeranong Parkway overpass of Forest Drive. Whilst widening of this bridge is proposed as part of the SW1 upgrade package, it is considered unlikely that any changes to the bridge will be required as part of this upgrade package.
Project Interdependencies	This project is located at a discrete site and is not considered to have any significant interdependencies with any other upgrades identified in the corridor strategy. However, it is noted that the proposed additional northbound lane (Upgrade SW1) also traverses the Lakeside interchange, although the two upgrades are not expected to have any operational dependencies.

Upgrade	G8 – Lakeside Interchange Upgrade	Location	Tuggeranong Parkway	Estimate Cost	$23M	Sheet	2 of 2

Option Details

The upgrade configuration was developed to enhance operational performance of the intersection. The upgrade of the Lakeside Interchange consists of the following primary alterations:

- **Northbound Ramp Terminal Intersection Upgrade** – The layout and capacity of the intersection is to be improved through:
  - Signalisation of the intersection
  - Provision of a dedicated left turn lane on its western leg (Forest Drive)
  - Provision of a dedicated right turn lane on its eastern leg (Forest Drive). This additional lane runs from the Lady Denman intersection under the Tuggeranong Parkway bridge where it is expected that there is sufficient clear space to accommodate the additional lane.
- **Southbound Ramp Terminal Intersection Upgrade** – The layout and capacity of the intersection is to be improved through:
  - Signalisation of the intersection
  - Provision of an additional left turn lane on its northern leg (Tuggeranong Parkway southbound exit ramp)
  - Provision of a second westbound through lane
  - Geometric improvements to the Tuggeranong Parkway southbound entry ramp including removal of the existing low angle entry and provision of a two lane merge
- **Lady Denman Drive / Forest Drive intersection** — The layout and capacity of the intersection is to be improved through:
  - Provision of an additional right turn lane on its western leg (Forest Drive)
  - Provision of a second southbound through lane and associated merge on Lady Denman Drive downstream of the intersection to accommodate the dual right turn from Forest Drive
  - Geometric improvements to the left turn lane from eastbound Forest Drive onto northbound Lady Denman Drive including increased downstream auxiliary lane length to facilitate merge movements



8. Corridor Priorities & Staging

8.1 Overview

A key consideration of the Corridor Strategy is identification of an appropriate approach to delivery staging of the upgrade works. Understanding how to best to phase implementation of the Corridor Strategy and prioritise its constituent activities and upgrades is critical for several reasons, including:

- Each upgrade responds to specific needs of the transport network that change over time, ensuring optimal network performance
- Each upgrade responds to the long term ACT land release program which is phased over time, ensuring optimal network performance
- Staged delivery of Corridor Strategy upgrades ensures that capital and operational costs associated with the upgrade are incurred at appropriate times and maximise economic value to the community
- The upgrades are capital intensive and are likely to place fiscal pressure on the Territory if not appropriately phased over time

Given these considerations, the Corridor Strategy proposes phased delivery of the identified upgrades.

8.2 Approach

Several factors have informed the prioritisation of Corridor Strategy upgrades. The approach to identifying an appropriate delivery staging of upgrades has been developed in the context of the following considerations:

- **Operational Need** - The primary trigger for delivering the Corridor Strategy upgrades is operational need. As adjacent land uses change over time, and population growth and associated trip attraction (employment, educational, commercial, etc) grow, the transport network inclusive of the South West Corridor will experience increasing load and congestion. Transport modelling has identified timeframes in which elements of the Corridor reach or exceed their capacity and require upgrade to prevent failure / unacceptable deterioration of performance (be it operational or safety).
- **Value for Money** - Targeting delivery of upgrades in timeframes that offer the greatest return on investment to the Territory. This may be tied to timely delivery of upgrades to prevent operational deterioration, or equally may seek to life extend or “sweat” an asset to extract the maximum value of infrastructure prior to its replacement or renewal.
- **Interdependence** – Some of the upgrades proposed in the Corridor Strategy share an interdependence with other upgrades, or other off-corridor network improvements. These interdependencies may be:
  - Sequential - The need for an upgrade is triggered by the performance life of a preceding upgrade
  - Concurrent - A relationship between two or more upgrades supports the concurrent delivery of the upgrades. This interdependence may be operational (there are network operational or performance benefits in concurrent delivery), physical (eg the upgrades physically connect to each other such as having a common interface point), or delivery related (eg there may be substantial cost and/or constructability efficiencies in concurrent delivery)

Based on these considerations, each of the Corridor Strategy upgrades has been assessed as being required in the Short, Medium or Long Term and collectively tested as grouped suites of work for delivery in or around the 2031, 2041, or 2051 timesteps investigated in the Corridor Strategy. Whilst acknowledging the upgrades may be delivered prior to, on, or after each of these model years, the nominated year of delivery has been adopted as a simplifying assumption for the purposes of the Corridor Strategy. Furthermore, it is noted that the most appropriate timeframes for delivery of each of the upgrades is likely to change over time in response to evolving Territory priorities, network conditions and performance, land use and population growth.

The upgrade prioritisation and groupings described following have been tested in the Corridor Strategy strategic and operational transport modelling described in Section 9, and informed the economic analysis discussed in Section 11.

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8.3 Short Term Priorities

Upgrades that were identified as having an urgent operational need, and are considered likely to require delivery in the short term are summarised in Table 8–1. The associated justification and rationale for their prioritisation has also been provided.

Table 8–1: Short Term Corridor Priorities

Upgrade		Prioritisation Rationale
SW4a	Tuggeranong Pkwy / Hindmarsh Dr Interchange upgrade – Interim Solution	The interchange currently experiences high levels of congestion and queuing, particularly in the PM peak where queuing is regularly observed to exceed 1km. This identified performance issue is supported by operational modelling which indicates that the interchange in its current configuration will fail by 2031. This interim solution seeks to provide a low cost solution to improve performance in the short term that utilises the remining life of existing infrastructure, and can be delivered in a short timeframe to address the existing issues at the site.
SW10	Tuggeranong Pkwy / Cotter Rd Interchange Upgrade	The site currently experiences congestion and extensive queuing to the west on John Gorton Drive, particularly in the AM peak. Whilst the cause of the queueing requires further investigation, it is considered likely that it as at least in part to be attributable to the interchange ramp terminal intersections. Whilst the upgrade is primarily intended to complement other upgrades associated with the East West Arterial Interchange (scheduled as a medium term priority), it has been proposed as a short term priority in an effort to address the current performance issues identified on John Gorton Drive.
G8	Upgrade of Tuggeranong Pkwy SB off-ramp Intersection with Lady Denman Dr	The southbound exit ramp of the interchange currently experiences high levels of congestion and queuing in the AM peak. This queuing spills back into the Tuggeranong Parkway and is regularly observed to interfere with mainline flows. This identified performance issue is supported by operational modelling which identifies issues with the operation of the ramp terminal intersection and the adjacent Forest Drive / Lady Denman Drive intersection, indicating that the interchange in its current configuration fails prior to 2031. This upgrade seeks to address these performance issues in the short term.

The total estimated cost of the prosed suite of short term priorities is **$61M** in $2025 AUD.

8.4 Medium Term Priorities

Upgrades that were identified as required in the next 10-20 years are summarised in Table 8–2. The associated justification and rationale for their prioritisation has also been provided.

Table 8–2: Medium Term Corridor Priorities

Upgrade		Prioritisation Rationale
SW1	Tuggeranong Parkway - Additional northbound lane	The northbound carriageway of the Tuggeranong Parkway experiences congestion in the AM peak, particularly in the merge zone of the Cotter Road Interchange entry ramp. Additionally, the third northbound lane on the Tuggeranong Parkway has a strong interdependence with the EWA interchange. Operational modelling indicates that the additional lane is required as part of the delivery of the EWA Interchange to ensure that merge, diverge and weave movements perform appropriately, and that the corridor has sufficient capacity between the Cotter Road Interchange and the Lakeside Interchange to cater to the forecast heavy movement between the two interchanges.

SW2	East West Arterial / Tuggeranong Pkwy interchange	Implementation of the East West Arterial is expected in the medium term in response to the anticipated land release and development of the eastern zone of the Molonglo Valley. Strategic and operational modelling indicates that the EWA connection into the trunk road network through the EWA Interchange will be required by 2041 to ensure appropriate operation of the broader transport network including within Molonglo Valley District and its associated access points such as John Gorton Drive (north and south) and the Bindubi Street Extension.
SW3	Auxiliary southbound lane upgrades to facilitate East West Arterial	The southbound auxiliary lane on the Tuggeranong Parkway has a strong interdependence with the EWA interchange. Operational modelling indicated that the auxiliary lane is required as part of the delivery of the EWA Interchange to ensure that merge, diverge and weave movements in addition to mainline flow performs appropriately.
SW5	Tuggeranong Pkwy - VSLS & VMS upgrades	The rationale for this upgrade relates to operational safety of the corridor, and as such the delivery timeframes for the upgrade are not tied to performance objectives, but rather depends on the safety priorities of the Territory. The upgrade is proposed in the medium term acknowledging: - The installation of ITS infrastructure prior to the delivery of EWA Interchange related packages (SW1, SW2 & SW3) is likely to result in a high degree of abortive work associated with SW5 - There are likely to be significant construction efficiencies if delivered concurrently with EWA Interchange related packages (SW1, SW2 & SW3).
SW8	Drakeford Dr / Athllon Dr / Isabella Dr intersection upgrade	The intersection is known to experience high levels of congestion during peak periods. Operational modelling indicates that the intersection is expected to fail by 2041, and as such the upgrade is proposed for implementation in the medium term.

The total estimated cost of the prosed suite of medium term priorities is **$331M** in $2025 AUD.

8.5 Long Term Priorities

Upgrades that are considered long term prospects to improve the performance of the transport network are summarised in Table 8–3. The associated justification and rationale for their prioritisation has also been provided.

Table 8–3: Long Term Corridor Priorities

Upgrade		Prioritisation Rationale
SW4b	Tuggeranong Pkwy / Hindmarsh Dr Interchange upgrade – Ultimate Upgrade	Operational modelling suggests that the Interim upgrade proposed at the Hindmarsh Drive interchange is forecast to extend the operational life of the interchange to approximately 2051. However by 2051, transport modelling indicates that the Interim upgrade will no longer provide appropriate performance at the interchange, noting that at that time the design life of the existing bridge structure is likely to be largely consumed. Given the anticipated 2051 performance issues at the interchange, the Ultimate upgrade of the interchange is proposed for delivery in the long term.

The total estimated cost of the prosed suite of long term priorities is **$203M** in $2025 AUD.

9. Corridor Operational Performance

9.1 Transport Analysis Approach

9.1.1 Modelling Approach

The two scenarios, being Do Minimum and Upgrade Scenario, were initially tested using the CSTM (version 1.2) to generate Origin-Destination matrices for the Canberra network, and to estimate growth in trips over the Corridor Strategy horizon. This growth was then used to estimate network demand flows for future years (2031, 2041 and 2051) that informed operational modelling of the Corridor and its surrounds. The operational modelling was developed using an Aimsun Hybrid (mesoscopic / microscopic) model to allow assessment of the two scenarios to understand how the Corridor Strategy would impact operation of the network. The modelling for the South West Corridor was part of a broader transport analysis that also included the concurrent assessment of the Parkes Way Corridor Strategy, and is documented in the Future Transport Modelling Report included as Appendix C of the Corridor Strategy. The study area for the operational modelling included the two primary transport corridors in addition to the surrounding adjacent transport network as indicated in Figure 9–1.

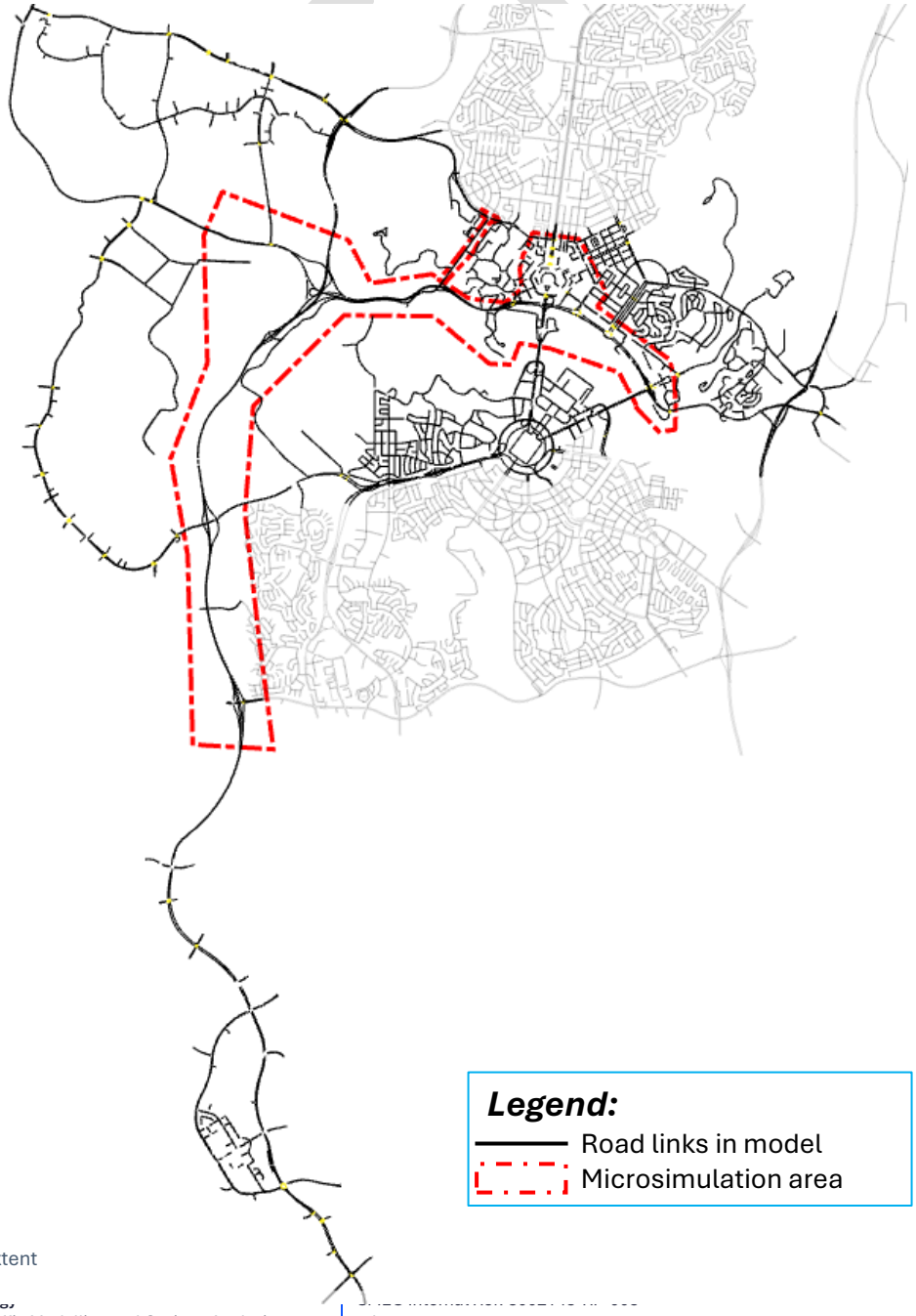

Figure 9–1: Aimsun Hybrid Model Extent

9.1.2 Operational Scenarios

In order to understand the likely future performance of the Corridor in response to changing land use and traffic conditions across the Canberra network, strategic and operational transport modelling was undertaken. This transport modelling considered two discrete scenarios for the future 2031, 2041 and 2051 Canberra transport network:

1) **Do Minimum** – The Base Case scenario refers to a Do Minimum approach adopted within the Corridor and is characterised by retention of the Corridor's infrastructure in its current form, with the minimum required operational and maintenance interventions undertaken to ensure that its existing configuration (intersection / interchange arrangements, lane configurations, speed regime etc) are retained. It is noted however that the Do Minimum scenario includes network enhancements and alterations outside the Corridor, consistent with Territory's anticipated adaption of the network over the Corridor Strategy horizon (as identified in future year versions of the CSTM). The Do Minimum scenario forms the Base Case for the Corridor Strategy, against which the Upgrade Scenarios have been compared and tested.
2) **Upgrade Scenario** – The Project Case scenario is intended to investigate the potential impacts of the upgrades proposed in the Corridor Strategy. The scenario assumes that the upgrades identified in Section 7 have been implemented. To ensure consistency between the Base and Project scenarios, the transport network outside the Corridor is assumed to be the same in the Upgrade scenario as that adopted in the Do Minimum scenario. That is, off-corridor transport infrastructure is consistent with Territory's anticipated network over the Corridor Strategy horizon as identified in future year versions of the CSTM. This approach ensures that any identified changes in network operation and performance can be attributed entirely to the implementation of the Corridor Strategy.

9.2 Operational Performance

9.2.1 Network Operation

In addition to investigating the performance of the Corridor, the operational model also tested the implications of the proposed Corridor Strategy on the network in the vicinity of the Corridors. This analysis was undertaken acknowledging that the Corridor is an integral part of the transport network, and the implications of its operation extend well beyond the Corridor itself.

To understand the operation of the Corridor and the surrounding transport network, and the impacts of the proposed upgrades, various performance metrics were assessed. These metrics for the AM and PM peak hours included:

- **Total Demand** – Total number of generated trips that are forecast to travel through the model, providing a sense of model scale
- **Uncompleted Trips** – The number of trips in the model that failed to reach their destination which is an indicator of congestion in the model (↑ uncompleted trips ≡ ↑ congestion)
- **Total VKT** – Aggregate number of Vehicle Kilometres Travelled provides insight into total distance travelled by vehicles in the peak hour across the model
- **Total VHT** – Aggregate number of Vehicle Hours Travelled provides insight into total time spent in transit by vehicles in the peak hour across the model
- **Average Speed (km/h)** – A measure of how fast vehicles travel on average in the peak hour across the model (typically Average Speed = VKT/VHT with (↑ speed ≡ improved network performance)
- **Average delay per vehicle** – A measure of the difference between free flow and congested travel times per vehicle which is an indicator of congestion in the model (↑ congestion ≡ ↑ average delay per vehicle)
- **% of demand unreleased** – Unreleased demand is the proportion of trips that are unable to enter the model during the peak hour which is an indicator of congestion in the model (↑ congestion ≡ ↑ unreleased demand)

The network statistics associated with these metrics for both the Do Minimum and Corridor Strategy Upgrade Scenario are summarised in Table 9–1.

Table 9–1: Network Statistics (South West Corridor + Parkes Way Corridor)

Network Statistics	AM		PM	
	Base Case	Project Case	Base Case	Project Case
2031				
Total Demand	68,735	68,735	80,402	80,402
Uncompleted Trips	16,798	16,992	19,455	18,712
Total VKT	352,811	354,335	387,619	389,652
Total VHT	11,295	11,575	11,632	11,685
Average Speed (km/h)	27	27	26	26
Average Delay per Vehicle	1:14	1:16	1:20	1:18
% of Demand Unreleased	5.90%	4.70%	4.70%	4.50%
2041				
Total Demand	79,041	79,041	90,740	90,740
Uncompleted Trips	22,303	18,907	31,404	20,742
Total VKT	354,499	392,765	325,450	434,300
Total VHT	12,035	12,495	11,912	12,747
Average Speed (km/h)	24	27	22	26
Average Delay per Vehicle	1:28	1:14	1:47	1:19
% of Demand Unreleased	12.80%	5.60%	12.50%	6.40%
2051				
Total Demand	87,111	87,111	97,090	97,090
Uncompleted Trips	20,578	22,659	31,570	21,411
Total VKT	637,232	638,657	603,527	672,986
Total VHT	26,095	25,689	30,402	24,844
Average Speed (km/h)	25	26	24	27
Average Delay per Vehicle	01:26	01:23	01:42	01:17
% of Demand Unreleased	12.9%	7.3%	10.5%	7.8%

There were numerous important network level findings that were observed from the operational modelling that provided insight into the implications of implementing the combined South West and Parkes Way Corridor Strategies. These findings included:

- The proportion of unreleased demand in the Project Case is lower (significantly lower in the case of 2041 and 2051) than the Base Case. This indicates that the proposed upgrades were providing increased network capacity which allowed more traffic to enter the road network compared to the Base Case.
- The number of uncompleted trips in the Project Case is lower (again, significantly lower in the case of 2041 and 2051 PM) than the Base Case. This indicates that the proposed upgrades provided improved accessibility for traffic to arrive at their destinations within a shorter time period.
- Whilst the 2031 average network travel speeds remained similar in both the Base and Project Cases, when considered in the context of the reduced unreleased demand in the Project Case, the results indicate that although the upgrades would not substantively reduce average delays along the corridors during the peak hour, the proposed 2031 upgrades provide benefits in other areas of the road network outside the modelled area that are not captured in the operational model results.

- Significant improvements to average delay and average travel speeds in 2041 and 2051, combined with improvements in unreleased demand, suggest that the proposed upgrades would provide increased road capacity for traffic to enter the road network, as well as allowing traffic to arrive at their destinations within a shorter duration.

9.2.2 Intersection Performance

The performance of an intersection can be measured by the average delay per vehicle, which corresponds to a Level of Service (LoS) measure for the intersection. The performance of an intersection in this modelling report was measured in accordance with the Transport for New South Wales (TfNSW), LoS definition shown in Table 9–2. For signalised intersections, the average delay over every movement was used to define the LoS of the intersection. For roundabouts and priority-controlled intersections, the delay on the worst movement was used to define the LoS of the intersection.

Table 9–2: LoS Criteria (TfNSW)

LoS	Delay
A	d <= 14
B	14 < d <=28
C	28 < d <= 42
D	42 < d <= 56
E	56 < d <= 70

Generally an intersection that performs at LoS D or better is considered to be performing acceptably and does not require any improvements. When intersections reach LoS E, the performance becomes unstable and indicates improvements would be beneficial, while LoS F indicates the intersection is performing unsatisfactorily and would benefit from physical capacity upgrades.

The Hybrid model was used to assess the performance implications of four upgrades that are sited at intersections or interchanges on the South West Corridor. The analysis made several findings based on the delay and LoS impacts summarised in Table 9–3. These findings included:

- Performance at the Lakeside Interchange would notably improve in 2031 from LoS E/D in the Base Case AM/PM peaks to LoS C upon implementation of the Corridor Strategies (both Parkes Way and the South West Corridor). This improvement is likely due to the combination of the capacity upgrades at the Lakeside Interchange site, in addition to changing traffic patterns associated with the implementation of the Clunies Ross Interchange Upgrade associated with the Parkes Way Corridor Strategy. The performance improvements at the interchange are expected to be greater in 2041 when the interchange is forecast to fail in both peaks in the Do Minimum scenario.
- The implementation of the Corridor Strategy addresses failure of the Hindmarsh Drive interchange in the 2031 PM peak. Whilst the upgrade also addresses a failure in the 2041 AM peak, the interim upgrade at the interchange no longer prevents PM failure 2041. This suggests that the Ultimate upgrade at the site will be required by 2051, if not before.
- The operational modelling suggests that the Cotter Road Interchange will perform satisfactorily in the 2031 AM peak, but will fail in the PM peak. The proposed Corridor Strategy upgrade at the interchange is forecast to address this PM failure. However, the upgrade is configured primarily to address changing traffic patterns associated with delivery of the EWA Interchange in medium term, and to this end is anticipated to significantly improve operation in 2041 and 2051 by addressing forecast failure at the Cotter Road Interchange in the AM peak, and substantially reduce delay in the PM peak (albeit noting that failure at the site remains forecast in this peak). It is noted however that the local network in this area is observed to currently experience significant congestion, delay and queuing to the west on John Gorton Drive in the AM peak, which whilst contributed to by the interchange is potentially influenced also by the capacity of adjacent intersections such as Cotter Road / Kirkpatrick Street. Further analysis is likely required of adjacent intersections in conjunction with the interchange that fall outside the Tuggeranong Parkway Corridor to properly identify all necessary works required to address the observed congestion issues.
- Operational modelling of the Isabella Drive intersection upgrade proposed in the Corridor Strategy indicates that while the upgrade will have minimal impact on the AM peak operation, intersection performance will improve significantly in 2041 and 2051 when compared to the Do Minimum scenario.

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Table 9–3: Intersection Performance – Delay (sec) + LoS

Intersection Site	AM				PM			
	Base Case		Project Case		Base Case		Project Case	
	Delay	LoS	Delay	LoS	Delay	LoS	Delay	LoS
2031								
Lakeside Interchange	67	E	33	C	43	D	41	C
Hindmarsh Dr Interchange	36	C	35	C	75	F	57	E
Cotter Rd Interchange	42	C	43	D	111	F	126	F
Drakeford Dr / Isabella Dr Intersection	36	C	29	C	73	F	81	F
2041								
Lakeside Interchange	87	F	38	C	79	F	45	D
Hindmarsh Dr Interchange	89	F	37	C	104	F	140	F
Cotter Rd Interchange	81	F	46	D	>200	F	94	F
Drakeford Dr / Isabella Dr Intersection	36	C	48	D	94	F	32	C
2051								
Lakeside Interchange	59	E	95	F	42	D	48	D
Hindmarsh Dr Interchange	69	E	48	D	65	E	49	D
Cotter Rd Interchange	42	C	44	D	307	F	38	C
Drakeford Dr / Isabella Dr Intersection	169	F	52	D	94	F	32	C

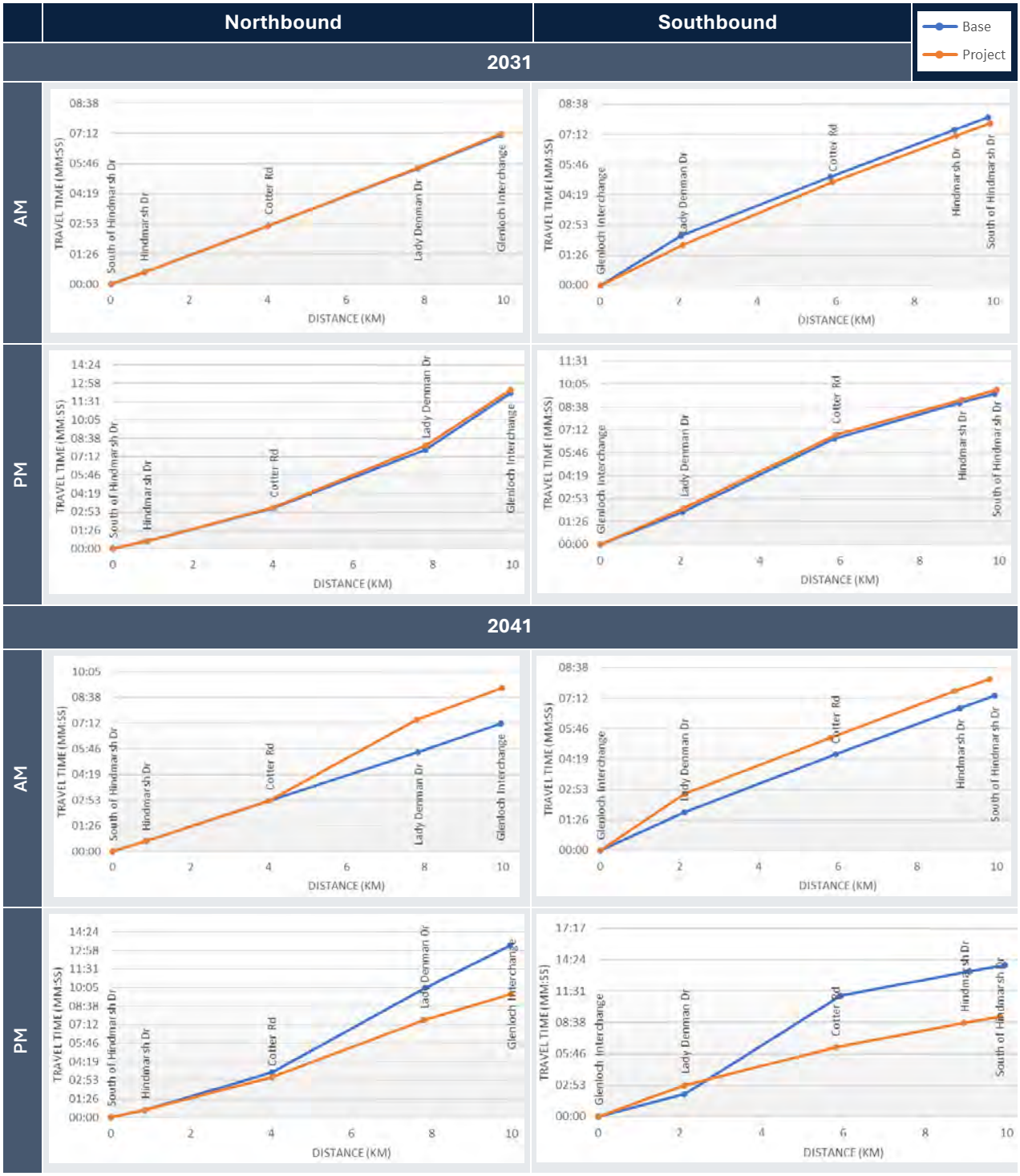
9.2.3 Corridor Travel Time

The time spent in transit is considered a cost to travellers as it consumes time that could have otherwise been spent on productive or leisure activities. As such, trip journey time is an important metric when assessing operational performance of transport networks. Trip journey times were extracted from microscopic zone of the Hybrid model (the Tuggeranong Parkway) to provide an understanding comparative travel times and the impact of the Corridor Strategy, noting that the analysis only assesses the part of a journey that occurs within the Corridor, and that broader network impacts of the Strategy are not captured in this metric. The Corridor travel times for 2031 and 2041 are shown in Table 9–4. The results of the Corridor travel time modelling provided several findings:

- Travel time along the corridor is broadly unchanged in 2031, noting that the three short term upgrades are focussed on interchange performance and are unlikely to substantively impact on mainline through flows and travel times.
- In the 2041 AM peak, travel times along Tuggeranong Parkway would increase in the Project Case in both the northbound and southbound directions between the Cotter Road and interchanges. This is likely due to the influx of traffic from the East-West Arterial, causing friction in the merge zone, resulting in slower travel speeds between Cotter Road and the Lakeside interchange.
- Significant improvements are apparent in the 2041 PM peak period in the Project Case for vehicles travelling in both the northbound and southbound directions. Average traffic volumes in the Project Case were observed to be higher than the Base Case, indicating significant improvement in corridor capacity.

Further to these results, it is noted that the road network as a whole is forecast to have improved performance as result of the Corridor Strategy with lower average delay per vehicle and unreleased demand at the end of the peak hour periods.

Table 9–4: 2031 forecast corridor performance – Average peak travel times



9.2.4 Corridor Travel Speed

Corridor travel speeds provide insight into the flow conditions and by extension performance of the Corridor. Weighted average travel speeds were extracted from the Hybrid model for segments along the South West Corridor for both the Base and Project scenarios in each direction for the 2031, 2041 and 2051 forecast years. The forecast average travel speeds have been depicted in Table 9–5 to Table 9–7 based on the legend indicated in Figure 9–2, with higher travel speeds indicative of better performance of the corridor.

The results of the modelling provided several findings in relation to average travel speeds in the Corridor. These findings included:

- Travel speeds and performance of the corridor southbound carriageway deteriorates in the 2031 AM peak north of Cotter Road, noting that southbound volumes in this part of the Corridor increase significantly in

the Project Case, likely due to changing patterns associated with the new access to Parkes Way created Clunies Ross Street Interchange associated with the Parkes Way Corridor Strategy. Similarly, travel speeds are worse north of Cotter Road in the PM peak in the Project Case, again likely due increased throughput on Parkes Way associated with the Parkes Way Corridor Strategy.

- In 2041 the implementation of the Corridor Strategy results in decreased northbound travel speeds to the north of Cotter Road in both peaks as a result of increased volumes and friction associated with the provision of the East West Arterial Interchange.
- In the southbound direction in 2041, volumes on the Tuggeranong Parkway also increase significantly between Cotter Road and the Glenloch Interchange as a result of the provision of the East West Arterial Interchange. This results in reduced travel speeds north of the Lakeside interchange in the PM peak as a result of the Corridor Strategy, however travel speeds improve between the Lakeside interchange and the Cotter Road interchange in the PM peak as a result of the proposed upgrades despite the increased volumes.
- Similar to 2041, the implementation of the Corridor Strategy in 2051 generally results in decreased northbound travel speeds to the north of Cotter Road in both peaks as a result of increased volumes and friction associated with the provision of the East West Arterial Interchange. It is noted however that northbound travel speeds in the PM peak improve between the Lakeside Interchange and the Glenloch interchange. Furthermore, northbound travel speeds in PM peak also improve between Sulwood Drive and Cotter Road, despite increased northbound volumes, likely in response to the upgrade of the Hindmarsh Drive Interchange.

Further to these results, it is noted that the road network as a whole is forecast to have improved performance as result of the Corridor Strategy with higher average speeds per vehicle and reduced unreleased demand at the end of the peak hour periods.

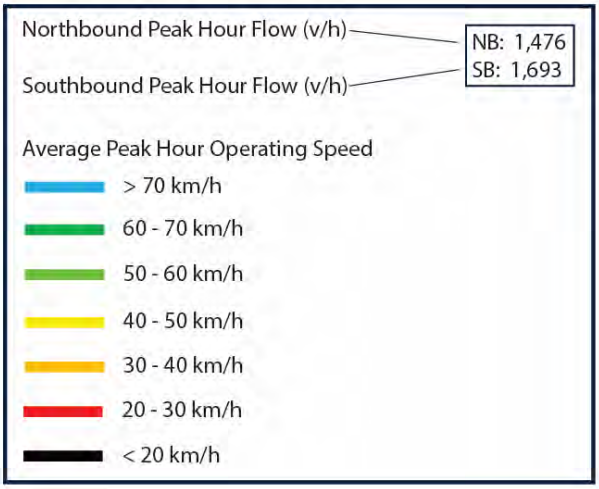


Figure 9–2: Average Travel Speed Assessment Legend

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Table 9–5: 2031 forecast corridor performance – Average peak hour speeds

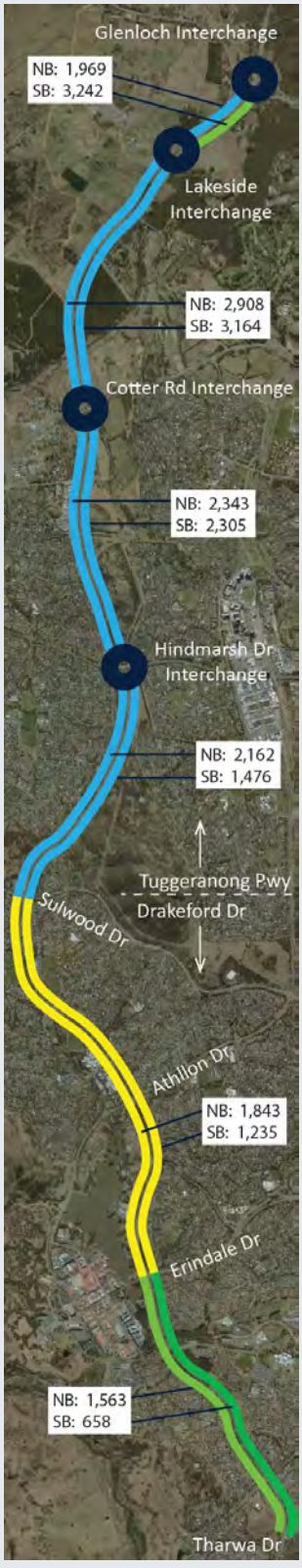
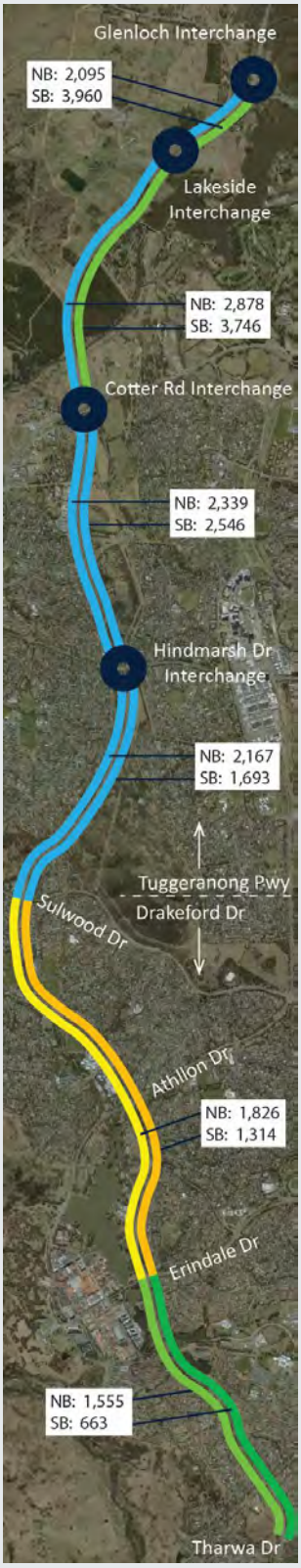
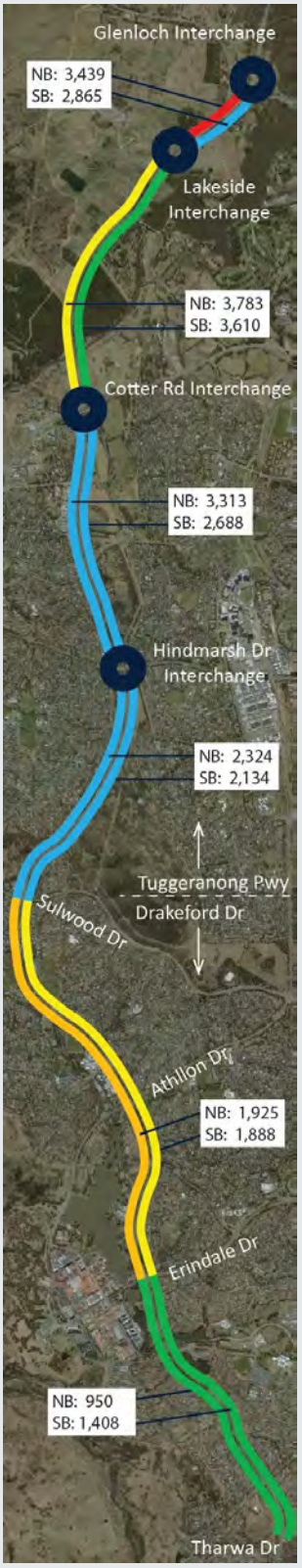
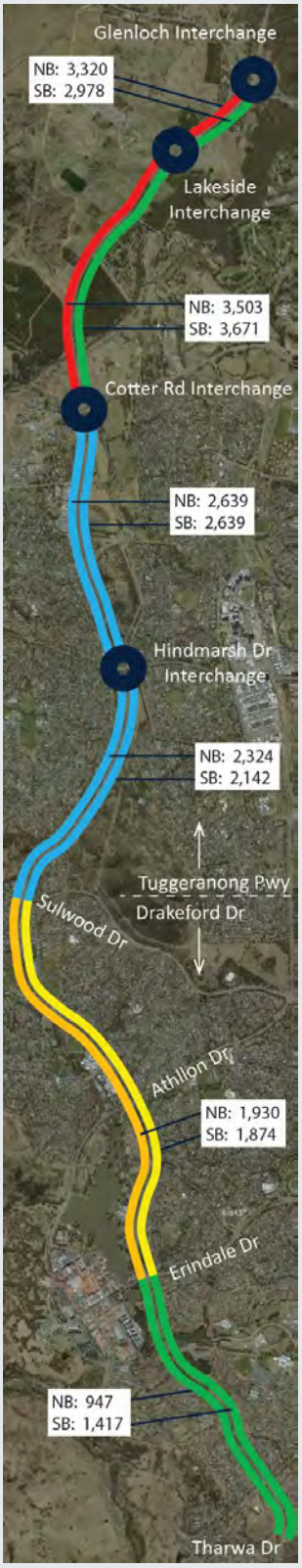
2031			
AM		PM	
Base	Project	Base	Project
			

Table 9–6: 2041 forecast corridor performance – Average peak hour speeds

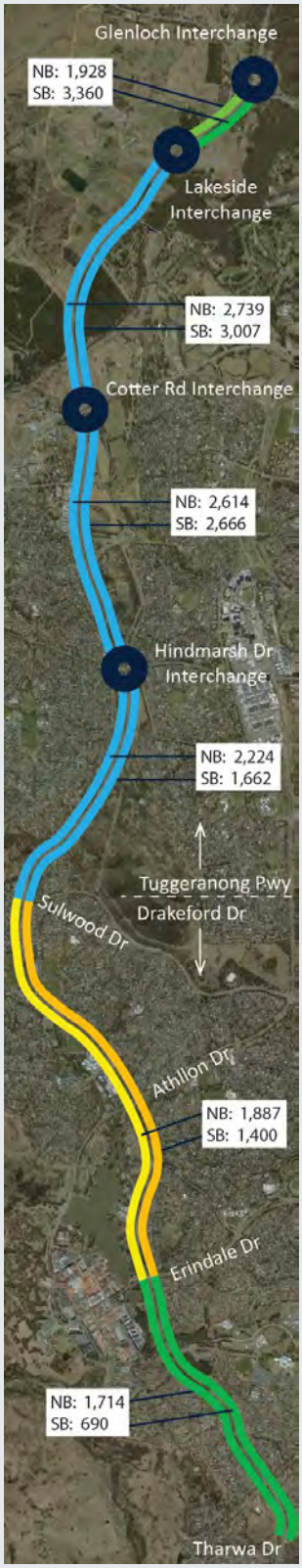
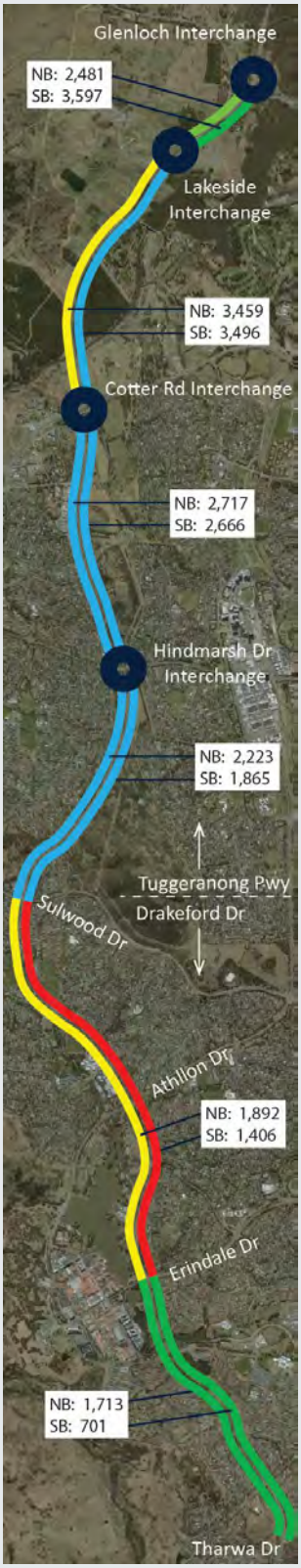
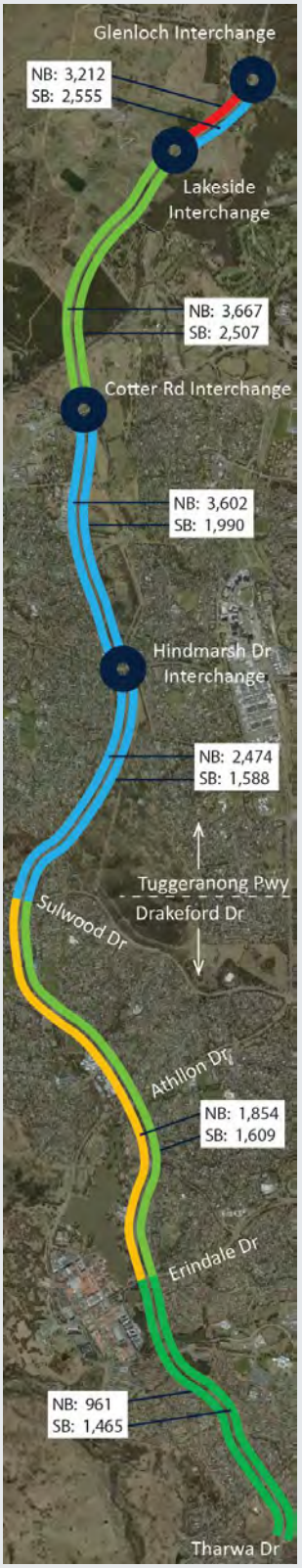
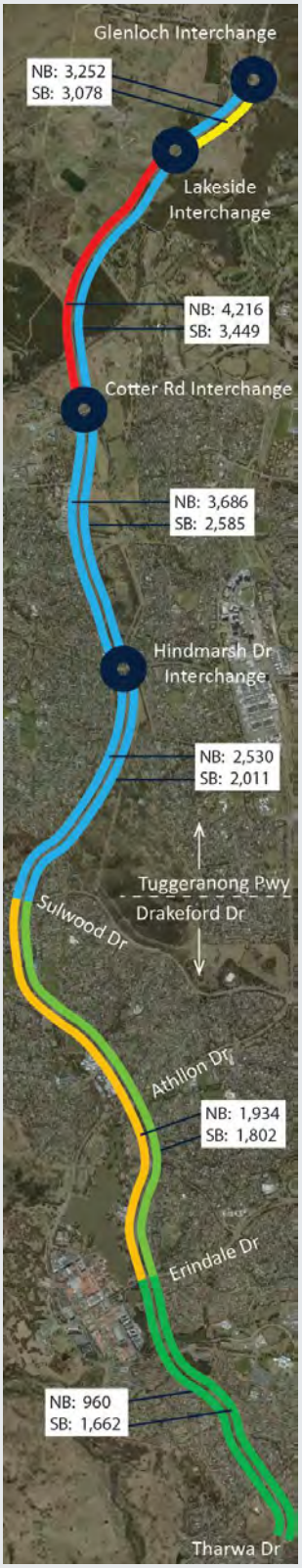
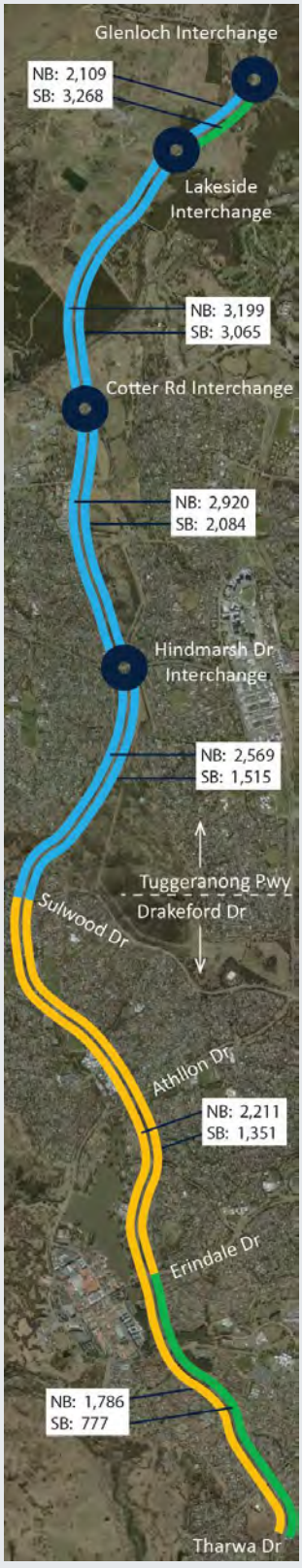
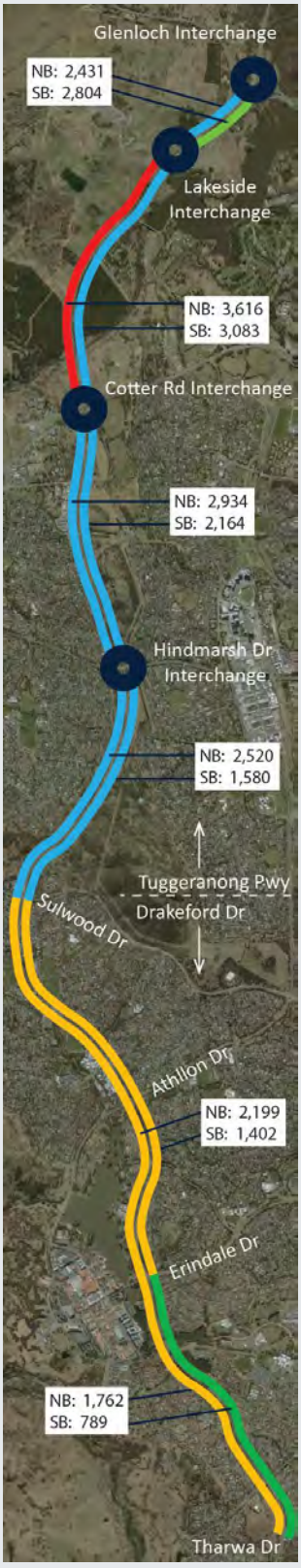
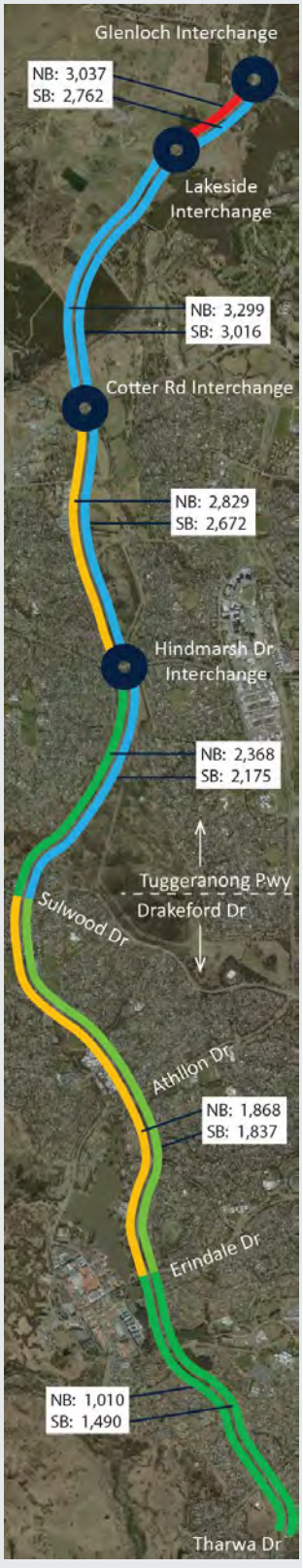
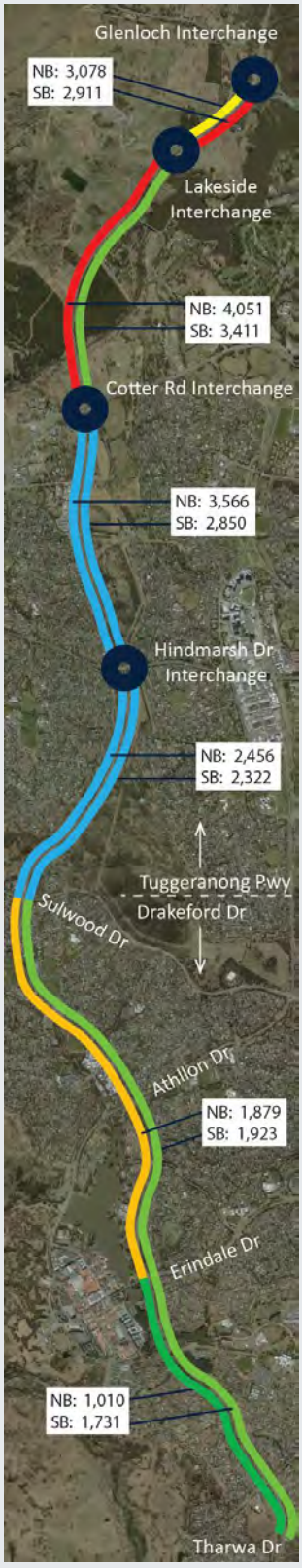
2041			
AM		PM	
Base	Project	Base	Project
			

Table 9–7: 2051 forecast corridor performance – Average peak hour speed

2051			
AM		PM	
Base	Project	Base	Project
			

9.3 Public Transport Operation

The South West Corridor conveys minimal public transport movements to the North of Athllon Drive, and no routes north of Cotter Road. There are several bus routes to the south of Athllon Drive, however it is noted that the only upgrade proposed in this area is improvements to the Isabella Drive intersection in 2041. As such, the Corridor Strategy is not expected to have a substantial impact to public transport operation on the Corridor itself.

However the Corridor Strategy proposes improvements to the Cotter Road and Hindmarsh Drive Interchanges, both of which convey several bus routes, including Rapid services, across the Corridor. Whilst bus operation on Cotter Road and Hindmarsh Drive has not been modelled independently, improved performance at these interchanges is expected to benefit Public Transport operation and travel times at these sites.

9.4 Active Travel

Upgrade of the Cotter Road and Hindmarsh Drive Interchanges, and the Isabella Drive Intersection involve minor alterations and improvements to the active travel network, although given the nature of the upgrades, these are considered unlikely to substantively influence active travel operation or mode share. Furthermore, the East West Arterial Interchange may potentially include a part of the Molonglo to City Cycle Highway, although it is noted that this feature of the upgrade is part of a more significant project that is largely outside the Corridor extent. As such, noting that the Corridor Strategy is likely to contribute to the operation of the active travel network in several minor ways, the operation of the active travel network has not been analysed as part of the Corridor Strategy

9.5 Freight

The South West Corridor forms part of Canberra's Orbital road freight network. Whilst 2023 surveys indicated that heavy vehicle movements on the Tuggeranong Parkway constituted 2.4% of total vehicles between the Glenloch and Lakeside Interchanges, the Corridor provides an important freight link to Several Canberra district in addition to regional freight links such as the Barton Highway to the west, the Monaro Highway to the south and the Federal Highway to the North.

The South West Corridor was considered in the recent Freight Corridor Assessment of Canberra's transport network included as Appendix D. The assessment considered five alternative ACT corridors to identify which were most suitable for conveying road freight in and through the Territory. Two of these corridor included routing of freight vehicles in the South West Corridor:

- **Route 2** – Barton Highway, Gungahlin Drive, Caswell Drive, Tuggeranong Parkway, Hindmarsh Drive, Canberra Avenue
- **Route 3** - Barton Highway, Gungahlin Drive, Caswell Drive, Tuggeranong Parkway, Drakeford Drive, Isabella Drive, Monaro Highway

A suitability assessment was undertaken on the alternative freight corridors considered in the study utilising a Multi Criteria Analysis. The suitability assessment made several findings in relation to the potential freight routes relevant to the South West Corridor:

- **Preferred Freight Route** – The analysis indicated that Canberra's existing primary freight corridor that routes through Barton Highway/Federal Highway/Majura Parkway is the most suitable for carrying large freight vehicles across Canberra. This corridor passes through/near the three major industrial areas (Hume, Mitchell and Fyshwick), provides the best north/south connection and the best east/west connection. The analysis indicated that this had a high degree of suitability for freight movements and is fully aligned with the Future Orbital Freight Network defined in the ACT Transport Strategy 2020.
- **Route 2** – This corridor was assessed as having moderate suitability as a freight corridor. With commercial, high density residential and mixed-use zones, numerous public transport routes, and steep grades along Hindmarsh Drive, the east-west component of the route was found to have low suitability for freight movements.

The north-south element of this freight corridor that routes along the South West Corridor (ie the Tuggeranong Parkway between Glenloch Interchange and Hindmarsh Drive) was found to have reasonable suitability for freight movements.

- **Route 3** – This corridor was assessed as having moderate suitability as a freight corridor. The east-west component of the route was found to be unsuitable for freight movements, with Isabella Drive featuring a two-way two-lane undivided arrangement along the majority of the section with a number at-grade intersections and suburban residential land uses.

  While part of the north-south component of the route (including the Tuggeranong Parkway zone of the Corridor) was found to have reasonable suitability freight movements, the southern zone of the South West Corridor that includes Drakeford Drive was found to be unsuitable for high volumes of freight movements due to surrounding land uses; vulnerable road user facilities such as cycle lanes; and presence of unsignalised intersections.

Given the above, the Freight Corridor Assessment recommended a focus on the preferred freight route to convey freight through the Territory and to key freight attractors including Hume, Mitchell and Fyshwick, and that freight network enhancements to the ACT transport network should target this Corridor. Notwithstanding this finding, it is noted that the South West Corridor will continue to serve an important route for local freight distribution and to facilitate some regional freight connectivity.

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10. Corridor Safety Performance

10.1 Current Crash History

The South West Corridor is one of the busiest road corridors in the ACT. The Corridor's nature and speed regime varies significantly over its length with implications for safety, crash potential, crash exposure and crash severity. The Corridor is characterised by two distinct zones:

- **Tuggeranong Parkway** – A motorway condition road with full access control and grade separation. It is a high volume / high speed free flow environment (posted speed 90-100 km/h). With full median barrier separation, there is minimal likelihood of head-on or side impact crashes, but potential for side-swipe crashes with high volumes in merge/diverge zones, high speed run off road crashes, and high-speed differential rear-end crashes.
- **Drakeford Drive** – An arterial road with numerous at grade intersections (signalised, roundabout and priority controlled). Drakeford Drive typically has a wide median and is consistently an intermediate speed environment (posted speed of 80 km/h). The wide median reduces the likelihood of head-on crashes, although there are numerous roadside hazards (trees, vertical drops etc) in both the verge and median, some of which are protected by barriers (noting that these some barriers do not conform to current design standards). Crash types of concern on Drakeford Drive include side impact (at intersections), run off road / hit object, high-speed differential rear end crashes, and crashes involving vulnerable road users.

The South West Corridor has a substantial crash history, having experienced over 2000 crashes, including 7 fatal accidents, in the five years to December 2024. Of these crashes, 92% were property damage only, and 8 % were fatal or injury crashes. Notably, whilst only 44% of the crashes were on Drakeford Drive (56% on the Tuggeranong Parkway and the Glenloch Interchange), the majority of fatal crashes occurred on Drakeford Drive. A summary of the crash history in the South West Corridor for the five years between January 2020 through to December 2024 by crash type is shown in Table 10–1.

Table 10–1: 5 year Crash History - 2020-2024 (ACT Open Data Portal)

Corridor Segment	Fatal	Injury	Property Damage	Total
Glenloch Interchange* - Lady Denman Dr	1	25	216	242
Lady Denman Dr - Cotter Rd	0	20	399	419
Cotter Rd - Hindmarsh Dr	0	18	300	318
Hindmarsh Dr - Sulwood	1	14	147	162
Sulwood Dr - Erindale Dr	3	43	549	595
Erindale Dr - Tharwa Dr	2	25	272	309
TOTAL	**7**	**145**	**1883**	**2045**

* Crash history includes all elements of the Glenloch Interchange

10.2 iRAP Safety Analysis

The International Road Assessment Program (iRAP) was established in order to minimise the significant social and economic cost of road crashes. It is the umbrella organisation for road assessment programs around the world, and works with governments, road authorities and other organisations to improve road safety outcomes in over 100 countries. The primary goal of the iRAP organisation is to improve the safety of all road users around the world, which it aims to achieve using the following four consistent protocols to assess and improve road safety.

1) **Risk Maps** – use detailed crash data to illustrate the actual number of deaths and injuries on a road network

2) **Star Ratings** – Provide a simple and objective measure of the level of safety provided by a road's design

3) **Safer Roads Investment Plans** – Draw on approximately 90 proven road improvement options to generate affordable and economically sough infrastructure options for saving lives

4) **Performance Tracking** – Enables the use of Star Ratings and Risk Maps to track road safety performance and establish policy positions

10.2.1 AusRAP

AusRAP is the Australian version of the iRAP and was introduced to Australia in 2000. It has been managed by Austroads since 2021, and aims to maximise road safety outcomes and reduce road trauma by assisting local governments and managing the effective investment in Australian roads.

10.2.2 The Safe System

The Safe System is a road safety philosophy that requires roads to be designed and managed so that death and serious injury are avoidable. The basic principles are:

- Humans are fallible, and will inevitably make mistakes when driving, riding or walking.
- Despite this, road trauma should not be accepted as inevitable. No one should be killed or seriously injured on our roads.
- To prevent serious trauma, the road system must be forgiving, so that the forces of collisions do not exceed the limits that the human body can tolerate.

The Safe System philosophy is divided into four core interrelated pillars (shown in):

- **Safer Roads:** Relates to both the road itself and the roadside. This considers ways to reduce the chance of a crash occurring as well as the consequence when one does occur.
- **Safer Speeds:** Relates to the speed at which vehicles are likely to travel on the road. Factors that influence operating speeds includes posted speed limits, the level of compliance with the speed limit and physical constraints. Unsafe speeds can increase both likelihood and consequence of a crash.
- **Safer Vehicles:** Relates to the safety features, including intelligent technologies that are incorporated into vehicles of different types, which contribute to crash avoidance and/or reduced crash severity.
- **Safer Road Users:** Relates to road user behaviour, driver/rider training and licensing, levels of compliance and personal safety equipment in the case of vulnerable road users such as cyclists and motorcyclists.
- **Post-Crash Care:** Relates to emergency medical and rescue response, trauma care (both at the scene and in hospital) and injury rehabilitation.

Figure 10–1: The Safe System (source: Austroads Guide to Road Safety Part 6, 2022)

The *Austroads Safe System Assessment Framework (AP-R509-16)* details the Safe System Assessment (SSA) that can be used to subjectively analyse a project's alignment with the safe system. However these qualitative assessments are typically high-level and therefore more useful at the planning stages of projects. The Austroads framework notes that when a high degree of precision is required, the standard SSA can be replaced by a more detailed, quantitative assessment.

The Australian National Risk Assessment Model (ANRAM) is identified as an example of a more detailed assessment of the safe system. ANRAM was a precursor to AusRAP, with a lot of the functionality relating to Fatal and Serious Injury (FSI) estimations having been incorporated into the iRAP/AusRAP process. Therefore, iRAP assessments are consistent with the Safe System approach and principles, while providing a more detailed analysis of road conditions compared to a standard SSA.

The key benefits of an iRAP/AusRAP assessment over a standard SSA are as follows:

- iRAP assessments have a global standard and is highly repeatable between users
- iRAP assessments are scalable to a network level
- iRAP assessments can be used to produce economic analysis for safety countermeasures and can be used to predict FSI on a road network

10.3 Star Ratings

As noted above, Star Ratings are one of the key iRAP/AusRAP protocols and provide a simple measure of the level of safety provided by a road's design. By inspecting more than 50 different road infrastructure attributes that are known to have an impact on the likelihood and/or severity of different crash types, a Star Rating Assessment (SRA) provides an objective measure of the level of safety the road provides for vehicle occupants, pedestrians, bicyclists and motorcyclists. Between 1 and 5 stars are awarded depending on the level of safety which is 'built in' to the road, with each star rating increment representing approximately half the road safety risk of the previous band.

An SRA forms part of an iRAP/AusRAP assessment. The aim of iRAP is to minimise the number of 1 and 2 star roads, which do not have the required safety attributes for the prevailing speed. The primary goal of AusRAP is to ensure that at least 80% of all vehicle travel across Australia is on 3-star roads or better by 2030.

10.4 Star Rating Assessment

The Star Rating Assessment (SRA) process involves dividing the road corridor into 100m sections, and then coding more than 50 different road infrastructure attributes along each section in accordance with the *iRAP Coding Manual – drive on the left edition*. The road attribute coding data is then then uploaded to the ViDA online software tool to produce Star Rating Scores, Risk Maps and Risk Worms, all of which provide a quantitative picture of the level of road safety for different road users.

As part of the South West Corridor Strategy, an SRA has been undertaken to assess the road safety outcomes that are expected from the proposed corridor upgrade. As vehicles represent the vast majority of traffic along this corridor, only the impact on vehicle SRS have been considered in the assessment. Further detail on the SRA include assumptions and results is included in Appendix F.

10.4.1 Relevant Design Packages

A number of strategic design packages are included in the proposed Corridor Strategy. While some of the proposed upgrades will directly impact the SRS and Star Rating along Drakeford Drive and Tuggeranong Parkway, others will not.

A summary of the proposed design packages and their potential impact on SRS and Star Rating is shown in Table 10–2. The upgrades proposed in packages SW4a, SW5, SW10 and G8 will not have an impact on the vehicle SRS and Star Rating along the South West Corridor. Therefore they have not been included in the SRA assessment.

Table 10–2: Upgrade package summary

Upgrade Package	Description	Will the Upgrade impact the SRS and Star Rating?
SW1	- Additional northbound traffic lane along Tuggeranong Parkway - Widen shoulder to 2.5m across Molonglo River	✓
SW2	- New northbound on-ramp (merge lane) from the proposed East-West Arterial - New southbound on-ramp (merge lane) from the proposed East-West Arterial	✓
SW3	- Additional southbound traffic lane along Tuggeranong Parkway - Widen shoulder to 2.5m across Molonglo River	✓
SW4a	- Additional traffic lane on Hindmarsh Drive	-
SW4b	- Upgrade Tuggeranong Parkway / Hindmarsh Drive to a S ingle Point Urban Interchange (SPUI)	✓
SW5	- VSLS & VMS Installation	-
SW8	- Convert the Drakeford Drive / Athllon Drive / Isabella Drive roundabout to a signalised intersection with additional turning lanes	✓
SW10	- Additional turn lanes at the Tuggeranong Parkway / Cotter Road interchange	-
G8	- Additional turn lanes at the Forest Drive intersections with the SWC ramps and Lady Denman Drive, respectively	-

10.4.2 Road Attribute Coding – Existing Conditions

In 2018, ARRB (NTRO) undertook road attribute coding for the entire ACT road network, including the South West Corridor. This coding was provided by the Territory in order to undertake the SRA of the existing conditions, hereby referred to as the Base Case. Whilst reviewing this coding it was noted that a number of inconsistencies between the observed and coded network existed. These inconsistencies, the associated analysis approach, and general analysis assumptions are discussed in detail in Appendix F.

10.4.3 Road Attribute Coding – Upgrade Scenario

The design coding was undertaken based initially on the original ARRB existing conditions coding and changing the relevant sections and attributes as per the proposed upgrades in the strategic design packages. The approach to coding and analysing the Upgrade Scenario (Project Case) included:

- **Unchanged Sections** – Only the sections of the Drakeford Drive and Tuggeranong Parkway being upgraded were reviewed and the coding modified accordingly. The coding for sections remaining unchanged from the existing conditions were not reviewed and therefore also left unchanged.
- **2018 vs 2041 Upgrade Scenario** - In order to assess the long term safety impacts of the South West Corridor, the proposed upgrades to Drakeford Drive and Tuggeranong Parkway have been assessed based on 2041 traffic conditions. The 2041 AADT traffic flows along Tuggeranong Parkway, Drakeford Drive and intersecting roads were unavailable for this assessment. Therefore for the 2041 design coding, the average of the AM and PM peak volumes from the 2041 CSTM (Version 1.2) estimates was calculated and then expanded by a factor of x10 to create a high level estimate of the daily traffic flow.

  However the increased traffic volumes in 2041 will also increase the overall risk of collisions along the corridor. Therefore while the proposed upgrades may improve safety outcomes, the SRS score may still see an increase from the existing conditions due to these higher traffic volumes. To ensure an accurate comparison can be made between the safety performance of road infrastructure in existing conditions and the Upgrade Scenario, the upgrades has also been coded using the same 2018 traffic volumes used for the existing conditions. As noted above these volumes are considered low, however testing a scenario

with consistent volumes allows for direct comparison between the Upgrade Scenario and the Do Minimum Scenario. Therefore for the 2018 Upgrade Scenario coding, AADT traffic flows along Tuggeranong Parkway, Drakeford Drive and intersecting roads remain unchanged from the ARRB existing conditions coding.

10.5 Star Rating Assessment Results

10.5.1 Vehicle Star Rating Score (SRS)

Table 10–3 presents the Vehicle SRS from the assessment, noting that the score represent an overall average for each Corridor segment or site, in contrast to the scores indicated on the risk worms which provide SRS scores for 100m segments along the Corridor. Note that lower scores indicate a safer outcome from a road safety perspective.

Table 10–3: Summary of Star Rating Scores

Corridor Segment	Base	Design 2018	Diff	Design 2041
Overall Corridor Segments (with all proposed upgrades)				
Drakeford Drive Northbound	10.66	10.80	-0.13	11.59
Drakeford Drive Southbound	10.78	10.99	-0.20	11.78
Drakeford Drive	10.72	10.89	-0.17	11.68
Tuggeranong Parkway Northbound	10.42	7.47	2.95	7.77
Tuggeranong Parkway Southbound	10.28	8.97	1.32	9.05
Tuggeranong Parkway	10.35	8.22	2.13	8.41
TOTAL CORRIDOR	**10.52**	**9.44**	**1.08**	**9.91**
Upgrade Sites				
SW1 + SW2 (northbound)	6.93	3.38	3.56	3.77
SW2 (southbound) + SW3	8.16	4.08	4.07	4.37
SW4b	14.26	4.19	10.07	4.95
SW8	8.99	12.80	-3.82	30.67
TOTAL – UPGRADE SITES	**9.59**	**6.11**	**3.47**	**10.94**

10.5.2 Risk Maps

Figure 10–2 and Figure 10–3 present the Risk Maps from the assessment, which indicate the Star Ratings of each individual section of Drakeford Drive and Tuggeranong Parkway.

Drakeford Drive

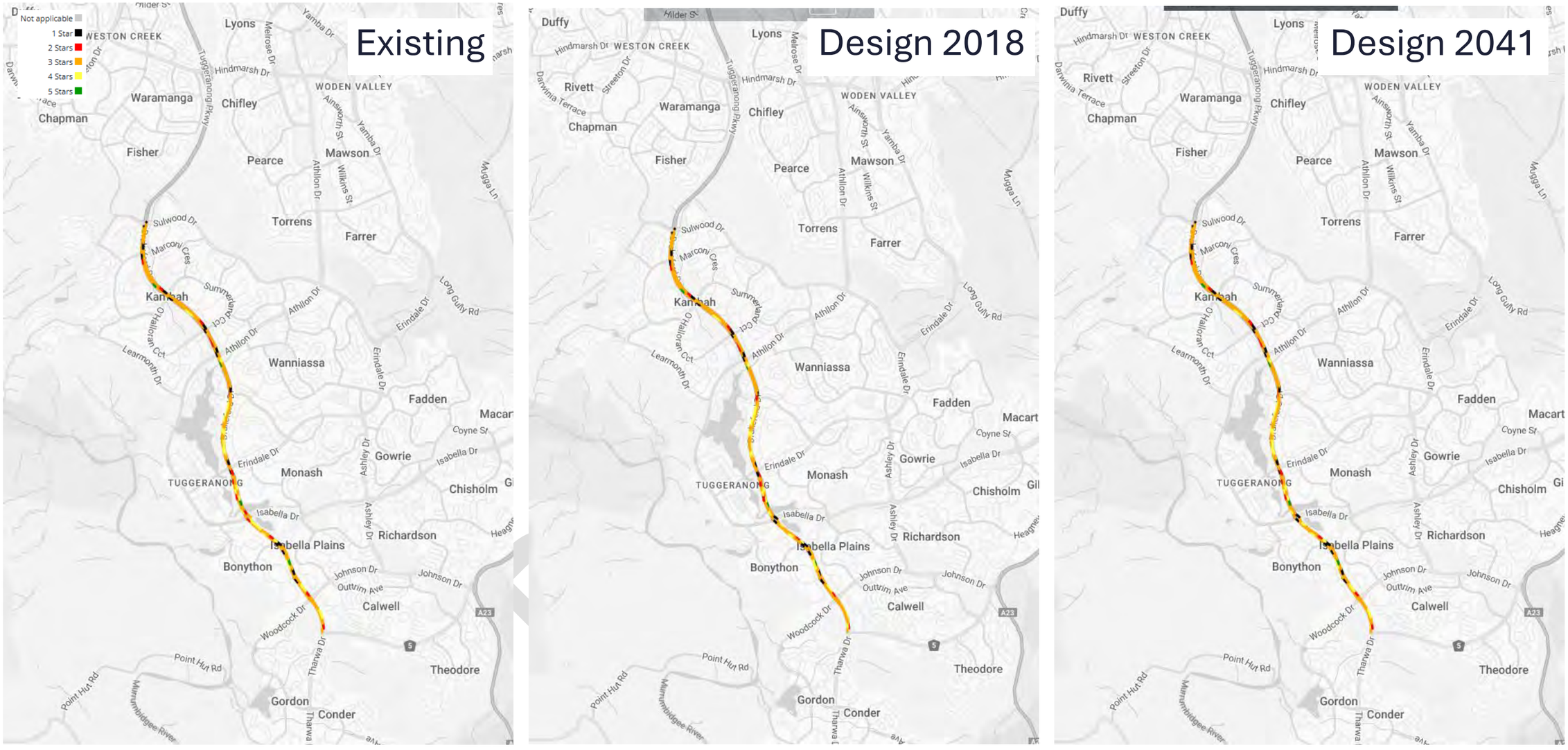

Figure 10–2: Drakeford Drive Risk Maps – existing (left), design 2018 (centre) and design 2041 (right)

Tuggeranong Parkway

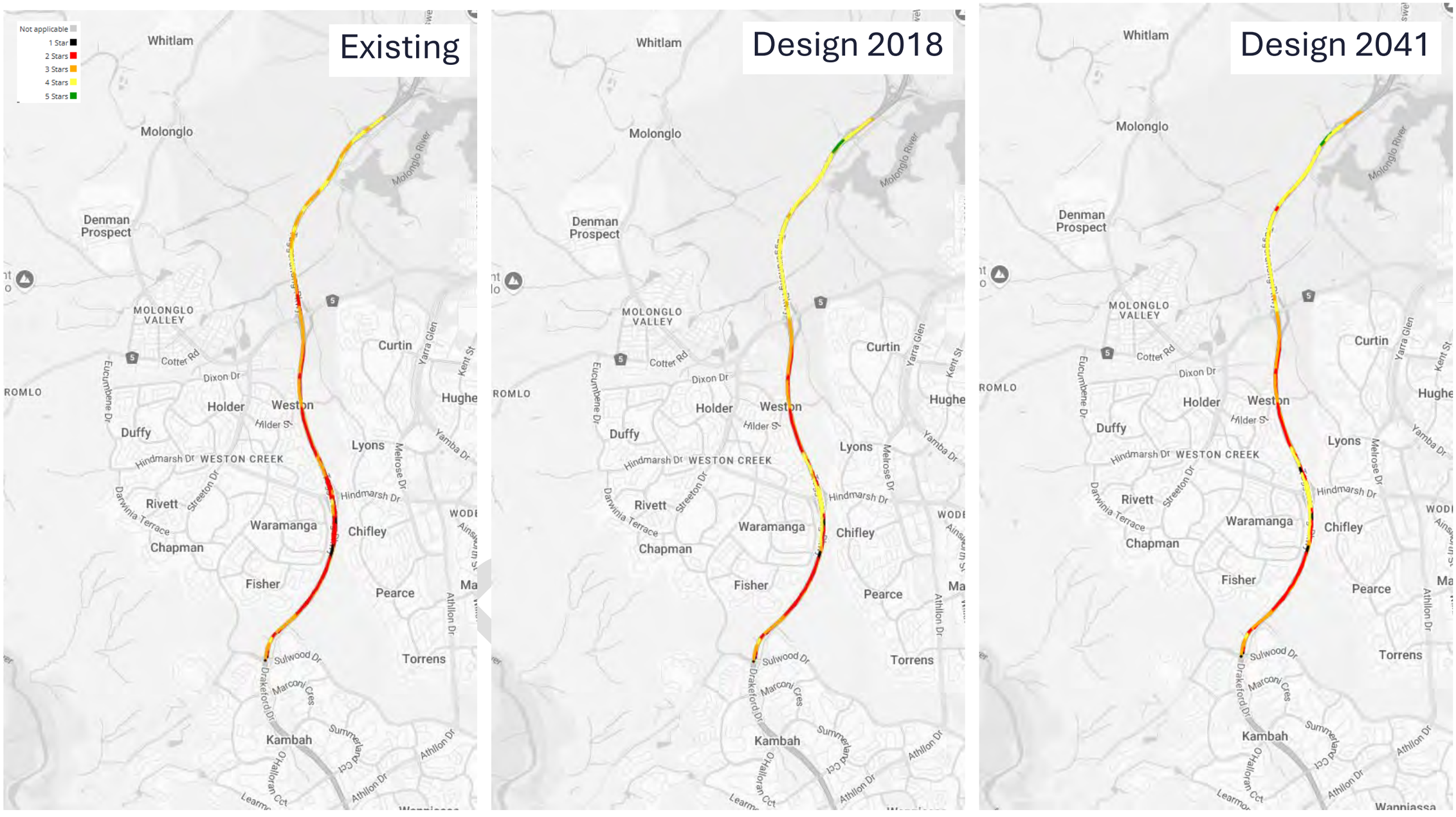

Figure 10–3: Tuggeranong Parkway Risk Maps – existing (left), design 2018 (centre) and design 2041 (right)

10.5.3 Risk Worms

Figure 10–4 and Figure 10–5 present the Risk Worms from the assessment, which indicate the Star Ratings of each individual section of Drakeford Drive and Tuggeranong Parkway on the southbound (dark blue worm) and the northbound (light blue) carriageways.

Drakeford Drive

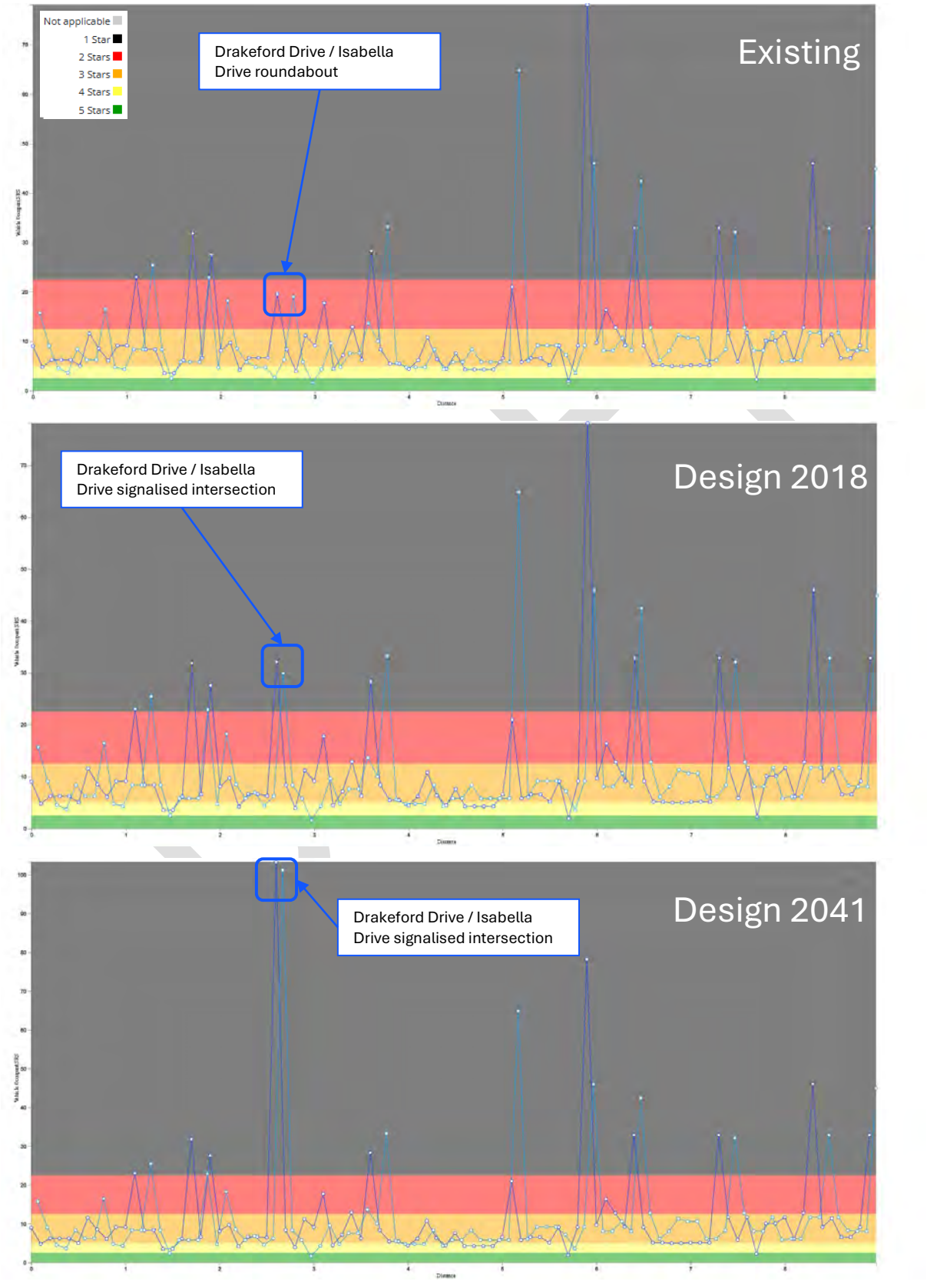

Figure 10–4: Drakeford Drive Risk Worms – existing (top), design 2018 (centre) and design 2041 (bottom)

Tuggeranong Parkway

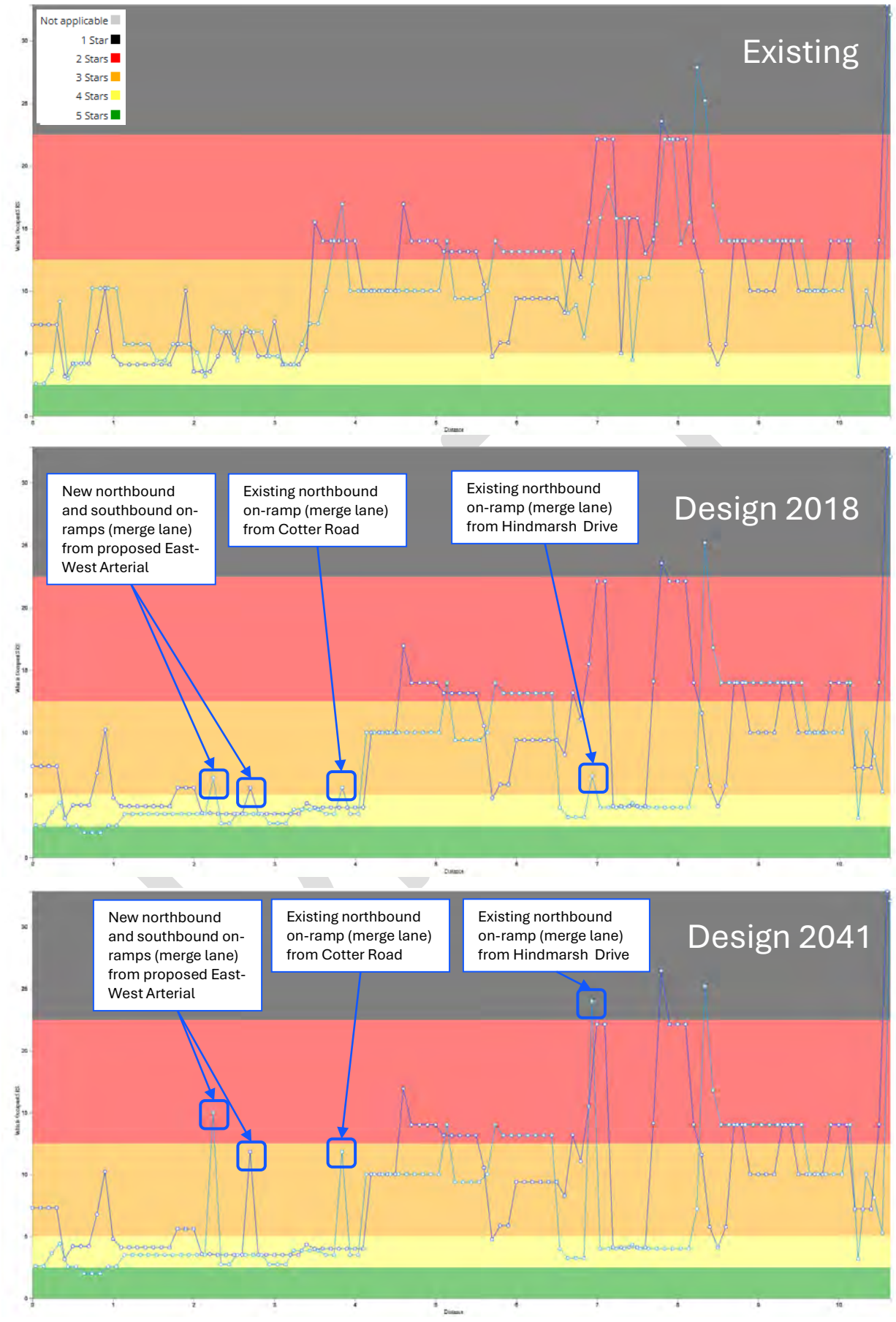

Figure 10–5: Tuggeranong Parkway Risk Worms – existing (top), design 2018 (centre) and design 2041 (bottom)

10.6 Discussion of SRA Results

The following sections provide a high level analysis of the SRS results for each vehicle crash type (refer to individual safety category results in Appendix F). Note that a reduction in SRS indicates an improvement in road safety outcomes.

The iRAP/AusRAP process considers the following three vehicle crash types:

- **Run-Off-Road –** Loss Of Control (LOC) to the driver side and to the passenger side
- **Head-On –** Loss Of Control (LOC) and Overtaking
- **Junction –** Intersection and Property Access

10.6.1 Run-Off LOC Driver Side

The southbound Drakeford Drive carriageway sees an increase in SRS from the Do Minimum Scenario (existing conditions) to the 2018 Upgrade Scenario, due to the addition of non-frangible signal pedestals close to the traffic lane at the Drakeford Drive / Isabella Drive intersection. However, both Tuggeranong Parkway carriageways see a reduced SRS (northbound had the greatest reduction) due to the minimum 1.0m barrier offset that has been assumed along the entire length. As a result, the South West Corridor as a whole sees an SRS reduction (safety improvement) from the Do Minimum Scenario to the 2018 Upgrade Scenario.

From a strategic design perspective, the new roadside hazards (signal pedestals) at the Drakeford Drive / Isabella Drive intersection means that SW8 sees an increase in SRS from the Do Minimum Scenario to the 2018 Upgrade Scenario, indicating reduced safety outcomes. However all other design packages see a reduction in SRS (with SW4b showing the greatest decrease), resulting in an overall safety improvement across all packages. The increased traffic volumes in the 2041 Upgrade Scenario do not impact the SRS, which remains the same as the 2018 design.

10.6.2 Run-Off LOC Passenger Side

Both Tuggeranong Parkway carriageways see a reduction in SRS from the Do Minimum Scenario to the 2018 Upgrade Scenario, which is primarily due to the assumed roadside safety barrier that will be installed along all sections within the upgrade sites.

From a strategic design perspective, all design packages see a reduction in SRS (with SW4b showing the greatest decrease) as a result of the roadside safety barrier, resulting in an overall safety improvement across all packages. The increased traffic volumes in the 2041 Upgrade Scenario do not impact the SRS, which remains the same as the 2018 design.

10.6.3 Head-On LOC

The Do Minimum Scenario (existing conditions) SRS is already very low, due to the separated carriageways and physical median separation along the majority of the corridor. However the SRS still sees a slight reduction (safety improvement) along Drakeford Drive in the 2018 Upgrade Scenario, which may be due to the increased separation between carriageways. Tuggeranong Parkway does not see any SRS change between the Do Minimum Scenario and 2018 Upgrade Scenario.

From a strategic design perspective, only SW8 sees a reduction in SRS from the Do Minimum Scenario to the 2018 Upgrade Scenario. All other design packages have Do Minimum Scenario and Upgrade Scenario SRS of 0.00, indicating there is already minimal risk of head-on collisions due to loss of control along these sections, which remains unchanged under the 2018 design. The SRS in the 2041 Upgrade Scenario is marginally higher than the 2018 design, which is due to the increased exposure to head-on collisions with higher traffic volumes.

10.6.4 Head-On Overtaking

All carriageways and design packages have Do Minimum Scenario (existing), 2018 Upgrade Scenario and 2041 Upgrade Scenario SRS of 0.00. This indicates that there is already minimal risk of head-on collisions due to overtaking manoeuvres along these sections, which remains unchanged under the proposed design.

10.6.5 Intersection

All carriageways see an increase in SRS from the Base Case to the 2018 Upgrade Scenario, indicating that the proposed design results in a higher risk of intersection crashes. The introduction of new on-ramps from the proposed East-West Arterial Interchange (which are coded as merge lanes) will create new intersection conflict points along the corridor, resulting in a greater risk of crashes along the northbound and southbound carriageways.

The conversion of the Drakeford Drive / Isabella Drive roundabout to a signalised at-grade cross intersection also has a detrimental impact on SRS. Roundabouts typically have more forgiving crash angles and fewer conflict points compared with cross intersections. Therefore the analysis suggests that Drakeford Drive will have a higher risk of intersection crashes as a result of the proposed upgrade. It is noted however the existing roundabout currently has a poor crash performance, and notwithstanding the SRS scoring, the actual implications of the upgrade are unclear as the comparative SRS do not consider existing crash history.

