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Cotter Road Options Assessment

Transport Report

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Cotter Road Options Assessment
Transport Report

City and Environment Directorate

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WSP acknowledges that every project we work on takes place on First Peoples lands.
We recognise Aboriginal and Torres Strait Islander Peoples as the first scientists and engineers and pay our respects to Elders past and present.

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1 Introduction

1.1 Background

Cotter Road is a key movement corridor providing access between Weston Creek, Molonglo Valley and the City. The newest of Canberra's nine District's, Molonglo Valley is set to support Canberra's forecast population and employment growth. Today, Cotter Road is a dual carriageway with two lanes in each direction, bus lanes on approach to key intersections and on-road cycle lanes. The key movement corridor supports a main cycle route, bus rapid route 10, private vehicle journeys and B-doubles for a portion of the route.

Figure 1.1 Project objective corridor

City and Environment Directorate (CED), [formally referred to as Transport Canberra and City Services (TCCS)], is conducting an Options Assessment for Cotter Road in response to mounting concerns over traffic performance along this key arterial corridor, between the intersections of Cotter Road/Streeton Drive and Cotter Road/Tuggeranong Parkway Ramp (southbound), Figure 1.1. CED's feedback and internal investigations indicate that during the morning peak, extensive queuing originates from the Tuggeranong Parkway, extending along Cotter Road past Streeton Drive towards John Gorton Drive. The primary cause of congestion is the signalised intersection of Cotter Road and Dargie Street/Kirkpatrick Street which acts as a bottleneck and significantly exacerbates upstream delays. These existing challenges are expected to intensify with future population growth and planned urban development across North Weston and the Molonglo Valley, underscoring the urgency of identifying effective network interventions.

1.2 Project objective

- *Identify and evaluate short-term, practical treatments to enhance traffic flow and public transport efficiency along Cotter Road between Streeton Drive and the southbound Tuggeranong Parkway on-ramp. – see Figure 1.1*

The focus of the Project is to provide low-impact, cost-effective measures that can deliver tangible improvements in the near term, rather than pursuing major infrastructure updates. To support this overall objective, the transport modelling activities are focused on examining several mitigations, both independently and as a package of treatments for the corridor to identify the most appropriate solution for Cotter Road between the intersections of Cotter Road/Streeton Drive and Cotter Road/Tuggeranong Parkway On-Ramp (southbound), for the 2031 future year scenario. From the transport modelling, it is to recommend priority treatments for design planning and delivery.

1.3 Report outline

The sections of this report include:

1. Introduction – Outlines the project objectives and background.
2. Planning and Strategic Context – Summarises current and future strategic aspirations likely to influence the project corridor in the near and long term.
3. Existing Transport Conditions – Describes the current operations of the study area within the network.
4. Future Transport Conditions – Provides assumptions and a summary of the 2031 'do minimum' future base case.
5. Options Development – Summarises option testing and details the mitigation measures for each option.
6. Options Assessment – Presents the Multi-Criteria Analysis (MCA) results for each project objective.
7. Options Assessment Comparison – Provides comparisons and insights between the assessed options.
8. Conclusions – Summarises the options assessment and outlines recommendations.

2 Planning and strategic context

2.1 ACT Transport Strategy

The future network structure supports and reinforces the ACT Planning Strategy's plan for future land use in Canberra. The following maps (Figure 2.1 to Figure 2.4) outlines the conceptual policy framework for Canberra's future transport network to both respond to the place making priorities and shape the city's future urban form. The ACT Transport Strategy contains no designated new transport connections within Weston Creek, where the project corridor and Cotter Road are located.

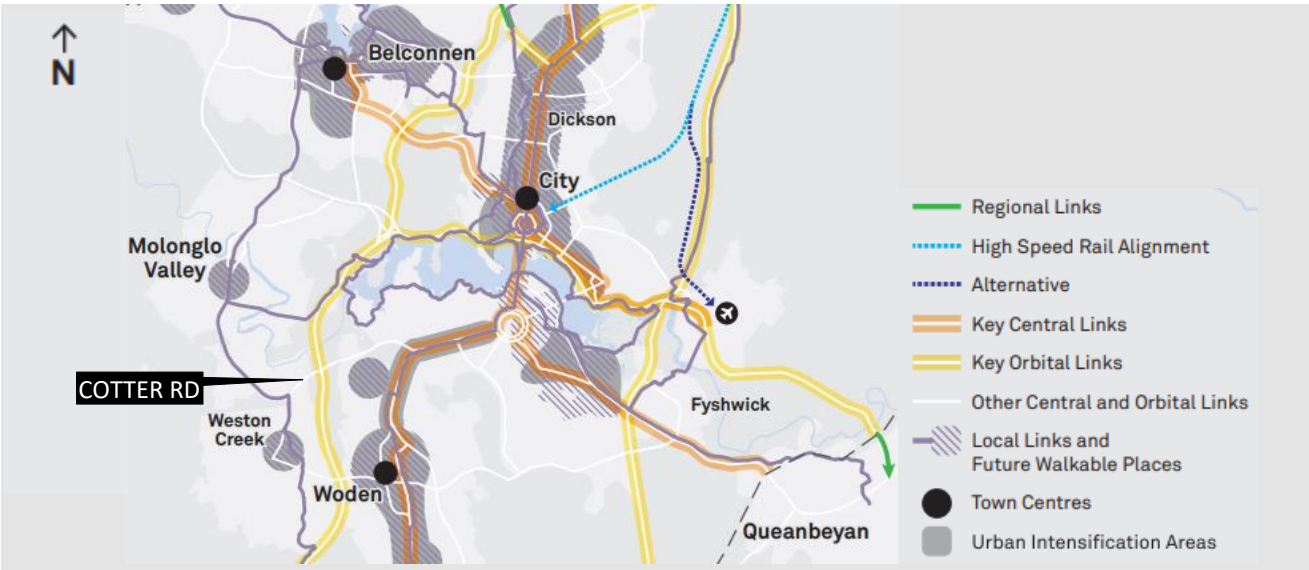


Figure 2.1 Conceptual transport network 2045

Source: ACT Transport Policy Plan 2020, ACT Government 2020

For Molonglo Valley, the ACT Transport Strategy has identified future connections and priority linkages across the district and connecting to the existing network across Canberra, including from the Tuggeranong Parkway into the district, adding connections to the existing network in Coombs and Wright, and connecting north into Belconnen District.

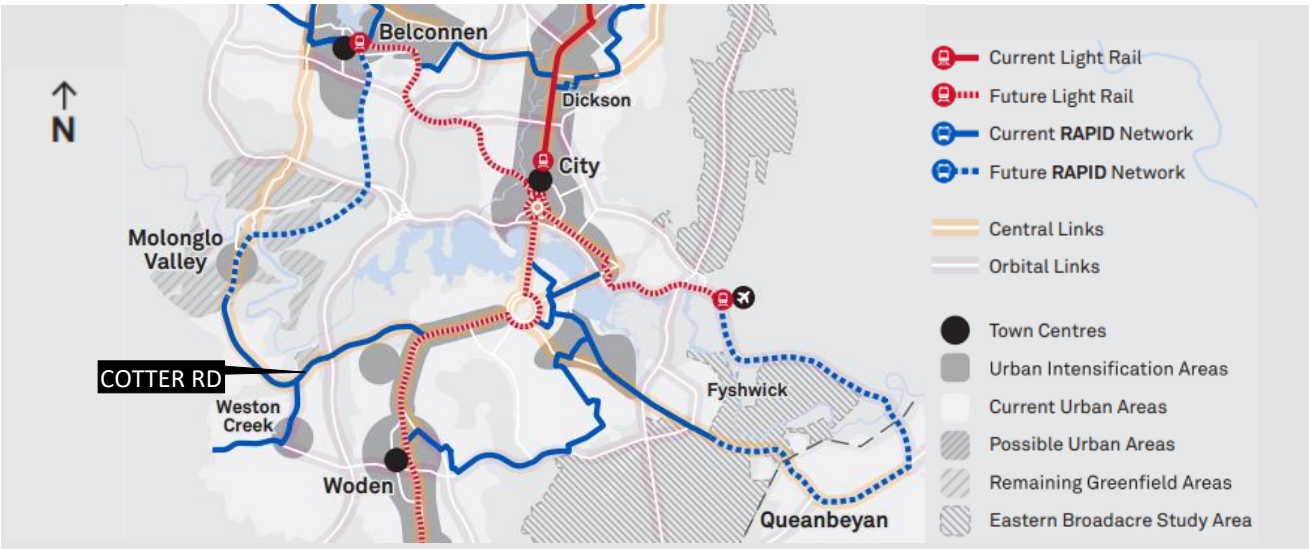


Figure 2.2 Central links and public transport network

Source: ACT Transport Policy Plan 2020, ACT Government 2020

It should be noted that this 2020 plan does not denote / highlight any future light rail projects between Molonglo to City as part of the public transport network (see Figure 2.2).

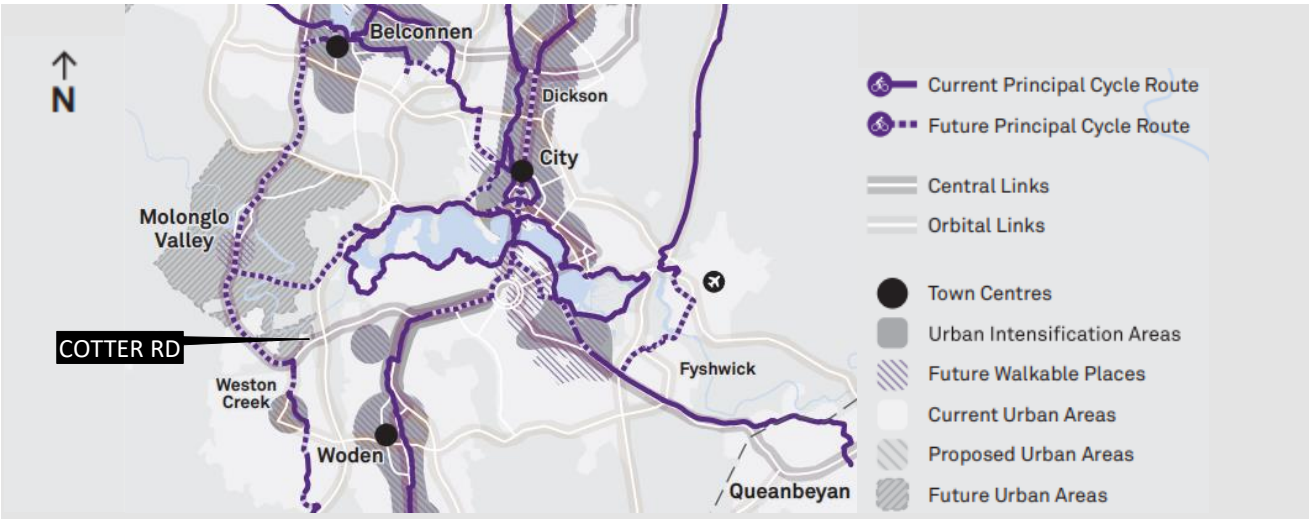


Figure 2.3 Local links, cycling network and walkable places

Source: ACT Transport Policy Plan 2020, ACT Government 2020

The ACT Transport Strategy does highlight the project corridor is to be part of the Future B-Double Route for review to help facilitate access to freight locations within the city.

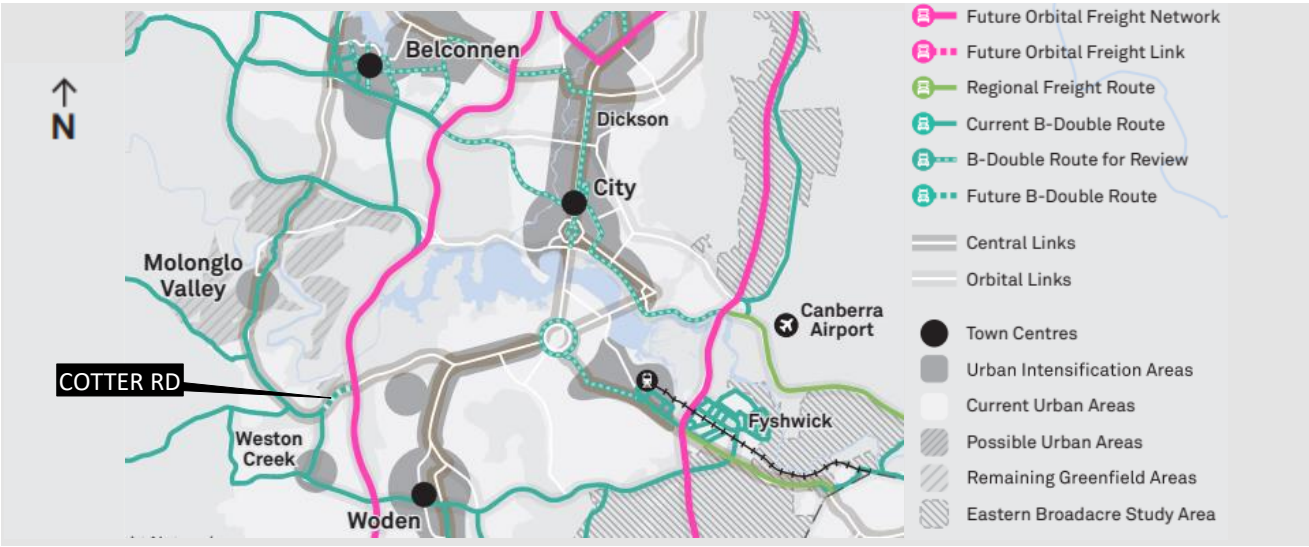


Figure 2.4 Orbital links and freight network

Source: ACT Transport Policy Plan 2020, ACT Government 2020

2.2 District strategies

The district strategies provide a plan towards 2038 and beyond to 2050 to manage growth and change at the district level. The strategies identify how, where and what growth might occur in each of the nine districts. They also identify what is required to support this change. The two districts related to the project scope include:

— **Weston Creek**: Focuses on protecting suburban character while directing modest infill, improving local services and enhancing active-transport connections

— **Molonglo Valley:** Prioritises staged urban growth, infrastructure delivery and new transport links to support residential and commercial land releases.

2.2.1 *Weston Creek (Part Eight)*

Weston Creek is the smallest of the ACT's nine districts in terms of land area. Weston group centre currently caters to residents in the Molonglo Valley while that district is still developing. New development areas that are currently proposed are limited to the northern part of Weston (north of Cotter Road) for residential development. This includes a private community facility site and potential future land release of the site associated with the relocation of the RSPCA, see Section 2.3.

The strategy notes that Streeton Drive, in the centre of the district, has been identified as an area requiring upgrades to intersections given the volume of traffic movements into and out of the district connecting onto the Tuggeranong Parkway and through traffic from Molonglo Valley. The document also notes Cotter Road, as the main arterial roads, are under capacity at peak times. Current traffic growth will need to shift to other more sustainable transport modes including active travel. Transport infrastructure projects will need to prioritise modal shifts and enhance connectivity, road user safety and amenity.

2.2.2 *Molonglo Valley (Part six)*

The strategic document notes that the potential future housing demand identified in Molonglo Valley is for around an additional 24,000 dwellings by 2050, based on the current population projections; Section 2.4.1 explores this development further. Many new transport connections would need to be added to the district as Molonglo Valley develops. Current projects in the road network include construction of the remaining stage of John Gorton Drive strategic investigation corridor (consistent with the ACT Transport Strategy) including a bridge over the Molonglo River (see Section 2.5.1). Four major road connections into the district comprise Cotter Road / John Gorton Drive to the south, John Gorton Drive from William Hovell Drive to the north, Bindubi Street extension from the north-east and, the east–west arterial linking Denman Prospect and the Molonglo group centre in the west to the Tuggeranong Parkway in the east.

John Gorton Drive is the main arterial road for the district, running north–south and providing for public transport as well as private vehicles. Molonglo Valley is currently serviced by rapid transit services connecting Denman Prospect to the City Centre via John Gorton Drive and Cotter Road. Local bus services connect Denman Prospect, Coombs and Wright into Weston and Woden.

2.3 ACT Planning Strategy

A large residential development is also planned for release from 2028-29 (Figure 2.6) as part of the *Indicative Land Release Program* in Weston Creek where the current RSPCA facility and the Joint Staff College are located, highlighted in Figure 2.5. A second access point would be investigated as part of this to cater for the ~800 dwellings; refer to Section 2.5.3 for more information.