From a strategic design perspective, this means that package SW8 results a significant SRS increase from Do Minimum Scenario to the 2018 Upgrade Scenario, which reflects the significant additional safety risk introduced by converting a roundabout to a signalised intersection. Furthermore, the SRS for the 2041 Upgrade Scenario increases by a factor of x4 compared with design 2018 (as seen on the Risk Worms) due to the significantly higher traffic volumes forecast along both Drakeford Drive and Athllon / Isabella Drive compared to the those considered in original 2018 ARRB coding.

In addition, the on-ramps (merge lanes) proposed from the East-West Arterial result in a higher SRS from the Do Minimum Scenario to the 2018 Upgrade Scenario considered in packages SW1, SW2 and SW3. A further increase is seen in the 2041 Upgrade Scenario due to the increased exposure to intersection crashes created from higher traffic volumes. However, it is noted that the Upgrade Scenario will encourage more traffic along the Corridor and reduce the traffic volumes on other parts of the road network in 2041. The SRA does not consider this reduced crash exposure at sites external to the Corridor, and is therefore likely to understate the overall safety benefit to the wider transport system resulting from the upgrades.

10.6.6 Property Access

All carriageways and design packages have Do Minimum Scenario (existing conditions), 2018 Upgrade Scenario and 2041 Upgrade Scenario SRS near 0.00. This indicates that there is already minimal risk of collisions involving vehicles departing/entering property access points, which remains unchanged under the proposed design.

10.7 Overall Vehicle Star Rating Improvements

Note that unlike SRS, a higher Star Rating means there is a lower risk of crashes along the road and is therefore desirable. Works are proposed in a total of 91 individual sections along Drakeford Drive and Tuggeranong Parkway, each of them 100m in length. Out of these, two-thirds of the sections (60 in total) see a higher Star Rating under the proposed 2018 Upgrade Scenario, compared with the Do Minimum Scenario. By contrast, only 5 sections see a lower star rating, which can be primarily attributed to the additional on-ramps and roundabout removal along the corridor.

Aside from two sections along Drakeford Drive (both associated with the new signalised at-grade intersection at Isabella Drive), all other sections within the scope of works feature a Star Rating of 3 or more under the proposed Upgrade Scenario. As a result, the overall smoothed Star Rating along the entire length of Drakeford Drive and the majority of Tuggeranong Parkway is 3 or more. The Star Ratings are summarised in Figure 10–6 and Figure 10–7 .

In conclusion, the SRA indicates that implementing the Corridor Strategy will improve road safety outcomes along the South West Corridor. While the risk of intersection crashes will increase due to the proposed new on-ramps from East-West Arterial and conversion of a major roundabout to signalised intersection (and will further increase in 2041 due to higher traffic volumes), the risk of other vehicle crash types will see a reduction under the proposed design. These benefits outweigh the higher intersection crash risk, resulting in an overall net-positive road safety outcome. Furthermore, it is noted that the Upgrade Scenario will encourage more traffic along the Corridor and reduce the traffic volumes on other parts of the road network in 2041. The SRA does not consider this reduced crash exposure at sites external to the Corridor, and is therefore likely to understate the overall safety benefit to the wider road network resulting from the upgrades.

10.8 Percentage of the Corridor with a 3+ Star Rating

An analysis of the SRS results indicated that 73% of the South West Corridor is rated at 3 stars or above in the Do Minimum Scenario. A greater number of 4 and 5 star sections under the Upgrade Scenario sees the total percentage of the Corridor rated at 3 stars or above increase to 78%, indicating the overall safety benefit that will result from the Corridor Strategy.

As previously noted, the primary goal of AusRAP is to ensure that at least 80% of all vehicle travel across Australia is on 3-star roads or better by 2030, which the South West Corridor is close to achieving under the Upgrade Scenario.

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Star Ratings	Vehicle Occupant Length (km)	Percent
3 star or better	14.8	82%
5 Stars	0.4	2.2%
4 Stars	2.9	16%
3 Stars	11.5	64%
2 Stars	1.4	7.8%
1 Star	1.8	10%
Not applicable	0.0	0%
Totals	18.0	100%

Star Ratings	Vehicle Occupant Length (km)	Percent
3 star or better	14.8	82%
5 Stars	0.4	2.2%
4 Stars	2.7	15%
3 Stars	11.7	65%
2 Stars	1.2	6.7%
1 Star	2.0	11%
Not applicable	0.0	0%
Totals	18.0	100%

Star Ratings	Vehicle Occupant Length (km)	Percent
3 star or better	14.8	82%
5 Stars	0.4	2.2%
4 Stars	2.7	15%
3 Stars	11.7	65%
2 Stars	1.2	6.7%
1 Star	2.0	11%
Not applicable	0.0	0%
Totals	18.0	100%

Figure 10–6: Drakeford Drive Star Ratings – existing (left), design 2018 (centre) and design 2041 (right)

Star Ratings	Vehicle Occupant Length (km)	Percent
3 star or better	13.8	64%
5 Stars	0.0	0%
4 Stars	4.0	19%
3 Stars	9.8	46%
2 Stars	7.1	33%
1 Star	0.5	2.3%
Not applicable	0.0	0%
Totals	21.4	100%

Star Ratings	Vehicle Occupant Length (km)	Percent
3 star or better	16.1	75%
5 Stars	0.3	1.4%
4 Stars	9.2	43%
3 Stars	6.6	31%
2 Stars	4.9	23%
1 Star	0.4	1.9%
Not applicable	0.0	0%
Totals	21.4	100%

Star Ratings	Vehicle Occupant Length (km)	Percent
3 star or better	15.9	74%
5 Stars	0.3	1.4%
4 Stars	9.2	43%
3 Stars	6.4	30%
2 Stars	5.0	23%
1 Star	0.5	2.3%
Not applicable	0.0	0%
Totals	21.4	100%

Figure 10–7: Tuggeranong Parkway Star Ratings – existing (left), design 2018 (centre) and design 2041 (right)

11. Corridor Strategy Investment Return

11.1 Overview

The delivery of the South West Corridor package of works will require significant infrastructure investment over the next 30 years. With the current constrained funding environment, it is essential that this infrastructure investment provides value for money for the ACT Government. A high-level cost benefit analysis (also known as a rapid economic appraisal) has therefore been undertaken to estimate the socio-economic benefits of the implementation of the Corridor Strategy compared to the investment cost for delivery and operation. Subsequent stages of planning and design will then provide a more detailed assessment of the cost and benefits of each individual project.

Due to the inter-related nature of the Parkes Way and South West Corridor Strategies, the rapid economic appraisal has initially been completed for the delivery of the full package of works along both corridors. The economic merit of the individual corridor package of works has then been estimated through a benefit apportionment process.

The results of the rapid economic appraisal are summarised following, with further details provided in the Rapid Economic Appraisal Report included in Appendix G.

11.2 Methodology

The rapid economic appraisal has been prepared using Australian Transport and Assessment Planning (ATAP) guidelines and the application of respective economic parameters. The methodology has been tailored for the proposed package of works along both the Parkes Way Corridor and South West Corridor, with consideration of the impacts on general traffic, freight, public transport and active travel. The following key economic performance measures have been calculated to estimate the economic viability:

- **Benefit Cost Ratio (BCR)** – a measure of the magnitude of net benefit to society derived from the capital investment in the package of works
- **Net Present Value (NPV)** – a measure of the magnitude of net benefit to society from the package of works, equal to the present value of benefits less the present value of costs of the package of works

Analysis of the results considers the BCR and NPV using the conventional cost benefit analysis method as the primary measure of economic viability. Other economic metrics such as Internal Rate of Return (IRR), Net Present Value per Dollar of Capital Investment (NPVI), and First year rate of return (FYRR) are discussed in the Rapid Economic Appraisal Report included in Appendix G. With the rapid nature of the appraisal, the focus has been on the main monetised benefits and costs. Other costs and benefits expected from the initiatives are then discussed qualitatively.

A key input into the appraisal has been the results of the hybrid (mesoscopic and microsimulation) models discussed in Section 9. This modelling indicates that gridlock will occur at several locations in the road network during both the mesoscopic assignment and hybrid model runs in the 2041 and 2051 Base Case ('Do Minimum' Scenario). Due to the significant traffic demands forecast by 2051, the microscopic model runs are considered too congested to provide meaningful results for this economic appraisal. Key performance metrics have therefore been extracted from the higher-level mesoscopic assignment and normalised to allow for a like-for-like comparison of the base case and project cases. For the purposes of the appraisal, modelling results have been interpolated between 2031 and 2041, as well as 2041 and 2051. For further details on these model extracts and the rapid appraisal methodology, refer to Appendix G.

11.3 Costs

The P50 capital cost estimates for the South West Corridor package of works have been used for this rapid economic appraisal. These costs are shown in Table 11–1 and exclude escalation, with further details provided in Appendix E.

Table 11–1: Project capital cost summary ($2025 prices)

Initiative	Cost Estimate (P50)
SW1	$132,483,000
SW2	$138,134,000
SW3	$13,337,000
SW4a	$5,691,000
SW4b	$203,448,000
SW5	$11,614,000
SW8	$36,302,000
SW10	$31,003,000
G8	$23,034,000
Total	**$595,046,000**

As no escalation has been applied to these costs (prices current as of April 2025), a delivery timeframe has been assumed for each initiative over the next 30 years to identify the present value. Given the rapid nature of this appraisal, no reduction in maintenance savings have been estimated.

Table 11–2 summarises the present value of capital and public transport related operational costs for the South West Corridor upgrades in comparison to the Base Case scenario, as well as the present value of both the South West Corridor and Parkes Way Corridor combined.

Table 11–2 : Summary of present value costs of project ($2025 prices)

Costs	South West Corridor	Combined Package of Works
Capital expenditure	$316.1	$966.2
Operational cost savings (public transport)	N/A	-$1.4
Total costs	**$316.1**	**$964.8**

11.4 Benefits

To determine the benefits of the proposed options, the Upgrade Scenario (South West Corridor and Combined Corridors) have been compared to the 'Do Minimum' Base Case for future years. The difference in benefits between the base case and project case provides the net benefits arising from the project.

The key benefits that have been quantified as part of the South West Corridor appraisal are travel time savings, vehicle operating costs and environmental (externality) benefits. The benefits attributable to the South West Corridor have been estimated using a benefit apportionment process based on the VKT change on each corridor.

Table 11–3 provides a summary of the present value of the benefits for the South West Corridor and combined package of works. It is important to note that these results are derived from the hybrid traffic model developed as part of this project, and that the proposed initiatives are expected to deliver wider network benefits outside of the hybrid traffic model extent.

Table 11–3 : Summary of present value benefits of project a 5% discount rate ($2025 prices)

Benefit	South West Corridor	Combined Package of Works
Travel time savings (general traffic and freight)	$2,914.7	$6,477.2
Travel time savings (public transport users)	N/A	$32.2
Vehicle Operating Cost savings (Stop-Start)	$1,041.3	$2,313.9
Environmental benefits (externalities)	-$231.8	-$515.1
Active travel benefits	N/A	$40.9
Total benefits	**$3,724.2**	**$8,349.2**

Key findings from the quantitative analysis of the South West Corridor are summarised below:

- Travel time savings for general traffic and freight are the main driver of benefits for both corridors followed by vehicle operating cost savings.
- Negative environmental impacts have been estimated due to the network becoming more efficient, allowing greater movements of higher volumes of vehicles and greater total kilometres travelled overall. This is based on VKT solely within the hybrid model, so does not capture wider VKT improvements throughout the network and also does not recognise the improved efficiency in the project scenarios, including reduced congestion and higher/more efficient operating speeds. As such, environmental benefits are likely to be understated in the analysis.

There are several other economic impacts from the proposed corridor upgrades that have not been monetised due to the rapid nature of the appraisal. These include:

- **Safety benefits** – The proposed package of works has been developed with a 'Safe Systems approach', which uses the ACT's design standards and other relevant guidance to ensure high-quality infrastructure is delivered that minimises the number and severity of crashes throughout the ACT. Based on the IRAP assessment undertaken during the development of the Corridor Strategy, there is expected to be a significant safety benefit.
- **Increased travel time reliability** – The proposed package of works is expected to improve reliability for private vehicle trips, i.e. the variation in journey times that individuals are unable to predict.
- **Construction disbenefits** – Construction of the proposed package of works is anticipated to have a negative impact on traffic performance, including increased travel times and a potential increase in crash rates during construction.
- **Cost of carbon emissions** – The proposed package of works is expected to result in upfront carbon emissions during the initial stages of each project, including raw material extraction, transportation, manufacturing, and construction. Additional in use carbon emission disbenefits are also expected with the forecast increase in VKT.
- **Residual value** – The asset design life for the proposed package of works will generally exceed the economic analysis time horizon (30 years for this analysis), with the residual value of this infrastructure providing a project benefit.

11.5 Summary of Cost-Benefit Analysis

The results of the economic appraisal are shown in Table 11–4 at the 5% discount rate with P50 costs. The appraisal has applied flat lining of benefits from 2051 for each project case.

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Table 11–4 : Summary of Cost Benefit Analysis ($2025 prices, discounted)

	South West Corridor	Combined Package of Works
Costs		
Capital expenditure	$316.1	$966.2
Operational savings (public transport)	N/A	-$1.4
Total costs	**$316.1**	**$964.8**
Benefits		
Travel time savings (general traffic and freight)	$2,914.7	$6,477.2
Travel time savings (public transport users)	N/A	$32.2
Vehicle Operating Cost savings (Stop-Start)	$1,041.3	$2,313.9
Environmental benefits (externalities)	-$231.8	-$515.1
Active travel benefits	N/A	$40.9
Total benefits	**$3,724.2**	**$8,349.2**
Economic Return		
NPV	$3,408.1	$7,384.4
BCR	**11.8**	**8.6**

Key findings from the rapid economic appraisal are:

- Benefits from the South West Corridor initiatives are expected to significantly outweigh the costs, with the BCR indicating that the full package of works will achieve 'very high' value for money. This is considered a conservative assessment as the results are derived from the hybrid traffic model developed as part of this project, with the proposed initiatives expected to deliver wider network benefits outside of the hybrid traffic model extent.
- Sensitivity testing has shown that the rapid appraisal is robust in its findings, indicating that the South West Corridor package of works is consistently viable from an economic perspective at 4%, 5% and 7% discount rates. Several additional economic benefits are also expected from the South West Corridor package of works that have not been quantified, such as safety benefits and increased travel time reliability.
- Delivery of the combined South West Corridor package of works and Parkes Way Corridor package of works are also expected to generate benefits that significantly outweigh the costs.

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12. Additional Corridor Considerations

12.1 Overview

The Corridor Strategy is primarily focussed on detecting threats to the operation of the Corridor over the next 30 years and identifying infrastructure upgrades within the Corridor that are likely to remedy forecast issues. However, beyond these infrastructure upgrades, there remain numerous other additional considerations that will also influence the operation and performance of the Corridor. These include policy considerations, mass action regimes, off corridor works, and alternative infrastructure upgrades. Following is a summary of additional considerations that may influence the Corridor over the next 30 years.

12.2 Glenloch Interchange

The Glenloch Interchange is a System interchange (Freeway to Freeway) that lies at the intersection of two of Canberra's most important and heavily trafficked road corridors – the Tuggeranong Parkway / Caswell Drive and Parkes Way / William Hovell Drive corridors. The interchange, particularly its ramps and Parkes Way component, has limited latent capacity and is a major network constraint. Furthermore, the configuration of the interchange is a complex and constrained triple deck arrangement which presents challenges to implementing capacity upgrades at the interchange.

It is noted that modelling indicates that the through lane capacity, ramp capacity, and the operation of the merge and diverge zones are likely to be a considerable operational constraint on the network, the influence of which feed back onto the Tuggeranong Parkway and negatively impact its operation. As such, and notwithstanding any constructability and operational difficulties with delivery of capacity upgrades at the interchange, capacity and / or connectivity upgrades to the Glenloch Interchange may be required (either within the Corridor Strategy horizon or beyond) if found to be viable.

12.3 William Hovell Drive & Parkes Way

There is a high degree of operational interdependence between the South West Corridor and the adjacent Parkes Way Corridor. Performance of the Parkes Way Corridor impacts the operation of ramps to and from the Tuggeranong Parkway, and by, extension influences the traffic flow on the South West Corridor in the vicinity of the Glenloch Interchange. That is, modelling indicates that capacity constraints and congestion on Parkes Way are likely to extend into the South West Corridor and compromise performance of the Corridor.

A Corridor Strategy for the Parkes Way Corridor (including part of William Hovell Drive) between Bindubi Street and Kings Avenue is being undertaken concurrently with this Corridor Strategy. The findings of the Parkes Way Corridor Strategy and implementation of its recommendations will have a significant impact on the South West Corridor. Upgrades to Parkes Way are likely to impact the South West Corridor in two primary ways:

- **Increased Demand** – Pakes Way upgrades are likely to alter traffic patterns in the Territory transport network. Improved conditions and increased capacity in the Parkes Way Corridor is anticipated to draw more trips into the Orbital network and reduce traffic on lower order and local roads. This is expected to result in more trips along the Tuggeranong Parkway, increasing demand on the South West Corridor. This increase however is expected to be offset to a degree by the implementation of proposed public transport and active travel projects on the Parkes Way Corridor which will cause mode shift away from private vehicle trips and ameliorate some of this increased demand.
- **Referred Congestion** – Performance issues and congestion on Parkes Way and William Hovell Drive can disrupt and constrain flow the Tuggeranong Parkway through the Glenloch Interchange. Capacity upgrades associated with the Parkes Way Corridor Strategy aim to address congestion issues on Parkes Way and by extension are expected to improve flow conditions in the South West Corridor.

12.4 Territory Land use

This Corridor Strategy responds to anticipated Territory land release and planned land use over the Corridor Strategy horizon at the time of the publication of this report. This intended ACT land use and its implications for the transport network is captured in the CSTM which has been the basis for trip generation and attraction assumed in this Corridor Strategy. It is noted however that land use planning by its nature is constantly evolving in response to various factors including population growth, community expectations, and physical, planning and environmental constraints in addition to many other factors.

Given the nexus between land use and transport need, and the changing nature of land use planning, there is by extension a relationship between ACT land development and the implementation of the Corridor Strategy. As such, Territory planning policy over the Corridor Strategy horizon will have a substantial influence on the transport needs of the ACT and affect the need and trigger points for the implementation timing of upgrades proposed in the Corridor Strategy.

12.5 Alternative Upgrades

12.5.1 Long List Upgrades

Whilst the upgrades proposed in the Corridor Strategy were identified as most likely to achieve outcomes aligned with the Vision for the Corridor, there remain numerous other opportunities to enhance network operation in and around the Corridor. That is, alternative infrastructure upgrades may become more attractive, viable or necessary in the context of changing community expectations, evolving land use, varying performance of the transport network, climate change, market conditions, and other external factors.

The Corridor Strategy identified numerous potential upgrades within the Corridor in its upgrade long list generated part of the options identification process outlined in the Options Shortlisting Assessment Report included as Appendix A. It is possible that some of the non-short listed upgrades identified in the process may become increasingly appropriate for adoption as network needs change.

12.5.2 John Gorton Drive / Cotter Road Corridor

The Cotter Road Interchange on the Tuggeranong Parkway is a significant node in the South West Corridor. The Interchange conveys high traffic volumes and its performance influences how effectively vehicles access and leave the corridor. The interchange, inclusive of signalised ramp terminal intersections also forms part of the John Gorton Drive / Cotter Road Corridor. Community and Territory feedback suggests that this corridor experiences extensive congestion and queuing in the AM peak, and that this congestion is, at least in part, associated with the Cotter Road Interchange. In the absence of traffic modelling / integration of the broader Cotter Road / John Gorton Drive corridor (noting that the current microsimulation model boundary is confined to the Tuggeranong Parkway / Cotter Road Interchange), it is unclear the degree to which the interchange contributes to this congestion, and whether other corridor elements such as intersection capacity constraints at the Kirkpatrick Street intersection influence the observed congestion.

It is noted that the current upgrade proposed at the site is configured to optimise performance of the interchange in response to the expected changing traffic patterns associated with the provision of the East West Arterial and its associated interchange. Implementation of the EWA is expected to reduce (relatively) the demand on the Cotter Road / John Gorton Drive corridor. It is noted that if congestion issues in the Cotter Road / John Gorton Drive corridor require resolution (either in the short term or more generally) then reconfiguration of the proposed Cotter Road Interchange upgrade and / or other improvements on Cotter Road and John Gorton Drive may be required, subject to a detailed assessment to pinpoint the basis of operational issues in that corridor.

12.6 Non-Infrastructure Solutions

12.6.1 General

Provision of infrastructure is often a costly and disruptive exercise. As an alternative it can sometimes be possible to achieve desired transport outcomes using non-infrastructure solutions such as policy levers,

regulation, standards, education and technology. Some broad approaches and considerations that have the potential to improve the operation and performance of the South West Corridor are summarised below:

12.6.2 Speed Regimes

The South West Corridor currently adopts a mix of high and intermediate speed zones. The Tuggeranong Parkway zone of the Corridor currently is a high speed environment with 90-100 km/h posted speed limits, whilst Drakeford Drive has 80 km/h speed posting. Whilst the Corridor Strategy hasn't explicitly investigated the implications of changes to speed zoning, adjustments to posted speeds could be considered to achieve the following outcomes:

- **Operating Speed Reduction** – assuming community compliance, potentially with the support of policing, the lowering of speed limits is likely to reduce the operating speeds (typically defined as the 85th percentile speed) of the Corridor. Reduced operating speeds are generally expected to improve safety performance as they reduce both the likelihood and severity of crashes, and are consistent with the Safe Systems approach to road safety.
- **Address Localised Safety Concerns** – Should a localised hazard (roadside objects / poorly protected vertical drops, increasing present of vulnerable road users etc) be identified in the Corridor that cannot be easily rectified, the implementation of reduced speed limits could be adopted to lower operating speeds and mitigate the risk associated with the hazard.

Notwithstanding the safety benefits discussed above, it is also noted that adjustments to speed limits also have other economic and productivity implications. Reductions in speed limits increase travel times and impose economic costs on the community, and conversely increased operating speeds improve productivity and save on travel time costs.

12.6.3 Government Policy

Territory and Commonwealth Government policy has the potential to influence the operation of the South West Corridor. Such policy areas could be specific to transport or conversely may not directly relate to transport operation. It is noted that there are many areas of government policy that could influence the operation of the corridor – indeed much of government decision making influences community behaviour and by extension people's need to make trips and how /when they are likely to make those trips. Whilst outside the scope of this Corridor Strategy, the influence of Government policy on travel behaviour is noted.

12.6.4 Technology / Vehicle Automation

Transport technology is rapidly evolving and influencing the way in which transport networks operate. Developing transport technology is expected to improve the efficiency of the ACT transport network and the safety of travellers. Some examples of developing technology may affect the operation of the South West Corridor include:

- Vehicle automation
- Vehicle to vehicle communications
- Improving vehicle safety features
- Mobility as a service
- Evolving power trains (electrification, hydrogen, bio/synthetic fuels)
- Alternative public transport technologies

12.6.5 Public Transport

Public transport policy and investment can provide non-infrastructure transport solutions and has the potential to substantially impact on the operation of the Corridor. Public Transport is discussed in greater detail in Section 12.8.

12.7 Safety Black Spot Programs

The Federal Government provides funding to assist State and Territories to address safety black spots on the road network. Similarly the ACT Government also implements a program of safety assessments and infrastructure upgrades to address safety concerns on the transport network.

Noting the crash performance of the corridor (discussed in Section 10), it is anticipated that the Territory will continue to monitor the safety performance of the Corridor to identify any areas of need that warrant rectification works or upgrade. This could include sites with high crash rates, areas with unprotected hazards, changing vulnerable road user presence, and substandard safety infrastructure such as roadside barriers. It is expected that such programs, whilst independent of the Corridor Strategy, will assist in achieving the Vision for the Corridor and the objectives of the Corridor Strategy.

12.8 Intelligent Transport Systems

One of the upgrades included in the Corridor Strategy (SW5) proposes the provision of an ITS system on the Tuggeranong Parkway inclusive of Variable Message Signs and Variable Speed Limit Signs. Further to this upgrade, broader implementation of ITS systems both in the Corridor and the transport network more generally has the potential to enhance the safety and operational performance of the South West Corridor. Such systems could include:

- Comprehensive ITS infrastructure in the Corridor (VMS and VSLS) additional to that currently proposed
- Implementation of Lane Use Management Systems
- Variable message signs at major entry points to the Corridor (such as Cotter Road, Hindmarsh Drive and the East West Arterial

12.9 Public Transport

The operation of the ACT public transport system, both within the corridor and the broader network, will influence the operation of the corridor, and vice versa. Patronage or increased mode share of public transport, whether it be for journeys within the Corridor, across the corridor, or external to the Corridor, will reduce the number of private vehicle trips generally across the network and likely within the Corridor. This reduction in the trips will improve Corridor performance by reducing congestion, travel times, vehicle operating costs, environmental emissions and crashes within the Corridor.

Similarly, improving Corridor performance will enhance operation of the public transport vehicles using the Corridor and its associated interchanges. In addition to reducing travel times for bus routes on Drakeford Drive and the Tuggeranong Parkway, public transport focused upgrades at interchanges could have positive outcomes for public transport operation and mode share. Whilst Corridor Strategy upgrades at both the Cotter Road and Hindmarsh Drive Interchanges will improve performance for both private vehicles and public transport alike, consideration could be given to providing public transport priority such as bus lanes or bus jump (bus priority) signals through these intersections. ACT public transport policy, bus routing and network performance will dictate the appropriateness of including public transport priority as part of these upgrades.

12.10 Active Travel

Part of the Molonglo to City Cycle Highway may route across or along the South West Corridor. While it is anticipated that this active travel infrastructure will be investigated and assessed independently of the Corridor Strategy, it is noted that provision of the Molonglo to City Cycle Highway is expected to improve active travel mode share, and by extension will reduce the number of private vehicle trips generally across the network and likely within the Corridor. This reduction in trips will improve Corridor performance by reducing congestion, travel times, vehicle operating costs, environmental emissions and crashes within the Corridor.

Other than the Molonglo to City Cycle Highway, there appears to be limited opportunity or need to improve active travel infrastructure within the Corridor itself. Furthermore, stakeholders did not express a desire to provide / improve active travel facilities within the Corridor during development of the Corridor Vision or assessment of the Corridor shortlist.

13. Assessment Framework

13.1 Overview

As part of the Options Shortlisting process outlined in Section 6, various upgrades were assessed and tested through the employment of Strategic Merit Test. The SMT is a preliminary decision framework that allows a proposal to be assessed against a set of criteria to determine if it aligns with an intended set of goal or objectives. The initial pass of the SMT was undertaken in order to identify which potential upgrades were most aligned with the Vision for the Corridor to allow for the creation of shortlist of projects to be further developed and interrogated.

Subsequent to the initial SMT and the shortlisting process, nine South West Corridor upgrades were identified and subject of the following activities:

- Strategic design
- Cost Estimation
- Prioritisation and packaging of upgrades
- Transport modelling, and
- Economic analysis

These assessments provided insight into an upgrade configuration that was considered likely to address an identified issue on the Corridor, the potential capital requirements to deliver the upgrade, an appropriate packaging and delivery staging of upgrades, how the transport network is likely to operate based on the implementation of the upgrade in combination with other upgrades in the South West Corridor and the Parkes Way Corridor, and finally if delivery of the upgrades was economically viable.

Informed by the outcomes of these assessments, a second SMT was applied to the nine Corridor Strategy upgrades. The purpose of applying this second assessment framework was threefold:

- Ensure that the upgrades were indeed aligned with the Vision for the Corridor
- Consider the technical, operational and economic viability of the upgrades
- Confirm that each upgrade is appropriate for inclusion in the Corridor Strategy

13.2 Assessment Outcomes

The SMT utilised the same assessment framework as originally undertaken as part of the options shortlisting process. Consistent with the methodology outlined in Section 6.5, the assessment used two scoring systems that tested the degree of Vision alignment of the upgrade:

- **SMT Score** - Indicates the degree to which an option aligns with the Vision Principle categories, aggregating the number of categories where there is alignment with at least 50% of Vision Principles in the category
- **Aligned Principles** - The net number of aligned principles (i.e. “Aligned” – “Not Aligned”), giving an overall sense of how the option aligns with all of the Vision Principles.

The outcomes of the final SMT assessment have been captured in Table 13–1. These outcomes include the following considerations:

- SMT scoring for each upgrade
- The Vision Principle categories which the upgrade is considered aligned
- A determination on whether the upgrade should form part of the Corridor Strategy based on the SMT framework
- A rationale explaining the reasons for the upgrade’s inclusion / exclusion in the Corridor Strategy, including discussion on notable considerations for the upgrade

The SMT analysis detailing the basis for the scoring of each of the assessed upgrades is included in Appendix H.

Table 13–1: South West Corridor Strategic Merit Test Outcomes

Upgrade	Discussion		
SW1	Tuggeranong Parkway - Additional northbound lane	SMT Score: 5	Aligned Principles: +15
Vision Alignment	The upgrade was considered to be aligned with the vision for the South West Corridor as it is expected to: - Support the corridor classification and purpose - Significantly improve operational performance of the corridor - Enhance safety of the corridor - Enhance corridor flexibility & facilitate the adoption of smart technologies - Provide positive land use and economic development outcomes		
Strategy Inclusion	Yes		
Inclusion Rationale	1) The SMT assessment indicated that the upgrade is strongly aligned with the agreed Vision for the Corridor 2) The upgrade is considered complementary to, and an essential component of the East West Arterial Interchange which was demonstrated to be a critical transport connection to the appropriate operation of the transport network, in addition to improving network connectivity, access and resilience. 3) The increased capacity associated with the upgrade allows the corridor to convey significantly higher northbound volumes. Additionally, when packaged with other 2041 upgrades, the upgrade relieves off-corridor congestion and significantly improves overall network performance. 4) Whilst the upgrade is capital intensive, when packaged with other 2041 upgrades, it has been demonstrated to offer a strong economic return on investment.		
SW2	East West Arterial / Tuggeranong Pkwy interchange	SMT Score: 6	Aligned Principles: +18
Vision Alignment	The upgrade of this interchange was considered to be aligned with the vision for the South West Corridor as it is expected to: - Support the corridor classification and purpose - Significantly improve operational performance of the corridor - Contribute to enhancement of the safety of the corridor - Improve amenity for the community - Provide positive land use and economic development outcomes - Enhance corridor flexibility and facilitate the adoption of smart technologies		
Strategy Inclusion	Yes		
Inclusion Rationale	1) The SMT assessment indicated that the upgrade is very strongly aligned with the agreed Vision for the Corridor 2) The upgrade provides arterial connectivity from the trunk road network into the Molonglo Valley which was demonstrated to be a critical transport connection for the appropriate operation of the transport network, in addition to improving network connectivity, access and resilience. 3) The network connection and free-flow nature of the proposed interchange enhances transport efficiency and safety. Additionally, when packaged with other 2041 upgrades, the upgrade relieves off-corridor congestion and significantly improves overall network performance. 4) Whilst the upgrade is capital intensive, when packaged with other 2041 upgrades, it has been demonstrated to offer a strong economic return on investment.		

Upgrade	Discussion		
SW3	Auxiliary southbound lane upgrades to facilitate East West Arterial	SMT Score: 6	Aligned Principles: +14
Vision Alignment	The upgrade of this interchange was considered to be aligned with the vision for the South West Corridor as it is expected to: - Support the corridor classification and purpose - Significantly improve operational performance of the corridor - Enhance safety of the corridor - Improve amenity for the community - Provide positive land use and economic development outcomes - Enhance corridor flexibility and facilitate the adoption of smart technologies		
Strategy Inclusion	Yes		
Inclusion Rationale	1) The SMT assessment indicated that the upgrade is very strongly aligned with the agreed Vision for the Corridor 2) The upgrade is considered complementary to, and an essential component of the East West Arterial Interchange which was demonstrated to be a critical transport connection to the appropriate operation of the transport network, in addition to improving network connectivity, access and resilience. 3) The increased capacity associated with the upgrade allows the corridor to convey significantly higher southbound volumes. Additionally, when packaged with other 2041 upgrades, the upgrade relieves off-corridor congestion and significantly improves overall network performance. 4) The upgrade has relatively low capital requirements, however when packaged with other 2041 upgrades, it has been demonstrated to offer a strong economic return on investment.		
SW4a	Tuggeranong Pkwy / Hindmarsh Dr Interchange – Interim Upgrade	SMT Score: 5	Aligned Principles: +16
Vision Alignment	The upgrade of this interchange was considered to be aligned with the vision for the South West Corridor as it is expected to: - Support the corridor classification and purpose - Significantly improve operational performance of the corridor - Improve sustainability, the environment, and cultural heritage in the corridor - Provide amenity to transport users - Provide positive land use and economic development outcomes		
Strategy Inclusion	Yes		
Inclusion Rationale	1) The SMT assessment indicated that the upgrade is strongly aligned with the agreed Vision for the Corridor 2) The upgrade requires relatively low capital input and is unlikely to cause substantial disruption during construction, however offers significant local operational improvement in the short term, particularly in the PM peak. 3) When packaged with other 2031 upgrades, the upgrade relieves off-corridor congestion and significantly improves overall network performance. 4) The upgrade has relatively low capital requirements, however when packaged with other 2031 upgrades, it has been demonstrated to offer a strong economic return on investment.		

Upgrade	Discussion		
SW4b	Tuggeranong Pkwy / Hindmarsh Dr Interchange - Ultimate Upgrade	SMT Score: 6	Aligned Principles: +13
Vision Alignment	The upgrade of this interchange was considered to be aligned with the vision for the South West Corridor as it is expected to: - Support the corridor classification and purpose - Significantly improve operational performance of the corridor - Enhance safety of the corridor - Improve user amenity - Provide positive land use and economic development outcomes - Enhance corridor flexibility & facilitate the adoption of smart technologies		
Strategy Inclusion	Yes		
Inclusion Rationale	1) The SMT assessment indicated that the upgrade is very strongly aligned with the agreed Vision for the Corridor 2) The increased capacity of the interchange associated with the upgrade allows the both the Corridor and Hindmarsh Drive to convey significantly higher volumes during peak periods, particularly in the PM peak. Additionally, when packaged with other 2051 upgrades across the South West Corridor and Parkes Way Corridor, the upgrade relieves off-corridor congestion and significantly improves overall network performance. 3) Whilst the upgrade is capital intensive, when packaged with other 2051 upgrades across the South West Corridor and Parkes Way Corridor, it has been demonstrated to offer a strong economic return on investment.		
SW5	Tuggeranong Pkwy - VSLS & VMS upgrades	SMT Score: 7	Aligned Principles: +18
Vision Alignment	The upgrade of this interchange was considered to be aligned with the vision for the South West Corridor as it is expected to: - Support the corridor classification and purpose - Improve operational performance of the corridor - Enhance safety of the corridor - Improve amenity for the community - Improve sustainability, the environment, and cultural heritage in the corridor - Support economic development in the corridor - Enhance corridor flexibility and facilitate the adoption of smart technologies		
Strategy Inclusion	Yes		
Inclusion Rationale	1) The SMT assessment indicated that the upgrade is very strongly aligned with the agreed Vision for the Corridor 2) The provision of ITS infrastructure will enhance safety for road users, work crews and emergency service personnel. 3) The upgrade is expected to have modest capital requirements, however when packaged with other 2041 upgrades has been demonstrated to offer a strong economic return on investment.		

Upgrade	Discussion		
SW8 Drakeford Dr / Athllon Dr / Isabella Dr intersection upgrade		SMT Score: 5	Aligned Principles: +15
Vision Alignment	The upgrade of this intersection was considered to be strongly aligned with the vision for the South West Corridor as it is expected to: - Support the corridor classification and purpose - Significantly improve operational performance of the corridor - Improve sustainability, the environment, and cultural heritage in the corridor - Support economic development in the corridor - Enhance corridor flexibility and facilitate the adoption of smart technologies		
Strategy Inclusion	Yes		
Rationale	1) The SMT assessment indicated that the upgrade is strongly aligned with the agreed Vision for the Corridor 2) The upgrade requires modest capital input, however offers significant local operational improvement in the PM peak. 3) When packaged with other 2041 upgrades, the upgrade relieves congestion and significantly improves overall network performance. 4) The upgrade has moderate capital requirements, however when packaged with other 2041 upgrades, it has been demonstrated to offer a strong economic return on investment.		
SW10 Tuggeranong Pkwy / Cotter Rd Interchange Upgrade		SMT Score: 5	Aligned Principles: +14
Vision Alignment	The upgrade of this interchange was considered to be aligned with the vision for the South West Corridor as it is expected to: - Support the corridor classification and purpose - Significantly improve operational performance of the corridor - Enhance safety of the corridor - Improve amenity for the community - Provide positive land use and economic development outcomes		
Strategy Inclusion	Yes		
Inclusion Rationale	1) The SMT assessment indicated that the upgrade is strongly aligned with the agreed Vision for the Corridor 2) The upgrade requires modest capital input, however offers significant local operational improvement in 2041, noting that it has minimal impact in the short term. 3) When packaged with other 2031 upgrades, the upgrade relieves congestion and significantly improves overall network performance. 4) The upgrade has modest capital requirements, however when packaged with other 2031 upgrades, it has been demonstrated to offer a strong economic return on investment.		

Upgrade	Discussion		
G8	Upgrade of Tuggeranong Pkwy SB off-ramp Intersection with Lady Denman Dr	SMT Score: 7	Aligned Principles: +16
Vision Alignment	The upgrade of this interchange was considered to be aligned with the vision for the South West Corridor as it is expected to: - Support the corridor classification and purpose - Improve operational performance of the corridor - Enhance safety of the corridor - Improve amenity for the community - Improve sustainability, the environment, and cultural heritage in the corridor - Support economic development in the corridor - Enhance corridor flexibility and facilitate the adoption of smart technologies		
Strategy Inclusion	Yes		
Inclusion Rationale	1) The SMT assessment indicated that the upgrade is very strongly aligned with the agreed Vision for the Corridor 2) The upgrade requires modest capital input, however offers significant local operational improvement in 2031. 3) When packaged with other 2031 upgrades, the upgrade relieves congestion and significantly improves overall network performance. 4) The upgrade has modest capital requirements, however when packaged with other 2031 upgrades, it has been demonstrated to offer a strong economic return on investment.		

14. Stakeholder Engagement

14.1 Overview

Engagement with stakeholders has been a key element of the preparation of the Corridor Strategy. Relevant stakeholders have been consulted during several of the Corridor Strategy phases including input into the development of the Vision for the corridor and identification of shortlisted upgrade options in the Corridor. Stakeholders have also provided comment on strategic design of the proposed upgrades, in addition to supplying feedback on the Corridor Strategy. These stakeholders have included ACT agencies such as:

- Transport Canberra and City Services (TCCS)
- Environment, Planning and Sustainable Development Directorate (EPSDD)
- Major Project Canberra (MPC)
- Suburban Land Agency (SLA)

14.2 Corridor Vision

A diverse range of stakeholders were consulted during the development of the Corridor Vision. This engagement was undertaken through a workshop held in March 2022 that obtained stakeholder input and feedback that informed the development of Vision Principles and Statements in response to agreed objectives for the corridor. The Workshop introduced the context of the corridor including its history, constraints, planning regime, network role, and performance (current and forecast). Attendees then provided insight and feedback on what were considered key principles relevant to each of the identified categories. The Workshop was facilitated by the Project Team (TCCS, MPC, and consultant team) and involved participation from the following stakeholders:

- City Renewal Authority
- National Capital Authority
- Transport Canberra – Bus Operations
- Major Projects Canberra - Light Rail (Parkes Way only)
- TCCS (Active Travel specialist)
- Major Projects Canberra
- TCCS City Services & Roads ACT
- TCCS Development Coordination / Major Project Support
- TCCS Infrastructure Planning & Infrastructure Delivery
- EPSDD - City Plan
- EPSDD – Infrastructure
- EPSDD - Urban Planning
- CMTEDD – ACT Treasury (Budget Bids / Business Cases)
- ESA (Emergency Services)
- National Arboretum Canberra (South West Corridor only)

14.3 Options Shortlisting

In December 2022, participants from TCCS, EPSDD, MPC, and the Project Team attended two Options Workshops where a longlist of potential upgrade options were presented and interrogated. The purpose of the workshops was to ensure the longlist was comprehensive and robust; discuss each of the options amongst the group; gain insight into the likely benefits and issues associated with each of the options; and to inform the

options assessment process. Following the two workshops the longlist was finalised and circulated to all participants. Based on the feedback provided by participating stakeholders, options were subsequently rated in terms of their alignment with the Vision Principles, and a shortlist of upgrades was identified that consisted of corridor improvements that were considered most aligned with the Vision for the Corridor.

14.4 Strategic Design Development

The strategic design has been developed in close consultation with numerous stakeholders across the ACT and Federal Government Departments and Agencies. Primary amongst these is ACT's project team which included TCCS Infrastructure Planning and Infrastructure Delivery teams. These TCCS stakeholders provided ongoing input into the design development process, and supplied formal feedback on each of the design packages that was recorded in Design Comment Registers which are included in Appendix B.

Further to this input from the Territory project team, the upgrade design proposals for the Corridor were presented to relevant stakeholders in a series of design workshops in September and October 2024. The purpose of these workshops was to brief stakeholders on the design proposals (including upgrade need, design rationale, upgrade configuration / details) and to afford stakeholders the opportunity to provide feedback and input into the design process and proposed upgrade configurations. A summary of the stakeholders that attended upgrade design workshops is provided in Table 14–1.

Table 14–1: Proposed Corridor Upgrades

Workshop		Stakeholders
Date	Upgrade Packages	
30/09/24	- SW1 - Tuggeranong Parkway - Additional northbound lane - SW10 - Tuggeranong Pkwy / Cotter Rd Interchange Upgrade	- TCCS Development Planning - TCCS Development Coordination - TCCS Infrastructure Planning - TCCS Infrastructure Delivery - TCCS (Traffic Management & Safety) - Suburban Land Agency - EPSDD – Development & Implementation
14/10/24	- SW5 - Tuggeranong Pkwy - VSLS & VMS upgrades - SW8 - Drakeford Dr / Athllon Dr / Isabella Dr intersection upgrade	- Major Projects Canberra - TCCS Development Planning - TCCS Development Coordination - TCCS Infrastructure Planning - TCCS Infrastructure Delivery - TCCS (Roads ACT) - TCCS (Traffic Management & Safety) - TCCS (Road Safety & Active Travel)
18/10/24	- SW2 - East West Arterial / Tuggeranong Pkwy interchange - SW3 - Auxiliary southbound lane upgrades to facilitate East West Arterial	- Major Projects Canberra - TCCS Development Planning - TCCS Development Coordination - TCCS Infrastructure Planning - TCCS Infrastructure Delivery - TCCS (Traffic Management & Safety) - TCCS (Roads ACT) - Suburban Land Agency - EPSDD – Development & Implementation
21/10/24	- SW4a - Tuggeranong Pkwy / Hindmarsh Dr Interchange upgrades – Interim Solution - SW4b - Tuggeranong Pkwy / Hindmarsh Dr Interchange upgrades – Ultimate Solution	- Major Projects Canberra - TCCS Development Planning - TCCS Development Coordination - TCCS Infrastructure Planning - TCCS Infrastructure Delivery

Workshop		Stakeholders
Date	Upgrade Packages	
		- TCCS (Traffic Management & Safety) - TCCS (Road Safety & Active Travel) - Suburban Land Agency - EPSDD – Development & Implementation
29/10/24	G8 - Upgrade of Tuggeranong Pkwy SB off-ramp Intersection with Lady Denman Dr	- TCCS Development Planning - TCCS Development Coordination - TCCS Infrastructure Planning - TCCS Infrastructure Delivery - TCCS (Traffic Management & Safety) - TCCS (Road Safety & Active Travel) - TCCS (Roads ACT) - TCCS (Business Improvement) - Suburban Land Agency - EPSDD – Development & Implementation

A summary of stakeholder feedback on the proposed upgrade design provided in or subsequent to these workshops was recorded in a Stakeholder Comment Register which is included in Appendix B.

14.5 Assessment Framework & Recommendations

Section to be completed upon circulation of draft Corridor Strategy and receipt of feedback from relevant stakeholders.

15. Conclusions & Recommendations

15.1 Conclusions

15.1.1 Background

The South West Corridor is one of Canberra's busiest and most import transport corridors. It conveys high volumes of traffic during peak periods, particularly on the Tuggeranong Parkway north of Hindmarsh Drive, and forms part of the City's Orbital network. It experiences, on average, 1.3 crashes a day over its 20 km length. That is to say, the corridor currently experiences congestion and has substantial safety concerns. Furthermore, the Corridor is adjacent to the Molonglo Valley, a district that is Canberra's primary zone of greenfield development and is forecast to grow from a population of 14,000 people in 2023 to 70,000 people in 2051. This growth, in conjunction with the anticipated urban intensification of the Woden District and general background population growth, has significant implications for the transport network, including:

- A significant increase in load on existing connections to the Molonglo Valley District, noting that these connections (John Gorton Drive and Cotter Road) currently experience high levels of congestion
- Introduction of more traffic and congestion into the trunk and Orbital road network, including the South West Corridor
- Introduction of more traffic and congestion on key arterial roads that provide connections to the South West Corridor and impact on its operation. The impact is primarily at the Parkes Way / William Howell Drive / Glenloch Interchange, but also around Cotter Road, Hindmarsh Drive, and Lady Denman Drive (through the Lakeside Interchange)

Whilst not currently ACT planning policy, it is noted that should the Western Edge Investigation Area be developed, traffic generation from this new district would also add to congestion on the South West Corridor, as the Tuggeranong Parkway is the most accessible part of the Orbital network to the Investigation Area.

15.1.2 Transport Analysis

Transport modelling of the future years over the Corridor Strategy horizon indicate that the forecast growth in population has significant implications for the Corridor and the transport network more broadly in its current form. The Hybrid modelling of the existing transport network investigated the operation of the Corridor and its immediate surrounds (microscopic component of the model) and a larger network footprint that included the Corridor and adjacent areas (mesoscopic component).

For the local network, this modelling indicated increases in average delay, total travel time, and unreleased demand (a metric suggesting congestion in the model), and reductions in travel speeds between 2031 and 2041. A further performance deterioration was observed from 2041 to 2051. Furthermore, it was observed from strategic modelling using the CSTM that deterioration in performance of the network more broadly (ie outside the Hybrid model area) can also be expected.

The observed degradation in both the Corridor and network performance is considered attributable to general growth in ACT population, but the Corridor performance is primarily as a result of significant concentrated growth in the Molonglo Valley. Given that the South West Corridor is one of only two access points to this district, the load and stress on the Corridor is forecast to increase substantially. It was noted however that as the Corridor reaches capacity, growth in traffic flows plateau, and demand (and congestion) on other parts of the network increase.

15.1.3 Proposed Upgrades

In response to existing identified issues on the Corridor, in addition to forecast traffic performance problems identified in transport modelling of future years, the Corridor Strategy proposes several infrastructure upgrades. Through a short listing process, the following nine upgrade solutions were found to be most aligned with the intended Vision for the Corridor:

- SW1) Tuggeranong Parkway - Additional northbound lane
- SW2) East West Arterial / Tuggeranong Pkwy interchange

- SW3) Auxiliary southbound lane upgrades to facilitate East West Arterial
- SW4a) Tuggeranong Pkwy / Hindmarsh Dr Interchange – Interim Upgrade
- SW4b) Tuggeranong Pkwy / Hindmarsh Dr Interchange – Ultimate Upgrade
- SW5) Tuggeranong Pkwy - VSLS & VMS upgrades
- SW8) Drakeford Drive Dr / Athllon Dr / Isabella Dr intersection upgrade
- SW10) Tuggeranong Pkwy / Cotter Rd Interchange Upgrade
- G8) Upgrade of Tuggeranong Pkwy SB off-ramp Intersection with Lady Denman Dr

A strategic design process identified design configurations for these upgrades that are considered technically feasible and are intended to appropriately address the identified transport problems in the Corridor, noting that the proposed arrangements have not been the subject of constraints analysis (planning, environmental etc). That is, the overall viability of the delivery of the upgrades requires further investigation and confirmation in future iterations of design development.

15.1.4 Corridor Strategy Impacts

The implementation of the nine Corridor Strategy upgrades was tested using the Hybrid traffic model. The purpose of this modelling was to interrogate a proposed delivery staging for the upgrades of packaged suites of upgrades across both the South West Corridor Strategy and the concurrent Parkes Way Corridor Strategy, and understand their implications for the operational performance of the Corridor and the network.

The upgrades provide improved connectivity and capacity in the Corridor, and analysis indicates that in response more trips utilise the Corridor. As a result, traffic volumes in the South West Corridor are forecast to increase substantially in the future, and the operational performance (average delay, travel speeds etc) does not necessarily improve uniformly in the Corridor in response to upgrades. Rather, changes in Corridor performance are mixed in response to increased capacity and volumes, with improvement / deterioration in performance varying across corridor segments, peak periods and timeframes. The network wide benefit however is unambiguous, with significant improvement across the network forecast by the Hybrid model, leading to the following conclusions:

- The proposed Corridor Strategy upgrades provide improved network connectivity and increased capacity, however this capacity is consumed by additional traffic that diverts to the Corridor
- The improved network connectivity and increased Corridor capacity associated with the upgrades attracts trips to the Corridor, reducing network travel times, concentrating longer trips on the trunk road network, and reducing traffic volumes on lower order roads

These outcomes are considered appropriate in the context of the Orbital nature of the South West Corridor, consistent with the objectives of the ACT Transport Strategy 2020, and will provide significant benefits to the community. It is important to note that these operational outcomes reflect the dual implementation of both the South West Corridor Strategy and the Parkes Way Corridor Strategy, noting that the forecast benefits are only likely to be realised to their full extent if all upgrades across both corridors are delivered.

The safety performance of the upgrades was also investigated using an iRAP model of the corridor. This analysis indicated that the Corridor Strategy upgrades are expected to provide significant improvement to safety on the corridor, increasing the proportion of the Corridor with a Star Rating of 3 or above from 73% in the Do Minimum scenario to 78% with the implementation of the Corridor Strategy. As such, the Corridor Strategy is anticipated to substantially improve both the operational and safety performance of the Canberra transport network.

15.1.5 Corridor Strategy Viability

As part of the strategic design exercise, high level opinions of cost have been estimated for each of the Corridor Strategy upgrades. These estimates, combined with analysis of the project benefits have been used to assess the economic viability of the implementation of the Corridor Strategy over the 30 year Strategy horizon. This Cost Benefit Analysis indicated that delivery of the Corridor Strategy provided a Benefit Cost Ratio of 11.8, and Net Present Value of $3.4 B, leading to the conclusion that the Corridor Strategy upgrades are economically viable and would provide a strong return on investment to the community.

It is important to note that whilst these economic outcomes relate to the South West Corridor, they reflect the dual implementation of both the South West Corridor Strategy and the Parkes Way Corridor Strategy, noting that the forecast benefits are only likely to be realised to their full extent if all upgrades across both corridors are delivered.

15.2 Recommendations

15.2.1 General

In close consultation with ACT stakeholders, this Corridor Strategy has established a Vision for Canberra's South West transport Corridor that articulates expectations and objectives relating to the operation, performance and role that the Corridor should play in the Canberra transport network. To assist in the realisation of this Vision, the Corridor Strategy has also undertaken an assessment of current and potential future issues and threats to the operation of the Canberra transport network that relate to the South West Corridor.

To address identified operational issues, nine infrastructure upgrades have been investigated for implementation on the South West Corridor. Initial analysis presented in this Corridor Strategy indicates that these upgrades are technically feasible solutions to address current and forecast issues on the Corridor and the transport network more broadly. Furthermore, application of a Strategic Merit Test also indicated that all nine of the proposed upgrades are strongly aligned with the agreed Vision for the corridor. And finally, these upgrades were shown to be effective in improving transport network operation, and their implementation provided a strong economic return to the community.

In view of these findings, it is recommended that the Corridor Strategy be progressed to its next stage of implementation, noting the upgrade-specific recommendations outlined in Section 15.2.2. The next stage of implementation is expected to involve the following for each individual upgrade:

- **Options Analysis** – The strategic design presented in this Corridor Strategy represent a potential solution to an identified transport problem. The nominated configurations are not the product of an options assessment exercise and do not necessarily constitute the most appropriate, efficient or best value solution to address the identified issue. As such, it is recommended that a robust optioneering assessment be undertaken to ensure that the most appropriate design solution is pursued for each upgrade.
- **Concept Development and Design** – As part of the optioneering process, and subsequent to the identification of a preferred option, it is recommended that concept design development be undertaken to identify and conceptually articulate the configuration and engineering requirements of the upgrade.
- **Constraints Analysis** – The options analysis and concept development activities should be informed by a constraints analysis. The analysis is likely to include (but not limited to) desktop environmental assessments, utilities investigations, planning assessment, and heritage assessments. Some field validation of desktop assessments may be required.
- **Engineering Investigations** – Depending on the level and detail of available information, engineering investigations such geotechnical investigations and topographic survey may be required to inform the concept design development.
- **Transport modelling** - In parallel to the option analysis and concept design development, it is expected that further transport modelling will be required to identify the most appropriate upgrade configuration and quantify its anticipated performance.
- **Cost estimation** – Cost estimation of the preferred concept for each upgrade is recommended to inform budgetary requirements, economic analysis and business case development.
- **Economic Analysis** – To ensure that each proposed upgrade provides value for money, it is recommended that an economic analysis be undertaken based on the estimated whole of life cost of each upgrade, and the anticipated transport benefits that it is forecast to provide to the community.

The timeframes to undertake these activities should be informed by both the identified prioritisation schedule described in the Corridor Strategy (noting many of the upgrades are proposed in the medium to long term), in addition to:

- ACT population growth

- ACT land release and development patterns
- Observed travel behaviours and patterns in the ACT
- Transport network operation and congestion
- ACT Government policy
- Monitoring of network safety performance and crash blackspots
- Climate change response and other environmental considerations

15.2.2 Corridor Upgrades

Further to the general recommendations provided above, each of the individual upgrades carry the following specific recommendations:

SW1 - Tuggeranong Parkway - Additional northbound lane

The additional northbound lane has a strong operational interdependency with the provision of the East West Arterial Interchange in that a) The EWA interchange appears unlikely to appropriately operate without the provision of the additional northbound lane, and b) The third northbound lane does not appear to be required in the short to medium term in the absence of the EWA connection to the Tuggeranong Parkway. Furthermore, there are construction synergies and efficiencies associated with concurrent delivery of these two projects. As such, there appears little merit in pursuing this upgrade prior to delivery of the East West Arterial Interchange, and it is recommended that this upgrade be developed in conjunction with the SW2 Package.

SW2 - East West Arterial / Tuggeranong Pkwy Interchange

The necessity of the EWA Interchange is expected to be driven largely by the ACT land release program in the Molonglo Valley. It is anticipated that the trigger for its delivery will relate to both the performance of other key network arterials that provide access into the Molonglo Valley (Cotter Road and John Gorton Drive) and the delivery of the Bindubi Street extension and associated interchange (included as Package G6 in the concurrent Parkes Way Corridor Strategy).

The configuration of the Interchange has been developed in response to design compliance requirements in addition to physical site and network constraints, which has consequently resulted in an interchange configuration that requires a substantial infrastructure footprint. It is recommended that future design development explores the potential application of the extended design domain and / or design departures (in the context of future land use and traffic generation), in addition to consultation with key adjacent stakeholders as part of value management exercises. It is further recommended that adaptability of the interchange layout be considered to account for possible future land uses to the east of the Tuggeranong Parkway adjacent to the interchange site.

SW3 - Auxiliary Southbound Lane

The auxiliary southbound lane has a strong interdependency with the additional northbound lane (Package SW1) as it relies on the duplication of the Molonglo River Bridge and transfer of the Tuggeranong Parkway northbound carriageway onto the new structure.

The auxiliary southbound lane also has a strong interdependency with the provision of the East West Arterial Interchange in that a) The EWA interchange appears unlikely to appropriately operate without the provision of the southbound auxiliary lane, and b) The auxiliary southbound lane is not required in the absence of the EWA connection to the Tuggeranong Parkway. Furthermore, there are construction synergies and efficiencies associated with concurrent delivery of these three projects. As such, there appears little merit in pursuing this upgrade prior to delivery of the East West Arterial Interchange, and it is recommended that this upgrade be developed in conjunction with the SW2 and SW3 packages.

SW4a Tuggeranong Pkwy / Hindmarsh Dr Interchange – Interim Upgrade

This upgrade seeks to address an existing performance issue at the Hindmarsh Interchange. Given the degree of PM queuing / performance issues at the site, and the relatively modest capital requirements of the upgrade, it is recommended that this upgrade be prioritised for further investigation in the short term. It is also noted geometric relaxations in the design approach are likely to yield reductions in construction cost and disruption, and should be investigated as part of value management exercises.

SW4b - Tuggeranong Pkwy / Hindmarsh Dr Interchange – Ultimate Upgrade

The ultimate upgrade of the Hindmarsh Drive Interchange proposes a complete update of the existing configuration including replacement of existing structures. Given the significant capital requirements associated with the upgrade, and the likely disruption associated with its construction, it is recommended that delivery of this upgrade be delayed for as long as is feasible in terms of the acceptable operation and Level of Service that the Interim Upgrade will provide. This approach will aid in the economic viability of the project and also ensure that there is minimal residual life remaining in the existing infrastructure prior to its demolition.

Modelling indicates that delayed delivery of the this package may require improvements to the northbound entry ramp at some stage after implementation of the Interim upgrade to ensure appropriate operation of the ramp merge onto the mainline. The performance of the interim upgrade will require ongoing monitoring to ensure this improvement (if required) and the ultimate upgrade will be delivered within appropriate timeframes.

It also recommended that the upgrade configuration presented in this Corridor Strategy be further tested in future phases of design development. The adopted single point urban intersection configuration is based on assumptions relating to traffic flow, design guideline requirements, and physical site constraints. Changing conditions and land use, including the potential development of the Western Edge Investigation Area, could significantly alter patterns of movement and the requirements of the upgrade, as could the acceptability of stakeholders to accept an extended design domain and / or design departures.

SW5 - Tuggeranong Pkwy - VSLS & VMS upgrades

The ITS infrastructure upgrade on the Tuggeranong Parkway is focused on improving safety. Whilst there is no pressing operational need to implement this upgrade, it is recommended that ongoing monitoring of the safety performance and needs of the corridor is maintained and that continuing engagement with relevant stakeholders (including the ACT ESA, TCCS Traffic Operations Team, Roads ACT and the Corridor asset manager) is undertaken. Implementation of this upgrade should be initiated in response to need identified by these stakeholders.

SW8 - Drakeford Drive Dr / Athllon Dr / Isabella Dr Intersection Upgrade

This upgrade seeks to address forecast performance and safety issues at the existing roundabout site. Given the relative expense and likely disruption that construction of this upgrade is likely to cause, it is recommended that the safety and operational performance of the intersection be monitored, and the upgrade be delayed to the extent that safety and operational considerations will allow.

SW10 - Tuggeranong Pkwy / Cotter Rd Interchange Upgrade

The proposed upgrade of the Cotter Road Interchange has been configured to address changing trip patterns associated with the delivery of the East West Arterial Interchange. Acknowledging existing queuing and operational performance issues on Cotter Road to the west of the interchange, the upgrade was assessed for delivery as part of a short term suite of works. It is noted however that intersection modelling indicated that the upgrade offers no operational benefit in the short term to 2031, and only begins to provide performance benefits in the medium term (to 2041) when it has been assumed that the East West Arterial comes online.

Given this outcome, it is not recommended that this upgrade be delivered in its current form in 2031, but rather be delayed until such time as the East West Arterial Interchange is delivered. However, acknowledging the current performance issues on Cotter Road at / immediately west of the interchange, it is recommended that further investigation of the Cotter Road / John Gorton Drive corridor be undertaken to identify the source of existing performance issues, and recommend remedies. The outcome from this investigation should ensure that any proposed upgrade recommendations are complementary to the East West Arterial when it becomes operational.

G8 - Upgrade of Tuggeranong Pkwy SB off-ramp Intersection with Lady Denman Dr

This upgrade seeks to address existing performance and safety issues at the Lakeside Interchange. Currently the southbound exit ramp experiences extensive queuing in the AM peak which causes delay to interchange users in addition to impacting on southbound mainline flows. Furthermore, the queuing and associated

turbulence creates a substantial safety hazard for through flows on the southbound carriageway. Given the degree of queuing / performance issues at the site, and the safety implications of its current operation, it is recommended that this upgrade be prioritised for further investigation in the short term.

15.2.3 Future Evolution of the Corridor Strategy

This document constitutes the first version of the South West Corridor Strategy. By its nature, the transport network and the Corridor itself will evolve over time in response to changing land use, land release, patterns of travel, population distribution, demographics, Government policy, technological change, social trends and climate change amongst many other factors. It is anticipated that this Corridor Strategy will be a live document that is updated periodically in order to continue to meet the needs of the community as they change over time.

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Appendix B

Strategic Design Report

Appendix C

Future Transport Modelling Report

Appendix D

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Appendix E

Cost Estimate Report

Appendix F

Star Rating Assessment

Appendix G

Economic Analysis

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Assessment Framework

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Volume 2 – Strategic Design Report – Preferred Route Option

Molonglo East-West Arterial Road Feasibility Study and Molonglo Strategic Traffic Study

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1 Introduction

1.1 Project Background

The three stages of Molonglo Valley development (Molonglo 1, 2 and 3) are proposed to accommodate approximately 50,000 to 55,000 people. Molonglo 2, comprises the suburb of Denman Prospect and the future suburbs of Molonglo, which is intended to include the district of Molonglo Valley's principle commercial centre. Molonglo 3 forms the third stage of urban development in Molonglo Valley and is likely to include three to four suburbs.

The Molonglo East West Arterial (EWA) road was identified as an essential part of the arterial road network for the Molonglo district in earlier traffic and road feasibility studies. The EWA was also identified in the Territory Plan's Molonglo and North Weston Structure Plan and is notionally indicated in the Territory Plan Map. It is noted that the alignment indicated in the Territory Plan Map will be superseded by the findings of this study.

The EWA road is also identified in the Molonglo 3 Planning and Design Framework (refer Figure 1-1). It is proposed to connect the future suburb of Molonglo and the wider Molonglo development area with the Tuggeranong Parkway via a bridge over the Molonglo River and a new grade-separated interchange at the Tuggeranong Parkway.

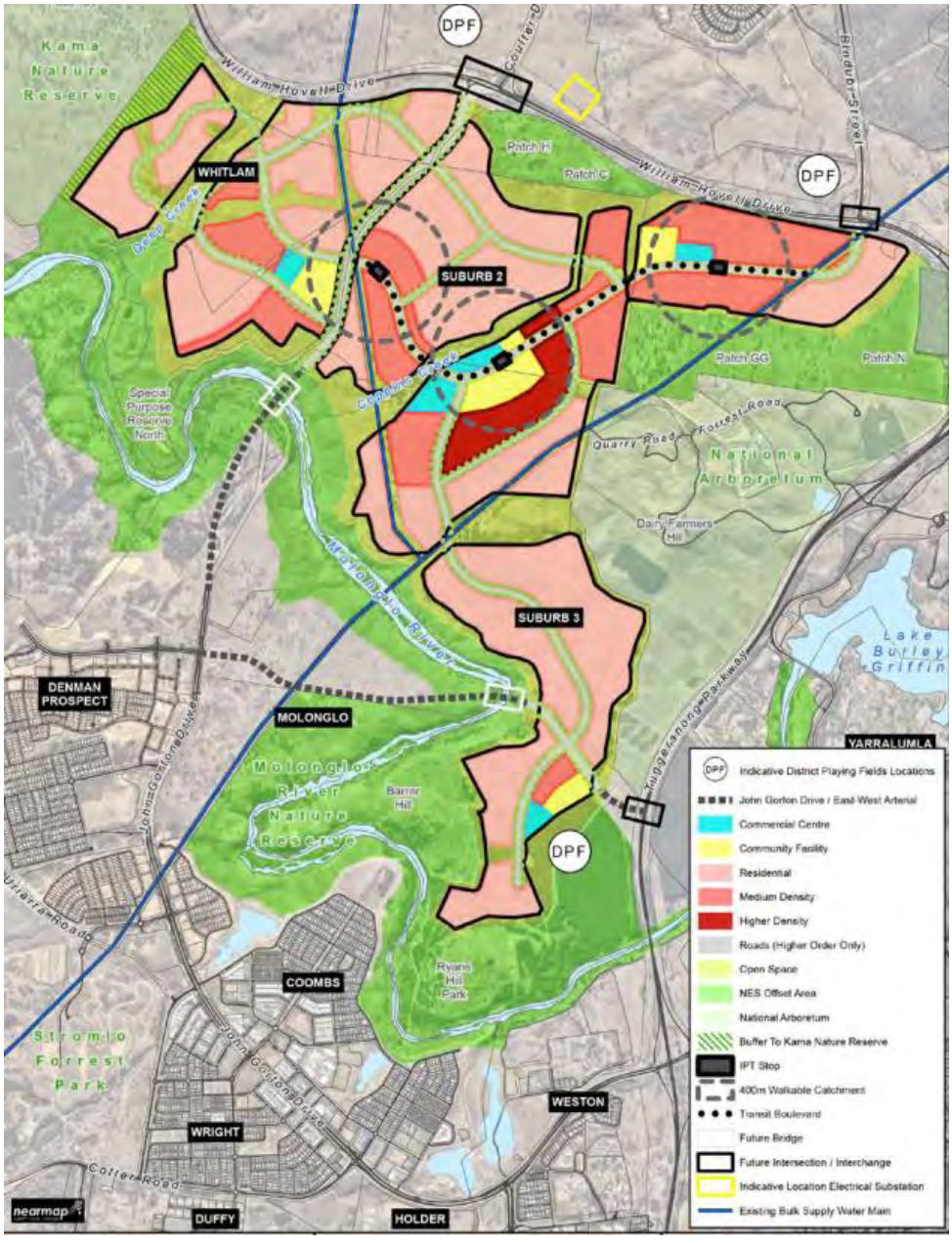

Figure 1-1 Molonglo Valley Stage 3 Framework Plan (Molonglo Valley Stage 3 Planning & Design Framework, EPSDD, 2019)

The Canberra Strategic Transport Model (CSTM) has demonstrated the need for the EWA road connection to the Tuggeranong Parkway to complement other arterial roads servicing the Molonglo area. This link will provide alternative and direct access for the suburb of Molonglo and Denman Prospect traffic to the Tuggeranong Parkway and the broader ACT trunk road network.

Furthermore, it is noted that possible development west of Molonglo (Western Edge Investigation Area) was not considered in the earlier traffic studies. The possible development of these areas is expected to have significant impacts on forecast traffic volumes for William Hovell Drive (WHD), John Gorton Drive (JGD), the EWA and the wider arterial road network and has been assessed in the transport modelling component of this study.

The Indicative Land Release Program contains significant land releases in Molonglo over the next four years and it is anticipated that substantial land release in the area will continue beyond this period. These population increases will lead to traffic demand that may exceed the combined capacity of other key access roads in the area if the EWA is not constructed. Recent traffic modelling has indicated that this growth will drive the need for an additional arterial road access for Molonglo. The likely beneficiaries of the EWA project are expected to include existing and future residents of Molonglo Valley, businesses in the area and, future residents to the west of Molonglo should development progress in the Western Edge Investigation Area.

While the completion of the EWA road to Tuggeranong Parkway may not be required in the near future (10-15 years), this study is required to confirm the road alignment reservation for gazettal, particularly through the Molonglo River Reserve and adjacent to the National Arboretum. The arterial road alignment, bridge location and associated reservations will provide surety for land use and infrastructure planning and the definition of the development boundary between Molonglo development and the National Arboretum. The road will also connect with access roads to service the suburb of Molonglo, containing the group centre and later stages of Molonglo stage 3.

1.2 Project Location

The project study area is situated in the Molonglo Valley of Canberra, ACT. The proposed EWA is to provide an arterial road link between the John Gorton Drive / Holborow Ave intersection in the west and the Tuggeranong Parkway in the east. The site is predominately rolling terrain incised by the Molonglo River, with a combination of farmland and pine plantation. To facilitate the EWA interchange with the Tuggeranong Parkway, it anticipated that upgrade works will be required on the Parkway to the Cotter Rd interchange. The location of the project site is indicated in Figure 1-2.

Figure 1-2 Locality Plan (Metromap, September 2020)

1.3 Project Objectives

When establishing a project brief, the Territory identified two primary objectives for the study:

1) Preparation of a strategic transport assessment using the most recent CSTM and results for 2041 development to determine the future traffic impacts of the proposed developments in Molonglo district and surrounds and proposed major new roads in particular the EWA and Bindubi Street Extension (BSE)
2) Integrate high level Molonglo 3 planning intentions as articulated in the Molonglo 3 Planning Design Framework (PDF), Molonglo 3 Stage 2 Proof of Concept (RobertsDay, 2019), Molonglo 2 Planning Design Framework and other relevant planning documents into the alignment options and concept design of the EWA road.

1.4 This Report

The ACT Environment, Planning and Sustainable Development Directorate (EPSDD) has commissioned a feasibility study of the EWA in the Molonglo Valley of Canberra. The Feasibility Study consists of three documents:

- Study Overview
- Volume 1 - Route Options Assessment Report
- Volume 2 - Strategic Design Report **(this Report)**

This Strategic Design Report has been prepared to document the approach, rationale and features of the strategic design of the preferred option for the EWA. The report records the adopted design criteria and assumptions and provides high level discussion on the design intent and decisions that have led to the development of the proposed design.

2 Planning & Environmental

2.1 Environmental Considerations

2.1.1 Heritage

An area of identified Potential Archaeological Deposit (PAD 1) is registered on the western bank of the Molonglo River, within the project study area. As discussed, in the Options Report (SMEC, 2020), consideration has been given to avoiding and minimising impact to PAD 1. The EWA alignment progressed in this Strategic Design Report has been designed to only dissect the southern portion of PAD 1.

Through consultation with PCS and ACT Heritage Office in the MCA process, it was confirmed that this was the preferred alignment of the EWA, as it does not dissect the PAD site and minimises impact.

Figure 2-1 Proposed alignment of EWA and PAD 1 (shown hatched). Green area represents the extent of the Molonglo River Reserve

The recommended next steps would be to engage a Heritage Consultant to prepare a Statement of Heritage Effect (SHE) proposing a salvaging program for potential artefacts within PAD 1. It is noted that geotechnical testing would be required to inform the PSP design for the EWA and would likely include test pitting within the Molonglo River Reserve (shaded green in Figure 2-1 above). Test pitting within the reserve would require prior approval by way of a Construction Environmental Management Plan (CEMP), including a Heritage Assessment. To avoid duplication of work, it is recommended a SHE be prepared for the EWA which could be used for both the CEMP and EWA approval. It would be appropriate to progress to this next stage when preparing to undertake the PSP design, and as close as possible to when salvaging is anticipated to occur.

2.1.2 Biodiversity

The EWA is primarily contained within the Molonglo Strategic Assessment Area, covered by the Molonglo Valley Plan for the Protection of Matters of National Environmental Significance 2011 (NES Plan). The NES Plan follows the environmental planning principles of avoid, minimise, mitigate, and includes offsetting provisions through the establishment of the Kama Nature Reserve and the Molonglo River Reserve. There is an extensive body of work relating to ecological matters within the Molonglo Valley, including:

- The NES Plan (ACT Planning and Land Authority, 2011)
- Molonglo Draft Strategic Assessment Report
- Molonglo and North Weston EPBC Act Strategic Assessment Supplementary Report (Ecological Australia, 2011)
- Molonglo Valley Strategic Assessment Annual Reports (EPSDD)
- Audit Report (2018)
- Expert Panel Review Reports – Molonglo Valley Vegetation Condition Monitoring Report 2013-2017 (ACT Government, 2018)
- Molonglo Valley Adaptive Management Strategy
- Molonglo River Reserve Management Plan (2019)

As discussed in the Volume 1 (Options Report) , vegetation along the alignment of the EWA was reviewed and ground truthing fieldwork was undertaken in March 2020. Vegetation of note along the EWA alignment includes areas of threatened woodland (Blakely's Red Gum Yellow Box Grassy Woodland, a threatened ecological community (TEC) under the EPBC Act and the NC Act), patches of threatened grassland (possibly Natural Temperate Grassland, a TEC under the EPBC Act) and habitat areas for Pink-tailed worm lizard (PTWL) (vulnerable under EPBC and NC Act) and Perunga Grasshopper (vulnerable under NC Act).

The sensitive ecological areas within the study area are mostly contained to the Molonglo River Reserve. The Strategic Design has attempted to align the road formation through the large areas of PTWL and NTG (Threatened Grasslands) in order to minimise direct impact as much as possible. The MCA process confirmed that preference was given to avoiding impacts on the large habitat patches that are mapped as occurring along the banks of the river, north and south of the current alignment.

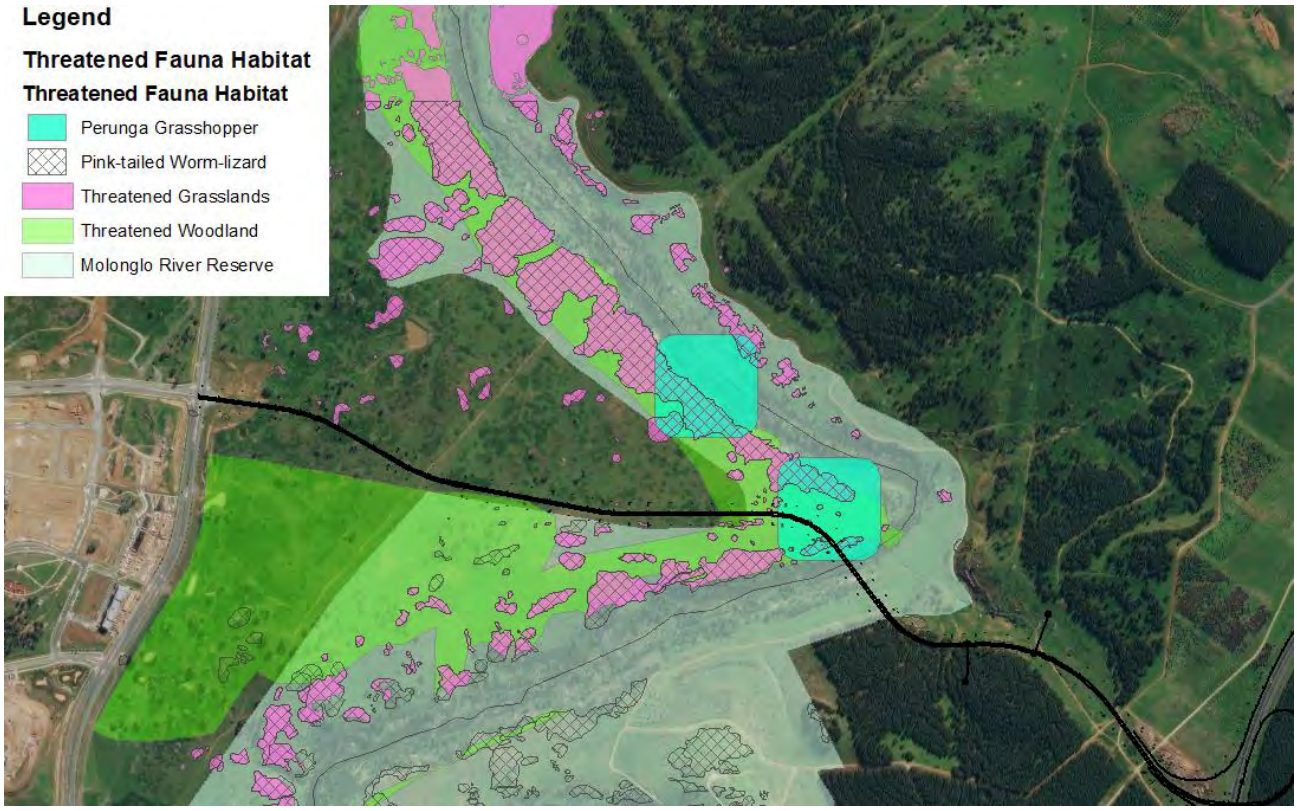

Figure 2-2 Identified Areas of Ecological Sensitivity in relation to the EWA strategic design

The vegetation communities present within the study area are relevant to the planning pathway considerations for the project:

- The NES Plan requires a 20m buffer be retained to areas of PTWL habitat. Where impact is unavoidable, larger habitat areas are considered more significant than smaller patches.
- The Commonwealth Department of Agriculture, Water and Environment (DAWE) has confirmed (via email to EPSDD-Impact Team, 27 August 2020) a 'three tired' approach should be taken to considering impacts on PTWL for the purpose of calculating contribution to the 27ha of PTWL habitat clearance that is included in the offsetting budget in the NES Plan:
    i. *Temporary impacts: For impacts to buffer zones that are temporary in nature there is no requirement to deduct impacts from the 27ha clearance budget. Impacts should be rehabilitated once works are complete.*
    ii. *Permanent impacts to buffer: For 'permanent' impacts that only impact a small area of the buffer or where a permanent project is being built but impacts will only be temporary and will be remediated (such as a trench being dug for a pipeline), expert ecological advice should be sought to determine whether the impact on the buffer will have a detrimental impact on the core habitat area that the buffer protects.*
        a. *If expert ecological advice indicates that the buffer impacts will not have an impact on the core habitat then the impact does not need to be deducted from the clearance budget.*
        b. *If expert ecological advice indicates that the impacts to the buffer are going to have an impact on the core habitat then the total impact should be deducted from the clearance budget.*
    iii. *Permanent impacts to buffer and habitat: For permanent impacts that affect both the buffer and the core habitat, the impact should be deducted from the clearance budget.*
- The NES Plan commits to clearing a maximum of 110 ha of Box Gum Woodland within East Molonglo and for construction of infrastructure within the river corridor, however, notes that infrastructure must be designed where possible to avoid or minimise impacts.

When the project progresses to PSP Design, it is recommended that further discussions occur with the EPSDD Impact Team, to determine if additional survey is required to support a s211 exemption to cover the western side of the Molonglo, and further development within the Molonglo Suburb (refer to discussion below).

2.2 Planning Considerations

This section provides commentary on the likely planning approval pathway for the EWA. There are several complexities that are relevant to the planning approval pathway.

Where a proposal triggers impact assessment under Part 4 P&D Act 2007, the approval pathway is either via an EIS, an EIS Exemption (under section 211 of the P&D Act 2007) or, in some circumstances, through the granting of an Environmental Significance Opinion (ESO).

The following table provides an initial analysis of the EWA against the 'impact tract' triggers of Part 4.2 and 4.3 of the P&D Act. Please note, this is a preliminary assessment only and further consideration would need to be made once the project progresses and potential impacts are better understood.

Table 2-1 Assessment of the project against impact development triggers of Schedule 4 P&D Act

Section	Trigger	Applicability to EWA project
4.2 – Activities Requiring EIS		
1	Proposal for construction of a transport corridor including a major road, a dedicated bus way, a railway, or a light rail corridor, on any land, other than on land designated under the territory plan as a future urban area or in a transport and services zone, if the proposal is likely to have a significant adverse environmental impact on —	Not applicable as the land is identified as a Future Urban Area under the Territory Plan. Additionally, an intent of the EWA is to provide confirmation of the alignment to allow this to be

Section	Trigger	Applicability to EWA project
	(a) air quality so as to be detrimental to the health of persons in an adjoining residential, commercial or community facility zone; or (b) ambient noise or vibration so as to be detrimental to the health of persons in an adjoining residential, commercial or community facility zone	transferred into the Territory Plan with a transport zoning.
2	Proposal that involves – (a) electricity transmission line construction…. (b) a coal electricity generating station (c) an electricity generating station… (d) an electricity generating station…	Not applicable.
3	Proposal for the construction of a water storage dam…	Not applicable.
4	Proposal for the construction of an airport or airfield...	Not applicable.
5	Proposal for the construction of a wastewater treatment plant…	Not applicable.
6	Proposal for the construction of a petroleum storage facility…	Not applicable.
7	Proposal for the construction of a permanent venue…	Not applicable.
8	Proposal for a commercial land use facility…	Not applicable.
9	Proposal for the construction of a waste management facility…	Not applicable.
10	Proposal for a waste transfer station…	Not applicable.
11	Proposal that involves storage of the placard quantity of a Schedule 11 hazardous chemical…	Not applicable.
4.3 Areas and processes requiring EIS		
1	Proposal that is likely to have a significant adverse environmental impact on 1 or more of the following unless the conservator of flora and fauna provides an ESO indicating that the proposal is not likely to have a significant adverse environmental impact: (a) critically endangered species (b) an endangered species (c) a vulnerable species (d) a conservation dependent species (e) a regionally threatened species (f) a regionally conservation dependent species (g) a provisionally listed threatened species (h) a listed migratory species (i) a threatened ecological community (j) a protected native species (k) a Ramsar wetland (l) any other protected matter.	Potential trigger. Additional confirmation would be required once the disturbance footprint is understood and more detailed ecological surveys undertaken.
2	Proposal involving (a) the clearing of more than 0.5 ha of native vegetation in a native vegetation area, other than on land that is	Potential trigger. Additional confirmation would be required once the disturbance footprint is

Section	Trigger	Applicability to EWA project
	designated as a future urban area under the territory plan, unless the conservator of flora and fauna produces an ESO that the clearing is not likely to have a significant adverse impact; or (b) the clearing of more than 0.5 ha of native vegetation in a native vegetation area, on land that is designated as a future urban area.	understood and more detailed ecological surveys undertaken.
3	Proposal for development in a reserve, unless – (a) the conservator of flora and fauna produces and environmental significance opinion that the proposal is not likely to have a significant adverse environmental impact, or (b) the proposal is for minor public works to be carried out by or for the Territory in accordance with a minor public works code approved by the conservator of flora and fauna under the *Nature Conservation Act 2014,* section 318A	Potential trigger due to works within the Molonglo River Reserve.
4	Proposal that is likely to have a significant adverse environmental impact on – (a) a domestic water supply catchment	Not applicable.
5	Proposal that is likely to result in environmentally significant water extraction or consumption…	Not applicable.
6	Proposal that is likely to have a significant adverse impact on the heritage significance of a place or object registered under the Heritage Act 2004 unless (a) the heritage council produces an environmental significance opinion that the proposal is not likely to have a significant adverse impact; or (b) the proposal is the demolition of a building that is affected residential premises, and the heritage council has approved a statement of heritage effect in relation to the proposal	Potential trigger due to impacts on the identified PAD site. Further confirmation would be sought through the Heritage Office once the disturbance footprint is understood through the preparation of a Statement of Heritage Effect. The preferred option which was selected through the MCA process seeks to minimise impact on the identified PAD site.
7	Proposal involving land included on the register of contaminated sites.	Not applicable.
8	proposal, other than on land in an existing urban area or land that is designated under the territory plan as a future urban area, with the potential to adversely affect the integrity of a site where significant environmental or ecological scientific research is being conducted by a government entity, a university or another entity prescribed by regulation	Not applicable.

Whilst the proposal would likely trigger one or more provisions under Schedule 4 of the P&D Act, there may also be an approval pathway available under Section 211 of the P&D Act. Under Section 211 the Minister has discretion to grant an exemption if satisfied that there are sufficient recent studies to address the anticipated environmental impacts resulting from the project. The provisions of Section 211 have been used to support the development of Molonglo 2, Molonglo 3 and the John Gorton Drive 3C Extension (refer Figure 2-3), it is reasonable to assume a similar pathway may be followed for the EWA project. Items to consider include:

- Section 211 Exemption – Molonglo 2: This existing approval is current and can be relied upon until 31 December 2041. This approval partially covers the western section of the project area.
- Section 211 Exemption – Molonglo 3: This existing approval can be relied upon until 31 December 2041, however, only covers the eastern portion of the study area.
- Neither exemptions cover works in the river corridor or the intended crossing location of the bridge.
- It is expected that a new EIS exemption would be prepared for the future suburbs around Molonglo, the Future Urban Area to the south of the existing exemption for Molonglo 2 and the western portion of the EWA alignment.
- In recent other projects in the Molonglo Valley, a limitation of the s211 Exemption for Molonglo 3 has become apparent. The EPSDD Impact Team have confirmed that the s211 Exemption for Molonglo 3 does not apply to development in the Molonglo River Reserve, and only applies to urban areas:
  - "…as identified in the documentation for the Molonglo Stage 3 EIS Exemption the application relates to the urban areas and does not include Schedule 4 Part 4.3 Item 3 (development in a reserve) as a trigger. Therefore, if you are proposing works in the reserve you will need to consider the appropriate assessment pathway." – email from Tegan Liston, Manager Impact Assessment, January 2020
  - It appears likely that this same advice would apply to the Molonglo 2 Exemption.
- As the existing s211 exemptions for Molonglo 2 and 3 do not cover the entire alignment, and may not cover the EWA works that occur within the extent of the Molonglo River Reserve, it is recommended that the EIS exemption that is expected to be sought for the overall development in Molonglo 1 and 2, specifically include the EWA project, the bridge and any associated infrastructure that may be required within the River Corridor, such as connections to the cycle highway. This exemption should clearly include the 'works in reserve' trigger under Part 4 of the P&D Act 2007.
- Currently, there is a considerable body of ecology and heritage work to support a s211 exemption either just for the EWA project (consistent with the approach recently taken for John Gorton Drive 3C), or for a wider development area. However, given the 10-15 year horizon for the EWA Project, the relevancy of these technical reports may change.
- When the project is to progress to PSP design, it is highly recommended that preliminary advice be sought from EPSDD to confirm the appropriate approval pathway and whether the supporting technical reports will need to be updated.

It is further noted that the easternmost portion of the project is within designated land and is subject to approval under the National Capital Plan. A separate Works Approval would be required to be lodged with the National Capital Authority for this section of the alignment. As discussed in the Volume 1, this portion of the project is not within the Strategic Assessment Area and therefore is not subject to the provisions of the NES Plan. Ecological assessment (ground truthing) undertaken by SMEC as part of this project confirmed that the vegetation within the designated land is pine plantation and that no listed flora or fauna was immediately present. Further ecological survey would likely be required during preparation of the PSP Design, to accompany the Works Approval.

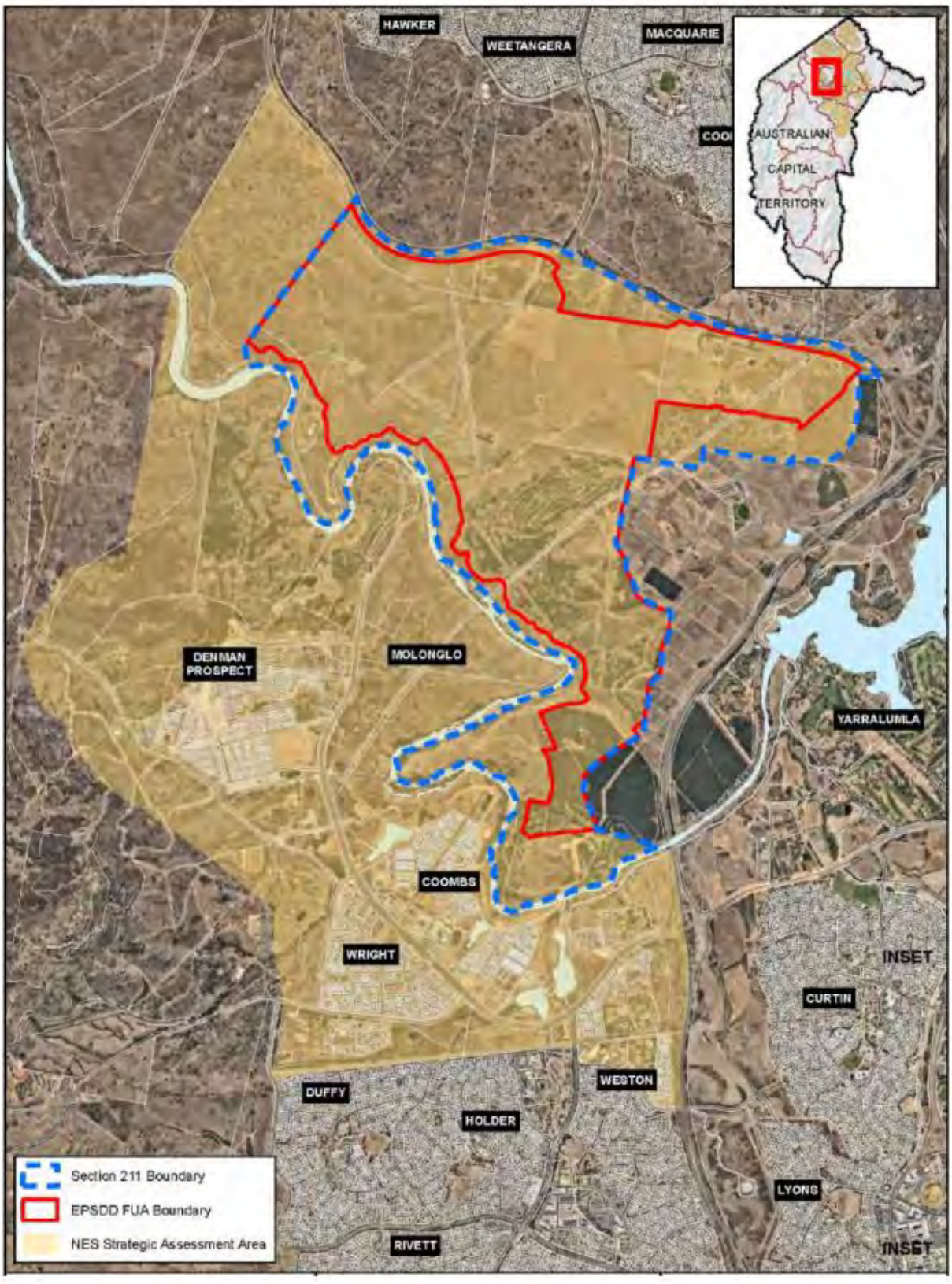

Figure 2-3 Section 211 Boundary applying to the Molonglo 3 EIS Exemption. Note, this only covers the eastern portion of the alignment.