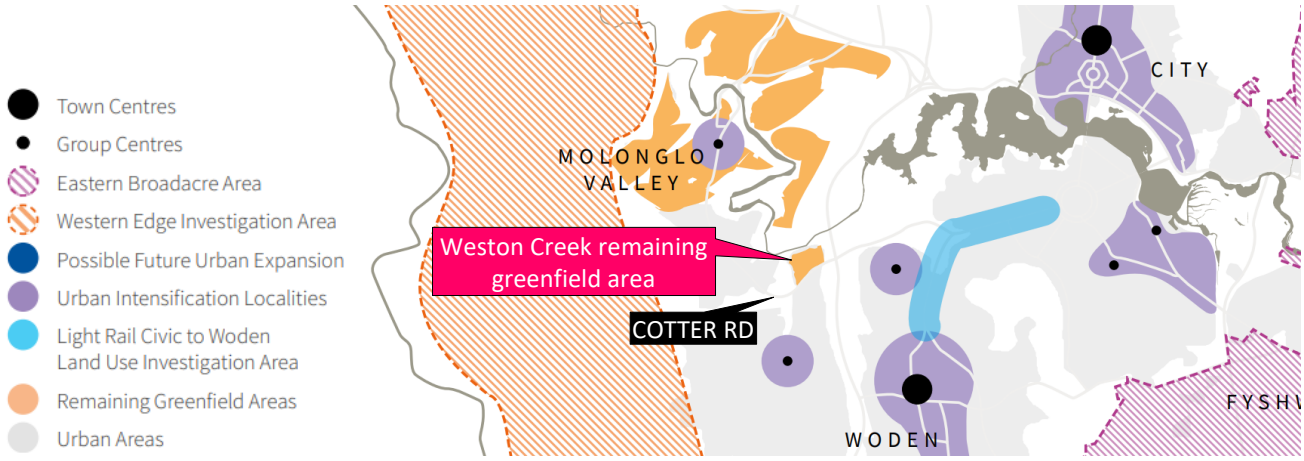


Figure 2.5 Weston Creek greenfield area – planned for release

Source: Extract from Map 6: Growth Map, ACT Planning Strategy 2018

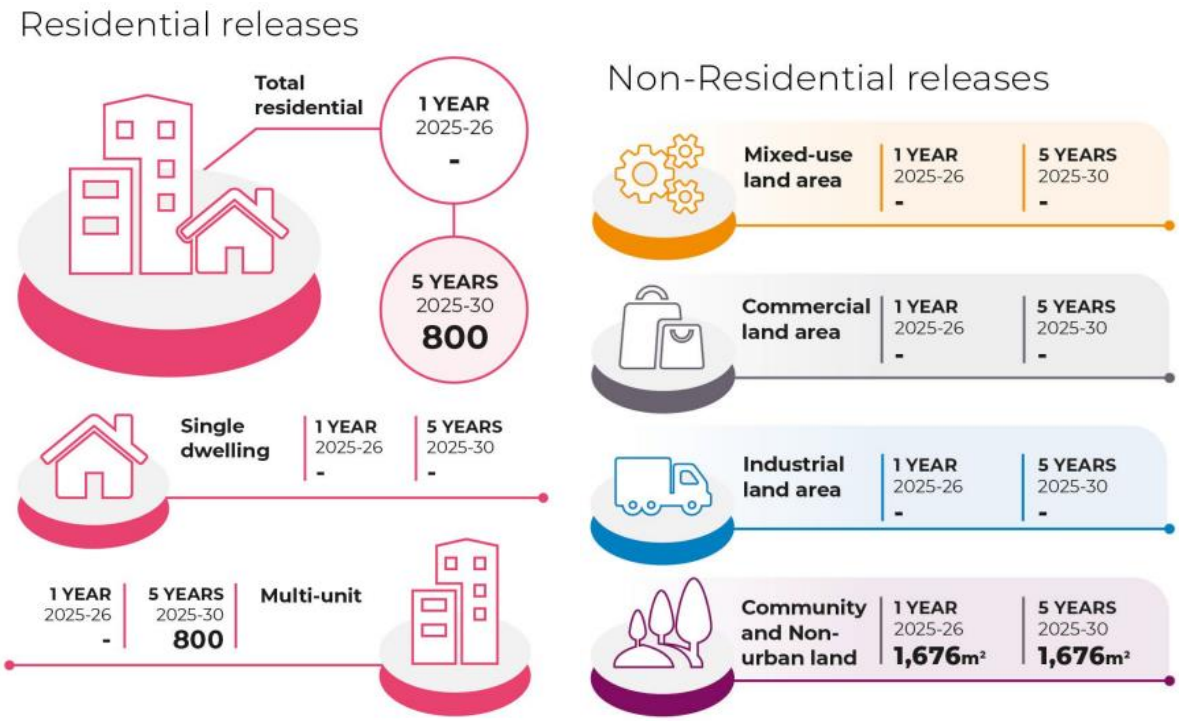


Figure 2.6 Weston Creek Indicative Land Release Program extract

Source: Housing Supply and Land Release Program 2025-26 to 2029-30, ACT Government 2025

2.4 Nearby developments

2.4.1 Molonglo Valley Stage 3

Molonglo Stage 3 is located between the Molonglo River and William Hovell Drive and comprises the suburb of Whitlam and two unnamed suburbs to the east of John Gorton Drive. Molonglo Stage 3 is projected to accommodate between 10,000 and 12,000 dwellings comprising low, medium and high residential densities and mixed use residential. The Molonglo Valley Planning and Design Framework (dated February 2019) notes a 60m wide reservation is to be provided for the East-West Arterial (from Denman Prospect, through the suburb of Molonglo and Molonglo Stage 3 to the Tuggeranong Parkway) suitable for a dual carriageway arterial road; see Section 2.5.2 for more detail.

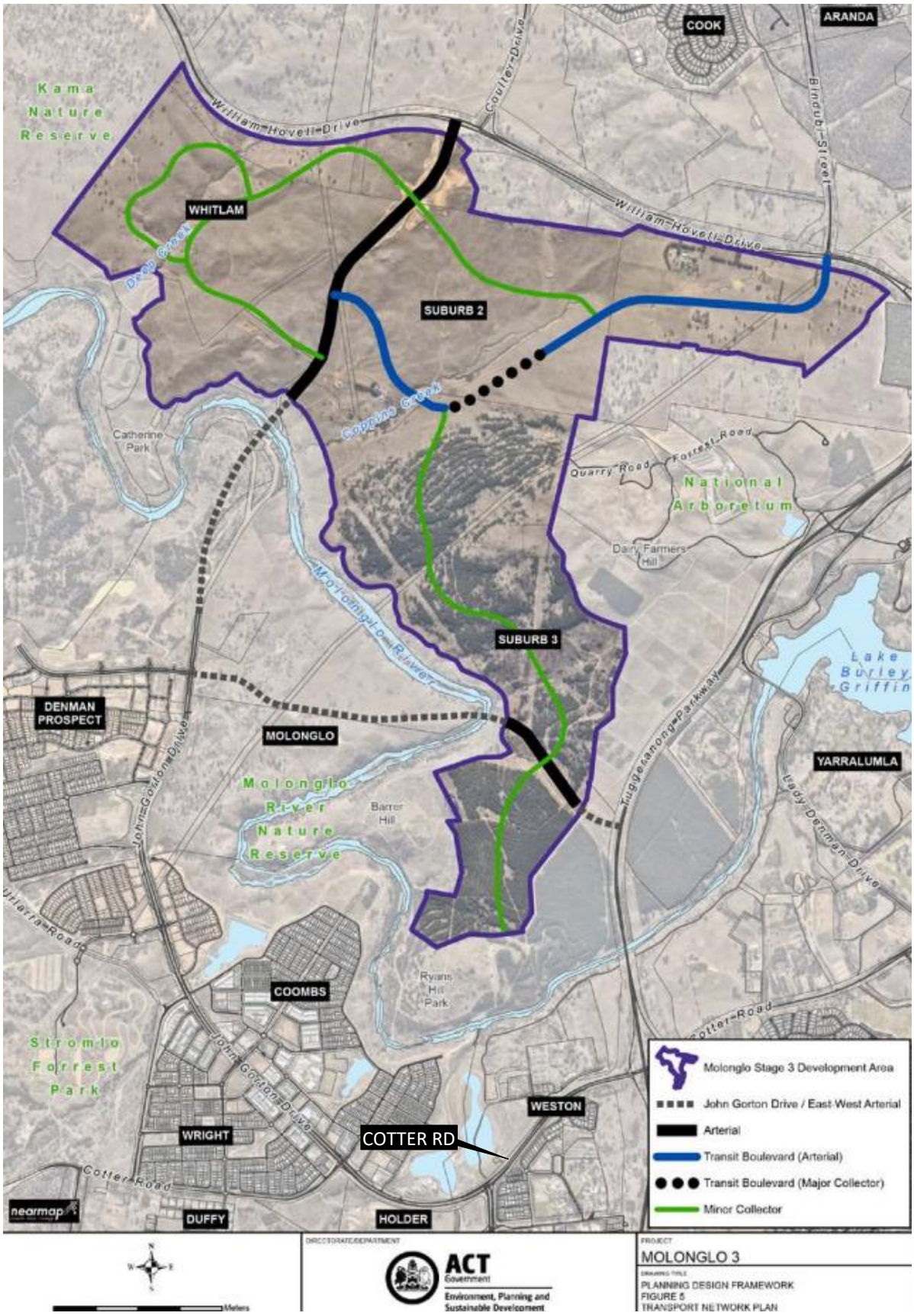


Figure 2.7 Molonglo Stage 3 Development Area – Transport Network Plan

Source: MOLONGLO PLANNING AND DESIGN FRAMEWORK - STAGE 3 Australian Capital Territory 2019

2.4.2 *LDK Amberfield*

LDK Amberfield is a premium seniors' living village located at 240 Cotter Road in Weston Creek (east of the of the project corridor, Figure 2.8). There are about 380 residences offering a mix of one- to three-bedroom apartments, villas and on-site care apartments (including 24/7 care and dementia cottages).

The development is a multi-stage project with resident moving into Stage 1 – 55 villas in October 2024. Stage 2 (an apartment building with associated facilities) is under construction and due to open in October 2025, delivering about 127 apartments as part of a broader five-stage. Stage 3 is already planned/underway with final build-out to occur sometime after, but no firm overall completion date has been published.

Figure 2.8 LDK Amberfield location, 240 Cotter Road, Weston Creek

The CED are also developing a traffic model to look at options for the Cotter Road/LDK Amberfield intersection.

2.5 Long-term infrastructure commitments

2.5.1 *Molonglo River Bridge construction (opening 2026)*

This project involves the completion of John Gorton Drive and the construction of a new bridge crossing over the Molonglo River. The bridge aims to support significant land releases in Molonglo, including the full development of Denman Prospect, Whitlam and the Molonglo Commercial Centre. Construction began in January 2024 which included the temporary realignment of the northern approach road to Coppins Crossing. The Coppins Crossing is to be retained at completion of the Molonglo River Bridge project and intended to be used for restricted maintenance access only. During construction and for diverted traffic, motorists have been in the past been detoured via Cotter Road and the surrounding arterial network when Coppins Crossing Road is closed, see Figure 2.9.

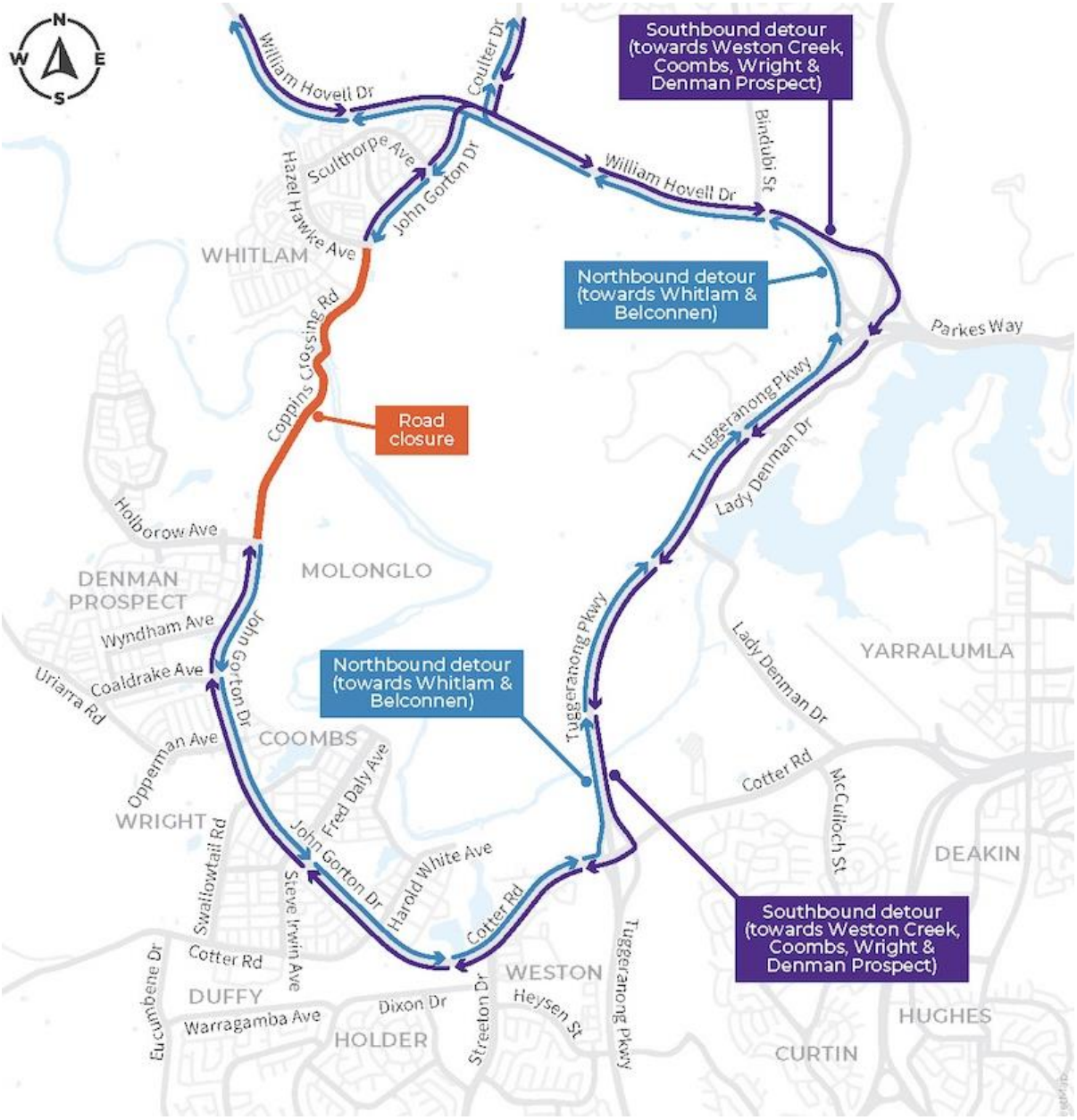


Figure 2.9 Molonglo River Bridge Construction, sample of traffic detour during road closure in 2025

Source: Built for CBR > Travel Impacts, ACT Government 2025

The Molonglo River Bridge project is reported for a practical completion target for late 2026. Short, planned full closures and lane/road closures are likely to occur until project completion. These disruptions are provided on the ACT government project pages updates including travel-impact notices highlighting disruption to local traffic an required detours.

2.5.2 *Molonglo Parkway Drive Connector*

The Suburban Land Agency (SLA) is progressing design of the Molonglo Town Centre including stage one of the Molonglo Parkway-Drive Connector, also known as the East West Arterial in coordination with Infrastructure Canberra and the City and Environment Directorate.

The Molonglo Parkway Drive Connector is a new arterial road which will run from Denman Prospect and the Molonglo Town Centre at John Gorton Drive through to the Tuggeranong Parkway in the east. This road will be the third arterial road and active travel connection into Molonglo's fast-growing district, providing direct access to both the town centre and the future eastern suburbs in Molonglo.

Figure 2.10 Molonglo Parkway-Drive Connector

Source: Molonglo Parkway Drive Connector, ACT Government 2025

The road is expected to be approximately 2.8 km long and will form an essential key transport connection for the Molonglo Valley, including for heavy vehicles. It is a key link in Molonglo's future transport network as identified in the ACT Transport Strategy 2020 and the Molonglo Valley District Strategy.

2.5.3 North Weston secondary site access

A preliminary assessment of potential access options was already undertaken in the form of an 'Access Options Report', prepared in October 2023 which identifies different access options for the North Weston site to support residential development in the area:

- Option 1: Service Road off Cotter Road eastbound with two local access roads off service road.
- Option 2: Protected, filtered right turn in from Cotter Road westbound and Left-in/Left-out from Cotter Road eastbound.
- Option 3: Fourth leg from existing Cotter Road / Streeton Drive intersection.
- Option 4: Harold White Extension and bridge over Weston Creek to link with Kirkpatrick Street.
- Option 5: Protected right turn in from Cotter Road westbound and Left-in/Left-out from Cotter Road eastbound.
- Option 6: Upgrade of Existing Cotter Road / Kirkpatrick Street intersection to service the future demand of North Weston.
- Option 7: Upgrade of Existing Cotter Road / Kirkpatrick Street intersection to service the future demand of North Weston and protected, filtered right turn in from Cotter Road westbound and Left-in/Left-out from Cotter Road eastbound.

The objective of this study was to identify constraints in the existing road network and further develop the package of access options through transport modelling to enable the site to operate efficiently.

Figure 2.11 North Weston secondary site access options explored

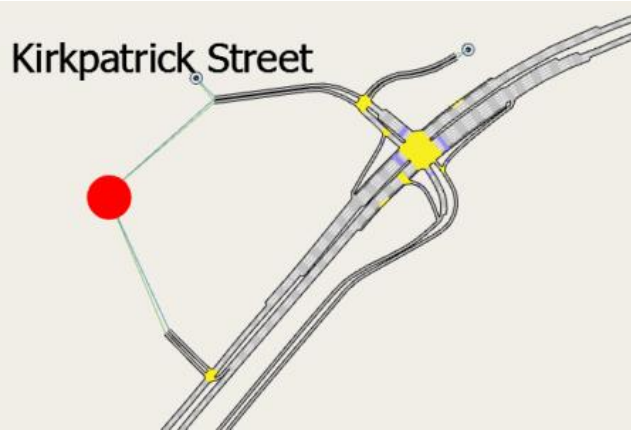


Figure 2.12 Option 7 Upgrade of Existing Cotter Road / Kirkpatrick Street intersection

The study alluded in providing a definitive recommendation; due to limitations on where developments were expected to go in relation to Kirkpatrick Street, and/or, how close to Cotter Road and the pond.