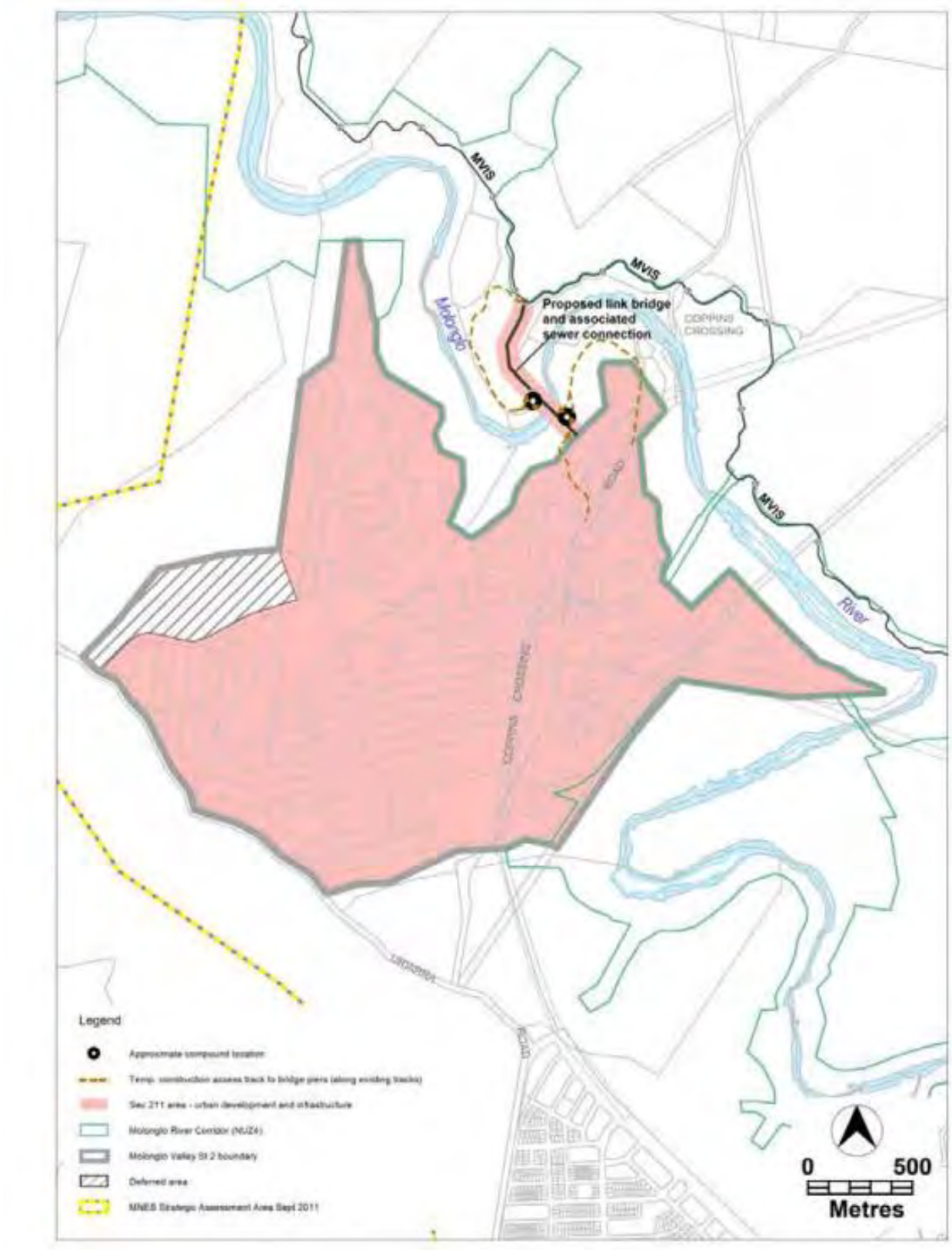

Figure 2-4 Section 211 Boundary applying to Molonglo 2 EIS Exemption. Note, this only covers the western portion of the alignment.

3 Road Design

3.1 Design Standards

Relevant design standards have been referenced to ensure that the proposed options are compliant with the latest practice. The specific standard utilised is dependent on the design component but would include the following:

- Relevant Territory standards (Trunk Road Infrastructure Standards, the Estate Development Code)
- AUSTROADS design guides (particularly the Guide to Road Design – the GRD)

3.2 Cross Section

The following typical road cross sections have been developed as part of the strategic design in consultation with TCCS. These cross sections incorporate the following features:

- 3.5 m paths for active travel (cycling and pedestrians) on road edge fronting development. East of the Molonglo Group Centre these are shared paths, however in the group centre the paths consist of:
  - 2 m dedicated cycle zone (in lieu of on-road cycle lanes)
  - 1.5 m dedicated pedestrian zone
- 3.5 m traffic lanes
- 6.0 m median (typical for dual carriageway sections)
- Allowance for streetlighting and landscape planting
- A zone for underground utilities
- Allowance for a 4m wide trunk cycleway east of the Molonglo Group Centre (in lieu of on-road cycle lanes)
- As the EWA is not an identified Inter-town Public Transport route, provision has not been made within the cross section to accommodate a dedicated public transport facility

The cross section varies along the length of the EWA depending on context of the road reserve (commercial, residential etc) and the anticipated vehicle demand.

3.2.1 Molonglo Group Centre (CH 0000 – 0700)

It is proposed to provide a low speed dual carriageway environment around the group centre at the western extent of the EWA (the proposed cross section in Figure 3-1) between CH 0000 - 0700 (refer Figure 3-4 for EWA alignment). This approach has been adopted to:

- Cater for a higher volume of vehicle movements anticipated around the group centre
- Provide intersection capacity at the John Gorton Drive intersection signalised intersection
- Provide consistency with Holborow Ave (EWA west of John Gorton Drive)
- Provide a consistent cross section throughout the group centre that then transitions to a two-way carriageway at the group centre edge
- Support the place function of the Molonglo Group Centre
- Enhance safety in the Group centre (eliminate cross movements of the arterial and provide two stage crossings of the arterial road)

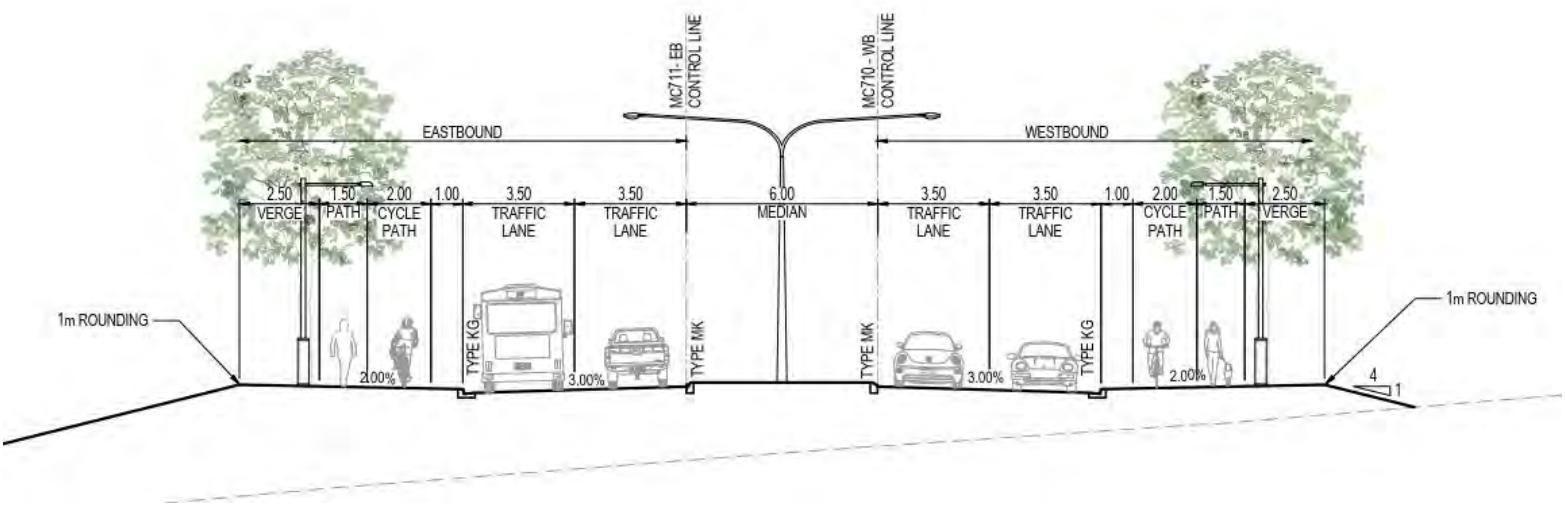

Figure 3-1 Typical cross section – Molonglo Group Centre

3.2.2 Molonglo Group Centre to Molonglo 3 East Connector Road (CH 0700 – CH2100)

East of the Molonglo Group Centre it is proposed to rationalise the cross section down to a two-way single carriageway. The rationale for this approach includes:

- Strategic transport modelling and micro-simulation modelling showed that the single carriageway is expected to provide sufficient capacity to 2041, using current planning and travel behaviour assumptions
- Whole of life cost reduction (reduced pavement, earthworks and drainage costs)
- Reduced structure costs for the EWA Molonglo River Bridge cross section

The proposed cross section (indicated in Figure 3-2) makes allowance for the future provision of a second carriageway should growth in demand necessitate an increase in corridor capacity. Such a future carriageway would also require widening of the EWA Molonglo River Bridge. Earthworks for this future duplication could be completed as part of the project, or left for the future, and would depend on the forecast likelihood of future duplication being required at the time the project is delivered.

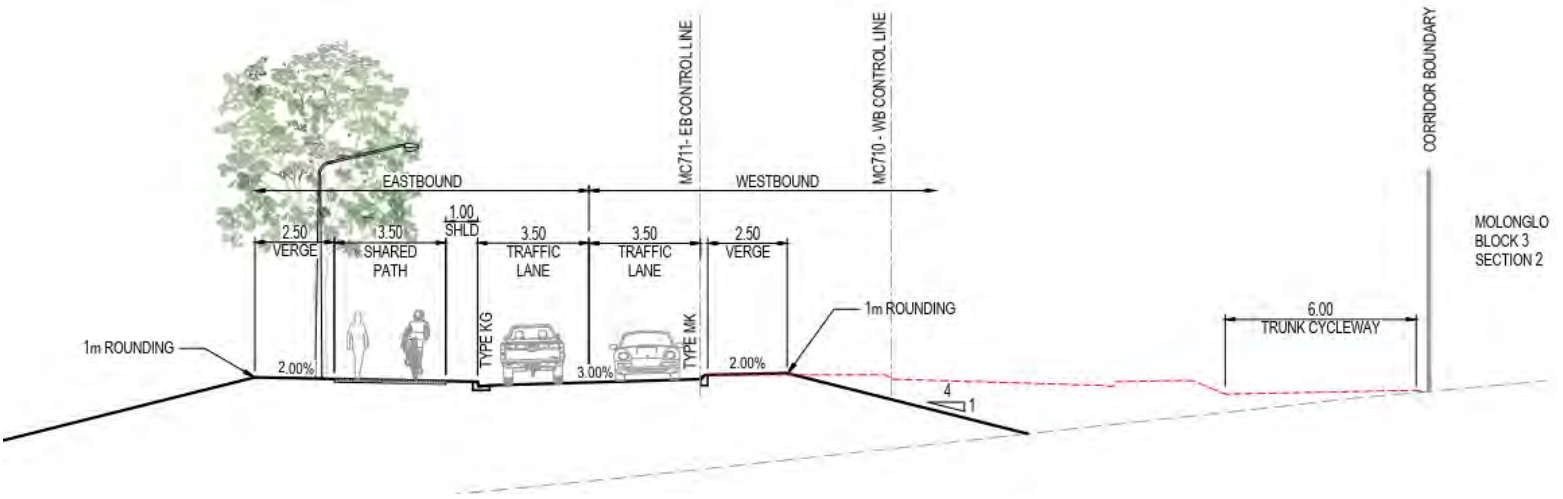

Figure 3-2 Typical cross section – Molonglo Group Centre to Molonglo 3 East Connector Road

3.2.3 Molonglo 3 East Connector Road to Tuggeranong Parkway (CH CH2100 – 3000)

The northern leg of the Molonglo 3 East (M3E) connector road is expected to introduce a significant amount of traffic onto the EWA. As such, the intersection of the EWA and the M3E Connector Rd, and the EWA to the east of the intersection will require significant capacity to convey the forecast traffic. As such it is proposed to provide a dual carriageway on the EWA on the eastbound approach to the M3E intersection. This approach has been adopted as:

- Traffic modelling indicates that two lanes in each direction is required for the predicted traffic volumes

- Traffic modelling indicates that several through and turn lanes are required at the M3E intersection

The proposed cross section east of the M3E intersection is provided in Figure 3-3.

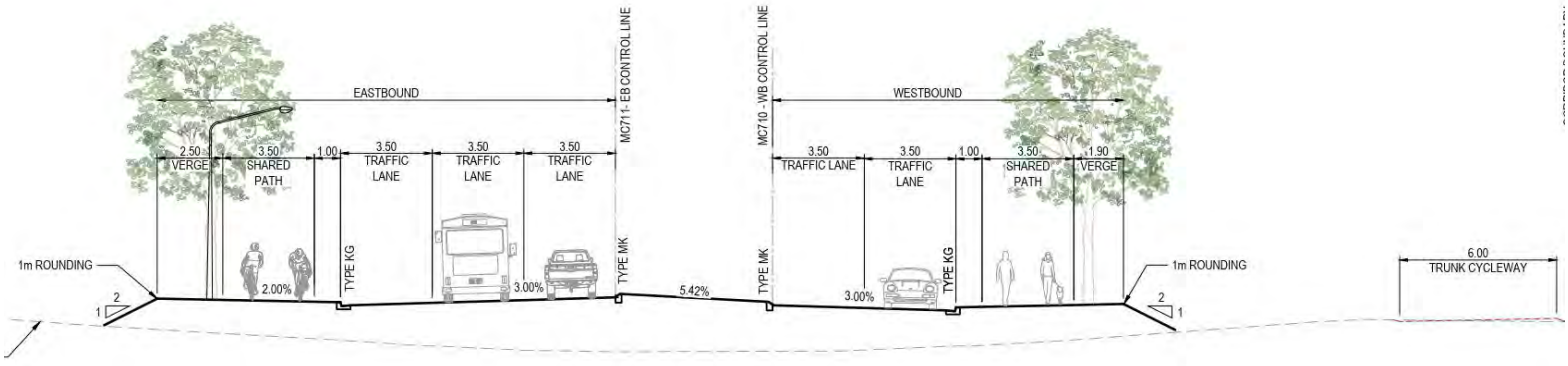

Figure 3-3 Typical cross section – Molonglo 3 East Connector Road to Tuggeranong Parkway

3.2.4 Earthworks

Earthworks and batter slope requirements will be subject to geotechnical investigation during future design stages. Typically, the following has been assumed in the preparation of the options development:

- 4:1 max – Road formation fill batters with no barrier;
- 2:1 max – Road formation fill batters with barrier; and
- 2:1 max – Road formation cut batters

3.3 Design Speed

Given the variable nature of the land uses adjacent to the EWA, and in the context of the arterial function of the road, two posted speed zones have been proposed in the strategic design:

- Molonglo Group Centre: 50 km/h – the Molonglo Group Centre will have a strong place function with high pedestrian movements and vehicular friction. Maintaining low vehicle speeds on this part of the EWA will be important in this urban context.
- East of the Molonglo Group Centre: 70 km/h – Between the group centre and the Tuggeranong Parkway the primary function of the EWA will be to provide an arterial link between the Molonglo Valley and the motorway corridor. That is, the EWA will primarily serve a movement function through a suburban area. As such it is considered important to convey traffic at higher travel speeds to reduce travel times and increase the capacity of the corridor.

As such, and in accordance with the standard Austroads GRD design approach, a design speed of 60 km/h has been adopted in the group centre, and 80 km/h has been adopted outside the group centre on the EWA.

3.4 Design Criteria

Table 3-1 below provides a summary of the design criteria that has been adopted for the development of the EWA preferred option strategic design.

Table 3-1 Road design criteria summary table

Criteria	Requirement	Reference
General		
Road Classification	Arterial Road	AUSTROADS - Guide to Road Design Part 2: Design Considerations (2019) - Section 2.4.1
Posted Speed Limit	50km/h	Molonglo Group Centre

Criteria	Requirement	Reference
	70km/h	Molonglo Group Centre (eastern edge) to Tuggeranong Parkway
Design Speed	60km/h	Molonglo Group Centre (AUSTROADS - Guide to Road Design Part 3: Geometric Design (2016) - Section 3.5.2)
	80km/h	East of Molonglo Group Centre (AUSTROADS - Guide to Road Design Part 3: Geometric Design (2016) - Section 3.5.2)
Design Life (Road)	30 years	AUSTROADS - Guide to Road Design Part 3: Geometric Design (2016) - Table 4.1
Design Life (Bridge)	100 years	AUSTROADS - Guide to Road Design Part 3: Geometric Design (2016) - Table 4.1
Design and Check Vehicles		
Design Vehicle	Single unit truck/bus (12.5 m) Radius 12.5 m	AUSTROADS - Guide to Road Design Part 4: Intersections and Crossings (2017) - Section 5.2
Check Vehicle	Single articulated (19.0 m) Radius 15 m	AUSTROADS - Guide to Road Design Part 4: Intersections and Crossings (2017) - Section 5.2
Lane, Shoulder, Verge, and Batters		
Traffic Lane Width	3.5m	AUSTROADS - Guide to Road Design Part 3: Geometric Design (2016) - Section 4.2.5
Shoulder Width	0m	Carriageway kerbed and off road cycle facilities provided
Min Verge Width	1.5m	AUSTROADS - Guide to Road Design Part 3: Geometric Design (2016) - Section 4.4.1
Path	3.5m	Shared and dedicated path widths as agreed with TCCS in session of 20 May 2020
Typical Maximum Design Batter Slopes	1V:4H grassed 1V:2H low maintenance treatment	AUSTROADS - Guide to Road Design Part 3: Geometric Design (2016) – Table 4.11
Median		
Width	6.0m	Typical (less at intersections)
Cross fall & Grading		
Pavement Cross fall on Straights	3%	AUSTROADS - Guide to Road Design Part 3: Geometric Design (2016) - Section 4.2.2
Cross fall on footpath	2.5%	Australian Standards AS1428
Vertical Alignment		
Minimum desirable longitudinal grade	0.5%	AUSTROADS - Guide to Road Design Part 3: Geometric Design (2016) - Table 8.5
Maximum desirable longitudinal grades	6-8 % 4-6 %	AUSTROADS - Guide to Road Design Part 3: Geometric Design (2016) - Table 8.3 60 km/h 80 km/h
Maximum desirable longitudinal grade for footpaths	5%	Australian Standards AS1428
Sight Distances		

Criteria	Requirement	Reference
Sight Distance Parameters	Varies	AUSTROADS - Guide to Road Design Part 3: Geometric Design (2016) - Section 5.2.1
Driver Reaction Time	2.0 sec	AUSTROADS - Guide to Road Design Part 3: Geometric Design (2016) -Table 5.2
Stopping Sight Distance (SSD) Minimum size crest VC (K value)	 K=19.1 (SSD=73m) K=29.3 (SSD=114m)	AUSTROADS - Guide to Road Design Part 3: Geometric Design (2016) -Table 5.5 and Table 8.7 60 km/h 80 km/h
Safe Intersection Sight Distance (SISD)	 K=16 (SSD=123m) K=35 (SSD=181m)	AUSTROADS - Guide to Road Design Part 4A: Unsignalised and Signalised Intersections - Table 3.2 60 km/h 80 km/h
Curves		
Minimum radii of horizontal curves based on superelevation and side friction at maximum values	161m desirable 107m absolute minimum	AUSTROADS - Guide to Road Design Part 3: Geometric Design (2016) - Section 7.6.1
Maximum superelevation	5%	AUSTROADS - Guide to Road Design Part 3: Geometric Design (2016) - Section 7.7.3
Minimum Sag Vertical Curve K Value	13	AUSTROADS - Guide to Road Design Part 3: Geometric Design (2016) - Figure 8.9
Minimum radii with adverse cross fall	400m	AUSTROADS - Guide to Road Design Part 3: Geometric Design (2016) - Table 7.12

3.5 Horizontal Geometry

The horizontal alignment of the preferred EWA option is largely adopted from Option 6 that was identified in the Optioneering process discussed in Volume 1 – Option Study. Refinements from Option 6 have been made to the horizontal geometry in response to more detailed design assessment and in order to optimise formation footprint, land and constraints impacts (including MVIS infrastructure), and Bridge geometry, and in the case of the Tuggeranong Parkway interchange, improve network operation. An overview of the EWA alignment is provided in Figure 3-4.

Figure 3-4 – Preferred EWA alignment

3.5.1 John Gorton Drive to Molonglo River Bridge

The rationale of the proposed horizontal alignment of the EWA west of the Molonglo River is as follows:

- From CH 0000 – 0300 the alignment is largely dictated by the location of the existing John Gorton Drive intersection. From the intersection there is length of straight that is intended to suite the development of the future group centre.
- From CH 0300 - 0700 curvature is introduced to align the EWA corridor as closely as possible to the Box Gum Woodland boundary whilst making allowance for future duplication. This alignment has been adopted to maximise developable area in this precinct.
- CH 0700 – 1500 is largely straight with a relatively short R400 curve at CH 1150. The short arc length of this curve has been adopted to minimise the EWA footprint and maximise developable area of the precinct, however it is noted that the arc length is shorter than recommended by the GRD. There is opportunity to refine this curve in future iterations of the design which will be affected by Molonglo River bridge geometry.
- CH 1500 – 1850 provides curvature that attempts to “square up” the Molonglo River bridge to the river corridor, reducing overall span length and cost.

3.5.2 Molonglo River Bridge to Tuggeranong Parkway

The rationale of the proposed horizontal alignment of the EWA east of the Molonglo River is as follows:

- The alignment between CH 1850 – 2450 is curvilinear in response to the undulating terrain of the site. This alignment includes reverse curves with a minimum allowable tangent length.
- Downstream of the western half of the M3E connector road staggered T intersection in the westbound direction there is a length of parallel road with the two lanes followed by merge zone that is within a R270 curve. This merge zone is proximal to the Molonglo River bridge. Whilst all geometric elements comply with the requirements of the GRD and are considered acceptable, it would be preferable to locate the merge zone within a straight. As such, future iterations of the design should consider potential adjustment to the horizontal geometry in this area based on:

  - A better understanding of demand volumes and the potential need for dual carriageway west of the M3E connector road (negating the need for a merge)
  - Refinement of the Molonglo River bridge type and alignment including a potential increase in skew across the river valley

- Between the eastern part of the M3E staggered T intersection (CH 2400) the Tuggeranong Parkway interchange ramps (CH 2750) there is a length of straight. The alignment in this location is in response to interchange geometry, the location of the Arboretum, and the alignment of the underground 132 kV cables.

All horizontal geometry in this area is compliant with Austroads Guide to Road Design.

3.6 Vertical Geometry

The vertical alignment of the preferred EWA option has been refined from Option 6 that was identified in the Optioneering process discussed in Volume 1 – Option Study. The primary objectives of these adjustments have been to ensure that the road follows existing terrain to the extent possible in order to: minimise the formation footprint, optimise cut/fil balance to the extent possible, reduced the extent and height of retaining walls and minimise impact on environmental constraints. Key drivers and considerations for the vertical grading of the EWA include:

- Provision of sufficient vertical clearance to the key utilities such as the bulk water supply mains (CH 0700) and the 132 kV cables (CH 2260)
- Ensuring a maximum longitudinal grade of 3% through likely side road intersection locations
- Ensuring a maximum overall longitudinal grade of 5% through the corridor to comply with accessibility requirements
- An absence of vertical curvature on the Molonglo River bridge to aid constructability
- Provision of the River Road underpass, requiring raising of the mainline to allow sufficient height for the underpass and the associated structural depth

All vertical geometry in this area is compliant with Austroads GRD. It is noted that the vertical grading of the EWA will require updating in future iterations of the design as material balance requirements dictate and to coordinate with side road connections when they have been confirmed.

3.7 Intersection & Interchanges

3.7.1 John Gorton Drive intersection

The John Gorton Drive intersection with the EWA / Holborow Ave has been constructed and does not form part of this design exercise. The existing configuration of the intersection has been adopted in the design, however it is noted that there appear to be deficiencies in the vertical geometry for the EWA / Holborow Ave through movement that the Territory may wish to be address as part of the EWA project.

3.7.2 Molonglo 3 East connector road intersection

3.7.2.1 Location

The location of the M3E connector road intersection is a function of spatial and topographic constraints. The location has sought to balance 1) the need to accommodate the westbound weave movement that is generated between the Tuggeranong Parkway exit ramps and the intersection; 2) an acceptable distance between the staggered legs of the T intersections, and 3) the proximity to the Molonglo River bridge and the need to accommodate a westbound length of parallel running and a merge zone before the bridge. There appears minimal latitude to adjust the intersection location given the current proposed arrangement.

3.7.2.2 Arrangement

Based on a number of factors considered in the optioneering process (refer Volume 1) a four-way crossroad intersection was preferred for the M3E connector road intersection. However, following more detailed design analysis and assessment of the local topological constraints, it was found that the crossroad intersection was not viable. The primary reason for this outcome related to the southern leg of the intersection and the fact that the terrain rises steeply along the southern edge of the EWA in this location. To accommodate this configuration the southern leg of the intersection would need to be very steep with a sharp horizontal curve on approach to the intersection threshold

in addition to requiring significant cut (resulting in a substantial scar on the landscape). These outcomes were considered unacceptable from a safety and landscape design perspective.

For this reason, a Right-Left staggered T arrangement has been proposed in the preferred option. The primary movement through the intersection is the M3E north / Tuggeranong Parkway movement (north -> east in the AM peak and east -> north in the PM peak) this movement is accommodated with dual turn lanes in both directions on the eastern part of the staggered T. A third eastbound lane is provided for the through movement on the EWA mainline to aid intersection performance. The eastern half of the staggered T provides access into the southern M3E precinct. It is noted that traffic performance was found to be similar between the staggered T and the crossroad intersection configurations. The proposed intersection arrangement is indicated in Figure 3-5.

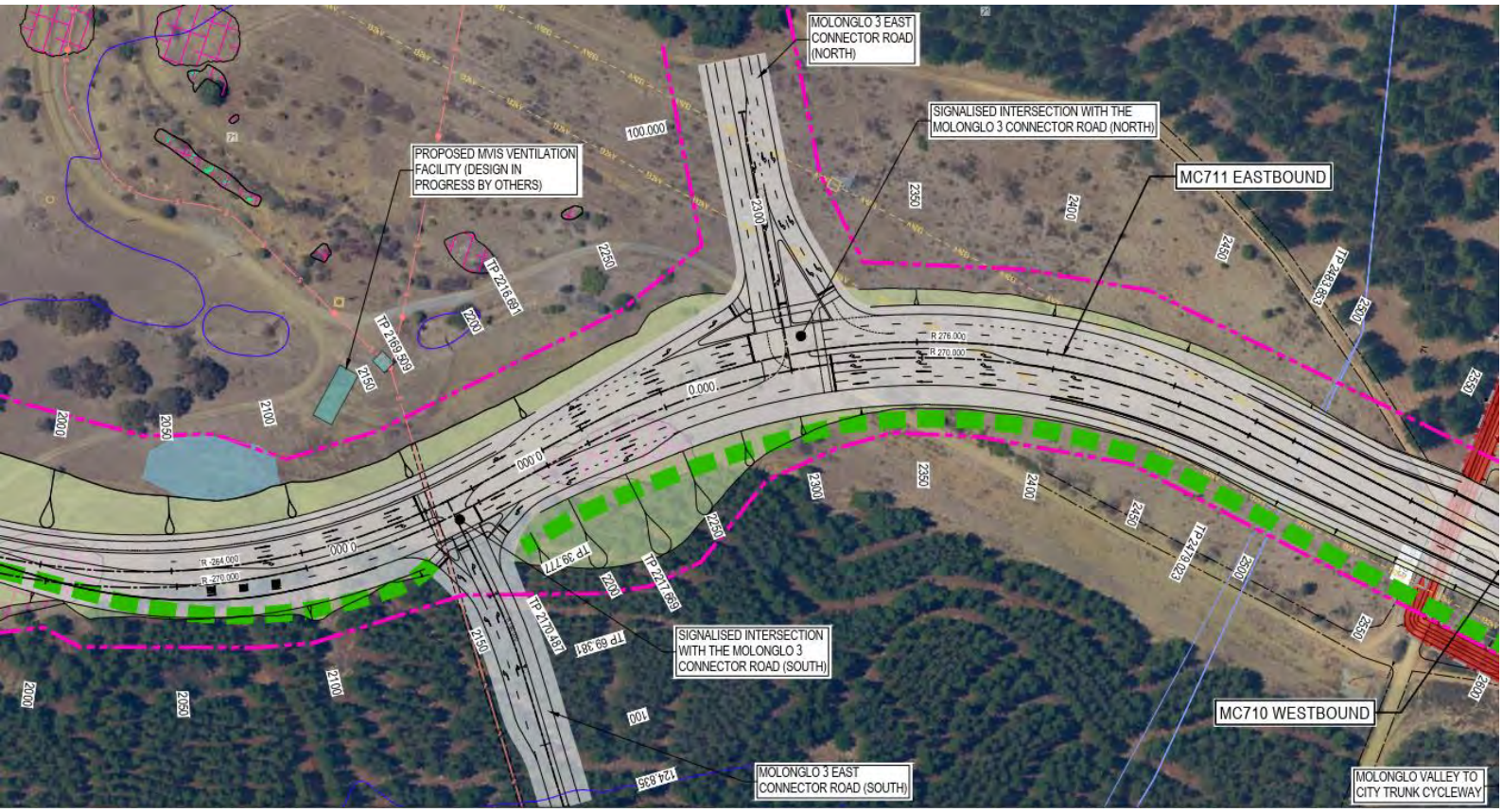

Figure 3-5 – Proposed Molonglo 3 East connector road intersection

3.7.3 EWA / Tuggeranong Parkway Interchange

3.7.3.1 Tuggeranong Parkway – Northbound exit ramp

The Tuggeranong Parkway northbound exit ramp is a free-flow ramp that originates from a diverge / slip lane from the Parkway mainline. The nose / gore of the exit ramp has been located as far north as considered possible to maximise weave length between the Cotter Rd interchange and the EWA. The ramp enters its own dedicated lane westbound lane on the EWA.

3.7.3.2 Tuggeranong Parkway – Northbound entry ramp

The Tuggeranong Parkway northbound entry ramp is a free-flow ramp that originates from a diverge / slip lane from the EWA mainline. A relatively small radius R120 curve has been used for the ramp. Whilst this radius curve is below standard for the proposed design speed, it has been adopted to minimise impact on the existing Arboretum plantings adjacent to the ramp, noting that the formation footprint will require some removal / relocation of arboretum plantings, primarily within the Tuggeranong Parkway gazetted road corridor. Further reductions to impact on the Arboretum plantings such as the provision of retaining walls for the ramp could be considered in future iterations of the design.

The northbound entry ramp joins the Tuggeranong Parkway mainline as a lane add, with a merge proposed on the mainline upstream of the ramp nose. Microsimulation traffic modelling indicated that this arrangement operates more efficiently than an entry ramp merge for the forecast demand.

3.7.3.3 Tuggeranong Parkway – Southbound exit ramp

The Tuggeranong Parkway southbound exit ramp is a free-flow ramp that originates from a diverge / slip lane from the Parkway mainline. The ramp uses a curvilinear arrangement to manage speeds for the transition between the Tuggeranong Parkway to the EWA where it enters its own dedicated lane westbound lane.

3.7.3.4 Tuggeranong Parkway – Southbound entry ramp

The Tuggeranong Parkway southbound entry ramp is a free-flow loop ramp that is a continuation of the eastbound EWA mainline. It is noted that mainline carriageways that feed directly into loop ramps can be hazardous as there is a high risk that approach speeds may be excessive for the loop ramp radii. For this reason, an intermediate speed curve (ie design speed that is lower than the EWA mainline, but higher than the ramp loop) has been introduced upstream of the loop to control approach speeds. An 80 m tangent between this curve and the loop has been provided to ensure that these successive curves don't behave as compound curves.

The loop ramp adopts the minimum radius stipulated in the GRD. Two lanes are proposed on the loop ramp with a merge downstream of the exit tangent point in response to advice in the GRD on indicative loop ramp capacities. A teardrop shape for the loop ramp has been adopted in an effort to maximise the weave length between the EWA and the Cotter Rd interchange. The entry ramp enters the Tuggeranong Parkway Mainline as a lane add.

3.7.4 Cotter Road / Tuggeranong Parkway Interchange

Upgrades to the Tuggeranong Parkway southbound exit ramp at the Cotter Road interchange are required in response to the extra demand that the EWA interchange will introduce at this location. These upgrades primarily consist of an additional dedicated left turn lane to improve interchange capacity to cope with increased flows that originate from the EWA.

3.8 Southern M3E Precinct Second Access

3.8.1 Access Requirement

The current design of the EWA makes provision for a single access to the precinct to the south of the road corridor. Whilst master planning activities for the M3E area were underway at the time of writing, it is understood that the current planning for this precinct makes allowance for 300 – 400 residences in the area in addition to public open space. Whilst not mandated in any applicable local or national guidelines, it is considered good practice to provide two access points to residential areas. The rationale for this approach relates to:

- **Emergency response, access and egress** – Secondary access into an area is important to ensure that emergency services (police, ambulance and fire) can enter an area if the primary access becomes blocked. Similarly, emergency egress is important should the need for evacuation be required in situations such as flood or bushfire (both from a capacity perspective in the case of rapid evacuation, and should the primary egress point become blocked). It is noted that this southern M3E precinct is considered a bushfire prone area.
- **Network redundancy** – A secondary access provides a network redundancy in the event that the M3E intersection becomes inoperable (through accident, maintenance etc).
- **Capacity** – Secondary accesses provide additional capacity to the road network. However, given the relatively small scale of the precinct, and the outcomes of the traffic modelling of the EWA / M3E intersection, capacity is not considered a driver for a second access.

In previous iterations of the design the requirement for a second access was addressed by the four-way M3E connector road intersection in addition to a Left-in / Left-out (LILO) arrangement to the west (refer Volume 1 – Options Report). However, as discussed in Section 3.7.2, the topography of the site has precluded this approach and as such an alternative arrangement for a secondary southern connection is required. Options for this connection have been identified below.

3.8.2 Access Options

It is noted that the southern M3E precinct is bounded by the Molonglo River reserve corridor, the Tuggeranong Parkway and the EWA. Given the hard constraints of the Molonglo River and the Tuggeranong Parkway corridors, it is considered prudent to identify a second point of access to the precinct either into or through the EWA corridor.

A number of options to achieve a secondary access interface between the southern M3E precinct and the EWA have been identified. These options are indicated in Figure 3-6 and discussed in Table 3-2.

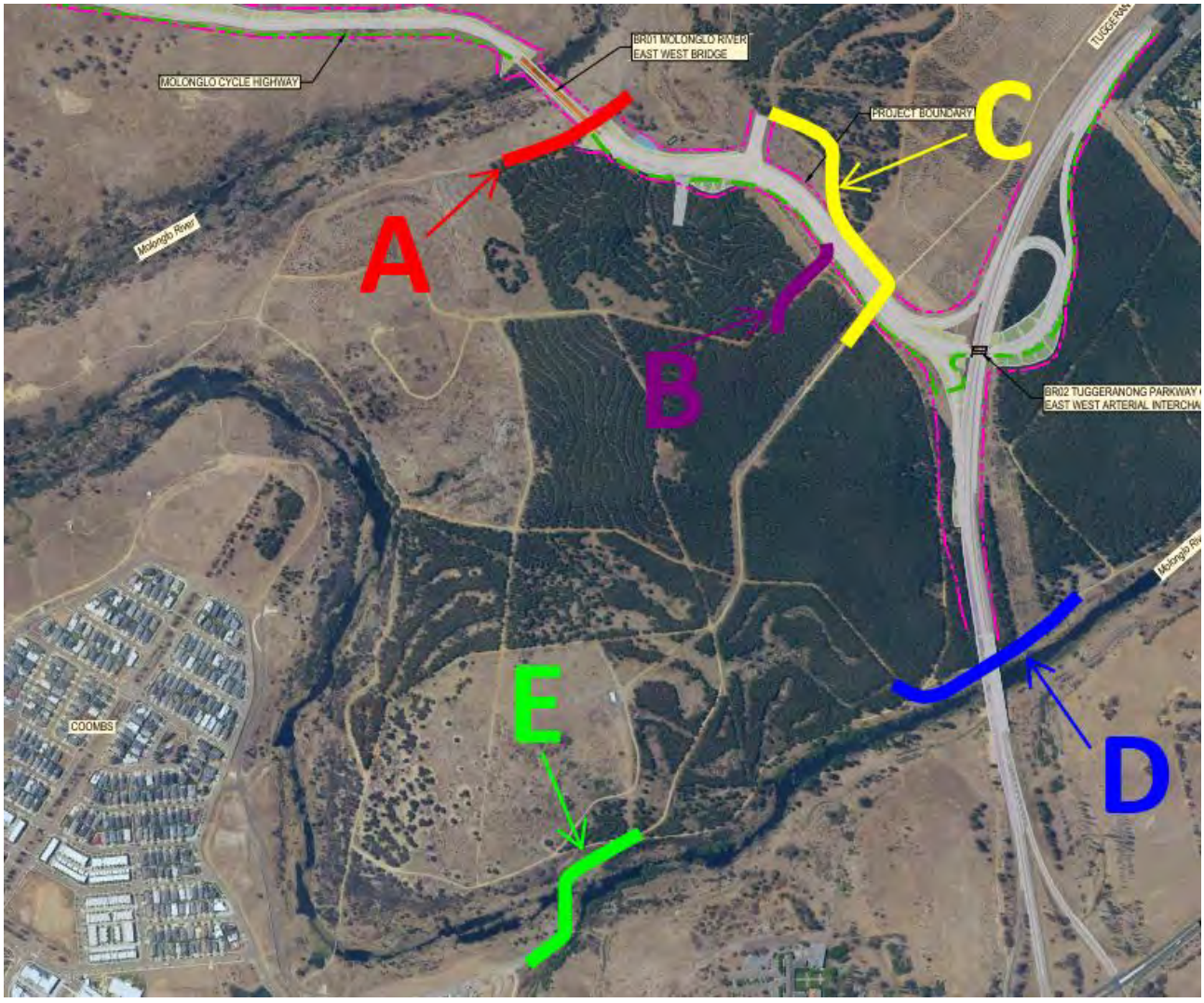

Figure 3-6 – Potential M3E southern precinct access locations

Table 3-2 Summary of M3E southern precinct access options

Option	Description	Comment
A	Riverside Edge Road	Options for a Riverside edge road were assessed in the options assessment process discussed in Volume 1 of this study. The optioneering process identified a preferred solution for this road connection that was considered viable and possessed several advantages. However, some stakeholders voiced concerns over the provision of road infrastructure in the Molonglo River Reserve, and as such alternative approaches were investigated. In future iterations of the EWA, design development Riverside Edge Road and its attendant advantages could be revisited with further engagement with stakeholders.

Option	Description	Comment
B	Left Out (LO) only	A secondary LO only option on the eastern edge of the southern precinct would provide an egress point and emergency access point. The design of the intersection would ensure that only westbound left turns onto the EWA would be permitted, and that right turn movements and left turns into the southern precinct from the EWA would not be permitted. The need to prevent the inbound left turn relates to the proximity of the intersection to Tuggeranong Parkway exit ramps, and the risk of accident / weave movements that the intersection is likely to induce. Key advantages of this arrangement include: – Emergency response - Egress in an emergency (eg bushfire) is facilitated by this option. Smart design of the intersection could ensure that emergency access in could also be achieved (eg flexible bollards etc). – Network redundancy – Whilst the LO option allows outbound movements it doesn't provide access into the precinct. However in the rare event that the primary access point (the M3E connector road intersection) is closed through accident, maintenance etc, traffic control would be in operation in the area and could be used manage access into the precinct through this LO intersection. A disadvantage of this approach relates to network legibility in that the inbound movement into the precinct could potentially be different to the return leg of the journey. This issue is mitigated to an extent by the fact that that the LO services the return movement rather than the inbound direction, and would be considered to have a more significant impact if the intersection didn't allow travellers to leave the way they entered. It is noted that this issue also exists with LILO arrangements.
C	River Road underpass	The current EWA design proposes a 3.5 m high underpass for active travel crossing of the corridor in addition to maintenance and emergency access. The design of this underpass could be adapted, and an access road connected to the northern leg of the M3E connector road to allow an alternate access point from the EWA. This option would require increase in the underpass height and regrading of the EWA (increase in embankment height) and widening of the underpass (longer structure span). This option would also change the nature of the road network interface with the Arboretum and would require engagement with key local stakeholders.
D	Tuggeranong Parkway Underpass	Depending on future development of the pine forest to the east of the Tuggeranong Parkway (south of the current zoo extent), it may be possible provide an access road under the Tuggeranong Parkway Molonglo River bridge. However, this access would potentially route through the Molonglo River Reserve and as such may raise similar concerns with stakeholders to the Riverside Edge Road. The viability of this option will be more apparent when future iterations of the EWA design are developed and future development scenarios to the east are better understood.
E	Molonglo River Low Level access - Coombs	There is currently a low-level crossing of the Molonglo River on the Bicentennial Trail route adjacent to Coombs. This crossing could be upgraded to provide a road link and secondary point of access into the precinct. However, depending on the design, this option is likely to have waterway safety concerns and would require substantial engagement with affected Coombs residents.

3.9 Assumed Network Upgrades

3.9.1 Tuggeranong Parkway – 3rd Northbound Lane

Based on advice from TCCS it is understood that prior to 2031 a third northbound lane will be constructed on the Tuggeranong Parkway from the Cotter Road interchange north. It is proposed to cater for increased forecast demand on the Parkway corridor. This additional lane has been assumed to be a lane add from the Cotter Road northbound entry ramp and involves widening into the western verge of the Tuggeranong Parkway.

This third northbound lane has been incorporated into the EWA interchange design. Furthermore, it is considered critical to the performance of the interchange, particularly to cater for the Cotter Road – Tuggeranong Parkway – EWA movement. It is considered unlikely that the Tuggeranong Parkway and the EWA interchange will operate at an acceptable level of service at EWA project opening if this third northbound lane is not in place.

3.9.2 Tuggeranong Parkway – Molonglo River Bridge

Associated with the third northbound lane on the Tuggeranong Parkway is the need to upgrade the crossing of the Molonglo River. The current Tuggeranong Parkway bridge over the Molonglo River has a highly substandard cross section and cannot accommodate the additional northbound lane. As such, additional structure will be required over the waterway which could take the form or either a widened bridge, or alternatively provision of a new bridge.

Given the design of the existing bridge, preliminary structural engineering advice indicates that it is unlikely to be suitable for widening. Furthermore, if widening was to occur, substantially more than a single lane width would be required to ensure that the revised configuration had appropriate lane widths and shoulders (both median and edge). As such, it appears preferable that the existing bridge be duplicated to accommodate the northbound carriageway. Indeed, the single direction crossfall and general structural design of the existing bridge suggests that duplication rather than widening of the structure was the original design intent when increased capacity would be required.

Provision of a duplicated bridge to accommodate the northbound carriageway allows for a third southbound auxiliary lane between the EWA and Cotter Road interchange on the existing bridge. This auxiliary lane is required to cater for southbound weave movements on the Parkway and for general capacity between the interchanges. It is considered unlikely that the Tuggeranong Parkway and the EWA interchange will operate at an acceptable level of service at EWA project opening if this southbound auxiliary lane is not provided. The design assumes that a new duplicated northbound bridge will be provided as part of a separate project prior to EWA project opening.

4 Structural Design

4.1 Structure Types on the EWA

A number of structures will be required as part of the EWA. The EWA strategic design includes the following structures:

- EWA bridge over Molonglo River
- EWA interchange bridge over Tuggeranong Parkway
- Reinforced earth walls at Molonglo River and Tuggeranong parkway bridges
- Active travel / access underpasses at River Road and beneath the Tuggeranong Parkway EWA northbound exit ramp.

Additionally, it is anticipated that a bridge on the Tuggeranong Parkway over the Molonglo River will be required to facilitate the project, however this is expected to be undertaken as part of other works prior to the construction of the EWA (refer Section 3.9.2). Noise walls or other attenuation features may also be required in the EWA corridor depending on the proximity of adjacent development and the requirements of applicable guidelines at the time of the EWA project delivery.

4.2 Design Criteria

Table 4-1 provides a summary of the design criteria that has been adopted for the development of the route options and will be used in the development of the strategic design.

Table 4-1 Bridge design criteria summary table

Criteria	Requirement	Reference
Live load	• SM1600 • HLP400 • W80 Wheel Load • Non-concurrent Pedestrian loading (**p**) as per Figure 8.1 of AS5100.2 which is based on loaded area (A) o A < 10m^2, **p** = 5kPa o A>100m^2, **p** = 2kPa **p** linearly varies for 10m^2 < A < 100m^2	Clauses 7 and 8 of AS5100.2
Flood parameters	• Flood immunity – 100 years • Service design flood – 100 years • Ultimate design flood – 2000 years	Clause 11.1 of AS5100.1 and clause 16 of AS5100.2
Temperature Parameters	• Mean Temperature 25°C • Average bridge temperature - -5°C to 60°C for steel bridge • Average bridge temperature - 0°C to 50°C for concrete bridge	Clause 18 of AS5100.2
Wind Parameters	Regional Wind Speed • V_{20}= 37m/s • V_{2000}= 48m/s	Clause 17 of AS5100.2 and clause 3.2 of AS1170.2
Settlement	• 20mm substructure settlement • 10mm differential settlement between adjacent substructures	The settlement value to be confirmed based on geotechnical investigation

Criteria	Requirement	Reference
Traffic Barriers and Pedestrian Railings	Medium performance traffic barriers Outside footpath: Pedestrian railing	Medium performance barrier is proposed in accordance with clause 14.5.4 of AS 5100.1.
Construction Load	• Construction live load – 0.5kPa, • Differential Temperature – 90% of Clause 18.3 of AS5100.2 • Wind Load – 200yr return Period: Regional Wind Speed V_R = 43m/s	Clause 22 of AS5100.2

4.3 Molonglo River Bridge

4.3.1 Bridge Purpose and Design Approach

The bridge over Molonglo River is a major infrastructure component of the EWA project. The purpose of the bridge is to serve a movement function, conveying the single, two-way carriageway of the EWA in addition to active travel paths (both shared pedestrian / recreational paths and a dedicated trunk cycleway).

Over the past decade the Territory have pursued a 'Family of Bridge' philosophy for bridge structures that are proximal or occupy the same corridor. It is proposed that the EWA Molonglo River bridge be delivered within this 'Family of Bridges' concept for the Molonglo Valley. Under the 'Family of Bridges' concept, Butters Bridge was a recently constructed pedestrian bridge that spans the Molonglo River on the west side of John Gorton Drive (JGD). A new John Gorton Drive Bridge over the river which is located downstream to the EWA is currently in the final PSPS design stage. It is expected that architectural aspects of the existing Butters Bridge, and the JGD Bridge will ultimately dictate the form of the EWA Bridge.

For the high-level strategic option development developed here, the steel trough girder bridge approach adopted for the JGD Bridge is proposed for the new EWA Molonglo Bridge to meet the 'Family of Bridges' concept requirements. A haunched profile was adopted for JGD Bridge to introduce economy and structural efficiency as well an elegant visual impact. Furthermore, it is understood that this design approach also facilitates future widening to accommodate additional deck area if required. A similar form is also proposed for EWA Bridge to reduce the visual weight of the spanning beams and to ensure aesthetic consistency between two bridges given their proximity. This approach will need to be reviewed with the architectural input and workshops in future stages of design development and in response to the final design approach adopted for the JGD bridge.

The following needs to be considered when developing the EWA bridge form:

- Within the Molonglo River Reserve, the new EWA bridge will be located in between existing Tuggeranong Parkway Bridge and the proposed JGD Bridge over Molonglo River.
- A new bridge on the Tuggeranong Parkway over the Molonglo River for the northbound carriageway will be required to facilitate the project.
- There may be a requirement for future widening of EWA Bridge to accommodate two traffic lanes in each direction.

Notwithstanding the current design approach described here, it is noted that there are other bridge forms that could also be considered in future stages of design development. Primary amongst these alternatives is a balanced cantilever construction which will offer a similar form of structure.

4.3.2 Bridge Form

The bridge over Molonglo River spans approximately 236 metres across the Molonglo River, passing over the Molonglo River at a maximum height of approximately 30 metres. The ACT Government's view for the new bridge is that the appearance and proximity of other bridges across the Molonglo River is an important contextual factor. The new bridge is located upstream of the proposed 3-span, steel trough girder bridge on John Gorton Drive (JGD) over Molonglo River. Hence, the similar form of haunched steel trough girder bridge for the new Molonglo Bridge is proposed. The proposed bridge will have a span configuration of 75 metres, 85 metres and 75 metres for an overall bridge length of 236 metres as shown in Figure 4-1.

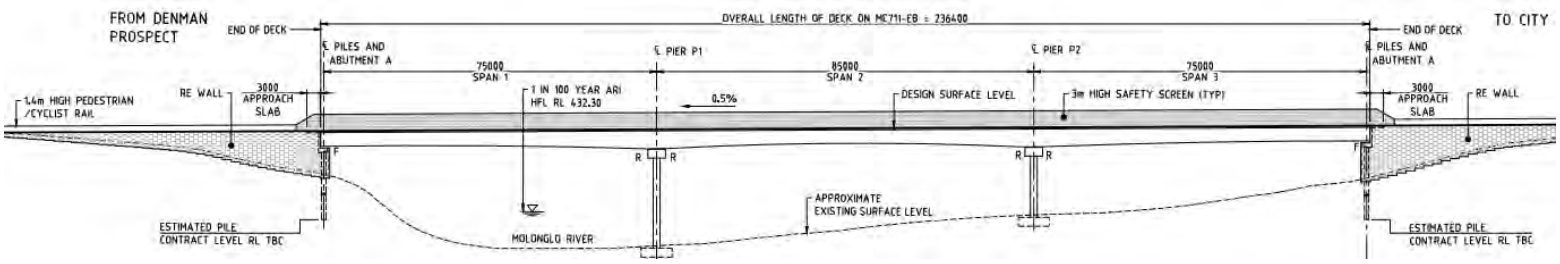

Figure 4-1 – Molonglo River Bridge Elevation

Span configuration was selected to avoid pier 1 in the natural water flow and abutments are placed outside the dam break flood level.

Feedback from some ACT Government agencies during the design development of the bridge has indicated that a longer and/or a higher bridge would be desirable in this location. The rationale for this proposed amendment was centred on the desire to reduce impact on habitat; improve ecological connectivity in the corridor and facilitate provision of a path network that is outside the Molonglo River Corridor boundary.

It is expected that the design of the bridge including adjustments to superstructure height and span lengths will be refined in future stages of the development for the project. However, the following considerations and implications of adjustment to the Molonglo River bridge are noted:

- Increasing the overall length of the bridge is likely to have significant capital cost implications, more so if a dual carriageway is required.
- There is a horizontal curve that terminates near each bridge abutment. Increasing the overall length of the bridge will impact on these curves and necessarily require adjustment to the road alignment. The viability of such an adjustment given the site constraints will require confirmation.
- Raising the height of the bridge will increase its visual impact in the context of the surrounding landscape.
- The current road and bridge alignment was selected to minimise impact on environmental constraints based on advice from various ACT Government agencies.
- The current overall bridge span of 236 m provides significant connectivity under the EWA corridor.

4.3.3 Cross Section

The bridge cross section allows for a two-way single carriageway with 1.2m shoulders, road barriers, a shared path and the cycle highway. Any run-off from the bridge will be directed to stormwater systems at the abutments and treated prior to discharge into the river. The proposed cross section is indicated in Figure 4-2.

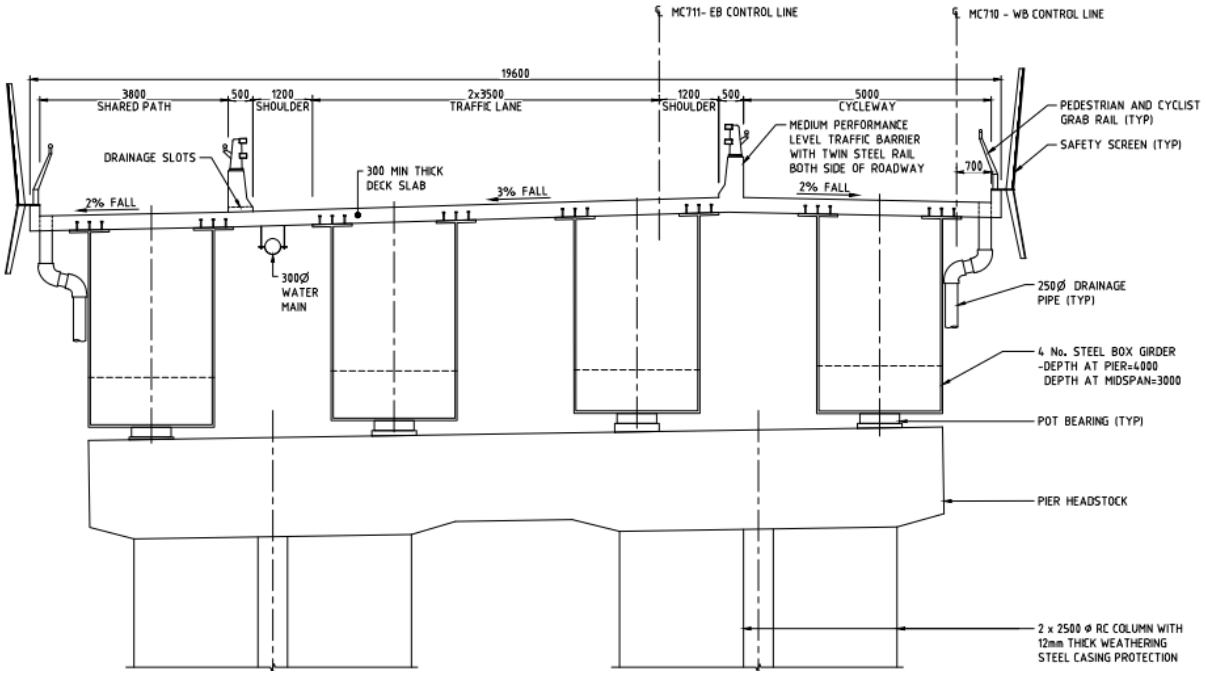

Figure 4-2 Typical cross section – Molonglo River Bridge

It is noted that a significant amount of the deck width is dedicated to active travel. Given the length of the bridge and associated costs, there may be opportunities to rationalise the amount of the bridge cross section allocated to active travel paths in future iterations of the design.

4.3.4 Substructure

The abutments will be supported on piles and reinforced soil walls will wrap around the abutments to limit the extend of the embankment and to reduce the encroachment into the river corridor.

The piers will be founded on pad footings due to their proximity to the top of rock, which is expected to be at shallow depth. This will need to be confirmed during the more detailed geotechnical investigation for the bridge in the future design phases, noting that there may be value in undertaking investigations early in the concept development to inform the development of the PSP design. Ground anchors will be installed to pad foundation to hold the pad footings down.

4.3.5 Superstructure

Steel trough girders made from weathered steel are proposed in this study to meet the 'Family of Bridges' concept in Molonglo area and to nestle the structure into the surrounding landscape. This concept needs to be reviewed with the architectural input in the next stage of design work. The form of the bridge is similar to the proposed JGD bridge and variable depth girder from 3 metres deep at the abutments and midspan to 4 metres deep at piers.

4.3.6 Constructability

The abutments and piers are easily accessible and foundation, abutment beam, piers and headstock will be constructed using common construction methods. The bottom of the Pier 1 footings will be close to, or just below, the river level and controlling the water in the pad footing excavations will be a challenge. The Pier 2 footings are at a higher level and water ingress will not be an issue.

The girders will need to be brought to site in a series of segments that are spliced together on site with bolted splices. There will be a series of 8 segments up to 30 metres long and be installed by lifting into position in segments by crane or by launching from abutment. Crane can be position behind Abutment A and between spans 2 and 3 to lift girder segments in position. If launching method is adopted, a special launching system is required to accommodate girder variable depth.

4.3.7 Future Widening

The current traffic modelling indicates that only a single two-way carriageway is required to the west of the M3E intersection (CH700 – 2300). As such, the current road and bridge design adopts a single 7m carriageway in this area. However, depending on future network performance, land use planning, and potential development of the western edge, there is the possibility that the EWA may require duplication at some stage after project opening, requiring widening of the Molonglo River bridge.

4.4 Tuggeranong Parkway Interchange Bridge

4.4.1 Bridge Purpose

The purpose of the interchange bridge over Tuggeranong Parkway to provide connectivity between the EWA and the southbound ramps of the Tuggeranong Parkway in addition to conveying the trunk cycleway across the parkway corridor.

4.4.2 Bridge Form

The proposed bridge over Tuggeranong Parkway spans approximately 34.6 metres with vertical clearance of minimum 5.4 metres. The new bridge is located north of existing Cotter Road bridge over Tuggeranong Parkway. The Cotter Road bridge is a single span bridge supported on abutments with reinforced earth walls around the abutments. Hence, the similar form of precast girder bridge with reinforced earth wall around the abutment is proposed for the bridge. The proposed bridge is as shown in Figure 4-3.

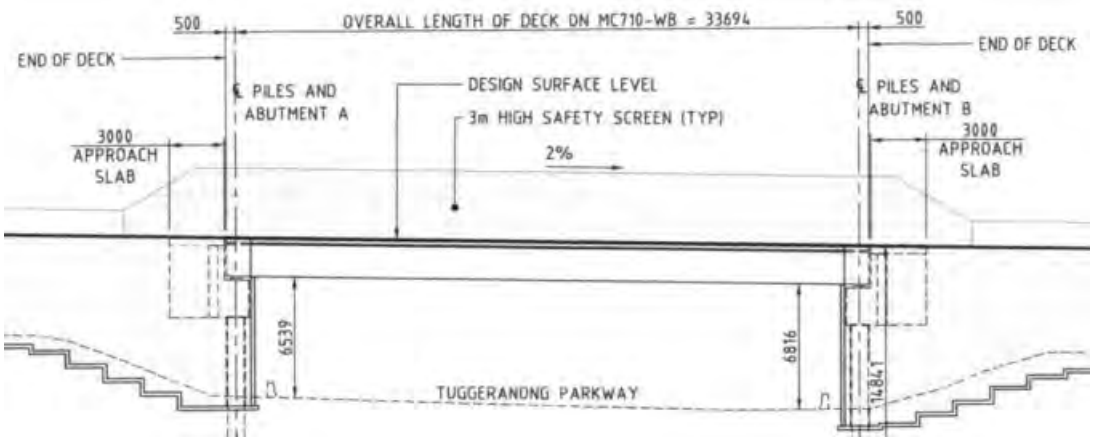

Figure 4-3 – Bridge over Tuggeranong Parkway elevation

4.4.3 Cross Section

The bridge cross section allows for a two-way single carriageway with 1.2m shoulders, road barriers, a shared path and the cycle highway. The proposed cross section is indicated in Figure 4-4.

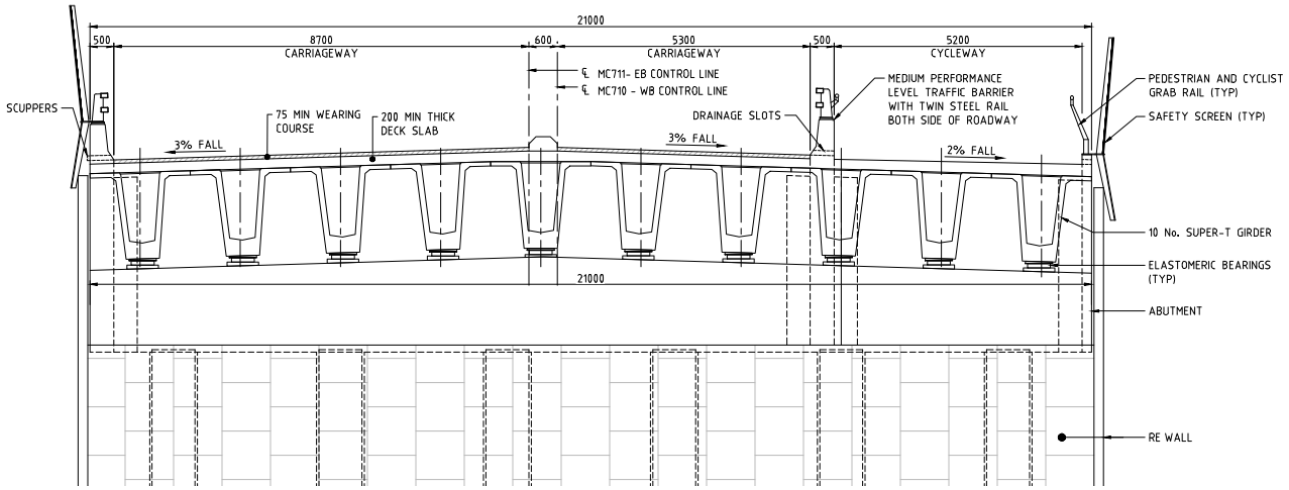

Figure 4-4 Typical cross section –Bridge over Tuggeranong Parkway

4.4.4 Substructure

The abutments will be supported on piles and reinforced soil walls will wrap around the abutments to limit the extend of the embankment and to reduce the encroachment into the river corridor. Reinforced wall abutment reduces required span length and to use standard 1500mm deep Super T girders.

4.4.5 Superstructure

The superstructure is comprised of a composite section which consists of 10 x 1515 mm deep Super-T girders and a composite cast in-situ deck slab with a minimum thickness of 200 mm. The girders are simply supported at both abutments on laminated elastomeric bearing pads. The deck supports two carriageways and a 5.2m wide cycleway. 3m minimum height throw screens are proposed along outer edges of the bridge.

4.4.6 Constructability

The Bridge is a simple bridge that will be constructed using common construction methods. Piling for abutments could be undertaken without impacting traffic on the Tuggeranong parkway as they are located away from the edge of the existing lanes. Temporary barriers need to be installed for piling construction. Reinforced earth wall and abutment beams will also be built behind the temporary barriers. Girder erection over Tuggeranong Parkway needs to be undertaken during night time with full road closure to assist safe construction. Temporary propping to support the girders needs to be designed to a robust standard that included mechanical restraints and design of propping for a range of load conditions.

4.5 Other Structures

4.5.1 River Road Underpass & Trunk Cycleway Underpass of Exit Ramp

There are two underpass structures proposed under the EWA. The purpose of these structures is to provide grade separated access under the arterial road.

4.5.1.1 River Road underpass

An underpass of the EWA at River Road (CH 2700) is proposed to facilitate emergency access, maintenance access to the Arboretum, and to provide active travel connectivity. There are a several options for this underpass structure, however the following two are considered the most likely (Option 1 has been included in the opinion of cost):

- Option 1: Cast in place structure. Structure depth is expected to be approximately 400mm + cross fall + surfacing with a total of the EWA above the path of approximately 4.2m. Figure 4-5 indicates an example of a similar structure used on another ACT road project.
- Option 2: Precast arch requiring 600mm min fill above (including pavement). Arch height will be approximately 4m to provide 3.5m clearance, with an estimated span of 9m and thickness of concrete 250mm. The total expected EWA height above the path is approximately 4.85m.

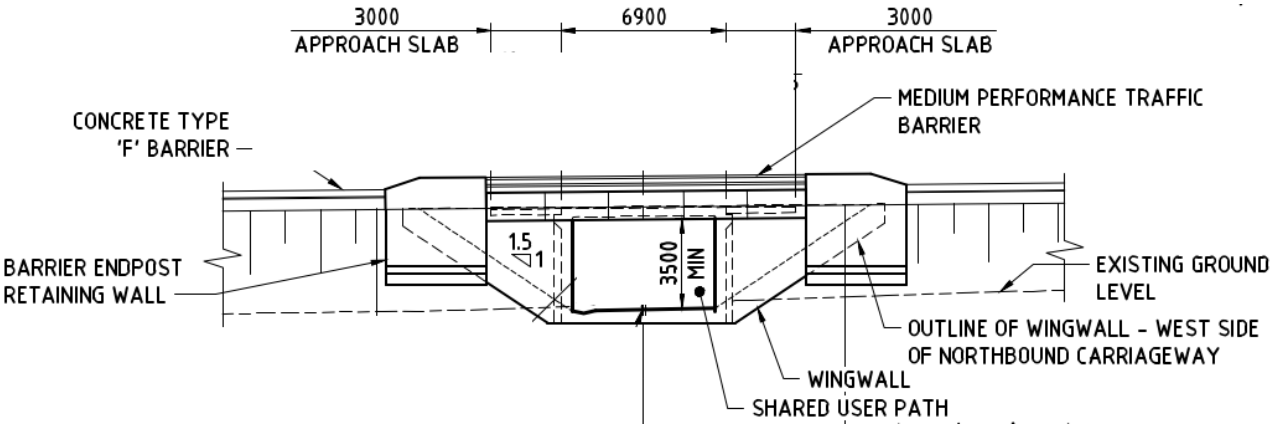

Figure 4-5 – Example underpass structure

4.5.1.2 Trunk Cycleway Underpass

An underpass of the Tuggeranong Parkway northbound exit ramp is proposed to allow free flow connectivity of the Cycle Highway. It is anticipated that the structure will be similar to the cast in place structure (Option 1) described above with a 3m clearance.

5 Utilities & Stormwater

5.1 Stormwater Design

Given the strategic nature of the design concept developed as part of the feasibility study, and the uncertainty around future characteristics and watersheds of adjacent catchments, design of stormwater systems has not been undertaken as part of this study. However indicative allowances have been made for stormwater systems in the opinion of cost included in Section 10.

Notwithstanding the early design stage of the project, commentary on likely drainage requirements and considerations is provided below.

5.1.1 Longitudinal Drainage

Longitudinal drainage systems will be required over the length of the EWA to ensure that flows generated within the road corridor are captured and directed to receiving waters in a controlled manner without discharging into adjacent properties / land uses.

The majority of the EWA route is currently designed in fill and in these areas. It is expected that minor event (up to 5% AEP) longitudinal drainage will consist of a combination of:

- Kerb and gutter / underground piped systems
- Over edge drainage into grass lied swales

The EWA is also in cut in some areas, and it is anticipated that piped drainage systems will be used in these areas for minor event drainage.

It is expected that major event stormwater drainage (up to 1% AEP) will be conveyed either within the road cross section or by grass lined channels within the road corridor.

5.1.2 Transverse Drainage

5.1.2.1 West of Molonglo River

To the west of the Molonglo River the EWA alignment is relatively close to a ridgeline. As such, and whilst the road is on a substantial side slope for the majority of this section, it is not anticipated that cross flows across the corridor will be significant. It is therefore expected that whilst some transverse culverts will be required to convey runoff across the EWA corridor, these are expected to be relatively minor.

5.1.2.2 East of Molonglo River

For a significant proportion of the EWA corridor to the east of the Molonglo River (CH 2000 – 2500) the road formation is adjacent to a water course. Furthermore, there are substantial and steep side slopes in this area and it is anticipated that significant transverse drainage infrastructure will be required. This transverse drainage is likely to take the form of either large pipe culverts or precast box culverts. The location will depend on the form of the proposed developments adjacent to the corridor, and where this development directs flows into the EWA corridor.

5.1.3 Water Sensitive Urban Design

Given the proximity of the EWA corridor to the Molonglo River, water sensitive urban design (WSUD) will be an important consideration in the development of future iterations of the EWA design. WSUD considerations for the EWA corridor to achieve water quality outcomes include:

- The use of grass lined swales is preferred in areas of fill embankment wherever space permits
- Vegetated features such as rain gardens
- Water treatment infrastructure including gross pollutant traps, ponds and wetland features
- Spill containment facilities

A potential location for a combined wetland / spill containment facility is indicated on the design plans in Appendix A.

5.2 Street Lighting

It is anticipated that street lighting will be required over the length of the EWA. Streetlighting is to be designed in future iterations of the EWA design concept, however an allowance has been made for streetlighting throughout the corridor in the order of cost summarised in Section 10.

5.3 Existing Utilities

5.3.1 Water Supply

Large diameter dual bulk water supply mains traverse the EWA corridor at CH 0700 on the eastern fringe of the future Molonglo group centre. These mains supply water from Mount Stromlo treatment plant to much of north Canberra including large areas of Belconnen, Gungahlin and the Inner North. The strategic design of the EWA has been developed such that no works on these mains will be required as part of the project. However, it is anticipated that a protection slab will be required over these mains. An allowance for this protection slab has been made in order of cost summarised in Section 10.

5.3.2 Sewer

The EWA alignment crosses over the Molonglo Valley Interceptor Sewer (MVIS) at approximate CH 2150. The MVIS is in the Ryans Hill tunnel in this location is understood to be over 10m below the design surface level of the EWA, and feedback from Icon Water has indicated that no works will be required on the MVIS as part of the EWA project. However, the existence of the MVIS tunnel may have implications for construction techniques, particularly in terms of any excavation requirements.

5.3.3 Electricity

An underground 132 kV line is currently in its final stages of design and is expected to have a transverse crossing of the EWA at CH 2560. The strategic design of the EWA has been developed such that no works on the 132 kV will be required as part of the project. However, it is anticipated that a protection slab will be required over these mains. An allowance for this protection slab has been made in order of cost summarised in Section 10.

In addition there is an 11 kV line that services the MVIS vent stack and future odour control facility that may be impacted by the works. This underground line is currently under investigation for potential local realignment as part of the MVIS odour control facility works that are under development and as such its final location is yet to be determined. Notwithstanding, this 11 kV appears likely to traverse the EWA corridor adjacent to the odour control facility and require minor relocation or protection works as part of the EWA project in the future. This 11 kV line also runs south of the EWA corridor between CH 2100 – 2600, although subject to any proposed realignment currently being considered it appears unlikely to impact on the EWA works beyond the transverse crossing discussed above.

5.4 Proposed Utilities

Arterial road corridors often serve the secondary function of providing a corridor for trunk utility services. It is anticipated that the EWA will be required to accommodate a number of utilities that service adjacent land uses, primarily for energy (electrical) and telecommunications services. The anticipated or potential requirement for utilities in the EWA corridor are discussed following.

5.4.1 West of Molonglo River

Previous studies have assessed the likely utility requirements of the Molonglo 2 East peninsula located west of the Molonglo River. The *Molonglo 2 Commercial Centre Infrastructure Investigation Study* (Indesco, 2019) and *Molonglo Town Centre Environs Growth Servicing Plans* (Indesco, 2020) identified that trunk water supply mains are expected to be routed along the EWA corridor, in addition to transverse sewer crossing adjacent to the bulk water supply main at CH 0700 (gravity main although it could alternatively be a rising main in this location). It is noted that discussions with Icon Water have also indicated that this water supply main may extend across the Molonglo River Bridge. The *Molonglo 2 Urban Edge Feasibility Study* (Indesco, 2014) indicates that High Voltage lines will also intersect the EWA at the bulk water supply main crossing of the corridor.

In addition to these services it is likely that the EWA corridor will also have electrical reticulation cables and communications lines. Given current policy positions of the ACT Government, it is possible that trunk and reticulation gas infrastructure may not be required to service residential and commercial developments by the time the EWA is constructed.

The EWA cross section in this area has been developed to accommodate trunk utility serves in verge areas. An allowance of 7m in the northern verge provided in the strategic design is considered sufficient to accommodate the above utility requirements.

5.4.2 East of Molonglo River

The utility requirements east of the Molonglo River are considered likely to be largely similar to those west of the river, although it is noted that given the topography it is likely that the EWA corridor will contain significant gravity sewer infrastructure that captures flows from the adjacent upstream development areas and conveys them to the MVIS. Similarly, there may also be trunk stormwater infrastructure in the EWA corridor in this area. Whilst gravity sewer and other reticulated utilities are likely to be accommodated in the 7m verges on both sides of the EWA, trunk stormwater requirements are uncertain and require further investigation.

6 Traffic Analysis

6.1 Study Area

The extent of the study area for the microsimulation modelling is shown in blue in Figure 6-1. In the Base Case, this includes Tuggeranong Parkway between Cotter Road and Glenloch Interchange and the interchanges of Tuggeranong Parkway with Cotter Road and Forest Drive. To the east, the John Gorton Drive – Holborow Avenue intersection is included. It is noted that the Base Case (and project Case) assume several network upgrades will be in place locally by project opening. More detail on the assumed upgrades on the Tuggeranong Parkway are provided in Section 3.9.

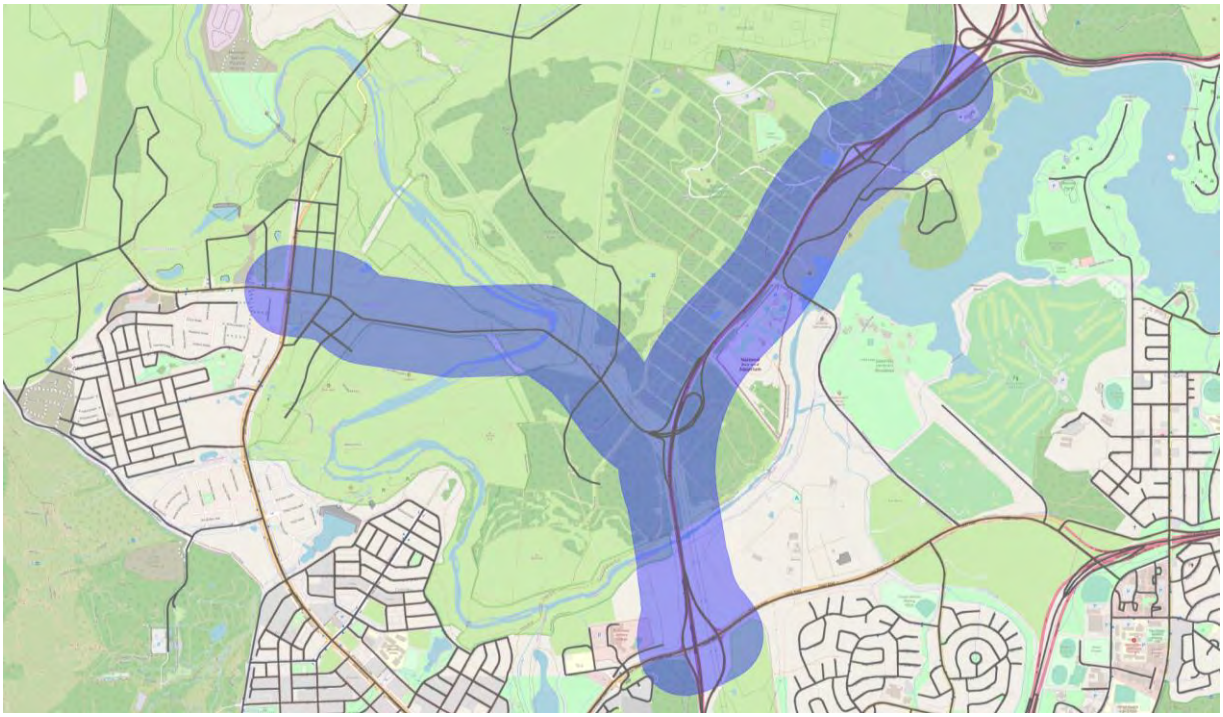

Figure 6-1 – Microsimulation Model Study Area

6.2 Base Model Calibration

Microsimulation modelling was conducted for Molonglo East-West Arterial using Aimsun Next 8.3. The Aimsun microsimulation model was calibrated to a 2019 base case for both the weekday AM and weekday PM peaks, meeting the requirements of the *ACT Microsimulation Modelling Guidelines* link and turn volume validation targets. In addition, some effort was made to calibrate the peak queue development and propagation at the Cotter Road and Forest Drive interchanges. The detail of the base model development and calibration can be found in the *Base Model Development Report*.

6.3 Demand

The CSTM was used to develop growth for each of the design options between 2019 and 2041. This growth was applied to the 2019 AM and PM Base Case origin-destination (OD) matrices to obtain 2041 AM and PM OD matrices for the microsimulation model. For each zone, the relative growth method was preferred, with absolute growth used as an alternative if relative growth resulted in an excessive growth rate. The total hourly peak volumes in each of the scenarios is shown in Table 6-1.

Table 6-1: Future Network Demand by Scenario

Scenario	2041 AM	2041 PM
Do Nothing	15,923	16,052
Option 7	19,338	18,754

6.4 Key Model Elements

6.4.1 Tuggeranong Parkway Northbound Widening

The Tuggeranong Parkway northbound is assumed to be widened to three lanes between Cotter Road and Forest Drive. During the course of the project, it was identified that the northbound on-ramp from EWA to Tuggeranong Parkway performed poorly as a merge and, by agreement with TCCS, was converted to a lane-add with an upstream merge on Tuggeranong Parkway from three lanes back to two. Tuggeranong Parkway northbound thus takes the following form in the analysis (as shown in Figure 6-2):

- Tuggeranong Parkway northbound remains two lanes south of the Cotter Road northbound off-ramp (red)
- The Cotter Road northbound on-ramp joins as a lane-add, widening Tuggeranong Parkway to three lanes (orange)
- The EWA northbound off-ramp diverges and Tuggeranong Parkway remains three lanes (yellow)
- Tuggeranong Parkway merges from three lanes to two on approach to the point at which the EWA northbound on-ramp joins (green)
- The EWA northbound on-ramp joins as a lane-add, widening Tuggeranong Parkway back to three lanes (blue)
- The Forest Drive northbound off-ramp diverges and Tuggeranong Parkway remains three lanes, merging back to two before reaching the Forest Drive overpass (purple).

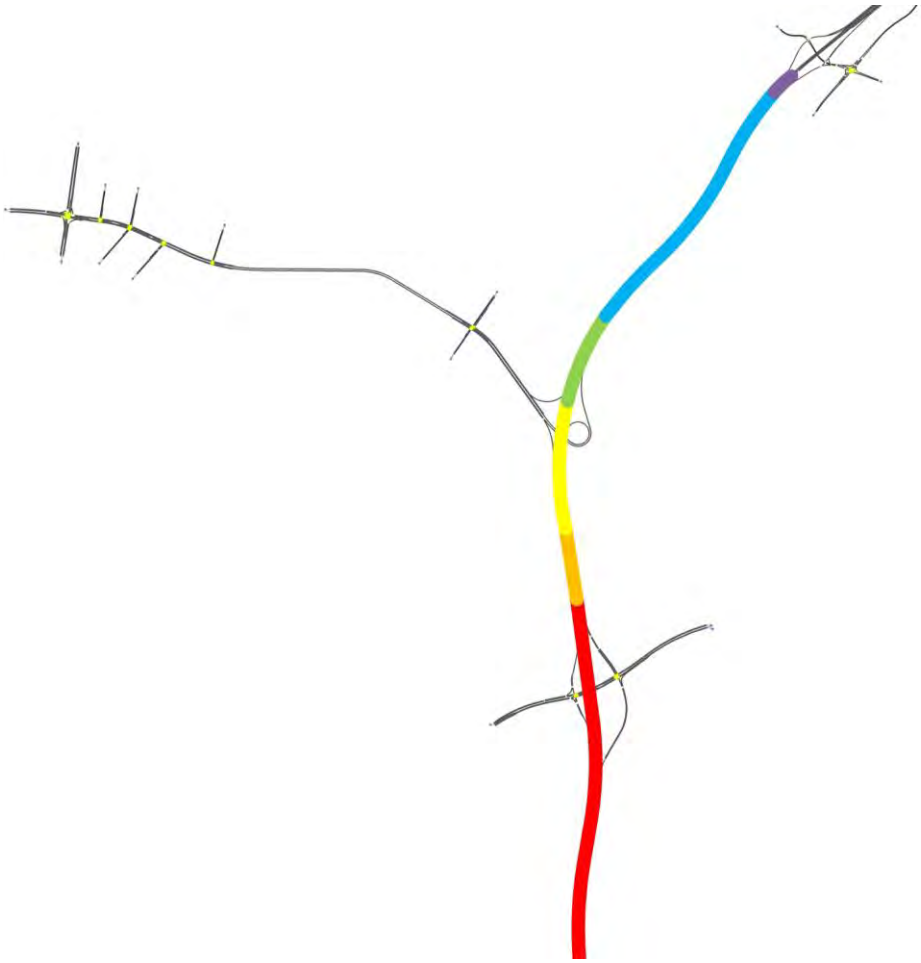

Figure 6-2: Tuggeranong Parkway Northbound Widening

6.4.2 Cotter Road Interchange and Tuggeranong Parkway Auxiliary Lanes

The inclusion of East-West Arterial in the road network results in significant changes to travel patterns as discussed in Volume 1. One of the consequences of this is that there is a large increase in traffic approaching Cotter Road on the southbound off-ramp from Tuggeranong Parkway. As such, the microsimulation model includes an upgrade to the Cotter Road – Tuggeranong Parkway southbound ramps intersection. Currently, there are three lanes approaching Cotter Road with one dedicated left turn lane, one dedicated right turn lane and a shared lane providing two turning lanes for each movement. An upgrade is required to provide two dedicated lanes for each turning movement, along

with a geometric realignment to improve the turning speeds and hence capacity of each movement, as the turning radii are currently reasonably tight. The existing layout is shown in Figure 6-3 while the upgraded layout is shown in Figure 6-4.

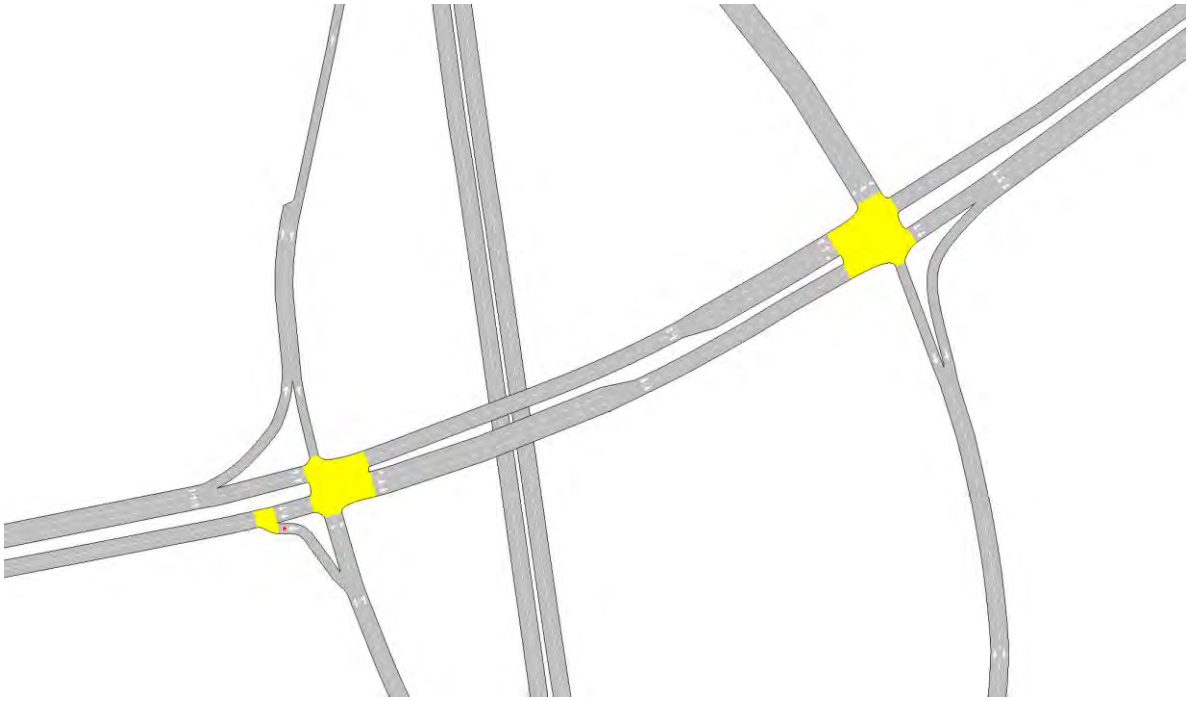

Figure 6-3: Cotter Road Interchange (Existing)

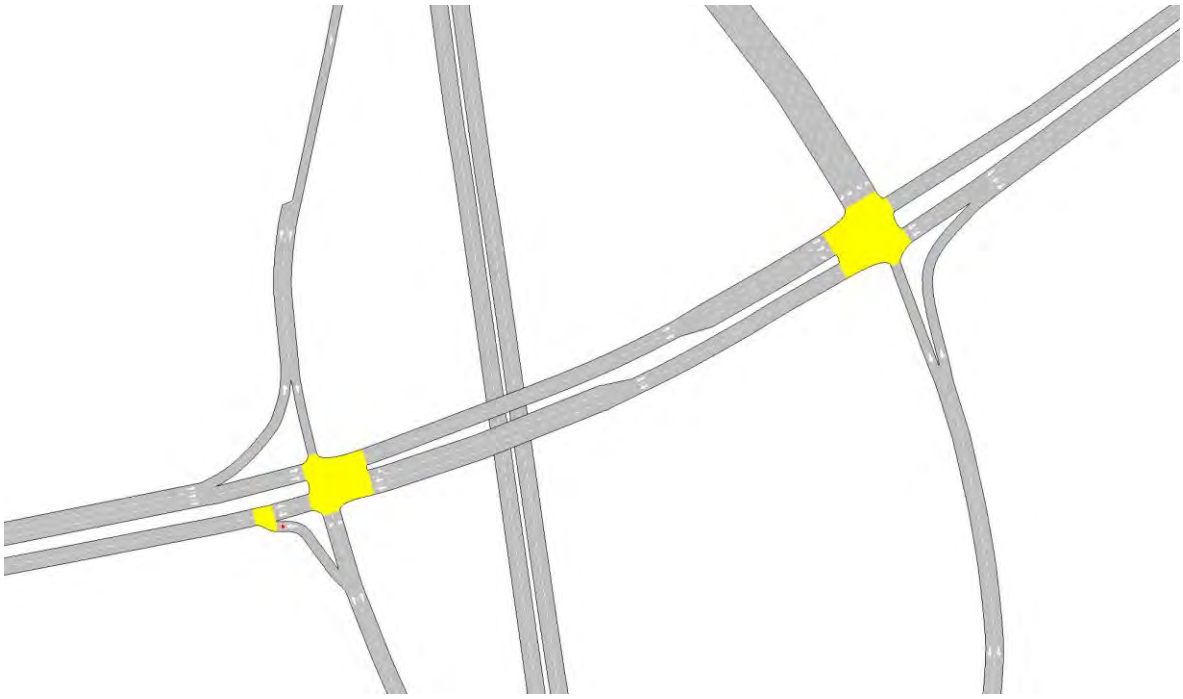

Figure 6-4: Cotter Road Interchange (Upgraded)

In addition, auxiliary lanes are required between the EWA and Cotter Road interchanges and two lanes are required for the southbound Cotter Road off-ramp exit, as shown in red in Figure 6-5.

On Tuggeranong Parkway northbound the section between the Cotter Road northbound on-ramp and the EWA northbound off-ramp is lane balanced, with a lane-add entering the segment and a ramp diverge leaving it.