2.5.4 South-West Corridor (SW10 – Cotter Road Interchange Upgrade)

The Territory Government identified a need to develop corridor strategies for key transport corridors within the ACT including relieving traffic congestion, enhancing transport network operations and improving safety along:

- Parkes Way – between Kings Avenue to the Glenloch interchange
- The South West Corridor – between Glenloch Interchange and Tharwa Drive comprising the Tuggeranong Parkway and Drakeford Drive

Shortlisted upgrades were identified through the assessment process for inclusion in the respective corridor strategy. The upgrade is proposed at the Cotter Rod 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 highly skewed ramps creating a large distance (~240m) between signalised ramp terminal intersections.

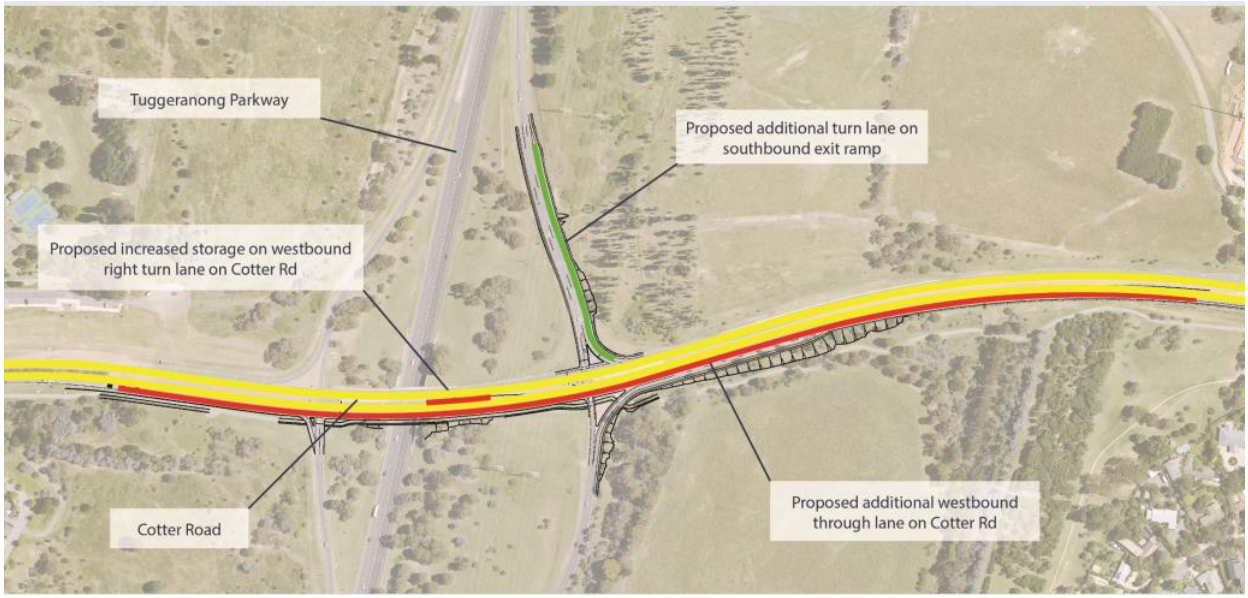


Figure 2.13 Strategic Design details of Cotter Road Intersection Upgrade

The proposed upgrade of the Cotter Road interchange consists of the following elements, as shown in Figure 2.13:

- Addition of a fourth ramp turn lane on the Tuggeranong Parkway southbound exit ramp
- Widening of the westbound Cotter Rd carriageway to provide a third through lane
- Increase length of the westbound right turn lane accessing the northbound Tuggeranong Parkway Entry ramp

The project site extends on Cotter Rd midblock between Kirkpatrick St 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.

2.5.5 Light Rail Route, Molonglo to City

The ACT Government drafted consultation report in late 2015 seeking community feedback on future stages of light rail network for Canberra. As part of this network, a Molonglo to City line was included, see Figure 2.14 supporting the population of Molonglo/Weston Group Master Plan which will increase considerably as this new district grows including activity at key centres as well as travel demand on the corridor.

Molonglo to City *ƒ* Future major transit corridor connecting Molonglo and Weston to Woden and the City *ƒ* Capitalises on the central access of these districts to other major centres in Canberra *ƒ* Immediate focus on active travel, Park and Rides and rapid bus services as the population grows in the future.

The drafted route travels from Woden to City via Weston Creek and Molonglo corridor. It connects Woden by Hindmarsh, Streeton and John Gorton drives (through Weston Creek and Molonglo) and Parkes Way to the city centre.

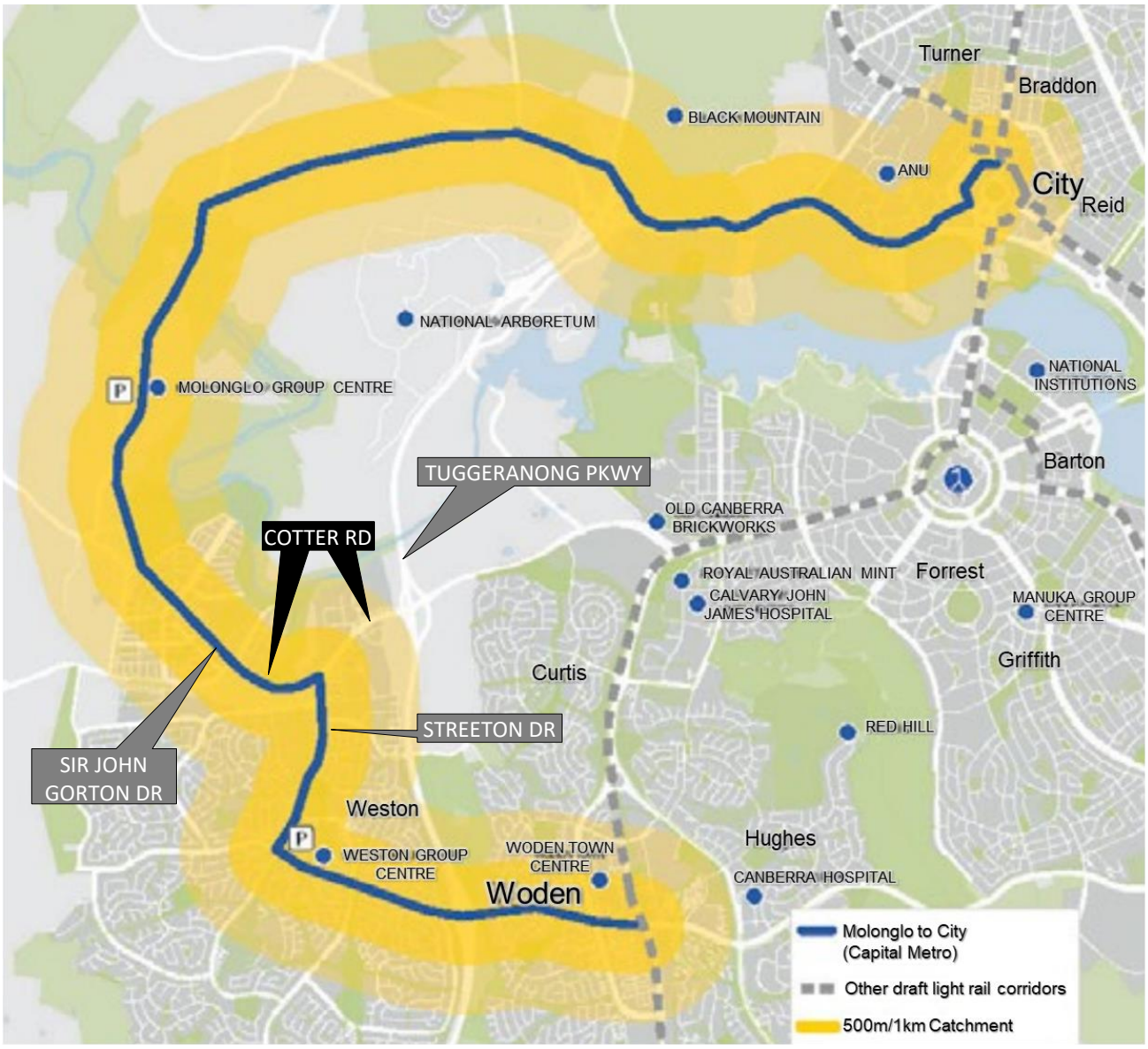


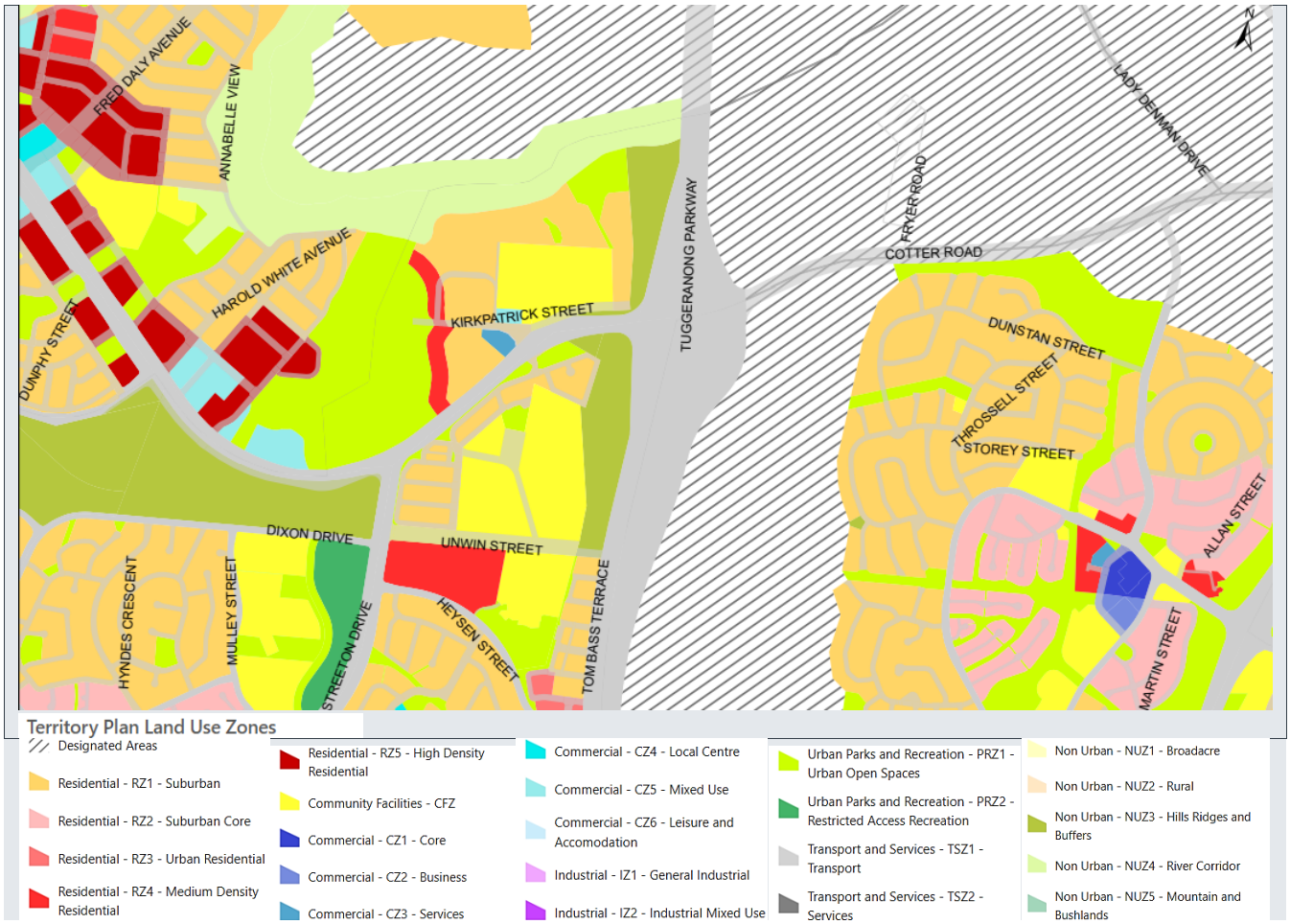
Figure 2.14 Draft Network Light Rail Corridors – Molonglo to City

Source: Transport Canberra Light Rail Network consultation report, ACT Government 2015

2.6 Land use

The land zoning around Cotter Road in the ACT as shown in Figure 2.15 reflects a diverse mix of uses that support both urban development and environmental preservation.

- **RZ1** zones are mostly located along and off the Cotter Road corridor, catering for generally low density residential
- **RZ3** medium density housing pockets located off Cotter Road and abutting urban recreational parkland
- **RZ5** appears closer to activity centres and supports high-density residential development towards the western end of Cotter Road (towards John Gorton Drive).
- Community and commercial facilities; i.e., places like shops, schools, and local services.
- Non-urban buffers; i.e., open spaces or green areas that separate built-up zones from natural land



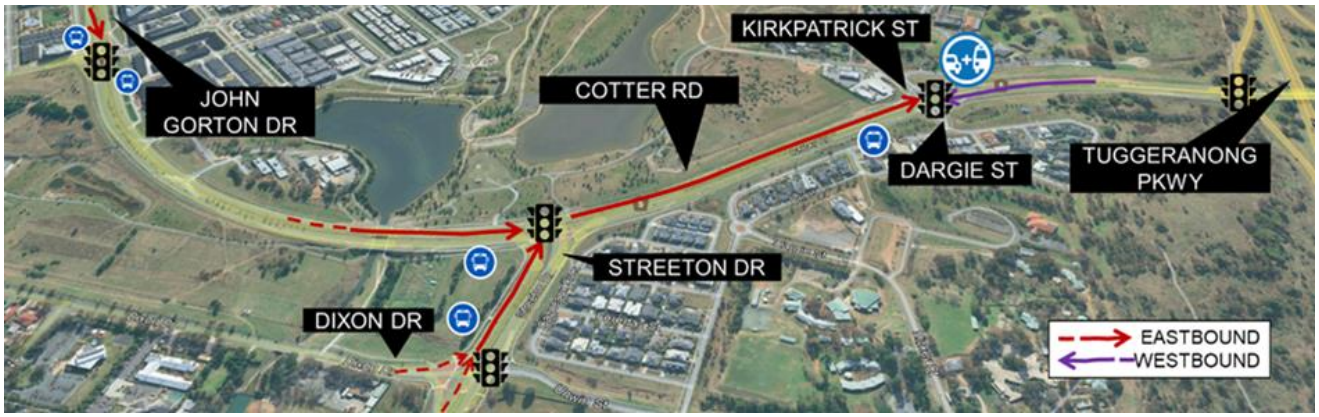
Source: ACT Government, ACTmapi (2025)

Figure 2.15 Land zoning

Cotter Road itself is zoned **TSZ1 – Transport Services Zone**, which safeguards its function as a major arterial route. This zoning supports road upgrades, public transport infrastructure, and corridor preservation for future capacity enhancements.

3 Existing transport conditions

Cotter Road is an arterial dual road with two traffic lanes in each direction separated with a central median. The corridor has on road bicycle facilities in each direction as well as a shared use path (SUP) on the southern side between Streeton Drive and the Tuggeranong Parkway; the SUP runs along both sides west of Streeton Drive.



- **Signal Bottleneck at Kirkpatrick St** Primary pinch point causing upstream delays and queue spillback.
- **High Commuter Volumes from Molonglo** Rapid population growth outpaces corridor capacity, especially AM peak eastbound.
- **Limited Alternative Routes** Dependency on Cotter Rd until Molonglo River Bridge completed (2026).
- **Intersection Geometry & Merge Conflicts** Turn lanes and ramp merges constrain flow and reduce effective capacity.
- **Signal Timing Saturation** SCATS adaptive control reaches limits under peak demand; multi-cycle delays common.
- **Modal Interactions** Bus re-entry, pedestrian phases contribute to friction and delay.