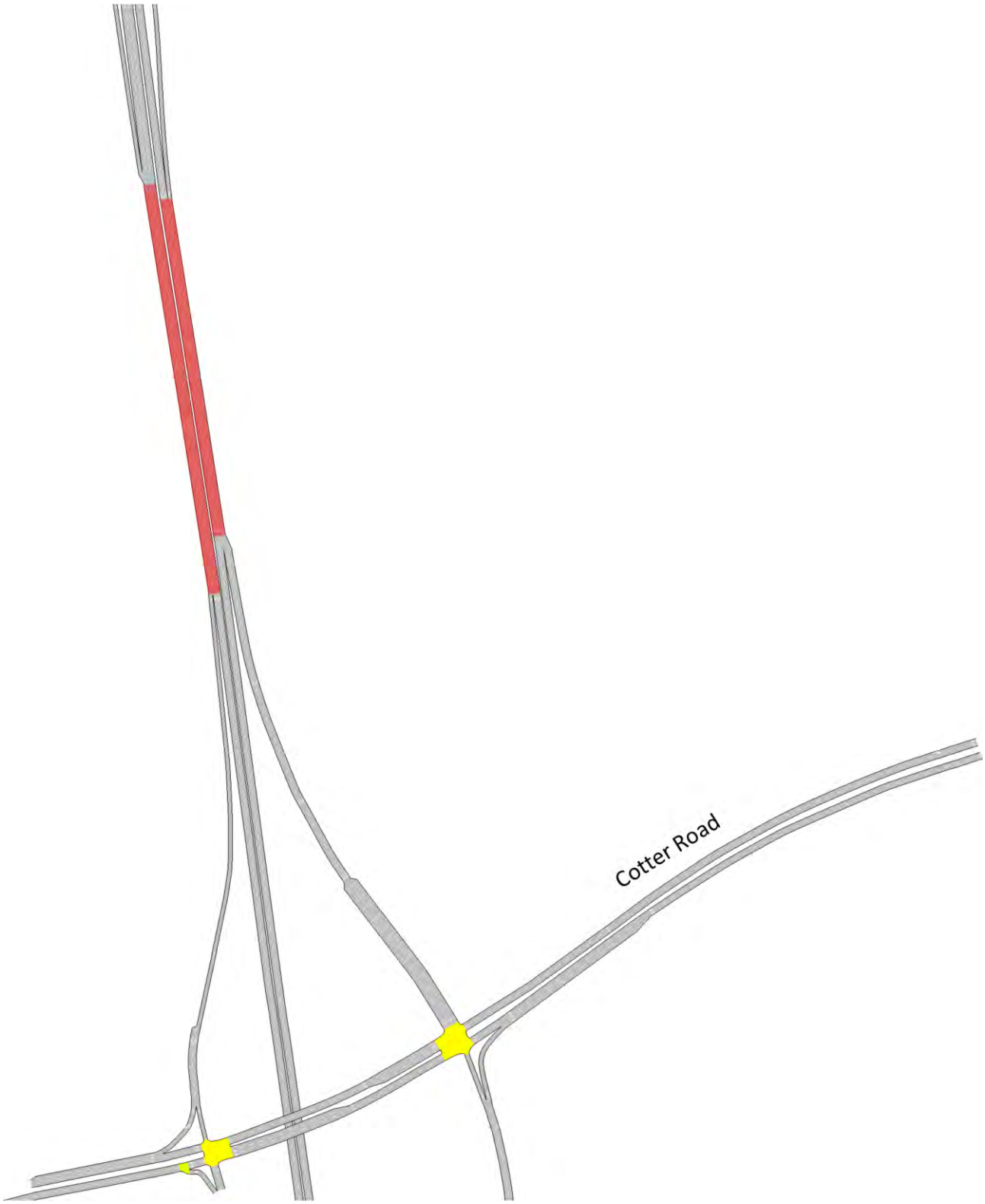

Figure 6-5: Tuggeranong Parkway Auxiliary Lanes and Cotter Road SB Off-ramp Detail

6.4.3 Preferred EWA Option

The preferred EWA option connects to Tuggeranong Parkway with a fully grade-separated "trumpet" style interchange, which has been reprofiled to increase the distance between it and the existing Cotter Road interchange. The EWA-M3E intersection was tested using a Staggered-T intersection arrangement as shown in Figure 6-6.

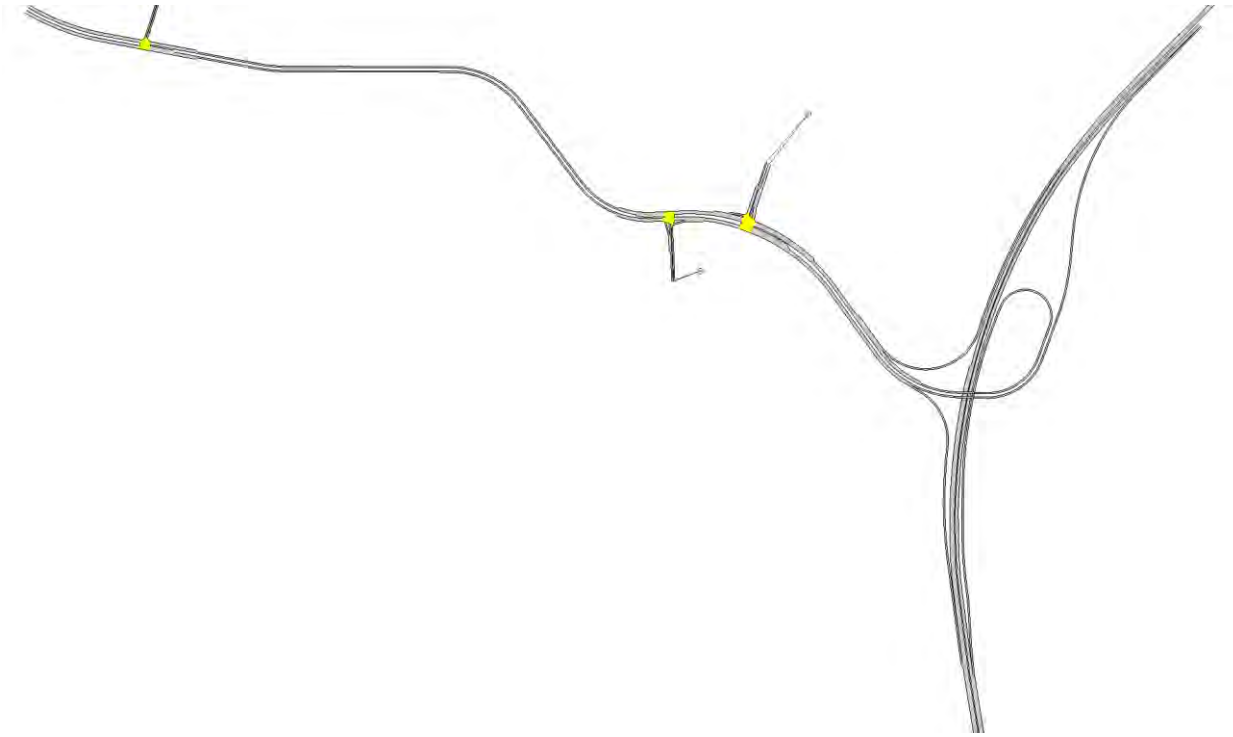

Figure 6-6: Option 7 (Staggered-T Intersection) Overview

6.5 Performance Assessment

6.5.1 Overall Network Performance

The overall network performance statistics for the preferred option model are provided in Table 6-2. These show the following statistical measures:

- **Demand**: The total number of vehicles attempting to use the network during the peak hour
- **Total Travel Distance**: The total distance travelled by vehicles in the network (aka Vehicle Kilometres Travelled)
- **Total Travel Time**: The total time spent by vehicles in the network (aka Vehicle Hours Travelled), separated into:
  - **Released**: Time spent by vehicles travelling through the network during the simulation period
  - **Unreleased** (including unmet demand) : Time spent by vehicles that have attempted to enter the network but are stuck in their origin zone due to congestion during the simulation period
- **Average Speed**: Total Distance divided by Total Travel Time

Table 6-2: EWA Options Microsimulation Bulk Performance Statistics

Option	Year	Demand	Total Travel Distance [km]	Total Travel Time [hr]		Average Speed [km/h]
				Released	Unreleased	
Do Nothing	2041 AM	15,923	55,684	1,499	1,105	21.4
	2041 PM	16,052	49,265	2,380	635	16.3
Preferred Option	2041 AM	19,338	66,520	2,482	1,042	18.9
	2041 PM	18,754	65,040	1,870	759	24.7

The overall network performance assessment indicates the following:

- Traffic demand on Tuggeranong Parkway is very high in 2041 and its operation is very near capacity.

- The addition of EWA changes the travel patterns dramatically, with all EWA Options exhibiting worse performance than Do Nothing in the AM peak period, but the preferred option significantly outperforms Do Nothing in the PM peak period.
- The EWA has issues in the AM peak period with average network speeds of 15-16 km/h
- The preferred option performs reasonably well in the PM peak period, with average network speeds of 24-25 km/h

It is noted that whilst the project case has lower average speeds than the base case (ie it performs worse) in the AM peak, this is because of a significant increase in demand within the model boundaries, and that strategic modelling indicates that the provision of the EWA significantly reduces congestion in other parts of the network and provides an improvement in average speeds across the Canberra transport network. Strategic modelling of the overall Canberra-wide network traffic performance is presented in Volume 1 of this study.

6.5.2 EWA Queuing

The queues at the end of the simulation period are shown in Figure 6-7 with a staggered-T intersection of EWA and M3E. The Tuggeranong Parkway remains busy in both periods with the AM peak queue along EWA from the southbound Parkway on-ramp being the most significant source of queuing on the EWA.

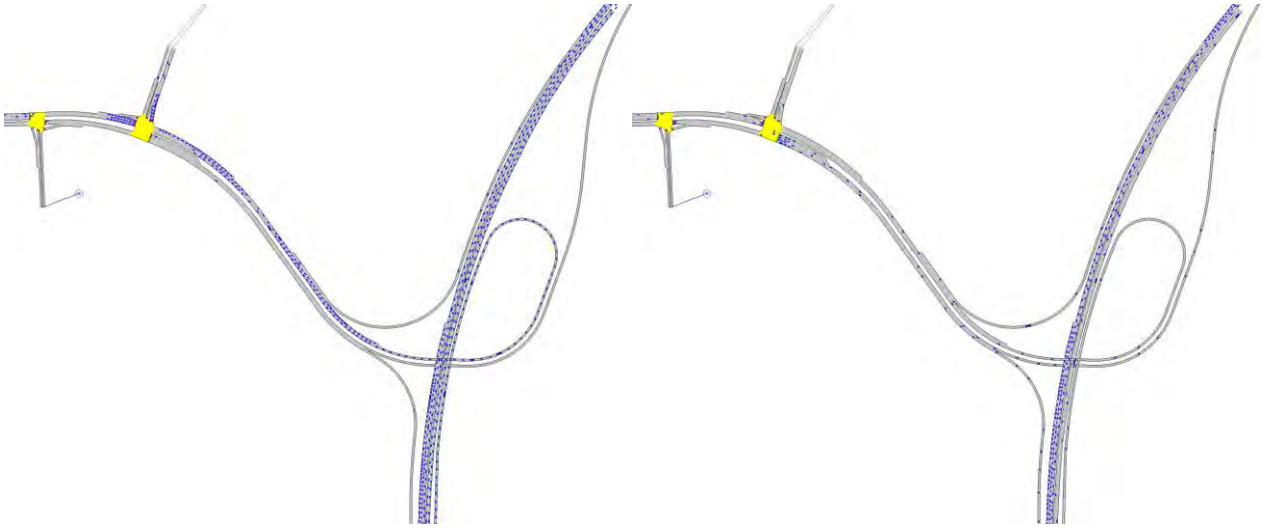

Figure 6-7: Option 7 (Staggered-T Intersection) 2041 Queues (Left: AM, Right: PM)

6.6 Weaving Assessment

A weaving analysis using the Highway Capacity Manual 2016 (HCM16) weaving methodology has been undertaken for Tuggeranong Parkway between the Cotter Road and EWA interchanges and for EWA between the Tuggeranong Parkway interchange and M3E intersection(s).

Level of Service (LoS) for freeway segments is based on density, which is the number of vehicles occupying a road at any point in time, measured in passenger car equivalent units (PCUs) per kilometre per lane. The use of PCUs rather than vehicles is a representation of the effect of various factors such as the peak profile, heavy vehicle proportion, road grade etc. on road capacity. The density based LoS thresholds are shown in Table 6-3.

Table 6-3: HCM16 Freeway Segment Level of Service (density)

Level of Service	Density [pc/km/ln]	Level of Service	Density [pc/km/ln]
A	0	D	51.5
B	19.3	E	57.9
C	38.6	F	64.4

6.6.1 Tuggeranong Parkway

The northbound and southbound weaving areas on Tuggeranong Parkway are shown in Figure 6-8. The Tuggeranong Parkway northbound weaving area is lane balanced with a lane-add at the on-ramp entry and a single downstream off-ramp exit splitting from the left lane. The freeway-ramp movement must weave while the other movements do not need to execute a lane change to reach their destination.

The Tuggeranong Parkway southbound weaving area is lane balanced with a lane-add at the on-ramp entry and a two-lane downstream off-ramp splitting from the left and middle lanes. The leftmost lane is therefore trapped, with the middle lane split. As such, the ramp-freeway movement must weave while the other movements do not need to execute a lane change to reach their destination.

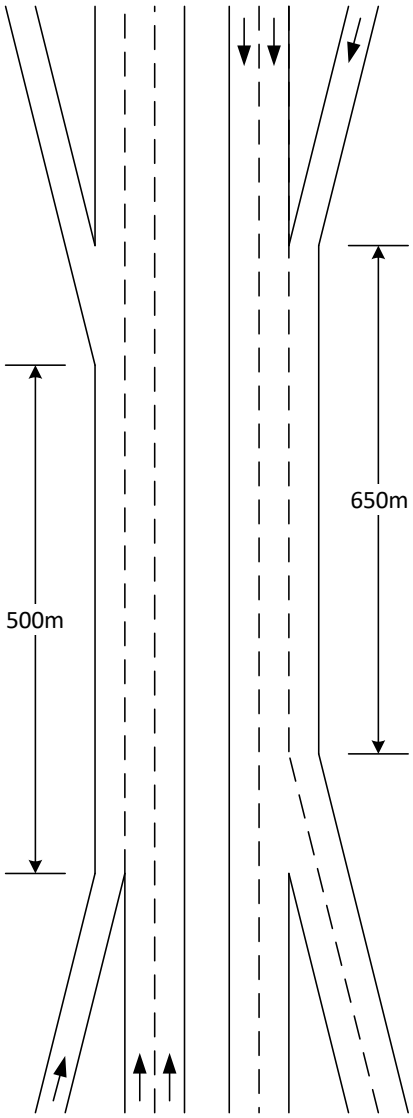

Figure 6-8: Tuggeranong Parkway Weaving Configuration and Dimensions

The HCM16 weaving inputs and performance outputs for Tuggeranong Parkway between Cotter Road and EWA are shown in Table 6-4. The volumes are taken from the Aimsun model OD matrices. The performance in the peak direction – PM northbound and AM southbound – is LoS F on account of the high demand volumes. The weaving length has an influence on the density, but analysis indicates that there is no maximum weaving length that improves the performance from LoS F. Effectively, the demand exceeds the capacity of the road section even if weaving is not considered, thus the cause of the poor performance is the total volume and not the weave itself. This also suggests that widening of Tuggeranong Parkway will be required well in advance of the interchange's construction. Addressing the excessive demand will likely require improvements to alternative north-south routes, to encourage traffic to use these alternatives.

Table 6-4: Tuggeranong Parkway Weaving Performance

Movement	Northbound		Southbound	
	2041 AM	2041 PM	2041 AM	2041 PM
Freeway-freeway volume [pcu/hr]	3,438	3,475	2,856	2,825
Freeway-ramp volume [pcu/hr]	383	811	1,962	929
Ramp-freeway volume [pcu/hr]	1,361	1,340	783	452
Ramp-ramp volume [pcu/hr]	74	682	1,224	264
Weaving volume [pcu/hr]	1,745	2,150	2,745	1,381
Non-weaving volume [pcu/hr]	3,512	4,157	4,080	3,089
Total volume [pcu/hr]	5,256	6,308	6,825	4,470
Heavy vehicles	2.2%	1.9%	1.7%	2.5%
Weaving length [m]	500	500	650	650
Weaving density [pc/km/ln]	**59.8**	**77.6**	**113.1**	**56.7**
Level of Service	**E**	**F**	**F**	**D**

6.6.2 East-West Arterial

The westbound section of EWA between Tuggeranong Parkway interchange and the M3E intersection(s) has also been tested using the HCM16 methodology, however it must be noted that this section of road is not a highway weaving section. It does have some strong movements and has been analysed to identify any potential issues. As discussed, weaving LoS is determined using density, which is appropriate for highways but on interrupted roads, and at speeds lower than typical highway speeds, higher densities can be sustained which would result in a lower reported LoS, even if the actual operation of the road is good. As such, the analysis results should be considered to be conservative.

The westbound weaving area on East-West Arterial is shown in Figure 6-9.

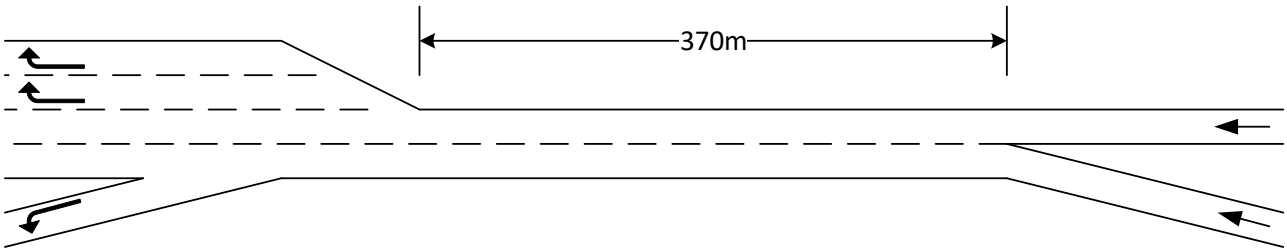

Figure 6-9: East-West Arterial Westbound Weaving Configuration and Dimensions

There are six discrete movements in this section, corresponding to the two entries and three exits. Two of these movements must change lanes to reach their destination:

- Vehicles entering via the Tuggeranong Parkway northbound off-ramp and exiting via the right turn into M3E northbound
- Vehicles entering via the Tuggeranong Parkway southbound off-ramp and exiting via the left turn into M3E southbound

The remaining movements do not need to change lanes:

- Northbound off-ramp to the left turn
- Southbound off-ramp to the right turn
- Both ramps to the through movement

The HCM16 weaving inputs and performance outputs for Tuggeranong Parkway between Cotter Road and EWA is shown in Table 6-5. The volumes are taken from the Aimsun model OD matrices. The volume during the AM peak period is very low and poses no problems. During the PM peak periods, the volume is much greater however only a third of the traffic must change lanes. The weaving performance – with the caveats discussed above – is LoS D in the PM peak period. The Aimsun and intersection analyses indicate that this section of road operates acceptably in 2041.

Table 6-5: East-West Arterial Weaving Performance

Movement	2041 AM	2041 PM
Weaving volume [pcu/hr]	269	843
Non-weaving volume [pcu/hr]	369	1,738
Total volume [pcu/hr]	638	2,581
Heavy vehicles	1.8%	1.8%
Weaving length [m]	370	370
Weaving density [pc/km/ln]	**7.7**	**34.0**
Level of Service	**A**	**D**

7 Public Transport & Active Travel

7.1 Public Transport

7.1.1 Overview

Public Transport planning for a future development area such as Molonglo can be difficult as so many decisions about land use type and location, along with preliminary road layouts, have not yet been agreed on. During a feasibility study such as this, it is critical to define the expected type of public transport services expected in the area and make appropriate allowance so that detailed routes can be designed in future without unnecessary constraints.

7.1.2 Public Transport Service Types

Two key public transport route types are expected to operate in the Molonglo area, which are:

- Rapid: High frequency, high capacity routes that travel between interchanges at key town and local centres
- Local: Medium frequency routes that carry passengers between the interchange and local land uses

The current plans for the Rapid network include buses travelling from Molonglo Group Centre to Belconnen, Civic and Woden via John Gorton Drive. No Rapid services are currently planned for the EWA.

Local buses are expected to run from the Molonglo Group Centre to Molonglo 3 via EWA and the Molonglo 3 Collector Road. There could be a single route running in a loop via EWA, Molonglo 3 Collector Road and John Gorton Drive, or two routes, one servicing Molonglo 3 north of EWA and the other servicing Molonglo 3 south of EWA. The route servicing the southern part of Molonglo 3 would use EWA and the route servicing north of EWA could use EWA or John Gorton Drive, or a combination of both.

7.1.3 Bus Stop Locations

Bus stops should be provided along each of the bus-accessible roads at locations that provide access to the pedestrian network and local streets, along with nearby attractors. As the DDA legislation requires a maximum grade at a bus stop of 2.5%, the provision of stops within the hilly terrain of Molonglo requires careful planning. Again, this needs to be planned without the guidance of detailed land use detail, so there may be locations that simply do not need stops due to the lack of adjacent development.

However, despite best efforts, there may be locations that the 2.5% grade cannot be achieved. It is better to have a bus stop in a location that is non-compliant than not provide bus access at all, as the spacing between stops may become too great if only fully compliant stops are provided.

In hilly terrain, it is recommended that stop spacing be a little tighter than normal, acknowledging the increased exertion required to walk to access bus stops in these areas. On roads with a long and/or steep incline, stops should be located at the top and bottom of the slope, allowing some passengers to walk down the slope to catch the bus, and again walk down the slope after alighting on the return trip.

Proposed bus stop locations are shown in Figure 7-1. These proposed stop locations are generally similar to those proposed in previous feasibility studies. The EWA between the Molonglo River and Molonglo 3 Collector Road has a grade of 3%, so could be non-compliant for a bus stop. However, it is expected that there could be a localised section of 2.5% grade around the bus stop, as one should be located in this section of road to provide access to Molonglo River Reserve and Molonglo 3 local centre. If it is deemed not possible to provide a stop here, stops would need to be provided on the Molonglo 3 Collector Road on both the northern and southern side of the intersection to provide a similar level of coverage.

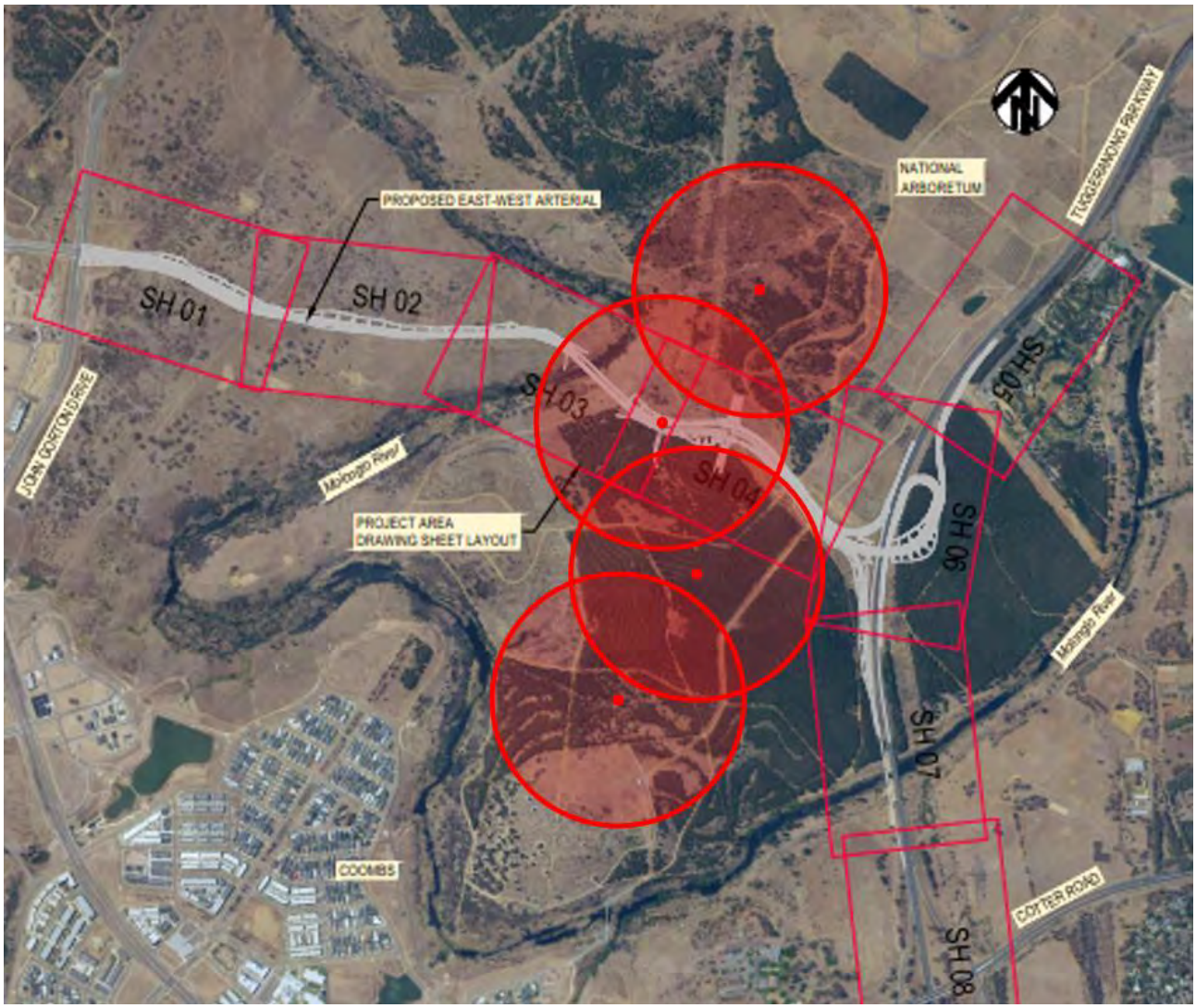

Figure 7-1: Proposed Bus Stop Location and Coverage (400m for local stops)

7.2 Active Travel

The key types of active travel that need to be provided for on the EWA include:

- Cycling (high speed)
- Cycling (recreational)
- Walking
- Equestrian

Provision for each of these user types is discussed in the following sections, with the proposed active travel paths proposed as part of the EWA depicted in Figure 7-2.

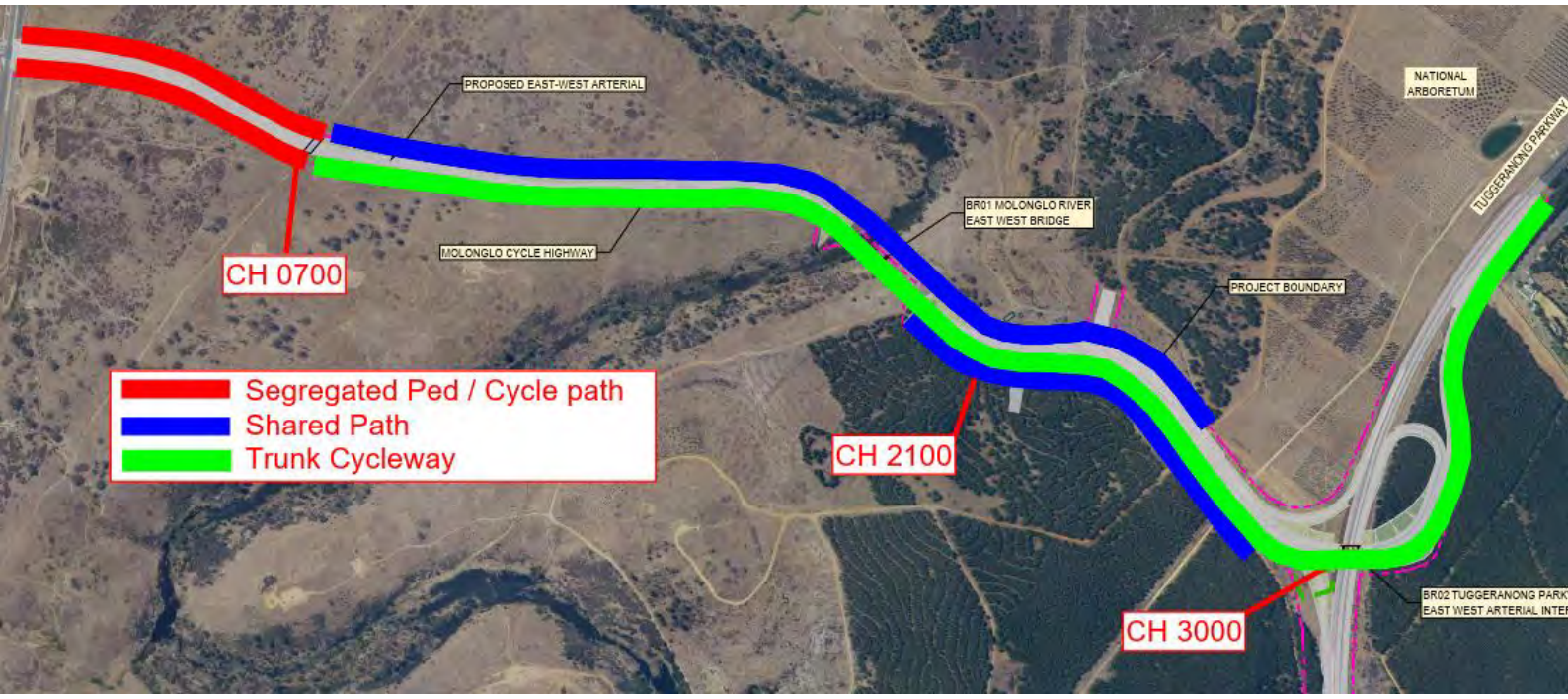

Figure 7-2: Proposed EWA path network

7.2.1 Cycling (high-speed)

Previous studies have recommended provision of the Molonglo Valley to City Trunk Cycleway through Molonglo, connecting Stromlo Forest Park, the Arboretum and Lake Burley Griffin to the Molonglo 2 Group Centre and Lake Burley Griffin utilising additional width on the East-West Arterial.

Currently, all off road paths in the ACT are shared by cyclists and pedestrians. The main difference between current ACT shared paths and the trunk cycleway is that the latter is intended to be a segregated or cyclist only facility where cyclists can travel faster without risk of collision with pedestrians. Geometry of the trunk cycleway will also be suited to higher speed travel. Associated pedestrian paths can be located alongside, with or without a separator. In the recently completed Belconnen Bikeway, pedestrian and cycle areas are separated by a grassed area with streetlighting located in it. In outer urban areas, or areas of lower pedestrian activity, a footpath may not necessarily be provided.

It is noted that the Molonglo Valley to City Trunk Cycleway will connect the Molonglo Group Centre to trunk path network north of Scrivener Dam. There will be a need to ensure that appropriate connectivity is provided from the adjacent suburbs in M3E and around the group centre.

An assessment of the cycle highway, its integration with the broader active travel network, and its optimisation within the EWA corridor is currently underway and will be included in Appendix E in future iterations of this report.

7.2.2 On-road Cycle Lanes and Footpaths

Earlier feasibility studies allowed for an allocation for 2.0 m on-road cycle lanes in both directions on EWA. For this design, provision for cyclists has been met through a combination of shared paths and the trunk cycleway instead of on road facilities. Paths would be provided on both sides of EWA in the Molonglo Group Centre and east of the Molonglo 3 East Connector Road. Across the bridge, and west of the Molonglo 3 East Connector Road, a shared path would be provided on one side and the trunk cycleway on the other side of EWA.

Given the unique presence of the trunk cycleway in the EWA corridor, a tailored approach to active travel has been agreed with TCCS. In the Molonglo Group Centre zone (CH 0000 – 0700), segregated walking (1.5m) and cycle paths (2m have been adopted) in the EWA verge where the dedicated cycle path caters to both commuting and recreational cyclists. From CH 0700 the trunk cycleway commences, making provision for high speed commuting cyclists, with allowance for recreational cyclists on shared paths. Connection between the eastbound segregated cycleway in the northern verge, and the trunk cycleway in the southern verge will require careful consideration in future iterations of the design.

Objective 12 of the Molonglo River Reserve Management Plan requires that the reserve provide a range of recreation opportunities that are valued by users and that can coexist with other values and objectives for the reserve. Good

connections from the paths along EWA to the Molonglo River Reserve will be important to assist in meeting this objective.

All shared paths should provide good connectivity to adjacent urban areas to minimise walk and cycle travel times and distances.

7.2.3 Equestrian Access

The area around the National Arboretum is currently well utilised by horse-riders. Provision for horses to cross the EWA away from traffic have been made at the River Road underpass.

8 Landscape Principles

8.1 Landscape and Proposed Development Summary

The Molonglo EWA is proposed as the main central linkage through the Molonglo development on the east – west alignment. The other linkages are on the periphery of the development with William Hovell Drive to the north and the Cotter Road to the south. The EWA therefore is a key element to the Molonglo transport network and warrants a landscape treatment that can be appreciated by its high volume of passing motorists, cyclists and pedestrians.

A proposed trunk cycleway setback to the south in the order of 20m from the arterial offers a pleasant and safe shared path alignment. Proposed landscape treatments will be selected and sited in order to avoid the need for barriers or other forms of protection.

The existing landscape character of the preferred alignment has three distinct existing zones that will become five distinct urban / open space zones with the urban development that is proposed.

8.2 Existing Character and Proposed Landscape Principles - Western Zone

8.2.1 Molonglo 2 proposed estate and group centre – existing character

The western zone is considered to run from John Gorton Drive, Denman Prospect (CH 0000) to the western edge of the Molonglo River corridor (approx. CH 1600). The western start point is an extension of the existing Holborow Ave (formally EWA in planning studies) at the signalised intersection with John Gorton Drive.

The elevated topography near this intersection may offer glimpses to distant eastward landmarks (Black Mountain, Diary Farmer's Hill, Red Hill and Mt Mugga) subject to future building developments at the group centre. Figure 8-1 provides the view from the existing John Gorton Drive intersection road stub eastwards along the proposed EWA alignment (centrally in the photo) across Yellow Box-Red Gum woodland (YBRG) to the distant Molonglo River proposed bridge.

Figure 8-1 – View from John Gorton Drive intersection - Molonglo river corridor and west zone

The entire zone is YBRG, an endangered ecological community albeit in this zone generally a fairly sparsely spaced savannah character woodland typical of much of the original Canberra plains. The eucalypts generally denser on the higher western slopes although due to the wide spacing of the woodland trees and due to may being aged and senescent or near senescent (in or nearing decline) it is probable that only reasonably limited numbers of YB-RG trees will be directly impacted with removal by the alignment earthworks of the proposed EWA.

Greater numbers of woodland trees may be at risk to the north and south from the often-widespread removals that occur in contemporary urban estate developments.

The low ridge (often 50 – 200m) south of the EWA will generally limit views of the arterial from established suburban areas of Wright and Coombs to the south and Denman Prospect to the south west. Some elevated often multi-storey developments near John Gorton Drive may have views of the arterial but these will generally diminish as further urban and group centre development. Figure 8-2 indicates the view from within the Arboretum south west to the Molonglo River corridor near the proposed bridge. The proposed EWA alignment (centrally across the photo) would be just above the crowns of the pine plantation and in the more open expanse of YB-RG woodland in the centre and right of the photo.

Figure 8-2 View from Dairy Farmers Hill to Western zone

8.2.2 Proposed urban / open space arterial landscape opportunities

8.2.2.1 The Group Centre zone

The group centre zone (CH 0100 – 0450) is recommended to be large canopy deciduous trees to create a strong boulevard. Quercus palustris 'Freefall' recommended and also a contrast to the dominant Plane trees of John Gorton Drive. If a verge width wide enough for a second tree row is provided then further plantings of Pyrus calleryana are suggested nearer the building line so less impact on facades and also an impediment to delivery and removalist truck use of the paved verge. Deciduous trees, especially in an East-West alignment maximise solar opportunities especially for properties on the road southern side. Deciduous trees are also consistent with the dominant character of most town & group centres and offer their benefit of generally more proven urban adaptability.

West of John Gorton Drive along Holborrow Avenue (which is an extension of the EWA) the existing street trees are two thirds native evergreen Eucalyptus mannifera and near intersections narrow upright Pyrus calleryana (Capital and Chanticleer cultivars) deciduous trees. Casuarinas are integrated into the Cravens Creek open space. The existing mix of character types to the west offers flexibility on the proposed EWA for site appropriate species selections and character which is an advantage and ensures the project landscape design principles have considered road scape continuity and broader context.

Presumably a single row of trees due to space along each verge will be the outcome – but two rows if space allows will offer a stronger landscape interface to the commercial group centre interface.

If the ultimate profile offers a median through the group centre then a single row of trees matching the larger of the verge species recommended. Similarly, understorey low shrub (<800mm ht) is recommended with appropriate crossing pathways for safe sightlines and informal access.

8.2.2.2 Townhouse / Apartment zone

The Townhouse / Apartment zone (SE of the group centre) is a 250m section of the arterial (CH 0450 - 0700) has close urban development both sides of the arterial (and a sports complex to the NW) in the Hames Sharley 2020 planning that has the flexibility to be either of two landscape options each with merit:

- Native tree plantings eg Eucalyptus mannifera due to their native character consistent with the EWA street trees west of John Gorton Drive. This species offers less solar impacting tree crowns than most other savannah woodland larger eucalypts. This would offer a more formal patterned native planting (presumably single row trees due to verge space) transition consistent to the group centre tree pattern / spacing (preferred); or
- Extending the group centre probable single row deciduous tree plantings along the arterial to the east.

Consideration could be given to smaller exotic tree plantings at intersections (similar to the EWA / Holborrow Avenue west of John Gorton Drive) as a visual guide for drivers and also provide contrast interest between the native and exotic plantings for arterial users.

If the ultimate profile offers a 6m width median, then a single row of trees matching the verge species centrally aligned in dryland grassing recommended.

8.2.2.3 Molonglo River western 'Peninsula' housing zone

The Molonglo River western 'Peninsula' housing zone is located between CH 0700 – 1400. North of the EWA based on the Hames Sharley 2020 planning sketch image a one or two block width townhouse or similar medium density zone. Recommend more formal patterned native planting street trees (presumably single row trees due to verge space) eg Eucalyptus mannifera for consistency along the E-W arterial. Note this species with its smooth bark is also advantageous as a low fire fuel load or lower ignition risk species.

South of the EWA based on the Hames Sharley 2020 planning sketch image is all open space to the Molonglo River banks. No constrained verge width and a parkland / urban edge management zone interface offers the opportunity for a more informal patterned native planting groves or individual trees reflective of savannah woodland. The trees can be setback various offsets from the road. The crown separation advantageous for fire management and for opening upriver corridor vistas. The native tree species selection may vary with different priorities such as:

- Eucalyptus Mannifera for consistency with the EWA street trees and fire resistance advantages.
- Yellow Box-Red Gum woodland former dominant character species eg:
  - Eucalyptus melliodora (Yellow Box) although a more fibrous bark;
  - Eucalyptus blakelyi (Blakely's Red Gum) although susceptible to Lerp attack so not often permitted as a street tree. Generally smooth bark so some fire resistance advantages.
  - Eucalyptus bridgesiana (Apple Box) is often a less dominant species in the YB-RG community.

If the ultimate profile offers a 6m width median, then a single row of trees matching the verge species centrally aligned in dryland grassing recommended.

8.3 Existing Character and Proposed Landscape Principles - Molonglo River Corridor Zone

8.3.1 Existing character

The Molonglo River corridor (CH 1600 - 2100) is an important linear open space corridor and waterway that the EWA crosses over. Figure 8-3 shows the view south west to the Molonglo River corridor near the proposed EWA bridge. The proposed Molonglo 3 Hamlet estate in the southern precinct (rear left) and the Green Link estate urban edge to the left foreground.

Figure 8-3 – Molonglo River Corridor zone and East zone

The zone is dominated in the river corridor riparian zone by Casuarina cunninghamiana (River She-Oaks) along the river banks. The rising land on either bank is generally grassland with few trees and often low rocky areas, particularly on the western bank that offer PTWL habitat. A wider eastern bank is also open grassland at the top before changing to an existing dense pine plantation.

8.3.2 Proposed urban / open space arterial landscape opportunities

The Molonglo River Corridor is primarily viewed over, due to half its length being a 236m long bridge up to 26m above the river. The river runs perpendicular beneath the bridge so generally those in vehicles, especially attentive to the road drivers, will have minimal awareness of the river itself. They will be aware of the moderately incised valley that the river flows through and the casuarinas along the river banks, although the taller tree crowns will

still be in the order of 10m below the bridge users. Pedestrians and cyclists due to their slower pace will gain better appreciation of the riverine landscape.

The river corridor awareness for all will be dependent on the visual permeability of the bridge balustrades at user eye level and marginally below to readily view downward. Placemaking opportunities to represent the river that passing over include:

- Integrating water or casuarina motifs to the balustrades or a sculpture / landscape feature including rockwork to the bridge approaches. There is potential for an occasional PTWL motif
- Symbolic tree plantings of the Casuarina cunninghamiana found along the river grouped at the bridge approaches

Generally, if the upper banks of the river corridor section of the arterial are left open this will better represent the existing adjacent grasslands and open up a clearer vantage of the river corridor below for passing traffic.

8.4 Existing Character and Proposed Landscape Principles – East Zone

8.4.1 Existing character

The East zone is identified as the zone from Molonglo River corridor (CH 2100) to the Tuggeranong Parkway interchange (CH 2950). The EWA traverses a broad ridge that is:

- On the western half (CH 2100 – 2650) a pine plantation to the south and grassland to the north with pine forest beyond. The RobertsDay / WSP / Elton planning study (June 2020) earmarks this area to be a premium residential enclave (The Hamlet) near Barrer, Misery and Ryan Hills to the south and the connecting The Green Link estate to the north; and
- On the eastern half (CH 2650 – 2950) a pine plantation to the south and the National Arboretum adjoining to the north.

The Tuggeranong Parkway interchange and on / off ramps on the eastern side of the Parkway are located through an existing Pine forest plantation. Both sides of Tuggeranong Parkway at the interchange have a reasonable batter allowing 'natural' bridge abutments for the proposed overpass to the Parkway. Figure 8-4 shows the view south to the Tuggeranong Parkway and the proposed Molonglo 3 Hamlet estate where the pine plantation: and the proposed EWA alignment across the foreground in front of the high voltage powerline. The raised landform facilitates the proposed Tuggeranong Parkway interchange overbridge on the left.

Figure 8-4 – Location of the EWA interchange with the Tuggeranong Parkway

The entire zone is predominately an existing Pine forest plantation other than the north east sector which is the new plantings of the National Arboretum. Figure 8-5 indicates the view north to Dairy Farmers Hill centre with the Tuggeranong Parkway and lower Arboretum to the right. The proposed EWA alignment is located on the left in the saddle with the high voltage powerline; and the proposed Molonglo 3 Hamlet estate is proposed at the site of pine plantation on the left.

Figure 8-5 – Location of the EWA interchange with the Tuggeranong Parkway

The EWA alignment utilises a saddle allowing the road alignment to better recede into the setting and the adjoining proposed residential estates to be on low ridgelines and a hill to take advantage of excellent vistas. This also blocks views of the arterial from established suburban areas of Wright and Coombs to the south. The arterial is well sited to diminish its awareness from established homes and roadway surrounds.

8.4.2 Proposed urban / open space arterial landscape opportunities

This 850m section of the arterial is primarily between or near proposed close urban development both sides of the arterial (other than the Arboretum to the NE) in the RobertsDay 2020 planning study. It has the flexibility to be either of two dominant landscape options (or a mix of both) each with merit:

- Native tree plantings eg Eucalyptus mannifera due to their native character consistent with the EWA existing street trees west of John Gorton Drive and along the proposed EWA west of the Molonglo River. Merit in a linked consistency throughout even if some deciduous focal exceptions as offered as options in select areas. The Eucalyptus mannifera offers less solar impacting tree crowns than most other savannah woodland larger eucalypts. A more formal patterned native planting (presumably single row trees due to verge space) is consistent to the group centre tree pattern /spacing (preferred); or
- Extending similar to the group centre zone far to the west a probable single row deciduous tree planting (or two or more rows if space) along the arterial where adjoining estates.

Consideration of smaller exotic tree plantings at intersections (similar to the EWA / Holborrow Avenue west of John Gorton Drive) as a visual guide for drivers and also provide contrast interest between the native and exotic plantings for arterial users.

A separate character has potential just in the National Arboretum adjoining section (CH 2550 – 2950) where matching Arboretum style one species rectangular grids could be added as space permits definitely to the adjoining northern verge and also to the southern verge if the pine plantation is removed. Pinus radiata is a Declared Weed in the ACT. Exotic trees would be most appropriate in this zone as consistent with the adjoining Arboretum selection.

If the ultimate profile offers a 6m width median then a single row of trees matching the verge species centrally aligned in dryland grassing recommended.

9 Noise Modelling

9.1 Noise Modelling Approach

The Roads ACT Noise Management Guideline sets the criteria for residential receivers at $L_{Aeq(15hour)}$ 60 dB at 1m from the building facade. This criterion has been applied as a blanket criterion across the proposal site to determine areas where exceedances may be predicted for future land developments. A build scenario has been modelled in order to determine the potential noise impacts from the proposal for future developments.

Noise levels have been predicted using a computer noise model of the existing scenario and the proposed EWA to assess the implications of the project. Noise levels in the form of noise contours have been assessed at 1.5 metres above the ground level for the 2041 scenario. These noise contours for the 15-hour day are presented are based on the predicted noise levels generated from the EWA proposal in isolation from the noise from existing roads surrounding the proposal. Detail of the noise modelling undertaken as part of this study are contained in the noise modelling report provided in Appendix C. In addition, noise contours indicated in Section 9.2 have been transposed on the strategic design plans contained in Appendix A.

9.2 EWA Noise Generation

As can be seen from the noise contours in Figure 9-1 and Figure 9-2, it is apparent that the 60 dB(A) criterion for residential buildings has the potential to be exceeded at residences up to approximately 210 metres from the centre of the proposal alignment towards Tuggeranong Parkway. This distance of exceedance does vary with the predicted traffic volumes and proposed speed limit. The distance of exceedance reduces noticeably where the posted speed limit is proposed to be 50 km/h, which is down to approximately 50 metres towards the west of the proposal.

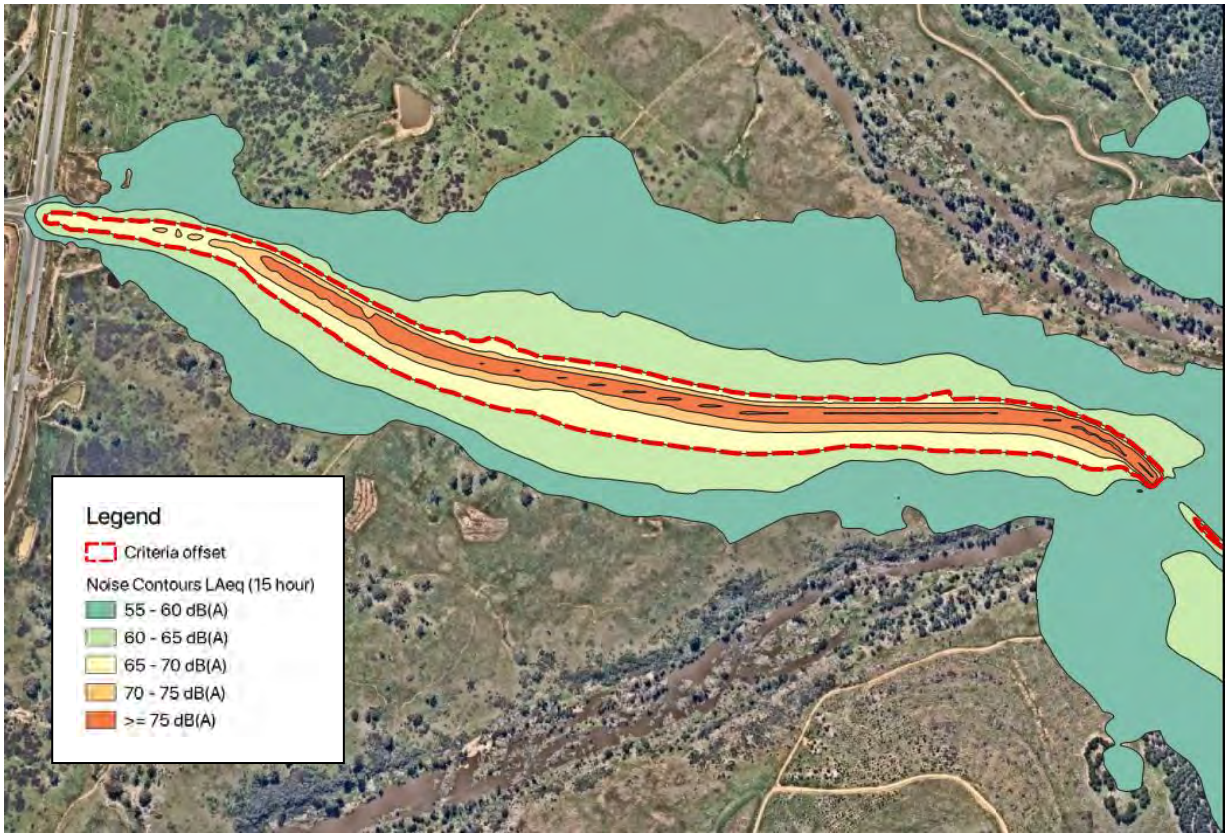

Figure 9-1 – EWA noise contours – west of Molonglo River

The proposal is to be located on a greenfield site and as such there are no existing receivers adjacent to the proposal that are predicted to exceed the criterion. Future developments in the area should consider the offset distance of 210 metres as developments within this distance would be predicted to exceed the criteria.

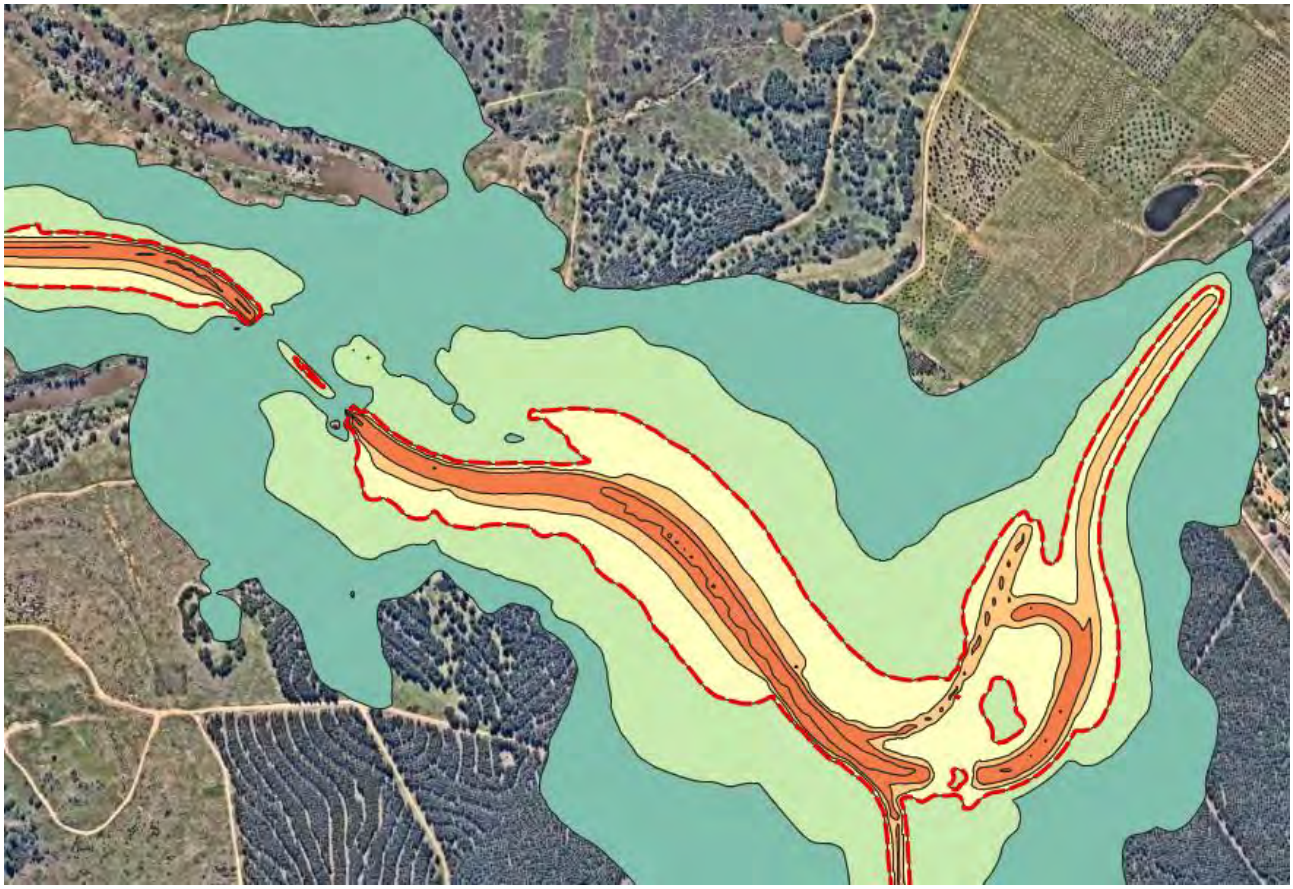

Figure 9-2 – EWA noise contours – east of Molonglo River

9.3 Potential Noise Mitigation Measures

Potential noise mitigation measures could be considered during the detailed design of the proposal in order to reduce the minimum offset distance for future developments. Possible mitigation measures may include one or a combination of the following:

- Low noise pavement (i.e. stone mastic asphalt)
- Noise walls or mounds
- At-property architectural treatments

9.3.1 Low noise pavement

Low noise pavement along the alignment where the posted speeds are to be 70 km/h or above has the potential to reduce the noise levels generated from the tyre/pavement interface. The noise level reduction is dependent on the low noise pavement to be incorporated into the design. The current proposal assumes DGA which has a noise correction of 0 dB while other options of pavement, i.e. Stone Mastic Asphalt (SMA), have corrections of -1 dB or less. Low noise pavement reduces in effectiveness in locations where the posted speed limit is below 70km/h and hence other forms of noise mitigation such as noise walls or mounds may be more appropriate.

9.3.2 Noise walls

Noise walls (or noise mounds) may prove beneficial across the entire alignment. Noise walls work best where the noise wall obstructs line of sight to the nearby receivers. Given that the proposal is in a greenfield site and there are presently no receivers in close proximity, consideration of future developments should take into account the potential implementation of noise walls as a form of noise mitigation.

9.3.3 At-property architectural treatments

At-Property treatments are typically recommended in locations where at-source or path mitigation measures are not considered reasonable or feasible, or where there are residual exceedances of the criteria after the implementation of other forms of noise mitigation. At-property architectural treatments benefit the internal amenity of receivers but do not provide benefit for the outdoor amenity.

Specific details of at-property architectural treatments would be subject to further assessment as the design progresses.

10 Order of Cost

10.1.1 Basis of Estimate

An estimate of the order of cost to deliver the EWA has been developed based on proposed design solution detailed in the strategic design drawings contained in Appendix A. The estimate is preliminary in nature based on high level strategic design concepts of key infrastructure components associated with the project. It therefore should only be used as an indicative guide of potential project costs and be refined as more detailed design iterations are developed in the future.

10.1.2 Construction Contingency

A Construction Contingency allowance of 40% has been made for unknowns that may occur during construction due to latent conditions or issues with the documentation. This contingency is based on deterministic methods and is typical of projects at a strategic design/feasibility stage.

10.1.3 Summary of Estimate

Details of the order of cost estimate are provided in the Molonglo East West Arterial Road Indicative Cost Estimate (Rev 1) of 19 November 2020 included in Appendix B. The cost estimate has been divided into two sections as indicated in Table 10-1.

Table 10-1 – Strategic order of cost estimate – total project cost

Item	Description	$/ Excl. GST
1	West of CH 1400	$25,685,000
2	East of CH 1400	$166,112,000
3	**Total Project Cost**	**$191,797,000**

These two sections constitute the base case scenario (west of CH1400) which will have to proceed to facilitate development of the peninsula west of the river, and the project case (east of CH 1400 - inclusive of the Molonglo River Bridge, M3E connector road intersection, and the Tuggeranong Parkway interchange) which is essentially the arterial connection between John Gorton Drive and the Tuggeranong Parkway. These two sub-opinions of cost are provided in Table 10-2 and Table 10-3.

Table 10-2 – Strategic order of cost estimate – west of CH 1400

Item	Description	$/ Excl. GST
1	Site Preparation	$3,734,000
2	Road Works	$7,949,000
3	Total Trade Costs	$11,683,000
4	Preliminaries and Margin	$1,753,000
5	Traffic Management	$807,000
6	Design and Management Fees	$2,137,000
7	Procurement and Project Management Fees	$1,966,000
8	Contingency	$7,339,000
9	**Total Cost - West of CH 1400**	**$25,685,000**

Table 10-3 – Strategic order of cost estimate – east of CH 1400

Item	Description	$/ Excl. GST
1	Site Preparation	$8,994,000
2	Road Works	$65,916,000
3	Cotter Road Upgrade	$659,000
4	Total Trade Costs	$75,569,000
5	Preliminaries and Margin	$11,336,000
6	Traffic Management	$5,215,000
7	Design and Management Fees	$13,818,000
8	Procurement and Project Management Fees	$12,713,000
9	Contingency	$47,461,000
10	**Total Cost - East of CH 1400**	**$166,112,000**

10.2 Estimate Assumptions

The assumptions made during the development of the order of cost estimate are detailed in Appendix B. A summary of key assumption is as follows:

- Allowances have been included for intersection works to new side roads including new traffic lights, islands, turning lanes, and the like, however no allowance has been included for the side roads
- New in-ground services are excluded including sewer, gas, communications and electrical utilities
- Diversion / demolition of existing utilities have been excluded. It has been assumed that only protection works for the bulk water supply and 132 kV lines are required
- The Trunk cycleway is to be delivered as part of a separate project and as such has not been included in the cost estimate
- The Tuggeranong Parkway third lane is to be delivered as part of a separate project and as such has not been included in the cost estimate
- The Tuggeranong Parkway bridge extension is to be delivered as part of a separate project and as such has not been included in the cost estimate
- Noise attenuation features are to be provided as part of subdivision development and as such has not been included in the cost estimate

11 Economic Analysis

11.1 Economic Approach

An economic appraisal has been undertaken to assess the economic viability of the proposed MEWA project by modelling quantifiable benefits and identifying intangible benefits that have not been modelled. The economic appraisal is contained in the rapid Economic Appraisal Technical Note provided in Appendix D.

The analysis tool used to assess the economic performance of the proposal is a Cost Benefit Analysis (CBA). A Cost benefit analysis attempts to provide an assessment of the social benefits of a project or policy by estimating the benefits that accrue to the community from undertaking an activity compared to the cost associated with the construction and operation of the activity. The analysis is conducted in real price terms for a given base year and considers whole of life costs and benefits and has been undertaken in accordance with the requirements of the following documents:

- Australian Transport Assessment and Planning Guidelines – T2 Cost Benefit Analysis, 2016 (ATAP Guidelines)
- The Australian Institute for Disaster Resilience, 2002 - Manual 27 of the Australian Disaster Resilience Handbook Collection - Disaster Loss Assessment Guidelines (AIDR Guidelines)

In the context of the project stage and level of available information, this economic appraisal has been undertaken as a rapid evaluation. The ATC Guidelines defines a rapid evaluation as an assessment that "is intended to be a cost-effective way for decision makers to gauge whether an initiative is likely to pass scrutiny at the detailed appraisal stage".

The economic analysis has been undertaken broadly consistent with the process described in the ATAP Guidelines.

11.2 Cost and Benefit Streams

As a rapid economic assessment, the appraisal has focused on key cost and benefit streams that contribute most to the economic performance of the project. The following cost and benefit streams have been considered in the economic analysis:

- Cost 1 – Capital Costs (design, construction, Principal costs etc)
- Cost 2 – Operational & maintenance costs
- Benefit 1 – Travel Time Savings
- Benefit 2 – Vehicle Operating Cost Savings

11.3 Unquantified and Intangible Benefits

Due to the rapid appraisal nature of the CBA, the stage of project development, available information and methodological constraints, the economic analysis necessarily has a number of additional cost and benefit streams that have not been incorporated into the modelling. These cost and benefit streams include:

- Wider Economic Benefits (WEBs)
- Improved network crash safety
- Facilitation of M3E development – emergency service response and access
- Facilitation of M3E development – M3E arterial road accessibility
- Funding costs
- Travel time reliability
- Construction impacts on network performance
- Environmental benefits
- Social Inclusion benefits
- Other intangible effects

Further details on these costs and benefits, and the rationale for their omission from the economic modelling are provided in Appendix D.

11.4 Economic Results

The results of the economic analysis for the EWA are provided in Table 11-1. These results indicate that the preferred EWA option is economically viable, with strongly positive NPVs and BCRs well above 1 at all considered discount rates. Indeed, with an NPV of over $1B and a BCR greater than 10 at a 7% discount rate, the economic modelling indicates that the EWA will provide a very high return on investment.

It is noted however that these results are a product of significant improvements in network performance that result from the provision of the EWA, and that the base case traffic modelling indicates substantial failure on many links in the network. Whist strategic traffic modelling is considered the appropriate tool to inform benefits analysis as it captures the network wide effects that the EWA has (as distinct from microsimulation modelling), it is understood that certain parameters that are currently used in the CSTM may not accurately model network performance in high congestion scenarios, and that network delay may be overstated as links in the model exceed their capacity. It is therefore likely that improvements in network performance resulting from the EWA are exaggerated, and by extension the strong economic benefits resulting from the EWA are overstated.

Table 11-1 – Economic indicators for the EWA project ($2020 M)

Economic Indicator	Discount Rate		
	4%	7%	10%
PV Cost	$154.3	$137.2	$123.6
PV Benefit	$3,264.8	$2,005.8	$1,309.2
NPV	$3,110.4	$1,868.6	$1,185.6
BCR	21.2	14.6	10.6

Travel time savings are the primary benefit stream and constitute approximately 70% of benefits for the economically viable project options. Travel time benefits area result of a significant reduction in hours travelled across the broader Canberra road network associated with the provision of the EWA. The majority of the remaining benefit (approximately 30%) is attributable to vehicle operating cost savings that result from: 1) shorter journey lengths due to the improved connectivity provided by the EWA, and 2) faster average travel speeds throughout the network.

A sensitivity analysis was undertaken to assess whether the results of the CBA were likely to be affected by the input assumptions. The sensitivity analysis tested various scenarios associated with overall increases and decreases in cost and benefits streams. The sensitivity analysis indicates that the EWA project remains economically viable for all sensitivity scenarios, and even when benefits are reduced by 40%, the project still returns an NPV over $1B at a 7% discount rate.

11.5 Economic Conclusions

The rapid economic analysis of the East West Arterial indicates that the project is strongly economically viable, providing considerable travel time savings to road users in addition to substantial savings in vehicle operating costs. These savings are experienced both by local users of the EWA, in addition to users of the broader transport network that will be impacted by traffic generated in the Molonglo Valley if the EWA is not provided.

It is noted however, that there are some concerns around the accuracy of the strategic modelling inputs that have been used as a basis for the economic modelling. It is understood that the Territory is currently considering modifications to some of the CSTM parameters to improve the model's performance at high levels of congestion which are likely to provide more accurate results in future model years. It is recommended that the economic modelling for the EWA be revisited when these updates to the CSTM are made. It is expected that revisions to the CSTM outputs are likely to reduce the NPVs and BCRs associated with the EWA.

Notwithstanding the need for refinement of strategic traffic modelling, it can be concluded that provision of the EWA will play an important role in alleviating congestion on the Canberra road network, and that these congestion improvements will provide considerable economic benefit to the community. As such, and given the current strength of the economic performance of the project, there appears to be a compelling case to advance the project to further stages of development in the future.

Appendix A Design Sketches – EWA

ACT Government
Environment, Planning and Sustainable Development

MOLONGLO EAST WEST ARTERIAL FEASIBILITY STUDY

STRATEGIC DESIGN

March 2021

SMEC AUSTRALIA PTY LTD
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Project Number 3002754

DRAWING FILE LOCATION / NAME
V:_Vault\Projects\3002\3002754\110_CADD\CADD\DWG\02_OPTION_07\3002754-0700.dwg

KEY PLAN
NOT TO SCALE

DRAWING INDEX

DRAWING NUMBER	DRAWING TITLE
3002754-0700	COVER SHEET
3002754-0701	KEY PLAN AND DRAWING INDEX
3002754-0702	LOCALITY PLAN, GENERAL NOTES AND LEGEND
3002754-0703	SITE PLAN
3002754-0711	TYPICAL SECTIONS SHEET 1
3002754-0712	TYPICAL SECTIONS SHEET 2
3002754-0721	GENERAL ARRANGEMENT PLAN SHEET 1
3002754-0722	GENERAL ARRANGEMENT PLAN SHEET 2
3002754-0723	GENERAL ARRANGEMENT PLAN SHEET 3
3002754-0724	GENERAL ARRANGEMENT PLAN SHEET 4
3002754-0725	GENERAL ARRANGEMENT PLAN SHEET 5
3002754-0726	GENERAL ARRANGEMENT PLAN SHEET 6
3002754-0727	GENERAL ARRANGEMENT PLAN SHEET 7
3002754-0728	GENERAL ARRANGEMENT PLAN SHEET 8
3002754-0741	WESTBOUND ALIGNMENT LONGITUDINAL SECTON CONTROL LINE MC710 SHEET 1
3002754-0742	WESTBOUND ALIGNMENT LONGITUDINAL SECTON CONTROL LINE MC710 SHEET 2
3002754-0743	WESTBOUND ALIGNMENT LONGITUDINAL SECTON CONTROL LINE MC710 SHEET 3
3002754-0744	LONGITUDINAL SECTION CONTROL LINES MCN7 AND MCS7
3002754-0745	EASTBOUND ALIGNMENT LONGITUDINAL SECTON CONTROL LINE MC711 SHEET 1
3002754-0746	EASTBOUND ALIGNMENT LONGITUDINAL SECTON CONTROL LINE MC711 SHEET 2
3002754-0747	NORTHBOUND ENTRY RAMP LONGITUDINAL SECTON CONTROL LINE MC7BE
3002754-0748	NORTHBOUND EXIST RAMP LONGITUDINAL SECTON CONTROL LINE MC7BX
3002754-0770	BRIDGES KEY PLAN AND DRAWING INDEX
3002754-0771	BRIDGE 01 MOLONGLO RIVER - EAST WEST BRIDGE PLAN AND ELEVATION
3002754-0772	BRIDGE 01 MOLONGLO RIVER - EAST WEST BRIDGE SECTION
3002754-0781	BRIDGE 02 TUGGERANONG PARKWAY OVERPASS PLAN AND ELEVATION
3002754-0782	BRIDGE 02 TUGGERANONG PARKWAY OVERPASS SECTION

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REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
01	17.12.2020	DRAFT SUBMISSION FOR CLIENT REVIEW	WVR 002	D.T.
02	09.03.2021	ISSUED FOR FINAL SUBMISSION	WVR 003	D.T.

TITLE	NAME
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DESIGN CHECK	TBC
PROJECT MANAGER	D. TONGE
PROJECT DIRECTOR	D. KEEP

SCALES AT A1 SIZE DRAWING

NOT FOR CONSTRUCTION

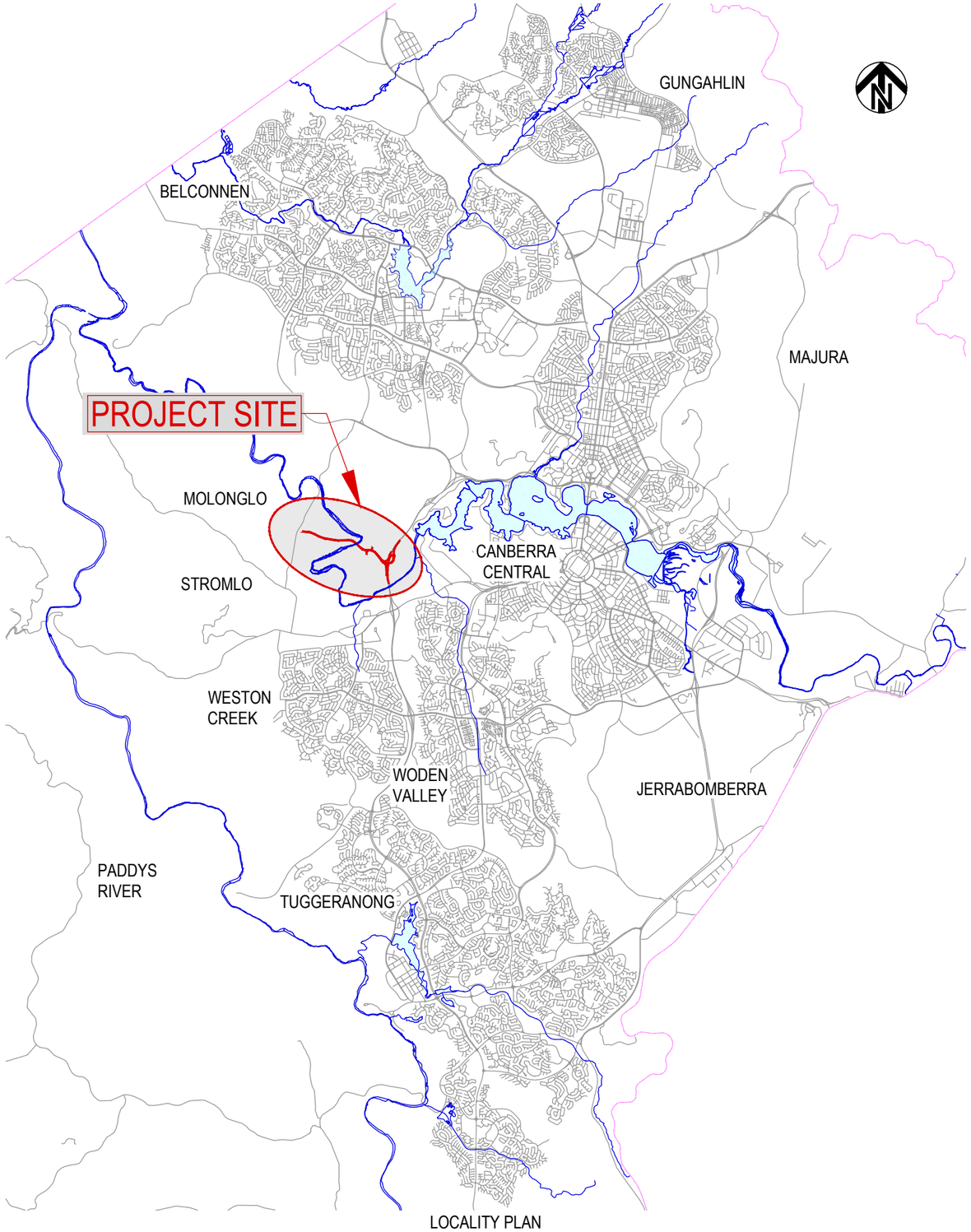
DESIGNER
SMEC
Member of the Surbana Jurong Group
SMEC AUSTRALIA PTY LTD
© ABN 47 065 475 149
SUITE 2, LEVEL 1, 243 NORTHBOURNE AVENUE
LYNEHAM ACT 2602 AUSTRALIA
SMEC PROJECT No 3002754

CLIENT
ACT Government
Environment, Planning and Sustainable Development

PROJECT TITLE
MOLONGLO EAST WEST ARTERIAL
FEASIBILITY STUDY

KEY PLAN AND DRAWING INDEX

SCALE	PHASE	PROJECT / DRAWING No.	REVISION
AS SHOWN	FEASIBILITY STUDY	3002754-0701	02



LOCALITY PLAN
NOT TO SCALE

LEGEND - GENERAL

- NEW ROAD PAVEMENT
- EXISTING PAVEMENT
- NEW BRIDGE WORKS
- EARTHWORKS BATTER
- RETAINING WALL
- NOTIONAL CORRIDOR BOUNDARY
- EXISTING BRIDGE
- TUGGERANONG PWY THIRD LANE (FUTURE)

LEGEND - ENVIRONMENTAL

- THREATENED GRASSLANDS
- THREATENED WOODLANDS
- PINK TAILED WORM LIZARD HABITAT
- ARBORETUM PLANTINGS
- PAD 1
- BICENTENNIAL NATIONAL TRAIL
- MOLONGLO VALLEY TO CITY TRUNK CYCLEWAY
- NOISE CONTOURS LAEQ (15 hr) 55 dB(A)
- 60 dB(A)

GENERAL NOTES:

1. DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. STATIONS AND REDUCED LEVELS ARE IN METRES.
3. REDUCED LEVELS ARE RELATED TO THE AUSTRALIAN HEIGHT DATUM.

SERVICES:

1. ALL EXISTING SERVICE LOCATIONS SHOWN ON DRAWINGS ARE INDICATIVE ONLY.
2. POTENTIAL INDICATIVE UTILITY WORKS ARE INDICATED ON THE DRAWINGS. AGREEMENT WITH THE RELEVANT UTILITY AUTHORITIES IS REQUIRED TO CONFIRM NATURE AND EXTENT OF WORKS.

NOT FOR CONSTRUCTION

DRAWING FILE LOCATION / NAME: V:_Vault\Projects\3002\3002754\110_CADD\CAD\DWG\02_OPTION_07\3002754-0702.dwg
PLOT DATE: 09 Mar 2021 TIME: 14:57:09

EXTERNAL REFERENCE FILES: X 2754_LEG_OPT7, X 2754_ACT_LOC, X 3002754_SMEC_a1

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
01	17.12.2020	DRAFT SUBMISSION FOR CLIENT REVIEW	WVR 002	D.T.
02	09.03.2021	ISSUED FOR FINAL SUBMISSION	WVR 003	D.T.

TITLE	NAME
DRAFTER	M. HUGHES
DRAFTING CHECK	K. CURLEY
DESIGNER	M. WATSON
DESIGN CHECK	TBC
PROJECT MANAGER	D. TONGE
PROJECT DIRECTOR	D. KEEP

SCALES AT A1 SIZE DRAWING

DESIGNER
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LYNEHAM ACT 2602 AUSTRALIA
SMEC PROJECT No 3002754

CLIENT
ACT Government
Environment, Planning and Sustainable Development

PROJECT TITLE
MOLONGLO EAST WEST ARTERIAL FEASIBILITY STUDY

LOCALITY PLAN, GENERAL NOTES AND LEGEND

SCALE	PHASE	PROJECT / DRAWING No.	REVISION
AS SHOWN	FEASIBILITY STUDY	3002754-0702	02

A1
150 mm ON ORIGINAL
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

150 mm ON ORIGINAL

A1

DRAWING FILE LOCATION / NAME: V:_Vault\Projects\3002\3002754\110_CADD\CAD\DWG\02_OPTION_07\3002754-0703.dwg

PLOT DATE: 09 Mar 2021 TIME: 14:57:53

NOT FOR CONSTRUCTION

EXTERNAL REFERENCE FILES:
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X:2754_OPT7_HWY_INT
X:BRG_Tugg_Plan
X:BRG_Molonglo_Plan
X:2754_DES_CL_OPT7
X:2754_DES_PWY_EW_3rd_LN
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X:2754_OPT_STAGGER_T

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
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02	09.03.2021	ISSUED FOR FINAL SUBMISSION	WVR 003	D.T.

TITLE	NAME
DRAFTER	M. HUGHES
DRAFTING CHECK	K. CURLEY
DESIGNER	M. WATSON
DESIGN CHECK	TBC
PROJECT MANAGER	D. TONGE
PROJECT DIRECTOR	D. KEEP

SCALES AT A1 SIZE DRAWING

SCALE 1:5000 50 0 100 200 250 m

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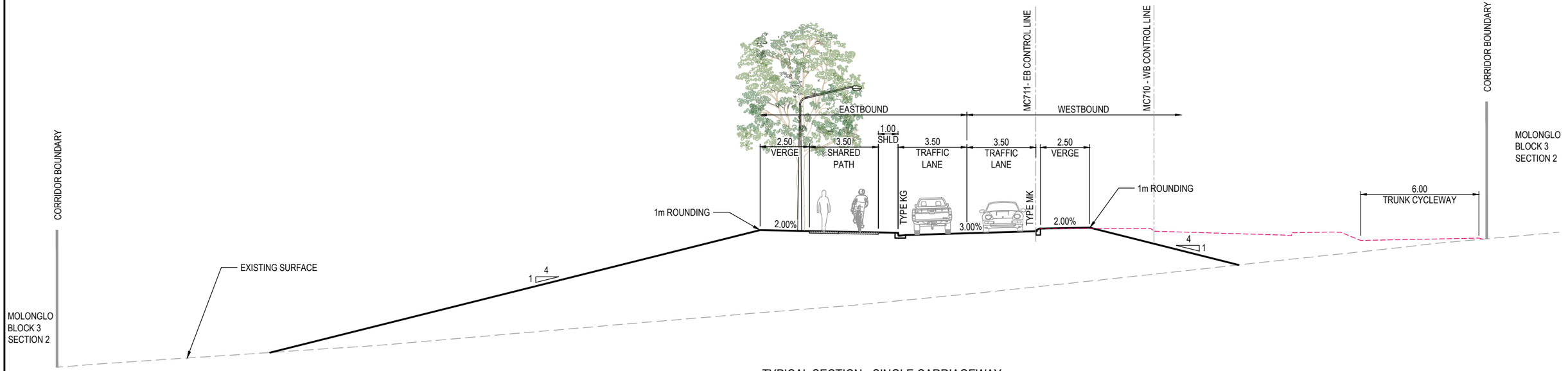
ACT Government
Environment, Planning and Sustainable Development

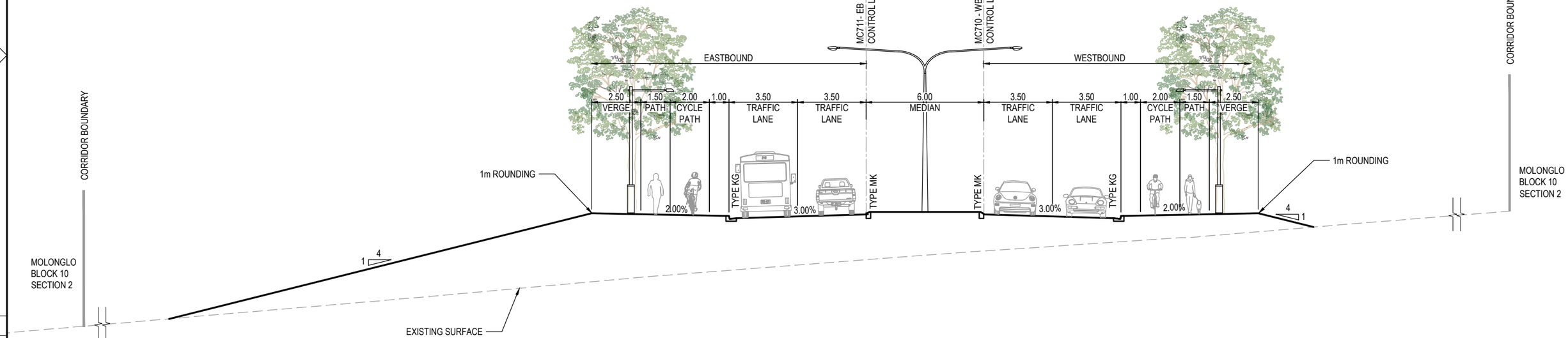
PROJECT TITLE
MOLONGLO EAST WEST ARTERIAL FEASIBILITY STUDY

SITE PLAN

SCALE	PHASE	PROJECT / DRAWING No.	REVISION
AS SHOWN	FEASIBILITY STUDY	3002754-0703	02



TYPICAL SECTION - SINGLE CARRIAGEWAY
WEST OF MOLONGLO RIVER
CH 1000
(REFER GENERAL ARRANGEMENT DRAWING SHEET 2)



TYPICAL SECTION - DUAL CARRIAGEWAY
MOLONGLO GROUP CENTRE
CH 400
(REFER GENERAL ARRANGEMENT DRAWING SHEET 1)

NOTE:
DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE

NOT FOR CONSTRUCTION

150 mm ON ORIGINAL
A1

DRAWING FILE LOCATION / NAME: V:_Vault\Projects\3002\3002754\110_CADD\CAD\DWG\02_OPTION_07\3002754-0711.dwg
PLOT DATE: 09 Mar 2021 TIME: 14:58:22

EXTERNAL REFERENCE FILES: 3002754_SMEC_xrl, K_2754_TYP_XS_OPT7

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
01	17.12.2020	DRAFT SUBMISSION FOR CLIENT REVIEW	WVR 002	D.T.
02	09.03.2021	ISSUED FOR FINAL SUBMISSION	WVR 003	D.T.

TITLE	NAME
DRAFTER	M. HUGHES
DRAFTING CHECK	K. CURLEY
DESIGNER	M. WATSON
DESIGN CHECK	TBC
PROJECT MANAGER	D. TONGE
PROJECT DIRECTOR	D. KEEP

SCALES AT A1 SIZE DRAWING
SCALE 1:100 (1 0 1 2 3 4 5 m)

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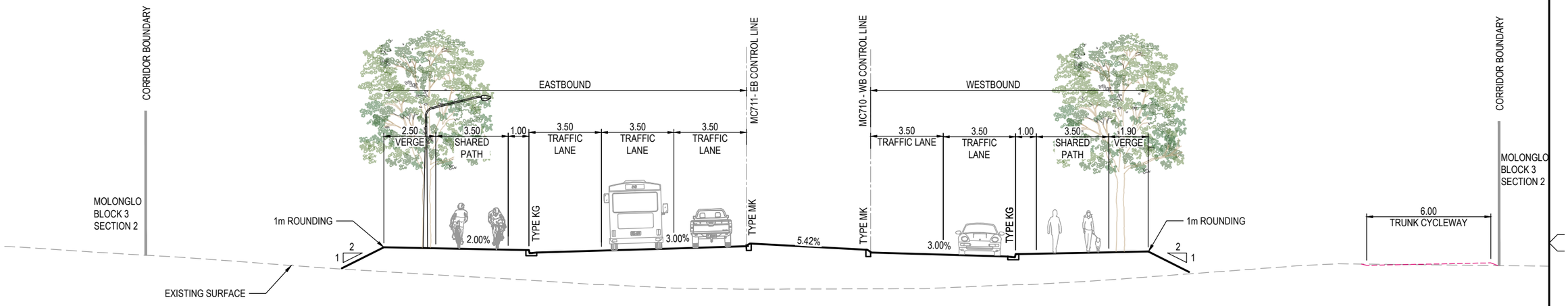
SUITE 2, LEVEL 1, 243 NORTHBOURNE AVENUE
LYNEHAM ACT 2602 AUSTRALIA
SMEC PROJECT No 3002754

CLIENT
ACT Government
Environment, Planning and Sustainable Development

PROJECT TITLE
MOLONGLO EAST WEST ARTERIAL FEASIBILITY STUDY

TYPICAL SECTIONS
SHEET 1

SCALE	PHASE	PROJECT / DRAWING No.	REVISION
AS SHOWN	FEASIBILITY STUDY	3002754-0711	02



TYPICAL SECTION - DUAL CARRIAGEWAY IN FILL
EAST OF MOLONGLO RIVER
CH 2600
(REFER TO GENERAL ARRANGEMENT DRAWING SHEET 4)

NOTE:
DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE

150 mm ON ORIGINAL
A1

DRAWING FILE LOCATION / NAME
V:_Vault\Projects\3002\3002754\110_CADD\CAD\DWG\02_OPTION_07\3002754-0712.dwg

PLOT DATE 09 Mar 2021 TIME 14:58:48

NOT FOR CONSTRUCTION

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
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	02	09.03.2021	ISSUED FOR FINAL SUBMISSION	WVR 003	D.T.

TITLE	NAME
DRAFTER	M. HUGHES
DRAFTING CHECK	K. CURLEY
DESIGNER	M. WATSON
DESIGN CHECK	TBC
PROJECT MANAGER	D. TONGE
PROJECT DIRECTOR	D. KEEP

SCALES AT A1 SIZE DRAWING
SCALE 1:100 (1 0 1 2 3 4 5 m)

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SUITE 2, LEVEL 1, 243 NORTHBOURNE AVENUE
LYNEHAM ACT 2602 AUSTRALIA
SMEC PROJECT No 3002754

CLIENT
ACT Government
Environment, Planning and Sustainable Development

PROJECT TITLE
MOLONGLO EAST WEST ARTERIAL FEASIBILITY STUDY

TYPICAL SECTIONS SHEET 2

SCALE	PHASE	PROJECT / DRAWING No.	REVISION
AS SHOWN	FEASIBILITY STUDY	3002754-0712	02

X:\3002754_SMEC_a1\X_2754_TYP_XS_0717

JOHN GORTON DRIVE

EXISTING JOHN GORTON DRIVE / HOLBOROW AVENUE / EWA INTERSECTION

CONTROL LINE MC711

CONTROL LINE MC710

MOLONGLO BLOCK 10 SECTION 2

MOLONGLO BLOCK 10 SECTION 2

BULK WATER SUPPLY MAINS PROTECTION SLAB

MOLONGLO VALLEY TO CITY TRUNK CYCLEWAY

LIMIT OF WORKS

R 466.000
R 460.000
R -494.000
R -500.000

TP 288.647
SAG 402.246
TP 464.501
CREST 598.990
TP 622.800
TP 787.408
SAG 400.783
TP 462.236
CREST 605.400
TP 620.536
TP 787.143

JOINS SHEET 2

NOTE:
FOR GENERAL NOTES & LEGEND REFER DRG 3002754-0702

NOT FOR CONSTRUCTION

DRAWING FILE LOCATION / NAME
V:_Vault\Projects\3002\3002754\110_CADD\CAD\DWG\02_OPTION_07\3002754-0721.dwg

PLOT DATE 09 Mar 2021 TIME 14:59:43

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X_2754_ENVIRO_BNT
X_2754_ENVIRO_GRASSLAND
X_2754_ENVIRO_THREAT_WOODLAND
X_2754_ENVIRO_THREAT_FAUNA
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X_2754_LIMS_ACTMAP_2020
X_2754_ENVIRO_PAD1
X_2754_DES_OPT7
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X_2754_SHT_TXT_OPT7
X_2754_DES_CAD_OPT7
X_2754_ALIGN_OPT7
X_2754_OPT7_NOTE_GA
X_EWA_NOISE

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
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02	09.03.2021	ISSUED FOR FINAL SUBMISSION	WVR 003	D.T.

TITLE	NAME
DRAFTER	C. DAWSON
DRAFTING CHECK	K. CURLEY
DESIGNER	M. WATSON
DESIGN CHECK	TBC
PROJECT MANAGER	D. TONGE
PROJECT DIRECTOR	D. KEEP

SCALES AT A1 SIZE DRAWING
SCALE 1:1000 10 0 10 20 30 40 50 m

DESIGNER
SMEC
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SUITE 2, LEVEL 1, 243 NORTHBOURNE AVENUE
LYNEHAM ACT 2602 AUSTRALIA
SMEC PROJECT No 3002754

CLIENT
ACT Government
Environment, Planning and Sustainable Development

PROJECT TITLE
MOLONGLO EAST WEST ARTERIAL FEASIBILITY STUDY

GENERAL ARRANGEMENT PLAN SHEET 1

SCALE	PHASE	PROJECT / DRAWING No.	REVISION
AS SHOWN	FEASIBILITY STUDY	3002754-0721	02

A1 150 mm ON ORIGINAL

MOLONGLO BLOCK 10 SECTION 2

MOLONGLO BLOCK 3 SECTION 2

COTNROL LINE MC711

CONTROL LINE MC710

MOLONGLO BLOCK 3 SECTION 2

MOLONGLO VALLEY TO CITY TRUNK CYCLEWAY

JOINS SHEET 1

JOINS SHEET 3

R -494.000

R -500.000

R -394.000

R -400.000

TP 787.408

TP 787.143

SAG 1003.419

SAG 1011.938

TP 1127.073

TP 1126.808

TP 1198.691

TP 1199.517

CREST 1243.132

CREST 1243.958

NOTE:
FOR GENERAL NOTES & LEGEND REFER DRG 3002754-0702

NOT FOR CONSTRUCTION

DRAWING FILE LOCATION / NAME
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PLOT DATE 09 Mar 2021 TIME 15:00:48

EXTERNAL REFERENCE FILES
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X-2754_ENVIRO_BNT
X-2754_ENVIRO_GRASSLAND
X-2754_ENVIRO_NATIVES
X-2754_ENVIRO_THREAT_WOODLAND
X-2754_ENVIRO_THREAT_FAUNA
X-CSD_MOLONGLOVALLEY
X-2754_LTO_A
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X-2754_OPT7_NOTE_GA
X-EWA_NOISE

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
01	17.12.2020	DRAFT SUBMISSION FOR CLIENT REVIEW	WVR 002	D.T.
02	09.03.2021	ISSUED FOR FINAL SUBMISSION	WVR 003	D.T.