Figure 3.1 Study area with localised observations and issues

Cotter Road is operating at or near capacity in peak periods as it serves as a significant transport corridor and public transport rapid route between Weston Creek and the Molonglo Valley to the City. Recurring congestion and delays indicate the corridor's throughput is stretched to its limits under current conditions, Figure 3.1. Key roads within the study include (see Figure 3.2):

— Cotter Road

— Tuggeranong Parkway northbound on and off ramps

— Kirkpatrick Street

— Dargie Street

Other roads, that lay just outside the core corridor but are reviewed wholistically as part of the provided on broader network performance:

— Streeton Drive, extending to Dixon Drive / Unwin Street

— John Gorton Drive / Harold White Avenue

— Tuggeranong Parkway southbound on and off ramps

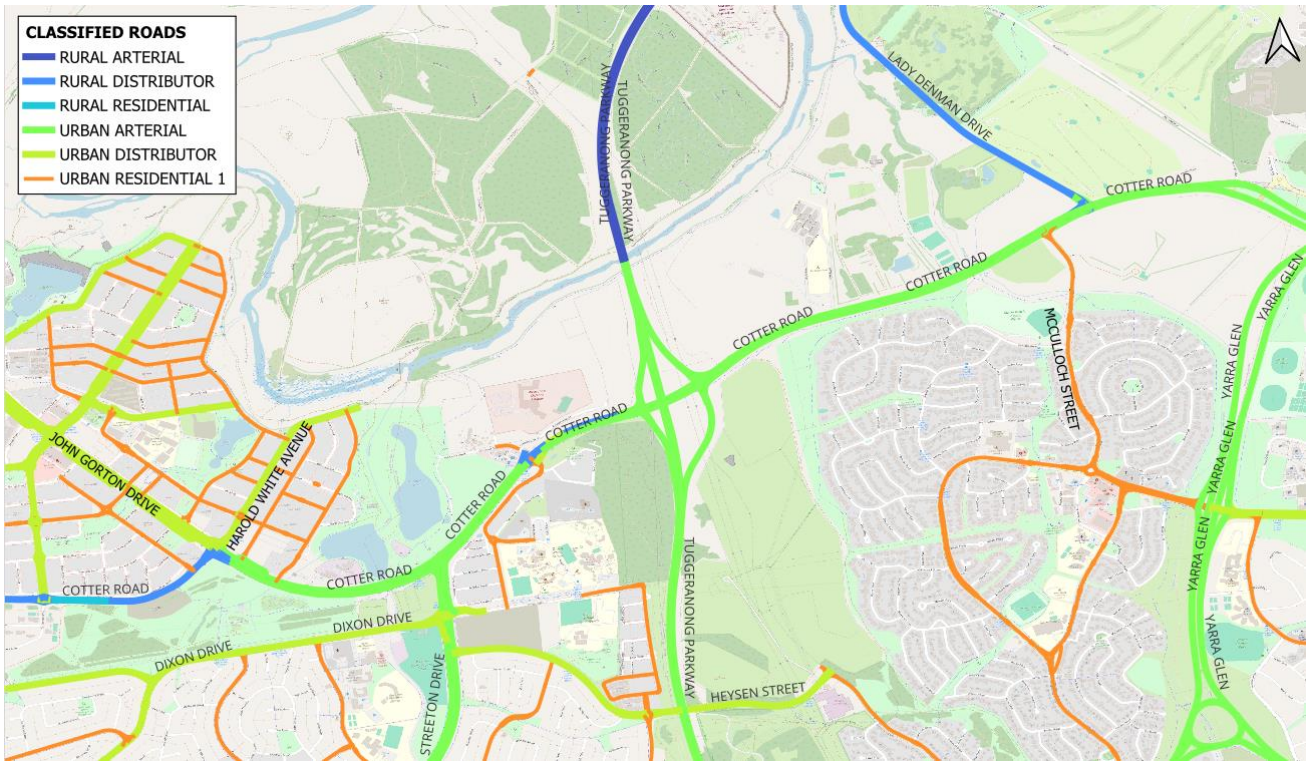


Figure 3.2 Classified road network

The Cotter Road posted speed limit is predominantly 80km/h with isolated sections of 70km/h between Harold White Avenue and Streeton Drive; see Figure 3.3.

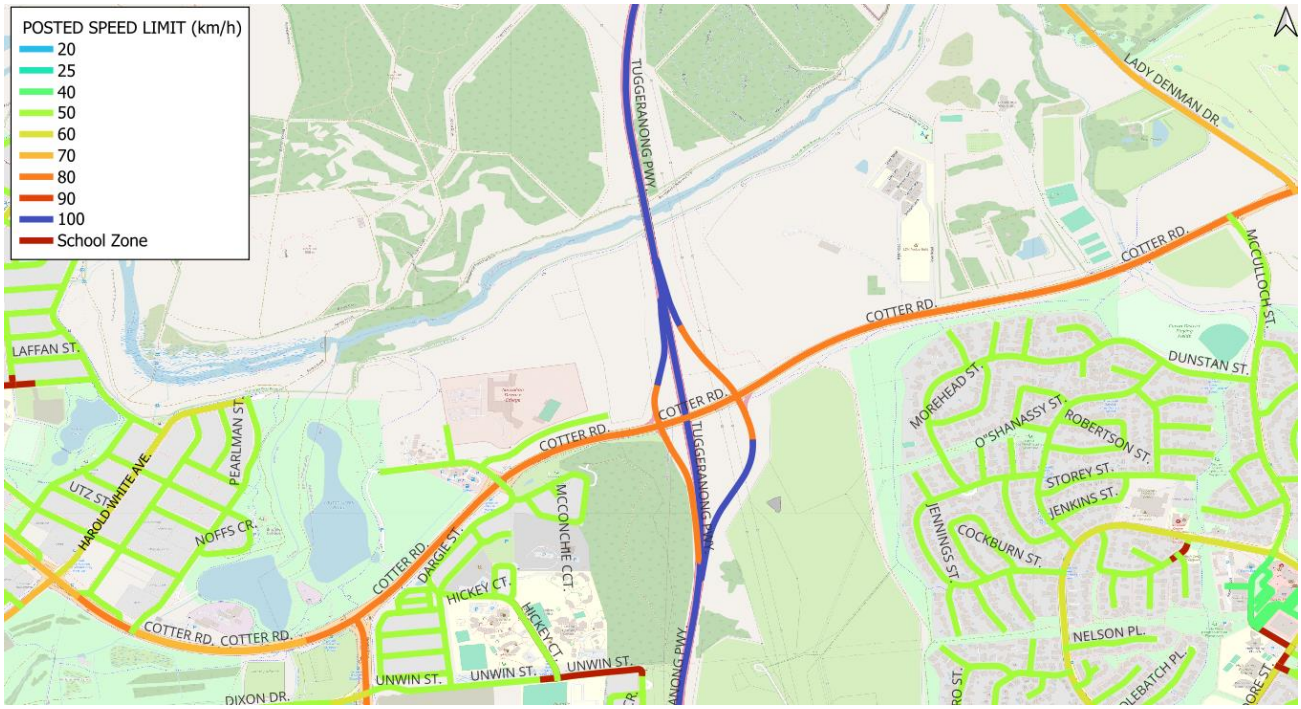


Figure 3.3 Speed limits (km/h)

3.1 Traffic surveys and data

An extensive traffic collection exercise was undertaken to gather insights into the travel behaviour within the study area and inform the development of the Aimsun model. The data was collected from a variety of sources, including CED and independent surveys.

3.1.1 Intersection counts

Classified intersection counts were conducted at 10 locations across the study area, shown in Table 3.1 and Figure 3.4. Conducted from 6 AM – 10 AM and 3 PM – 7 PM on the 23rd of July 2025, these counts recorded the volumes of cars and heavy vehicles.

Table 3.1 Intersection count locations

NO.	INTERSECTION	CONTROL TYPE
1	Annabelle View / Harold White Avenue	Priority
2	Woodberry Avenue / Harold White Avenue	Roundabout
3	Cotter Road / John Gorton Drive	Signal
4	Cotter Road / Max Jacobs Avenue	Priority
5	Cotter Road / Streeton Drive	Signal
6	Streeton Drive / Unwin Street / Dixon Drive	Signal
7	Streeton Drive / Heysen Street	Priority
8	Cotter Road / Kirkpatrick Street	Signal
9a	Cotter Road / Tuggeranong Parkway NB	Signal
9b	Cotter Road / Tuggeranong Parkway SB	Signal

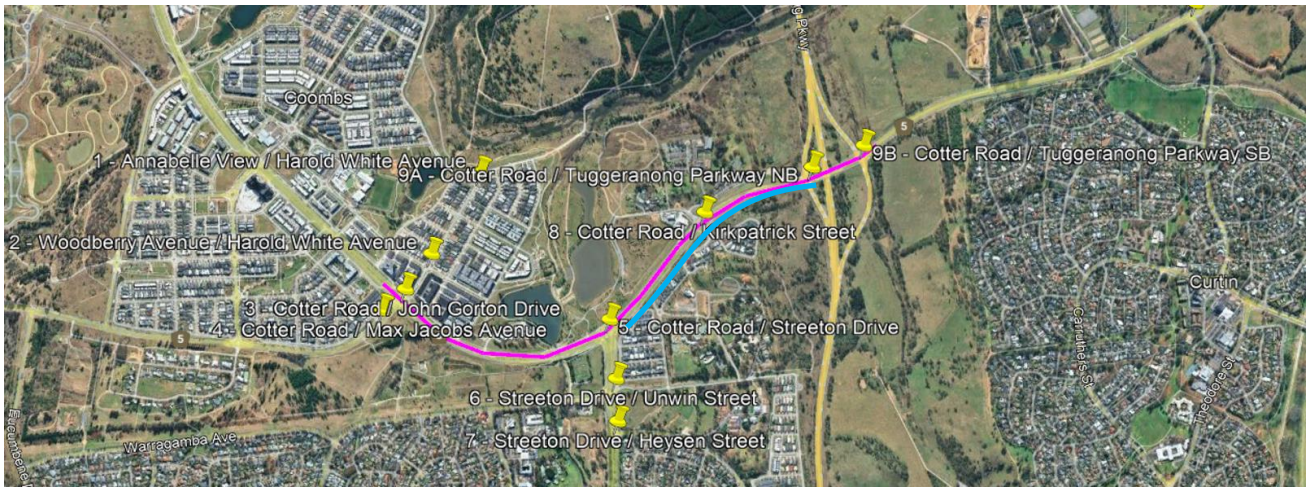


Figure 3.4 Intersection count locations

For the three intersections located within the project corridor, the turning movement counts for both peaks have been provided from Figure 3.5 to Figure 3.8. The AM peak hour consistent through these intersections occurring at 8:00 to 9:00am; and the PM peak hour being more varied.

Streeton Drive / Cotter Road

The Streeton Drive / Cotter Road intersection is a signalised T-intersection east of John Gorton Drive. During high volume AM peaks, it often experiences gridlocks due to eastbound queues extending back to the intersection. This results in both right turning traffic out of Streeton Drive and eastbound through traffic on Cotter Road being unable to clear each cycle. As a result, queues at this intersection tend to extend back to upstream intersections and impede their performance.

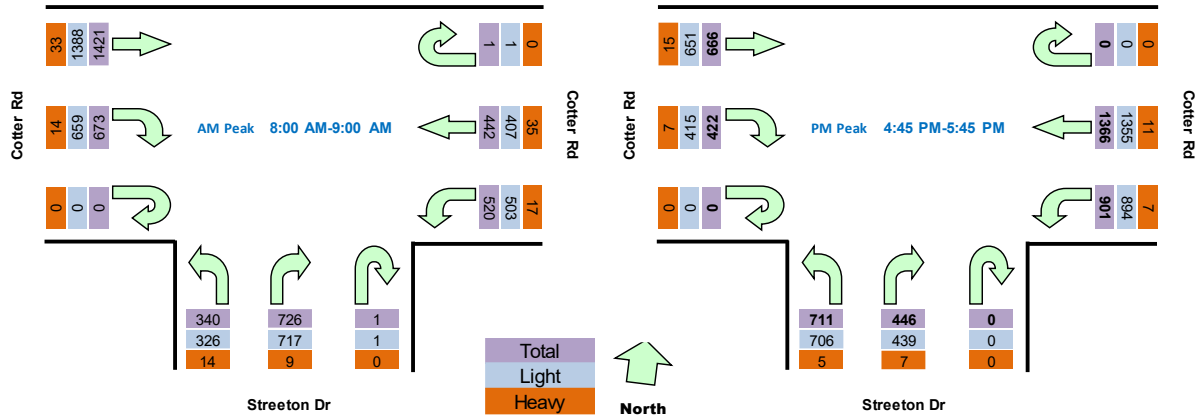


Figure 3.5 Cotter Road / Streeton Drive – Turning movement counts AM and PM peak hour

During the PM peak, both directions of Cotter Road operate well. However, the left turn out of Streeton Drive experiences significant queuing; refer to Section 3.1.3 for further details.

Cotter Road / Kirkpatrick Street / Dargie Street

The Cotter Road / Kirkpatrick Street / Dargie intersection is a signalised 4-legged intersection east of Streeton Drive. During the AM peak this intersection is the eastbound pinch point along the corridor. Any slight reductions in green time for the through movement sees queues quickly extend upstream, gridlocking the whole corridor. High pedestrian volumes and right turning traffic from the westbound approach are both in conflict with the eastbound through movement. Limiting their impact will be key to resolving the issues along the corridor.

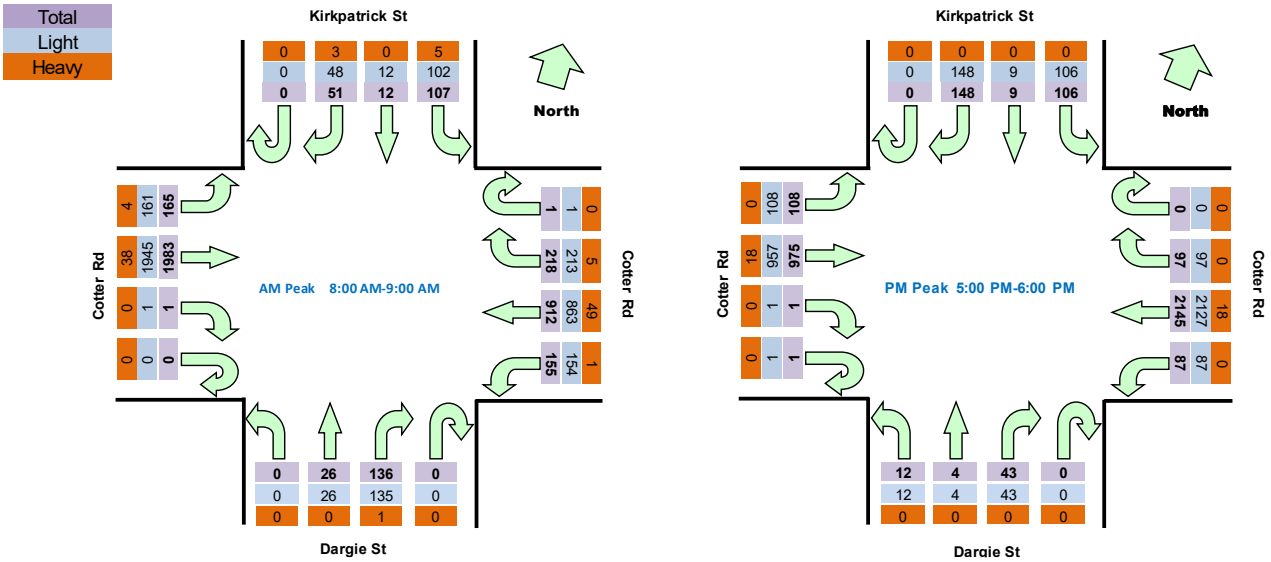


Figure 3.6 Cotter Road / Kirkpatrick Street / Dargie Street – Turning movement counts AM and PM peak hour

During the PM peak the intersection performs reasonably.

Tuggeranong Parkway ramps / Cotter Road

The Tuggeranong Parkway ramps / Cotter Road intersections are a pair of signalised intersections that facilitate the movement of traffic onto and off the highway. They are at the eastern extent of the study area. In the AM peak, eastbound traffic can queue at these intersections but it clears each cycle.

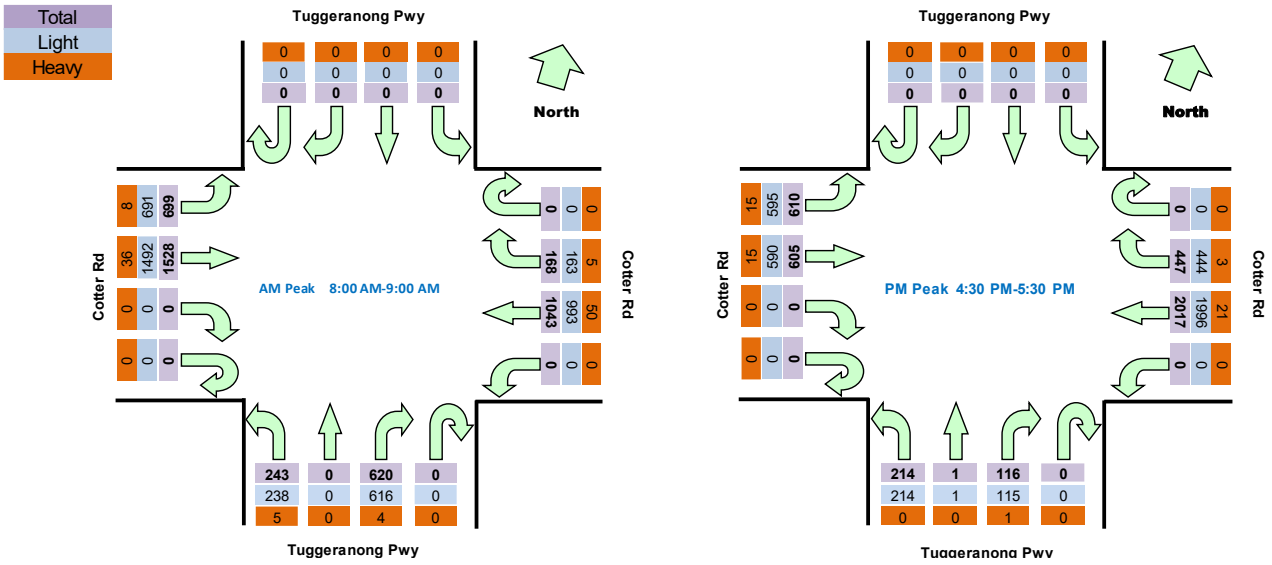


Figure 3.7 Cotter Road / Tuggeranong Parkway NB ramps – Turning movement counts AM and PM peak hour

During the PM peak, westbound traffic is observed to queue back at the first of the two intersections. These queues do not clear within one cycle and begin to extend back.

John Gorton Drive / Cotter Road

The John Gorton Drive / Cotter Road intersection is a signalised 4-legged intersection at the western extent of the project study area. During the AM peak, it has been observed that eastbound queues from downstream intersections can queue back to this intersection, prohibiting eastbound traffic from clearing each cycle (refer to Section 3.1.3).

During the PM peak, eastbound traffic has been observed to queue out of the model, resulting in unreleased trips during model runs. This queueing is not a result of downstream delays as is the case in the AM but rather capacity constraints at the John Gorton Drive intersection.

3.1.2 Travel time surveys

Travel time surveys from 7 AM – 9 AM and 4 PM – 6 PM were conducted on the 23rd of July 2025. The route is shown in pink in Figure 3.4 and detailed in Table 3.2 and Table 3.3.

Table 3.2 AM floating car travel time survey results

Route	7:00 AM – 8:00 AM			8:00 AM – 9:00 AM		
	Mean	Min	Max	Mean	Min	Max
Cotter Road EB	03:07	01:58	06:21	05:08	03:43	06:45
Cotter Road WB	02:26	01:51	03:57	03:06	02:02	05:17

Table 3.3 PM floating car travel time survey results

Route	4:00 PM – 5:00 PM			5:00 PM – 6:00 PM		
	Mean	Min	Max	Mean	Min	Max
Cotter Road EB	03:09	02:31	04:52	03:17	02:29	05:00
Cotter Road WB	03:34	02:55	05:45	03:43	02:31	05:21

TomTom Bluetooth travel time car survey was provided by CED along Cotter Road from Monday, 23 June 2025 to Friday, 27 June 2025 recorded at 30 min intervals, between Streeton Drive and Tuggeranong Parkway (north ramp) as shown as the pink line in Figure 3.4. The extracted travel time from 7 AM – 9 AM and 4 PM – 6 PM for the route is shown in blue in Figure 3.4 and is in Table 3.4 and Table 3.5.

The floating car survey (pink line) was used as the primary source for travel time calibration, given its direct alignment with the modelled corridor and timestamp accuracy. While the Bluetooth dataset (blue line) provided broader temporal coverage and a significantly larger sample size, it was not spatially mapped to individual Aimsun Cotter Road sections.

It's shown that the floating travel times were quicker than the Bluetooth data. Sensitivity tests were undertaken to simulate different degrees of congestion on the Cotter Road corridor and carried forward for the future base case modelling (Section 4.3).

Table 3.4 AM Bluetooth travel time survey results

Route	7:00 AM – 8:00 AM			8:00 AM – 9:00 AM		
	Counts	Mean	Std Dev	Counts	Mean	Std Dev
Eastbound						
Monday, 23/06/2025	627	04:22	05:26	742	06:36	10:30
Tuesday, 24/06/2025	532	04:15	05:05	624	08:07	10:00
Wednesday, 25/06/2025	648	04:54	07:37	737	07:37	07:47
Thursday, 26/06/2025	555	04:43	08:55	788	08:15	08:59
Friday, 27/06/2025	555	05:18	11:13	766	07:26	09:48
EB five-day average		*04:42*	*07:39*		*07:36*	*09:25*
Westbound						
Monday, 23/06/2025	246	06:10	13:01	402	05:13	10:24
Tuesday, 24/06/2025	206	04:46	09:05	316	06:38	13:55
Wednesday, 25/06/2025	222	05:04	12:08	333	08:04	15:38
Thursday, 26/06/2025	283	05:38	12:41	356	06:57	12:32
Friday, 27/06/2025	260	07:01	14:07	427	07:59	15:25
WB five-day average		*05:44*	*12:12*		*06:58*	*13:35*

Table 3.5 PM Bluetooth travel time survey results

Route	4:00 PM – 5:00 PM			5:00 PM – 6:00 PM		
	Counts	Mean	Std Dev	Counts	Mean	Std Dev
Eastbound						
Monday, 23/06/2025	433	06:39	14:01	430	06:18	11:07
Tuesday, 24/06/2025	435	07:02	14:09	433	07:57	16:23
Wednesday, 25/06/2025	444	07:30	13:56	469	06:16	11:42
Thursday, 26/06/2025	475	07:24	14:17	467	06:48	12:52
Friday, 27/06/2025	415	06:11	12:04	498	05:43	11:24
EB five-day average		*06:57*	*13:41*		*06:36*	*12:42*
Westbound						
Monday, 23/06/2025	637	05:40	11:02	702	05:40	09:42
Tuesday, 24/06/2025	613	07:06	15:15	743	06:31	11:14
Wednesday, 25/06/2025	661	06:57	13:42	732	05:59	10:27
Thursday, 26/06/2025	656	05:39	09:42	694	07:19	15:13
Friday, 27/06/2025	638	08:18	16:42	672	06:13	11:37
WB five-day average		*06:44*	*13:17*		*06:20*	*11:39*

3.1.3 Queuing

CED has provided CCTV video snapshots of traffic congestion being experienced at three of the intersections, see Figure 3.9 to Figure 3.12. This footage, dated 12 June 2024, captures eastbound traffic flows during the AM peak period, with queues along Cotter Road extending from Kirkpatrick Street, past Streeton Drive, and back onto Sir John Gorton Drive. These queues have been indicatively illustrated in Figure 3.8 with the corresponding numbered CCTV frame captures.

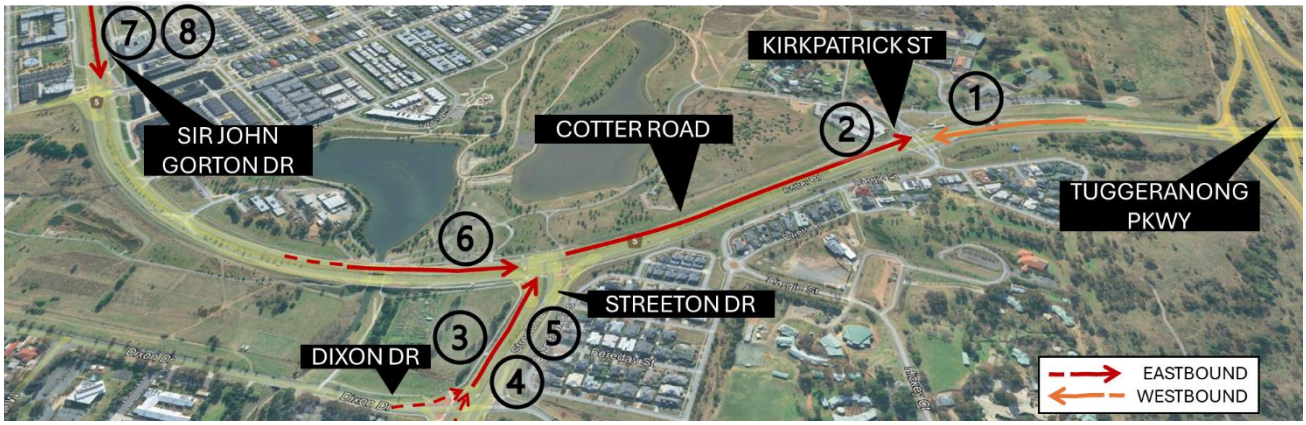


Figure 3.8 Cotter Road, indicative AM peak queueing based on 2024 CCTV snapshots.

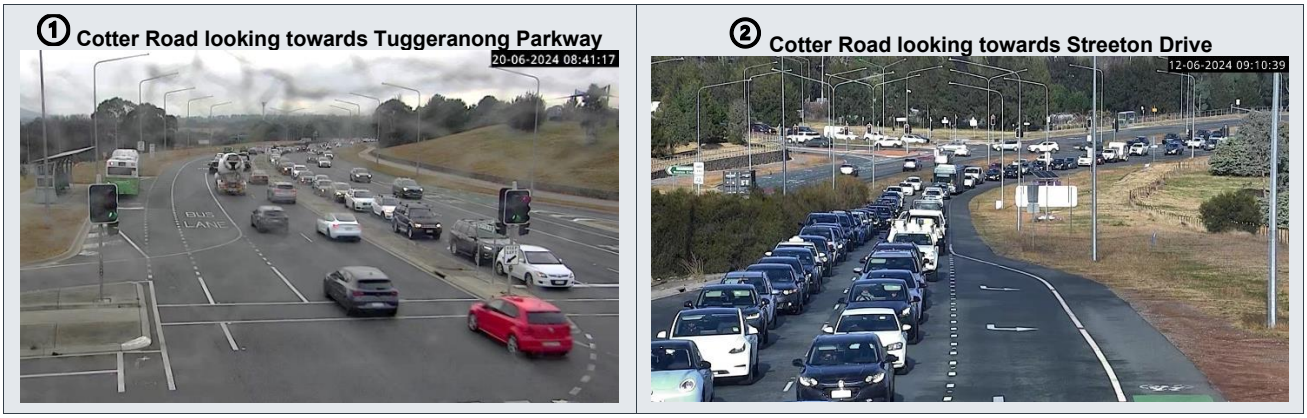


Figure 3.9 Cotter Road / Kirkpatrick, CCTV – Site C0253

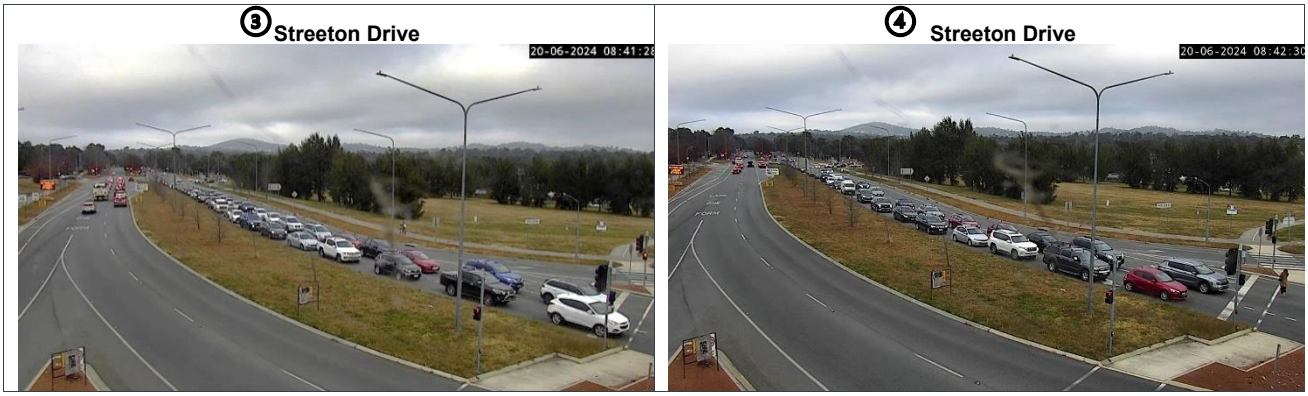


Figure 3.10 Cotter Road / Streeton Drive, CCTV – Site C0253

Figure 3.11 Cotter Road / Streeton Drive, CCTV – Site C0253

The footage shows Streeton Drive queuing extending beyond the Unwin Street and Dixon Drive (see Figure 3.11).

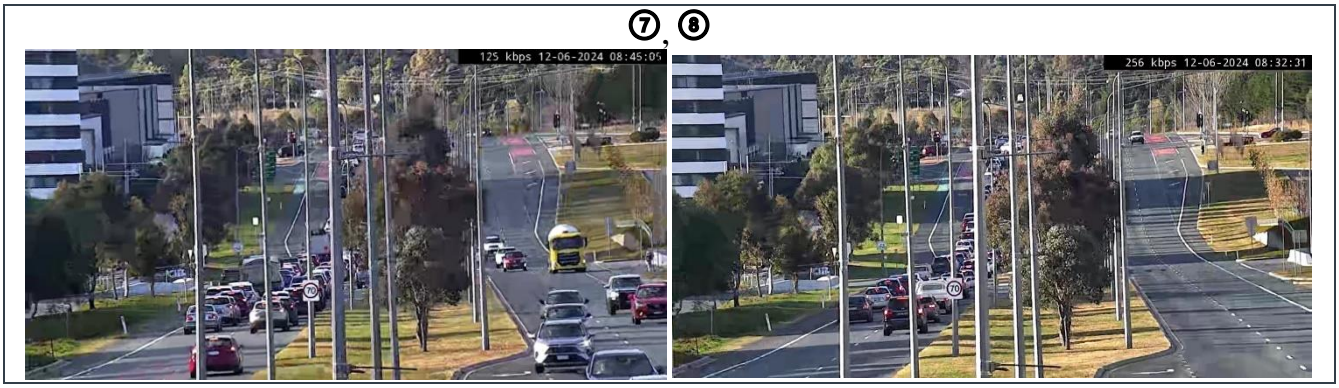


Figure 3.12 John Gorton Drive (looking towards Cotter Road), CCTV – Site C0256A

Recent CCTV snapshots from August 2025, provided by CED, are shown Figure 3.14 (AM peak) and Figure 3.15 (PM peak). The AM peak conditions closely resemble those observed in in the 2024 CCTV snapshots, with eastbound queues extending past Streeton Drive. In contrast, the PM peak shows minimal westbound congestion along Cotter Road. These have been annotated in Figure 3.13 with the corresponding numbered CCTV frame captures.

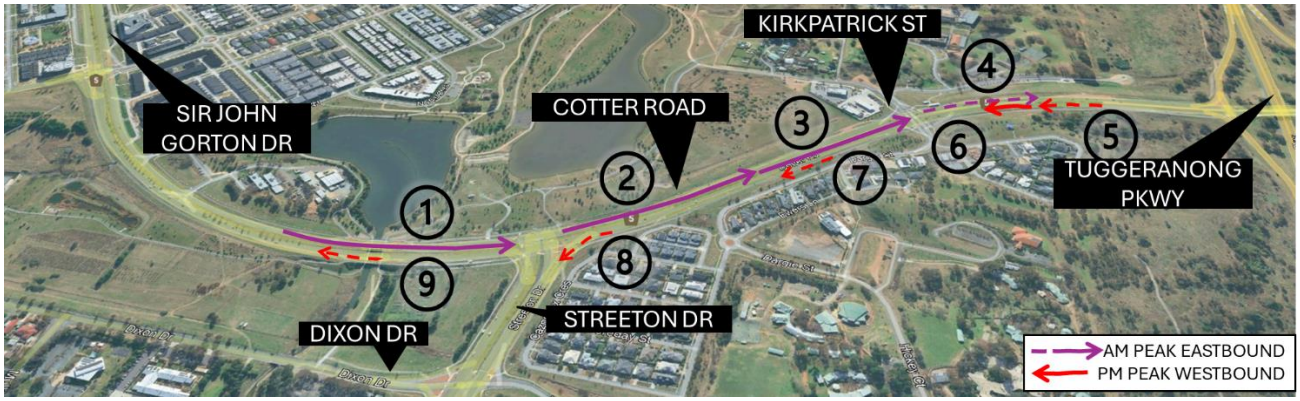


Figure 3.13 Cotter Road, indicative peak queueing based of 2025 CCTV video snapshots.

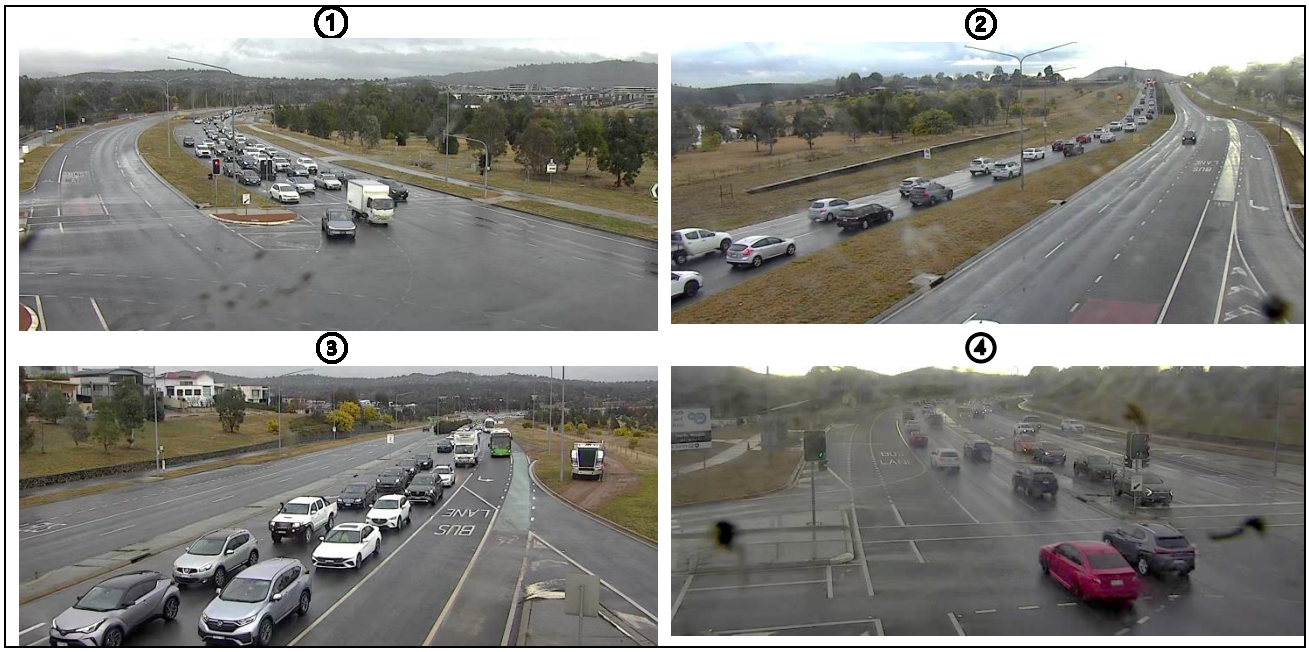


Figure 3.14 Westbound 8:30AM peak traffic - Cotter Road, Streeton Drive to Kirkpatrick Street. Dated 21/08/2025.