TITLE	NAME
DRAFTER	C. DAWSON
DRAFTING CHECK	K. CURLEY
DESIGNER	M. WATSON
DESIGN CHECK	TBC
PROJECT MANAGER	D. TONGE
PROJECT DIRECTOR	D. KEEP

SCALES AT A1 SIZE DRAWING
SCALE 1:1000 10 0 10 20 30 40 50 m

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SMEC PROJECT No 3002754

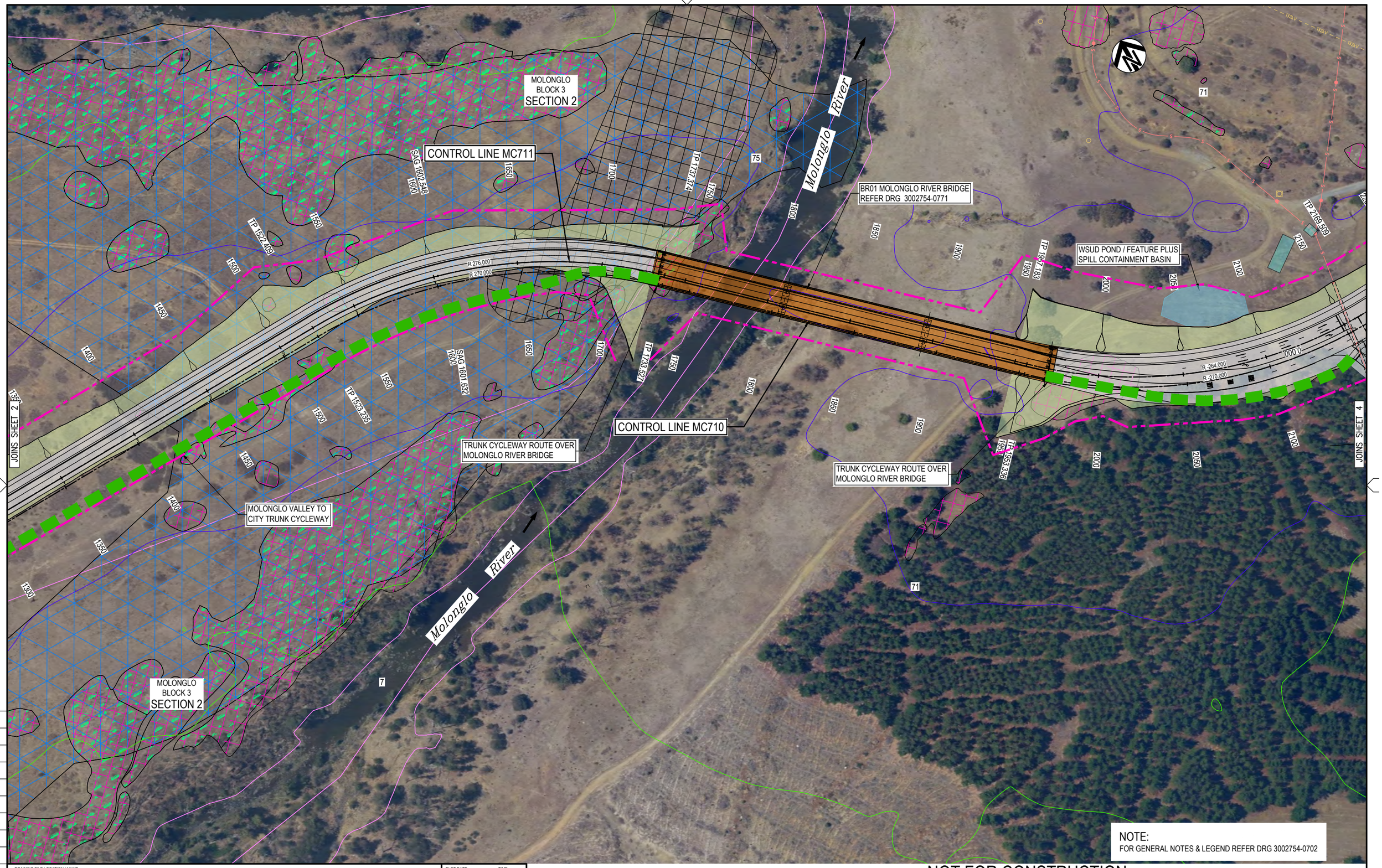
CLIENT
ACT Government
Environment, Planning and Sustainable Development

PROJECT TITLE
MOLONGLO EAST WEST ARTERIAL FEASIBILITY STUDY

GENERAL ARRANGEMENT PLAN SHEET 2

SCALE	PHASE	PROJECT / DRAWING No.	REVISION
AS SHOWN	FEASIBILITY STUDY	3002754-0722	02

150 mm ON ORIGINAL
A1



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PLOT DATE 09 Mar 2021 TIME 15:01:53

NOT FOR CONSTRUCTION

EXTERNAL REFERENCE FILES
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X_2754_ENVIRO_WOODLAND_HERBS
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X_2754_SHT_TXT_OPT7
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X_2754_SHT_TXT_OPT7
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X_EWA_NOISE
X_2754_OPT_STAGGER_T
X_BNG_Molonglo_Plan

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
01	17.12.2020	DRAFT SUBMISSION FOR CLIENT REVIEW	WVR 002	D.T.
02	09.03.2021	ISSUED FOR FINAL SUBMISSION	WVR 003	D.T.

TITLE	NAME
DRAFTER	C. DAWSON
DRAFTING CHECK	K. CURLEY
DESIGNER	M. WATSON
DESIGN CHECK	TBC
PROJECT MANAGER	D. TONGE
PROJECT DIRECTOR	D. KEEP

SCALES AT A1 SIZE DRAWING
SCALE 1:1000 10 0 10 20 30 40 50 m

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SUITE 2, LEVEL 1, 243 NORTHBOURNE AVENUE
LYNEHAM ACT 2602 AUSTRALIA
SMEC PROJECT No 3002754

CLIENT
ACT Government
Environment, Planning and Sustainable Development

PROJECT TITLE
MOLONGLO EAST WEST ARTERIAL FEASIBILITY STUDY

GENERAL ARRANGEMENT PLAN SHEET 3

SCALE	PHASE	PROJECT / DRAWING No.	REVISION
AS SHOWN	FEASIBILITY STUDY	3002754-0723	02

A1 150 mm ON ORIGINAL

CONTROL LINE MCN7

MOLONGLO 3 EAST CONNECTOR ROAD (NORTH)

MOLONGLO BLOCK 3 SECTION 2

SIGNALISED INTERSECTION WITH THE MOLONGLO 3 CONNECTOR ROAD (NORTH)

CONTROL LINE MC711

PROPOSED MVIS VENTILATION FACILITY (DESIGN IN PROGRESS BY OTHERS)

JOINS SHEET 3

JOINS SHEET 6

SIGNALISED INTERSECTION WITH THE MOLONGLO 3 CONNECTOR ROAD (SOUTH)

CONTROL LINE MC710

MOLONGLO 3 EAST CONNECTOR ROAD (SOUTH)

MOLONGLO VALLEY TO CITY TRUNK CYCLEWAY

CONTROL LINE MCS7

MOLONGLO BLOCK 3 SECTION 2

6.0m WIDE x 3.5m HIGH CONCRETE BOX CULVERT RIVER ROAD UNDERPASS

132KV UNDERGROUND (DESIGN IN PROGRESS BY OTHERS)

NOTE:
FOR GENERAL NOTES & LEGEND REFER DRG 3002754-0702

NOT FOR CONSTRUCTION

150 mm ON ORIGINAL

A1

DRAWING FILE LOCATION / NAME
V:_Vault\Projects\3002\3002754\110_CADD\CAD\DWG\02_OPTION_07\3002754-0724.dwg

PLOT DATE 09 Mar 2021 TIME 15:03:00

EXTERNAL REFERENCE FILES
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X_2754_SURVX_01A
X_2754_SURVX_01B
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X_2754_ENVIRO_BNT
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X_2754_ENVIRO_WOODLAND_WEEDS
X_2754_ENVIRO_THREAT_WOODLAND
X_2754_ENVIRO_THREAT_FAUNA
X_CAD_MOLONGLOVALLEY
X_2754_LIMS_ACTMAP_2020
X_2754_ENVIRO_PAD1
X_2754_DES_CTRL_OPT7
X_2754_DES_ALIGN_OPT7
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X_2754_PAV_OPT7
X_2754_SIGN_OPT7
X_2754_OPT7_NOTE_GA
X_EWA_NOISE
X_2754_OPT_STAGGER_T

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
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DRAFTER	C. DAWSON
DRAFTING CHECK	K. CURLEY
DESIGNER	M. WATSON
DESIGN CHECK	TBC
PROJECT MANAGER	D. TONGE
PROJECT DIRECTOR	D. KEEP

SCALES AT A1 SIZE DRAWING
SCALE 1:1000 10 0 10 20 30 40 50 m

DESIGNER
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SMEC PROJECT No 3002754

CLIENT
ACT Government
Environment, Planning and Sustainable Development

PROJECT TITLE
MOLONGLO EAST WEST ARTERIAL FEASIBILITY STUDY

GENERAL ARRANGEMENT PLAN SHEET 4

SCALE	PHASE	PROJECT / DRAWING No.	REVISION
AS SHOWN	FEASIBILITY STUDY	3002754-0724	02

NATIONAL ZOO AND AQUARIUM

MOLONGLO VALLEY TO CITY TRUNK CYCLEWAY TO CONTINUE TO CITY IN TUGGERANONG PARKWAY EASTERN VERGE (ALIGNMENT TO BE CONFIRMED)

CONTROL LINE MC711

TUGGERANONG PARKWAY - EAST WEST ARTERIAL INTERCHANGE SOUTHBOUND EXIT RAMP

MOLONGLO VALLEY TO CITY TRUNK CYCLEWAY

26 OR 27

JOINS SHEET

JOINS SHEET 6

EXISTING UNDERPASS

NATIONAL ARBORETUM

TUGGERANONG PARKWAY

TUGGERANONG PARKWAY FUTURE 3rd NORTHBOUND LANE (SEPARATE PROJECT)

TUGGERANONG PARKWAY

NOTE:
FOR GENERAL NOTES & LEGEND REFER DRG 3002754-0702

NOT FOR CONSTRUCTION

150 mm ON ORIGINAL

A1

DRAWING FILE LOCATION / NAME: V:_Vault\Projects\3002\3002754\110_CADD\CAD\DWG\02_OPTION_07\3002754-0725.dwg

PLOT DATE: 09 Mar 2021 TIME: 15:04:07

EXTERNAL REFERENCE FILES:
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X_2754_SURVX_01A
X_2754_SURVX_01B
X_2754_SURVX_02
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X_2754_CADD_GRID
X_2754_ENVRO_CONSTRAINTS
X_2754_ENVRO_BNT
X_2754_ENVRO_GRASSLAND
X_2754_ENVRO_NATIVES
X_2754_ENVRO_THREAT_WOODLAND
X_2754_ENVRO_THREAT_FAUNA
XCADMOLONGLOVALLEY
X_2754_LTA
X_2754_IMG_ACTMAP_2020
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X_2754_SHT_TXT_OPT7
X_2754_RAIL_OPT7
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X_2754_OPT7_NOTE_GA
XEWA_NOISE

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
01	17.12.2020	DRAFT SUBMISSION FOR CLIENT REVIEW	WVR 002	D.T.
02	09.03.2021	ISSUED FOR FINAL SUBMISSION	WVR 003	D.T.

TITLE	NAME
DRAFTER	C. DAWSON
DRAFTING CHECK	K. CURLEY
DESIGNER	M. WATSON
DESIGN CHECK	TBC
PROJECT MANAGER	D. TONGE
PROJECT DIRECTOR	D. KEEP

SCALES AT A1 SIZE DRAWING

SCALE 1:1000 10 0 10 20 30 40 50 m

DESIGNER
SMEC
Member of the Surbana Jurong Group
SMEC AUSTRALIA PTY LTD
© ABN 47 065 475 149
SUITE 2, LEVEL 1, 243 NORTHBOURNE AVENUE
LYNEHAM ACT 2602 AUSTRALIA
SMEC PROJECT No 3002754

CLIENT
ACT Government
Environment, Planning and Sustainable Development

PROJECT TITLE
MOLONGLO EAST WEST ARTERIAL FEASIBILITY STUDY

GENERAL ARRANGEMENT PLAN SHEET 5

SCALE	PHASE	PROJECT / DRAWING No.	REVISION
AS SHOWN	FEASIBILITY STUDY	3002754-0725	02

CONTROL LINE MC710

TUGGERANONG PARKWAY - EAST WEST ARTERIAL INTERCHANGE SOUTHBOUND EXIT RAMP

MOLONGLO VALLEY TO CITY TRUNK CYCLEWAY

TRUNK CYCLEWAY ROUTE OVER TUGGERANONG PARKWAY INTERCHANGE BRIDGE

BR02 TUGGERANONG PARKWAY OVERPASS EAST WEST ARTERIAL INTERCHANGE

TUGGERANONG PARKWAY - EAST WEST ARTERIAL INTERCHANGE SOUTHBOUND TWO LANE LOOP ENTRY RAMP

CONTROL LINE MC711

TRUNK CYCLEWAY ROUTE OVER TUGGERANONG PARKWAY INTERCHANGE BRIDGE

JOINS SHEET 5

JOINS SHEET 7

TUGGERANONG PARKWAY FUTURE 3rd NORTHBOUND LANE (SEPARATE PROJECT)

TUGGERANONG PARKWAY

TUGGERANONG PARKWAY FUTURE 3rd NORTHBOUND LANE (SEPARATE PROJECT)

CONTROL LINE MC7NBE

TUGGERANONG PARKWAY - EAST WEST ARTERIAL INTERCHANGE NORTHBOUND ENTRY RAMP

CONTROL LINE MC7NBX

POTENTIAL ADDITIONAL ARBORETUM PLANTING / TREE RELOCATION ZONE

POTENTIAL ADDITIONAL ARBORETUM PLANTING / TREE RELOCATION ZONE

MOLONGLO BLOCK 3 SECTION 2

CONTROL LINE MC711

JOINS SHEET 4

NOTE:
FOR GENERAL NOTES & LEGEND REFER DRG 3002754-0702

NOT FOR CONSTRUCTION

DRAWING FILE LOCATION / NAME	V:_Vault\Projects\3002\3002754\110_CADD\CAD\DWG\02_OPTION_07\3002754-0726.dwg
PLOT DATE	09 Mar 2021
TIME	15:05:14

EXTERNAL REFERENCE FILES
X-3002754_SMEC_sf
X-2754_SURVX_00
X-2754_SURVX_00TM
X-2754_ENVIRO_CONSTRAINTS
X:CAD:MOLONGLOVALLEY
X-2754_UTILX
X-2754_UTIL_CTAMP_2020
X-2754_DES_OPT7
X-2754_DES_CTRL_OPT7
X-2754_SHT_TXT_OPT7
X-2754_DES_CUT_OPT7
X-2754_PAV_OPT7
X-2754_DES_PWY_EW_3rd_LN
X-2754_OPT7_NOTE_GA
X-2754_SURVX_00
X-2754_SURVX_01A
X-2754_SURVX_01B
X-2754_SURVX_02
X-2754_SURVX_04
X-2754_ENVIRO_BNT
X-2754_ENVIRO_GRASSLAND
X-2754_ENVIRO_TREES
X-2754_ENVIRO_THREAT_WOODLAND
X-2754_ENVIRO_THREAT_FAUNA
X-2754_ENVIRO_PAD1

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
01	17.12.2020	DRAFT SUBMISSION FOR CLIENT REVIEW	WVR 002	D.T.
02	09.03.2021	ISSUED FOR FINAL SUBMISSION	WVR 003	D.T.

TITLE	NAME
DRAFTER	C. DAWSON
DRAFTING CHECK	K. CURLEY
DESIGNER	M. WATSON
DESIGN CHECK	TBC
PROJECT MANAGER	D. TONGE
PROJECT DIRECTOR	D. KEEP

SCALES AT A1 SIZE DRAWING

SCALE 1:1000 10 0 10 20 30 40 50 m

DESIGNER

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LYNEHAM ACT 2602 AUSTRALIA
SMEC PROJECT No 3002754

CLIENT

ACT Government
Environment, Planning and Sustainable Development

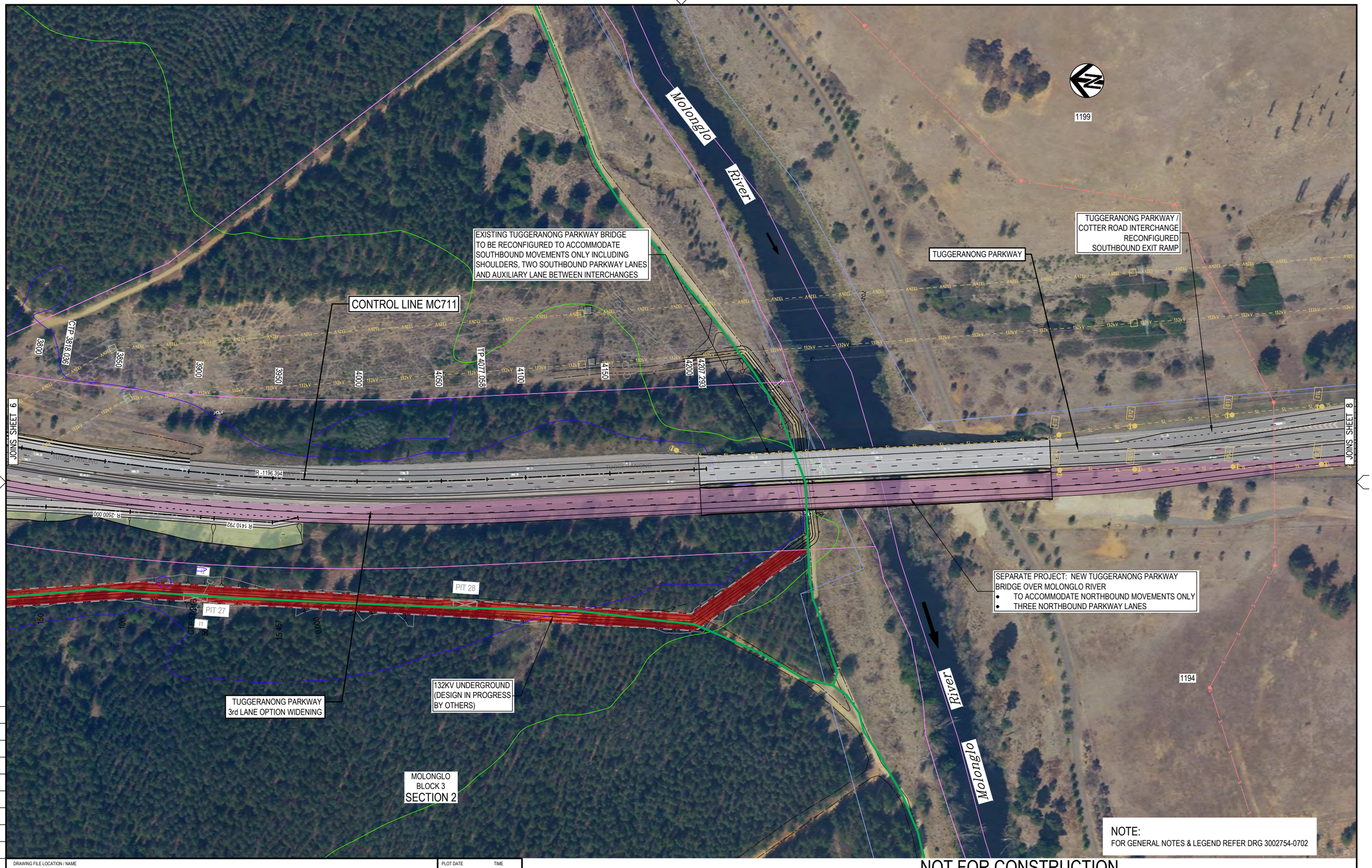
PROJECT TITLE

MOLONGLO EAST WEST ARTERIAL FEASIBILITY STUDY

GENERAL ARRANGEMENT PLAN SHEET 6

SCALE	PHASE	PROJECT / DRAWING No.	REVISION
AS SHOWN	FEASIBILITY STUDY	3002754-0726	02

150 mm ON ORIGINAL
A1



NOT FOR CONSTRUCTION

DRAWING FILE LOCATION / NAME: V:_Vault\Projects\3002\3002754\I110_CADD\CAD\DWG\02_OPTION_07\3002754-0727.dwg

PLOT DATE: 09 Mar 2021 TIME: 15:06:20

EXTERNAL REFERENCE FILES: X_3002754_SMEC_a1, X_2754_SURVK_00, X_2754_SURVK_01A, X_2754_SURVK_01B, X_2754_SURVK_02, X_2754_SURVK_01C, X_2754_CADD_MAIN, X_2754_ENVIRO CONSTRAINTS, X_2754_ENVIRO_BNT, X_2754_ENVIRO_GRASSLAND, X_2754_ENVIRO_GRASSLAND WOODLAND, X_2754_ENVIRO_THREAT_WOODLAND, X_2754_ENVIRO_THREAT_FAUNA, X_CQG MOLONGLOVALLEY, X_2754_IMS_ALT, X_2754_IMS_ACTMAP_2020, X_2754_ENVIRO_PAD1, X_2754_DES_OPT7, X_2754_DES_OPT7_OPT7, X_2754_SHT_TXT_OPT7, X_2754_DES_CAD_OPT7, X_2754_DES_PWY_OPT7, X_2754_DES_PWY_EW_3rd_LN, X_2754_OPT7_NOTE_GA, X_EWA_NOISE

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
01	17.12.2020	DRAFT SUBMISSION FOR CLIENT REVIEW	WVR 002	D.T.
02	09.03.2021	ISSUED FOR FINAL SUBMISSION	WVR 003	D.T.

TITLE	NAME
DRAFTER	C. DAWSON
DRAFTING CHECK	K. CURLEY
DESIGNER	M. WATSON
DESIGN CHECK	TBC
PROJECT MANAGER	D. TONGE
PROJECT DIRECTOR	D. KEEP

SCALES AT A1 SIZE DRAWING: SCALE 1:1000 (10 0 10 20 30 40 50 m)

DESIGNER: SMEC — Member of the Surbana Jurong Group
SMEC AUSTRALIA PTY LTD
© ABN 47 065 475 149
SUITE 2, LEVEL 1, 243 NORTHBOURNE AVENUE
LYNEHAM ACT 2602 AUSTRALIA
SMEC PROJECT No 3002754

CLIENT: ACT Government — Environment, Planning and Sustainable Development

PROJECT TITLE: MOLONGLO EAST WEST ARTERIAL FEASIBILITY STUDY

GENERAL ARRANGEMENT PLAN SHEET 7

SCALE	PHASE	PROJECT / DRAWING No.	REVISION
AS SHOWN	FEASIBILITY STUDY	3002754-0727	02

A1 150 mm ON ORIGINAL

DRAWING FILE LOCATION / NAME: V:_Vault\Projects\3002\3002754\110_CADD\CAD\DWG\02_OPTION_07\3002754-0728.dwg

PLOT DATE: 09 Mar 2021 TIME: 15:07:25

NOT FOR CONSTRUCTION

EXTERNAL REFERENCE FILES:
- 3002754_SMEC_a1
- X:2754_SURVX_00
- X:2754_SURVX_01A
- X:2754_SURVX_01B
- X:2754_SURVX_02
- X:2754_SURVX_01C
- X:2754_CADD_GRID
- X:2754_ENVIRO_CONSTRAINTS
- X:2754_ENVIRO_BNT
- X:2754_ENVIRO_GRASSLAND
- X:2754_ENVIRO_NAT_WOODLAND
- X:2754_ENVIRO_THREAT_WOODLAND
- X:2754_ENVIRO_THREAT_FAUNA
- X:CADD\MOLONGLOVALLEY
- X:2754_LTA
- X:2754_IMG_ACTMAP_2020
- X:2754_ENVIRO_PADI
- X:2754_DES_OPT1
- X:2754_DES_OPT7
- X:2754_DES_CAD_OPT7
- X:2754_PAV_OPT7
- X:2754_PAV_FEH_3rd_LN
- X:2754_SHT_TXT_OPT7
- X:2754_OPT7_NOTE_GA
- X:EWA_NOISE

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
01	17.12.2020	DRAFT SUBMISSION FOR CLIENT REVIEW	WVR 002	D.T.
02	09.03.2021	ISSUED FOR FINAL SUBMISSION	WVR 003	D.T.

TITLE	NAME
DRAFTER	C. DAWSON
DRAFTING CHECK	K. CURLEY
DESIGNER	M. WATSON
DESIGN CHECK	TBC
PROJECT MANAGER	D. TONGE
PROJECT DIRECTOR	D. KEEP

SCALES AT A1 SIZE DRAWING

SCALE 1:1000 (10 0 10 20 30 40 50 m)

DESIGNER
SMEC
Member of the Surbana Jurong Group
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LYNEHAM ACT 2602 AUSTRALIA
SMEC PROJECT No 3002754

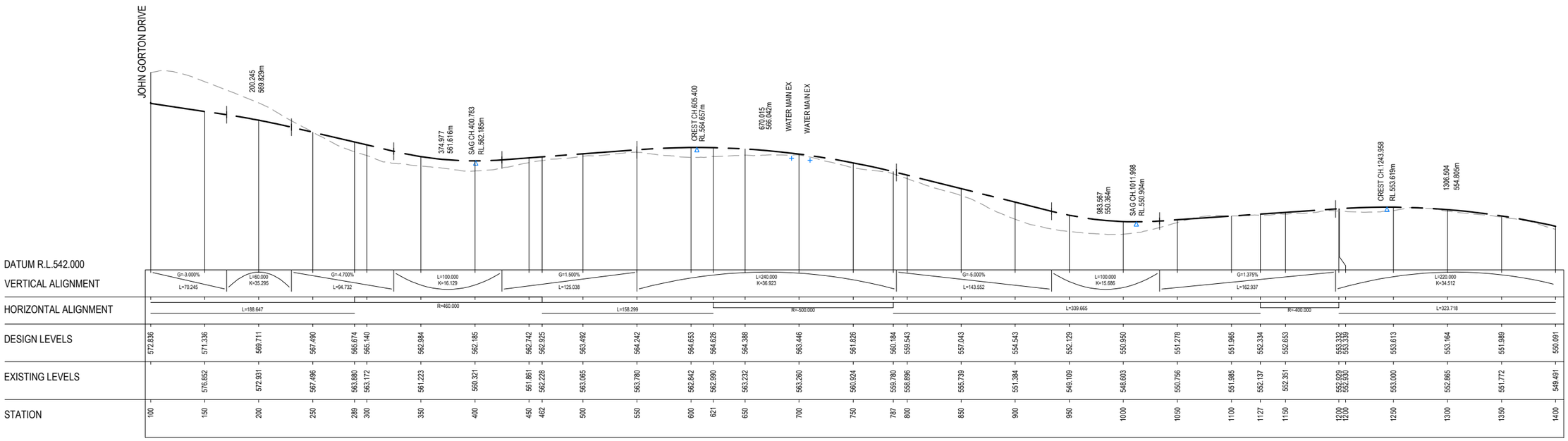
CLIENT
ACT Government
Environment, Planning and Sustainable Development

PROJECT TITLE
MOLONGLO EAST WEST ARTERIAL FEASIBILITY STUDY

GENERAL ARRANGEMENT PLAN
SHEET 8

SCALE	PHASE	PROJECT / DRAWING No.	REVISION
AS SHOWN	FEASIBILITY STUDY	3002754-0728	02

A1 150 mm ON ORIGINAL



LONGITUDINAL SECTION ALONG CONTROL MC710

NOT FOR CONSTRUCTION

DRAWING FILE LOCATION / NAME	PLOT DATE	TIME
V:_Vault\Projects\3002\3002754\110_CADD\CAD\DWG\02_OPTION_07\3002754-0741.dwg	09 Mar 2021	15:07:57

EXTERNAL REFERENCE FILES
K_3002754_SMEC_d1 K_2754_LS_MC710_01

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
01	17.12.2020	DRAFT SUBMISSION FOR CLIENT REVIEW	WVR 002	D.T.
02	09.03.2021	ISSUED FOR FINAL SUBMISSION	WVR 003	D.T.

TITLE	NAME
DRAFTER	C. DAWSON
DRAFTING CHECK	K. CURLEY
DESIGNER	M. WATSON
DESIGN CHECK	TBC
PROJECT MANAGER	D. TONGE
PROJECT DIRECTOR	D. KEEP

SCALES AT A1 SIZE DRAWING

HORZ 1:2000 20 0 20 40 60 80 100m
VERT 1:400 4 0 4 8 12 16 20 m

DESIGNER
SMEC
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SUITE 2, LEVEL 1, 243 NORTHBOURNE AVENUE
LYNEHAM ACT 2602 AUSTRALIA
SMEC PROJECT No 3002754

CLIENT
ACT Government
Environment, Planning and Sustainable Development

PROJECT TITLE
MOLONGLO EAST WEST ARTERIAL FEASIBILITY STUDY
WESTBOUND ALIGNMENT
LONGITUDINAL SECTON CONTROL LINE MC710
SHEET 1

SCALE	PHASE	PROJECT / DRAWING No.	REVISION
AS SHOWN	FEASIBILITY STUDY	3002754-0741	02

A1 150 mm ON ORIGINAL
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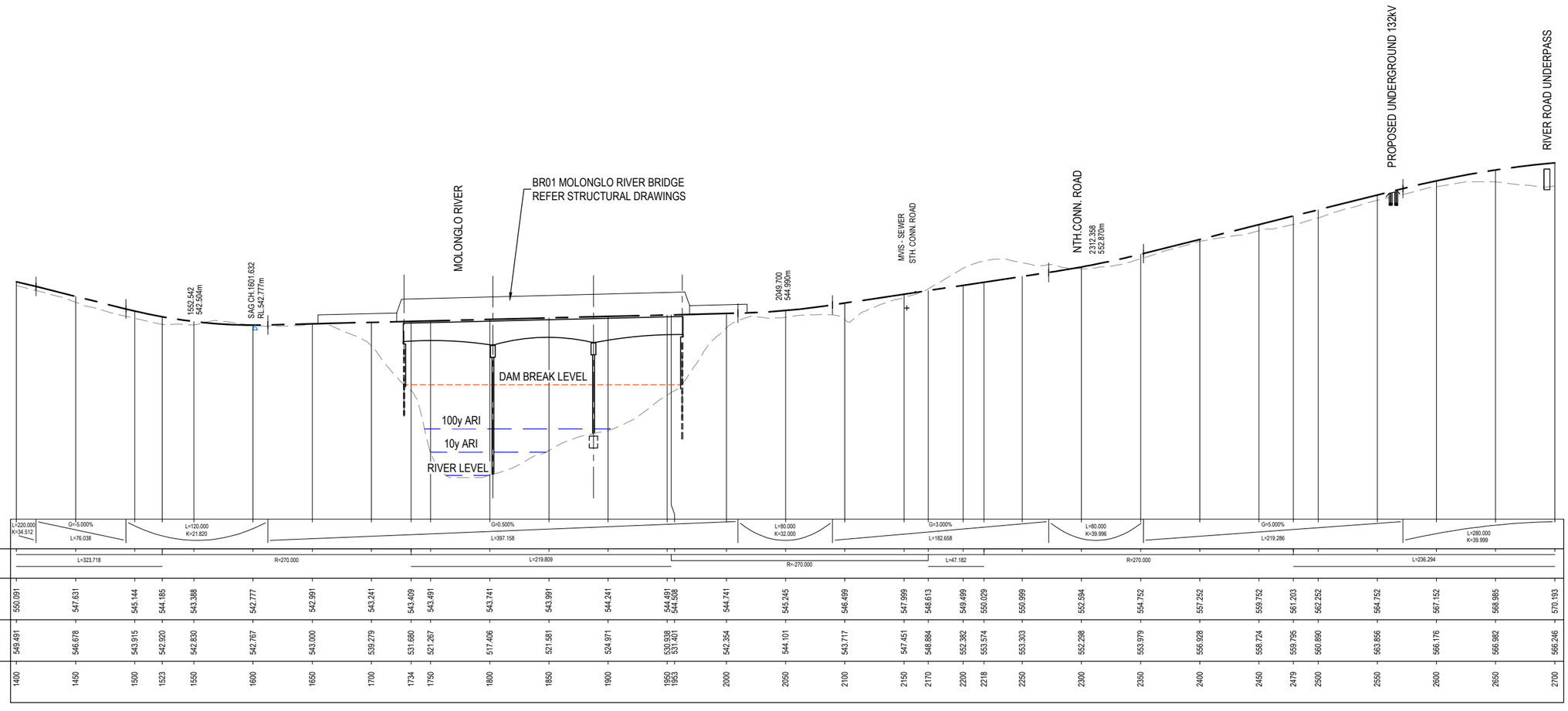


LONGITUDINAL SECTION ALONG - MC710 - WESTBOUND CONTROL

NOT FOR CONSTRUCTION

DRAWING FILE LOCATION / NAME	V:_Vault\Projects\3002\3002754\110_CADD\CAD\DWG\02_OPTION_07\3002754-0742.dwg
PLOT DATE / TIME	09 Mar 2021 15:08:21
EXTERNAL REFERENCE FILES	K_3002754_SMEC_xt1 K_2754_LS_MC710_02

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
01	17.12.2020	DRAFT SUBMISSION FOR CLIENT REVIEW	WVR 002	D.T.
02	09.03.2021	ISSUED FOR FINAL SUBMISSION	WVR 003	D.T.

TITLE	NAME
DRAFTER	C. DAWSON
DRAFTING CHECK	K. CURLEY
DESIGNER	M. WATSON
DESIGN CHECK	TBC
PROJECT MANAGER	D. TONGE
PROJECT DIRECTOR	D. KEEP

SCALES AT A1 SIZE DRAWING

HORZ 1:2000 VERT 1:400

20 0 20 40 60 80 100m
4 0 4 8 12 16 20 m

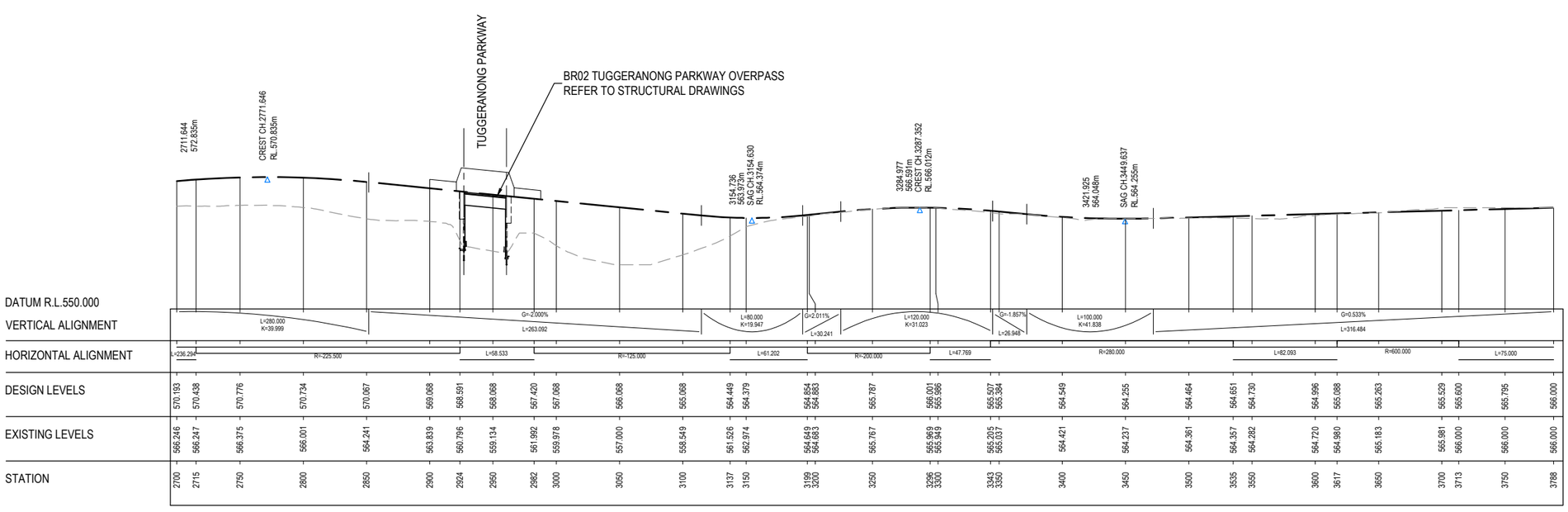
DESIGNER
SMEC
Member of the Surbana Jurong Group
SMEC AUSTRALIA PTY LTD
© ABN 47 065 475 149
SUITE 2, LEVEL 1, 243 NORTHBOURNE AVENUE
LYNEHAM ACT 2602 AUSTRALIA
SMEC PROJECT No 3002754

CLIENT
ACT Government
Environment, Planning and Sustainable Development

PROJECT TITLE
MOLONGLO EAST WEST ARTERIAL FEASIBILITY STUDY
WESTBOUND ALIGNMENT
LONGITUDINAL SECTON CONTROL LINE MC710
SHEET 2

SCALE	PHASE	PROJECT / DRAWING No.	REVISION
AS SHOWN	FEASIBILITY STUDY	3002754-0742	02

A1 150 mm ON ORIGINAL



LONGITUDINAL SECTION ALONG - MC710 - WESTBOUND CONTROL

NOT FOR CONSTRUCTION

DRAWING FILE LOCATION / NAME	PLOT DATE	TIME
V:_Vault\Projects\3002\3002754\110_CADD\CAD\DWG\02_OPTION_07\3002754-0743.dwg	09 Mar 2021	15:08:44

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	01	17.12.2020	DRAFT SUBMISSION FOR CLIENT REVIEW	WVR 002	D.T.
	02	09.03.2021	ISSUED FOR FINAL SUBMISSION	WVR 003	D.T.

TITLE	NAME
DRAFTER	C. DAWSON
DRAFTING CHECK	K. CURLEY
DESIGNER	M. WATSON
DESIGN CHECK	TBC
PROJECT MANAGER	D. TONGE
PROJECT DIRECTOR	D. KEEP

SCALES AT A1 SIZE DRAWING

HORZ 1:2000 VERT 1:400

20 0 20 40 60 80 100m
4 0 4 8 12 16 20 m

DESIGNER
SMEC
Member of the Surbana Jurong Group
SMEC AUSTRALIA PTY LTD
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SUITE 2, LEVEL 1, 243 NORTHBOURNE AVENUE
LYNEHAM ACT 2602 AUSTRALIA
SMEC PROJECT No 3002754

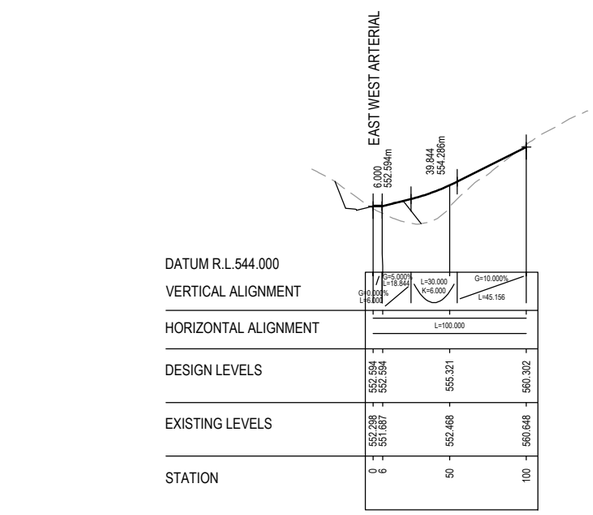
CLIENT
ACT Government
Environment, Planning and Sustainable Development

PROJECT TITLE
MOLONGLO EAST WEST ARTERIAL FEASIBILITY STUDY
WESTBOUND ALIGNMENT
LONGITUDINAL SECTON CONTROL LINE MC710
SHEET 3

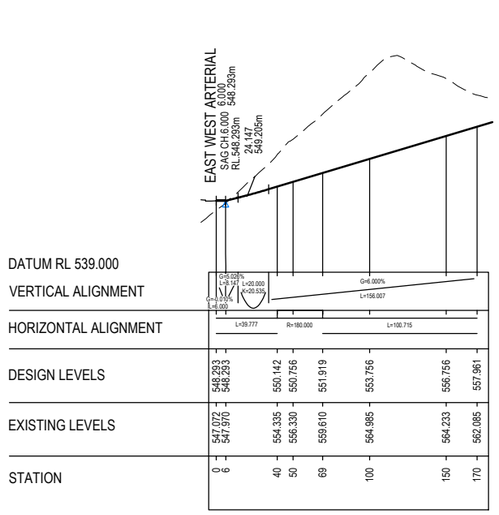
SCALE	PHASE	PROJECT / DRAWING No.	REVISION
AS SHOWN	FEASIBILITY STUDY	3002754-0743	02

X_3002754_SMEC.stl
X_2754_LS_MC710_03

150 mm ON ORIGINAL
A1



LONGITUDINAL SECTION - MCN7



LONGITUDINAL SECTION - MCS7

NOT FOR CONSTRUCTION

DRAWING FILE LOCATION / NAME	PLOT DATE	TIME
V:_Vault\Projects\3002\3002754\110_CADD\CAD\DWG\02_OPTION_07\3002754-0744.dwg	09 Mar 2021	15:09:08

EXTERNAL REFERENCE FILES
K_3002754_SMEC_d1
K_2754_LS_MCN7
K_2754_LS_MCS7

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
01	17.12.2020	DRAFT SUBMISSION FOR CLIENT REVIEW	WVR 002	D.T.
02	09.03.2021	ISSUED FOR FINAL SUBMISSION	WVR 003	D.T.

TITLE	NAME
DRAFTER	M. HUGHES
DRAFTING CHECK	K. CURLEY
DESIGNER	M. WATSON
DESIGN CHECK	TBC
PROJECT MANAGER	D. TONGE
PROJECT DIRECTOR	D. KEEP

SCALES AT A1 SIZE DRAWING

HORZ 1:2000 20 0 20 40 60 80 100m
VERT 1:400 4 0 4 8 12 16 20 m

DESIGNER
SMEC
Member of the Surbana Jurong Group
SMEC AUSTRALIA PTY LTD
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SUITE 2, LEVEL 1, 243 NORTHBOURNE AVENUE
LYNEHAM ACT 2602 AUSTRALIA
SMEC PROJECT No 3002754

CLIENT
ACT Government
Environment, Planning and Sustainable Development

PROJECT TITLE
MOLONGLO EAST WEST ARTERIAL
FEASIBILITY STUDY
LONGITUDINAL SECTION
CONTROL LINES MCN7 AND MCS7

SCALE	PHASE	PROJECT / DRAWING No.	REVISION
AS SHOWN	FEASIBILITY STUDY	3002754-0744	02

A1 150 mm ON ORIGINAL
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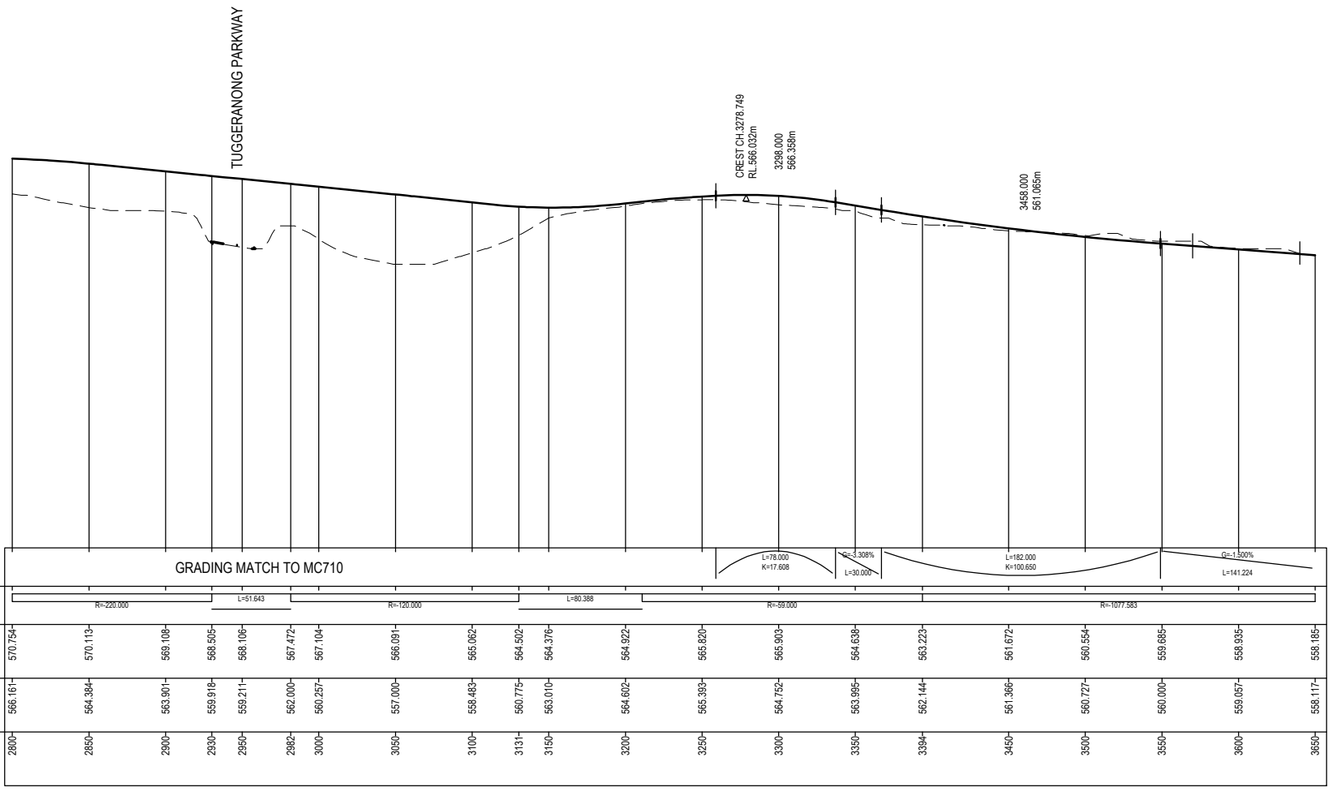


LONGITUDINAL SECTION ALONG CONTROL MC711

DRAWING FILE LOCATION / NAME: V:_Vault\Projects\3002\3002754\110_CADD\CAD\DWG\02_OPTION_07\3002754-0745.dwg

PLOT DATE: 09 Mar 2021 TIME: 15:09:31

NOT FOR CONSTRUCTION

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
X_3002754_SMEC.xlt X_2754_LS_OPT_07 MC711_01	01	09.03.2021	ISSUED FOR FINAL SUBMISSION	WVR 003	D.T.

TITLE	NAME
DRAFTER	C. DAWSON
DRAFTING CHECK	K. CURLEY
DESIGNER	M. WATSON
DESIGN CHECK	TBC
PROJECT MANAGER	D. TONGE
PROJECT DIRECTOR	D. KEEP

SCALES AT A1 SIZE DRAWING

HORZ 1:2000 VERT 1:400

20 0 20 40 60 80 100m
4 0 4 8 12 16 20 m

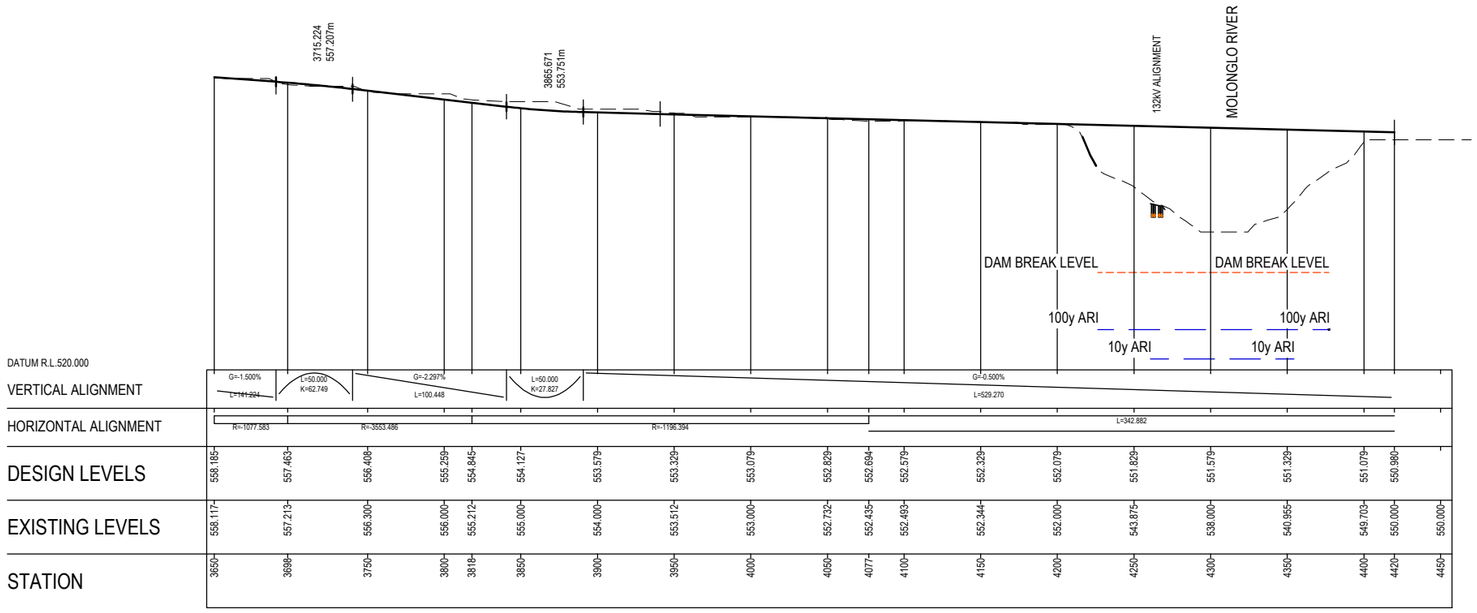
DESIGNER
SMEC
Member of the Surbana Jurong Group
SMEC AUSTRALIA PTY LTD
© ABN 47 065 475 149
SUITE 2, LEVEL 1, 243 NORTHBOURNE AVENUE
LYNEHAM ACT 2602 AUSTRALIA
SMEC PROJECT No 3002754

CLIENT
ACT Government
Environment, Planning and Sustainable Development

PROJECT TITLE
MOLONGLO EAST WEST ARTERIAL
FEASIBILITY STUDY
EASTBOUND ALIGNMENT
LONGITUDINAL SECTON CONTROL LINE MC711
SHEET 1

SCALE	PHASE	PROJECT / DRAWING No.	REVISION
AS SHOWN	FEASIBILITY STUDY	3002754-0745	01

150 mm ON ORIGINAL
A1
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



LONGITUDINAL SECTION ALONG CONTROL MC711

NOT FOR CONSTRUCTION

DRAWING FILE LOCATION / NAME: V:_Vault\Projects\3002\3002754\110_CADD\CAD\DWG\02_OPTION_07\3002754-0746.dwg					PLOT DATE: 09 Mar 2021	TIME: 15:09:55	
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	TITLE	NAME
X_3002754_SMEC.ctt X_2754_LS_GPT_07 MC711_02	01	09.03.2021	ISSUED FOR FINAL SUBMISSION	WVR 003	D.T.	DRAFTER	C. DAWSON
						DRAFTING CHECK	K. CURLEY
						DESIGNER	M. WATSON
						DESIGN CHECK	TBC
						PROJECT MANAGER	D. TONGE
						PROJECT DIRECTOR	D. KEEP

SCALES AT A1 SIZE DRAWING

HORZ 1:2000 VERT 1:400

20 0 20 40 60 80 100m
4 0 4 8 12 16 20 m

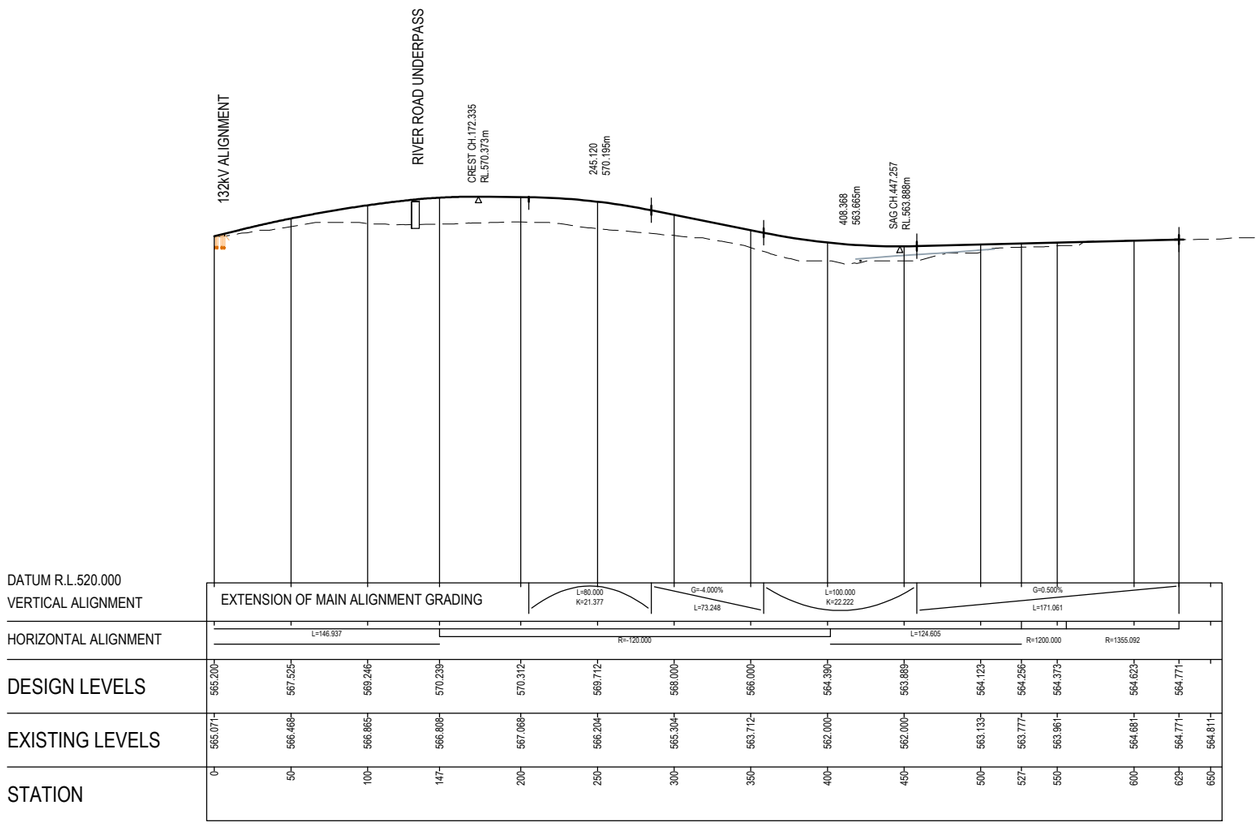
DESIGNER
SMEC
Member of the Surbana Jurong Group
SMEC AUSTRALIA PTY LTD
ABN 47 065 475 149
SUITE 2, LEVEL 1, 243 NORTHBOURNE AVENUE
LYNEHAM ACT 2602 AUSTRALIA
SMEC PROJECT No 3002754

CLIENT
ACT Government
Environment, Planning and Sustainable Development

PROJECT TITLE
MOLONGLO EAST WEST ARTERIAL FEASIBILITY STUDY
EASTBOUND ALIGNMENT
LONGITUDINAL SECTON CONTROL LINE MC711
SHEET 2

SCALE	PHASE	PROJECT / DRAWING No.	REVISION
AS SHOWN	FEASIBILITY STUDY	3002754-0746	01

A1 150 mm ON ORIGINAL



LONGITUDINAL SECTION ALONG CONTROL - NORTHBOUND ENTRY RAMP (MC7NBE)

DRAWING FILE LOCATION / NAME: V:_Vault\Projects\3002\3002754\110_CADD\CAD\DWG\02_OPTION_07\3002754-0747.dwg

PLOT DATE: 09 Mar 2021 TIME: 15:10:18

NOT FOR CONSTRUCTION

EXTERNAL REFERENCE FILES: X_3002754_SMEC.xlt, X_2754_LS_OPT_07 MC7NBE_01

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
01	09.03.2021	ISSUED FOR FINAL SUBMISSION	WVR 003	D.T.

TITLE	NAME
DRAFTER	C. DAWSON
DRAFTING CHECK	K. CURLEY
DESIGNER	M. WATSON
DESIGN CHECK	TBC
PROJECT MANAGER	D. TONGE
PROJECT DIRECTOR	D. KEEP

SCALES AT A1 SIZE DRAWING

HORZ 1:2000 VERT 1:400

20 0 20 40 60 80 100m
4 0 4 8 12 16 20 m

DESIGNER
SMEC
Member of the Surbana Jurong Group
SMEC AUSTRALIA PTY LTD
© ABN 47 065 475 149
SUITE 2, LEVEL 1, 243 NORTHBOURNE AVENUE
LYNEHAM ACT 2602 AUSTRALIA
SMEC PROJECT No 3002754

CLIENT
ACT Government
Environment, Planning and Sustainable Development

PROJECT TITLE
MOLONGLO EAST WEST ARTERIAL FEASIBILITY STUDY

NORTHBOUND ENTRY RAMP LONGITUDINAL SECTON CONTROL LINE MC7BE

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AS SHOWN	FEASIBILITY STUDY	3002754-0747	01

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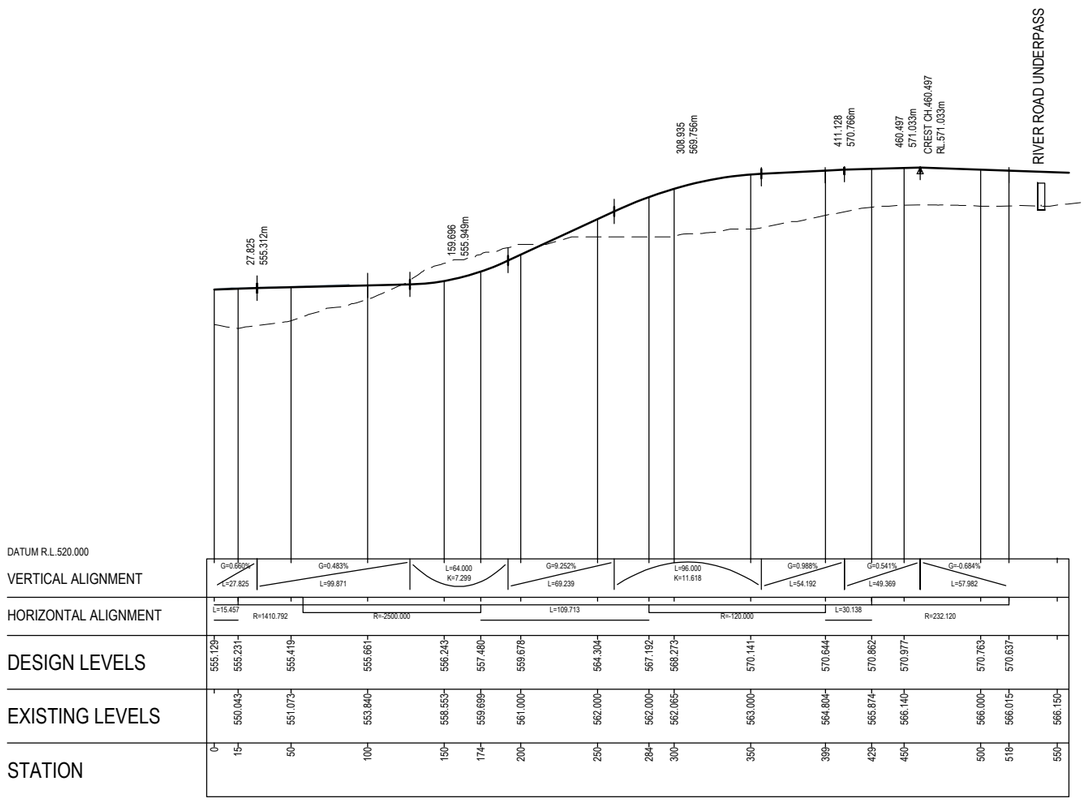

LONGITUDINAL SECTION ALONG CONTROL NORTHBOUND EXIST RAMP (MC7NBX)

NOT FOR CONSTRUCTION

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PLOT DATE / TIME	09 Mar 2021 15:10:43

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TITLE	NAME
DRAFTER	C. DAWSON
DRAFTING CHECK	K. CURLEY
DESIGNER	M. WATSON
DESIGN CHECK	TBC
PROJECT MANAGER	D. TONGE
PROJECT DIRECTOR	D. KEEP

SCALES AT A1 SIZE DRAWING

HORZ 1:2000 20 0 20 40 60 80 100m
VERT 1:400 4 0 4 8 12 16 20 m

DESIGNER
SMEC
Member of the Surbana Jurong Group
SMEC AUSTRALIA PTY LTD
© ABN 47 065 475 149
SUITE 2, LEVEL 1, 243 NORTHBOURNE AVENUE
LYNEHAM ACT 2602 AUSTRALIA
SMEC PROJECT No 3002754

CLIENT
ACT Government
Environment, Planning and Sustainable Development

PROJECT TITLE
MOLONGLO EAST WEST ARTERIAL
FEASIBILITY STUDY

NORTHBOUND EXIST RAMP
LONGITUDINAL SECTON CONTROL LINE MC7BX

SCALE	PHASE	PROJECT / DRAWING No.	REVISION
AS SHOWN	FEASIBILITY STUDY	3002754-0748	01

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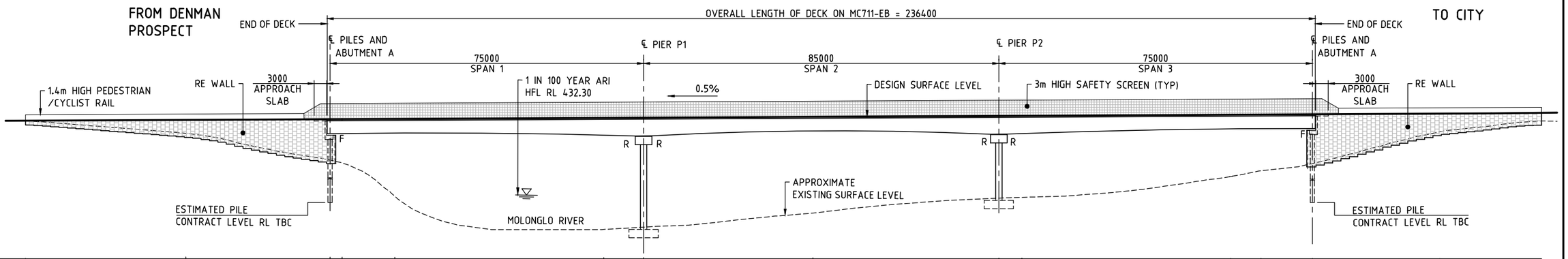

DATUM RL 510.000

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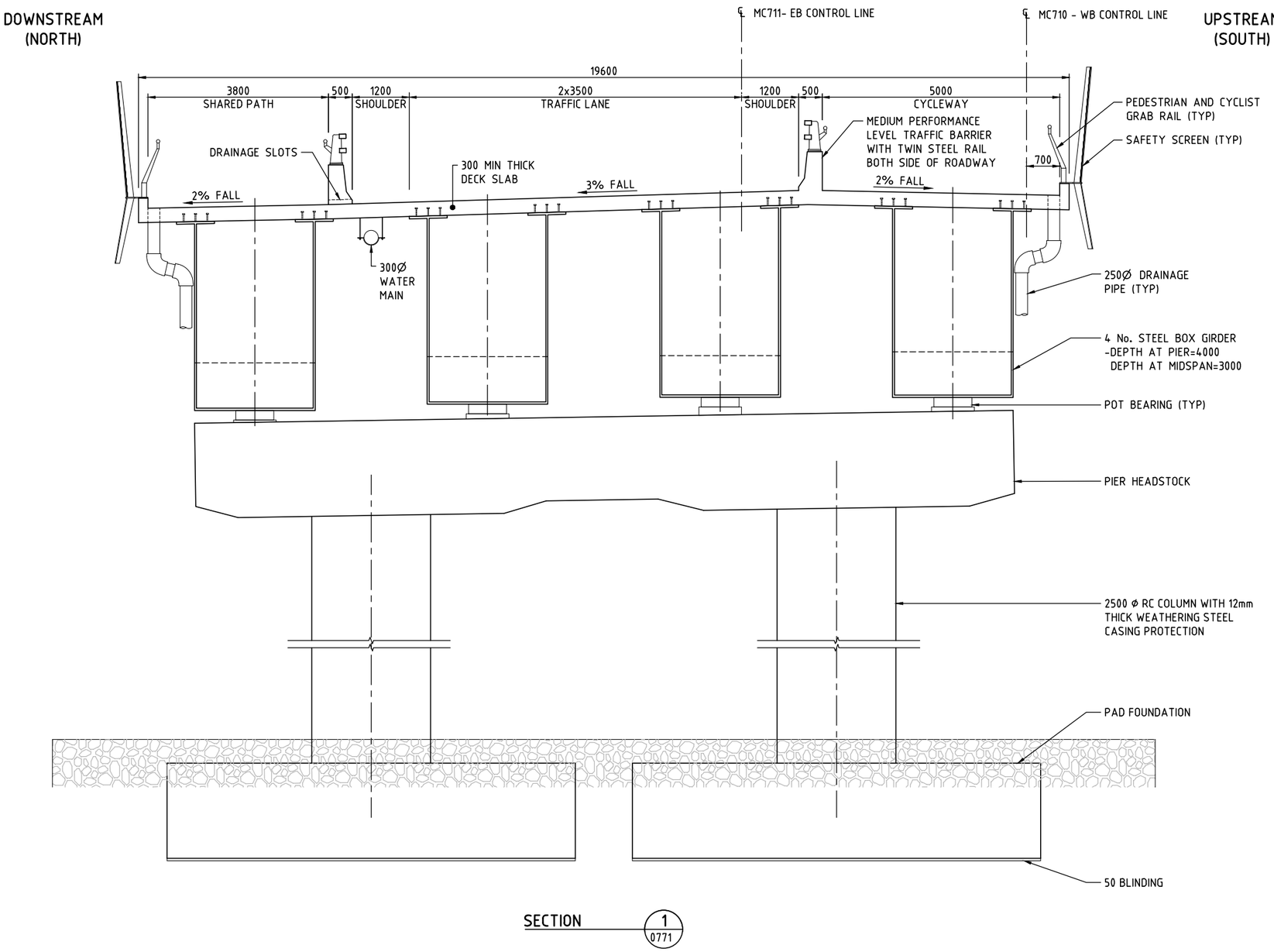

SECTION 1 / 0771

GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.
2. FOR OTHER GENERAL NOTES RELATED TO THIS DRAWING, REFER TO DRG No. 0771

NOT FOR CONSTRUCTION

DRAWING FILE LOCATION / NAME: V:_Vault\Projects\3002\3002754\110_CADD\CAD\DWG\03_SB_Struct_Bridges\BR01\3002754-0772.dwg
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	02	09.03.2021	ISSUED FOR FINAL SUBMISSION	WVR 003	D.T.

TITLE	NAME
DRAFTER	GDC
DRAFTING CHECK	
DESIGNER	
DESIGN CHECK	V. VIGNESWARAN
PROJECT MANAGER	D. TONGE
PROJECT DIRECTOR	D. KEEP

SCALES AT A1 SIZE DRAWING
SCALE 1:50 0.5 0 1 2 2.5 m

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LYNEHAM ACT 2602 AUSTRALIA
SMEC PROJECT No 3002754

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Environment, Planning and Sustainable Development

PROJECT TITLE
MOLONGLO EAST WEST ARTERIAL
FEASIBILITY STUDY
BRIDGE 01
MOLONGLO RIVER - EAST WEST BRIDGE
SECTION

SCALE	PHASE	PROJECT / DRAWING No.	REVISION
AS SHOWN	FEASIBILITY STUDY	3002754-0772	02

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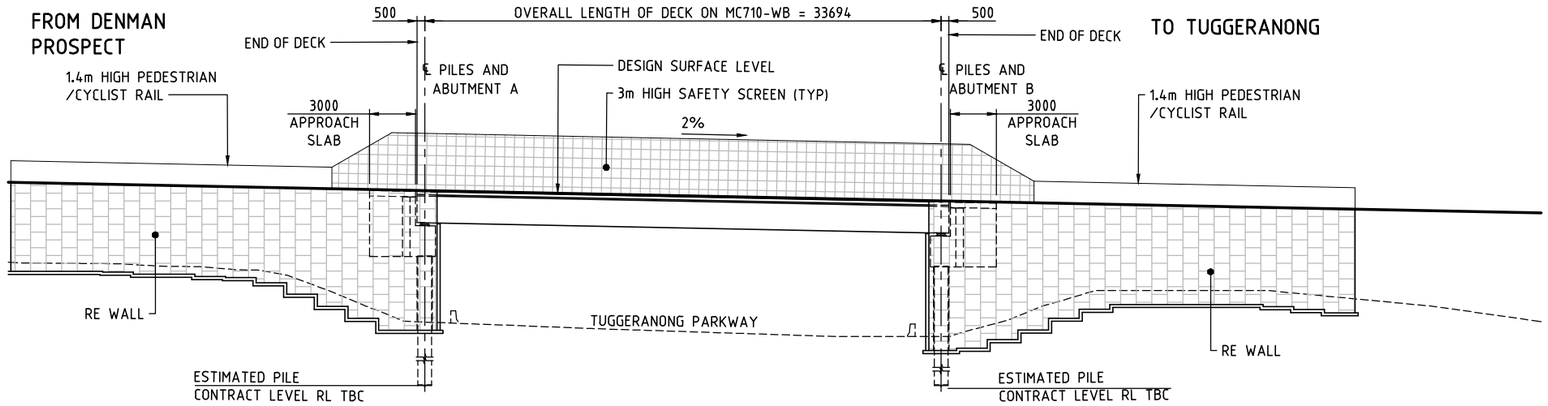
X_3002754_SMEC_a1
X_BRG_Molongo_Pier



DATUM RL 553.000

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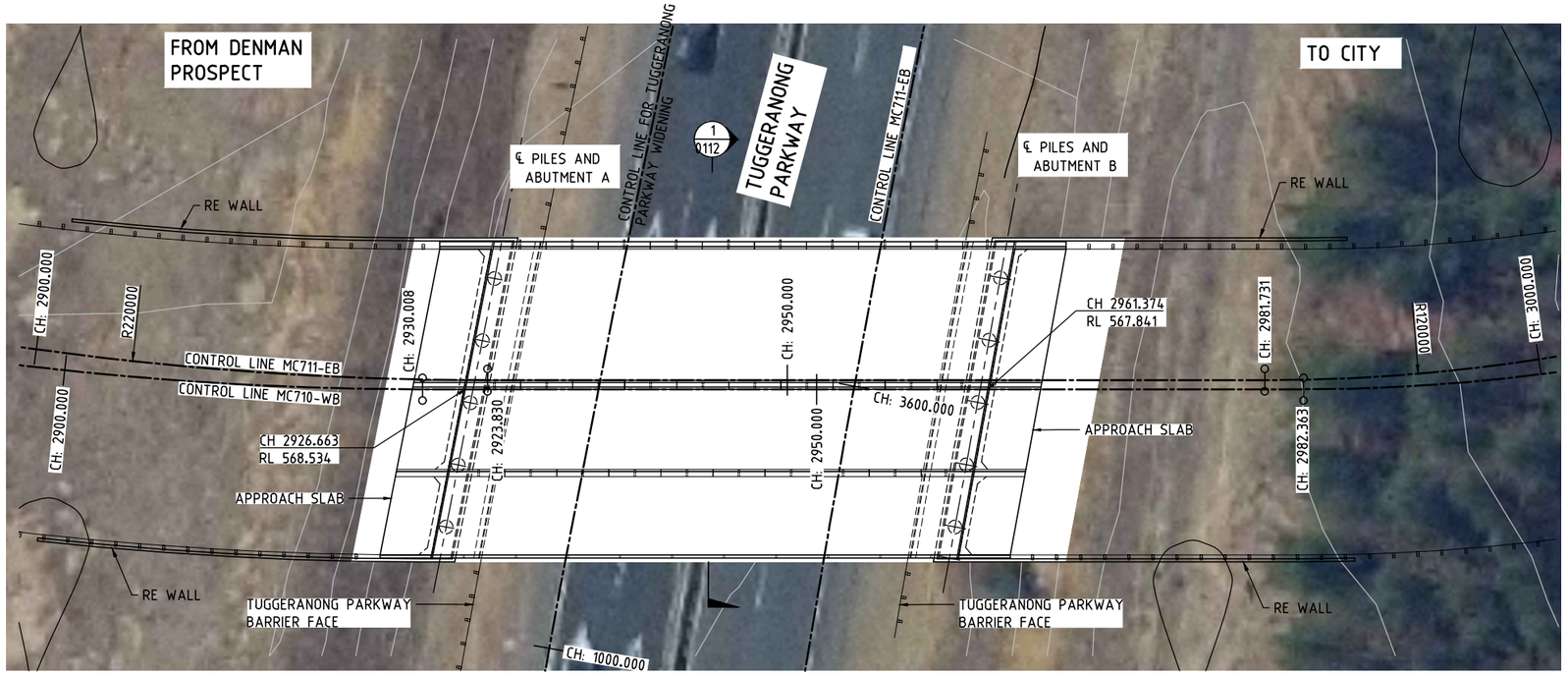
ELEVATION



PLAN

GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. CHAINAGES AND REDUCED LEVELS ARE IN METRES.
3. ALL REDUCED LEVELS ARE IN METERS TO AHD.

NOT FOR CONSTRUCTION

DRAWING FILE LOCATION / NAME: V:_Vault\Projects\3002\3002754\110_CADD\CAD\DWG\03_SB_Struct_Bridges\BR02\3002754-0781.dwg
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REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
01	17.12.2020	DRAFT SUBMISSION FOR CLIENT REVIEW	WVR 002	V. V.
02	09.03.2021	ISSUED FOR FINAL SUBMISSION	WVR 003	D.T.

TITLE	NAME
DRAFTER	GDC
DRAFTING CHECK	
DESIGNER	
DESIGN CHECK	V. VIGNESWARAN
PROJECT MANAGER	D. TONGE
PROJECT DIRECTOR	D. KEEP

SCALES AT A1 SIZE DRAWING
SCALE 1:200 2 0 2 4 6 8 10 m

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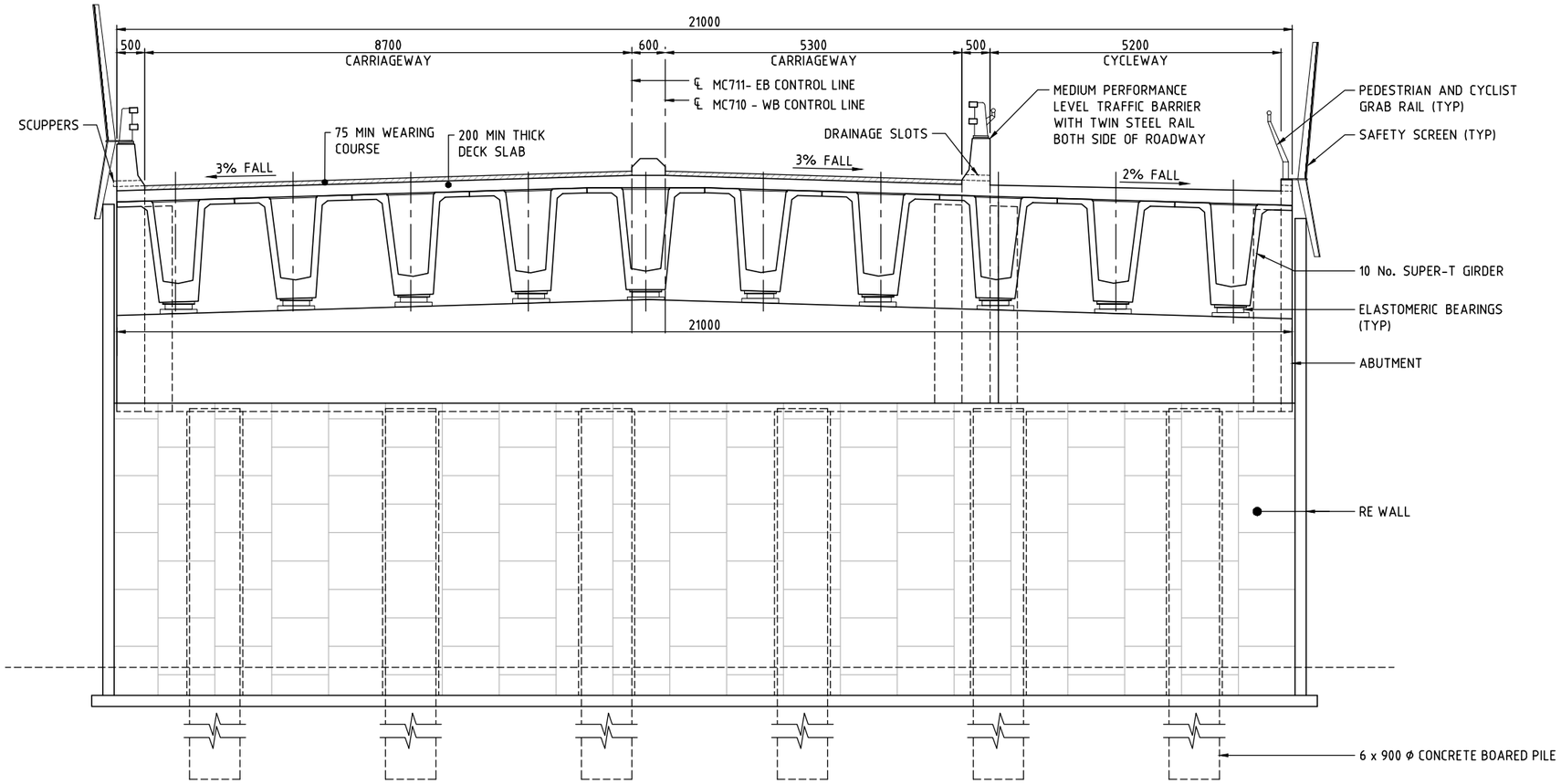
LYNEHAM ACT 2602 AUSTRALIA
SMEC PROJECT No 3002754

CLIENT
ACT Government
Environment, Planning and Sustainable Development

PROJECT TITLE
MOLONGLO EAST WEST ARTERIAL FEASIBILITY STUDY
BRIDGE 02
TUGGERANONG PARKWAY OVERPASS
PLAN AND ELEVATION

SCALE	PHASE	PROJECT / DRAWING No.	REVISION
AS SHOWN	FEASIBILITY STUDY	3002754-0781	02

A1



SECTION 1 / 0111

GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.
2. FOR OTHER GENERAL NOTES RELATED TO THIS DRAWING, REFER TO DRG No. 0011.

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EXTERNAL REFERENCE FILES: X_3002754_SMEC_a1, X_BRG_Tugg_Abutment

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
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02	09.03.2021	ISSUED FOR FINAL SUBMISSION	WVR 003	D.T.

TITLE	NAME
DRAFTER	GDC
DRAFTING CHECK	
DESIGNER	
DESIGN CHECK	V. VIGNESWARAN
PROJECT MANAGER	D. TONGE
PROJECT DIRECTOR	D. KEEP

SCALES AT A1 SIZE DRAWING: SCALE 1:50 (0.5 0 1 2 2.5 m)

DESIGNER: SMEC
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LYNEHAM ACT 2602 AUSTRALIA
SMEC PROJECT No 3002754

CLIENT: ACT Government — Environment, Planning and Sustainable Development

PROJECT TITLE: MOLONGLO EAST WEST ARTERIAL FEASIBILITY STUDY
BRIDGE 02
TUGGERANONG PARKWAY OVERPASS
SECTION

SCALE	PHASE	PROJECT / DRAWING No.	REVISION
AS SHOWN	FEASIBILITY STUDY	3002754-0782	02

A1

Appendix B Opinions of Cost

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ABN 81 058 229 404

Molonglo East-West Arterial Road

Indicative Cost Estimate

Issue No. 1

Date: 19 November 2020

Prepared by:

Wilde and Woollard Consultants Pty Ltd
28 Eyre Street
KINGSTON ACT 2604

On behalf of:

SMEC
Suite 2, Level 1
243 Northbourne Avenue
LYNEHAM ACT 2602

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Document Issue Sheet

Issue No.	Document	Issue Date	Document Issued To	Prepared By	Checked By	Reviewed By
1	Indicative Cost Estimate	18/11/2020	SMEC	AT	PS	PS

Issue log	Comments
1	Indicative Cost Estimate

Director Authorisation

Director Name and Qualifications:	**Peter Spaven** FAIQS, CQS
Director Authorisation:	
Date	19/11/2020

1. This report is confidential and should not be distributed to any other recipients without approval from the Client.

2. This report is based upon project specific information provided to Wilde and Woollard and our opinion of general market conditions at the time of preparing this report. Any subsequent changes may result in significant cost impacts.

3. Quantities and rates identified in this report are indicative only and are for the purpose of estimating the cost. They are not to be used for any other purpose.

Acronyms

Acronym	Meaning
ESD	Environmentally Sustainable Design
FECA	Fully Enclosed Covered Area
FF&E	Furniture Fittings and Equipment
FY	Financial Year
GFA	Gross Floor Area
GST	Goods and Services Tax
ICT	Information Communications Technology
HC	Head Contractor
P.A.	Per Annum
TBC	To Be Confirmed
UCA	Unenclosed Covered Area
WHS	Work Health and Safety
WOL	Whole of Life
WW	Wilde and Woollard Consultants Pty Ltd

Contents

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2.2	Out-Turn Cost Estimate Summary - East of CH1400	7
3.0	Basis & Assumptions	8
4.0	Exclusions	11

Appendix		Page No.
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B	East of CH1400	17

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Table 2.2	Out-Turn Cost Summary - East of CH1400	7

1.0 - Executive Summary

1.1 Purpose

The following cost estimate has been prepared for SMEC to advise on the potential costs for the proposed Molonglo East-West Arterial Road project.

1.2 Scope of Works

The proposed infrastructure works comprise the construction of new roads and bridges along the new East-West Arterial Road.

1.3 Out-Turn Cost

All costs noted in this report are exclusive of GST (unless stated otherwise).

The out-turn cost is summarised as follows:-

Table 1.3 Out-Turn Cost Summary All Options

Ref	Description	Total Out-Turn Cost
1	East of CH1400	**$ 25,685,000**
2	West of CH1400	**$ 166,112,000**

2.1 - Out-Turn Cost Estimate Summary - West of CH1400

On the basis of the information as listed in Sections 3.0 and 4.0 of this document, the cost of the works is summarised as follows:-

Table 2.1 Out-Turn Cost Summary - West of CH1400 (Refer to Appendix A for Breakdown / Details)

Ref	Description	%	Total
1	Site Preparation		$ 3,734,000
2	Road Works		$ 7,949,000
3	**Total Trade Costs**		**$ 11,683,000**
4	Locality Allowance	Excl	$ -
5	Allowance for ESD	Excl	$ -
6	Allowance for Cost Escalation	Excl	$ -
7	Preliminaries and Margin	15.0%	$ 1,753,000
8	Traffic Management	6.0%	$ 807,000
9	Design and Management Fees	15.0%	$ 2,137,000
10	Procurement and Project Management Fees	12.0%	$ 1,966,000
11	Contingency	40.0%	$ 7,339,000
12	**Total Project Cost (Excl GST)**		**$ 25,685,000**

2.2 - Out-Turn Cost Estimate Summary - East of CH1400

On the basis of the information as listed in Sections 3.0 and 4.0 of this document, the cost of the works is summarised as follows:-

Table 2.2 Out-Turn Cost Summary - East of CH1400 (Refer to Appendix B for Breakdown / Details)

Ref	Description	%	Total
1	Site Preparation		$ 8,994,000
2	Road Works		$ 65,916,000
3	Cotter Road Upgrade		$ 659,000
4	**Total Trade Costs**		**$ 75,569,000**
5	Locality Allowance	Excl	$ -
6	Allowance for ESD	Excl	$ -
7	Allowance for Cost Escalation	Excl	$ -
8	Preliminaries and Margin	15.0%	$ 11,336,000
9	Traffic Management	6.0%	$ 5,215,000
10	Design and Management Fees	15.0%	$ 13,818,000
11	Procurement and Project Management Fees	12.0%	$ 12,713,000
12	Contingency	40.0%	$ 47,461,000
13	**Total Project Cost (Excl GST)**		**$ 166,112,000**

3.0 - Basis & Assumptions

The following provides an overview of the cost methodology and process used for the preparation of this report.

3.1 Information Used

Drawings

- Molonglo East West Arterial Road Feasibility Study Strategic Design Set dated October 2020

3.2 Methodology

Buildsoft and CostX Estimating software were used in order to prepare the estimate, utilising on-screen take-off methods of measurement of quantities.

Unit cost rates were derived from knowledge of base market rates, of projects similar in nature, local market conditions and influences. Quantities were derived from a combination of the design plans produced for each milestone, knowledge of the likely construction methods and additional inclusions determined through consultation with the project team.

3.3 Project Program

No program has been advised at the time of preparing this report.

3.0 - Basis & Assumptions

3.4 Trade Work Allowances and Assumptions

Generally

- All bulk earthwork quantities have been based upon advice from SMEC.
- It is assumed that the median strip separating the carriageways will be a landscaped median strip in lieu of a concrete median strip.

West of CH1400 - Roadworks

- Allowances have been included to connect the road to the existing John Gorton Drive including new traffic intersection.

East of CH1400 - Roadworks

- The new Molonglo River Bridge has been included as part of this scope of works.
- The new bridge over Tuggeranong Parkway has been included as part of this scope of works.
- The road widening to the Tuggeranong Parkway exit onto Cotter road has been included as part of this scope of works.
- Allowances have been included for intersection works to new side roads including new traffic lights, islands, turning lanes, and the like. **No allowance has been included for the side roads**.
- A new 30m long x 6m wide x 3.5m high boxed culvert has been included under the Tuggeranong Parkway Northbound Exit onto the new East-West Arterial Road to facilitate the new cycle highway **(cycle highway delivered under separate project)**.
- A new 40m long x 6m wide x 3.5m high boxed culvert has been included under CH2700 to facilitate the new electrical services infrastructure works **(electrical works delivered under separate project)**.

3.5 Trade Work On-Costs

Separate "on-costs" have been applied to the trade costs to reflect the outturn cost. These "on-costs" include the following:-

Locality Allowance

The Cost Estimate is based upon current day costs in Canberra, ACT.

ESD Allowance

Not applicable

Cost Escalation

This cost estimate has been based on November 2020 prices.

3.0 - Basis & Assumptions

Preliminaries and Margin

Allowance included at 15.00% of the trade cost and associated on-costs.

Traffic Management

Allowance included at 6.00% of the trade cost and associated on-costs.

Design and Management Fees

Allowance included at 15.00% of the trade cost and associated on-costs.

Procurement and Project Management Fees

Allowance included at 12.00% of the trade cost and associated on-costs.

Contingency

Allowance included at 40.00% of the trade cost and associated on-costs.

3.6 Cost Benchmarking

The cost estimate has been reviewed and compared to other similar projects on a 'high level' cost / m2 rate basis.

3.7 Procurement

The project delivery is based upon a lump sum Head Contractor delivery.

4.0 - Exclusions

The estimate excludes the following:

- GST
- Cost escalation beyond date of estimate
- In-ground water services
- In-ground sewer services
- In-ground gas services
- In-ground communication services
- In-ground electrical services
- Diversion / relocation of existing services
- Demolition of existing services
- Side roads
- Cycle highway
- Tuggeranong Parkway third lane
- Tuggeranong Parkway bridge extension

Appendix A - West of CH1400

Detailed Breakdown

Project: Default Project **Details:** Preferred Option Cost Estimate
Building: 4520 - Molonglo East-West Arterial Road

Description	Quantity	Unit	Rate	Total
MOLONGLO EAST-WEST ARTERIAL ROAD				
WEST OF CH1400				
WEST OF CH1400				
Site Preparation	1	item	3,734,000	3,734,000
Roadworks	1	item	7,949,000	7,949,000
Net Trade Cost	***1***	***item***	***11,683,000***	***11,683,000***
Preliminaries (15%)	1	item	1,753,000	1,753,000
Traffic Management (6%)	1	item	807,000	807,000
Design and Management Fees (15%)	1	item	2,137,000	2,137,000
Procurement and Project Management Fees (12%)	1	item	1,966,000	1,966,000
Contingency (40%)	1	item	7,339,000	7,339,000
Total Out-Turn Cost at November 2020 Prices (Excl GST)	**1**	**item**	**25,685,000**	**25,685,000**
WEST OF CH1400				25,685,000
MOLONGLO EAST-WEST ARTERIAL ROAD				**25,685,000**

Detailed Breakdown

Project: Default Project **Details:** Preferred Option Cost Estimate
Building: 4520 - Molonglo East-West Arterial Road

Description	Quantity	Unit	Rate	Total
WEST OF CH1400				
Site Preparation				
Site Preparation				
Protection of the Works	1	item	150,000	150,000
Stockpile Environmental Control Measure	1	item	100,000	100,000
Clearing and Grubbing	60,000	m2	1.5	90,000
Removal of Trees	1	item	50,000	50,000
General Demolition	1	item	10,000	10,000
General Earthworks	25,975	m3	20	519,500
Cut to Stockpile	12,988	m3	7.5	97,406
Disposal of spoil materials	12,988	m3	25	324,688
Unsuitable material	1	item	50,000	50,000
Replacement of unsuitable with general fill	66,058	m3	25	1,651,438
Allowance for sedimentation ponds	1	item	100,000	100,000
Supply and install geotextile	1	item	10,000	10,000
Allowance for protection slab over utilities at CH700	1	item	240,000	240,000
Sundries	1	item	340,000	340,000
Rounding	1	item	969	969
Sub-Total - Site Preparation				**3,734,000**
Site Preparation				3,734,000
Roadworks				
Roadworks				
Dual Carriageway (CH100 - CH600)				
Verge (Westbound side)				
Allowance for shared footpaths	2,100	m2	105	220,500
Allowance for external lighting	1	item	130,000	130,000
Allowance for street signage	1	item	25,000	25,000
Allowance for landscaping including landscape drainage to verge	1	item	125,000	125,000
Allowance for incidental works	1	item	295,000	295,000
Westbound Road				
Allowance for flexible pavement including engineered fill	4,200	m2	180	756,000
Allowance for stormwater drainage complete including in-ground pipework, pits, and the like	1	item	455,000	455,000
Allowance for subsoil drains including pipework, outlets, and the like	1	item	50,000	50,000
Allowance for linemarking and pavement marking	1	item	45,000	45,000
Allowance for kerb and gutter	600	m	55	33,000
Allowance for mountable kerb and gutter	600	m	60	36,000
Allowance for road furniture	1	item	25,000	25,000
Median				
Allowance for median strip - Assume grass lined median strip	3,600	m2	80	288,000

Detailed Breakdown

Project: Default Project **Details:** Preferred Option Cost Estimate
Building: 4520 - Molonglo East-West Arterial Road

Description	Quantity	Unit	Rate	Total
WEST OF CH1400				*(Continued)*
Roadworks				*(Continued)*
Eastbound Road				
Allowance for flexible pavement including engineered fill	4,200	m2	180	756,000
Allowance for stormwater drainage complete including in-ground pipework, pits, and the like	1	item	455,000	455,000
Allowance for subsoil drains including pipework, outlets, and the like	1	item	50,000	50,000
Allowance for linemarking and pavement marking	1	item	45,000	45,000
Allowance for kerb and gutter	600	m	55	33,000
Allowance for mountable kerb	600	m	60	36,000
Allowance for road furniture	1	item	25,000	25,000
Verge (Eastbound side)				
Allowance for shared footpaths	2,100	m2	105	220,500
Allowance for external lighting	1	item	130,000	130,000
Allowance for street signage	1	item	25,000	25,000
Allowance for landscaping including landscape drainage to verge	1	item	125,000	125,000
Allowance for incidental works	1	item	295,000	295,000
Miscellaneous				
Allowance to connect to existing intersection at John Gorton Drive at CH100	1	item	250,000	250,000
Rounding		item	0	0
Sub-Total - Dual Carriageway (CH100 - CH600)				*4,929,000*
Single Carriageway (CH600 - CH1400)				
Verge (Westbound side)				
Allowance for landscaping	1	item	145,000	145,000
Allowance for incidental works	1	item	345,000	345,000
Eastbound / Westbound Road				
Allowance for flexible pavement including engineered fill	4,900	m2	180	882,000
Allowance for stormwater drainage complete including in-ground pipework, pits, and the like	1	item	505,000	505,000
Allowance for subsoil drains including pipework, outlets, and the like	1	item	60,000	60,000
Allowance for linemarking and pavement marking	1	item	55,000	55,000
Allowance for kerb and gutter	700	m	55	38,500
Allowance for mountable kerb	700	m	60	42,000
Allowance for road furniture	1	item	25,000	25,000
Verge (Eastbound side)				
Allowance for shared footpaths	2,450	m2	105	257,250
Allowance for external lighting	1	item	145,000	145,000
Allowance for street signage	1	item	30,000	30,000
Allowance for landscaping including landscape drainage to verge	1	item	145,000	145,000
Allowance for incidental works	1	item	345,000	345,000
Rounding	1	item	250	250

Detailed Breakdown

Project: Default Project **Details:** Preferred Option Cost Estimate
Building: 4520 - Molonglo East-West Arterial Road

Description	Quantity	Unit	Rate	Total
WEST OF CH1400				*(Continued)*
Roadworks				*(Continued)*
Sub-Total - Single Carriageway (CH600 - CH1400)				*3,020,000*
Sub-Total - Roadworks				**7,949,000**
Roadworks				7,949,000
WEST OF CH1400				**25,685,000**

Appendix B - East of CH1400

Detailed Breakdown

Project: Default Project **Details:** Preferred Option Cost Estimate
Building: 4520 - Molonglo East-West Arterial Road

Description	Quantity	Unit	Rate	Total
MOLONGLO EAST-WEST ARTERIAL ROAD				
EAST OF CH1400				
EAST OF CH1400				
Site Preparation	1	item	8,994,000	8,994,000
Roadworks	1	item	65,916,000	65,916,000
Cotter Road Upgrade	1	item	659,000	659,000
Net Trade Cost	***1***	***item***	***75,569,000***	***75,569,000***
Preliminaries (15%)	1	item	11,336,000	11,336,000
Traffic Management (6%)	1	item	5,215,000	5,215,000
Design and Management Fees (15%)	1	item	13,818,000	13,818,000
Procurement and Project Management Fees (12%)	1	item	12,713,000	12,713,000
Contingency (40%)	1	item	47,461,000	47,461,000
Total Out-Turn Cost at November 2020 Prices (Excl GST)	**1**	**item**	**166,112,000**	**166,112,000**
EAST OF CH1400				166,112,000
MOLONGLO EAST-WEST ARTERIAL ROAD				**166,112,000**

Detailed Breakdown

Project: Default Project **Details:** Preferred Option Cost Estimate
Building: 4520 - Molonglo East-West Arterial Road

Description	Quantity	Unit	Rate	Total
EAST OF CH1400				
Site Preparation				
Site Preparation				
Protection of the Works	1	item	200,000	200,000
Stockpile Environmental Control Measure	1	item	100,000	100,000
Clearing and Grubbing	112,000	m2	1.5	168,000
Removal of Trees	1	item	150,000	150,000
General Demolition	1	item	50,000	50,000
General Earthworks	26,071	m3	20	521,420
Cut to Stockpile	13,036	m3	7.5	97,766
Disposal of spoil materials	13,036	m3	25	325,888
Unsuitable material	1	item	50,000	50,000
Replacement of unsuitable with general fill	252,114	m3	25	6,302,838
Allowance for sedimentation ponds	1	item	200,000	200,000
Supply and install geotextile	1	item	10,000	10,000
Sundries	1	item	817,591	817,591
Rounding	1	item	498	498
Sub-Total - Site Preparation				**8,994,000**
Site Preparation				8,994,000
Roadworks				
Roadworks				
Single Carriageway (CH1400 - CH 1735)				
Verge (Westbound side)				
Allowance for landscaping	1	item	70,000	70,000
Allowance for incidental works	1	item	165,000	165,000
Eastbound / Westbound Road				
Allowance for flexible pavement including engineered fill	2,345	m2	180	422,100
Allowance for stormwater drainage complete including in-ground pipework, pits, and the like	1	item	330,000	330,000
Allowance for subsoil drains including pipework, outlets, and the like	1	item	30,000	30,000
Allowance for linemarking and pavement marking	1	item	25,000	25,000
Allowance for kerb and gutter	335	m	55	18,425
Allowance for mountable kerb	335	m	60	20,100
Allowance for road furniture	1	item	15,000	15,000
Verge (Eastbound side)				
Allowance for shared footpaths	1,173	m2	105	123,165
Allowance for external lighting	1	item	75,000	75,000
Allowance for street signage	1	item	15,000	15,000
Allowance for landscaping including landscape drainage to verge	1	item	70,000	70,000
Allowance for incidental works	1	item	165,000	165,000

Detailed Breakdown

Project: Default Project **Details:** Preferred Option Cost Estimate
Building: 4520 - Molonglo East-West Arterial Road

Description	Quantity	Unit	Rate	Total
EAST OF CH1400				*(Continued)*
Roadworks				*(Continued)*
Rounding	1	item	210	210
Sub-Total - Single Carriageway (CH1400 - CH 1735)				*1,544,000*
Molonglo River Bridge (CH1735 - CH1970)				
Allowance for piling	1	item	1,700,000	1,700,000
Allowance for piers	1	item	5,000,000	5,000,000
Allowance for bearings and joints	1	item	550,000	550,000
Allowance for bridge deck	1	item	18,250,000	18,250,000
Allowance for safety screens	1	item	950,000	950,000
Allowance to connect bridge at CH1735 and CH1970	1	item	250,000	250,000
Allow for abutments and retaining walls	1	item	3,500,000	3,500,000
Sub-Total - Molonglo River Bridge (CH1735 - CH1970)				*30,200,000*
Roadworks Including Intersection Works				
Verge				
Allowance for shared footpaths	4,270	m2	105	448,350
Allowance for external lighting	1	item	275,000	275,000
Allowance for street signage	1	item	60,000	60,000
Allowance for landscaping including landscape drainage to verge	1	item	275,000	275,000
Allowance for incidental works	1	item	665,000	665,000
Road				
Allowance for flexible pavement including engineered fill	14,000	m2	180	2,520,000
Allowance for stormwater drainage complete including in-ground pipework, pits, and the like	1	item	970,000	970,000
Allowance for subsoil drains including pipework, outlets, and the like	1	item	115,000	115,000
Allowance for linemarking and pavement marking	1	item	210,000	210,000
Allowance for kerb and gutter	1,350	m	55	74,250
Allowance for mountable kerb and gutter	1,010	m	60	60,600
Allowance for road furniture	1	item	50,000	50,000
Allowance for traffic signals	1	item	300,000	300,000
Median Strip and Islands				
Allowance for median strip - Assume grass lined median strip	2,780	m2	80	222,400
Allowance for concrete islands	544	m2	350	190,400
Rounding	1	item	0	0
Sub-Total - Roadworks Including Intersection Works				*6,436,000*
Dual Carriageway Including Exit Lane (CH2530 - CH2750)				
Verge (Westbound side)				
Allowance for shared footpaths	770	m2	105	80,850
Allowance for external lighting	1	item	50,000	50,000
Allowance for street signage	1	item	10,000	10,000

Detailed Breakdown

Project: Default Project **Details:** Preferred Option Cost Estimate
Building: 4520 - Molonglo East-West Arterial Road

Description	Quantity	Unit	Rate	Total
EAST OF CH1400				*(Continued)*
Roadworks				*(Continued)*
Allowance for landscaping including landscape drainage to verge	1	item	45,000	45,000
Allowance for incidental works	1	item	110,000	110,000
Westbound Road				
Allowance for flexible pavement including engineered fill	1,540	m2	180	277,200
Allowance for stormwater drainage complete including in-ground pipework, pits, and the like	1	item	275,000	275,000
Allowance for subsoil drains including pipework, outlets, and the like	1	item	20,000	20,000
Allowance for linemarking and pavement marking	1	item	20,000	20,000
Allowance for kerb and gutter	220	m	55	12,100
Allowance for mountable kerb and gutter	220	m	60	13,200
Allowance for road furniture	1	item	5,000	5,000
Median				
Allowance for median strip - Assume grass lined median strip	1,320	m2	80	105,600
Eastbound Road				
Allowance for flexible pavement (including exit lane) including engineered fill	2,310	m2	180	415,800
Allowance for stormwater drainage complete including in-ground pipework, pits, and the like	1	item	275,000	275,000
Allowance for subsoil drains including pipework, outlets, and the like	1	item	20,000	20,000
Allowance for linemarking and pavement marking	1	item	30,000	30,000
Allowance for kerb and gutter	220	m	55	12,100
Allowance for mountable kerb	220	m	60	13,200
Allowance for road furniture	1	item	5,000	5,000
Verge (Eastbound side)				
Allowance for shared footpaths	770	m2	105	80,850
Allowance for external lighting	1	item	50,000	50,000
Allowance for street signage	1	item	10,000	10,000
Allowance for landscaping including landscape drainage to verge	1	item	45,000	45,000
Allowance for incidental works	1	item	110,000	110,000
Miscellaneous				
Allowance for underpass / boxed culvert 40m long x 6m wide x 3.5m deep	1	item	1,050,000	1,050,000
Rounding	1	item	100	100
Sub-Total - Dual Carriageway Including Exit Lane (CH2530 - CH2750)				*3,141,000*
Dual Carriageway (CH2750 - CH2850)				
Verge (Westbound side)				
Allowance for shared footpaths	350	m2	105	36,750
Allowance for external lighting	1	item	25,000	25,000
Allowance for street signage	1	item	5,000	5,000
Allowance for landscaping including landscape drainage to verge	1	item	25,000	25,000
Allowance for incidental works	1	item	50,000	50,000

Detailed Breakdown

Project: Default Project **Details:** Preferred Option Cost Estimate
Building: 4520 - Molonglo East-West Arterial Road

Description	Quantity	Unit	Rate	Total
EAST OF CH1400				*(Continued)*
Roadworks				*(Continued)*
Westbound Road				
Allowance for flexible pavement including engineered fill	700	m2	180	126,000
Allowance for stormwater drainage complete including in-ground pipework, pits, and the like	1	item	215,000	215,000
Allowance for subsoil drains including pipework, outlets, and the like	1	item	10,000	10,000
Allowance for linemarking and pavement marking	1	item	10,000	10,000
Allowance for kerb and gutter	100	m	55	5,500
Allowance for mountable kerb and gutter	100	m	60	6,000
Allowance for road furniture	1	item	5,000	5,000
Median				
Allowance for median strip - Assume grass lined median strip	600	m2	80	48,000
Eastbound Road				
Allowance for flexible pavement including engineered fill	700	m2	180	126,000
Allowance for stormwater drainage complete including in-ground pipework, pits, and the like	1	item	215,000	215,000
Allowance for subsoil drains including pipework, outlets, and the like	1	item	10,000	10,000
Allowance for linemarking and pavement marking	1	item	10,000	10,000
Allowance for kerb and gutter	100	m	55	5,500
Allowance for mountable kerb	100	m	60	6,000
Allowance for road furniture	1	item	5,000	5,000
Verge (Eastbound side)				
Allowance for shared footpaths	350	m2	105	36,750
Allowance for external lighting	1	item	25,000	25,000
Allowance for street signage	1	item	5,000	5,000
Allowance for landscaping including landscape drainage to verge	1	item	25,000	25,000
Allowance for incidental works	1	item	50,000	50,000
Rounding	1	item	500	500
Sub-Total - Dual Carriageway (CH2750 - CH2850)				*1,087,000*
Dual Carriageway (CH2850 - CH2925)				
Verge (Westbound side)				
Allowance for shared footpaths	263	m2	105	27,615
Allowance for external lighting	1	item	20,000	20,000
Allowance for street signage	1	item	5,000	5,000
Allowance for landscaping including landscape drainage to verge	1	item	20,000	20,000
Allowance for incidental works	1	item	40,000	40,000
Westbound Road (1 Lane)				
Allowance for flexible pavement including engineered fill	263	m2	180	47,340
Allowance for stormwater drainage complete including in-ground pipework, pits, and the like	1	item	205,000	205,000

Detailed Breakdown

Project: Default Project **Details:** Preferred Option Cost Estimate
Building: 4520 - Molonglo East-West Arterial Road

Description	Quantity	Unit	Rate	Total
EAST OF CH1400				*(Continued)*
Roadworks				*(Continued)*
Allowance for subsoil drains including pipework, outlets, and the like	1	item	10,000	10,000
Allowance for linemarking and pavement marking	1	item	5,000	5,000
Allowance for kerb and gutter	75	m	55	4,125
Allowance for mountable kerb and gutter	75	m	60	4,500
Allowance for road furniture including crash barriers	1	item	20,000	20,000
Median				
Allowance for median strip - Assume grass lined median strip	450	m2	80	36,000
Eastbound Road (2 Lanes)				
Allowance for flexible pavement including engineered fill	525	m2	180	94,500
Allowance for stormwater drainage complete including in-ground pipework, pits, and the like	1	item	205,000	205,000
Allowance for subsoil drains including pipework, outlets, and the like	1	item	10,000	10,000
Allowance for linemarking and pavement marking	1	item	10,000	10,000
Allowance for kerb and gutter	75	m	55	4,125
Allowance for mountable kerb	75	m	60	4,500
Allowance for road furniture including crash barriers	1	item	20,000	20,000
Verge (Eastbound side)				
Allowance for shared footpaths	263	m2	105	27,615
Allowance for external lighting	1	item	20,000	20,000
Allowance for street signage	1	item	5,000	5,000
Allowance for landscaping including landscape drainage to verge	1	item	20,000	20,000
Allowance for incidental works	1	item	40,000	40,000
Rounding	1	item	680	680
Sub-Total - Dual Carriageway (CH2850 - CH2925)				*906,000*
Tuggeranong Parkway Bridge				
Allowance for piling	1	item	150,000	150,000
Allowance for piers	1	item	450,000	450,000
Allowance for bearings and joints	1	item	100,000	100,000
Allowance for bridge deck	1	item	4,150,000	4,150,000
Allowance for safety screens	1	item	200,000	200,000
Allowance to connect bridge at CH2925 and CH2965	1	item	250,000	250,000
Allow for abutments and retaining walls	1	item	5,000,000	5,000,000
Sub-Total - Tuggeranong Parkway Bridge (CH2925 - CH2965)				*10,300,000*
Dual Carriageway (CH2965 - CH3200)				
Verge (Westbound side)				
Allowance for shared footpaths	823	m2	105	86,415
Allowance for external lighting	1	item	50,000	50,000
Allowance for street signage	1	item	10,000	10,000

Detailed Breakdown

Project: Default Project **Details:** Preferred Option Cost Estimate
Building: 4520 - Molonglo East-West Arterial Road

Description	Quantity	Unit	Rate	Total
EAST OF CH1400				*(Continued)*
Roadworks				*(Continued)*
Allowance for landscaping including landscape drainage to verge	1	item	50,000	50,000
Allowance for incidental works	1	item	115,000	115,000
Westbound Road (1 Lane)				
Allowance for flexible pavement including engineered fill	823	m2	180	148,140
Allowance for stormwater drainage complete including in-ground pipework, pits, and the like	1	item	280,000	280,000
Allowance for subsoil drains including pipework, outlets, and the like	1	item	20,000	20,000
Allowance for linemarking and pavement marking	1	item	10,000	10,000
Allowance for kerb and gutter	235	m	55	12,925
Allowance for mountable kerb and gutter	235	m	60	14,100
Allowance for road furniture including crash barriers	1	item	50,000	50,000
Median				
Allowance for median strip - Assume grass lined median strip	1,410	m2	80	112,800
Eastbound Road (2 Lanes)				
Allowance for flexible pavement including engineered fill	1,645	m2	180	296,100
Allowance for stormwater drainage complete including in-ground pipework, pits, and the like	1	item	205,000	205,000
Allowance for subsoil drains including pipework, outlets, and the like	1	item	20,000	20,000
Allowance for linemarking and pavement marking	1	item	20,000	20,000
Allowance for kerb and gutter	235	m	55	12,925
Allowance for mountable kerb	235	m	60	14,100
Allowance for road furniture including crash barriers	1	item	50,000	50,000
Verge (Eastbound side)				
Allowance for shared footpaths	823	m2	105	86,415
Allowance for external lighting	1	item	50,000	50,000
Allowance for street signage	1	item	10,000	10,000
Allowance for landscaping including landscape drainage to verge	1	item	50,000	50,000
Allowance for incidental works	1	item	115,000	115,000
Rounding	1	item	80	80
Sub-Total - Dual Carriageway (CH2750 - CH2850)				*1,889,000*
Tuggeranong Parkway Northbound Exit onto EWA				
Westbound Road - Single Lane Incl Shoulders				
Allowance for flexible pavement including engineered fill	4,200	m2	180	756,000
Allowance for stormwater drainage complete including in-ground pipework, pits, and the like	1	item	455,000	455,000
Allowance for subsoil drains including pipework, outlets, and the like	1	item	50,000	50,000
Allowance for linemarking and pavement marking	1	item	45,000	45,000
Allowance for kerb and gutter	600	m	55	33,000
Allowance for mountable kerb	600	m	60	36,000

Detailed Breakdown

Project: Default Project **Details:** Preferred Option Cost Estimate
Building: 4520 - Molonglo East-West Arterial Road

Description	Quantity	Unit	Rate	Total
EAST OF CH1400				*(Continued)*
Roadworks				*(Continued)*
Allowance for road furniture	1	item	185,000	185,000
Verge (Westbound side)				
Allowance for external lighting	1	item	125,000	125,000
Allowance for street signage	1	item	25,000	25,000
Allowance for landscaping including landscape drainage to verge	1	item	215,000	215,000
Allowance for incidental works	1	item	295,000	295,000
Miscellaneous				
Allowance for cycleway underpass / boxed culvert - Assumed 30m long x 6m wide x 3.5m deep	1	item	800,000	800,000
Allowance for islands, signage, and the like between ramp and main road	1	item	75,000	75,000
Allowance to merge and connect to existing Tuggeranong Parkway	1	item	50,000	50,000
Rounding	1	item	0	0
Sub-Total - Tuggeranong Parkway Northbound Exit onto EWA (Westbound)				*3,145,000*
Tuggeranong Parkway Southbound Exit onto EWA (Westbound)				
Westbound Road - Single Lane				
Allowance for flexible pavement including engineered fill	4,130	m2	180	743,400
Allowance for stormwater drainage complete including in-ground pipework, pits, and the like	1	item	450,000	450,000
Allowance for subsoil drains including pipework, outlets, and the like	1	item	50,000	50,000
Allowance for linemarking and pavement marking	1	item	45,000	45,000
Allowance for kerb and gutter	590	m	55	32,450
Allowance for mountable kerb	590	m	60	35,400
Allowance for road furniture	1	item	185,000	185,000
Verge (Westbound side)				
Allowance for external lighting	1	item	125,000	125,000
Allowance for street signage	1	item	25,000	25,000
Allowance for landscaping including landscape drainage to verge	1	item	210,000	210,000
Allowance for incidental works	1	item	290,000	290,000
Miscellaneous				
Allowance for islands, signage, and the like between ramp and main road	1	item	75,000	75,000
Allowance to merge and connect to existing Tuggeranong Parkway	1	item	50,000	50,000
Rounding	1	item	750	750
Sub-Total - Tuggeranong Parkway Southbound Exit onto EWA (Westbound)				*2,317,000*
EWA Eastbound Exit onto Tuggeranong Parkway (Northbound)				
Northbound Road - Single Lane				
Allowance for flexible pavement including engineered fill	3,010	m2	180	541,800
Allowance for stormwater drainage complete including in-ground pipework, pits, and the like	1	item	375,000	375,000
Allowance for subsoil drains including pipework, outlets, and the like	1	item	40,000	40,000

Detailed Breakdown

Project: Default Project **Details:** Preferred Option Cost Estimate
Building: 4520 - Molonglo East-West Arterial Road

Description	Quantity	Unit	Rate	Total
EAST OF CH1400				*(Continued)*
Roadworks				*(Continued)*
Allowance for linemarking and pavement marking	1	item	35,000	35,000
Allowance for kerb and gutter	430	m	55	23,650
Allowance for mountable kerb	430	m	60	25,800
Allowance for road furniture	1	item	125,000	125,000
Verge (Northbound side)				
Allowance for external lighting	1	item	125,000	125,000
Allowance for street signage	1	item	20,000	20,000
Allowance for landscaping including landscape drainage to verge	1	item	125,000	125,000
Allowance for incidental works	1	item	215,000	215,000
Miscellaneous				
Allowance for islands, signage, and the like between ramp and main road	1	item	75,000	75,000
Allowance to merge and connect to existing Tuggeranong Parkway	1	item	50,000	50,000
Rounding	1	item	750	750
Sub-Total - EWA Eastbound Exit onto Tuggeranong Parkway (Northbound)				*1,777,000*
EWA Eastbound Exit onto Tuggeranong Parkway (Southbound)				
Southbound Road - Single Lane				
Allowance for flexible pavement including engineered fill	7,350	m2	180	1,323,000
Allowance for stormwater drainage complete including in-ground pipework, pits, and the like	1	item	505,000	505,000
Allowance for subsoil drains including pipework, outlets, and the like	1	item	60,000	60,000
Allowance for linemarking and pavement marking	1	item	80,000	80,000
Allowance for kerb and gutter	700	m	55	38,500
Allowance for mountable kerb	700	m	60	42,000
Allowance for road furniture	1	item	190,000	190,000
Verge (Southbound side)				
Allowance for external lighting	1	item	145,000	145,000
Allowance for street signage	1	item	30,000	30,000
Allowance for landscaping including landscape drainage to verge	1	item	215,000	215,000
Allowance for incidental works	1	item	345,000	345,000
Miscellaneous				
Allowance for islands, signage, and the like between ramp and main road	1	item	75,000	75,000
Allowance to merge and connect to existing Tuggeranong Parkway	1	item	125,000	125,000
Rounding	1	item	500	500
Sub-Total - EWA Eastbound Exit onto Tuggeranong Parkway (Southbound)				*3,174,000*
Roadworks				65,916,000
Cotter Road Upgrade				
Cotter Road Upgrade				
Site Works				

Detailed Breakdown

Project: Default Project **Details:** Preferred Option Cost Estimate
Building: 4520 - Molonglo East-West Arterial Road

Description	Quantity	Unit	Rate	Total
EAST OF CH1400				*(Continued)*
Cotter Road Upgrade				*(Continued)*
Allowance for site preparation including clearance, cut and fill, and the like	1	item	35,000	35,000
Verge				
Allowance for external lighting including removal of existing	1	item	30,000	30,000
Allowance for street signage including removal of existing	1	item	10,000	10,000
Allowance for landscaping including landscape drainage to verge	1	item	35,000	35,000
Allowance for incidental works	1	item	80,000	80,000
Road				
Allowance for flexible pavement including engineered fill	410	m2	180	73,800
Allowance for stormwater drainage complete including in-ground pipework, pits, and the like	1	item	240,000	240,000
Allowance for subsoil drains including pipework, outlets, and the like	1	item	15,000	15,000
Allowance for linemarking and pavement marking	1	item	10,000	10,000
Allowance for kerb and gutter				*Nil*
Allowance for mountable kerb and gutter				*Nil*
Allowance for road furniture	1	item	5,000	5,000
Allowance for modifications to existing traffic signals	1	item	100,000	100,000
Miscellaneous				
Allowance to connect to existing road	1	item	25,000	25,000
Rounding	1	item	200	200
Sub-Total - Cotter Road Upgrade				**659,000**
Cotter Road Upgrade				659,000
EAST OF CH1400				**166,112,000**

Appendix C Noise Assessment

Monday, 8 March 2021

Project number: S190761
Reference: S190761LT1A

Doug Tonge
SMEC Australia Pty Ltd
Level 5, 20 Berry Street North Sydney NSW 2060

Dear Doug,

Molonglo East-West Feasibility Study
Acoustic Design Advice

1 Introduction

Resonate have been engaged by SMEC to prepare a road traffic noise assessment based on one design option for the Monlonglo East-West Link Feasibility Study. The Monlonglo East-West Link (the proposal) would join Tuggeranong Parkway and John Gorton Drive.

The purpose of this report is to provide a description on the methodology and outcomes of the noise modelling assessment for inclusion into the overall Feasibility Study being prepared by SMEC.

The proposal alignment and surrounding roads are shown in Figure 1.

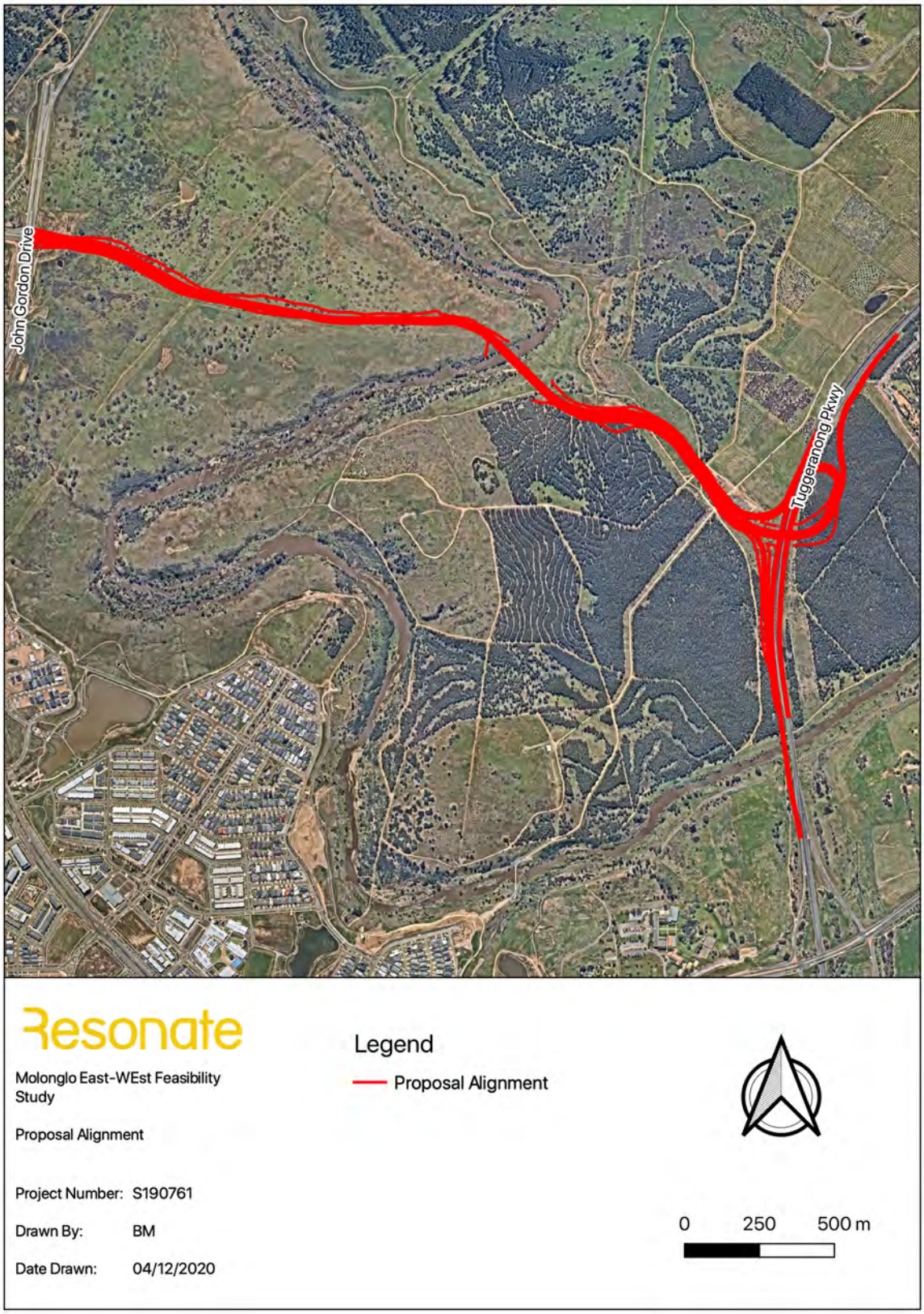

Figure 1 Proposal alignment

2 Road Traffic Noise Modelling

A computer noise model of the existing scenario and the proposed link road was developed using SoundPLAN V8.2 noise prediction software. SoundPLAN implements the UK Calculation of Road Traffic Noise (CoRTN) algorithms for the prediction of road traffic noise. The CoRTN methodology is an accepted road traffic noise prediction method in Australia.

The Roads ACT Noise Management Guideline sets the criteria for residential receivers at $L_{Aeq(15hour)}$ 60 dB at 1m from the building facade. This criterion has been applied as a blanket criterion across the proposal site to determine areas where exceedances may be predicted for future land developments. A build scenario has been modelled in order to determine the potential noise impacts from the proposal for future developments. This scenario includes the following parameters as per Table 1.

Table 1 Road traffic noise modelling parameters, description and relevant assumptions

Parameter	Description / Assumption
Vehicle speeds	• Refer to Appendix A
Traffic volumes	• Refer to Appendix A
Proposal study area	• Roads that influence the noise environment surround the proposal have been included for a minimum distance of 600 m from the proposal alignment
Road traffic noise prediction algorithm	• Calculation of Road Traffic Noise (CoRTN) 1988
Single Source height	• 0.5 m above ground
Pavement corrections	• 0 dB(A) for Densely Graded Asphalt (DGA) applied
Ground absorption factor	• 75% for grassed land
Search radius	• 3 km for grid noise maps.
Grid spacing and height above ground	• 10 m grid • 1.5 m above ground.
Facade reflection correction	• + 2.5 dB(A) at 1 m from facade (single point receiver calculations) • Noise contour plots (grid noise maps) are presented with the facade reflected correction (+2.5 dB(A) incorporated).
Standard Australian condition correction based on ARRB	• -1.7 dB(A) for standard correction at 1 m from facade • -0.7 dB(A) for free field measurements.

3 Road Traffic Noise Assessment

Noise levels have been predicted in the form of noise contours assessed at 1.5 metres above the ground level for the opening year (2041) scenario. These noise contours for the 15-hour day are presented in Appendix B, and are based on the predicted noise levels generated from the proposal in isolation from the noise from existing roads surrounding the proposal.

Reviewing the noise contours in Appendix B, it is apparent that the 60 dB(A) criterion for residential buildings has the potential to be exceeded at residences up to approximately 210 metres from the centre of the proposal alignment towards Tuggeranong Parkway. This distance of exceedance does vary with the predicted traffic volumes and proposed speed limit. The distance of exceedance reduces noticeably where the posted speed limit is proposed to be 50 km/h, which is down to approximately 50 metres towards the west of the proposal.

The proposal is to be located on a greenfield site and as such there are no existing receivers adjacent to the proposal that are predicted to exceed the criterion. Future developments in the area should consider the offset distance of 210 metres as developments within this distance would be predicted to exceed the criteria.

Potential noise mitigation measures should be considered during the detailed design of the proposal in order to reduce the minimum offset distance for future developments. Possible mitigation measures may include one or a combination of the following:

- Low noise pavement (i.e. stone mastic asphalt)
- Noise walls or mounds
- At-property architectural treatments

Low noise pavement along the alignment where the posted speeds are to be 70 km/h or above has the potential to reduce the noise levels generated from the tyre/pavement interface. The noise level reduction is dependent on the low noise pavement to be incorporated into the design. The current proposal assumes DGA which has a noise correction of 0 dB while other options of pavement, i.e. Stone Mastic Asphalt (SMA), have corrections of -1 dB or less. Low noise pavement reduces in effectiveness in locations where the posted speed limit is below 70km/h and hence other forms of noise mitigation such as noise walls or mounds may be more appropriate.

Noise walls (or noise mounds) may prove beneficial across the entire alignment. Noise walls work best where the noise wall obstructs line of sight to the nearby receivers. Given that the proposal is located in a greenfield site and there are presently no receivers in close proximity, consideration of future developments should take into account the potential implementation of noise walls as a form of noise mitigation.

At-Property treatments are typically recommended in locations where at-source or path mitigation measures are not considered reasonable or feasible, or where there are residual exceedances of the criteria after the implementation of other forms of noise mitigation. At-property architectural treatments benefit the internal amenity of receivers but do not provide benefit for the outdoor amenity. Specific details of at-property architectural treatments would be subject to further assessment as the design progresses.

Further noise assessment should be conducted during detailed design of the proposal and consideration should be made for the implementation of noise mitigation measures along the proposal corridor and at-receiver treatments where necessary.

4 Conclusion

Noise modelling has been conducted of the opening year (2041) for the proposal to determine the potential noise impacts to the surrounding environment.

Noise contours have been produced that demonstrate the proposal may generated noise levels above 60 dB(A) out to distances of approximately 210 metres from the centre of the alignment. Future developments within this distance may experience noise levels that would exceed the criteria for residential receivers as set out in Table 1.2 of the Roads ACT noise management guideline.

Potential noise mitigation measures such as low noise pavement and/or noise walls would have a beneficial impact and should be further considered during the detailed design phase of the project.

Please let me know if you have any queries or wish to discuss the above.

Yours sincerely,

Ben Masson

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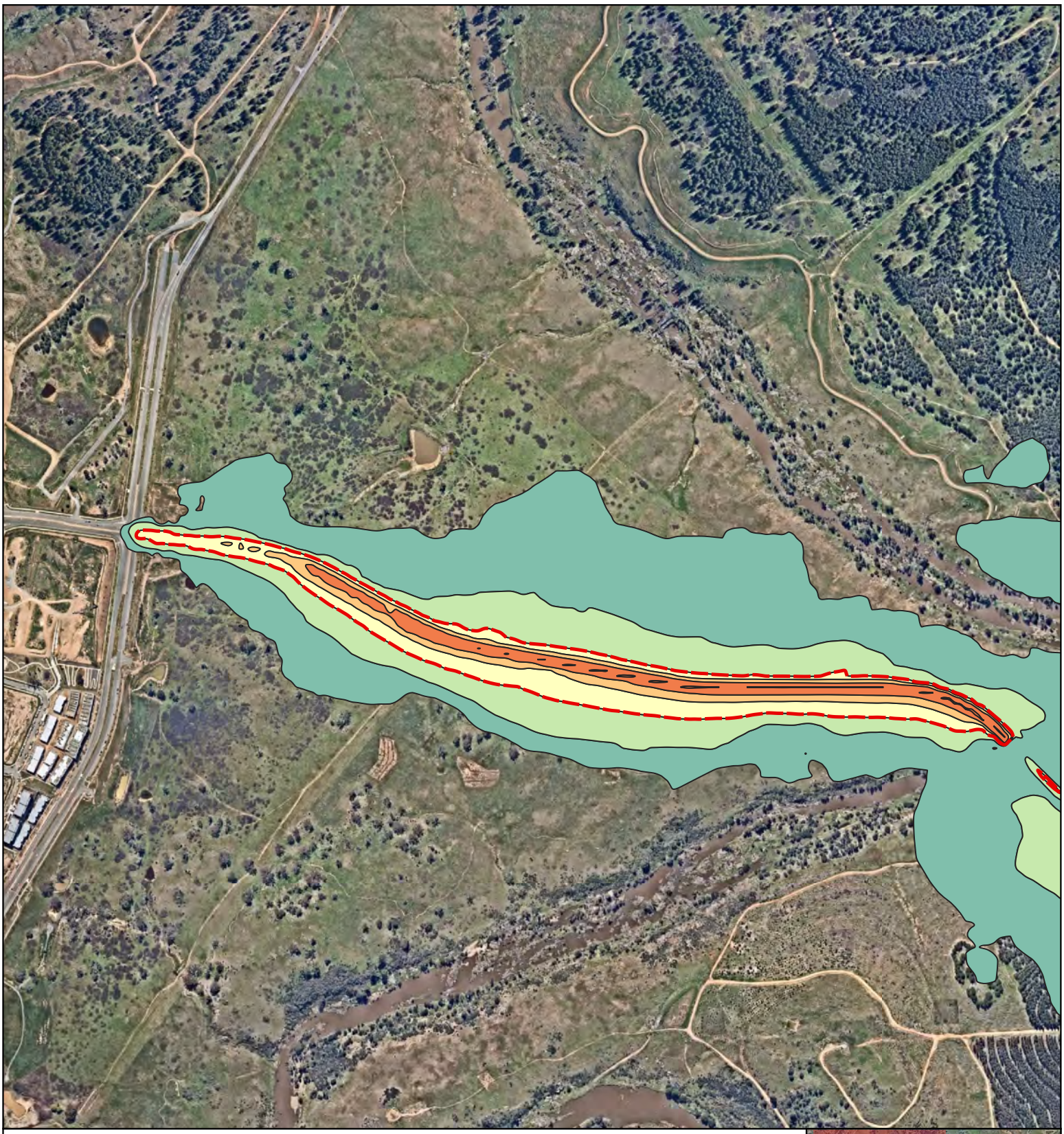
Appendix A – Traffic Volumes and Speeds

Road Section Name[1]	Speed (km/h)	Annual Average Daily Traffic (AADT)	Heavy Vehicle Percentage (HV%)
Link EB 1	50	970	4
Link EB 2	50	2660	4
Link EB 3	70	6340	4
Link EB 4	70	10385	4
Link EB 5	70	10755	4
Link EB 6	70	18635	4
Link WB 1	50	975	1
Link WB 2	50	1550	1
Link WB 3	70	3790	1
Link WB 4	70	5765	1
Link WB 5	70	7020	1
Link WB 6	70	12485	1
Link EB Off Ramp	70	5455	4
Link WB On Ramp	70	7700	1
Link WB On ramp to link road	70	4750	1
Link EB Off Ramp to Highway	70	12655	4

(1) Note that the East - West Link road has been labelled in sections from 1 to 6 from West to East for modelling purposes.

Appendix B – Noise Contours



Resonate

Molonglo East-West Feasibility Study

Opening Year 2041
Day time Noise contours

Project Number: S190761

Drawn By: BM

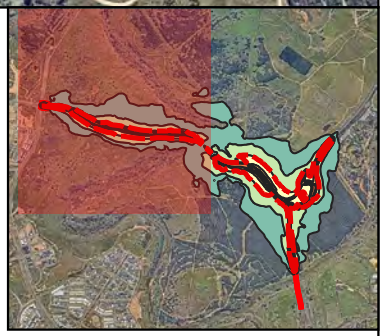
Date Drawn: March 2021

Legend

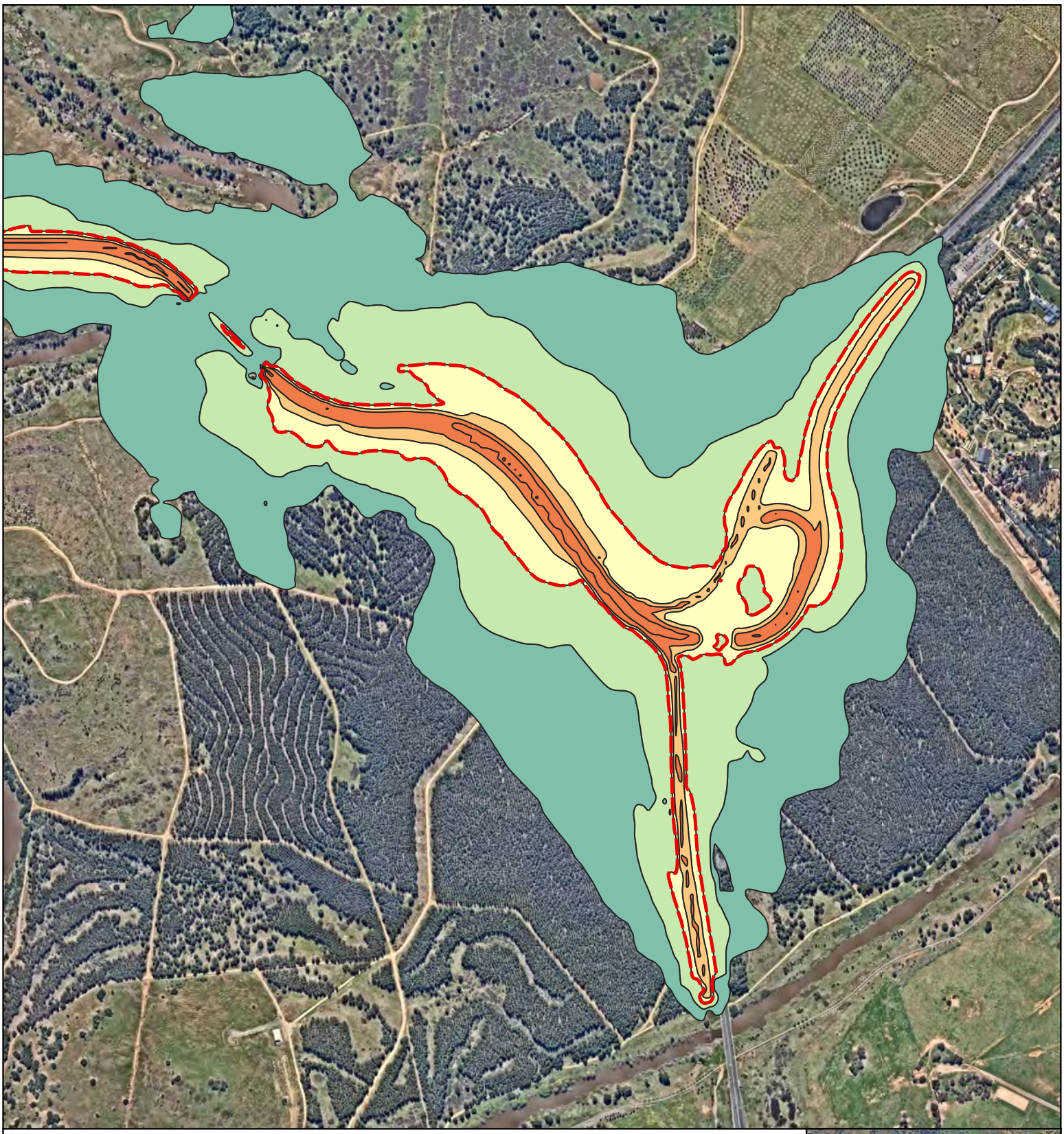
Criteria offset

Noise Contours LAeq (15 hour)

- 55 - 60 dB(A)
- 60 - 65 dB(A)
- 65 - 70 dB(A)
- 70 - 75 dB(A)
- >= 75 dB(A)



0 100 200 m



Resonate

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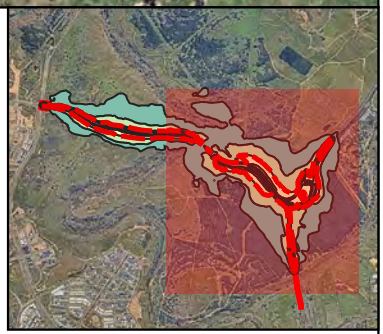
- 55 - 60 dB(A)
- 60 - 65 dB(A)
- 65 - 70 dB(A)
- 70 - 75 dB(A)
- >= 75 dB(A)



0 100 200 m

Appendix D Economic Analysis

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Technical Note

Prepared by: Doug Tonge (SMEC)

Project: **3002754 – Molonglo East West Arterial**

Date: 09 March 2021

Re: **Rapid Economic Appraisal – Rev 02**

Background

Project Background

The three stages of Molonglo Valley development (Molonglo 1, 2 and 3) are proposed to accommodate approximately 50,000 to 55,000 people. The Molonglo East West Arterial (EWA) road was identified as an essential part of the arterial road network for the Molonglo district in earlier traffic and road feasibility studies. The EWA was also identified in the Territory Plan's Molonglo and North Weston Structure Plan and is notionally indicated in the Territory Plan map.

The EWA road is also identified in the Molonglo 3 Planning and Design Framework (February 2019). It is proposed to connect the future suburb of Molonglo and the wider Molonglo development area with the Tuggeranong Parkway via a bridge over the Molonglo River and a new grade-separated interchange at the Tuggeranong Parkway.

The Canberra Strategic Transport Model (CSTM) has demonstrated the need for the EWA road connection to the Tuggeranong Parkway to complement other arterial roads servicing the Molonglo area. This link will provide alternative and direct access for the suburb of Molonglo and Denman Prospect traffic to the Tuggeranong Parkway and the broader ACT trunk road network. Furthermore, it is noted that the West Belconnen (Ginninderry) development and any further possible development west of Molonglo (Western Edge Investigation Area) was not considered in the earlier traffic studies. The possible development of these areas is expected to have significant impacts on forecast traffic volumes for William Hovell Drive (WHD), John Gorton Drive (JGD), the EWA and the wider arterial road network.

Population increases in the Molonglo area will lead to traffic demand that may exceed the combined capacity of other key access roads in the area if EWA is not constructed. Recent traffic modelling has indicated that this growth will drive the need for an alternative arterial road access for Molonglo. The likely beneficiaries of the EWA project are expected to include existing and future residents of Molonglo Valley,

businesses in the area, and future residents to the west of Molonglo should development progress in the Western Edge Investigation Area.

The project study area is situated in the Molonglo Valley of Canberra, ACT. The proposed East West Arterial is proposed to provide an arterial road link between the John Gorton Drive / Holborow Ave intersection in the west and the Tuggeranong Parkway in the east. The site is predominately rolling terrain incised by the Molonglo River, with a combination of farmland and pine plantation. To facilitate the EWA interchange with the Tuggeranong Parkway, it anticipated that upgrade works will be required on the Parkway to the Cotter Rd interchange. The location and extent of the project site is indicated in Figure 1.

Figure 1 – EWA Locality Plan (Metromap, September 2020)

Purpose of the Rapid Economic Appraisal

The purpose of the rapid economic analysis is to assess the economic viability of the proposed preferred Molonglo East West Arterial road by modelling quantifiable benefits and identifying intangible benefits that have not been modelled.

Project Description

The proposed EWA consists of approximately 3 km of new arterial road through a greenfield site connecting into the existing Holborow Ave intersection in the west and the Tuggeranong Parkway to the east. It has one major 4-way signalised intersection along its route where it meets the Molonglo 3 East (M3E) Connector

Road in addition to at least two T intersections. To the east of the M3E Connector Road the EWA is proposed to be a single carriageway (except for around the Molonglo Town Centre where it is dual carriageway), however due to the anticipated introduction of significant demand from the M3E Connector Road, the EWA is proposed to be a dual carriageway to the west of this intersection.

Figure 2 – EWA preferred option alignment

The preferred route option that has been adopted in the strategic design is depicted in Figure 2. The proposed alignment runs immediately adjacent to the Box Gum Woodland to the west of the Molonglo River, generally following the natural surface to the extent possible. The EWA passes through the Molonglo River Corridor reserve and over the Molonglo River on a 3-span, 236 m bridge (refer Figure 3).

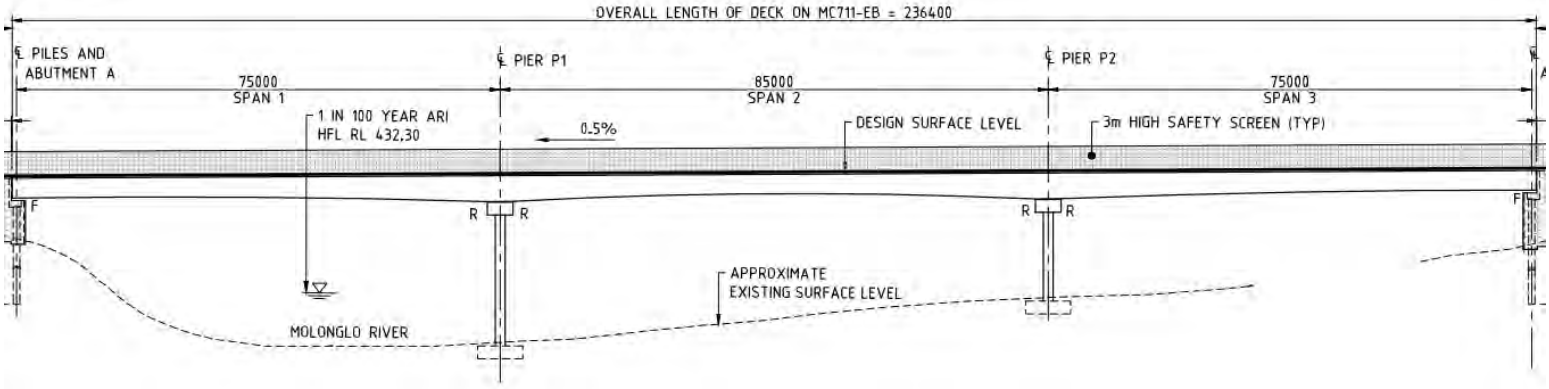

Figure 3 – Proposed Molonglo River Bridge

To the east of the Molonglo River the proposed alignment is curvilinear in response to rolling topography, climbing at 3-5% grades until it nears the Tuggeranong Parkway. The proposed Tuggeranong Parkway interchange consists entirely of free flow ramps, one of which is a loop ramp.

Economic Analysis Methodology

Approach

Cost benefit analysis attempts to provide an assessment of the social benefits of a project or policy by estimating the benefits that accrue to the community from undertaking an activity compared to the cost associated with the construction and operation of the activity. The analysis is conducted in real price terms for a given base year and considers whole of life costs and benefits. This Economic Appraisal has been undertaken in accordance with the requirements of the following documents:

- Australian Transport Assessment and Planning Guidelines – T2 Cost Benefit Analysis, 2016 (ATAP Guidelines)
- Australian Transport Council: National Guidelines for Transport System Management (ATC Guidelines)

In the context of the project stage and level of available information, this economic appraisal has been undertaken as a rapid evaluation. The ATAP Guidelines identify a rapid economic appraisal as a cost-effective way of gauging whether an initiative is likely to pass a detailed appraisal. The rapid appraisal measures the primary costs and benefits of a project, and excludes considerations that are likely to have minimal impact on the economic metrics.

The economic analysis has been undertaken broadly consistent with the process described in the ATAP Guidelines. This process is reflective of a standard industry approach to CBA and includes the following steps, noting that given the rapid nature of this assessment some steps have been abbreviated / excluded:

Step 1 - Specify the initiative and analyse options

Step 2 - Identify the benefits and costs

Step 3 - Estimate investment costs

Step 4 - Make demand forecasts

Step 5 - Estimate infrastructure operating costs

Step 6 - Estimate user benefits

Step 7 - Estimate cross-modal and network effects

Step 8 - Estimate safety benefits

Step 9 - Estimate externality benefits and costs

Step 10 - Discount benefits and costs, calculate summary results

Step 11 - Assess risk and uncertainty

The application of these steps in this rapid assessment are described below.

Step 1 – Project Options

Two options have been considered in the economic analysis for the Molonglo EWA – a base case and a project case. Descriptions of the Base Case and the Project Case are provided as part of the discussion on Economic Assumptions section of the Technical Note.

- **Base Case –** The Base Case forms the reference for which the project option has been considered against. All benefits and costs identified in the CBA process are relative to what would occur in the Base Case scenario. The Base Case has been defined as the component of the EWA works required to facilitate access to the development area to the west of the Molonglo River.
- **Project Case** – The Project Case has been defined as the remainder of the preferred EWA option alignment, consisting of the EWA alignment from immediately west of the Molonglo River to the

Tuggeranong Parkway inclusive of the Molonglo River Bridge, the Molonglo 3 east Connector Road intersection and the Tuggeranong Parkway interchange.

Step 2 – Identify Costs & Benefits

Project costs represent the negative implications of proceeding with the project. Two primary cost elements have been considered in the analysis – up front capital costs and recurrent operational costs:

- Capital costs entail all costs associated with the initial delivery of the project, inclusive of items such as design, project management and construction costs.
- Operational & maintenance costs relate to the cost of ensuring the ongoing function of the asset. This includes items such as pavement repair / renewal, cyclic maintenance, and utility costs associated with elements such as street lighting and traffic signal operation

Project benefits represent the positive outcomes associated with the project. These benefits often relate to savings or improved amenity experienced by users of the infrastructure, and are derived by monetisation of items based on past research that has identified values that society places on various levels of benefit. The primary benefits that have been included in this rapid economic analysis relate to travel time savings and vehicle operating costs (VOC) savings. Whilst other benefits may arise from the upgrade options (such as safety benefits, travel time certainty, congestion reduction and other environmental externalities), these are expected to be relatively minor by comparison to travel time and VOC savings and as such the focus of this rapid evaluation has been on these two primary benefit streams. It is anticipated that these additional benefits will be accounted for in future detailed economic appraisals.

Step 3– Estimate Investment Costs

Capital investments costs associated with the project have been based on Opinion of Costs developed as part of the strategic design process. Given the nature of the proposed works, and the necessity for some of the arterial road to be constructed to facilitate development to the west of the Molonglo River, the base case has been assumed to be a partial construction of the EWA. That is, the base case is assumed to have positive capital cost requirement. The basis of this assumption is discussed in further detail below.

Step 4 – Estimate Demand Forecasts

Demand forecasts for the economic analysis have been derived from the Canberra Strategic Transport Model (CSTM). These demand forecasts are documented in the *Strategic Transport Scenarios Modelling Technical Note* developed by SMEC in November 2020. Traffic modelling undertaken as part of this study was based on whole of network impacts associated with the EWA and included the following demand scenarios:

- 2031 Forecast Year
- 2041 Forecast Year

Step 5 - Estimate infrastructure operating costs

A simplified method of estimating operating costs has been undertaken based on the new assets associated with the base case and project options.

Step 6 - Estimate User Benefits

User benefits have been calculated based on travel time savings and anticipated VOC reductions derived from outputs of the traffic modelling for each of the options:

- Travel time savings describe the benefit that people receive by spending less time in transit. Time spent travelling by an individual is time that would otherwise be spent either on productive activity or on leisure, and therefore represents a cost to society. Hence reductions in travel time are

considered a societal benefit. The travel time cost is calculated based on assumed: values of time; occupancy rates for vehicle types; and vehicle type distribution percentages.

- Vehicle Operating Savings (per km - VOC) represents the cost of operating a vehicle, which varies with distance travelled and travel speed. The cost includes fixed vehicle costs and variable (running) costs such as depreciation, tyres, fuel and maintenance. VOC savings depends on the number of Vehicle-Kilometres Travelled (VKT), as well as average operating speed.

Parameters contained in the ATAP Guidelines have been used to monetise these benefits.

Step 7-9 - Estimate Cross-modal / Network Effects + Safety Benefits and Externalities

Network wide effects, safety benefits and externalities have been excluded from this rapid evaluation. It is anticipated that these effects will be captured in a future detailed evaluation.

Step 10 - Discount benefits and costs, calculate summary results

When considering investment in a project that has ongoing costs and benefits over a defined time horizon, economic analysis must consider the positive time preference that people have for present consumption over future consumption. As such, this CBA applies a discount rate to future costs and benefits which measures how investments in the present are valued in exchange for additional value in the future. A range of discounts rates have been considered in the evaluation of each project option to understand the sensitivity of the CBA results to variation in discount rate. Various jurisdictions nominate different benchmark discount rates for project analysis, however consistent with the approach recommended by Transport for NSW and Infrastructure Australia, a discount rate of 7% is the primary rate considered in the analysis, with rates of 4% & 10% also been tested to provide a broader sense of the economic viability of the project in relation to alternative discount rates. Consistent with standard practice across jurisdictions, the analysis horizon will be 30 years from project opening.

The economic merit of an infrastructure project can be evaluated using several different metrics. The Molonglo EWA analysis has been assessed using the following key economic performance measures to estimate the economic viability of each project:

- **Net Present Value (NPV)** is a measure of the magnitude of net benefit to society from the project, equal to the present value of benefits less the present value of costs of the project (with future values discounted). NPV provides a single overall net economic project value and is given by the following expression:

$$NPV = \sum_{t=0}^{t=n} \frac{(B_t - C_t)}{(1+r)^t}$$

where B_t = Benefits in time period t
C_t = Costs in time period t
r = discount rate
n = project time horizon

The general threshold value for the economic viability of a project is to have a positive NPV (i.e. greater than zero).

- **Benefit Cost Ratio (BCR)** is a measure of the magnitude of net benefit to society derived from the total cost investment in the project. It is a ratio of all project benefits to costs (with future values discounted). The BCR is given by the following expression:

$$BCR = \frac{\sum_{t=0}^{t=n} \frac{(B)_t}{(1+r)^t}}{\sum_{t=0}^{t=n} \frac{(C)_t}{(1+r)^t}}$$

where B_t = Benefits in time period t

C_t = Costs in time period t

r = discount rate

n = project time horizon

The general threshold value for the economic viability of a project is to have a BCR that is greater than 1.

Step 11 - Assess risk and uncertainty

Risk analysis is sometimes employed in CBA assessments to give a broader and more robust estimate of the range of likely NPV or BCR results. Such risk analyses typically apply probabilistic distributions to identified costs and benefits to generate an envelope in which these impacts are likely to fall. However, in the absence of probabilistic cost estimates or project risk analysis, and given the rapid nature of the evaluation, it is not considered appropriate to incorporate risk analysis into this economic appraisal.

Sensitivity analysis seeks assess uncertainty and identify which project variables are likely to significantly impact on the CBA results, and to better understand the likely implications to the CBA if these variables were not accurately anticipated. As such a range of sensitivities relating to capital cost and benefits levels have been tested.

Economic Inputs, Parameters and Assumptions

Economic Assumptions – Analysis Time Horizons & Cost Profile

There is a degree of uncertainty about the land release programme for the Molonglo 3 precinct, and by extension the delivery timeframes for the EWA. From review of assumed network upgrades embedded in the CSTM it is understood that the EWA is not anticipated to be in place 2031, but is expected to be operational by 2041. However, as the analysis is undertaken in real price terms (refer discussion below), the construction start date does to not affect the economic metrics.

In the absence of a definitive timeframe information, the year of opening for the EWA has been assumed to be 2032. The rationale for this assumption is centred primarily on:

1) Current strategic network planning - the EWA is expected to come on line between 2031 to 2041
2) The availability of traffic modelling information – strategic modelling outputs are not available beyond 2041. An assumption of opening in 2032 allows the greatest adoption of available strategic modelling outputs. The adoption of a later opening date would require the use of traffic modelling forecasts that are further into the future and subsequently open to greater uncertainty and potential inaccuracy.
3) Later opening dates are expected to indicate higher demand flows on the EWA. As such, the adoption of an opening year of 2032 is considered likely experience lower demand on the EWA, and as such the analysis will produce more conservative economic metrics.

The assumed notional spend profile over the course of the project development is four years is provided in Table 1:

Table 1: Assumed Spend Profile

Year	Base Case		Project Case	
	Project Stage	Cost Allocation	Project Stage	Cost Allocation
2028	Concept Design	33% of design estimate	Concept Design	33% of design estimate
2029	Detailed Design	67% of design estimate	Detailed Design	67% of design estimate
2030	Construction	As per estimate	Construction	50% of estimate
2031			Construction	50% of estimate

A simplified method of calculating maintenance costs has been used in the used in the analysis. These maintenance costs have been applied to both the base and project case. The difference in maintenance costs between the two project cases determines the operational cost of the project. For road pavements, routine maintenance has been assumed to occur once a year, with resurfacing occurring every 10 years and major rehibition undertaken every 20 years. Routine maintenance is assumed not to occur every tenth year, and resurfacing does not occur when major rehabilitation is undertaken. General maintenance on structures (graffiti removal) and concrete maintenance have been annualised, as have the costs associated with streetlighting and signalisation.

Consistent with guidance in the ATAP Guidelines, an analysis horizon of 30 years from project opening (i.e. 2032 – 2061) has been adopted, which is considered typical for road projects.

Economic Assumptions – Economic Values & Prices

All economic calculations have been undertaken using real prices, benchmarked to 2020 Australian Dollars. Consistent with standard industry practice, inflation has not been considered for any future costs or benefits. Similarly, construction escalation has not been considered in the analysis.

The parameters used for the CBA have primarily been taken from the ATAP Guidelines. Where these parameters are represented by a price in a given year, the value has been inflated to 2020 dollars using different indices based on the type of item the price relates to:

- Australian national CPI where the price relates to consumption items and injury costs
- The Australian Transport Index where the price relates to transportation costs
- The Australian Average Weekly Earning index where the price relates to values placed on time.

Economic Assumptions – Base Case

The Base Case adopted for the analysis is the “Do Minimum” scenario. In the case of the EWA, the Do Minimum is considered to be the construction of the EWA to between CH 0000 – 1400. This partial delivery of the EWA is considered necessary to facilitate the development of the precinct . In the Base Case scenario, this length of road will serve a local or collector road function rather than an arterial function. However, notwithstanding the classification of the road (arterial versus collector / local), the required infrastructure elements (cross section, pavement areas, utility requirements) are considered likely to be similar, and such the costs identified for CH 0000 – 1400 of the EWA are considered appropriate for adoption in the Base Case. The extent of works required for the Base Case is indicated in Figure 4.

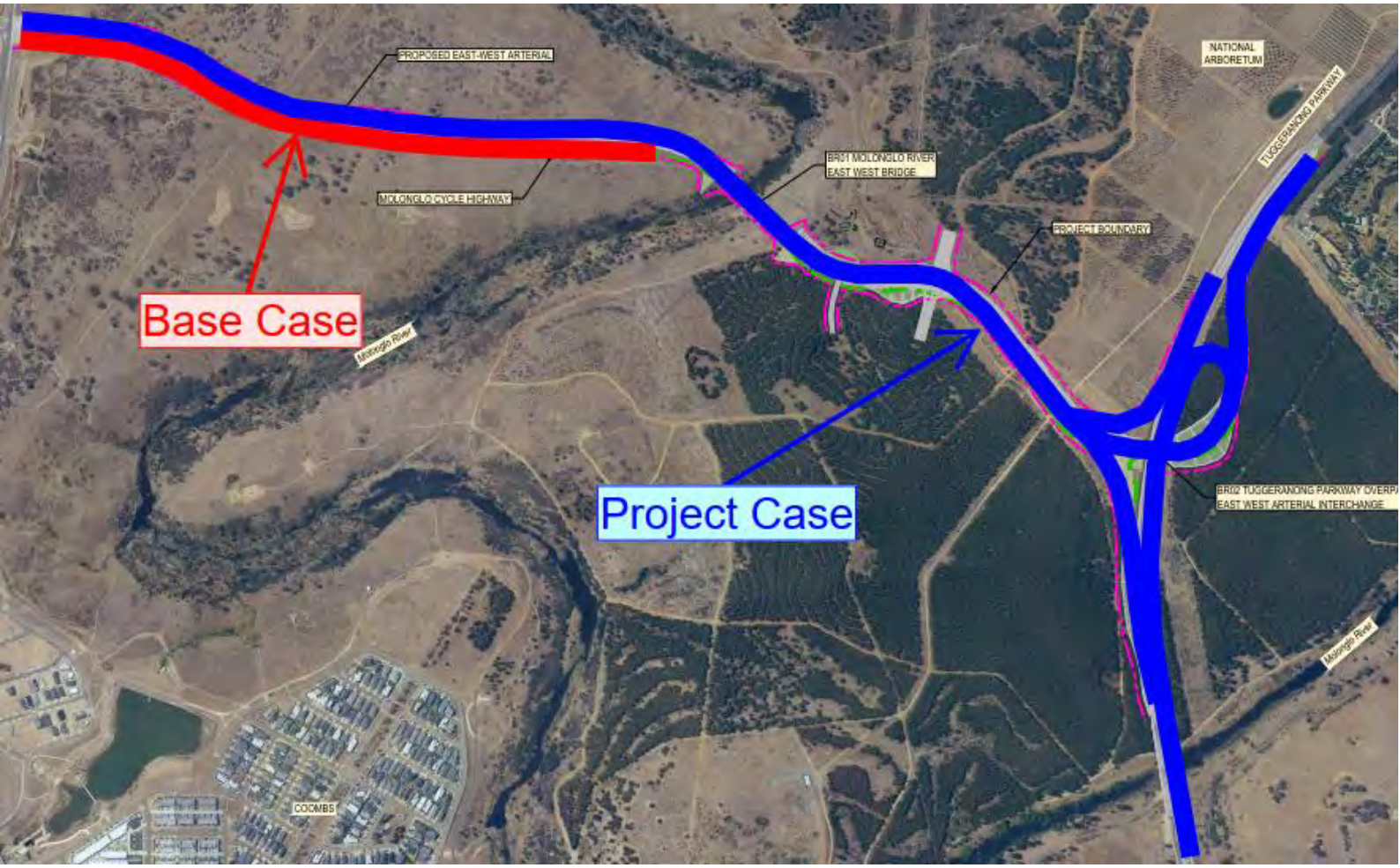

Figure 4 – EWA base and project cases

In terms of network operation, the Base Case does not provide a link between John Gorton Drive and the M3E precinct / the Tuggeranong Parkway in addition to failing to provide a link between the M3E precinct and the Tuggeranong Parkway. This has significant and wide-reaching implications for the operation of road network both in the Molonglo Valley and beyond. These implications are discussed in further detail below.

Economic Assumptions – Project Case

The project case assessed in the economic analysis is the provision of the entire EWA project outlined in the Project Description above. It differs from the Base Case in that it provides a link between the Molonglo precinct west of the River to the Molonglo 3 East area and connectivity to the Tuggeranong Parkway. The extent of the EWA Project Case is also indicated in Figure 4.

Economic Assumptions – Traffic Modelling

Traffic Modelling inputs used in the economic modelling have been derived from the in the *Strategic Transport Scenarios Modelling Technical Note* developed by SMEC in November 2020. Full details of the specific scenario assumptions (including traffic demand totals and modelled network assumptions) used for the rapid economic appraisal are detailed in the Technical Note, noting the following:

- The "Without Western Edge" land use scenario has been used as the basis of the traffic performance for the economic assessment.
- Results from Option 3 assessed in the in the Strategic Transport Technical Note have been used to inform this Economic Appraisal as it is considered substantively the same as the preferred option from a strategic modelling perspective.

TransCAD strategic modelling of the Base Case and the Project Case was undertaken of the AM and PM peak hours (8am – 9am and 5pm – 6pm) for the Canberra road network defined in the CSTM. The aggregate of these two peaks in combination with an annual expansion factor has been used to generate annual traffic benefits associated with the project scenarios. An example output from the CSTM modelling of both the Base Case and the Project Case indicating forecast demand flows and Volume / Capacity ratios are provided in Figure 5 and Figure 6.

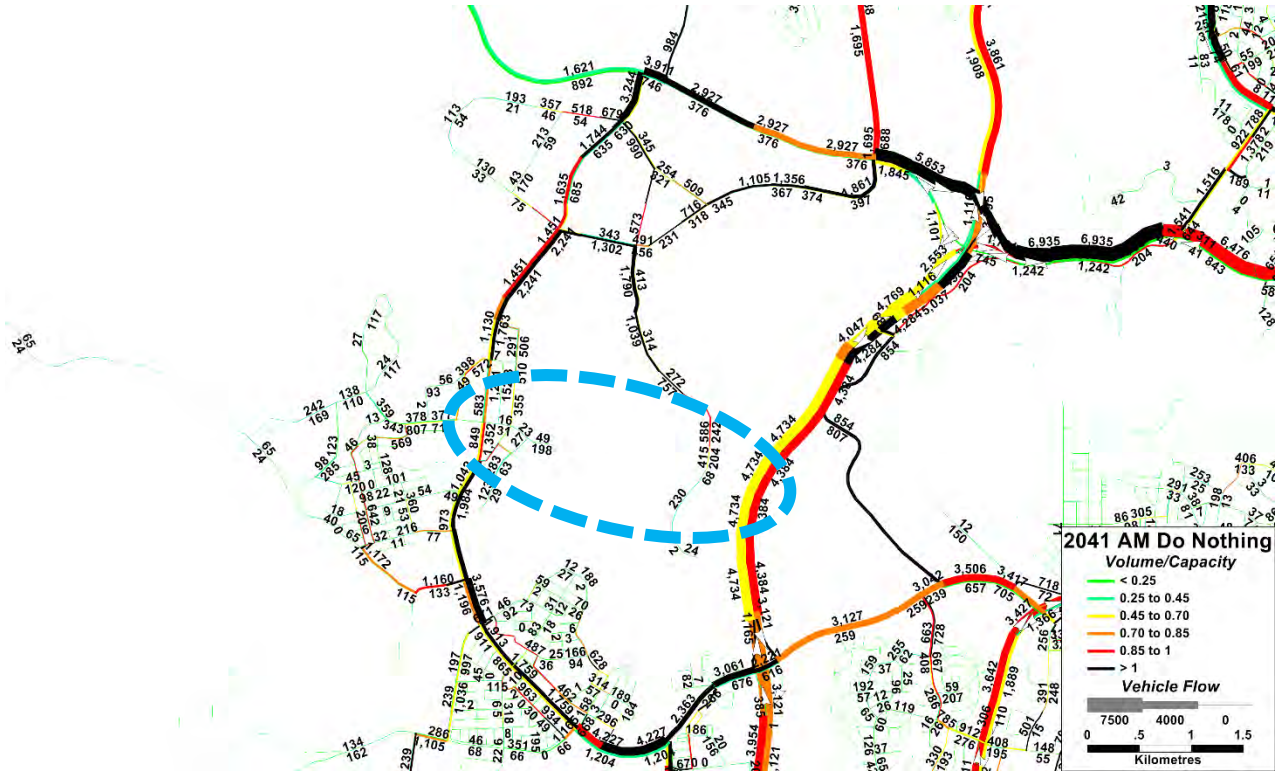

Figure 5 – EWA 2041 AM Base Case – no EWA connection between JGD and the Tuggeranong Parkway

Figure 6 – EWA 2041 AM Project Case – arterial road connection between JGD and the Tuggeranong Parkway (EWA indicated)

The model periods incorporated into the economic analysis were for years 2031 and 2041. Linear interpolation has been assumed for forecasting between the modelled years for the base case, and zero growth has been assumed for traffic benefits post 2041.

Due to the way delay is calculated in the CSTM, it was found that some links (approximately 0.2% of the 25,452 links in the model) had unrealistically low travel speeds. These links were very sensitive to changes in the flow and artificially increased the travel time savings of the proposed EWA. These links have been removed from the modelling results in this economic assessment in an effort to provide a more robust indication of network performance.

Economic Modelling Parameter Sources

Many values used in economic assessment are not readily quantifiable (e.g. the value people place on time). In these cases, the CBA uses shadow prices to apply a value to various measures of benefits and costs. These parameters have been used in the construction of the economic models for the EWA and are based on previous research and guidelines.

Economic Modelling Parameter Values

The primary parameter values (in $2020) that have been used in the economic analysis are contained in Table 2. A detailed list of all parameter values used in the economic evaluation are provided in the enclosed economic models.

Table 2: Economic Parameter Values - Various

Parameter	Parameter Value	Source
Value of time – Private LV	$28.20 / hr	ATAP PV Table 12
Value of time – Business LV	$80.05 / hr	ATAP PV Table 12
Proportion of LVs for business	1.4%	CSTM
Proportion of HVs	2%	Notional peak estimate for Canberra network
Weighted ave value of time	$28.93 / hr	ATAP PV Table 12
Value of time – HV	$40.38 - $161.40 / hr	ATAP PV Table 12
Expansion Factor - 1hr peak to day	8	Volume EF (ACT travel survey – 1997)
Expansion Factor - Day to yearly	252	Volume expansion – weekday to year

Calculation of vehicle operating costs (VOCs) was based on vehicle kilometres travelled (VKT) and average speeds, using the parameters described in Table 35 of the ATAP Guidelines. It is noted that the 60 km/h is the decision threshold for the stop-start vs free flow methodology for calculating VOCs. As such, given that average speeds across the network are in the order of 25-44 km/h, the economic modelling adopted the stop-start approach.

Economic Benefit Inputs - Traffic

The economic benefits associated with the upgrade options relate to travel time and vehicle operating cost savings. The vehicle related savings between the base case and the project scenarios are a function of forecast traffic vehicle kilometres travelled (VKT); Vehicle Hours Travelled (VHT); and average travel speed, all of which are outputs produced by the traffic modelling. A summary of the traffic performance over the two modelled peaks the base case and the project options is provided in Table 3 and Table 4.

Table 3: Economic benefit inputs – 2031 traffic modelling results

Operational Measure		AM Peak		PM Peak	
		Base Case	Project Case	Base Case	Project Case
Person Trip Total	Person Trips	184,492	184,492	167,196	167,196
Auto Vehicle km Travelled	Car VKT	1,584,069	1,579,875	1,538,118	1,530,746
Auto Vehicle Hours Travelled	Car VHT	38,922	37,512	34,637	33,656
Heavy Vehicle km Travelled	HV VKT	31,681	31,598	30,762	30,615
Heavy Vehicle Hours Travelled	HV VHT	778	750	693	673
Car Speed		40.7	42.1	44.4	45.5

Table 4: Economic benefit inputs – 2041 traffic modelling results

Operational Measure		AM Peak		PM Peak	
		Base Case	Project Case	Base Case	Project Case
Person Trip Total	Person Trips	209,600	209,600	191,119	191,119
Auto Vehicle km Travelled	Car VKT	1,784,207	1,778,009	1,735,691	1,727,217
Auto Vehicle Hours Travelled	Car VHT	55,828	52,585	48,446	46,081
Heavy Vehicle km Travelled	HV VKT	35,684	35,560	34,714	34,544
Heavy Vehicle Hours Travelle	HV VHT	1,117	1,052	969	922
Car Speed		32.0	33.8	35.8	37.5

Economic Benefit Inputs – Residual Value

Infrastructure at the time of its construction has a specified design life. If the asset design life exceeds the economic analysis time horizon (30 years in case of this analysis), then the asset will have a proportion of its design life that is unused. This residual life at the end of the analysis period means that the asset has a residual value that should be included in the economic analysis. The economic analysis has used a linear depreciation approach to calculate the residual value of proposed bridge and retaining wall infrastructure based on an assumed design life of 100 year.

Economic Cost Inputs

The economic costs of the projects relate up front capital expenditure and ongoing recurrent maintenance costs. Capital expenditure is associated with the cost of project design development, management and construction. A summary of the capital costs for the two project options are provided in Table 5.

Table 5: Project Capital Costs ($2020 M)

Cost Item	Base Case	Project Case
Design Cost	$3.0	$22.3
Construction Cost	$22.7	$169.5
Total	**$25.7**	**$191.8**

Recurrent costs relate to the ongoing operation and maintenance of the assets associated with the upgrade. These costs relate to utilities (eg power consumption of assets), cyclic maintenance (eg structure or pavement repairs), and cleaning/landscape maintenance. A summary of modelled operational and maintenance costs assumed for the upgrades is provided in Table 6. These estimates are based on a combination notional power consumption / costs and rates obtained for similar projects / road infrastructure.

Table 6: Assumed operational and maintenance costs

Item	Cost
Traffic Signals (power + maintenance)	$4k per set ($1 k power + $3k O&M)
Streetlighting (power + maintenance)	$50 / 500m^2 of pavement (notional per lantern - $20 power + $30 O&M)
Pavement Maintenance	- $0.40 / m^2 - routine (yearly) - $55 / m^2 resurfacing (10 yearly) - $330 / m^2 major rehab (20 yearly)
Bridge Structure	- $0.75 / m^2 – concrete repair annualised - $6 / m^2 anti-graffiti treatment (annualised)

Analysis Limitations

Due to the nature of this CBA (rapid appraisal), the stage of project development, available information and methodological constraints, this economic analysis necessarily has a number of limitations:

- *Facilitation of M3E development* – Local Territory Development codes have requirements around access and travel times for emergency response vehicles. Based on current plans for emergency response stations in the Molonglo Valley, the EWA is required to ensure that to ensure that emergency response times to all zones of the M3E precinct comply with code requirements. As such, without the EWA additional emergency service facilities will be required or proposed developments in the M3E precinct will fail to comply with local Territory planning requirements.
- *Crash Costs* – Accidents impose a cost on society, whether it relates to property damage losses or personal injury costs. The provision of the EWA will reduce travel distances for many road users which in turn decreases the likely number of crashes. Consequently, there is likely to be accident savings associated with the EWA, however safety benefits are expected to be relatively minor compared to the anticipated travel time and vehicle operating cost benefits. As such, and given the rapid nature of this assessment, crash costs have not been considered in this economic analysis.
- *Funding Costs* - The question of economic efficiency in the context of project funding, and the measure of Dead Weight Loss associated with collection of necessary revenue to fund the project has not been considered in the analysis. That is, different methods of infrastructure funding carry

different costs. Furthermore, raising revenue through the tax base draws economic inefficiency. This cost, known as the Marginal Excess Burden of Tax, has been estimated in Australia as 19-24% over and above the tax revenue collected[1]. This economic cost has not been considered in this CBA.

- *Travel Time Reliability* - This is the measure of variability of travel time through the network. Travellers have an expectation that they will be confident of arrival at their destination at a certain time. Lack of such certainty may create the need allow a buffer time which could lead to idle time at the end of the trip. Given the available modelling conducted for this analysis, it was not possible to calculate travel time reliability and required buffer times.
- *Construction impacts on network performance* - Large-scale construction works on existing transport networks are likely to have a negative impact on traffic performance, increasing delay and travel times for the site in addition to potential increase in accidents rates. These impacts are difficult to quantify without a thorough understanding of the proposed traffic management regime over the course of the construction period and as such have not been considered in this economic analysis.
- Environmental externalities - Environmental externalities such as CO2 and noxious gas emissions emanating from transport vehicles impose a social cost on the community. However, these tend to be minor contributors to economic performance and given the rapid nature of this economic appraisal environmental externalities have not been considered.
- *Social Inclusion Benefits* - Transportation projects can play a valuable role in allowing all members of the community to become socially included and engaged. Whilst social inclusion is an important consideration when assessing the provision of transport infrastructure, it is noted it has not yet been accommodated in formal evaluation and planning processes in Australia. As such, social inclusion benefits associated with the proposed options have not been included in the analysis.
- *Secondary Market Impacts* - Wider economic benefits or secondary market effects are sometimes considered in CBA assessments. However, in the absence of a market failure, inclusion of these secondary market effects can often lead to double-counting of benefits. For this reason, and in the context of the rapid appraisal nature of this analysis, wider economic benefits have not been considered as part of this CBA assessment.
- *M3E Arterial Road Accessibility* – The Estate Development Code (EDC) requires that all dwellings be located within 1200m driving distance of an arterial road (Rule 58). M3E is located approximately 3.5-4.0km away from John Gorton Drive and 5 km away from William Hovell Dve, which would be the closest arterial roads if EWA is not constructed. Without the EWA the type of development allowed in M3E would be severely restricted.
- *Western Edge Investigation Area* – The potential Western Edge Investigation Area urban development will place additional load on the transport network in the Molonglo valley. The EWA is expected to become increasingly critical to network performance should the WEIA come online.
- *Intangible Effects* - It is possible that the project may result in a number of intangible effects. These impacts may be either positive or negative, however by their nature they are not quantifiable and hence have not been considered as part of this economic analysis.

Economic Modelling

The results of the economic analysis for the EWA are provided in Table 7. These results indicate that the preferred EWA option is economically viable, with strongly positive NPVs and BCRs well above 1 at all considered discount rates. Indeed, with an NPV of over $1B and a BCR greater than 10 at a 7% discount rate, the economic modelling indicates that the EWA will provide a very high return on investment.

[1] Campbell, H, & Bond, K, 1997, 'The cost of public funds in Australia', Economic Record, vol. 73, pp. 22-34.

It is noted however that these results are a product of significant improvements in network performance that result from the provision of the EWA, and that the base case traffic modelling indicates substantial failure on many links in the network. It is understood that certain parameters that are currently used in the CSTM may not accurately model network performance in high congestion scenarios, and that network delay may be overstated as links in the model exceed their capacity. It is therefore likely that improvements in network performance resulting from the EWA are exaggerated, and by extension the strong economic benefits resulting from the EWA are overstated.

Table 7: Economic indicators for the EWA project ($2020 M)

Economic Indicator	Discount Rate		
	4%	7%	10%
PV Cost	$154.3	$137.2	$123.6
PV Benefit	$3,264.8	$2,005.8	$1,309.2
NPV	$3,110.4	$1,868.6	$1,185.6
BCR	21.2	14.6	10.6

The value of the benefit streams for the EWA project is summarised in Table 8. As can be seen, travel time savings are the primary benefit stream and constitute approximately 70% of benefits for the economically viable project options. Travel time benefits are result of a significant reduction in hours travelled across the broader Canberra road network associated with the provision of the EWA. The majority of the remaining benefit (approximately 30%) is attributable to vehicle operating cost savings that result from: 1) shorter journey lengths due to the improved connectivity provided by the EWA, and 2) faster average travel speeds throughout the network.

Table 8: Benefit stream results for the EWA ($2020 M)

Discount Rate	Travel Time Savings	VOC Savings	Residual Value
4%	$2,263.1	$988.1	$13.6
7%	$1,392.3	$608.5	$5.0
10%	$909.4	$397.9	$1.9

A sensitivity analysis was undertaken to assess whether the results of the CBA were likely to be affected by the input assumptions. The sensitivity analysis tested various scenarios associated with overall increases and decreases in cost and benefits streams. The results of this sensitivity test for various discount rates are provided in Table 9. The sensitivity analysis indicates that the EWA project remains economically viable for all sensitivity scenarios, and even when benefits are reduced by 40%, the project still returns an NPV over $1B at a 7% discount rate.

Table 9: Sensitivity analysis results for the EWA project ($2020 M)

	PV Costs	PV Benefits	NPV	BCR
20% Reduction in Costs				
4%	$125.2	$3,264.8	$3,139.6	26.1
7%	$110.7	$2,005.8	$1,895.1	18.1
10%	$99.4	$1,309.2	$1,209.8	13.2
20% Increase in Costs				
4%	$183.5	$3,264.8	$3,081.3	17.8
7%	$163.7	$2,005.8	$1,842.1	12.3
10%	$147.8	$1,309.2	$1,161.4	8.9
40% Increase in Costs				
4%	$212.6	$3,264.8	$3,052.2	15.4
7%	$190.2	$2,005.8	$1,815.6	10.5
10%	$172.0	$1,309.2	$1,137.2	7.6
20% Increase in Benefits				
4%	$154.3	$3,917.7	$3,763.4	25.4
7%	$137.2	$2,406.9	$2,269.8	17.5
10%	$123.6	$1,571.0	$1,447.5	12.7
20% Reduction in Benefits				
4%	$154.3	$2,611.8	$2,457.5	16.9
7%	$137.2	$1,604.6	$1,467.4	11.7
10%	$123.6	$1,047.4	$923.8	8.5
40% Reduction in Benefits				
4%	$154.3	$1,958.9	$1,804.5	12.7
7%	$137.2	$1,203.5	$1,066.3	8.8
10%	$123.6	$785.5	$661.9	6.4

Conclusions

The rapid economic analysis of the East West Arterial indicates that the project is strongly economically viable, providing considerable travel time savings to road users in addition to substantial savings in vehicle operating costs. These savings are experienced both by local users of the EWA, in addition to users of the broader transport network that will be impacted by traffic generated in the Molonglo Valley if the EWA is not provided.

It is noted however, that there are some concerns around the accuracy of the strategic modelling inputs that have been used as a basis for the economic modelling. It is understood that the Territory is currently considering modifications to some of the CSTM parameters to improve the model's performance at high levels of congestion which are likely to provide more accurate results in future model years. It is recommended that the economic modelling for the EWA be revisited when these updates to the CSTM are made. It is expected that revisions to the CSTM outputs are likely to reduce the NPVs and BCRs associated with the EWA.

Notwithstanding the need for refinement of strategic traffic modelling, it can be concluded that provision of the EWA will play an important role in alleviating congestion on the Canberra road network, and that these congestion improvements will provide considerable economic benefit to the community. As such, and given the current strength of the economic performance of the project, there appears to be a compelling case to advance the project to further stages of development in the future.