Figure 3.15 Westbound 5:15PM peak traffic - Cotter Road, Streeton Drive to Kirkpatrick Street. Dated 20/08/2025.

3.2 Public transport

The public transport provision along Cotter Road within the project scope is currently served by several bus routes shown in Figure 3.16. Table 3.6 provides bus stop and route frequencies whilst Table 3.7 provides the volume of services in the AM peak period. On the western side of Tuggeranong Parkway, the R10 Rapid Service operates along Cotter Road, connecting Deman Prospect, Monlonglo Valley and the City. Route R7 Rapid service connects Weston Creek and Cooleman Court to the City. Local routes such as Route 66 also service the area linking suburbs like Wright, Coombs, and Weston Creek to broader destinations. Bus routes 180 and 181 travel along the eastern section of Cotter Road from Tuggeranong Parkway; there are no bus stops provided up to McCulloch Street.

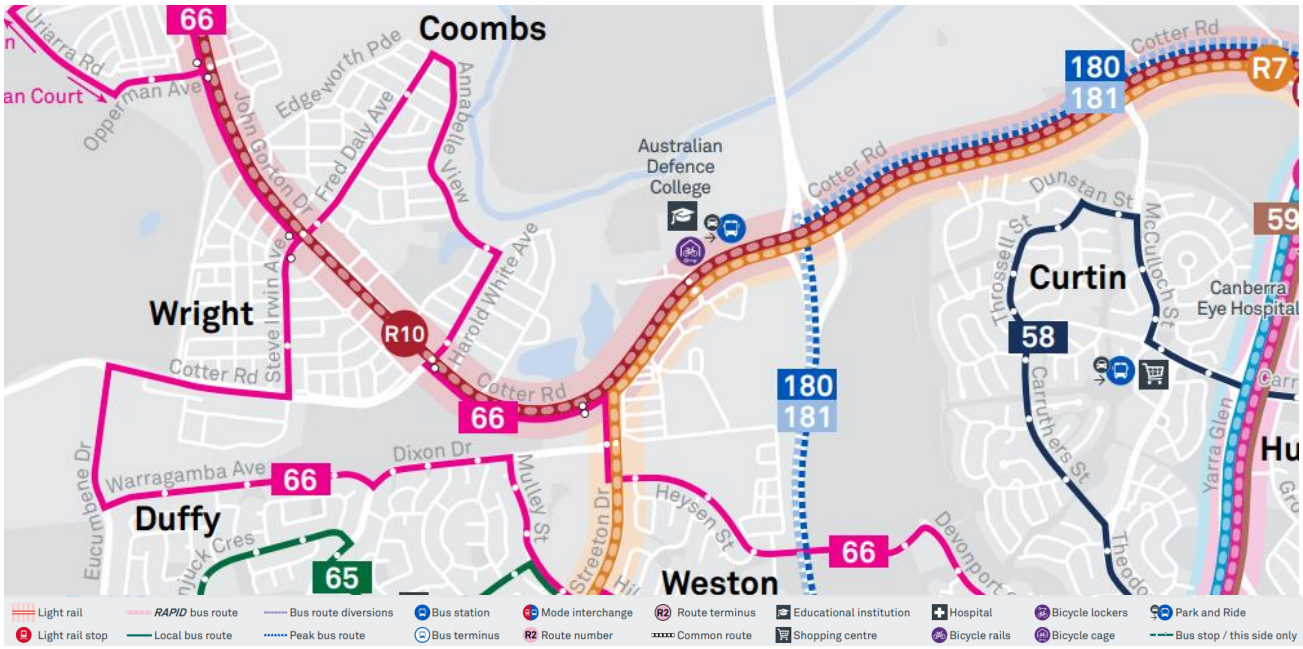


Figure 3.16 Public transport network

Source: ACT Government, Transport Canberra Network Map (28 April 2025)

Table 3.6 Bus stop locations and frequencies

NEAREST INTERSECTION	STOP NAME	STOP ID	SERVED ROUTES	PEAK FREQUENCY	OFF-PEAK FREQUENCY
Cotter Road / John Gorton Drive / Harold White Avenue	Cotter Road after Harold White Ave	2812	R10	Every 15 min	Every 15–30 min
	John Gorton Dr after Cotter Rd	2811	R10, 66	Every 15–30 min	Every 30–60 min
	Harold White Av after Woodberry Av	2842	66	Every 30 min	Every 30-60 min
	Harold White Av before Woodberry Av	2843	66	Every 30 min	Every 30-60 min
Cotter Road / Streeton Drive	Cotter Rd After Streeton Dr	2822	R10, 66, R7	Every 15–30 min	Every 30–60 min
	Streeton Dr after Dixon Dr	2821	66, R7	Every 15–30 min	Every 30–60 min
	Streeton Drive after Unwin Pl	2820	66, R7	Every 15–30 min	Every 30–60 min
Dargie Street / Cotter Road Intersection	North Weston Park & Ride	1802	R10, 66, R7	Every 15–30 min	Every 30–60 min
	Opp North Weston Park & Ride	1809	R10, R7	Every 15 min	Every 15–30 min

Table 3.7 Cotter Road bus AM peak weekday services

	BETWEEN SIR JOHN GORTON DRIVE AND STREETON DRIVE				BETWEEN STREETON DRIVE AND TUGGERANONG PARKWAY			
	7:00 to 8:00		8:00 to 9:00		7:00 to 8:00		8:00 to 9:00	
Route	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
R10	5	2	6	2	5	2	6	2
66	4	2	2	2	-	-	-	-
R7	-	-	-	-	4	4	3	4
Sub total (direction)	11	10	8	4	9	6	9	6
Total (combined)	**21**		**12**		**15**		**15**	

Source: ACT Government, TC Transport Canberra (effective 31 August 2025)

3.3 Active transport

Cotter Road includes active transport infrastructure that varies in form and coverage across the corridor, Figure 3.17.

A shared use path is located on the southern verge of Cotter Road between Yarralumla Creek (~325m west of McCulloch Street) and John Gorton Drive, providing pedestrian and cyclist access. The lakes on the northern side of Cotter Road also provide shared use paths that connect to Cotter Road / Streeton Drive, as well as under Cotter Road (following the Weston Creek) and connecting to the shared use path on the southern side.

Signalised intersections at Streeton Drive / Dargie Street include marked pedestrian crossings with dedicated crossing phases. On-road cycle lanes are marked in segments near Streeton Drive and Dargie Street. Additional informal path connections exist between Cotter Road and nearby recreational reserves in the Molonglo Valley.

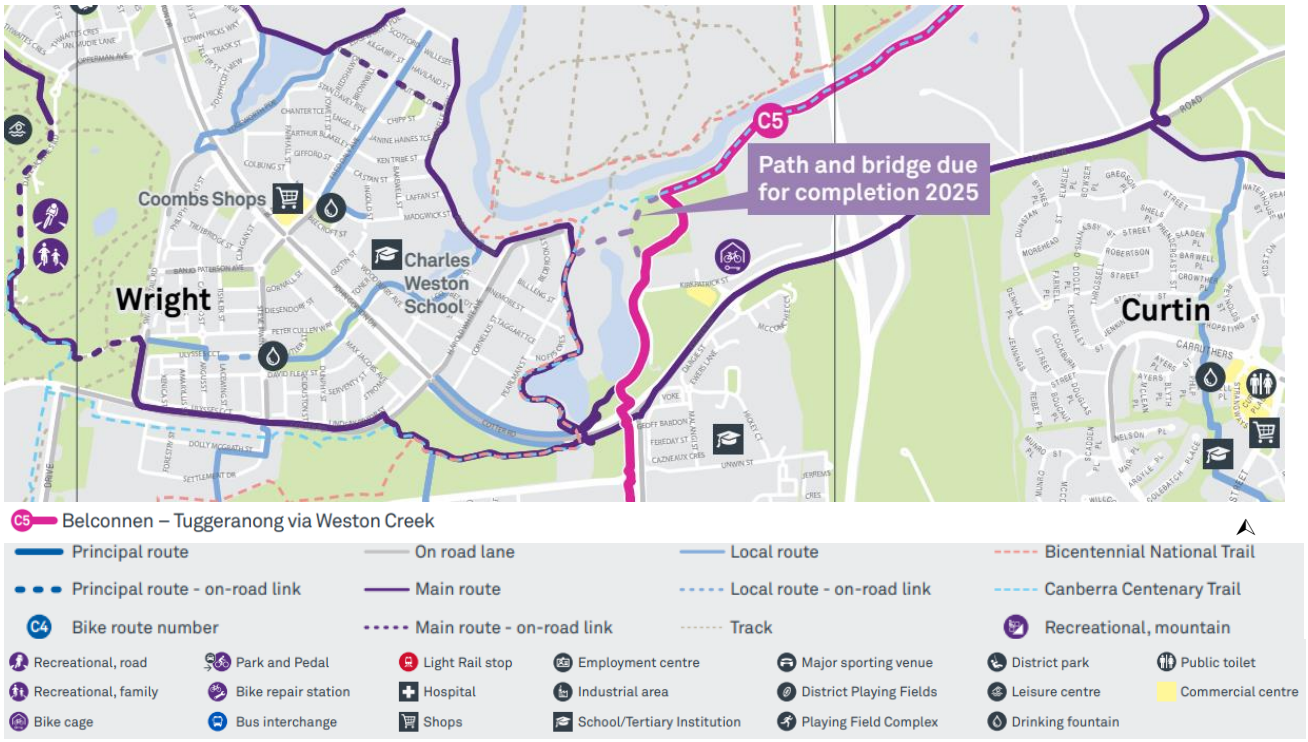


Figure 3.17 Active transport local infrastructure

Source: Canberra Walking and Cycling map, Transport Canberra, ACT Government

3.4 Heavy vehicle network

There is a small section of Cotter Road that falls within the heavy vehicle network subject to conditions; from the west up to Streeton Drive (refer to Figure 3.18).

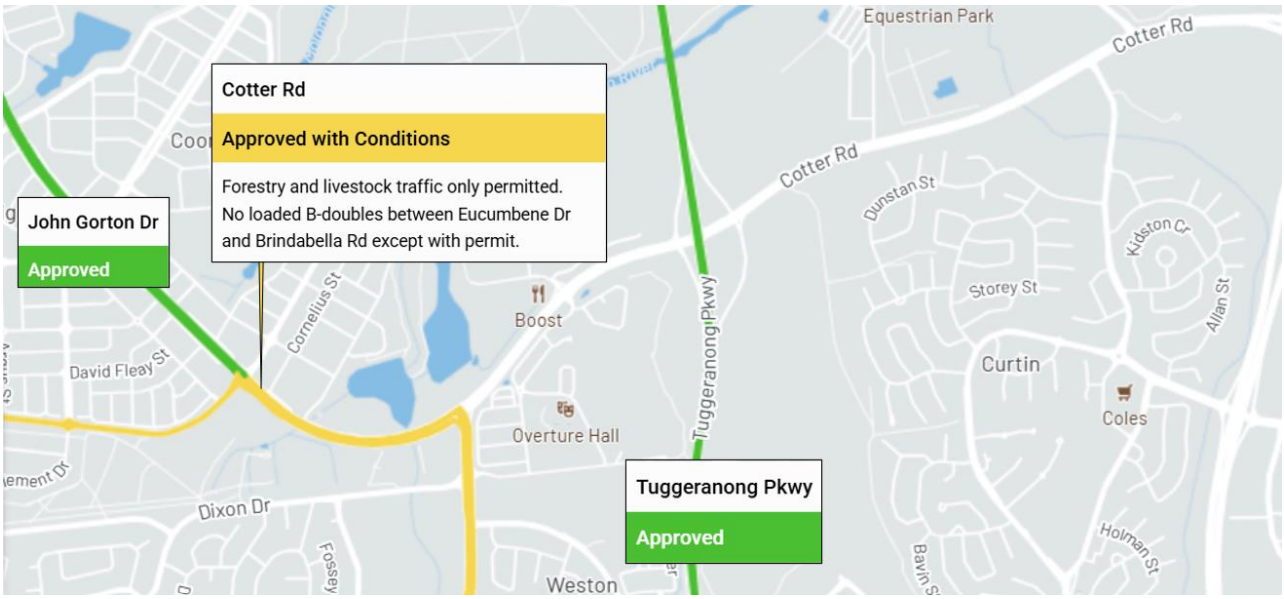


Figure 3.18 Heavy Vehicle network

Source: National Heavy Vehicle Regulator, NHVR Network Map (2025)

3.5 Crash history and safety context

ACT Road Crash Data extracted 1 September 2020–2025 (five years historic) from the ACT Open Data Portal (accessed 24 September 2025). Shown in Figure 3.19, reported crashes (those recorded by police or via the Australian Federal Police Crash Report Form) are clustered around Cotter Road intersections (Streeton Drive, Kirkpatrick/Dargie and the Tuggeranong Parkway ramps); rear-end collisions are the most common type, with notable concentrations of right-angle and pedestrian strikes at signalised and slip-lane locations, and spatial points represent indicative intersection or mid-block locations rather than precise GPS fixes.

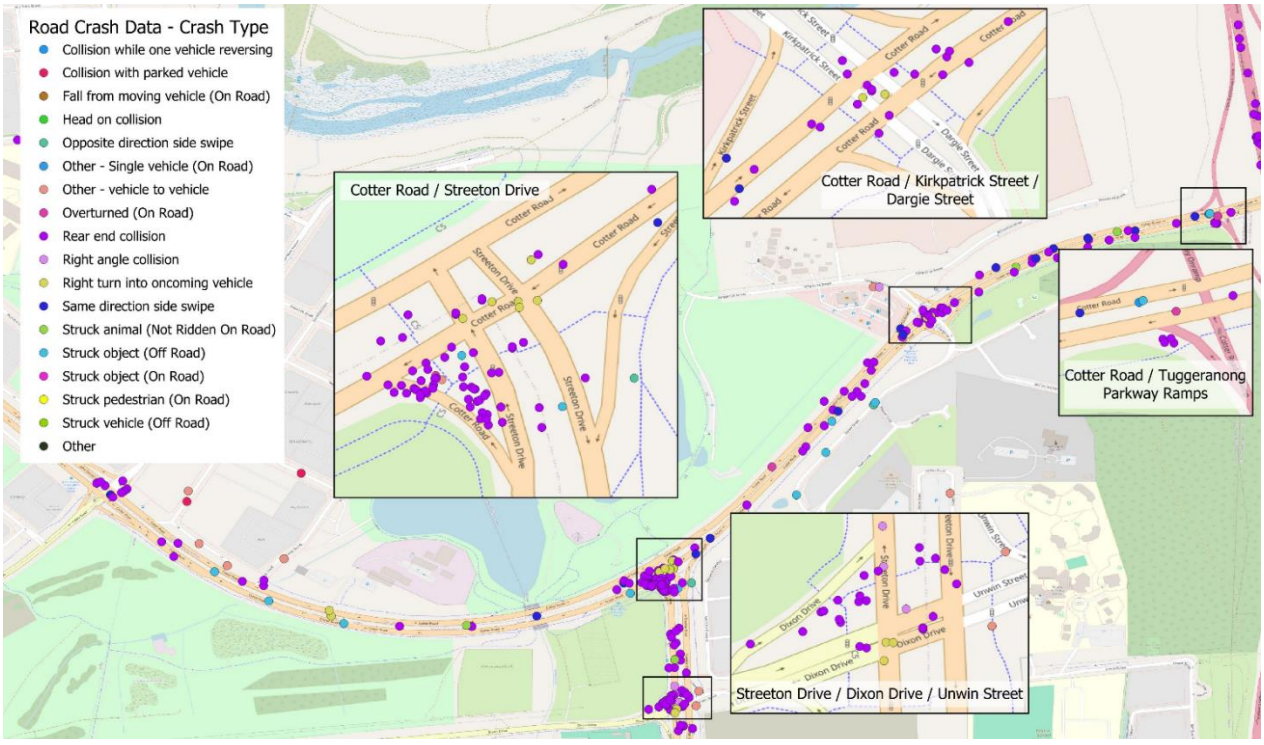
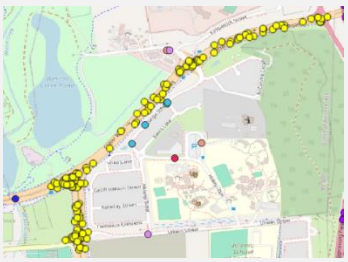


Figure 3.19 Map of crash history by crash type; September 2020-2025.

Source: ACT Road Crash Data. Open Data Portal data ACT accessed 24 September 2025.

Across September 2020–2025 there were 204 recorded crashes, of which rear-end collisions dominated with 162 incidents (about 79% of the total, Table 3.8). Annual totals peaked in 2023 (46 reports) after a large rise from 2020 (9 reports) and then declined to 31 reports in 2025, while all other crash types were comparatively rare and dispersed across the period.

Table 3.8 Crash history summarised by crash type, September 2020-2025



CRASH TYPE	2020	2021	2022	2023	2024	2025	GRAND TOTAL
Collision while one vehicle reversing					1		*1*
Opposite direction side swipe				1			*1*
Other - vehicle to vehicle			1	2			*3*
Overturned (On Road)			2	1			*3*
Rear end collision	7	38	23	33	36	25	*162*
Right angle collision			2	1			*3*
Right turn into oncoming vehicle	1	1	3	4		2	*11*
Same direction side swipe	1		2	3	4	2	*12*
Struck animal (Not Ridden On Road)		1			1	1	*3*
Struck object (Off Road)		1	2	1		1	*5*
Grand Total	**9**	**41**	**35**	**46**	**42**	**31**	**204**

Crashes are strongly concentrated in peak periods (summarised in Table 3.9), with the highest single-hour count at 17:00 (36 incidents), a secondary morning peak at 08:00 (26 incidents) and elevated counts across 16:00–18:00 and 07:00–09:00; totals by hour show most incidents are rear-end collisions that dominate the peak periods.

Table 3.9 Crash history summarised by crash type and hour of the day, September 2020-2025

CRASH TYPE	HOUR OF THE DAY																				
	0	1	2	4	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Rear end collision	1	1			4	7	17	8	9	8	10	9	9	10	16	31	13	2	4	2	1
Same direction side swipe						1	3		1	1						3	1	1			1
Right turn into oncoming vehicle					1		2	1	2							1	1		1	1	1
Struck object (Off Road)			1										1		1				2		
Other - vehicle to vehicle							1						1			1					
Overturned (On Road)							1				1						1				
Right angle collision						1	2														
Struck animal (Not Ridden On Road)		1		1																	1
Collision while one vehicle reversing										1											
Opposite direction side swipe								1													
GRAND TOTAL	**1**	**2**	**1**	**1**	**5**	**9**	**26**	**10**	**12**	**10**	**11**	**9**	**11**	**10**	**17**	**36**	**16**	**3**	**7**	**3**	**4**

Between September 2020–2025 there were 16 crashes that resulted in injury, peaking in 2023 with 7 incidents – summarised in Table 3.10. The largest contributors were rear-end collisions (6) and right-turn-into-oncoming vehicle (3), with smaller counts for overturned (2), struck object (2) and single cases for opposite-direction side swipe, same-direction side swipe and other vehicle-to-vehicle.

Table 3.10 Crash history summarised by injury, September 2020-2025

CRASH TYPE	CRASH THAT RESULTED IN INJURY BY YEAR						
	2020	2021	2022	2023	2024	2025	GRAND TOTAL
Opposite direction side swipe				1			*1*
Other - vehicle to vehicle				1			*1*
Overturned (On Road)			1	1			*2*
Rear end collision		2		2	2		*6*
Right turn into oncoming vehicle	1		1	1			*3*
Same direction side swipe					1		*1*
Struck object (Off Road)				1		1	*2*
GRAND TOTAL	**1**	**2**	**2**	**7**	**3**	**1**	**16**

4 Future transport conditions

4.1 Future transport network

WSP has modelled a "Future Base (2031)" scenario in order to compare the proposed short-listed options with (refer to Section 5.1). CED has provided the Canberra Strategic Transport Model (CSTM2) network assumptions which includes a map of the future infrastructure within the study area. This map (extract provided in Figure 4.1) confirms that there are no committed infrastructure projects within the Aimsun modelling boundaries expected to be delivered by 2031. While a few upgrades are planned in the broader precinct, they all lie outside our model extent. As a result, the 2031 do-minimum network is represented by the existing 2025 road conditions.

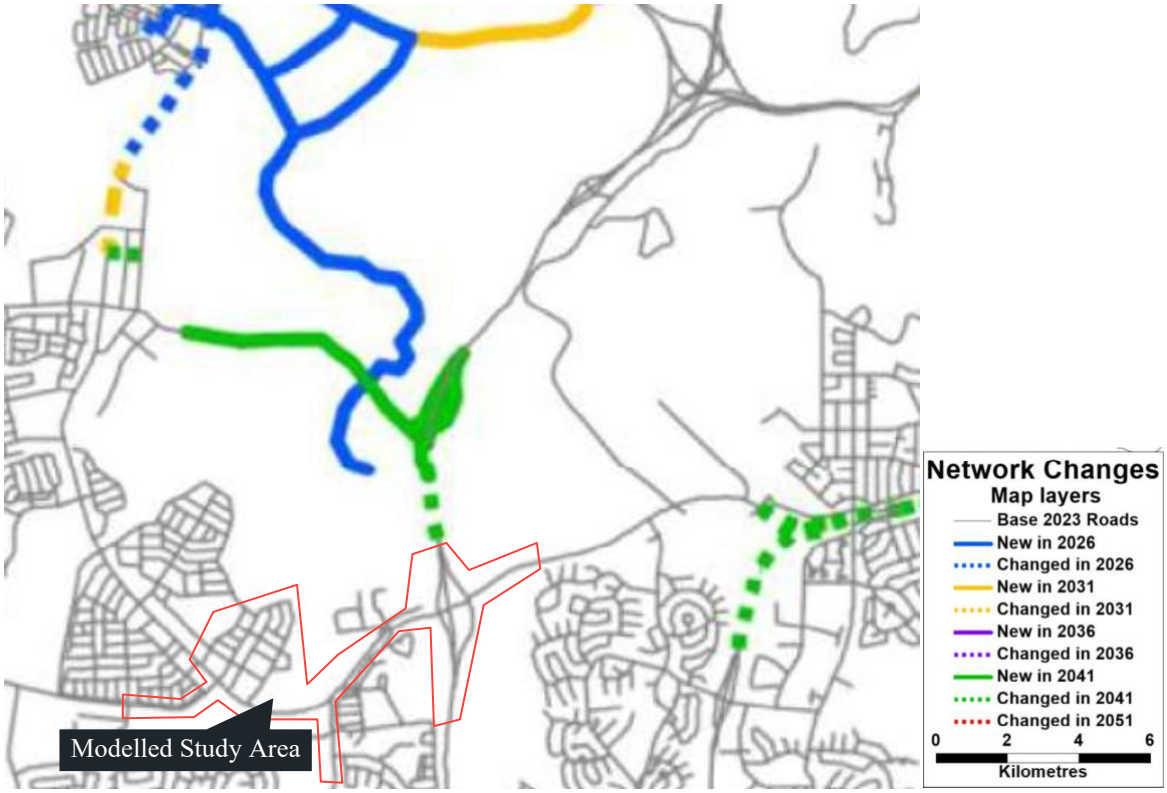


Figure 4.1 CSTM 2.0 Road network upgrades

Source: CED, CSTM2 Network Assumptions

Whilst there are broader strategic planning reports documenting indicative land releases for Weston Creek off Cotter Road; the overarching strategic transport model does not include these potential network changes. The Project concentrates on low-impact, cost-effective measures that deliver tangible, near-term improvements, while ensuring shortlisted options do not preclude or constrain longer-term strategic planning.

The total 1-hour volumes from CSTM2 are detailed in the Table 4.1, combining both car and heavy vehicles. The CSTM2 indicates that future traffic growth (between 2023 and 2031) within the Cotter Road precinct for the AM peak is about 7.6 per cent (cumulative) and 7.1 per cent (cumulative) during the PM peak.

Table 4.1 CSTM 2.0 forecast (2-hour peak)

	2023	2031	Growth	% Growth (cumulative)
AM	12,667	13,631	964	7.6%
PM	10,012	10,722	710	7.1%

Source: CSTM 2

4.2 Assumed future public transport

The 2023 Molonglo Bus Network Strategy (Draft Report Rev 3, 2023) outlines a list of committed, planned and expected bus network upgrades by development stage in the Molonglo Urban Development, which has overlaps with the Cotter Road study area. Under the Molonglo Network Stage 2, the network proposed changes include:

- Routes 66 and 67 are reconfigured to connect the Molonglo Group Centre with Woden as follows:
  - Route 66 links Denman Prospect and Coombs with the Group Centre and Woden *(proposed headways are as per existing)*
  - Route 67 links Wright and northern Weston Creek with the Group Centre, Cooleman Court and Woden *(located outside of project model extents)*
- Route 47/R10 realigned to terminate at the Group Centre *(located outside of project model extents)*
- Future Rapid R12 delivered as a local route connecting Belconnen with Molonglo, Cooleman Court and Woden on a fast, direct alignment *(new service, with proposed 30 min headways during peak hours)*

Therefore, the future 2031 base model includes the existing 2025 public transport services with the addition of the Future Rapid 12 service, which aligns with the CSTM 2.0 network assumptions that CED has provided. This results in a maximum bus headway of 30 minutes in the AM and PM peaks along Cotter Road between Streeton Drive and Harold White Avenue. It should also be noted that public transport network in the CSTM2 includes Light Rail Stage 1 in 2023, while Stage 2 is included in 2036 onwards.

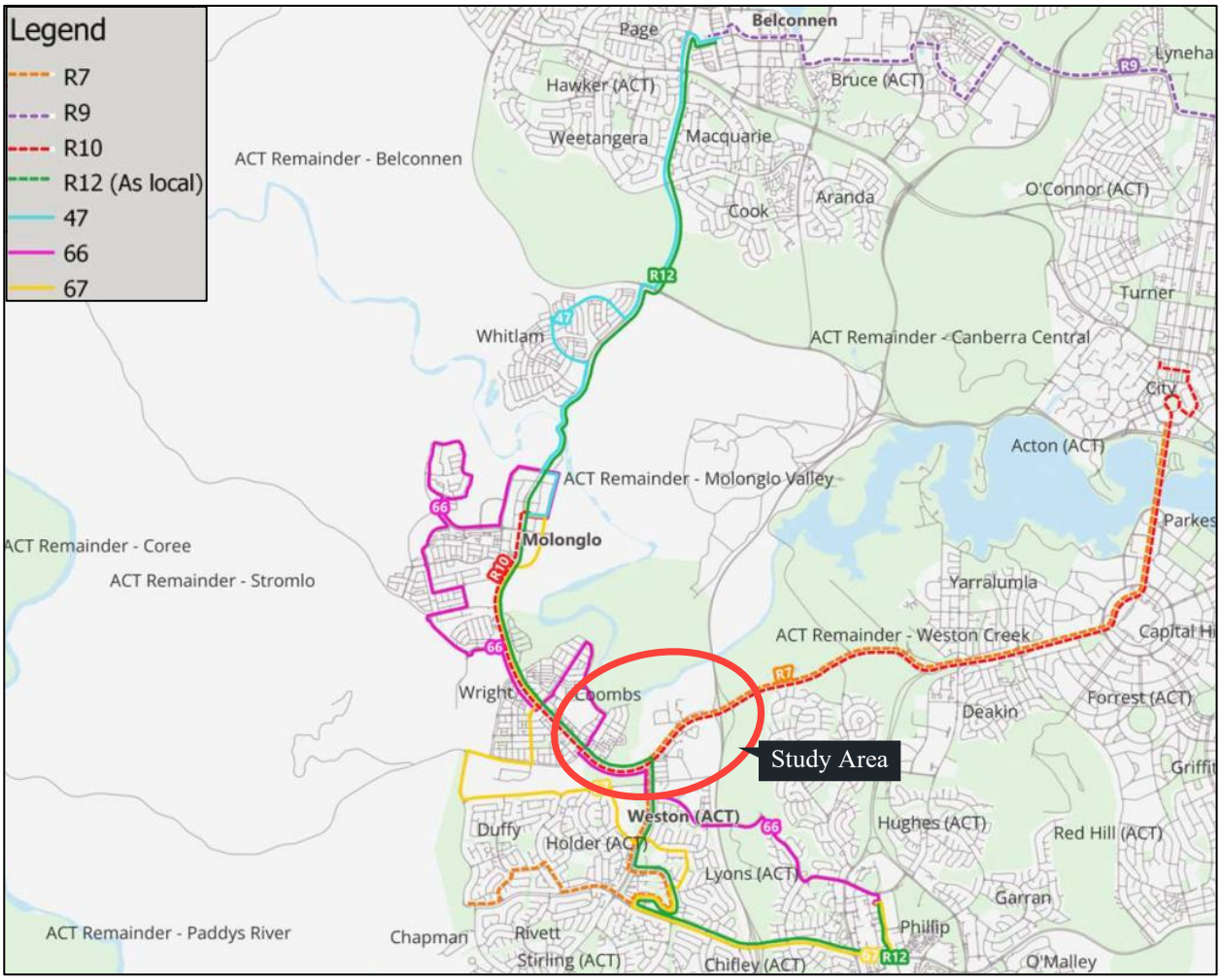


Figure 4.2 Molonglo Network Stage 2, Bus Network Strategy Extract

4.3 Future base case operational modelling

4.3.1 Network assumptions

CED has noted that at TCS 253, the number of pedestrian activations is 60 per cent higher in February when compared to the data provided for July. For the 2031 future base case scenario, the signal times at Kirkpatrick Street have been altered to mimic more frequent pedestrian activations.

In addition, due to the extensive queuing observed along the corridor during worst case 2025 existing conditions, a 10 per cent increase has also been applied to the 2031 base model demand matrix to ensure the model replicates the queueing and delay along Cotter Road for the 2031 future base case scenario. Therefore, the modelling within this report would be conservative.

For the AM peak, specifically the 7:00 – 8:00 period, TCS 254 assumes a cycle length of 110s to release additional traffic into the corridor. For the PM peak, the 16:00-17:00 period for TCS 254, TCS 92, and subsequently TCS 95, TCS 253 and TCS 44 (as they are part of the same subsystem of TCS 92 also assumes a longer cycle length of 110s for the same reason as AM peak). These cycle length adjustments sit within the existing HCL and XCL limits for these traffic signal sites.

4.3.2 Network performance

Network performance results have been extracted from the model which represents the overall network operating performance across all roads and links in the model network. Definitions of the network performance metrics are provided in the Table 4.2, with the results for both peaks in Table 4.3.

Table 4.2 Definitions of network performance metrics

PERFORMANCE METRIC	UNIT	DEFINITION
Total vehicle kilometres travelled (VKT)	Km	Total distance travelled for all vehicles within the reported period.
Total hours travelled (VHT)	Hours	Total travel time for all vehicles within the reported period.
Average speed	Km/hr	Average speed of all vehicles in the network
Average delay	Sec/km	Average delay of all vehicles in the network.
Total traffic demand	Vehicles	Total number of vehicles completed the trip, active in the network and unleased demand.
Unreleased demand	Vehicles	Number of vehicles unable to enter the model network
% of unreleased demand	%	Proportion of unreleased demand to total demand

The presented results in this memo have been based on the **median seed** that was identified in the 2025 base model.; that is 86524 in the AM and 7771 in the PM.

Table 4.3 Network performance for 2031 future base case

NETWORK PARAMETERS	BASE – AM	BASE – PM
Avg network delay (sec/km)	83.9	47.9
Density (veh/km per lane)	21.0	15.9
VHT (h)	2,418	1,969
VKT (km)	68,365	77,098
Avg speed (km/hr)-all vehicles	54.4	55.6
Number of vehicles generated	31,125	33,145
Vehicles waiting to enter	583	123
% unreleased demand	1.87%	0.37%

4.3.3 Travel time performance

The total travel time along Cotter Road in eastbound and westbound direction are summarised Table 4.4 below. On average, travel times are longer in the future model particularly when the additional 10% of traffic and the mimicking of more frequent pedestrian activations. It's notable that the AM peak experiences significant degradation in the eastbound direction, particularly in the second peak hour (8:00-9:00).

The PM peak experiences less of an impact than the AM peak as the actuated signals assign more green time to the main road, however overall, there is increased congestion in the westbound direction.

Table 4.4 Cumulative travel time along Cotter Road 2031 future base case operational results

PEAK	PERIOD	DIRECTION	CUMULATIVE TRAVEL TIME (MM:SS)
AM PEAK	7:00 – 8:00	Eastbound	05:15
		Westbound	02:52
	8:00 – 9:00	Eastbound	13:56
		Westbound	04:40
PM PEAK	16:00 – 17:00	Eastbound	03:07
		Westbound	03:25
	17:00 – 18:00	Eastbound	02:54
		Westbound	03:51

4.3.4 Network Capacity

Figure 4.3 and Figure 4.4 shows the simulation density plot for the 2031 future base case during the AM peak at 8:30, and PM peak at 17:30 respectively. The plot visualises traffic density across the network, highlighting areas of congestion and flow constraints. Denser shading or colour intensity typically indicates higher vehicle volumes or slower speeds, helping to pinpoint pressure points in the network.

In the AM peak future base case, the plot is clearly showing higher volumes of eastbound traffic, density extending back to the western limit on John Gorton Drive all the way from the Cotter Road corridor pinch point at the intersection of Kirkpatrick Street / Dargie Street.

In contrast the PM peak shows more dispersed movements, with increased volumes across the model extents rather than a dominant eastbound movement on Cotter Road seen in the AM. The plot shows a wider spread network pressure extending to (northbound on ramp) / from (southbound off ramp) the Tuggeranong Parkway.