Appendices

- Appendix A – Economic Model

Appendix A – Economic Model

CBA Economic Model
Molonglo EWA
CBA Results

SMEC
Member of the Surbana Jurong Group

11/12/2020
Project No: 3002754

Project Location	Molonglo Valley, ACT Molonglo EWA

CBA Results

	Discount Rate		
	4%	7%	10%
PV Costs	$154.3	$137.2	$123.6
PV Benefits	$3,264.8	$2,005.8	$1,309.2
NPV	$3,110.4	$1,868.6	$1,185.6
BCR	21.2	14.6	10.6

Present Value of Benefit Streams

Discount Rate	Travel Time Savings	VOC Savings	Residual Value
4%	$2,263.1	$988.1	$13.6
7%	$1,392.3	$608.5	$5.0
10%	$909.4	$397.9	$1.9

Sensitivity Analysis Results

20% Reduction in Costs

Discount Rate	PV Costs	PV Benefits	NPV	BCR
4%	$125.2	$3,264.8	$3,139.6	26.1
7%	$110.7	$2,005.8	$1,895.1	18.1
10%	$99.4	$1,309.2	$1,209.8	13.2

20% Increase in Costs

Discount Rate	PV Costs	PV Benefits	NPV	BCR
4%	$183.5	$3,264.8	$3,081.3	17.8
7%	$163.7	$2,005.8	$1,842.1	12.3
10%	$147.8	$1,309.2	$1,161.4	8.9

40% Increase in Costs

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10%	$172.0	$1,309.2	$1,137.2	7.6

20% Increase in Benefits

Discount Rate	PV Costs	PV Benefits	NPV	BCR
4%	$154.3	$3,917.7	$3,763.4	25.4
7%	$137.2	$2,406.9	$2,269.8	17.5
10%	$123.6	$1,571.0	$1,447.5	12.7

20% Reduction in Benefits

Discount Rate	PV Costs	PV Benefits	NPV	BCR
4%	$154.3	$2,611.8	$2,457.5	16.9
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40% Reduction in Benefits

Discount Rate	PV Costs	PV Benefits	NPV	BCR
4%	$154.3	$1,958.9	$1,804.5	12.7
7%	$137.2	$1,203.5	$1,066.3	8.8
10%	$123.6	$785.5	$661.9	6.4

CBA Economic Model
Molonglo EWA
Model Inputs - Cost

Member of the Surbana Jurong Group

Project No: 3002754

11/12/2020

Project Location	Molonglo Valley, ACT Molonglo EWA

Capital Costs

Base Costs	Base Case	Project Case	
Design Cost	$2,991,800	$22,337,000	Wilde & Woollard - Indicative Cost Estimate, Nov 2020
Construction Cost	$22,693,200	$169,460,000	Wilde & Woollard - Indicative Cost Estimate, Nov 2020
Total	$25,685,000	$191,797,000	Wilde & Woollard - Indicative Cost Estimate, Nov 2020
Spend Profile			
Concept Design - 2028	$997,267	$7,445,667	Notional Estimate
Detailed Design - 2029	$1,994,533	$14,891,333	Notional Estimate
Construction - 2030	$22,693,200	$84,730,000	Notional Estimate
Construction - 2031	$0	$84,730,000	Notional Estimate

O & M

Unit Costs	Cost	Source / *Comment*
Traffic Signals (per set / year)	$4,000	Notional Estimate - Previous Studies
Streetlighting (cost per column)	$50	Notional Estimate - Previous Studies
Routine pavement maintenance (per m2 pavement / year)	$0.40	Notional Estimate - Previous Studies
Pavement resurfacing (per m2 of new pavement area / 10 yearly)	$55	Notional Estimate - Previous Studies
Pavement rehab (per m2 of pavement / 20 yearly)	$330	Notional Estimate - Previous Studies
Bridge repair (per m2 of new deck area / year)	$6.75	Notional Estimate - Previous Studies

Asset Measures	Base Case	Project Case	Source / *Comment*
Traffic Signals (additional sets)	0	1	SMEC design, Nov 2020
Streetlighting (columns (assuming 1 column / 500m2 of new pavement area))	27	116	SMEC design, Nov 2020
Pavement area for yearly routine maintenance (m2 of pavement)	13300	58074	SMEC design, Nov 2020
Pavement area for 10 yearly resurfacing (m2 of pavement)	13300	58074	SMEC design, Nov 2020
Pavement area for 20 yearly rehab (m2 of pavement)	13300	58074	SMEC design, Nov 2020
Area of new bridge deck (m2 relative to base)	0	5340	SMEC design, Nov 2020

CBA Economic Model
Molonglo EWA
Model Inputs - Benefits

Member of the Surbana Jurong Group

11/12/2020
Project No: 3002754

Project Location	Molonglo Valley, ACT
Project Description	Molonglo EWA
Analysis Year	2020

Analysis Period	
Analysis Period (years)	30

Traffic Perforamnce

2031		AM Peak		PM Peak		
		Base Case	Project Case	Base Case	Project Case	Source / *Comment*
Auto Vehicle km Travelled	Car VKT	1,584,069	1,579,875	1,538,118	1,530,746	*Strategic Transport Scenarios Modelling Technical Note, SMEC 2020*
Auto Vehicle Hours Travelled	Car VHT	38,922	37,512	34,637	33,656	*Strategic Transport Scenarios Modelling Technical Note, SMEC 2020*
Heavy Vehicle km Travelled	HV VKT	31681	31598	30762	30615	*Strategic Transport Scenarios Modelling Technical Note, SMEC 2020*
Heavy Vehicle Hours Travelled	HV VHT	778	750	693	673	*Strategic Transport Scenarios Modelling Technical Note, SMEC 2020*
Ave Veh Speed		40.7	42.1	44.4	45.5	*Strategic Transport Scenarios Modelling Technical Note, SMEC 2020*

2041		AM Peak		PM Peak		
		Base Case	Project Case	Base Case	Project Case	
Auto Vehicle km Travelled	Car VKT	1784207	1778009	1735691	1727217	*Strategic Transport Scenarios Modelling Technical Note, SMEC 2020*
Auto Vehicle Hours Travelled	Car VHT	55828	52585	48446	46081	*Strategic Transport Scenarios Modelling Technical Note, SMEC 2020*
Heavy Vehicle km Travelled	HV VKT	35684	35560	34714	34544	*Strategic Transport Scenarios Modelling Technical Note, SMEC 2020*
Heavy Vehicle Hours Travelled	HV VHT	1117	1052	969	922	*Strategic Transport Scenarios Modelling Technical Note, SMEC 2020*
Car Speed		32	33.8	35.8	37.5	*Strategic Transport Scenarios Modelling Technical Note, SMEC 2020*

Residual Value	Base Case	Project Case	Source / *Comment*
Bridges			
Capital Cost - Base	$0	$42,350,000	Wilde & Woollard - Indicative Cost Estimate, Nov 2020
Capital Cost - with contingency	$0	$59,290,000	Wilde & Woollard - Indicative Cost Estimate, Nov 2020
Design Life	100	100	
Residual Life	70	70	
Retaining Walls			
Capital Cost - Base	$0	$8,500,000	Wilde & Woollard - Indicative Cost Estimate, Nov 2020

Capital Cost - with contingency	$0	$11,900,000	Wilde & Woollard - Indicative Cost Estimate, Nov 2020
Design Life	100	100	
Residual Life	70	70	
Drainage			
Capital Cost - Base	$910,000	$4,645,000	Wilde & Woollard - Indicative Cost Estimate, Nov 2020
Capital Cost - with contingency	$1,274,000	$6,503,000	Wilde & Woollard - Indicative Cost Estimate, Nov 2020
Design Life	100	100	
Residual Life	70	70	

CBA Economic Model
Molonglo EWA
Model Parameters

SMEC
Member of the Surbana Jurong Group

11/12/2020
Project No: 3002754

Project Location	Molonglo Valley, ACT Molonglo EWA

Analysis Year	2020

Vehicle Costs	Value	Year	Current Value	Index	Source
Value of Travel Time - Urban - LV - per occupant - Private	$14.99	2013	$17.63	AWE	ATAP PV 2 Table 12
Vehicle Occupancy - Urban - Light Vehicle - Private	1.6				ATAP PV 2 Table 12
Value of Travel Time - Urban - per LV - Private			$28.20		
Value of Travel Time - Urban - LV - per occupant - Business	$48.63	2013	$57.18	AWE	ATAP PV 2 Table 12
Vehicle Occupancy - Urban - Light Vehicle - Business	1.4				ATAP PV 2 Table 12
Proprtion of HVs	2%				Notional Estimate
Value of Travel Time - Urban - per LV - Business			$80.05		
Proportion of Business Trips	1.4%				CSTM
Weighted Average VoT (Private / Business) - Urban - Per LV			$28.93		

Inclusive WTP costs per casualty	Value	Year	Current Value	Index	Source
Fatality	$7,278,105	2018	$7,434,416	CPI	TfNSW - App 4 - Table 52
Serious injury (hospitalisation)	$436,643	2018	$446,021	CPI	TfNSW - App 4 - Table 52
Moderate Injury (emergency department)	$67,045	2018	$68,485	CPI	TfNSW - App 4 - Table 52
Minor Injury (no hospital attendance)	$67,045	2018	$68,485	CPI	TfNSW - App 4 - Table 52
Unknown Injury type	$192,092	2018	$196,218	CPI	TfNSW - App 4 - Table 52
Property Only (Per Crash)	$10,139	2018	$10,357	CPI	TfNSW - App 4 - Table 52

Expansion factor		Source
1 hours to daily	8	Volume expansion factor - ACT estimate
Daily to annual	252	Weekday to year only

ATAP PV2 - Table 35	Type	Fleet breakdown (ATAP PV2 - Table 25)	% of LV / HV	Value of HV Trave Time										
				occ. Rate	value per occ	total value of	Year	Current	Index	value of	Year	Current	Index	Total
Car (all types)														
Small Car	Light	26.0%	28.0%											
Medium Car	Light	35.4%	38.1%											
Large Car	Light	14.4%	15.5%											
Utility Vehicles														
Courier van	Light	9.9%	10.7%											
4WD mid-size	Light	7.1%	7.7%											
Rigid Trucks														
Light Rigid	Heavy	0.8%	10.9%	1.3	$ 25.41	$ 33.03	2013	$38.84	AWE	$ 1.53	2013	$ 1.54	Transport	$ 40.38
Medium Rigid	Heavy	1.1%	15.0%	1.3	$ 25.72	$ 33.44	2013	$39.32	AWE	$ 4.15	2013	$ 4.18	Transport	$ 43.49
Heavy Rigid	Heavy	2.2%	30.2%	1.0	$ 26.19	$ 26.19	2013	$30.79	AWE	$ 14.20	2013	$ 14.29	Transport	$ 45.08
Bus														
Heavy Bus	Heavy	1.2%	16.6%	21.0	$ 15.50	$ 325.50	2013	$382.73	AWE					$ 382.73
Articulated Trucks														
4 axle	Heavy	0.6%	7.7%	1.0	$ 26.81	$ 26.81	2013	$31.52	AWE	$ 30.59	2013	$ 30.78	Transport	$ 62.30
5 axle	Heavy	0.1%	1.5%	1.0	$ 26.81	$ 26.81	2013	$31.52	AWE	$ 39.01	2013	$ 39.25	Transport	$ 70.78
6 axle	Heavy	0.5%	7.3%	1.0	$ 26.81	$ 26.81	2013	$31.52	AWE	$ 42.06	2013	$ 42.32	Transport	$ 73.84
Combination Vehicles														
Rigid + 5 axle dog	Heavy	0.0%	0.1%	1.0	$ 27.20	$ 27.20	2013	$31.98	AWE	$ 62.99	2013	$ 63.38	Transport	$ 95.36
B-Double	Heavy	0.7%	9.8%	1.0	$ 27.20	$ 27.20	2013	$31.98	AWE	$ 64.91	2013	$ 65.31	Transport	$ 97.29
Twin str. + 5 axl. dog	Heavy	0.0%	0.1%	1.0	$ 27.20	$ 27.20	2013	$31.98	AWE	$ 60.89	2013	$ 61.27	Transport	$ 93.25
A-Double	Heavy	0.0%	0.1%	1.0	$ 27.98	$ 27.98	2013	$32.90	AWE	$ 85.25	2013	$ 85.78	Transport	$ 118.68
B-Triple	Heavy	0.0%	0.1%	1.0	$ 27.98	$ 27.98	2013	$32.90	AWE	$ 87.01	2013	$ 87.55	Transport	$ 120.45
A B Combinations	Heavy	0.0%	0.1%	1.0	$ 27.98	$ 27.98	2013	$32.90	AWE	$ 104.80	2013	$ 105.45	Transport	$ 138.35
A-Triple	Heavy	0.0%	0.1%	1.0	$ 28.45	$ 28.45	2013	$33.45	AWE	$ 125.64	2013	$ 126.42	Transport	$ 159.87
Double B-Double	Heavy	0.0%	0.1%	1.0	$ 28.45	$ 28.45	2013	$33.45	AWE	$ 127.09	2013	$ 127.88	Transport	$ 161.33
Total														

	Type	Fleet	% of LV / HV	Year	Stop-Start Coefficients A	Stop-Start Coefficients B	Free-flow coefficients C_0	Free-flow coefficients C_1	Free-flow coefficients C_2
Car (all types)									
Small Car	Light	26.0%	28.0%	2013	12.5	838.3	25.8	-0.1	0.0
Medium Car	Light	35.4%	38.1%	2013	12.7	1315.5	35.0	-0.2	0.0
Large Car	Light	14.4%	15.5%	2013	14.4	1838.5	46.2	-0.2	0.0
Utility Vehicles									
Courier van	Light	9.9%	10.7%	2013	15.9	1357.1	38.5	-0.2	0.0
4WD mid-size	Light	7.1%	7.7%	2013	21.0	1328.8	40.6	-0.2	0.0
Rigid Trucks									
Light Rigid	Heavy	0.8%	10.9%	2013	34.0	1543.6	51.5	-0.2	0.0
Medium Rigid	Heavy	1.1%	15.0%	2013	35.8	2259.9	62.7	-0.3	0.0
Heavy Rigid	Heavy	2.2%	30.2%	2013	57.2	2556.1	82.3	-0.6	0.0
Bus									
Heavy Bus	Heavy	1.2%	16.6%	2013	64.6	4632.2	124.7	-0.6	0.0
Articulated Trucks									
4 axle	Heavy	0.6%	7.7%	2013	84.6	3323.0	111.7	-0.7	0.0
5 axle	Heavy	0.1%	1.5%	2013	91.1	3688.6	119.9	-0.7	0.0
6 axle	Heavy	0.5%	7.3%	2013	98.7	3991.3	128.7	-0.7	0.0
Combination Vehicles									
Rigid + 5 axle dog	Heavy	0.0%	0.1%	2013	122.6	3729.8	136.2	-0.6	0.0
B-Double	Heavy	0.7%	9.8%	2013	123.0	4592.2	151.5	-0.7	0.0
Twin str. + 5 axl. dog	Heavy	0.0%	0.1%	2013	127.2	4380.0	149.9	-0.7	0.0
A-Double	Heavy	0.0%	0.1%	2013	144.0	5692.0	183.5	-0.8	0.0
B-Triple	Heavy	0.0%	0.1%	2013	149.4	7134.5	214.1	-1.0	0.0
A B Combinations	Heavy	0.0%	0.1%	2013	170.3	6257.8	208.7	-0.9	0.0
A-Triple	Heavy	0.0%	0.1%	2013	190.6	7134.9	237.1	-1.0	0.0
Double B-Double	Heavy	0.0%	0.1%	2013	199.6	6976.3	238.7	-1.0	0.0
Total									

CBA Economic Model
Molonglo EWA
Cost Analysis

Member of the Surbana Jurong Group

Project No: 3002754

Project Location	Molonglo Valley, ACT Molonglo EWA

O & M Costs

Base Costs	Base Case	Project Case	Source / *Comment*
Traffic Signals (per year)	$0	$4,000	*Quantity x Rate*
Streetlighting (per year)	$1,330	$5,807	*Quantity x Rate*
Routine pavement maintenance (per year)	$5,320	$23,230	*Quantity x Rate*
Pavement resurfacing (per 10 years)	$731,500	$3,194,070	*Quantity x Rate*
Pavement rehab (per 20 years)	$4,389,000	$19,164,420	*Quantity x Rate*
Bridge concrete repair (per year)	$0	$36,042	*Quantity x Rate*
Total Yearly Cost	$6,650	$69,079	*Quantity x Rate*
Total 10 yearly cost	$731,500	$3,194,070	*Quantity x Rate*
Total 20 yearly cost	$4,389,000	$19,164,420	*Quantity x Rate*

Cost Profile

Year		Base		Project	
Project	Calendar	Capital	O&M	Capital	O&M
-	2028	$997,267	$0	$7,445,667	$0
-	2029	$1,994,533	$0	$14,891,333	$0
-	2030	$22,693,200	$0	$84,730,000	$0
-	2031	$0	$6,650	$84,730,000	$0
1	2032	$0	$6,650	$0	$69,079
2	2033	$0	$6,650	$0	$69,079
3	2034	$0	$6,650	$0	$69,079
4	2035	$0	$6,650	$0	$69,079
5	2036	$0	$6,650	$0	$69,079
6	2037	$0	$6,650	$0	$69,079

7	2038	$0	$6,650	$0	$69,079
8	2039	$0	$6,650	$0	$69,079
9	2040	$0	$732,830	$0	$69,079
10	2041	$0	$6,650	$0	$3,239,920
11	2042	$0	$6,650	$0	$69,079
12	2043	$0	$6,650	$0	$69,079
13	2044	$0	$6,650	$0	$69,079
14	2045	$0	$6,650	$0	$69,079
15	2046	$0	$6,650	$0	$69,079
16	2047	$0	$6,650	$0	$69,079
17	2048	$0	$6,650	$0	$69,079
18	2049	$0	$6,650	$0	$69,079
19	2050	$0	$4,390,330	$0	$69,079
20	2051	$0	$6,650	$0	$19,210,270
21	2052	$0	$6,650	$0	$69,079
22	2053	$0	$6,650	$0	$69,079
23	2054	$0	$6,650	$0	$69,079
24	2055	$0	$6,650	$0	$69,079
25	2056	$0	$6,650	$0	$69,079
26	2057	$0	$6,650	$0	$69,079
27	2058	$0	$6,650	$0	$69,079
28	2059	$0	$6,650	$0	$69,079
29	2060	$0	$732,830	$0	$69,079
30	2061	$0	$6,650	$0	$3,239,920

Project Location	Molonglo Valley, ACT Molonglo EWA

VHT Calculations

VHT - Average 1 Hour Peak	Base Case		Project Case		
	2031	2041	2031	2041	Source / *Comment*
LVs - Average Peak VHT	36780	52137	35584	49333	*Average of AM and PM Peak*
Trucks (total)- Average Peak VHT	736	1043	712	987	*Average of AM and PM Peak using ATAP HV fleet profile*

Average Travel time Cost - 1 Hour Peak	Base Case		Project Case		
	2031	2041	2031	2041	
LVs - Average 1hr Peak VHT	$1,063,921	$1,508,168	$1,029,339	$1,427,056	*VHT x weighted ave value of travel time*
Trucks (total) - Average 1hr Peak VHT	$80,863	$114,670	$78,224	$108,513	*HV VHT x weighted ave value of travel time for ATAP HV fleet profile*
Total Travel Time Cost	$1,144,783	$1,622,837	$1,107,563	$1,535,569	

Aggregated Travel time Cost	Base Case		Project Case		
	2031	2041	2031	2041	
Daily	$9,158,268	$12,982,698	$8,860,501	$12,284,553	*Total travel time cost x EF* $_{Peak->daily}$
Annual	$2,307,883,501	$3,271,639,953	$2,232,846,259	$3,095,707,460	*Total travel time cost x EF* $_{Daily->Annual}$

Yearly Travel Time Costs

Year Project	Calendar	Base case	Project Case
-	2028	$0	$0
-	2029	$0	$0
-	2030	$0	$0
-	2031	$2,307,883,501	$2,232,846,259
1	2032	$2,404,259,147	$2,319,132,379
2	2033	$2,500,634,792	$2,405,418,499
3	2034	$2,597,010,437	$2,491,704,620
4	2035	$2,693,386,082	$2,577,990,740
5	2036	$2,789,761,727	$2,664,276,860
6	2037	$2,886,137,372	$2,750,562,980
7	2038	$2,982,513,017	$2,836,849,100
8	2039	$3,078,888,663	$2,923,135,220
9	2040	$3,175,264,308	$3,009,421,340
10	2041	$3,271,639,953	$3,095,707,460
11	2042	$3,271,639,953	$3,095,707,460
12	2043	$3,271,639,953	$3,095,707,460
13	2044	$3,271,639,953	$3,095,707,460
14	2045	$3,271,639,953	$3,095,707,460
15	2046	$3,271,639,953	$3,095,707,460
16	2047	$3,271,639,953	$3,095,707,460
17	2048	$3,271,639,953	$3,095,707,460
18	2049	$3,271,639,953	$3,095,707,460
19	2050	$3,271,639,953	$3,095,707,460
20	2051	$3,271,639,953	$3,095,707,460
21	2052	$3,271,639,953	$3,095,707,460
22	2053	$3,271,639,953	$3,095,707,460
23	2054	$3,271,639,953	$3,095,707,460
24	2055	$3,271,639,953	$3,095,707,460
25	2056	$3,271,639,953	$3,095,707,460
26	2057	$3,271,639,953	$3,095,707,460
27	2058	$3,271,639,953	$3,095,707,460
28	2059	$3,271,639,953	$3,095,707,460
29	2060	$3,271,639,953	$3,095,707,460
30	2061	$3,271,639,953	$3,095,707,460

CBA Economic Model
Molonglo EWA
Vehicle Operating Cost Impacts

SMEC
Member of the Surbana Jurong Group

11/12/2020
Project No: 3002754

Project Location	Molonglo Valley, ACT Molonglo EWA

Average Speeds	2031	2041
Base Case	42.55	33.9
Project Case	43.8	35.65

VOC Indexation	
Parameter Year	2013
Indexation factor	1.00

VOC per Vehicle Type given Average Speeds

		Base Case		Project Case	
	Type	2031	2041	2031	2041
Car (all types)					
Small Car	Light	$0.32	$0.37	$0.32	$0.36
Medium Car	Light	$0.44	$0.52	$0.43	$0.50
Large Car	Light	$0.58	$0.69	$0.57	$0.66
Utility Vehicles					
Courier van	Light	$0.48	$0.56	$0.47	$0.54
4WD mid-size	Light	$0.53	$0.61	$0.52	$0.59
Rigid Trucks					
Light Rigid	Heavy	$0.71	$0.80	$0.70	$0.78
Medium Rigid	Heavy	$0.89	$1.03	$0.88	$1.00
Heavy Rigid	Heavy	$1.18	$1.33	$1.16	$1.29
Bus					
Heavy Bus	Heavy	$1.74	$2.02	$1.71	$1.95
Articulated Trucks					
4 axle	Heavy	$1.63	$1.83	$1.61	$1.79
5 axle	Heavy	$1.79	$2.01	$1.76	$1.96
6 axle	Heavy	$1.93	$2.17	$1.91	$2.12
Combination Vehicles					
Rigid + 5 axle dog	Heavy	$2.11	$2.34	$2.09	$2.28
B-Double	Heavy	$2.32	$2.60	$2.29	$2.53
Twin str. + 5 axl. dog	Heavy	$2.31	$2.58	$2.28	$2.51
A-Double	Heavy	$2.79	$3.13	$2.75	$3.05
B-Triple	Heavy	$3.19	$3.62	$3.14	$3.51
A B Combinations	Heavy	$3.19	$3.57	$3.15	$3.48
A-Triple	Heavy	$3.60	$4.03	$3.55	$3.93
Double B-Double	Heavy	$3.65	$4.07	$3.61	$3.97
Total					

VOC Calculations

Average VOC Cost - Peak

	Base Case		Project Case		
	2031	2041	2031	2041	
LVs - Average Peak VOC	$685,566	$907,437	$669,728	$871,302	*Average of AM and PM Peak*
Trucks (total)- Average Peak VOC	$43,908	$56,200	$43,084	$54,354	*Average of AM and PM Peak using ATAP HV fleet profile*
Total VOC Cost	$729,474	$963,637	$712,812	$925,656	

Aggregated Travel time Cost

	Base Case		Project Case		
	2031	2041	2031	2041	
Daily	$5,835,788	$7,709,094	$5,702,494	$7,405,252	*Total VOC x EF $_{Peak->daily}$*
Annual	$1,470,618,660	$1,942,691,772	$1,437,028,605	$1,866,123,488	*Total VOC x EF $_{Daily->Annual}$*

Yearly VOCs

Year			
Project	Calendar	Base case	Project Case
-	2028		
-	2029		
-	2030		
-	2031	$1,470,618,660	$1,437,028,605
1	2032	$1,517,825,971	$1,479,938,093
2	2033	$1,565,033,283	$1,522,847,582
3	2034	$1,612,240,594	$1,565,757,070
4	2035	$1,659,447,905	$1,608,666,558
5	2036	$1,706,655,216	$1,651,576,046

6	2037	$1,753,862,527	$1,694,485,535
7	2038	$1,801,069,839	$1,737,395,023
8	2039	$1,848,277,150	$1,780,304,511
9	2040	$1,895,484,461	$1,823,213,999
10	2041	$1,942,691,772	$1,866,123,488
11	2042	$1,942,691,772	$1,866,123,488
12	2043	$1,942,691,772	$1,866,123,488
13	2044	$1,942,691,772	$1,866,123,488
14	2045	$1,942,691,772	$1,866,123,488
15	2046	$1,942,691,772	$1,866,123,488
16	2047	$1,942,691,772	$1,866,123,488
17	2048	$1,942,691,772	$1,866,123,488
18	2049	$1,942,691,772	$1,866,123,488
19	2050	$1,942,691,772	$1,866,123,488
20	2051	$1,942,691,772	$1,866,123,488
21	2052	$1,942,691,772	$1,866,123,488
22	2053	$1,942,691,772	$1,866,123,488
23	2054	$1,942,691,772	$1,866,123,488
24	2055	$1,942,691,772	$1,866,123,488
25	2056	$1,942,691,772	$1,866,123,488
26	2057	$1,942,691,772	$1,866,123,488
27	2058	$1,942,691,772	$1,866,123,488
28	2059	$1,942,691,772	$1,866,123,488
29	2060	$1,942,691,772	$1,866,123,488
30	2061	$1,942,691,772	$1,866,123,488

CBA Economic Model
Molonglo EWA
Residual Value

Member of the Surbana Jurong Group

11/12/2020

Project No: 3002754

Project Location	Molonglo Valley, ACT Molonglo EWA

Residual Value	Base Case	Project Case	Source / *Comment*
Residual Value			
Bridges	$0	$41,503,000	*Linear depreciation method*
Retaining Walls	$0	$8,330,000	*Linear depreciation method*
Drainage	$891,800	$4,552,100	*Linear depreciation method*
Total	$891,800	$54,385,100	*Linear depreciation method*

CBA Economic Model
Molonglo EWA
CBA Model Calculations

SMEC
Member of the Surbana Jurong Group

11/12/2020
Project No: 3002754

Project Location	Molonglo Valley, ACT Molonglo EWA

EWA Project

Year		Costs		Benefits		
Project	Calendar	Capital	O&M	Travel Time	VOCs	Residual Value
-	2028	$6,448,400	$0	$0	$0	$0
-	2029	$12,896,800	$0	$0	$0	$0
-	2030	$62,036,800	$0	$0	$0	$0
-	2031	$84,730,000	-$6,650	$0	$0	$0
1	2032	$0	$62,429	$85,126,767	$37,887,878	$0
2	2033	$0	$62,429	$95,216,292	$42,185,701	$0
3	2034	$0	$62,429	$105,305,817	$46,483,524	$0
4	2035	$0	$62,429	$115,395,342	$50,781,347	$0
5	2036	$0	$62,429	$125,484,867	$55,079,170	$0
6	2037	$0	$62,429	$135,574,393	$59,376,993	$0
7	2038	$0	$62,429	$145,663,918	$63,674,816	$0
8	2039	$0	$62,429	$155,753,443	$67,972,639	$0
9	2040	$0	-$663,751	$165,842,968	$72,270,462	$0
10	2041	$0	$3,233,270	$175,932,493	$76,568,285	$0
11	2042	$0	$62,429	$175,932,493	$76,568,285	$0
12	2043	$0	$62,429	$175,932,493	$76,568,285	$0
13	2044	$0	$62,429	$175,932,493	$76,568,285	$0
14	2045	$0	$62,429	$175,932,493	$76,568,285	$0
15	2046	$0	$62,429	$175,932,493	$76,568,285	$0
16	2047	$0	$62,429	$175,932,493	$76,568,285	$0
17	2048	$0	$62,429	$175,932,493	$76,568,285	$0
18	2049	$0	$62,429	$175,932,493	$76,568,285	$0
19	2050	$0	-$4,321,251	$175,932,493	$76,568,285	$0
20	2051	$0	$19,203,620	$175,932,493	$76,568,285	$0
21	2052	$0	$62,429	$175,932,493	$76,568,285	$0
22	2053	$0	$62,429	$175,932,493	$76,568,285	$0
23	2054	$0	$62,429	$175,932,493	$76,568,285	$0
24	2055	$0	$62,429	$175,932,493	$76,568,285	$0
25	2056	$0	$62,429	$175,932,493	$76,568,285	$0
26	2057	$0	$62,429	$175,932,493	$76,568,285	$0
27	2058	$0	$62,429	$175,932,493	$76,568,285	$0
28	2059	$0	$62,429	$175,932,493	$76,568,285	$0
29	2060	$0	-$663,751	$175,932,493	$76,568,285	$0
30	2061	$0	$3,233,270	$175,932,493	$76,568,285	$0
31	2062	$0	$0	$0	$0	$53,493,300

CBA Economic Model
Molonglo EWA
Sensitivity Analysis - 20% Increase in Costs

Member of the Surbana Jurong Group

11/12/2020

Project No: 3002754

Project Location	Molonglo Valley, ACT Molonglo EWA

EWA Project

Year		Costs		Benefits		
Project	Calendar	Capital	O&M	Travel Time	VOCs	Residual Value
-	2028	$7,738,080	$0	$0	$0	$0
-	2029	$15,476,160	$0	$0	$0	$0
-	2030	$74,444,160	$0	$0	$0	$0
-	2031	$101,676,000	-$6,650	$0	$0	$0
1	2032	$0	$62,429	$85,126,767	$37,887,878	$0
2	2033	$0	$62,429	$95,216,292	$42,185,701	$0
3	2034	$0	$62,429	$105,305,817	$46,483,524	$0
4	2035	$0	$62,429	$115,395,342	$50,781,347	$0
5	2036	$0	$62,429	$125,484,867	$55,079,170	$0
6	2037	$0	$62,429	$135,574,393	$59,376,993	$0
7	2038	$0	$62,429	$145,663,918	$63,674,816	$0
8	2039	$0	$62,429	$155,753,443	$67,972,639	$0
9	2040	$0	-$663,751	$165,842,968	$72,270,462	$0
10	2041	$0	$3,233,270	$175,932,493	$76,568,285	$0
11	2042	$0	$62,429	$175,932,493	$76,568,285	$0
12	2043	$0	$62,429	$175,932,493	$76,568,285	$0
13	2044	$0	$62,429	$175,932,493	$76,568,285	$0
14	2045	$0	$62,429	$175,932,493	$76,568,285	$0
15	2046	$0	$62,429	$175,932,493	$76,568,285	$0
16	2047	$0	$62,429	$175,932,493	$76,568,285	$0
17	2048	$0	$62,429	$175,932,493	$76,568,285	$0
18	2049	$0	$62,429	$175,932,493	$76,568,285	$0
19	2050	$0	-$4,321,251	$175,932,493	$76,568,285	$0
20	2051	$0	$19,203,620	$175,932,493	$76,568,285	$0
21	2052	$0	$62,429	$175,932,493	$76,568,285	$0
22	2053	$0	$62,429	$175,932,493	$76,568,285	$0
23	2054	$0	$62,429	$175,932,493	$76,568,285	$0
24	2055	$0	$62,429	$175,932,493	$76,568,285	$0
25	2056	$0	$62,429	$175,932,493	$76,568,285	$0
26	2057	$0	$62,429	$175,932,493	$76,568,285	$0
27	2058	$0	$62,429	$175,932,493	$76,568,285	$0
28	2059	$0	$62,429	$175,932,493	$76,568,285	$0
29	2060	$0	-$663,751	$175,932,493	$76,568,285	$0
30	2061	$0	$3,233,270	$175,932,493	$76,568,285	$0
31	2062	$0	$0	$0	$0	$53,493,300

CBA Economic Model
Molonglo EWA
Sensitivity Analysis - 20% Decrease in Costs

Member of the Surbana Jurong Group

11/12/2020

Project No: 3002754

Project Location	Molonglo Valley, ACT Molonglo EWA

EWA Project

Year		Costs		Benefits		
Project	Calendar	Capital	O&M	Travel Time	VOCs	Residual Value
-	2028	$5,158,720	$0	$0	$0	$0
-	2029	$10,317,440	$0	$0	$0	$0
-	2030	$49,629,440	$0	$0	$0	$0
-	2031	$67,784,000	-$6,650	$0	$0	$0
1	2032	$0	$62,429	$85,126,767	$37,887,878	$0
2	2033	$0	$62,429	$95,216,292	$42,185,701	$0
3	2034	$0	$62,429	$105,305,817	$46,483,524	$0
4	2035	$0	$62,429	$115,395,342	$50,781,347	$0
5	2036	$0	$62,429	$125,484,867	$55,079,170	$0
6	2037	$0	$62,429	$135,574,393	$59,376,993	$0
7	2038	$0	$62,429	$145,663,918	$63,674,816	$0
8	2039	$0	$62,429	$155,753,443	$67,972,639	$0
9	2040	$0	-$663,751	$165,842,968	$72,270,462	$0
10	2041	$0	$3,233,270	$175,932,493	$76,568,285	$0
11	2042	$0	$62,429	$175,932,493	$76,568,285	$0
12	2043	$0	$62,429	$175,932,493	$76,568,285	$0
13	2044	$0	$62,429	$175,932,493	$76,568,285	$0
14	2045	$0	$62,429	$175,932,493	$76,568,285	$0
15	2046	$0	$62,429	$175,932,493	$76,568,285	$0
16	2047	$0	$62,429	$175,932,493	$76,568,285	$0
17	2048	$0	$62,429	$175,932,493	$76,568,285	$0
18	2049	$0	$62,429	$175,932,493	$76,568,285	$0
19	2050	$0	-$4,321,251	$175,932,493	$76,568,285	$0
20	2051	$0	$19,203,620	$175,932,493	$76,568,285	$0
21	2052	$0	$62,429	$175,932,493	$76,568,285	$0
22	2053	$0	$62,429	$175,932,493	$76,568,285	$0
23	2054	$0	$62,429	$175,932,493	$76,568,285	$0
24	2055	$0	$62,429	$175,932,493	$76,568,285	$0
25	2056	$0	$62,429	$175,932,493	$76,568,285	$0
26	2057	$0	$62,429	$175,932,493	$76,568,285	$0
27	2058	$0	$62,429	$175,932,493	$76,568,285	$0
28	2059	$0	$62,429	$175,932,493	$76,568,285	$0
29	2060	$0	-$663,751	$175,932,493	$76,568,285	$0
30	2061	$0	$3,233,270	$175,932,493	$76,568,285	$0
31	2062	$0	$0	$0	$0	$53,493,300

CBA Economic Model
Molonglo EWA
Sensitivity Analysis - 40% Increase in Costs

Member of the Surbana Jurong Group

11/12/2020

Project No: 3002754

Project Location	Molonglo Valley, ACT Molonglo EWA

EWA Project

Year		Costs		Benefits		
Project	Calendar	Capital	O&M	Travel Time	VOCs	Residual Value
-	2028	$9,027,760	$0	$0	$0	$0
-	2029	$18,055,520	$0	$0	$0	$0
-	2030	$86,851,520	$0	$0	$0	$0
-	2031	$118,622,000	-$6,650	$0	$0	$0
1	2032	$0	$62,429	$85,126,767	$37,887,878	$0
2	2033	$0	$62,429	$95,216,292	$42,185,701	$0
3	2034	$0	$62,429	$105,305,817	$46,483,524	$0
4	2035	$0	$62,429	$115,395,342	$50,781,347	$0
5	2036	$0	$62,429	$125,484,867	$55,079,170	$0
6	2037	$0	$62,429	$135,574,393	$59,376,993	$0
7	2038	$0	$62,429	$145,663,918	$63,674,816	$0
8	2039	$0	$62,429	$155,753,443	$67,972,639	$0
9	2040	$0	-$663,751	$165,842,968	$72,270,462	$0
10	2041	$0	$3,233,270	$175,932,493	$76,568,285	$0
11	2042	$0	$62,429	$175,932,493	$76,568,285	$0
12	2043	$0	$62,429	$175,932,493	$76,568,285	$0
13	2044	$0	$62,429	$175,932,493	$76,568,285	$0
14	2045	$0	$62,429	$175,932,493	$76,568,285	$0
15	2046	$0	$62,429	$175,932,493	$76,568,285	$0
16	2047	$0	$62,429	$175,932,493	$76,568,285	$0
17	2048	$0	$62,429	$175,932,493	$76,568,285	$0
18	2049	$0	$62,429	$175,932,493	$76,568,285	$0
19	2050	$0	-$4,321,251	$175,932,493	$76,568,285	$0
20	2051	$0	$19,203,620	$175,932,493	$76,568,285	$0
21	2052	$0	$62,429	$175,932,493	$76,568,285	$0
22	2053	$0	$62,429	$175,932,493	$76,568,285	$0
23	2054	$0	$62,429	$175,932,493	$76,568,285	$0
24	2055	$0	$62,429	$175,932,493	$76,568,285	$0
25	2056	$0	$62,429	$175,932,493	$76,568,285	$0
26	2057	$0	$62,429	$175,932,493	$76,568,285	$0
27	2058	$0	$62,429	$175,932,493	$76,568,285	$0
28	2059	$0	$62,429	$175,932,493	$76,568,285	$0
29	2060	$0	-$663,751	$175,932,493	$76,568,285	$0
30	2061	$0	$3,233,270	$175,932,493	$76,568,285	$0
31	2062	$0	$0	$0	$0	$53,493,300

CBA Economic Model
Molonglo EWA
Sensitivity Analysis - 20% Increase in Benefits

Member of the Surbana Jurong Group

11/12/2020

Project No: 3002754

Project Location	Molonglo Valley, ACT Molonglo EWA

EWA Project

Year		Costs		Benefits		
Project	Calendar	Capital	O&M	Travel Time	VOCs	Residual Value
-	2028	$6,448,400	$0	$0	$0	$0
-	2029	$12,896,800	$0	$0	$0	$0
-	2030	$62,036,800	$0	$0	$0	$0
-	2031	$84,730,000	-$6,650	$0	$0	$0
1	2032	$0	$62,429	$102,152,121	$45,465,453	$0
2	2033	$0	$62,429	$114,259,551	$50,622,841	$0
3	2034	$0	$62,429	$126,366,981	$55,780,229	$0
4	2035	$0	$62,429	$138,474,411	$60,937,616	$0
5	2036	$0	$62,429	$150,581,841	$66,095,004	$0
6	2037	$0	$62,429	$162,689,271	$71,252,391	$0
7	2038	$0	$62,429	$174,796,701	$76,409,779	$0
8	2039	$0	$62,429	$186,904,131	$81,567,166	$0
9	2040	$0	-$663,751	$199,011,561	$86,724,554	$0
10	2041	$0	$3,233,270	$211,118,991	$91,881,941	$0
11	2042	$0	$62,429	$211,118,991	$91,881,941	$0
12	2043	$0	$62,429	$211,118,991	$91,881,941	$0
13	2044	$0	$62,429	$211,118,991	$91,881,941	$0
14	2045	$0	$62,429	$211,118,991	$91,881,941	$0
15	2046	$0	$62,429	$211,118,991	$91,881,941	$0
16	2047	$0	$62,429	$211,118,991	$91,881,941	$0
17	2048	$0	$62,429	$211,118,991	$91,881,941	$0
18	2049	$0	$62,429	$211,118,991	$91,881,941	$0
19	2050	$0	-$4,321,251	$211,118,991	$91,881,941	$0
20	2051	$0	$19,203,620	$211,118,991	$91,881,941	$0
21	2052	$0	$62,429	$211,118,991	$91,881,941	$0
22	2053	$0	$62,429	$211,118,991	$91,881,941	$0
23	2054	$0	$62,429	$211,118,991	$91,881,941	$0
24	2055	$0	$62,429	$211,118,991	$91,881,941	$0
25	2056	$0	$62,429	$211,118,991	$91,881,941	$0
26	2057	$0	$62,429	$211,118,991	$91,881,941	$0
27	2058	$0	$62,429	$211,118,991	$91,881,941	$0
28	2059	$0	$62,429	$211,118,991	$91,881,941	$0
29	2060	$0	-$663,751	$211,118,991	$91,881,941	$0
30	2061	$0	$3,233,270	$211,118,991	$91,881,941	$0
31	2062	$0	$0	$0	$0	$64,191,960

CBA Economic Model
Molonglo EWA
Sensitivity Analysis - 20% Decrease in Benefits

Member of the Surbana Jurong Group

11/12/2020
Project No: 3002754

Project Location	Molonglo Valley, ACT Molonglo EWA

EWA Project

Year		Costs		Benefits		
Project	Calendar	Capital	O&M	Travel Time	VOCs	Residual Value
-	2028	$6,448,400	$0	$0	$0	$0
-	2029	$12,896,800	$0	$0	$0	$0
-	2030	$62,036,800	$0	$0	$0	$0
-	2031	$84,730,000	-$6,650	$0	$0	$0
1	2032	$0	$62,429	$68,101,414	$30,310,302	$0
2	2033	$0	$62,429	$76,173,034	$33,748,561	$0
3	2034	$0	$62,429	$84,244,654	$37,186,819	$0
4	2035	$0	$62,429	$92,316,274	$40,625,077	$0
5	2036	$0	$62,429	$100,387,894	$44,063,336	$0
6	2037	$0	$62,429	$108,459,514	$47,501,594	$0
7	2038	$0	$62,429	$116,531,134	$50,939,853	$0
8	2039	$0	$62,429	$124,602,754	$54,378,111	$0
9	2040	$0	-$663,751	$132,674,374	$57,816,369	$0
10	2041	$0	$3,233,270	$140,745,994	$61,254,628	$0
11	2042	$0	$62,429	$140,745,994	$61,254,628	$0
12	2043	$0	$62,429	$140,745,994	$61,254,628	$0
13	2044	$0	$62,429	$140,745,994	$61,254,628	$0
14	2045	$0	$62,429	$140,745,994	$61,254,628	$0
15	2046	$0	$62,429	$140,745,994	$61,254,628	$0
16	2047	$0	$62,429	$140,745,994	$61,254,628	$0
17	2048	$0	$62,429	$140,745,994	$61,254,628	$0
18	2049	$0	$62,429	$140,745,994	$61,254,628	$0
19	2050	$0	-$4,321,251	$140,745,994	$61,254,628	$0
20	2051	$0	$19,203,620	$140,745,994	$61,254,628	$0
21	2052	$0	$62,429	$140,745,994	$61,254,628	$0
22	2053	$0	$62,429	$140,745,994	$61,254,628	$0
23	2054	$0	$62,429	$140,745,994	$61,254,628	$0
24	2055	$0	$62,429	$140,745,994	$61,254,628	$0
25	2056	$0	$62,429	$140,745,994	$61,254,628	$0
26	2057	$0	$62,429	$140,745,994	$61,254,628	$0
27	2058	$0	$62,429	$140,745,994	$61,254,628	$0
28	2059	$0	$62,429	$140,745,994	$61,254,628	$0
29	2060	$0	-$663,751	$140,745,994	$61,254,628	$0
30	2061	$0	$3,233,270	$140,745,994	$61,254,628	$0
31	2062	$0	$0	$0	$0	$42,794,640

CBA Economic Model
Molonglo EWA
Sensitivity Analysis - 40% Decrease in Benefits

Member of the Surbana Jurong Group

11/12/2020

Project No: 3002754

Project Location	Molonglo Valley, ACT Molonglo EWA

EWA Project

Year		Costs		Benefits		
Project	Calendar	Capital	O&M	Travel Time	VOCs	Residual Value
-	2028	$6,448,400	$0	$0	$0	$0
-	2029	$12,896,800	$0	$0	$0	$0
-	2030	$62,036,800	$0	$0	$0	$0
-	2031	$84,730,000	-$6,650	$0	$0	$0
1	2032	$0	$62,429	$51,076,060	$22,732,727	$0
2	2033	$0	$62,429	$57,129,775	$25,311,421	$0
3	2034	$0	$62,429	$63,183,490	$27,890,114	$0
4	2035	$0	$62,429	$69,237,205	$30,468,808	$0
5	2036	$0	$62,429	$75,290,920	$33,047,502	$0
6	2037	$0	$62,429	$81,344,636	$35,626,196	$0
7	2038	$0	$62,429	$87,398,351	$38,204,889	$0
8	2039	$0	$62,429	$93,452,066	$40,783,583	$0
9	2040	$0	-$663,751	$99,505,781	$43,362,277	$0
10	2041	$0	$3,233,270	$105,559,496	$45,940,971	$0
11	2042	$0	$62,429	$105,559,496	$45,940,971	$0
12	2043	$0	$62,429	$105,559,496	$45,940,971	$0
13	2044	$0	$62,429	$105,559,496	$45,940,971	$0
14	2045	$0	$62,429	$105,559,496	$45,940,971	$0
15	2046	$0	$62,429	$105,559,496	$45,940,971	$0
16	2047	$0	$62,429	$105,559,496	$45,940,971	$0
17	2048	$0	$62,429	$105,559,496	$45,940,971	$0
18	2049	$0	$62,429	$105,559,496	$45,940,971	$0
19	2050	$0	-$4,321,251	$105,559,496	$45,940,971	$0
20	2051	$0	$19,203,620	$105,559,496	$45,940,971	$0
21	2052	$0	$62,429	$105,559,496	$45,940,971	$0
22	2053	$0	$62,429	$105,559,496	$45,940,971	$0
23	2054	$0	$62,429	$105,559,496	$45,940,971	$0
24	2055	$0	$62,429	$105,559,496	$45,940,971	$0
25	2056	$0	$62,429	$105,559,496	$45,940,971	$0
26	2057	$0	$62,429	$105,559,496	$45,940,971	$0
27	2058	$0	$62,429	$105,559,496	$45,940,971	$0
28	2059	$0	$62,429	$105,559,496	$45,940,971	$0
29	2060	$0	-$663,751	$105,559,496	$45,940,971	$0
30	2061	$0	$3,233,270	$105,559,496	$45,940,971	$0
31	2062	$0	$0	$0	$0	$32,095,980

Appendix E Assessment of Key Cycle Interfaces

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Technical Note

Prepared by: Doug Tonge (SMEC)

Project: **3002754 – Molonglo East West Arterial**

Date: 22 February 2021

Re: **Assessment of Key Cycle Interfaces**

Background

Project Background

The three stages of Molonglo Valley development (Molonglo 1, 2 and 3) are proposed to accommodate approximately 50,000 to 55,000 people. The Molonglo East West Arterial (EWA) road was identified as an essential part of the arterial road network for the Molonglo district in earlier traffic and road feasibility studies. The EWA was also identified in the Territory Plan's Molonglo and North Weston Structure Plan and is notionally indicated in the Territory Plan map.

The EWA road is also identified in the Molonglo 3 Planning and Design Framework (February 2019). It is proposed to connect the future suburb of Molonglo and the wider Molonglo development area with the Tuggeranong Parkway via a bridge over the Molonglo River and a new grade-separated interchange at the Tuggeranong Parkway.

The Canberra Strategic Transport Model (CSTM) has demonstrated the need for the EWA road connection to the Tuggeranong Parkway to complement other arterial roads servicing the Molonglo area. This link will provide alternative and direct access for the suburb of Molonglo and Denman Prospect traffic to the Tuggeranong Parkway and the broader ACT trunk road network. Furthermore, it is noted that the West Belconnen (Ginninderry) development and any further possible development west of Molonglo (Western Edge Investigation Area) is expected to have significant impacts on forecast traffic volumes for William Hovell Drive (WHD), John Gorton Drive (JGD), the EWA and the wider arterial road network.

Population increases in the Molonglo area will lead to traffic demand that may exceed the combined capacity of other key access roads in the area if EWA is not constructed. Recent traffic modelling has indicated that this growth will drive the need for an alternative arterial road access for Molonglo. The likely beneficiaries of the EWA project are expected to include existing and future residents of Molonglo Valley, businesses in the area, and future residents to the west of Molonglo should development progress in the Western Edge Investigation Area.

The project study area is situated in the Molonglo Valley of Canberra, ACT. The proposed East West Arterial is proposed to provide an arterial road link between the John Gorton Drive / Holborow Ave intersection in the west and the Tuggeranong Parkway in the east. The site is predominately rolling terrain incised by the Molonglo River, with a combination of farmland and pine plantation. To facilitate the EWA interchange with the Tuggeranong Parkway, it anticipated that upgrade works will be required on the Parkway to the Cotter Rd interchange. The location and extent of the project site is indicated in Figure 1.

Figure 1 – EWA Locality Plan (Metromap, September 2020)

Cycle and active travel infrastructure will be a key consideration and a feature of the development of the Molonglo Valley. It is expected that the local transport network in the M3E area will need to cater for both commuting and recreational cyclists as the Territory looks to increasingly encourage active travel. Furthermore, the Molonglo Valley is generally located within easy cycling distance (5-10km) of Belconnen, Woden and Civic, which are key employment and retail areas of Canberra in addition to the education precincts of the ANU and the University of Canberra.

As a key transport artery in the Molonglo Valley, the EWA will necessarily interface with a number of dedicated cycle and shared (cycle + pedestrian) facilities. This has become increasingly apparent over the evolution of the EWA project, with SLA providing recent feedback on its strategic intent for cycling in the M3E area that complements previous work on the Molonglo Trunk Cycleway to the city.

Purpose of the Assessment of Key Cycle Interfaces

The need to understand how cycle infrastructure would be incorporated / interface with the East West Arterial corridor was identified during the development of the strategic design of the preferred option. In

response, this assessment seeks to assess the interface between the EWA and potential cycle facilities in the Molonglo Valley, and how cycle infrastructure can be best accommodated and coordinated in the EWA corridor. As such, the objective of the assessment is to test the viability of various elements of cycle infrastructure in the EWA corridor to ensure that coherent and compliant cycle infrastructure can be developed in the M3E area in the future.

It is intended that the assessment will help guide decisions on the development of future design iterations of the EWA in addition to informing the strategic planning and development of the active travel network in the Molonglo Valley.

Project Description

EWA Proposal

The proposed EWA consists of approximately 3 km of new arterial road through a greenfield site connecting into the existing Holborow Ave intersection in the west and the Tuggeranong Parkway to the east. It has a staggered T signalised intersection along its route where it meets the Molonglo 3 East (M3E) Connector Road. To the west of the M3E Connector Road the EWA is proposed to be a single carriageway (except for around the Molonglo Town Centre where it is dual carriageway), however due to the anticipated introduction of significant demand from the M3E Connector Road, the EWA is proposed to be a dual carriageway to the east of this intersection.

Figure 2 – EWA preferred option alignment (proposed southern alignment shown in Green)

The preferred route option that has been adopted in the strategic design is depicted in Figure 2. The proposed alignment runs immediately adjacent to the Box Gum Woodland to the west of the Molonglo River, generally following the natural surface to the extent possible. The EWA passes through the Molonglo River Corridor reserve and over the Molonglo River on a 3-span, 236 m bridge.

To the east of the Molonglo River the proposed alignment is curvilinear in response to rolling topography, climbing at 3-5% grades until it nears the Tuggeranong Parkway. The proposed Tuggeranong Parkway interchange consists entirely of free flow ramps, one of which is a loop ramp.

The Molonglo Valley to City Trunk Cycleway

Previous studies have recommended provision of a Molonglo Valley to City Trunk Cycleway (the Trunk Cycleway), connecting Stromlo Forest Park, the Arboretum and Lake Burley Griffin to the Molonglo 2 Group Centre and Lake Burley Griffin utilising additional width on the East-West Arterial corridor. Previous studies have proposed a 4m wide Trunk cycleway with 1 m shoulders.

Currently, most off road paths in the ACT are shared by cyclists and pedestrians. The main difference between current ACT shared paths and the Trunk Cycleway is that the latter is intended to be a segregated or cyclist only facility where cyclists can travel faster without risk of collision with pedestrians. Geometry of the Trunk Cycleway will also be suited to higher speed travel. Associated pedestrian paths can be located alongside, with or without a separator. In the recently completed Belconnen Bikeway, pedestrian and cycle areas are separated by a grassed area with streetlighting located in it. In outer urban areas, or areas of lower pedestrian activity, a footpath may not necessarily be provided.

It is noted that the Molonglo – City Trunk Cycleway will connect the Molonglo Town Centre to trunk path network north of Scrivener Dam. There will be a need to ensure that appropriate connectivity is provided from the adjacent suburbs in M3E and around the Town Centre. Whilst the strategic planning for the Molonglo cycle network will be the subject of future investigations, the design of the EWA corridor has been developed to allow flexibility for connections into the peripheral cycle network

Cycle Infrastructure – Proposed EWA Approach

Provision for cyclists has been met in the EWA design through a combination of shared paths and the Trunk Cycleway. Paths are proposed be provided on both sides of EWA in the Molonglo Town Centre and east of the Molonglo 3 East Connector Road. Across the bridge, and west of the Molonglo 3 East Connector Road, a shared path would be provided on one side and the Trunk Cycleway on the other side of EWA.

Given the unique presence of the Trunk Cycleway in the EWA corridor, a tailored approach to active travel has been agreed with TCCS. In the Molonglo Town Centre zone (CH 0000 – 0700), segregated walking (1.5m) and cycle paths (2m) have been adopted in the EWA verge where the dedicated off-road cycle path caters to both commuting and recreational cyclists. From CH 0700 the Trunk Cycleway commences, making provision for high speed commuting cyclists, with allowance for recreational cyclists on shared paths. Connection between the eastbound segregated cycleway in the northern verge, and the Trunk Cycleway in the southern verge will require careful consideration in future iterations of the design.

Objective 12 of the Molonglo River Reserve Management Plan requires that the reserve provide a range of recreation opportunities that are valued by users and that can coexist with other values and objectives for the reserve. Good connections from the paths along EWA to the Molonglo River Reserve will be important to assist in meeting this objective.

The proposed shared paths are expected to provide good connectivity to adjacent urban areas to minimise walk and cycle travel times and distances.

Cycle Infrastructure – Geometric Considerations of Current Proposal

Whilst design of the Trunk Cycleway was outside the scope of the EWA feasibility study, spatial allowance was made for it during the strategic design development. The current proposal for the Trunk Cycleway in the strategic design of the preferred EWA options proposes the Trunk Cycleway in the southern verge of EWA for the entirety of the corridor between CH 0700 and the Tuggeranong Parkway interchange. The rationale for this approach is to:

- Provide a high speed free-flow environment for commuting cyclists to the west of the Molonglo River that does not traverse side roads.
- Locate the Trunk Cycleway adjacent to the Box-Gum woodland west of the Molonglo River that does not traverse side roads (and away from the urban area) in order to segregate the Trunk Cycleway

from pedestrians. This is expected to reduce friction on the Trunk Cycleway (improve travel times) and enhance safety for pedestrians and cyclists alike.

- Avoid the need to traverse the northern leg of the M3E connector road. This road is expected to convey high traffic volumes and will potentially impose substantial delay to commuting cyclists as there will be a substantial turn phase at the signalised intersection that stops the through movement of cyclists.
- Avoid potential impacts on the Arboretum.
- Allow the Trunk Cycleway to more easily navigate the Tuggeranong Parkway interchange.
- Minimise cost of the Trunk Cycleway by rationalising the need for structures (underpasses) to accommodate the path

It was considered that the Trunk Cycleway would generally follow the geometry of the EWA carriageway, noting that the geometry would have more flexibility than EWA alignment due to its lower design speed. That is, there is more scope for the Trunk Cycleway to follow the natural topography of the site. Notwithstanding, the anticipated longitudinal gradient of the proposed Trunk Cycleway is expected to generally range between 0.5 – 5%, with a local steepening up to 7% in the vicinity of the Tuggeranong Parkway Interchange (refer discussion on site 4 below).

The provision of the Trunk Cycleway would have implications for the material balance and structural requirements for the EWA project. It is noted that bridge designs (namely the Molonglo Bridge, the Tuggeranong Parkway Interchange Bridge, and Tuggeranong Parkway northbound exit ramp underpass) have been developed (and costed) with provision for the Trunk Cycleway. However, as geometric design of the Trunk Cycleway did not form part of the EWA project, its provision would require additional cut and fill. This is of particular note in areas of steep terrain such as the cutting between the northern and southern legs of the M3E intersection.

Key Cycle Interfaces Overview

This assessment of cycle infrastructure interfaces has focussed on five key locations which are considered critical to prove the existing concept (the Southern Alignment) or alternatively assess the viability of elements of an alternative Northern Alignment. This Northern Alignment is documented in the design sketches contained in Attachment A. The key cycle features that have been assessed are provided in Table 1 and depicted in Figure 3.

Table 1: Assessed Cycle Interfaces

Site		Interface Assessment
#	Option	
1	Southern Alignment*	Cycle underpass (under Tuggeranong Parkway northbound exit ramp) – proof of current EWA design concept to ensure acceptable geometry can be achieved for the Trunk Cycleway to allow it to reach the bridge crossing of the Parkway.
2	Northern Alignment	Cycle underpass (west of Molonglo River) – underpass structure under the EWA that provides an alternative Northern Alignment for the Trunk Cycleway west of the Molonglo River. This underpass aims to: - provide connectivity between the Trunk Cycleway and shared path facilities on the western Molonglo River Corridor boundary - facilitate full grade separation of the Trunk Cycleway

Site		Interface Assessment
#	Option	
3		M3E Cycle underpass (for alternative Northern Alignment) – underpass structure under the M3E connector Rd (north) to facilitate full grade separation of the Trunk Cycleway
4		Reconfiguration of River Rd Underpass (for alternative Northern Alignment) – adjustment of the current proposed configuration of the River Road underpass to accommodate cyclists in order to facilitate full grade separation of the Trunk Cycleway.
5		Alternative Trunk Cycleway alignment (east of M3E connector road) - testing of the implications of routing the cycleway on the western side of the Tuggeranong Parkway, using the existing zoo underpass to traverse the Tuggeranong Parkway corridor.

** Proof of existing concept*

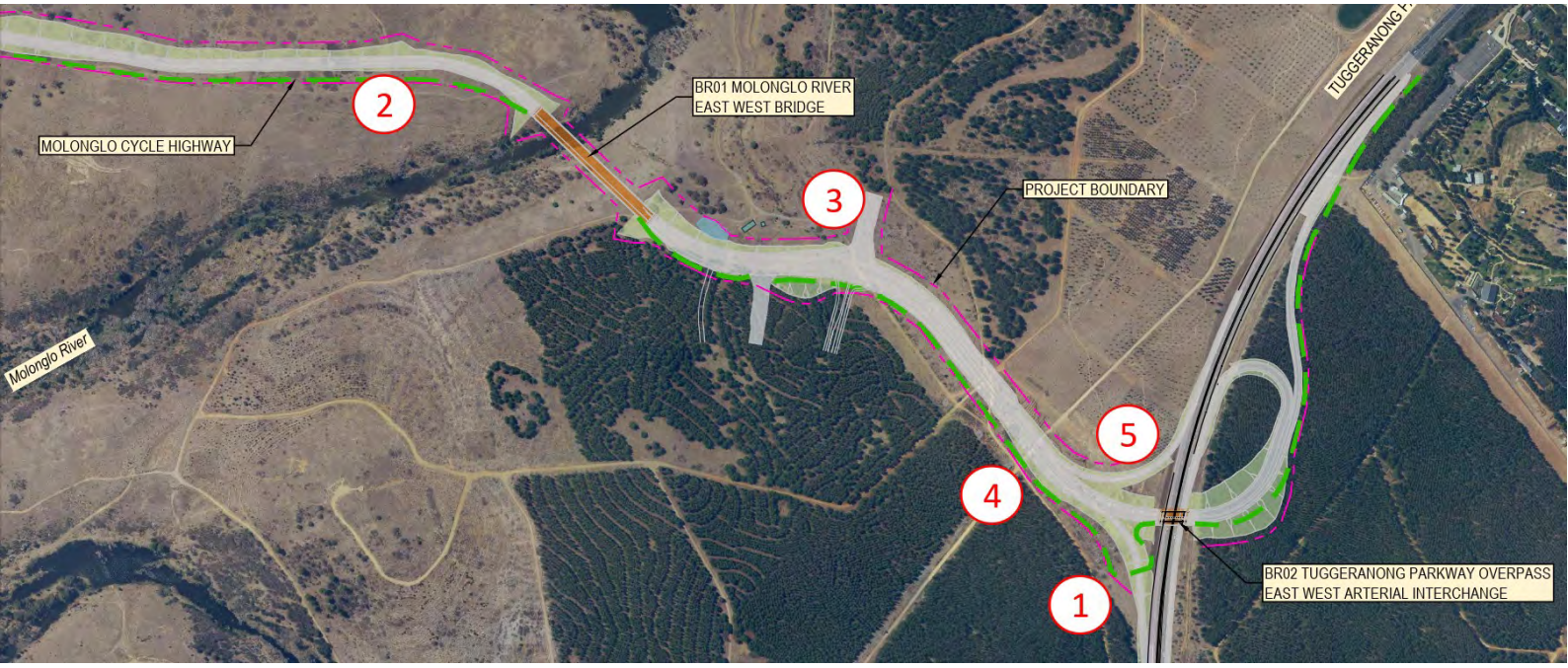


Figure 3 – Assessment locations of cycle interface sites in the EWA corridor

In assessing and reporting the proposed interface sites described above, geometric assessment of the Trunk Cycleway has been undertaken to understand the implications and viability of the proposal. This assessment is documented in the design sketches provided in Attachment A. In addition, qualitative commentary on structural implications of the options has been provided where applicable.

Site 1: Cycle Underpass – Tuggeranong Parkway Exit Ramp

The Trunk Cycleway alignment and associated cycle underpass proposed in the strategic design at the Tuggeranong Parkway Interchange northbound exit ramp has both horizontal and vertical spatial constraints. To ensure the viability of the proposed Trunk Cycleway alignment in this area, a proof of concept assessment has been undertaken of the strategic design.

The proof of concept assessment has tested three options for the Trunk Cycleway alignment (depicted in Figure 4), finding that all three options are viable. Details of the three tested options are provided in Table 2.

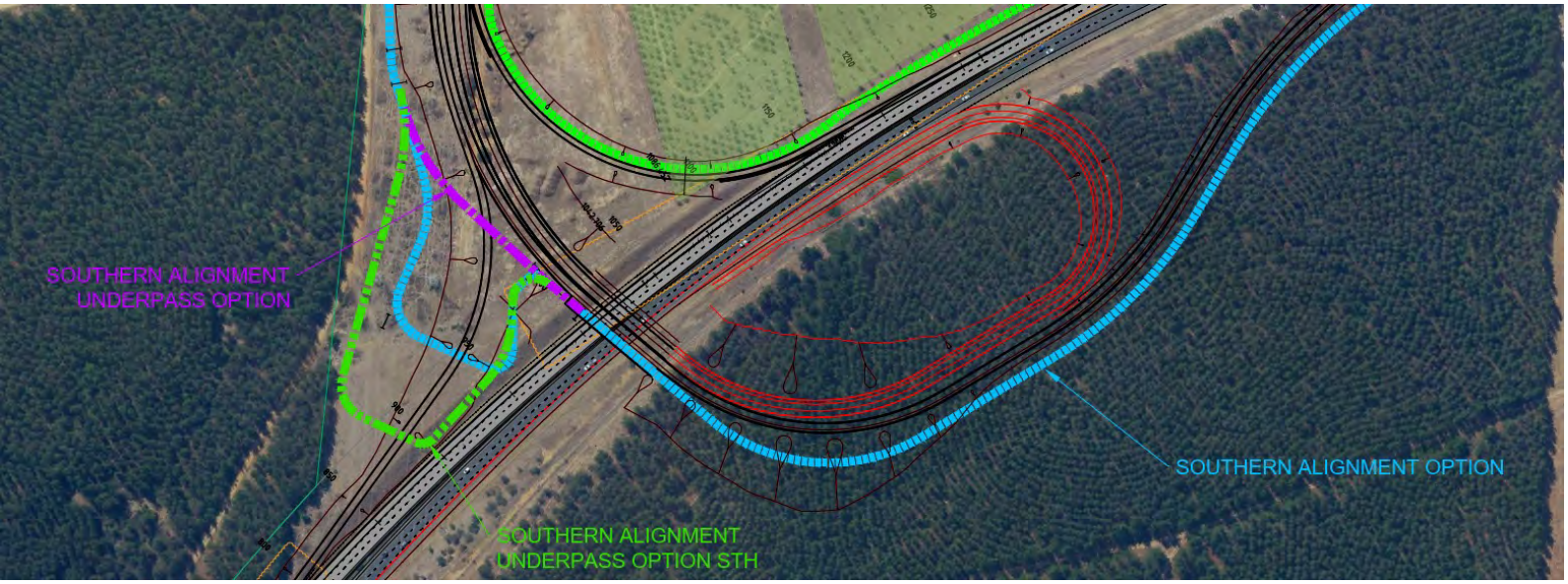


Figure 4 – Trunk Cycleway geometry at Tuggeranong Parkway northbound exit ramp

Table 2: Tuggeranong Parkway northbound exit ramp underpass options

Option	Comments
A	This is the current notional alignment of the Trunk Cycleway in the preferred EWA strategic design. The design intent for the alignment is to route under Tuggeranong Parkway northbound exit ramp embankment through an underpass and then climb to the Tuggeranong Parkway interchange bridge where the Trunk Cycleway crosses the Parkway corridor. In addition to the underpass structure, this option is likely to require retaining walls adjacent to the Tuggeranong Parkway. The alignment combines relatively steep geometry (up to 10%) with very tight horizontal radius curves (R10) in close proximity to the underpass headwall. Whilst viable, the arrangement is highly undesirable from a safety perspective as it combines a steep descent with a tight horizontal curve on approach to a structure.
B	Option B adopts a similar design approach to the Blue option (circuitous arrangement with an underpass and retaining walls), but seeks to mitigate the safety concerns inherent in the Blue option. Whilst it still maintains R10 horizontal curves, it has a flatter descent on the westbound approach to the underpass structure (4.5%), reducing the risk of loss of control and impact with the underpass headwall. It should be noted however that the Green option is longer than the Blue option, diminishing cyclist amenity.
C	Option C is the most direct of those considered. It eliminates the need for any tight horizontal curves and provides are relatively flat grade to access the Tuggeranong Parkway interchange bridges (3.5%). This option is significantly better from an operational and safety perspective for cyclists as compared to other options as it is substantially shorter, flatter and has no sharp bends. However, as the underpass is on a skew to the embankment it is expected to be longer and hence more expensive than other options. Another consideration is that the drop to the eastern headwall will need to be to be protected by rigid safety barrier from both northbound and southbound Tuggeranong Parkway exit ramps. These barriers will interfere with the mutual sightlines required for the weave movement on the westbound EWA. Future design iterations of the EWA will need to ensure that minimum mutual sight distances are achieved and the downstream weave distance is not compromised.

Site 2: Cycle Underpass – West of Molonglo River

The alternative Northern Alignment diverges from the current proposed Trunk Cycleway at approximately CH 1490. To ensure full grade separation of the Northern Alignment, an underpass structure at CH 1520 has been included in the assessment. This structure is considered likely to be a cast in place box culvert or similar with a clearance of 3.0 m and clear width of 6m to accommodate the Trunk Cycleway cross section (a potential configuration is provided in Figure 5.

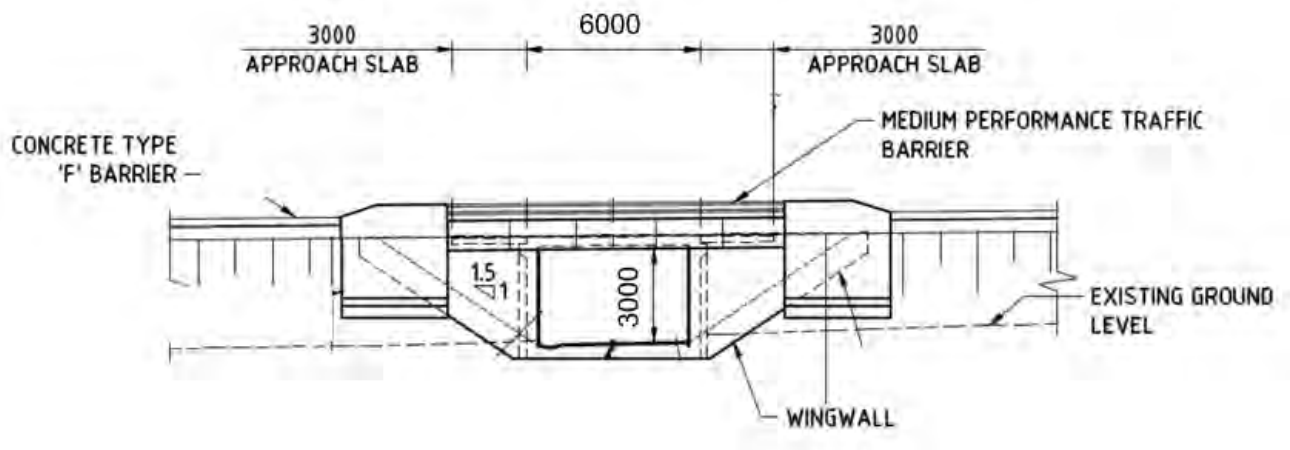


Figure 5 – Potential underpass structure arrangement

It is proposed to align the underpass on a skew to avoid the need for cyclists to significantly slow down and to improve approach sight lines. It is anticipated that the Trunk Cycleway will need to drop into cut to achieve the grade separation. The location of the underpass and alignment of the underpass is indicated in Figure 6. This underpass structure will also facilitate transverse crossing of the EWA and improve connectivity of surrounding active travel networks.

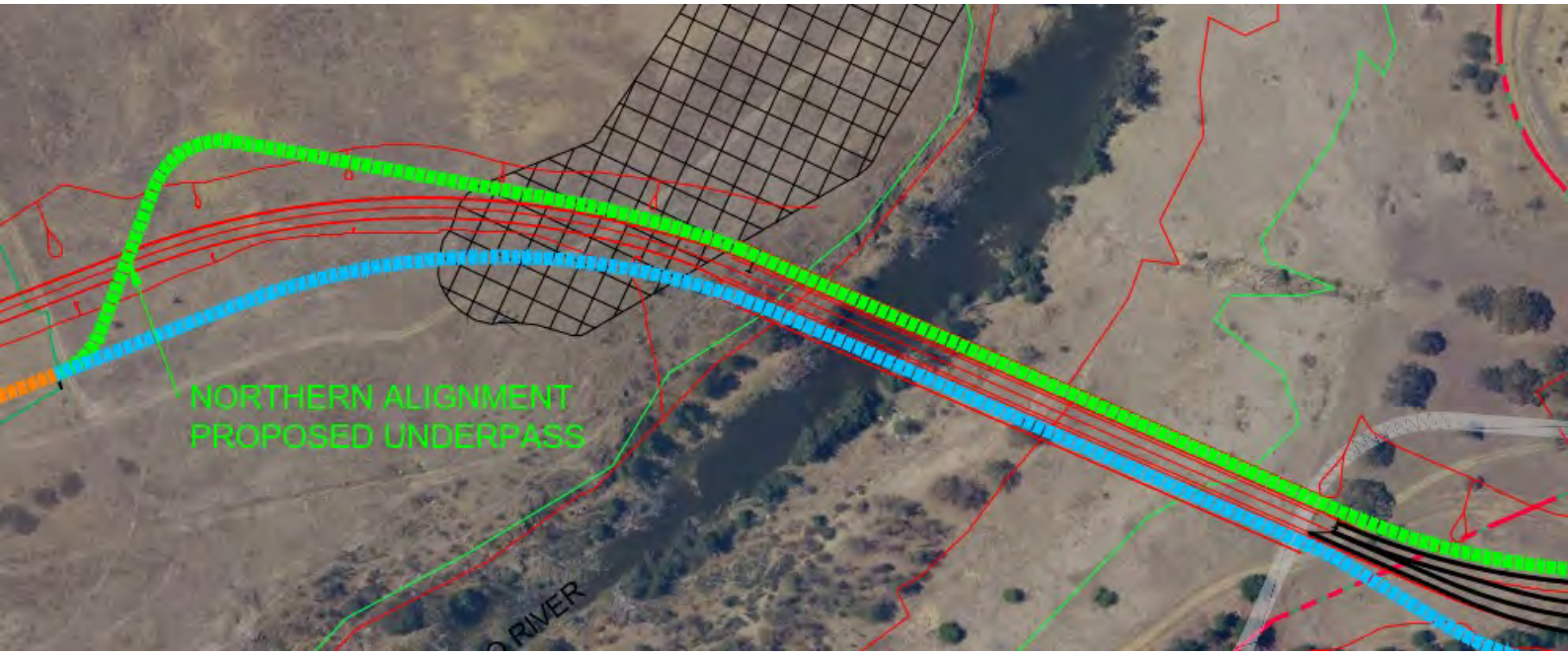


Figure 6 – Northern Alignment underpass location west of Molonglo River

Site 3: Cycle Underpass – Molonglo 3 east Connector Road (Northern Leg)

In order to achieve full free flow of the Trunk Cycleway, grade separation of the M3E Connector Road will be required. The existing topography lends itself to aligning the Trunk Cycleway under the road in this area and it is proposed to provide a culvert underpass below the M3E Connector Road similar to the culvert depicted in Figure 5.

A potential layout for this underpass is indicated in Figure 7. As can also be seen in Figure 7, the alignment of the Trunk Cycleway in this location would largely be at existing grade under the M3E Connector road. This outcome is borne of the fact that M3E Connector Road intersection is located adjacent to a water course / gully and the northern leg of the intersection is sited in fill. Connectivity to the local path network associated with the M3E Connector Road would need to be considered as part of the design development process.

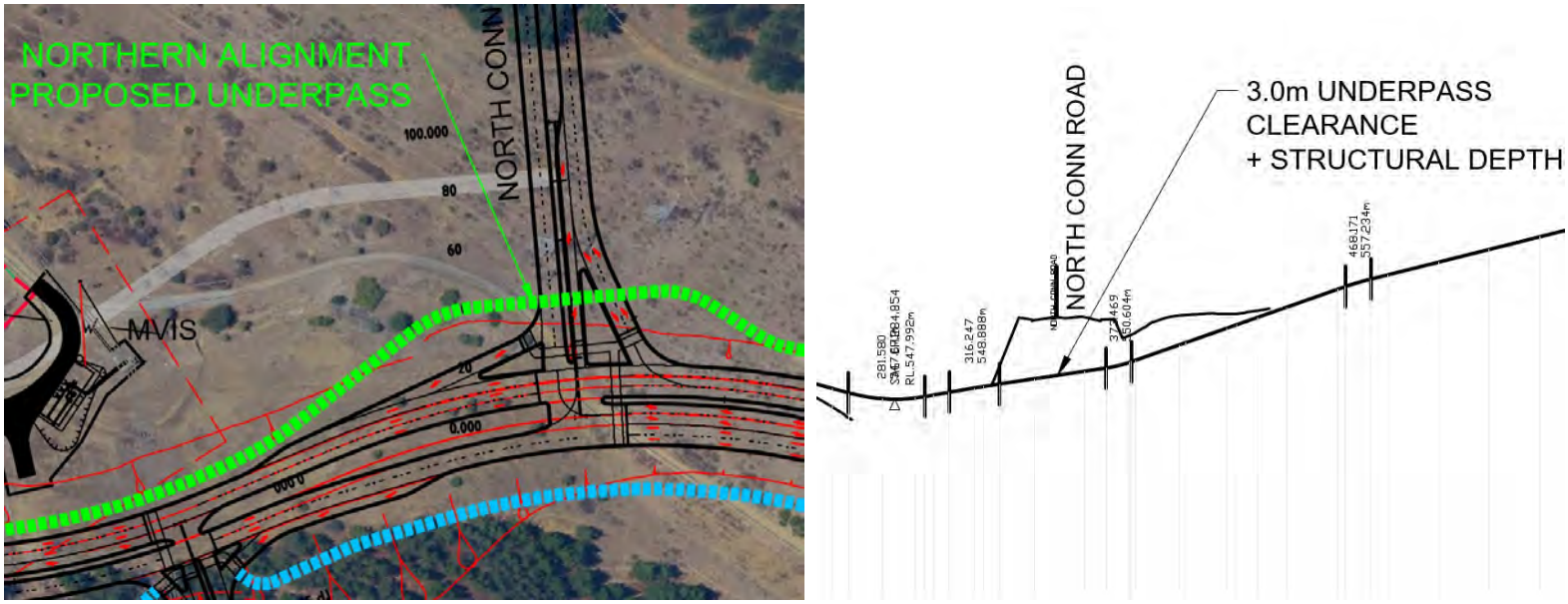


Figure 7 – Northern Alignment underpass location and profile under the M3E Connector road

Site 4: Reconfiguration of River Road Underpass

The strategic design of the EWA currently provides for an underpass of the mainline on the River Road alignment. This underpass has been provided to facilitate maintenance access to Arboretum and to ensure connectivity of the Bicentennial trail whilst avoiding any interface with live traffic. The existing proposed dimensions of the underpass allow 3.5m clearance for maintenance and emergency vehicle access in addition to equestrian thoroughfare without the need to dismount. A clear width of 6m has been proposed to allow for segregation of the Bicentennial trail and maintenance access, although it is noted that this could be potentially rationalised as part of a value management / stakeholder consultation exercise

If the Northern Alignment is adopted, there will be a requirement to navigate the Trunk Cycleway through the Tuggeranong Parkway Interchange. As the River road underpass is a required component of the EWA project, the lowest cost approach to achieve this is likely to be routing the Trunk Cycleway through the River Road underpass.

Adopting this approach is likely to require some adjustment to the proposed dimensions of the River Road underpass. It is considered that a clear width in the order of 10 m will be required to accommodate a segregated cycleway, Bicentennial trail, and maintenance track. A potential configuration is indicated in

Figure 8(an adaption to the cast in situ box culvert proposal) or alternatively a precast plank bridge may be preferred (refer Figure 9).

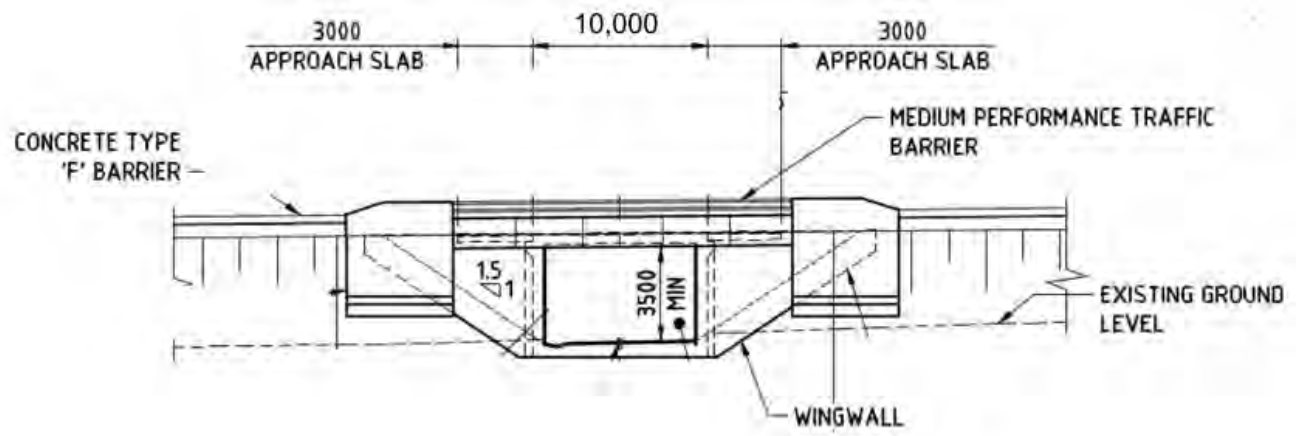


Figure 8 – Potential revised River Road underpass structure arrangement – cast in situ box culvert

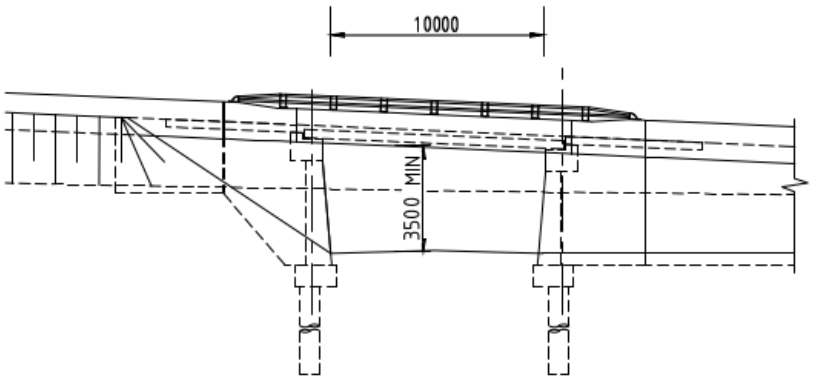


Figure 9 – Potential revised River Road underpass structure arrangement – precast plank approach

An alternative to the reconfiguration of the proposed River Road underpass would be to route the Trunk Cycleway onto the northern side of the Tuggeranong Parkway Interchange overbridge. This option would require an underpass of the northbound entry ramp in addition to an underpass of the southbound exit and entry ramps. It is likely that this approach would require an extra underpass structure compared to other alternatives being considered, but would be less circuitous and less steep, ie would offer a better outcome for cyclists. The viability of this approach would need to be assessed in further detail.

Site 5: Alternative Trunk Cycleway alignment (east of M3E Connector Road)

Should the Northern Alignment be preferred, it introduces the potential to connect the Trunk Cycleway to the Tuggeranong Parkway underpass adjacent to the Zoo. This approach (depicted in Figure 10) removes the need for the Trunk Cycleway to traverse the Tuggeranong Parkway Interchange, which is likely to have significant cost and cyclist amenity advantages.

Figure 10 – Northern Alignment connection to Zoo underpass

However, it is noted that the option faces challenges in terms of potential conflict with existing Arboretum plantings. Depending on the design approach, the additional cross-sectional space required to accommodate the Trunk Cycleway may increase the number of trees impacted in the Arboretum. That is, the Trunk Cycleway may require the removal or relocation of Arboretum plantings, notwithstanding that the majority of these plantings are sited in the gazetted Tuggeranong Parkway corridor.

A possible mitigation to this issue involves aligning the Trunk Cycleway immediately adjacent to the northbound entry ramp and providing a retaining wall to minimise infrastructure footprint (refer Figure 11). This approach would also accommodate the necessary visibility splays to achieve the required stopping sight distance for vehicles on the entry ramp. Another potential mitigation is possibility of relocating Arboretum trees in a “land-swap” type arrangement. These mitigations require further investigation and consultation to understand their viability.

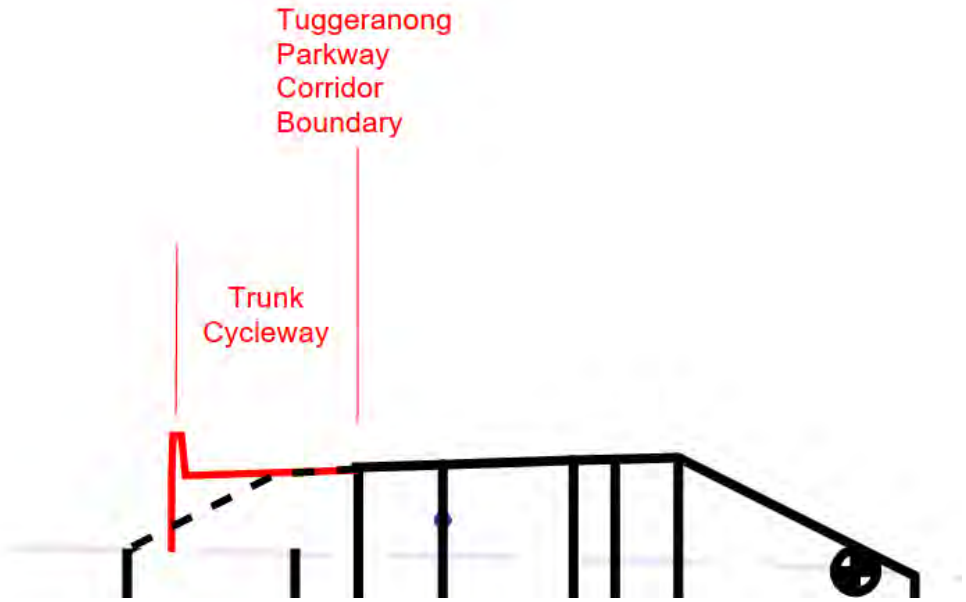


Figure 11 – Cross section of Tuggeranong Parkway northbound exit ramp with Trunk Cycleway connection to Zoo underpass

Another mitigation that could be either discrete or combined with the mitigation above could be to revise the northbound entry ramp geometry. Providing a tighter horizontal radius on the ramp will result in a lower design speed for the ramp, however will reduce the impact on the Arboretum.

Adopting a Northern Alignment connection to the Zoo underpass would remove the need for upsizing the River Road underpass, allow deletion of the underpass of the Tuggeranong Parkway northbound exit ramp, and significantly reduce the required width of the Tuggeranong Parkway overpass bridge. Conversely, it would require some widening of the path at the Zoo underpass and potentially construction of retaining walls adjacent to the zoo. This path widening at the underpass would require the demolition of the existing raked retaining wall shown in Figure 12 and replacement with new retaining walls (potentially soil nailed or anchored) to accommodate the wider path cross section needed for the Trunk Cycleway. A detailed assessment of the vertical clearances, retaining walls and substructure of this existing bridge would be required to properly understand the requirements of such works.

Figure 12 – Existing Tuggeranong Parkway underpass adjacent to the Zoo

Notwithstanding uncertainties associated with the required works at the Zoo underpass, and the potential requirement for retaining wall, it is considered that the cost savings of this alternative associated with reduced structural requirements, in addition to the reduction in path lengths, is likely to realise substantial savings for the Northern Alignment option. Furthermore, this option is considered to offer substantially better outcomes for cyclists in terms of journey length, path grades, and general amenity (fewer underpasses and better views to the Arboretum).

Conclusions

The Assessment of Key Cycle Interfaces technical note explores a number of options at key interface points between the proposed Molonglo Trunk Cycleway and the local path and road network. The assessment was undertaken in the context of two broad scenarios contained within the EWA corridor:

1) a southern Trunk Cycleway alignment (the current notional assumption in the EWA strategic design); and

2) an alternative northern alignment.

Table 3 summarises the advantages and disadvantages identified with each of the approaches.

Table 3: Site options and associated advantages and disadvantages

Site			Advantages	Disadvantages
#	Option			
1	Southern Alignment	A		- Relatively steep grades and unsafe geometry
		B	- Softer grades and slightly safer than the Blue option	- Remains relatively unsafe geometry (albeit better than the Blue option). - More circuitous than the blue option
		C	- Shortest, flattest and safest option	- Likely to have higher structure costs - Barrier requirements on the EWA may impact on sightlines.
2	Northern Alignment	Grade separated crossing of EWA	- Facilitates full grade separation of the Trunk Cycleway and the road / path network (safety, travel time and amenity benefits) - Consistent with the philosophy of the Trunk Cycleway as a high speed, low friction active travel route - Better connectivity with M3E northern precinct including local centre - Integration with Molonglo peninsula path network (west of river bend) and provision of grade separation of the local path network	- Steeper grades for the Trunk Cycleway (reduced amenity) - Worse connectivity into M3E southern precinct - Additional whole of life cost (both capex and ongoing opex) associated with an additional structure. The cost implications of earthworks between options requires more detailed investigation.
3		Grade separated crossing of M3E Connector road	- Facilitates full grade separation of Trunk Cycleway and the road / path network (safety, travel time and amenity benefits) - Consistent with the philosophy of the Trunk Cycleway as a high speed, low friction active travel route - Better connectivity with M3E northern precinct including local centre	- Steeper grades for the Trunk Cycleway (reduced amenity) - Worse connectivity into M3E southern precinct - Additional whole of life cost (both capex and ongoing opex) associated with an additional structure
4		Widening of River Road underpass	- A wider structure provides flexibility with the path network in that it allows: a) A northern alignment to transition to the south (if a northern alignment is preferred but a connection to the zoo underpass is not feasible) b) A southern alignment to transition to the north (if a southern alignment is preferred and a connection to the zoo underpass is feasible) - It provides grade separated connectivity of the path network between M3e North and South precincts	- Additional whole of life cost (both capex and ongoing opex) associated with wider structure

Site #	Option		Advantages	Disadvantages
5		Connection to Zoo underpass in western Tuggeranong Pwy verge	- Facilitates full grade separation of Trunk Cycleway and the road / path network (safety, travel time and amenity benefits) - The route is shorter and flatter (significant cycle amenity benefits) - Is likely to be significantly cheaper than Tuggeranong Parkway interchange option (TBC with further assessment of zoo underpass) - Consistent with the philosophy of the Trunk Cycleway as a high speed, low friction active travel route	- Trunk Cycleway alignment will require removal / relocation of additional arboretum trees, and / or ramp geometry with reduced design speed

The southern alignment was proposed during the strategic design development process of the EWA as it was considered likely to:

- reduce at grade interface with the local road network (in particular the northern leg of the busy M3E connector road);
- have cost advantages; and
- avoid interface with the Arboretum.

However, whilst it is considered likely that an alternative Northern Alignment would have a higher cost, it would also provide substantial benefits to cyclists. The provision of Trunk Cycleway underpasses of the EWA west of the Molonglo River Bend and under the northern leg of the M3E connector road will provide an entirely free flow, grade separated facility for commuting cyclists. This will improve travel times, safety and general amenity for cyclists, and is more in keeping with the philosophy of a high-speed, uninterrupted trunk cycleway between the Molonglo Valley and the City.

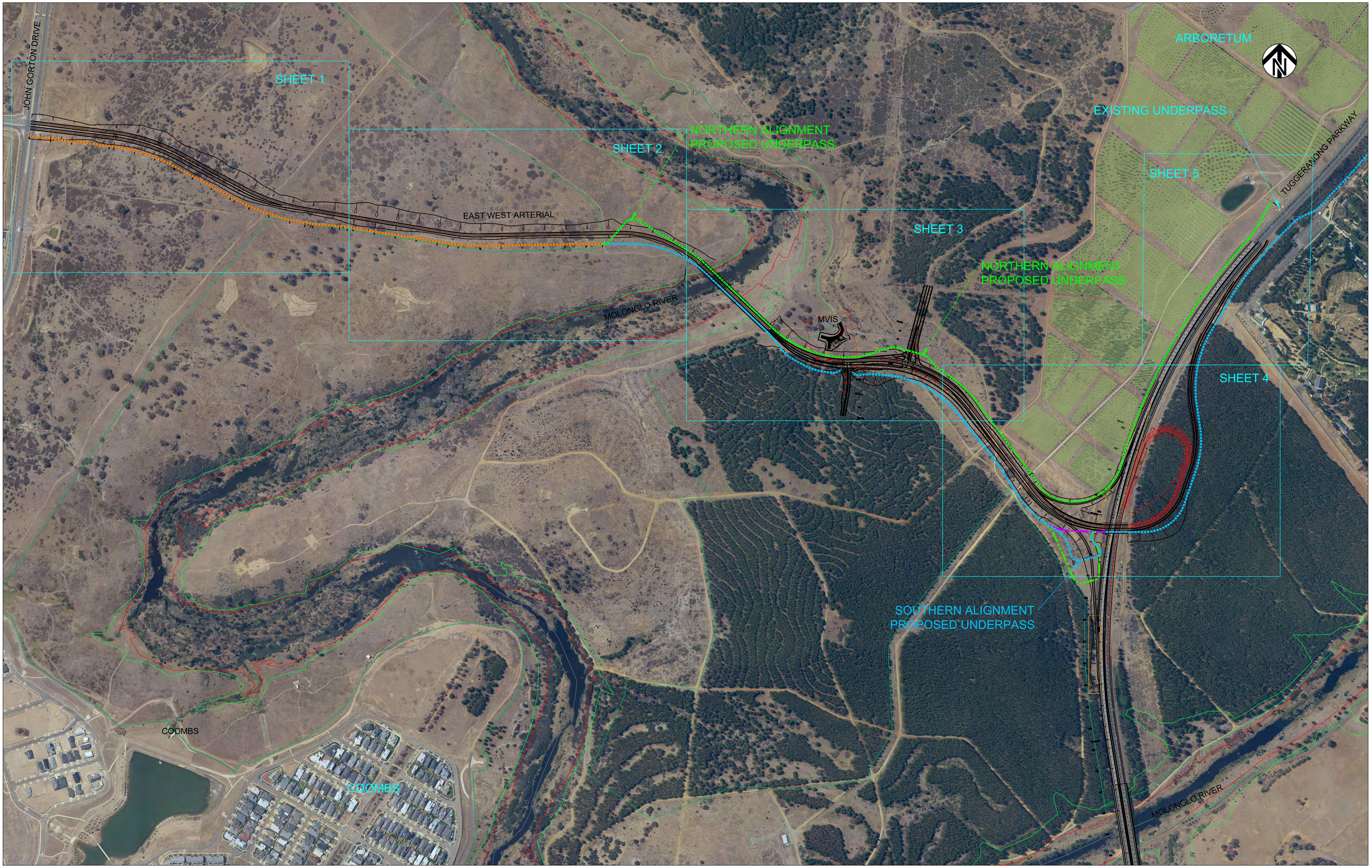
In addition, a potential connection between a Northern Alignment and the Zoo underpass will further improve journey times, safety, average travel speeds and amenity for cyclists. This alternative is also considered likely to offer substantial cost savings. However, whilst there appears to be significant advantages in adopting this connection, it imposes impacts on the Arboretum that will require management either through consultation, tree removal or replanting in a land swap agreement, or potentially partially through adjustment to the EWA alignment.

In summary, whilst a Northern Alignment for the Trunk Cycleway will potentially have a higher capital cost, there appears merit in further investigation of this alternative in future iterations of the EWA and Trunk Cycleway design.

Attachments

- Attachment A – Geometric Assessment Design Sketches

Attachment A – Geometric Assessment Design Sketches



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MOLONGLO EAST WEST ARTERIAL

TRUNK CYCLEWAY OPTIONS - GENERAL ARRANGEMENT

INFORMATION DOCUMENT

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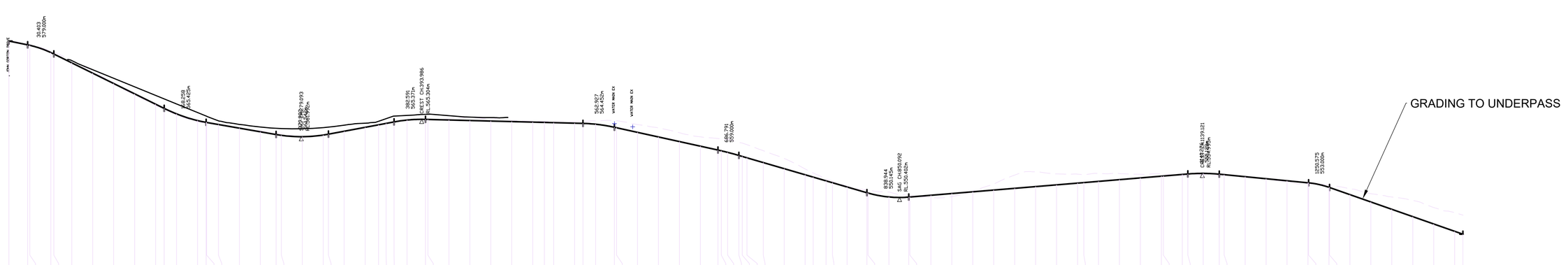

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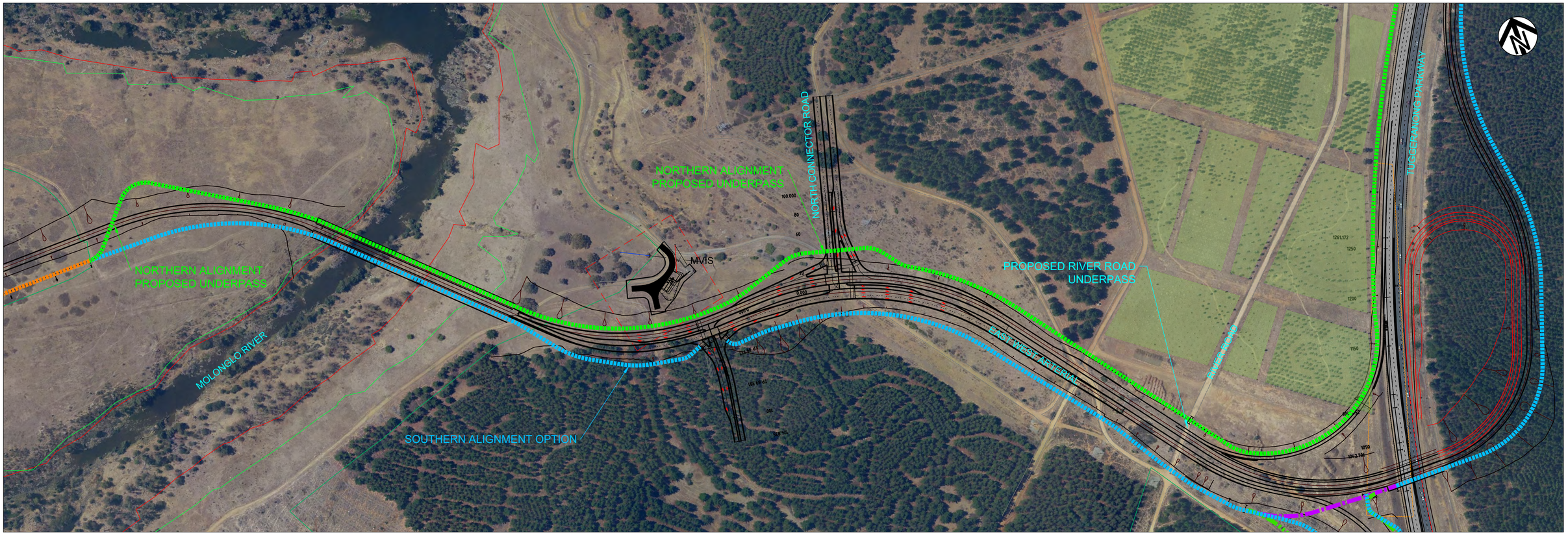
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SOUTHERN ALIGNMENT OPTION
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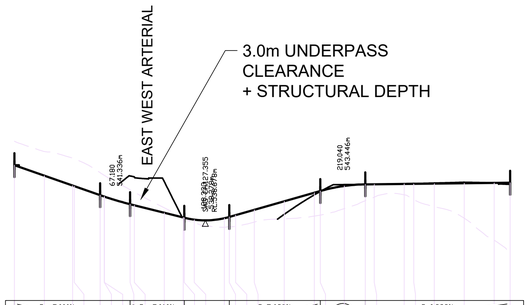
UNDERPASS
EAST WEST ARTERIAL
FERNDALE ROAD
TUGGERANONG PARKWAY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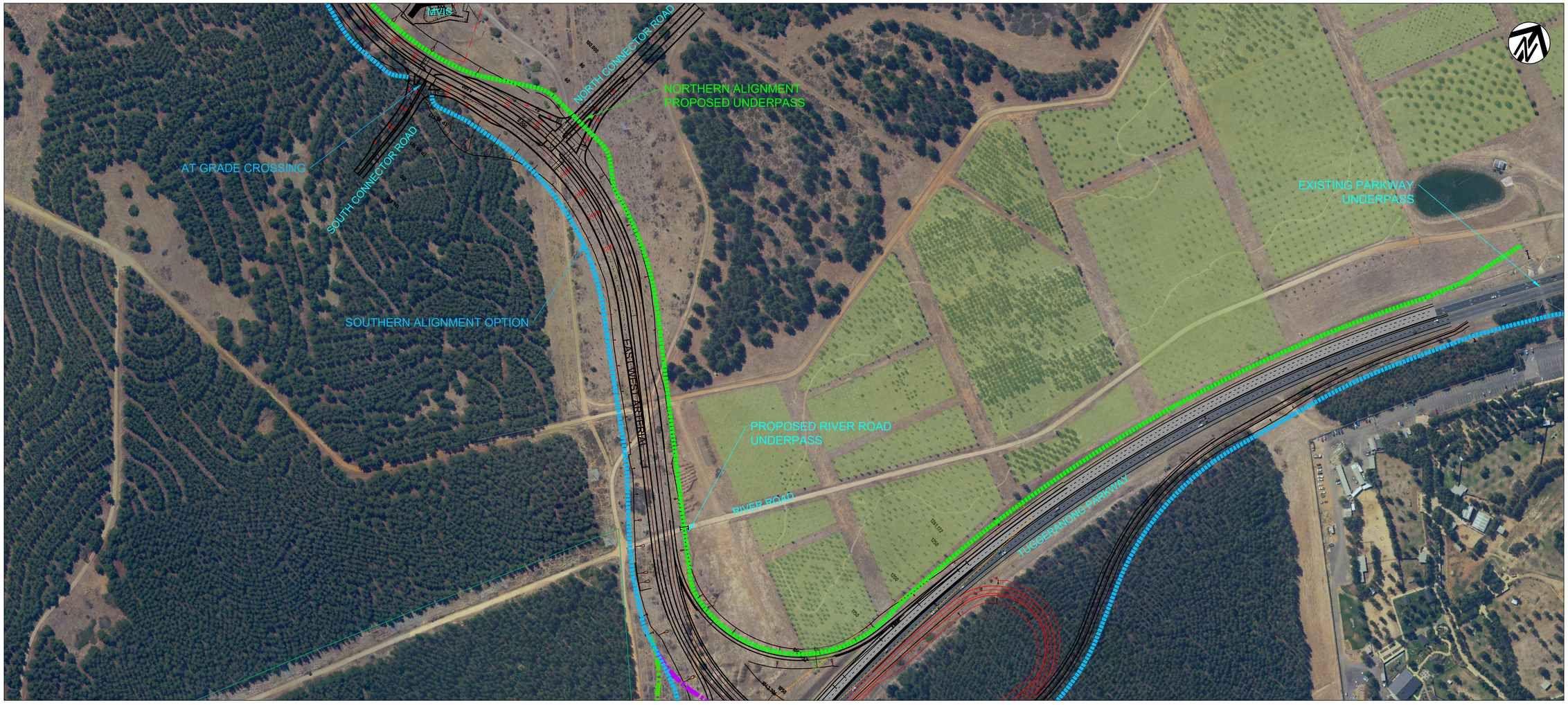

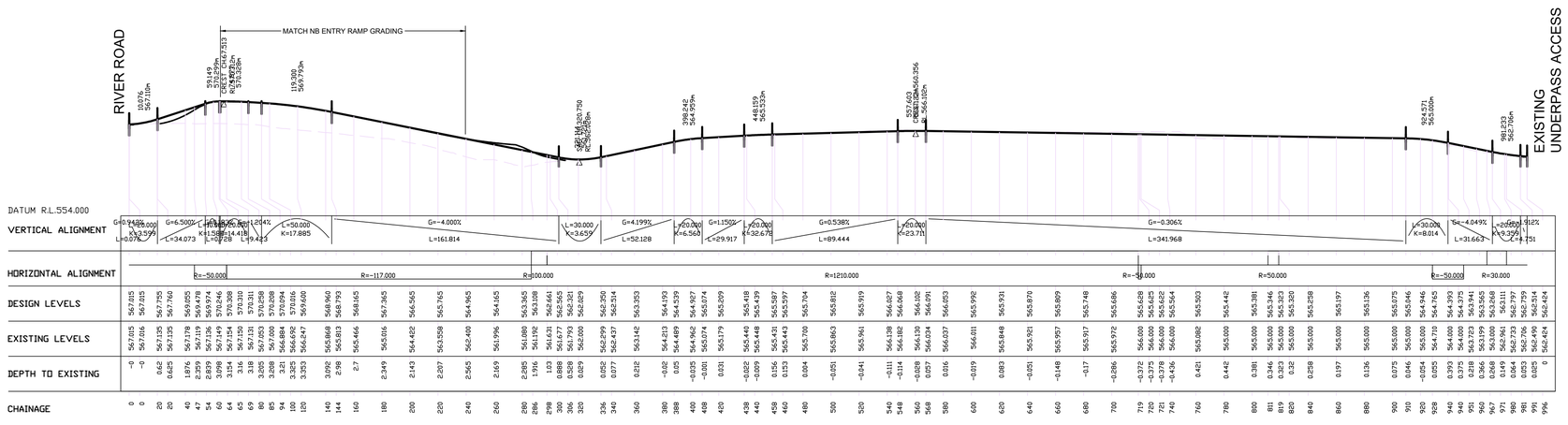

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MOLONGLO - EAST WEST ARTERIAL

TRUNK CYCLEWAY OPTIONS - RIVER ROAD TO PARKWAY

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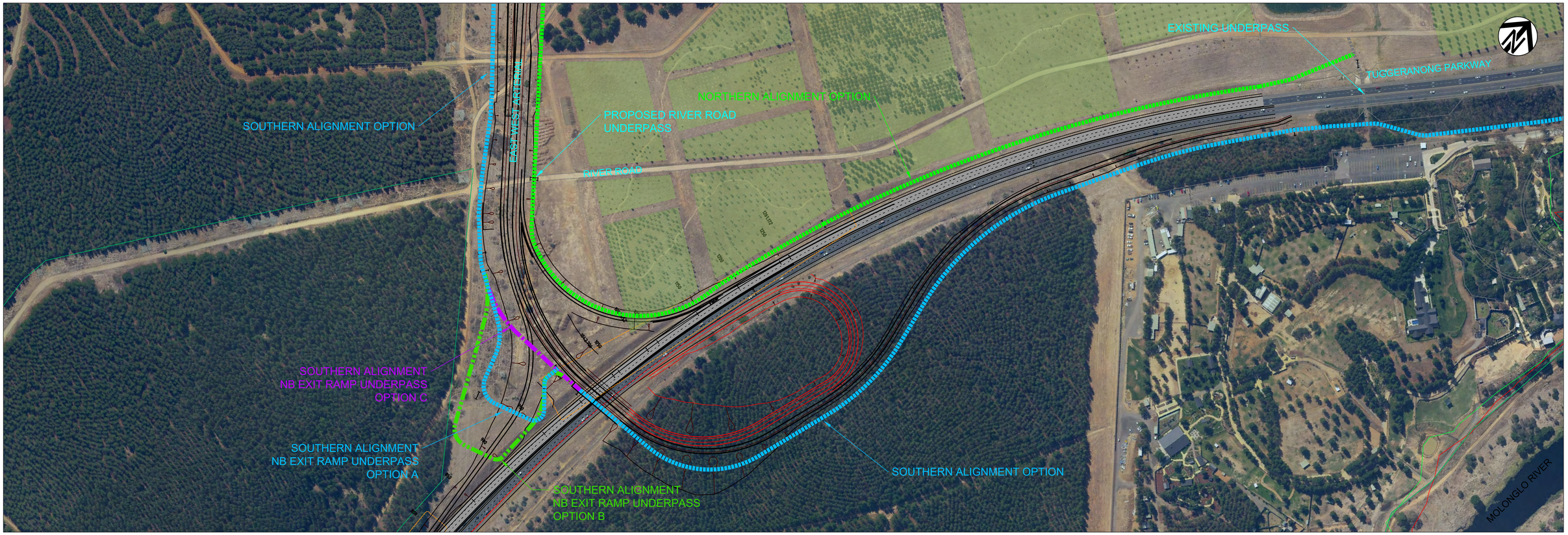

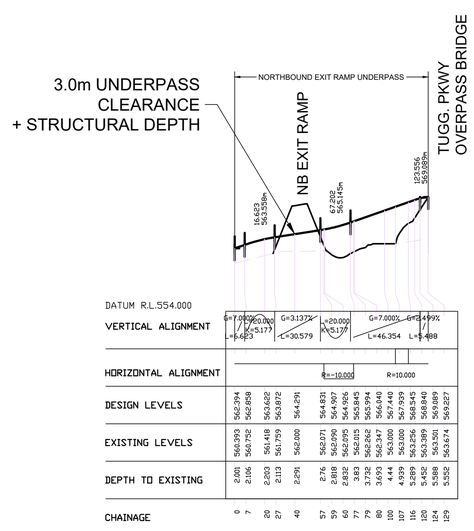

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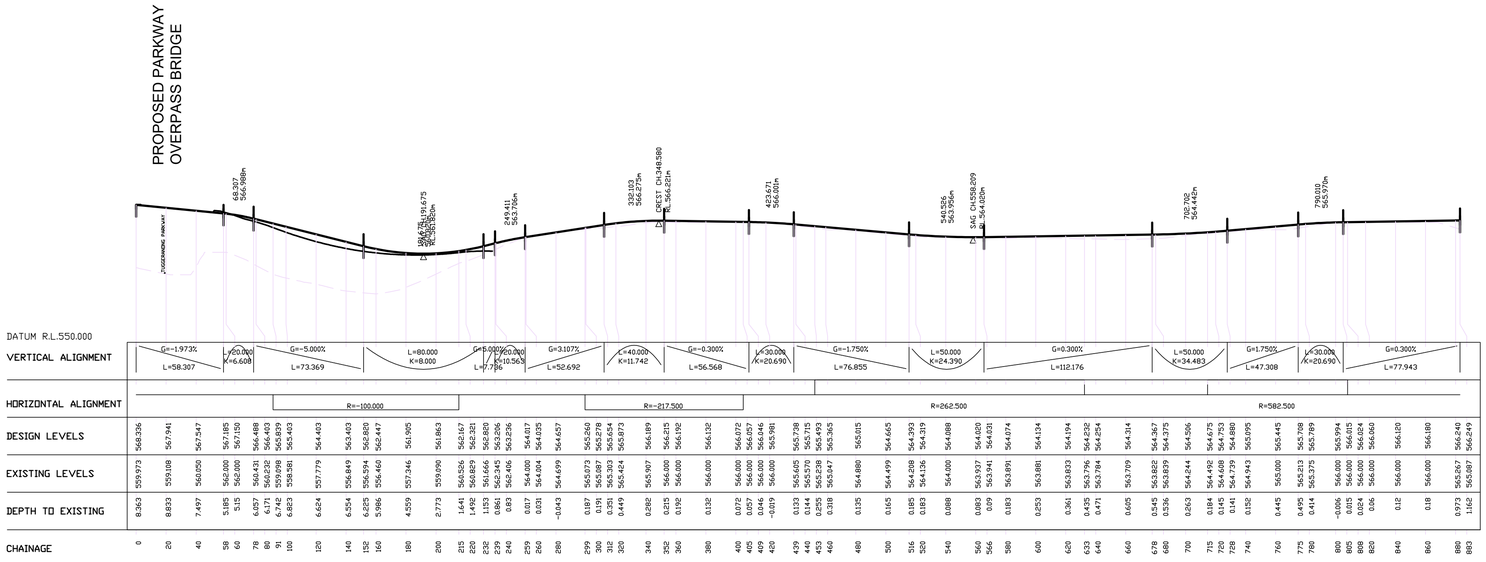

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TRUNK CYCLEWAY OPTIONS - SOUTHERN ALIGNMENT

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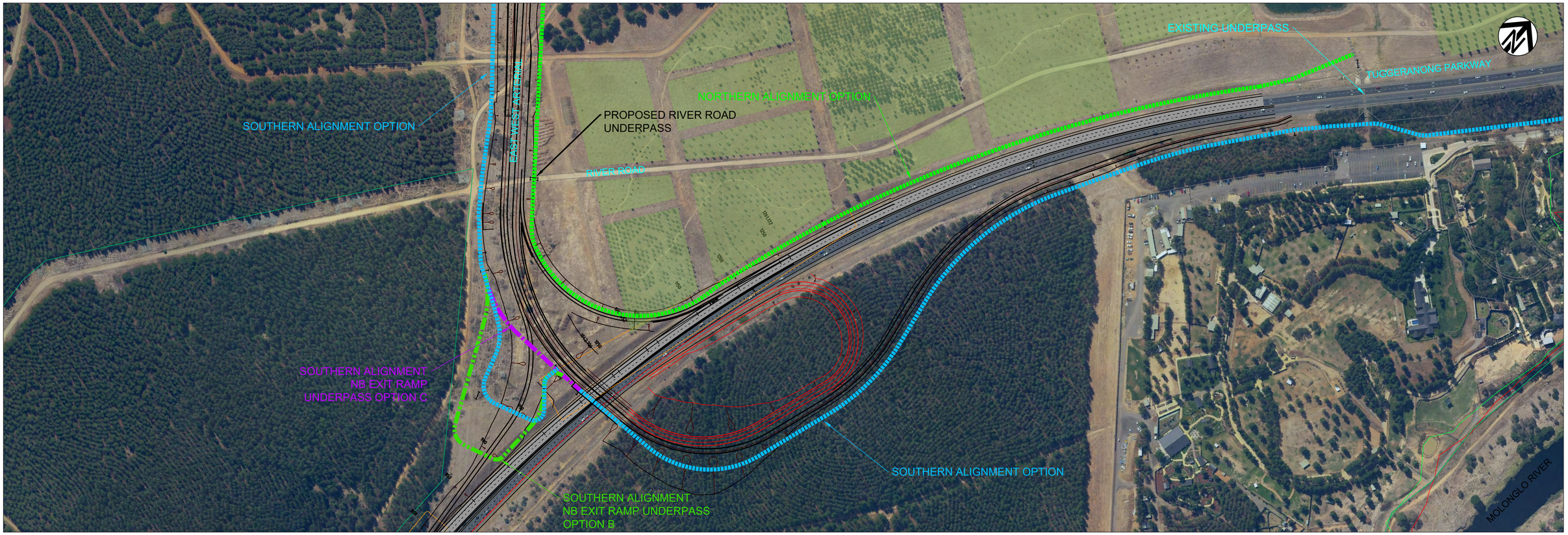

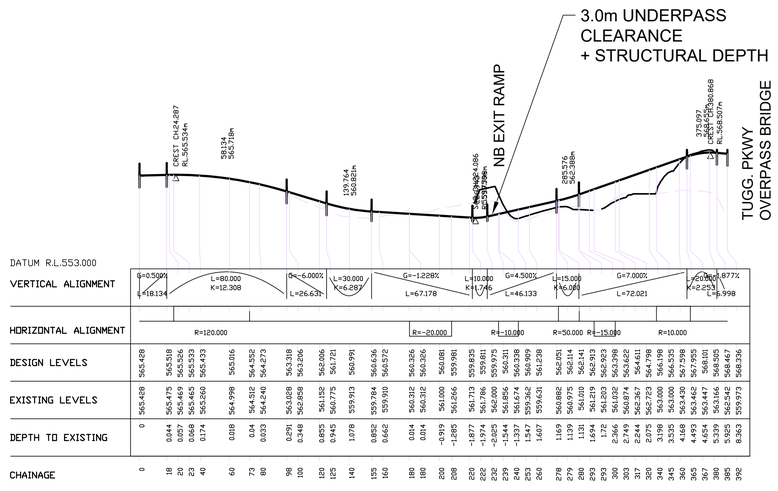

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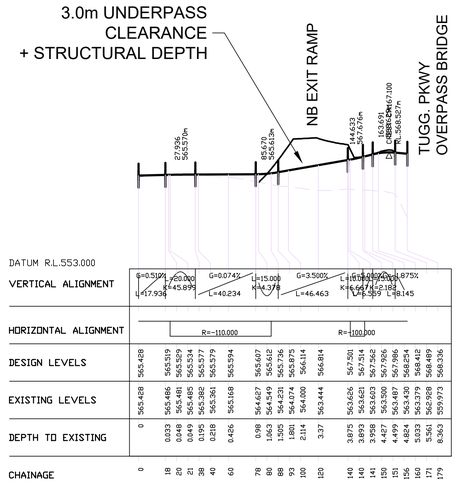

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MOLONGLO - EAST WEST ARTERIAL
TRUNK CYCLEWAY OPTIONS - RAMP UNDERPASS OPTIONS

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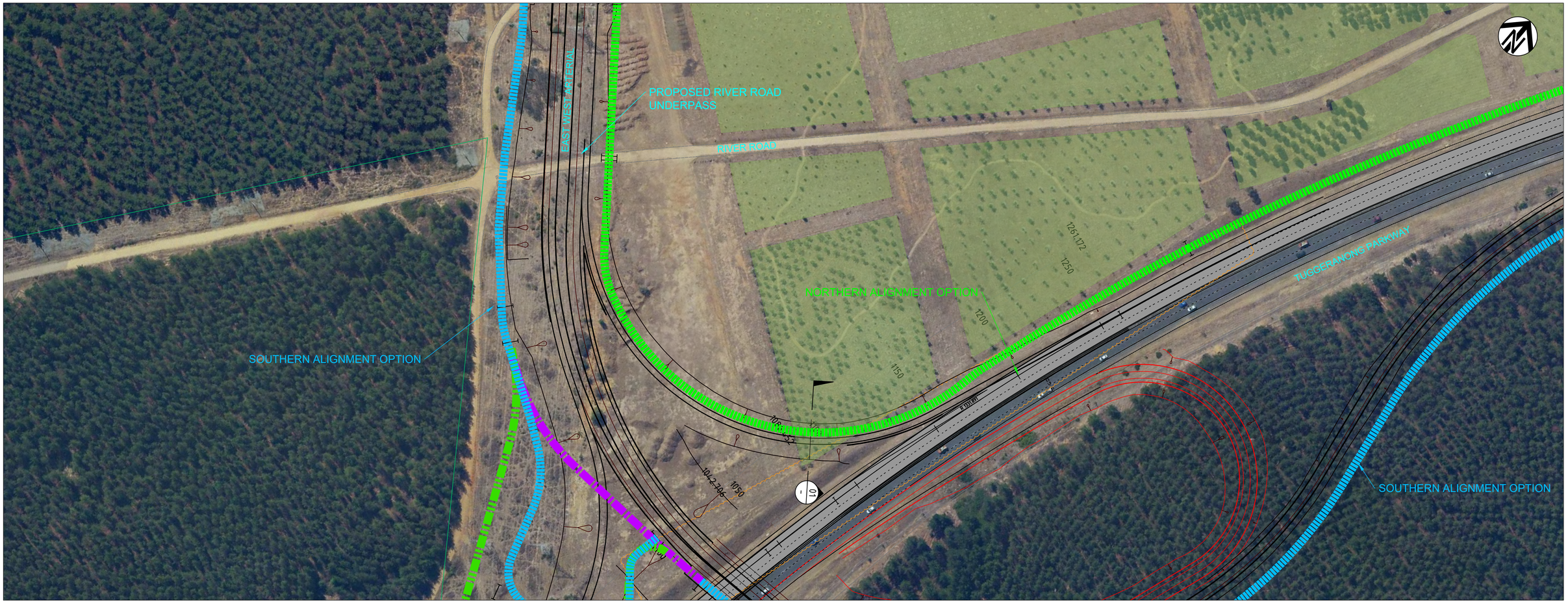

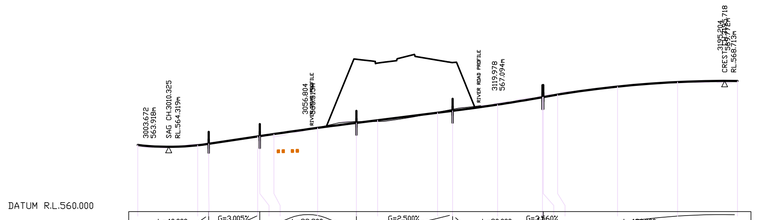

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Appendix F Comment Register

Comments on Molonglo East-West Arterial Road Feasibility Study and Molonglo Strategic Traffic Study
Document Title: Volume 2 - Strategic Design Report - Preferred Route Option

No.	Section/Figure/ Table	Page	Reviewer	Date	TCCS Business Unit	Comment	SMEC Response	
							By	Response / Comment
1	Section 3.2.3	17	Steve Hare	12/01/2021	Infrastructure Planning	Given that many town centres are being retrofitted with 40km/h posted speed limits owing to the high pedestrian activity and to enhance these areas as places, should the study adopt this as an assumption in lieu of the proposed 50km/h posted limit in the town centre?	Doug Tonge	The rationale of this proposal is understood. The approach to the speed posting was agreed with TCCS during the design development and was grounded in a desire to: make it consistent with the approach on JGD which at the time from memory was intended to be 50 km/h around the group centre; b) acknowledged that this is an arterial road that will convey relatively high traffic volumes. Notwithstanding, it will be appropriate to re-assess the approach to speed posting when the PSP is developed.
2	Table 3.1	18	Steve Hare	12/01/2021	Infrastructure Planning	Adoption of single unit truck as the design vehicle with single articulated for check vehicle - should the design vehicle be single articulated for servicing shops in the Molonglo Town Centre? I am not sure what scale of shops are proposed, but it a supermarket is planned it is highly likely to be services by single articulated vehicles for deliveries.	Doug Tonge	Potentially an articulated vehilce would be an appropriate design vehicle for the group centre when the PSP is developed. At this stage side road intersections have not been designed around the group centre so a rigid was considered the appropriate design vehicle for the overall corridor.
3	Section 3.5	20	Steve Hare	12/01/2021	Infrastructure Planning	Does the vertical grading that is targetting suitable clearance above the bulk water main and 132kv allow for the boxing out for pavements during construction (ie subgrade is above the minimum cover to the services)? Noting the proposed timeframe for construction and general increase in cover requirements to major services over long periods of time, has additional allowance been made for potential future increases to utility cover requirements? While this is hard to estimate, allowing and additional several hundred millimetres of cover may avoid some very expensive future relocations if requirements to change.	Doug Tonge	Cover allowances have been based on feedback from utility authorities and meet current requirements, although it is noted that protection slabs have been assumed which should ameliorate cover concerns. Notwithstanding, cover requirements will need to be revisited at each future stage of design development.
4	Section 5.4.1	33	Steve Hare	13/01/2021	Infrastructure Planning	Given the possibility of future duplication of the EWA west of the Molonglo River, will the proposed 7m verges containing utiltities allow sufficient width for duplication and these services?	Doug Tonge	It is considered unlikely that there would be a need to site any utilities in the southern verge of the EWA west of the river as there is only box gum woodland adjacent to this verge in the single carriageway zone. Certainly, future designers should avoid proposing utilities in this verge.
5	Section 6.4.1	35	Steve Hare	13/01/2021	Infrastructure Planning	The report notes that TCCS has advised that an additional northbound lane is likely to be constructed on the Tuggeranong Parkway before 2031 owing to demand and capacity constraints. The micro sim model does not appear to have accounted for this in the project (2041 cases) based on the discussion in 6.4.1. As a result, many of the microsim outputs show poor traffic perforancne on the network. Should the additional northbound lane on Tuggeranong Parkway have been included in the project cases?	Josh Everett / Lindsay Jacobsen	All 2041 models in the Aimsun micro-simulation model include a third northbound lane on Tuggeranong Parkway. In the Do Nothing scenario this begins where the Cotter Road northbound on-ramp joins as an added lane and ultimately merging back to two lanes about 100 metres after the Forest Drive off-ramp diverge. In the project case, Tuggeranong Parkway northbound has been merged back to two lanes within the EWA interchange to facilitate the northbound on-ramp joining as an added lane, so there is a short two lane section between the northbound off- and on-ramps. It is noted that TCCS are about to initiate a study into the Tuggeranong Parkway. Section 6.4.1 describes the actual changes made to the micro-simulation model following discussions with Rama Paluri.
6	Section 6.6/Table 6-4	41	Steve Hare	13/01/2021	Infrastructure Planning	Given the Tuggeranong Parkway Weaving Assessments show LOD E and F for 2041 peak periods, consider providing some discussion in this section of matters required for further consideration in subsequent design stages to address and improve these outcomes (presumably this reinforces the need for the third lane northbound pre EWA opening). Consider providing some comment on further items to address in subsequent design stages to improve the AM Peak southbound weaving LOS.	Josh Everett / Lindsay Jacobsen	The weaving segment performance is dictated by the total demand flow rather than the weaving. The comments in Section 6.6.1 have been expanded to include a brief discussion of the implications of this.
7	Section 9.1	51	Steve Hare	13/01/2021	Infrastructure Planning	The reference to the noise level in the guideline is incorrect. The report references La10(18 hour) level of 63db, the guideline adopts the requirement of Laeq15 hour) of 60dB. Whiel these are generally regarded as corresponding equivalent requirements, it is better to provide a matching reference.	Ben Masson	This is correct. The La10(18 hour) of 63dB is considered an equivalent requirement as the Laeq(15 hour) of 60dB. The report and associated report images can be updated accordingly.
8	Table 10-3	54	Steve Hare	13/01/2021	Infrastructure Planning	What is included in the line item Cotter Road Upgrade ($75m)? Given the quantum of this amount being over a thrid of the total estimated costs there should be some discussion in the text of what this line item entails. If it is just for the reconfiguration of ramps at the Cotter Road/Tugg Parkway interchange the cost estimate is excessively high. If it also includes widening of the Tuggeranong Parkway this seems more realistic - however the name is misleading. Reading the cost estimate in the appendix this appears to be a transcription erro and should be against the total trade costs.	Doug Tonge	This was an error in transposing information from the cost estimate report into the body of the document. Cotter road upgrade works are only $660k and entail upgrades to the parkway southbound exit ramp. The error has been corrected.
9	Section 10.3.1	53	Steve Hare	13/01/2021	Infrastructure Planning	The description of the two cases for cost estimate - east and west of CH1400 appear reversed in relation to the items included (in the text body under table 10-1).	Doug Tonge	Agreed, discussion has erroneously swapped east and west. Error has been corrected
10	Section 11	55	Steve Hare	13/01/2021	Infrastructure Planning	Given the flagged potential issues with use of the CSTM outputs as inputs in the economic modelling (and notinga microsim model has been preapred as part of this study), should the sensitivity testing include running a scenario using the microsim model outputs in lieu of CSTM outputs? This is liekly to prove a more realistic rapid BCA outcome.	Doug Tonge	Unfortunately as the EWA has network wide effects, the local microsim model cannot provide a base case scenario that adequately captures the implications of not having the EWA in place.
11	General	N/A	Anand Joshi	22/01/2021	Roads Maintenance	Design package must need to submit inline with TCCS reference document number 6.	Doug Tonge	It is understood that reference Doc #6 relates to design acceptance. As this is project is only at feasibility stage, design acceptance is not required.
12	Section 3.2	16	Anand Joshi	22/01/2021	Roads Maintenance	As figure 3.1 streetlighting pole is proposed in the median, where figure 3.3 for same cross section no streetlighting pole proposed in the median. I assumed that in the streetlighting pole height in both the section on both side of the road which can through the street light as per AS1158, however could you please confirm.	Doug Tonge	Given the early strategic stage of the design, streetlighting design has not been undertaken. As such, street lighting features should be regarded as notional.
13	Section 9.3	52	Anand Joshi	22/01/2021	Roads Maintenance	As per 9.3, a SMA is proposed to reduce the 1db or less is not justified to select particular type of wearing course over other. Therefore, before final design proposal TCCS would like to see cross section of pavement design. Roads Maintenance experience that, SMA has not performed well in high stress areas i.e intersections, round abouts. RM support current proposal of DGA as wearing course over SMA on a 70Km/h posted speed limit road.	Doug Tonge	Noted
14	General	N/A	Carl Pillig	1/02/2021	Bus Operations	There may be opportunities to get buses into Molonglo off the parkway so we should ensure the roads are all bus trafficable.	Doug Tonge	Noted. To be considered in future iterations of design development.
15	Section 3.2	16	Carl Pillig	1/02/2021	Bus Operations	Please check if the carriageway has a hard kerb or the extra metre of verge is part of the roadway. Estate development guidelines specify 4m of unimpeded width on bus routes. – I note the Holborrow Ave section is 3.5 but has a 2m cycle lane in the verge – not a hard kerb.	Doug Tonge	Noted. It is not clear where this requirement is documented. To be considered in future iterations of design development.
16	Section 1.1 (5th para)	7	Jerome Catbagan	1/02/2021	Major Project Support	The West Belconnen (Ginninderry) development was considered in earlier traffic studies. Please clarify the statement.	Josh Everett	Noted. The report has been corrected.

17	Section 1.4	8	Jerome Catbagan	1/02/2021	Major Project Support	The Executive Summary hasn't been provided to TCCS for comment.	Doug Tonge	Exec summary will be provided as a summary of both volumes of the study (Options report and strategic design report).
18	Section 3.4	19	Jerome Catbagan	1/02/2021	Major Project Support	It would be useful to have the alignment plan shown in this section so readers could easily reference what's being discussed in the sub-sections.	Doug Tonge	Agreed - overview alignment plan has been added to the report
19	Section 3.5	20	Jerome Catbagan	1/02/2021	Major Project Support	As with the preceding comment, the alignment profile would be a useful reference for this section.	Doug Tonge	Given the length of the project it is difficult to embed a long section in the report at a scale that will provide useful information.
20	Section 3.6.2.2	21	Jerome Catbagan	1/02/2021	Major Project Support	Can the description be more explicit in terms of the type of stagger - LR or RL type? A diagram showing the arrangement would be useful as well.	Doug Tonge	Agreed - additional commentary added and an excerpt from the drawing included in the report.
21	Section 3.7.2	22	Jerome Catbagan	1/02/2021	Major Project Support	No discussion on the preferred second access option, including the rationale as to why it was selected?	Doug Tonge	A preferred option was not agreed with all stakeholders as part of the feasibility study. Option A was broadly identified by the project team as the best outcome, however was opposed by PCS. For this reason the study sought to identify a suite of options for a second access to ensure that there were viable alternatives that could be expanded upon in future stages of the study.
22	Section 6.5	38-39	Jerome Catbagan	1/02/2021	Major Project Support	Please provide further insights on the following: - why the performance of the Preferred Option is worse in the 2041 AM peak but better in the 2041 PM peak - the extensive queuing in both NB and SB directions in the AM peak; what are the extents, what's causing them and what possible measures (including non-infrastructure ones) can be considered to address these queues.	Josh Everett / Lindsay Jacobsen	The project case causes significant increases in local traffic demand. In the 2041 AM peak period there are 21% (3,415) more vehicles while in 2041 PM there are 17% (2,702) more vehicles in 2041 PM. In 2041 AM, 84% of this extra demand is additional traffic heading to Tuggeranong Parkway, while in the PM peak 89% of the extra demand is additional traffic returning to Molonglo. During the 2041 AM peak, the weaving area between the southbound on-ramp and the Cotter Road southbound off-ramp experiences a bottleneck that queues back on to EWA. During the 2041 PM peak period, congestion is generally confined to Tuggeranong Parkway and Cotter Road, while EWA traffic is heading to Molonglo and doesn't experience additional bottlenecks. The location of both south-facing EWA ramp interfaces with Tuggeranong Parkway was too far south in the original Option 7 model and has been corrected to reflect the design, including updates to Figures 6-5 and 6-7. This has significantly lengthened both weaving areas but has only a very minor effect on the performance. The major contributor to the performance issues observed in the 2041 AM preferred option model was queue development and propagation from Cotter Road extending along the southbound off-ramp and blocking the weaving area on Tuggeranong Parkway, which affected both Tuggeranong Parkway and EWA via its southbound on-ramp. As stated in the report, geometry improvements will be required at the Cotter Road interchange and these had been assumed in the model. A review of the Cotter Road - southbound off-ramp intersection coding found an improvement to the left turn efficiency that had been omitted. The left turn speed has been increased in Aimsun to reflect this, which has limited the impact of the queue at this intersection. The southbound weaving area on Tuggeranong Parkway now operates well and the southbound on-ramp from EWA is not blocked in either 2041 peak period. The network average speed subsequently improved from 16.3 km/h to ~18.9 km/h. Additionally, the EWA interchange introduces a merge from three to two lanes on Tuggeranong Parkway northbound in advance of the EWA northbound on-ramp, allowing it to join as an added lane. This results in significant queues on the Cotter Road northbound on-ramp in the second half of both peak periods, which in 2041 AM also propagates back along both directions of Cotter Road. This traffic is otherwise effectively unimpeded in the Do Nothing scenario. This is an issue of existing demand rather than EWA. A possible solution for this could be to retain three lanes on Tuggeranong Parkway northbound and bring the EWA northbound on-ramp on as an added lane with a downstream merge, however this would result in a significant four lane section on Tuggeranong Parkway.
23	Section 6.6	39	Jerome Catbagan	1/02/2021	Major Project Support	Please also include the weaving performance critieria and LoS thresholds for reference.	Josh Everett / Lindsay Jacobsen	These are shown in Table 6-3. The table has been modified to be clearer.
24	Section 6	34-42	Jerome Catbagan	1/02/2021	Major Project Support	Please include a summary of all the required network upgrades somewhere in this section. This would also be useful information in the Executive Summary.	Josh Everett / Lindsay Jacobsen	An assessment of required network upgrades has not been undertaken. Rather, we have developed modelling on what we understand will constructed by the ACT prior to project delivery. Some text has been added to the intro.
25	Section 10.2	54	Jerome Catbagan	1/02/2021	Major Project Support	Please fix reference error	Doug Tonge	Error addressed in updated report.
26	Section 10.2	54	Jerome Catbagan	1/02/2021	Major Project Support	I note that five of the seven dot points describe exclusions in the cost estimates. Is it possible to provide a very high-level estimate/approximation (even in % terms) of how much these would add to the total cost?	Doug Tonge	It is difficult to provide these values without developing a basic level of design at the very least. Without such design information the estimates would be at risk of significant inaccuracy and as such we would be reluctant to include them in the report. However, if agreed with EPSDD informal discussions around the potential cost of these items can be undertaken outside of the formal deliverables for the study.
27	Section 11.3	55	Jerome Catbagan	1/02/2021	Major Project Support	Please fix reference error	Doug Tonge	Error addressed in updated report.
28	Section 11.4 (2nd para)	56	Jerome Catbagan	1/02/2021	Major Project Support	Does this mean that the economic benefits have been calculated based on the outputs of the CSTM and not the microsimulation model? If that's the case, please explain why this approach was taken given the availability of microsimulation modelling results.	Doug Tonge	Correct, economic benefits have been calculated based on the strategic model outputs. Unfortunately as the EWA has network wide effects, the local microsim model cannot provide a base case scenario that adequately captures the implications of not having the EWA in place. Some text has been added to the report to explain this.
29	Sections 11.4 and 11.5	56	Jerome Catbagan	1/02/2021	Major Project Support	Is it correct to say that the 'Cost' used in the economic analysis has substantial exclusions (e.g. Tuggeranong Pwy bridge, etc, as per Section 10.2) but the benefits are derived from an upgraded wider network (i.e. Tuggeranong Pwy bridge already uilt, etc)? If this is the case, please provide a discussion on the validity of the economic assessment given that the upgrade costs considered in the analysis are incomplete.	Doug Tonge	The economic approach is considered valid - the base case and project scenario both have the wider upgraded network. The only difference between the scenarios is the introduction of the EWA. That is, the only benefits measured in the analysis are associated with the EWA, and the only costs assessed are all associated with the EWA.
30	Report - General		Gerard Coffey	2/02/2021	Land Release Infrastructure	An Executive Summary capturing key findings would be useful (intro, brief project description, key road design criteria / principles, opinion of costs, further work and any critical information for time poor colleagues).	Doug Tonge	Noted. A separate ES is being prepared that will provide an overview of both elements of the study - options process and strategic design of the preferred option
31	Report - General		Gerard Coffey	2/02/2021	Land Release Infrastructure	Understand that the terminology probably changed mid delivery, but the detail needs to be updated to the commercial centre being labelled a Group Centre (and throughout the report).	Doug Tonge	Noted. References to town centre have been updated in the report and on the drawings.
32	Figure 1.1		Gerard Coffey	2/02/2021	Land Release Infrastructure	Suggest JGD is labelled.	Doug Tonge	JGD has been added to the updated report.
33	1.4		Gerard Coffey	2/02/2021	Land Release Infrastructure	Says there is an ES, but must be for the whole delivery? Still believe this 159 page report like this needs its own.	Doug Tonge	Understood. However, as there are only two deliverables for the study, it was considered useful to capture the key elements of the study in a single brief document.
34	3		Gerard Coffey	2/02/2021	Land Release Infrastructure	Check numbering (3.2 to 3.2.1.1)	Doug Tonge	Agreed - numbering updated.
35	3.1		Gerard Coffey	2/02/2021	Land Release Infrastructure	Could be worth saying it is not a IPT route (close out that drama).	Josh Everett	Text to this effect has been added to Section 3.2.
36	3.2		Gerard Coffey	2/02/2021	Land Release Infrastructure	Is there road cycling (need commentary to say why, if not)?	Doug Tonge	Off road cycling is discussed in the first dot point. In terms of on road cycling, it is not provided due to the provision of dedicated cycle facilities. The justification for this approach is discussed in Section 7.2.2, however some additional text has been added here in the updated report.
37	3.2		Gerard Coffey	2/02/2021	Land Release Infrastructure	Include median in list.	Doug Tonge	Median added to updated report.
38	3.2		Gerard Coffey	2/02/2021	Land Release Infrastructure	Is 'cycle highway' the adopted nomenclature? (not saying it shouldn't – would be good to lock it in for future project briefs etc.).	Doug Tonge	We have reverted to the terminology used in the previous study - "Molonglo Valley to City Trunk Cycleway" or "Trunk Cycleway" in the report and drawings
39	3.2.1.1		Gerard Coffey	2/02/2021	Land Release Infrastructure	A plan view drawing showing details Ch's 0-700, 700-2300 and 2300-3000 metres would be useful.	Doug Tonge	Figure added to section 3.5.

40	3.2.1.1		Gerard Coffey	2/02/2021	Land Release Infrastructure	Say what the speed zone is (okay – in 3.2.3).	Doug Tonge	Noted
41	Figure 3.1		Gerard Coffey	2/02/2021	Land Release Infrastructure	It'd be worth labelling the overall road reserve width (and for all typical cross sections).	Doug Tonge	Road reserve width is variable due to changes in batter footprint. There are concerns that providing a dimension will be misleading as it will only apply locally.
42	3.2.1.2		Gerard Coffey	2/02/2021	Land Release Infrastructure	Suggest dot point commentary on transitioning to two lanes.	Doug Tonge	Text added to amended report.
43	3.2.1.2		Gerard Coffey	2/02/2021	Land Release Infrastructure	Say traffic volume capacity to 2041 (or when ?).	Josh Everett	Report updated.
44	3.2.1.2		Gerard Coffey	2/02/2021	Land Release Infrastructure	Suggest saying it is the EWA Molonglo River Bridge cross section.	Doug Tonge	Text amended in report.
45	3.2.1.2		Gerard Coffey	2/02/2021	Land Release Infrastructure	Provision for a second carriageway is sensible and sound – note and confirm it also includes the bridge crossing (?).	Doug Tonge	A second carriageway would require widening of the bridge. Some text has been added to the report for clarity.
46	3.2.1.3		Gerard Coffey	2/02/2021	Land Release Infrastructure	The earlier mention plan view drawing here would be very useful to show this – commentary is on the basis the reader knows what the arrangement is (eg. 3.4.2).	Doug Tonge	A plan view has been added to the report.
47	3.2.1.3		Gerard Coffey	2/02/2021	Land Release Infrastructure	What are the intersection details?	Doug Tonge	A figure showing the intersection layout has now been added to section 3.7.2.
48	3.2.2		Gerard Coffey	2/02/2021	Land Release Infrastructure	Do we have volumes?	Doug Tonge	Volumes are discussed in the cost estimate report. This section is focussed on communicating the adopted batter slopes (design / cross section criteria).
49	3.3		Gerard Coffey	2/02/2021	Land Release Infrastructure	Have these been agreed to by TCCS? Say so if so or TBC as further works.	Doug Tonge	Not sure what this item referencing - please confirm?
50	3.4.1		Gerard Coffey	2/02/2021	Land Release Infrastructure	'From CH 0300 to 0700'	Doug Tonge	Agreed - text amended.
51	3.4.1 / 2		Gerard Coffey	2/02/2021	Land Release Infrastructure	Might be just me but this is a bit random / confusing until commentary is read. Maybe label 'JGD to Molonglo River Bridge' and 'Molonglo River Bridge to Tuggeranong Parkway'.	Doug Tonge	Noted. Headings adjusted.
52	3.4.2		Gerard Coffey	2/02/2021	Land Release Infrastructure	Maybe say Guide to Road Design (or have a full Acronym list at the start).	Doug Tonge	Agreed - text amended.
53	3.5		Gerard Coffey	2/02/2021	Land Release Infrastructure	The 132kV should be well gone by the time we're building this.	Doug Tonge	The underground 132kV will be in place. Even though the HV is still in the design phase it turned out to be a hard constraint for the EWA due to urgency of its construction and a reluctance to adjust its design.
54	3.5		Gerard Coffey	2/02/2021	Land Release Infrastructure	Good that there is no VC on the MR Bridge.	Doug Tonge	Noted
55	4.3.1		Gerard Coffey	2/02/2021	Land Release Infrastructure	Close brackets.	Doug Tonge	Text amended.
56	4.3.1		Gerard Coffey	2/02/2021	Land Release Infrastructure	'Family of Bridges'. (do " or ' – be consistent).	Doug Tonge	Text amended.
57	4.3.1		Gerard Coffey	2/02/2021	Land Release Infrastructure	JGD Molonglo River Bridge is at final PSP design.	Doug Tonge	Text amended.
58	4.3.1 / 2		Gerard Coffey	2/02/2021	Land Release Infrastructure	Bridge commentary – This is all very good, the shape and form is the same as JGD3C with three spans / two piers . Maybe mentioned the possible inclusion of 'weathered steel girders' (to be consistent) and an intention to 'nestle the structure into the surrounding landscape' (NCDRP presentation report wording). There was also an emphasis to keep piers out of the river to minimise environmental and other impacts.	Doug Tonge	Some additional text has been provided to this effect.
59	4.3.3		Gerard Coffey	2/02/2021	Land Release Infrastructure	It'd be worth noting that road runoff stormwater will be captured and treated before entering the Molonglo River.	Doug Tonge	Some additional text to this effect has been provided.
60	4.3.3		Gerard Coffey	2/02/2021	Land Release Infrastructure	Acknowledge that it is beyond feasibility study level – but an architectural workshop should be flagged as future work, eg. use of haunched headstocks, shaped piers, weathered steel girders, etc. (as per 4.3.5)	Doug Tonge	Some additional text provided.
61	4.3.4		Gerard Coffey	2/02/2021	Land Release Infrastructure	It'd be worth noting that once the shape and form of the bridge is confirmed that early geotechnical investigation work on the abutments and pad footings would considerably reduce construction risks (there's many learnings from JGD3C here).	Doug Tonge	Some additional text has been provided to this effect.
62	4.3.7		Gerard Coffey	2/02/2021	Land Release Infrastructure	This value adds, but will need to also interface with the Tuggeranong Parkway GSI.	Doug Tonge	I'm not certain that I have interpreted the comment correctly, but widening is only an issue for the river bridge. It is not anticipated that widening will be required for the eastern part of the EWA.
63	Drawings - General		Gerard Coffey	2/02/2021	Land Release Infrastructure	Drawings are good. The contour lines seem like they are at low res. There generally needs to be more leaders and labels to say what's happening. I know they're at feasibility study level, but there's always the opportunity to value add to inform the next design phase.	Doug Tonge	- If this is a reference to the noise contours, they appear to be OK on our version of the pdf. Please advise If this is a reference to the noise contours or something else. - Some additional labels have been added to provide more information - please advise If there was anything specific that would enhance the drawings.
64	700		Gerard Coffey	2/02/2021	Land Release Infrastructure	No such entity as 'Procurement and Capital Works'. Maybe just ACT Government (throughout).	Doug Tonge	Noted - logo updated.
65	701		Gerard Coffey	2/02/2021	Land Release Infrastructure	Just an opinion; a more zoomed in locality plan showing JGD to the west, TP to the east and CR to the south would be better (maybe all on one page and Index separate) (see later comment).	Doug Tonge	This was more intended to be a key plan, rather than a location plan - to be relabelled. Notwithstanding, it has been reframed to zoom in, in line with comment.
66	701		Gerard Coffey	2/02/2021	Land Release Infrastructure	Just Drawing Index (no Option 7).	Doug Tonge	Noted. Option 7 is legacy labelling - has been removed.
67	703		Gerard Coffey	2/02/2021	Land Release Infrastructure	This would be better as a locality plan.	Doug Tonge	We are keen to keep this as a site plan to give a sense of the project, however agree that a locality plan would be useful. We have added a locality plan to the general notes drawing.
68	711 / 712		Gerard Coffey	2/02/2021	Land Release Infrastructure	Wording is vague, show chainages.	Doug Tonge	Noted, cross sections updated and chainages added.
69	711 / 712		Gerard Coffey	2/02/2021	Land Release Infrastructure	Cross reference to the plan views.	Doug Tonge	Cross references now provided.
70	711 / 712		Gerard Coffey	2/02/2021	Land Release Infrastructure	Label what is to the north and south (rural block number, etc)	Doug Tonge	Block numbers provided on updated sections.
71	711 / 712		Gerard Coffey	2/02/2021	Land Release Infrastructure	Overall road reserve width would be useful.	Doug Tonge	Notional corridor boundary now included on sections, noting that it is defined by batter extents and will likely be redefined by subdivision earthworks in the future.
72	721		Gerard Coffey	2/02/2021	Land Release Infrastructure	Show start limit of works (where is Ch 0.00?).	Doug Tonge	LOW provided on updated plan.
73	721		Gerard Coffey	2/02/2021	Land Release Infrastructure	It's good you've identified a environmental / limit of works boundary generally.	Doug Tonge	Noted

74	721		Gerard Coffey	2/02/2021	Land Release Infrastructure	Show adjacent rural block numbers or landmarks like National Arboretum Canberra, etc. (same throughout).	Doug Tonge	Block numbers provided on updated plans.
75	721		Gerard Coffey	2/02/2021	Land Release Infrastructure	Should 'cycle highway' start at Ch 100?	Doug Tonge	The cycle highway commences outside the Group centre. Within the group centre it has been proposed to adopt dedicated on way cycle paths in each verge.
76	721		Gerard Coffey	2/02/2021	Land Release Infrastructure	Show transition to two lanes.	Doug Tonge	Additional line marking provided on updated plans.
77	723		Gerard Coffey	2/02/2021	Land Release Infrastructure	Show abutment and pier locations.	Doug Tonge	Plans have been updated.
78	723		Gerard Coffey	2/02/2021	Land Release Infrastructure	Leader / label on what the 'cycle highway' does for crossing the bridge.	Doug Tonge	Plans have been updated.
79	724		Gerard Coffey	2/02/2021	Land Release Infrastructure	Interesting. Has SIDRA and traffic movement modelling been done on intersections less than 150m apart?	Doug Tonge	SIDRA and microsim analysis has been undertaken for the intersection. Looks to work OK - refer section 6 for discussion.
80	724		Gerard Coffey	2/02/2021	Land Release Infrastructure	How does the cycle highway cross the south connector road?	Doug Tonge	Currently at-grade through signals. However alternatives have been explored in the tech note provided in Appendix E.
81	724		Gerard Coffey	2/02/2021	Land Release Infrastructure	What is the bulge at Ch 2600? A bus stop? Again, more labels.	Doug Tonge	This indicates the end of the shared path. As the EWA approaches the interchange (and abuts the Arboretum) the need for the path ceases.
82	725		Gerard Coffey	2/02/2021	Land Release Infrastructure	Say what the 'cycle highway' ties into.	Doug Tonge	Additional note provided on updated plans.
83	726		Gerard Coffey	2/02/2021	Land Release Infrastructure	Remove cut off leader.	Doug Tonge	Tidied up on updated plans.
84	726		Gerard Coffey	2/02/2021	Land Release Infrastructure	Say how 'cycle highway' connects with the TP GSI.	Doug Tonge	Additional note provided on updated plans.
85	726		Gerard Coffey	2/02/2021	Land Release Infrastructure	Noted – There are studies and investigations to increase the capacity of TP, it would be sensible to integrate these.	Doug Tonge	A third northbound lane is included in the existing design plans. Existing note has been amended for clarity.
86	742		Gerard Coffey	2/02/2021	Land Release Infrastructure	Would be useful to show a normal river level. Again. It would be preferable for development approvals to keep the pier out of the normal river flow level.	Doug Tonge	Information has been added to long section.
87	App B		Gerard Coffey	2/02/2021	Land Release Infrastructure	Cost break down – be useful to escalate / extrapolate out to say 2035.	Doug Tonge	Escalation at 4% would take the project value from $166M to $299M by 2035. Not sure this value should be included in the report though as there significant uncertainty in terms of final delivery timeframes and escalation projections. Can include if required however.

No.	Section/Figure/ Table	Reviewer	Date	EPSDD Business Unit	Comment	SMEC Response	
						By	Response / Comment
1		Patrick Paynter	5/01/2021	Infrastructure Planning	Separate Exec Summary Noted - assume this covers both Options Assessment and Strategic Design?	Doug Tonge	Correct - ES will cover both volumes of the study
2	1.1	Patrick Paynter	5/01/2021	Infrastructure Planning	Para 1 Molonglo 1 is actually Wright and Coombs. Molonglo 2 is Denman P and Molonglo suburbs.	Doug Tonge	Noted. Text amended.
3	1.1	Patrick Paynter	5/01/2021	Infrastructure Planning	Para 3 Molonglo 3 PDF should be a figure in the document - noting it will be superseded by current work on M3E.	Doug Tonge	Figure has been added to the report
4	1.1	Patrick Paynter	5/01/2021	Infrastructure Planning	Para 6 line 4. Suggest replace 'alternative' with 'additional'	Doug Tonge	Noted. Text amended.
6	2.2	Patrick Paynter	5/01/2021	Infrastructure Planning	This section appears to only cover issues under Schedule 4 Part 4.3 (areas and processes) but not Part 4.2 (activities) that include major roads at Item 1. The report should discuss this even if the exclude this criterion.	Sophie Olsen	Report has been updated
7	3.2.2	Patrick Paynter	5/01/2021	Infrastructure Planning	Would the bulk earthworks for both carriageways be built up-front or staged? (This may go in a later section on staging?)	Doug Tonge	It could be approached either way. It would depend on how likely duplication is considered to be in the future. If considered likely then it would make things a lot easier if the earthworks were completed as part of the project. Some text has been added to the report about earthworks scenarios.
8	3.2.3	Patrick Paynter	5/01/2021	Infrastructure Planning	Do we have a response for the likely question around why the posted speed in the TC is not 40km/h and outside the TC at 60 km/k?	Doug Tonge	The speed regime was agreed across the project team and with TCCS early in the project. The rationale was primarily around the fact that this is a key arterial road that has a movement function and needs to convey vehicle movements. Lower speeds compromise its ability to do that.
9	Table 3.1	Patrick Paynter	5/01/2021	Infrastructure Planning	3rd row says 'Molonglo Town Centre (eastern extent) to Tuggeranong Parkway'. Should say 'East of Molonglo Town Centre' I think.	Doug Tonge	Noted. Wording tweaked to say Eastern Edge for clarity
10	3.5	Patrick Paynter	5/01/2021	Infrastructure Planning	Where is the issue of the vertical geometry on the EWA at JGD appear? A vehicle moving through JGD on EWA/Holborow Ave would be almost airborne due to the instantaneous 6% grade change due to 3% cross falls either side of the centreline on JGD. This could be added to 3.6.1?	Doug Tonge	As the intersection is built it hasn't been included in the design exercise / discussion. However, agreed that there are deficiencies here - some high level text has been added to this section.
11	3.6.2.1	Patrick Paynter	5/01/2021	Infrastructure Planning	The 'Molonglo 3 East connector road' is referred to as the 'Southern Collector Road' in the M3E study. For consideration for change?	Doug Tonge	Whilst the rationale for the terminology is understood, the term 'Southern Collector Road' is a little misleading in the context of the EWA.
12	3.6.2.2	Patrick Paynter	5/01/2021	Infrastructure Planning	Is it possible that further design work at a more detailed level could come up with a cross road solution?	Doug Tonge	It is possible. There are two key constraints here 1) topography, & 2) the weave distance from the Parkway interchange. Given current weave requirements, the necessary location of the intersection makes the topography very challenging. There are tweaks to the horizontal and vertical geometry of the EWA that could mitigate the issues identified in the report, but fundamentally the geometry of the southern leg of the M3E connector road will be undesirable. What may change in the future (say the 10-15 year delivery horizon for the EWA), is the weave distance requirements. Changes in vehicle autonomy & car to car communications may shorten the weave distance required and allow a more favourable location for the intersection (i.e. further east) that will facilitate a four-way instead of the staggered T. Notwithstanding, given current information, the staggered T is considered the most appropriate approach.
13	3.6.3.2	Patrick Paynter	5/01/2021	Infrastructure Planning	The removal of 'some trees' should be mentioned in this section.	Doug Tonge	Text has been amended to make this explicit.
14	3.6.3.3	Patrick Paynter	5/01/2021	Infrastructure Planning	Radii adopted? Equivalent safe exit speeds?	Doug Tonge	There are a number of curves on this ramp. We have avoided putting too much numeric commentary into the report on specific gematric elements as it is contained on the drawings, however some broad text has been added to this section about the exit ramp geometry.
15	3.6.4	Patrick Paynter	5/01/2021	Infrastructure Planning	Not enough detail here. Additional lane on the Molonglo R bridge? Where do we make it clear that the Molonglo R bridge needs duplication?	Doug Tonge	A little bit of text has been added, however it is noted that these are minor works and there not much to describe. Discussion on the required upgrades to the Parkway that are assumed to be part of other projects is discussed in Section 3.9 (formerly 3.8 in Rev 01 of the doc)
16	Table 3.2	Patrick Paynter	5/01/2021	Infrastructure Planning	Table 3.2 is good. Option B second dot point line 1 - do you mean 'Outbound' instead of 'inbound'?	Doug Tonge	Agreed, text corrected.
17	Table 3.2	Patrick Paynter	5/01/2021	Infrastructure Planning	Option C would involve increased height and width	Doug Tonge	Agreed, text amended.
18	Table 3.2	Patrick Paynter	5/01/2021	Infrastructure Planning	Options D and E unlikely to get any support but include anyway.	Doug Tonge	Noted
19	3.8.1	Patrick Paynter	5/01/2021	Infrastructure Planning	3rd last line. EWA-Tugg Pkwy- Cotter is a southbound movement. Do you mean the other way around? IE Cotter- Tugg- EWA.	Doug Tonge	Agreed, text amended.

20	3.8.2	Patrick Paynter	5/01/2021	Infrastructure Planning	Mal could probably confirm that the intention was to duplicate the bridge on the western side.	Doug Tonge	I recall having this discussion with Mal. He wasn't across the specific history of this bridge, however he formed the view that given the single carriageway crossfall and direction (and deck width), it appeared that the network planning intent was that future duplicate was planned to the west .
21	4.1	Patrick Paynter	5/01/2021	Infrastructure Planning	Error reference - check.	Doug Tonge	Agreed, text corrected.
22	4.3.1	Patrick Paynter	5/01/2021	Infrastructure Planning	1st para. May need to be careful with the use of the term 'cycle highway'. Perhaps 'dedicated trunk cycle path'?	Doug Tonge	We have reverted to the terminology used in the previous study - "Molonglo Valley to City Trunk Cycleway" or "Trunk Cycleway" in the report and drawings
23	4.3.1	Patrick Paynter	5/01/2021	Infrastructure Planning	2nd para. 'Paradigm' or 'philosophy'?	Doug Tonge	Text updated to philosophy.
24	4.3.2	Patrick Paynter	5/01/2021	Infrastructure Planning	Provide essential dimensions/spans of JGD bridge.	Doug Tonge	Last sentence above Fig 4-1 provides span lengths.
25	4.3.3	Patrick Paynter	5/01/2021	Infrastructure Planning	Bridge 01. Section seems to be more paths than roadway. Do we need shared path and cycleway on either side of bridge? Could we combine to one 5m wide area with 3m cycleway and 2m walkway?	Doug Tonge	Agreed. This could be rationalised. Particularly if the preferred trunk cycleway alignment was changed to a northern alignment. However it should be noted that this then would not meet the criteria defined for the trunk cycleway (4m width + shoulders); it would mix recreational and commuting cyclists; and it would put peds in close proximity to high speed cyclists. Whilst none of these outcomes are desirable, from a value management perspective it may worthwhile. Some text has been added to the report to prompt future designers to consider this line of thinking.
26	4.3.6	Patrick Paynter	5/01/2021	Infrastructure Planning	Bolted or welded splices?	Vic Vigneswaran	Bolted splices are preferred at this stage as they site welding and maintaining quality can be difficult.
27	4.3.7	Patrick Paynter	5/01/2021	Infrastructure Planning	My estimation is that Government will make a decision on development of WEIA well before the EWA is opened. I would hope a decision will be available in 2 years. If this is the case, then a duplicated design would be undertaken in the next stage of design development.	Doug Tonge	Noted
28	4.4.1	Patrick Paynter	5/01/2021	Infrastructure Planning	'Cycle highway' review term	Doug Tonge	We have reverted to the terminology used in the previous study - "Molonglo Valley to City Trunk Cycleway" or "Trunk Cycleway" in the report and drawings
29	4.4.1	Patrick Paynter	5/01/2021	Infrastructure Planning	2nd sentence....the bridge is also located north of the existing Tuggeranong Parkway road bridge over the Molonglo River...	Doug Tonge	The reference to the Cotter Road bridge is included as the proposed design intends to adopt a similar form.
30	4.4.3	Patrick Paynter	5/01/2021	Infrastructure Planning	Not sure I'm convinced the bridge needs to be so wide. Do we need two lanes eastbound?	Doug Tonge	There is large volume of traffic in the AM peak using the southbound entry ramp. The predicted volumes significantly exceed what Austroads suggests is the capacity of a single lane loop ramp, hence two lanes have been provided. There may however be the opportunity to delete the cycleway - refer the tech note.
31	4.4.3	Patrick Paynter	5/01/2021	Infrastructure Planning	Can cycleway be 4m and each road carriageway be one lane plus 0.5m on inside and 1m on outside? This would reduce deck width from 21m to 16m.	Doug Tonge	Refer response above.
32	4.5	Patrick Paynter	5/01/2021	Infrastructure Planning	Underpass of EWA at western side of Molonglo R bridge (at @ Ch 1500) missing in analysis. Also - option of having cycle path on north side of Molonglo R bridge and further west thus avoiding need to cross access road to southern precinct of M3E. Crossing of cycle path with Southern Collector Road can be done as an underpass thus avoiding all at-grade crossings (for greater safety, convenience, speed etc)	Doug Tonge	This is now covered in the cycle tech note provided as appendix E
33	4.5.1.1	Patrick Paynter	5/01/2021	Infrastructure Planning	Is a large RCBC a possibility? This would be more affordable. Ditto for 4.5.1.2. Recall the cycleway underpasses at Glenloch interchange.	Vic Vigneswaran	This is essentially what is proposed (albeit cast in situ). This approach was used on the Majura Parkway.
34	4.5.1.1	Patrick Paynter	5/01/2021	Infrastructure Planning	The opportunity to use the existing underpass near the zoo should be included. The narrow 3m path could be widened to 5 or more meters to form an alternative path to that shown (and from the previous Molonglo to City Cycleway study).	Doug Tonge	This is now covered in the cycle tech note provided as appendix E.
35	4.5.1.1	Patrick Paynter	5/01/2021	Infrastructure Planning	This option would involve keeping the cycle path on the north side of the EWA (potentially from Ch 1500 to Tugg Pkwy), then along the western side of the Tugg Pkway between Arboretum and then under the existing underpass - widened.	Doug Tonge	This is now covered in the cycle tech note provided as appendix E.
36	5.1	Patrick Paynter	5/01/2021	Infrastructure Planning	The revised WSUD requirements now also apply to arterial road projects. Options for the siting of WQ ponds/wetlands should be discussed briefly and shown indicatively on plan (noted at 5.1.3).	Doug Tonge	Noted
37	5.3.1	Patrick Paynter	5/01/2021	Infrastructure Planning	1st sentence Add...'on the eastern fringe of the future Molonglo commercial centre'. Might also add that 'these mains supply water from Mount Stromlo treatment plant to much of north Canberra including arge areas of Belconnen, Gungahlin and the Inner North.'	Doug Tonge	Text added to the report
38	5.3.1	Patrick Paynter	5/01/2021	Infrastructure Planning	No watermain crossing of the EWA Molonglo River bridge is anticipated and the pressure zones on each side of the river are set at different elevations.	Doug Tonge	Noted
39	5.3.2	Patrick Paynter	5/01/2021	Infrastructure Planning	'Sewers' may be a better term. Expand definition of MVIS. Could include 'Ryans Hill' in the tunnel description.	Doug Tonge	Text added to the report.
41	5.4	Patrick Paynter	5/01/2021	Infrastructure Planning	....anticipated primarily for energy (electrical) and telecommunications services.	Doug Tonge	Text added to the report.
42	5.4.1	Patrick Paynter	5/01/2021	Infrastructure Planning	Recent policy positions on reticulated gas supply indicate that gas infrastructure may not be provided in the remainder of Molonglo.	Doug Tonge	Text added to the report.

43	5.4.2	Patrick Paynter	5/01/2021	Infrastructure Planning	Is SMEC sure about the last statement. 7m on steep cross slopes with retaining walls, services and limited landscaping may dictate the need for wider verges.	Doug Tonge	Agreed. Language softened. Gravity sewer is likely to be OK, but stormwater requirements are uncertain.
44	7.1.2	Patrick Paynter	5/01/2021	Infrastructure Planning	Molonglo Town Centre not to be used. Use either Molonglo 'commercial centre' or Molonglo 'group centre'.	Doug Tonge	All commentary in report and on drawings now refers to group centre.
45	7.1.2	Patrick Paynter	5/01/2021	Infrastructure Planning	2nd para. If Rapid buses were to use the EWA to go to City, would they be faster than using JGD and WHD? This could determine a preferable route for Rapid services.	Josh Everett	It may be faster to travel via EWA-Tuggeranong Parkway-Parkes Way between Molonglo and Civic. However, buses using JGD would likely provide coverage to a larger proportion of Molonglo residents. Using JGD for buses between Molonglo-Civic and Molonglo-Belconnen may give better value if any bus improvements (bus lane, queue jump lane, etc) are being considered.
46	7.2.2	Patrick Paynter	5/01/2021	Infrastructure Planning	2nd para 5th line typo	Doug Tonge	Typo corrected.
47	7.2.2	Patrick Paynter	5/01/2021	Infrastructure Planning	Plan of paths would be useful in the body of the report here.	Doug Tonge	Plan added to report.
48	8.2.1	Patrick Paynter	5/01/2021	Infrastructure Planning	Error Reference	Doug Tonge	Reference errors corrected.
49	8.2.2.1	Patrick Paynter	5/01/2021	Infrastructure Planning	and elsewhere	Doug Tonge	Reference errors corrected.
50	8.2.2.1	Patrick Paynter	5/01/2021	Infrastructure Planning	Clarify 'clear-zone' requirements along the EWA and any barriers that would be needed if trees were provided in the verges and median	Doug Tonge	We would want to avoid barriers to protect landscaping as it compromises the amenity of the landscaping. Some text added to the report
51	8.2.2.1	Patrick Paynter	5/01/2021	Infrastructure Planning	Our experience with JGD resulted in early landscape concepts being abandoned with aesthetic and environmental consequences	Doug Tonge	Noted. For more detailed consideration in future phases
52	8.2.2.1	Patrick Paynter	5/01/2021	Infrastructure Planning	Would it be reasonable to suggest that other than in front of residential dwellings (on north side), all road verge trees should be native?	Jamie Dawson	It is proposed that Group Centre (CH 000 - 700) has deciduous trees as they generally have advantages of more proven urban adaptability; are generally consistent with the dominant character of most town & group centres; offer improved solar access opportunities, especially in Winter; and also offer the advantage of readily available in larger tree stock (that when super advanced the deciduous forms tend to establish better and with fuller crowns than the more limited usage native tree super advanced forms if selected for initial impact). Native trees are the proposed landscape character nearer the Molonglo River corridor and approaches (CH 700 to 2100). Natives are also likely to be dominant from CH 2100 to the Tuggeranong Parkway interchange, however the interface with the Arboretum and consultation with stakeholders may impact on the adopted plantings in this zone.
53	9.3	Patrick Paynter	5/01/2021	Infrastructure Planning	The noise levels look to be a significant issue.	Doug Tonge	Noted. Noise mitigation is likely to be required, but will depend on the configuration of the adjacent developments / receiver locations. Refinement of the road geometry (particularly vertical) could also play a role in mitigating impacts.
54	9.3.2	Patrick Paynter	5/01/2021	Infrastructure Planning	How effective would a low noise wall (say 1m high gabion) be at reducing noise levels to acceptable levels?	Doug Tonge / Ben Masson	Without the understanding of the potential locations of nearby sensitive receivers, the benefit of any height of noise wall cannot be determined. The benefit of noise walls along the alignment would be subject to further assessment as the design progresses.
55	9.3.2	Patrick Paynter	5/01/2021	Infrastructure Planning	At-property architectural treatments not discussed.	Doug Tonge / Ben Masson	At-Property treatments are typically recommended in locations where mitigation measures at the source are not considered reasonable or feasible, or where there are residual exceedances of the criteria after the implementation of other forms of noise mitigation. At-property noise architectural treatments benefit the internal amenity of receivers but do not provide any benefit for the outdoor amenity. Specific details of at-property architectural treatments would be subject to further assessment as the design progresses.
56	10	Patrick Paynter	5/01/2021	Infrastructure Planning	The division in costs in Table 10.1 would be more meaningful if it also included works between Item 1 and the southern collector intersection in M3E including the Molonglo R bridge. The two bridge structures could be separated also.	Doug Tonge	The intention of the breakdown was based on the rationale that the EWA will either be built as a local collector west of the river (a near certainty), or alternately it will be a full arterial connection to the Parkway. This breakdown also fed into the economic analysis scenarios. The section between CH1400 - M3E intersection is only likely to come into play if the EWA was built without a link to the Parkway (which appears to be very necessary).
57	10	Patrick Paynter	5/01/2021	Infrastructure Planning	Table 10.3. What is Cotter Road upgrade? The figure does not agree with that in the appendix (that looks way low). I thought these were assumed as separate. Where are the two bridge and underpass costs?	Doug Tonge	This was an error in transposing information from the cost estimate report into the body of the document. Cotter road upgrade works are only $660k and entails upgrades to the parkway southbound exit ramp. Error has been corrected.
58	10	Patrick Paynter	5/01/2021	Infrastructure Planning	Cost Estimate Appendix B. Raw cost of $30M for Molonglo R bridge and $10M for Tugg Pkwy bridge seems low.	Doug Tonge	Appreciate that this seems low. Please keep in mind that these are raw costs only for structural elements and exclude a number of ancillary things such margins, preliminaries, site prep in addition to contingency which is significant given the early stage of design.
59	11.2	Patrick Paynter	5/01/2021	Infrastructure Planning	One of the key economic benefits of this project is to allow for the release and development of land. The area benefiting from this measure alone is about the size of a suburb.	Doug Tonge	Noted. Access to developable land has been identified as an unquantified benefit.

60	11.2	Patrick Paynter	5/01/2021	Infrastructure Planning	If there were no EWA, it is likely that 100 hectares or more of land may not be able to be developed. At a notional value of $3M per hectare, this would equate to $300M value capture by Government.	Doug Tonge	Appreciate that there is a financial benefit to the Territory for the land release. This is not necessarily an economic benefit, or at least not totally. The eg $300M is a transfer from private citizens to the government, i.e. it is a transfer from one part of the community to another rather than an economic benefit to the community as a whole. It could be argued that provision of the EWA will change what the land could be used for and hence its value - this would be an economic benefit. However to quantify the benefit, we would need to understand exactly how much land could be released with / without the project, and what the current / altered value of that land is. This would be a reasonably complex task, and is well beyond what would normally be done at this very early stage in the project's life. It is considered that the current approach of identifying it qualitatively is appropriate, especially given that it has already been shown to be strongly economically viable.
61	11.2	Patrick Paynter	5/01/2021	Infrastructure Planning	Can these be added in as ' Benefit 3 - Land sales'? SLA may be able to provide better figures of net value of land release.	Doug Tonge	Refer above.
62	11.2	Patrick Paynter	5/01/2021	Infrastructure Planning	The benefits of this road to possible development in the WEIA would only strengthen the viability. This should be mentioned somewhere in the report.	Doug Tonge	Noted, text added.
63	11.4	Patrick Paynter	5/01/2021	Infrastructure Planning	The BCR above 10 will cause much suspicion about this analysis. I suspect mny TSY people will simply not believe it. Please double check the figures.	Doug Tonge	Noted. The economic analysis was independently checked prior to issue. The fundamental issue is the network failure in the base case traffic model. The Economic tech note and report text has tried to communicate this.
64	App A - Site Plan	Patrick Paynter	5/01/2021	Infrastructure Planning	Legend reqd.	Doug Tonge	Legend has been provided on previous drawing.
65	App A - GA Sheet 6.	Patrick Paynter	5/01/2021	Infrastructure Planning	Cycle Highway looks tortuous under off-ramp. May need to add discussion of alternatives including longer but more direct underpass and an overpass option (if these work geometrically?).	Doug Tonge	Agree that the alignment is circuitous. A better alignment has been identified in the cycle interface assessment that has been undertaken, and now included in the design.
66	App D - pg 8	Patrick Paynter	5/01/2021	Infrastructure Planning	The Base case assumption of the EWA to Ch 1400 as being required regardless may be a bit 'heroic' depending on the design of internal roads for the precinct. The reality may be closer to 75% of the EWA cost to Ch 1400.	Doug Tonge	Noted. This is uncertain, however minor adjustments to the base case cost will not have a substantive impact on the economic results
67	App D	Patrick Paynter	5/01/2021	Infrastructure Planning	I think what the analysis is trying to say (in essence) is that the delays created by not having an EWA would be so great on the remaining road network that the economic (societal) cost of these would be ten times the cost of constructing the road.	Doug Tonge	To a degree. Delay is about 70% of the benefit. Vehicle operating cost savings (relating to average speed and route length) are another important factor.
68	App D	Patrick Paynter	5/01/2021	Infrastructure Planning	Does the model consider a point at which people would just give up travelling and perhaps use a different mode (bus, bike) or simply work from home?	Josh Everett	The mode choice component of the CSTM uses a logit curve to predict the mode share of a trip based on the difference in generalised cost between the available modes. As the difference in cost grows, a larger proportion choose the cheaper mode. However, most buses travel mixed in traffic (e.g. at the same speed or slower than the traffic) and the bike mode share is not very sensitive to overall cost. The model has no option for people to abandon their trip if the generalised cost of all available modes becomes too high.
69	App D	Patrick Paynter	5/01/2021	Infrastructure Planning	The expansion factor (Table 2) of 8 - does this assume that delays are also experienced off-peak? Given the very congested nature of the network for the peak hour (Figure 5) is it reasonable to assume congestion and delays at other times? What if the benefits of this project mainly accrue during the peak hour only ?(do they?)	Josh Everett	It is noted that an EF of 8 is significantly lower than what is used in other jurisdictions, and is based on actual ACT travel survey information. Furthermore, it should be noted that not all travel time and VoC savings relate to congestion (increased route length / network accessibility also plays a role).
70	App D	Patrick Paynter	5/01/2021	Infrastructure Planning	Can we give an average travel time (peak and outside peak hours) with and without the EWA to give readers an indication of the delay costs. I fear many readers will not be able to make the connection between delay costs with and without the project.	Josh Everett	The CSTM only models the AM and PM peak hours. We could include average trip times for these peak periods, but they would be for all trips in the model and wouldn't necessarily demonstrate the scale of the savings for people in Molonglo.
71	App D - pg 14	Patrick Paynter	5/01/2021	Infrastructure Planning	Hidden half way down page 14 is a significant benefit - 'Facilitation of M3E development'. Can this be made more prominent?	Doug Tonge	Noted. Item brought to the top of the list
72	App D - pg 14	Patrick Paynter	5/01/2021	Infrastructure Planning	'M3E Arterial Road Accessibility' - The only other alternative is William Hovell Drive at Bindubi St - about 5 km away from the EWA via local collector roads.	Doug Tonge	Noted. WHD added to discussion.
73	NA	Melissa Snape	2/02/2021	Conservation Research	I would particularly like to bring attention to the need for a road design which mitigates the very high likelihood of high kangaroo-vehicle collisions on a section of road with nature reserve on either side (a risk to both human and animal wellbeing) and also highlight the importance of maintaining habitat connectivity along the riparian corridor for a range of wildlife species, including the pink tailed worm lizard.	Doug Tonge	Noted

74	NA	Melissa Snape	2/02/2021	Conservation Research	Nic's suggestion of extending the bridge to facilitate the passage of wildlife underneath (assuming a design can be identified which enables the continued growth of the critical grassy habitat in what may otherwise be too shady an area) may well address both of these issues. This option should be considered, in my opinion, before the sorts of wildlife fences which have been used elsewhere which tend to result in larger issues of wildlife-vehicle collisions at intersections and other places where the fence necessarily has to have a gap in it. Such fences, where erected without the provision of suitable alternative options for the passage of large and small wildlife, increase the issues of habitat fragmentation presenting a risk to ecosystem services (e.g. urban cooling, rain water infiltration, carbon sequestration, functional wildlife habitat) provided by our remaining green spaces. The effectiveness of mitigation strategies should be monitored to inform future decision making and ensure the most suitable and cost-effective options can be deployed in future.	Doug Tonge	Noted. Refer responses to PCS comments for discussion about bridge lengthening. Consideration for future iterations of the design.
75	NA	Melissa Snape	2/02/2021	Conservation Research	this work will introduce a new route of passage for pollutants and exotic species (pest plants and animals) into an area of threatened species habitat. This will be true both during construction and ongoing, as vehicles spread weeds and invasive predators (cats, foxes) prefer the use of linear features such as roads to navigate the landscape. These ongoing threats should also be considered in the design, through appropriate use of buffers outside of core habitat areas where possible to 'catch' these edge effects and reduce their impact on conservation values.	Doug Tonge	Noted. Construction issues to be managed through a CEMP. Design mitigations to be considered in future iterations of the design.

No.	Reviewer	Date	Entity	Comment	SMEC Response	
					By	Response / Comment
1	Nic Jario, Mark Sweaney & Richard Miller	1/02/2021	Parks & Conservation Service	PCS suggest exploring options to extend the span of the bridge on the western side of the river. A longer span could allow for existing pink tail worm lizard habitat patches to be retained. These habitat patches, if retained through an appropriate design and construction methodology, provide an important connectivity linkage under the proposed alignment. Habitat connectivity must be maintained between the existing upstream and downstream pink tailed worm lizard patches to mitigate fragmentation.	Doug Tonge / Sophie Olsen	The feasibility study considered multiple options for the alignment of the bridge. The options included differing impacts on patches of PTWL habitat. In the MCA workshop, it was discussed that the preferred option was that which impacted smaller and more isolated habitat patches, to minimise fragmentation. This is the option that has been progressed as the preferred option. There may be opportunity for further refinement of the design at PSP stage, however it is noted that a longer span would significantly increase structure, retaining wall and earthworks costs, and make the bridge a more dominant future in the landscape.
1.1	Nic Jario, Mark Sweaney & Richard Miller	1/02/2021	Parks & Conservation Service	For 200-300m the EWA will fragment the nature reserve, with conservation land being present on both sides of the road. Appropriate fencing will need to be designed to limit wildlife and vehicle collisions and direct wildlife to an appropriate crossing point. A longer bridge span could provide greater connectivity for mammals and other fauna, in conjunction with appropriate fencing treatments to direct animal movement.	Sophie Olsen	Minimising the footprint of the bridge and impacts on the reserve were considered in the various options and discussed in the MCA workshop. When the project progresses to PSP stage, there will be further opportunity to review passage underneath the bridge, along the banks of the river for fauna and fencing options.
1.2	Nic Jario, Mark Sweaney & Richard Miller	1/02/2021	Parks & Conservation Service	A longer span may assist in mitigating impacts to heritage the feature.	Sophie Olsen	Impacts on the PAD site was discussed in detail in the MCA workshop. The preferred option was selected as it minimised dissection of the PAD site. Further consideration of the heritage impacts of the proposed alignment and consultation with Registered Aboriginal Parties would be undertaken during the PSP stage of the project.
1.3	Nic Jario, Mark Sweaney & Richard Miller	1/02/2021	Parks & Conservation Service	Investigate options to accommodate a fire management trail under the alignment for emergency response and reserve operations.	Sophie Olsen	Works within the Molonglo River Nature Reserve to provide a fire management trail are not within the scope of this feasibility study.
2	Nic Jario, Mark Sweaney & Richard Miller	1/02/2021	Parks & Conservation Service	Pink tailed worm lizard habitat patches are impacted by the indicative alignment of the proposed shared path. Explore options to mitigate this impact.	Sophie Olsen	There may be opportunities to adjust the shared path in places to avoid and minimise impact at PSP design stage. Some text has been added to the report that discussed bridge extension.
3	Nic Jario, Mark Sweaney & Richard Miller	1/02/2021	Parks & Conservation Service	The proposed eastern batter and project footprint impact native trees that represent an important connectivity stepping stone in the landscape for woodland birds. The proposed batter also impacts an existing fire management trail. Subsequent submissions should address these impacts.	Sophie Olsen	These matters will be considered and addressed when this project progresses to PSP stage.
4	Nic Jario, Mark Sweaney & Richard Miller	1/02/2021	Parks & Conservation Service	PCS will need to review any proposed stormwater discharge designs that may impact the Molonglo River Reserve.	Sophie Olsen	These matters will be considered and addressed when this project progresses to PSP stage. It is noted that a treatment pond site has been identified and bridge drainage will be directed to this pond (ie no scuppers are proposed on the bridge).

No.	Reviewer	Date	Entity	Comment	SMEC Response	
					By	Response / Comment
1	Alison Stewart	1/02/2021	National Arboretum Canberra and Stomlo Forest Park	As key stakeholders, the Arboretum continues to have concerns regarding the alignment of the road and the impact on our Living Collection including the commemorative Boer War Plantings. We commend the statements in 3.6.3.2 and look forward to continued involvement to re-enforce this approach.	Doug Tonge	Noted
2	Alison Stewart	1/02/2021	National Arboretum Canberra and Stomlo Forest Park	The Arboretum strongly supports the proposed River Road Underpass noting that in negotiations for similar access routes, the discord between equestrians and other active users has resulted in the separation of equestrians from other users.	Doug Tonge	Noted. The configuration of the River Road underpass will be explored in further detail in future iterations of the design
3	Alison Stewart	1/02/2021	National Arboretum Canberra and Stomlo Forest Park	The road traffic noise assessment illustrates a clear acoustic impact on the Arboretum's southern forests thus creating more additional high noise zones within the site. We will be interested in seeing what noise mitigation is put in place in future design work including low noise pavements and noise walls.	Doug Tonge	Noted. Noise mitigation design will be undertaken in future iterations of the design when there is more certainty around the EWA alignment.

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