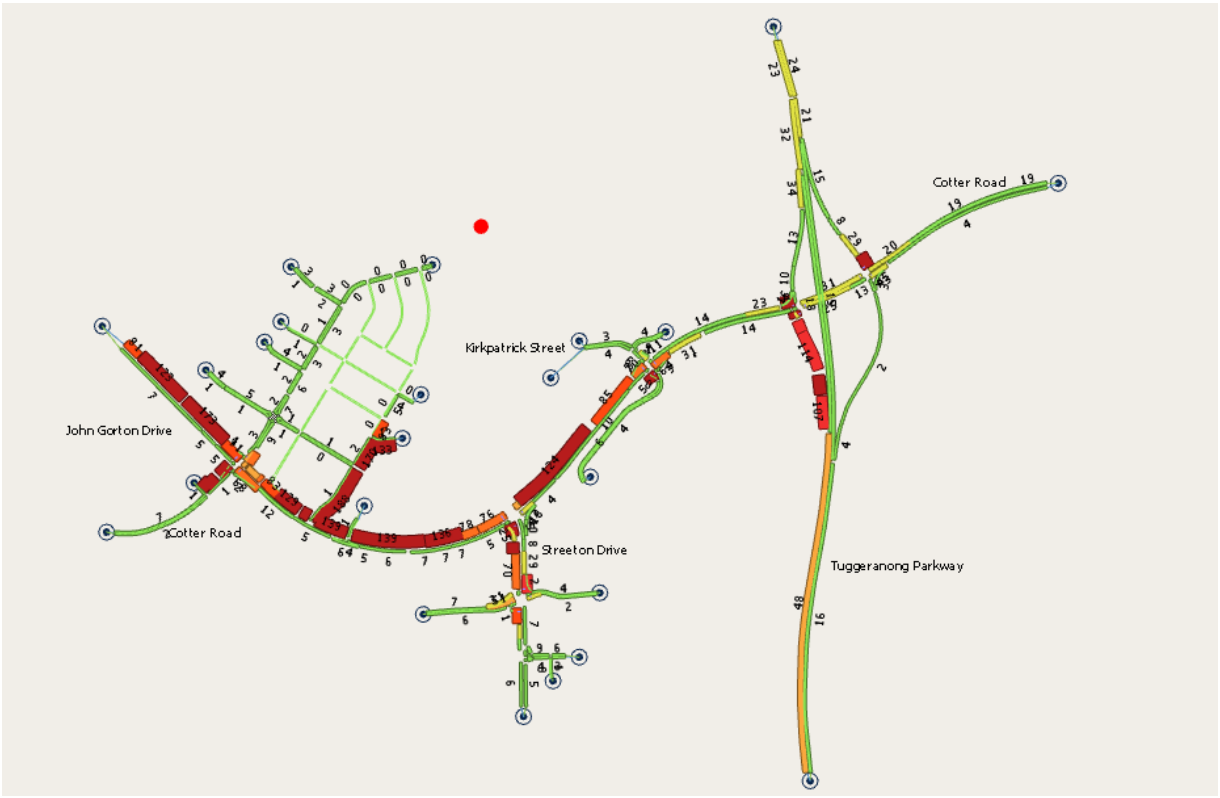


Figure 4.3 Simulation density plot: 2031 future base case AM peak 8:30

Figure 4.4 Simulation density plot: 2031 future base case PM peak 17:30

4.3.5 *Key Observations*

4.3.5.1 AM peak

The primary pinch point is the signals at Kirkpatrick Street / Dargie Street intersection causing upstream delays and queue spillback – i.e., onto John Gorton Drive and Streeton Drive. The more frequent pedestrian activations exacerbate the bottleneck combined with signal timing saturation, the adaptive control reaches limits under this eastbound peak demand and multi-cycle delays common with unreleased flows at John Gorton Drive. The future base case model also indicates that there is extensive queueing from the Tuggeranong Parkway northbound off-ramp back onto the Parkway that temporary constrain flow – marginally contributing to the unreleased flow.

4.3.5.2 PM peak

Under the current geometric and signal arrangement, releasing westbound demand from Cotter Road and the Tuggeranong Parkway is highly sensitive particularly in the modelled PM peak. Traffic signals are trying to balance two competing flows: southbound vehicles exiting the Parkway, and those attempting to re-enter it in either direction. Thus, creating a delicate trade-off whilst trying to release flows to the project corridor for the future base case (and to be able to quantity the Options being assessed) versus prioritising wider operational constraints. It is worth noting that long-term infrastructure commitments include the South-West Corridor (SW10 – Cotter Road Interchange Upgrade) which includes increasing the capacity of the southbound exit ramp and an additional westbound through lane on Cotter Road. Timing of which is unknown, for the purpose of this options modelling – has been excluded from the future base case.

4.4 Future base case Safe Systems Approach (SSA) review

The SSA review of the future base has been summarised by two sites:

- Cotter Road and Dargie Street as well as Road Extent from Streeton Drive to Parkway NB Off Ramp:
  - High exposure across all crash types (AADT >10,000; >100 pedestrians/cyclists/day) with greatest risk concentrated at intersections and to vulnerable road users; combined likelihood and severity produce notable scores for intersection, pedestrian and cyclist crashes. Overall safety performance is moderate–poor under future base case conditions: **120/384**
- Dixon Drive left turn slip onto Streeton Drive
  - High exposure for vehicles, pedestrians and cyclists (AADT >10,000; >100 pedestrians/cyclists/day) with notable risk concentrated at the slip-lane and at intersections where congestion encourages gap-seeking. Combined likelihood and severity are highest for cyclists and pedestrians, then intersection crashes; run-off and head-on risks are lower here. Overall safety performance under future base case conditions: **100/320**

Refer to Appendix C – Safe Systems Approach review for the SSA matrix and scoring.

5 Options development

A range of practical interventions—varying from low to high scale, see Figure 5.1 —were initially developed to improve traffic flow and public transport efficiency along Cotter Road, between Streeton Drive and the southbound Tuggeranong Parkway on-ramp.

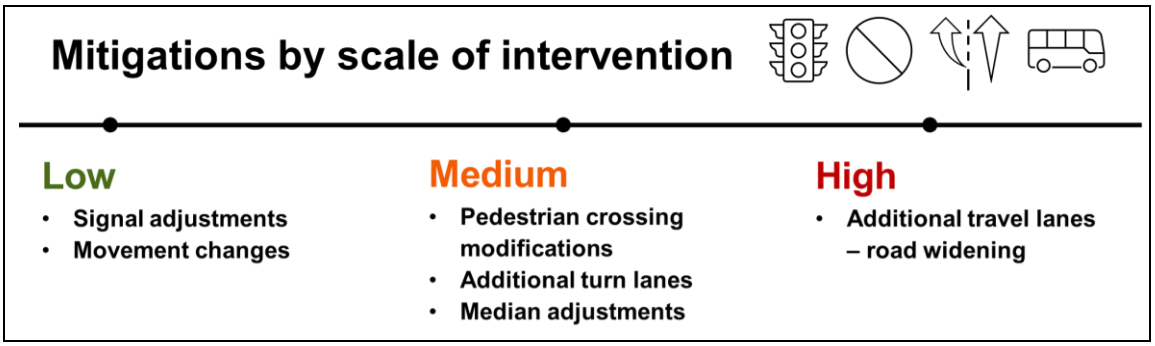


Figure 5.1 Mitigations by scale of intervention

The mitigation interventions listed in Table 5.1 were tested using SIDRA intersection modelling and benchmarked performance against existing baseline conditions. They were then workshopped with stakeholders to refine and prioritise the shortlist, ensuring scope alignment – see Section 1.2. See Appendix A for the *Interventions options workshop* presentation and whiteboard outcomes.

Table 5.1 Mitigation options explored and presented at the workshop

CATEGORY	ID	MITIGATION	LOCATION
Signal Adjustments	**1a**	Increase cycle times to 140s.	All signals between John Gorton Drive and Tuggeranong Parkway
	1b	Introduce available phases according to traffic demands (e.g.: right turn overlap phases)	Kirkpatrick Street / Dargie Street and Streeton Drive / Cotter Road
	1c	Cotter Road priority. Gate traffic from upstream side roads.	All signals between John Gorton Drive and Tuggeranong Parkway
	1d	Introduce left turn lane signals. Control and limit Dixon Drive traffic flow.	Dixon Drive left turn onto Streeton Drive
	1e	Right turn every second cycle, providing more green time for Cotter Road eastbound flows.	Cotter Road, right turn into Kirkpatrick Street
	1f	Right turn every second cycle, providing more green time for Cotter Road eastbound flows.	Dargie Road, right turn into Cotter Road
	1g	Bus queue jump for right turn buses. Signal adjustments for right turn bus phase.	Streeton Drive right turn onto Cotter Road
Movement Changes	**2a**	Remove a N-S pedestrian crossing facility.	Cotter Road / Dargie Street / Kirkpatrick Street
	2b	Make Dargie Street left out only. Divert traffic in this area to use Unwin St – removes rat-run.	Cotter Road / Dargie Street / Kirkpatrick Street
	2c	Convert N/S pedestrian crossings to split crossings. Minor median works required.	Cotter Road / Dargie Street / Kirkpatrick Street

CATEGORY	ID	MITIGATION	LOCATION
Additional lanes	**3a**	Triple right turn for general traffic. Minor widening and merging on Cotter Road.	Streeton Drive right turn onto Cotter Road
	3b	Not used	N/A
	3c	Bus lane eastbound on Cotter Road	Eastbound, between Streeton Drive and Kirkpatrick Street / Tuggeranong Parkway on-ramp
	3d	Additional general traffic lane eastbound	Eastbound, between Streeton Drive and Kirkpatrick Street / Tuggeranong Parkway on-ramp
	3e	T2 lane eastbound	Eastbound, between Streeton Drive and Kirkpatrick Street / Tuggeranong Parkway on-ramp
	3f	(1g + 3c) Bus lane eastbound on Cotter and bus jump on Streeton northbound	Eastbound, between Streeton Drive and Kirkpatrick Street / Tuggeranong Parkway on-ramp
	3g	(3a + 3d) Additional general traffic lane eastbound plus additional right turn lane from Streeton onto Cotter Road.	Eastbound, between Streeton Drive and Kirkpatrick Street / Tuggeranong Parkway on-ramp
Additional lanes + Signal Adjustments	**4a**	Add separate right turn lanes to Dargie and Kirkpatrick. Allows for more flexible signal operation.	Cotter Road / Dargie Street / Kirkpatrick Street
	4b	4a + 2c	Cotter Road / Dargie Street / Kirkpatrick Street

Table 5.2 Initial options traffic performance summary: SIDRA and workshop commentary

INTERVENTION LEVEL	OPTION	SIDRA TRAFFIC PERFORMANCE DIFFERENCE COMPARED TO BASE (%)			WORKSHOP COMMENTARY
		DOS	DELAY (S)	95% QUEUE (M)	
L	1a - Increase cycle time to 140s	-22%	-38%	-14%	It was mentioned that this has already been tested and does not reduce queues, which may not be reflected in SIDRA testing. Could be added to improve other options
L	1b - Introduce available phases according to traffic demands	-35%	-55%	-31%	Phases are already introduced as required which may not be reflected in SIDRA testing
L	1a + 1b	-41%	-68%	-38%	As per 1a + 1b - SIDRA results are unlikely to reflect reality here
L	1c - Cotter Road priority. Gate traffic from upstream side roads.	-37%	-64%	-35%	Side roads already running at minimum

INTERVENTION LEVEL	OPTION	SIDRA TRAFFIC PERFORMANCE DIFFERENCE COMPARED TO BASE (%)			WORKSHOP COMMENTARY
		DOS	DELAY (S)	95% QUEUE (M)	
L	1d - Introduce left turn lane signals. Control and limit Dixon Drive traffic flow.	N/A	N/A	N/A	This could be added to most options
L	1e - Right turn every second cycle, providing more green time for Cotter Road eastbound flows. [Cotter Road, RT into Kirkpatrick Street]	-9%	-17%	-6%	Not done in ACT
L	1f - Right turn every second cycle, providing more green time for Cotter Road eastbound flows. [Dargie Street, RT into Cotter Road]	-32%	-55%	-27%	Not done in ACT
L	2a - Remove a N-S pedestrian crossing facility (East crossing)	-35%	-61%	-33%	Signals team say that east is better as Kirkpatrick has low demands
L	2a - Remove a N-S pedestrian crossing facility (West crossing)	-35%	-57%	-31%	Signals team say that east is better as Kirkpatrick has low demands
L	2b - Make Dargie Street left out only. Diver traffic in this area to use Unwin Street - removes rat-run.	-6%	-8%	-4%	not well received. Also requires removal of western ped crossing. Unknown rat running traffic.
L	2c - Covert N-S pedestrian crossings to split crossings. Minor median works required.	-45%	-76%	-48%	Good level of improvement
M	3a - Triple right turn for general traffic. Minor widening and merging on Cotter Road.	N/A	N/A	N/A	As Dargie intersection is the constraint suggest that this is included with other options
L	1g - Bus queue jump for right turn buses. Minor widening and merging on Cotter Road.	N/A	N/A	N/A	As Dargie intersection is the constraint suggest that this is included with other options
H	3c - Bus lane eastbound on Cotter Road	0%	0%	0%	Positive for PT priority and aligns with government policy
H	3d - Additional general traffic lane eastbound	-28%	-37%	-44%	Good traffic performance improvement across the corridor
H	3e - T2 lane eastbound	-6%	-14%	-10%	Good compromise for traffic / PT performance
H	3f (1g +3c) Bus lane eastbound on Cotter and bus jump on Streeton Drive northbound	N/A	N/A	N/A	Maximises improvement of 3c

INTERVENTION LEVEL	OPTION	SIDRA TRAFFIC PERFORMANCE DIFFERENCE COMPARED TO BASE (%)			WORKSHOP COMMENTARY
		DOS	DELAY (S)	95% QUEUE (M)	
H	3g (3a +3d) Additional general traffic lane eastbound plus additional right turn lane from Streeton Drive onto Cotter Road	N/A	N/A	N/A	Maximises improvement of 3d
M	4a - Add separate right turn lanes to Dargie and Kirkpatrick streets. Allows for more flexible signal operation	-30%	-51%	-25%	Requires ped changes to be effective - see 4b
M	4b: 4a with 2c (Covert N-S pedestrian crossings to split crossings)	-51%	-85%	-58%	Signals team suggests removing western crossing in this case
Options Developed during and or post stakeholder workshop					
H	NEW: 3d + 4b: Additional traffic lane along Cotter Road + Staggered Ped at Dargie/Kirkpatrick	-	-	-	RT lane on Streeton should be included - see below
H	NEW: 3c + 4b: Additional traffic lane along Cotter Road and RT lane at Streeton Drive + Staggered Ped at Dargie/Kirkpatrick	-	-	-	Combines positive options
L	NEW: 2a + 2c: Remove a N-S pedestrian crossing facility, the remaining crossing to be staggered.	-	-	-	Combines positive options
M	NEW: 4b + 2a: Add separate right turn lanes, with one staggered crossing	-	-	-	Removing the pedestrian crossing in this case is no benefit over Option 4b, at the expense of pedestrians
M	NEW: Ban RT into Dargie St with staged crossing, provides space for peds. (remove eastern crossing). Potential to mix with Dargie LILO.	-	-	-	LILO Dargie was not preferred by attendees

5.1 Overview of shortlisted options

The recommended options developed to take forward are described in Table 5.3. Table 6.1 details the assessment criteria used for the shortlisting process.

Table 5.3 Options shortlisted options summary

INTERVENTION LEVEL		MITIGATION COMBINATIONS	JUSTIFICATION	OPTION	DETAIL
Low	L1	**2a** - Remove a north-south pedestrian crossing facility (West crossing) + **1d** Dixon left turn lane signals.	Most realistic (SIDRA) low intervention Option considering performance improvement	Option 1	See Section 5.1.1
Low	L2	**2c -** Covert north-south pedestrian crossings to split crossings. Minor median works required. + **1d** Dixon left turn lane signals.	Best performing low intervention option	Option 2	See Section 5.1.2
Medium	M1	**2a** + **2c**: Remove west north-south pedestrian crossing facility, the remaining crossing to be staggered. + **1d** Dixon left turn lane signals.	Combines best performing low intervention options	Option 3	See Section 5.1.3
Medium	M2	**4b:** 4a separated RT with 2c (Covert north-south pedestrian crossings to split crossings) + **1d** Dixon left turn lane signals.	Best performing medium intervention option	Option 4	See Section 5.1.4
High	H1	**3f** – Added full length bus lane Streeton Drive to Tuggeranong Parkway + **1a** (140s) longer cycle time + **3b** added right turn queue bus jump on Streeton Drive + **1d** Dixon left turn lane signals.	Combines full public transport improvement options with longer cycle time	Option 5	See Section 5.1.5
High	H2	**3g** - Added full length general traffic lane Streeton Drive to Tuggeranong Parkway + **3a** added right turn general traffic lane + **1d** Dixon left turn lane signals.	Combines best performing options for general traffic	Option 6	See Section 5.1.6
High	H3	**3e** - T2 Lane [Head Start at Kirkpatrick Drive, then added lane to Tuggeranong Parkway] + **1d** Dixon left turn lane signals.	Good compromise for traffic / public transport performance. Lower intervention level required compared to full length additional lanes.	Option 7	See Section 5.1.7

5.1.1 Option 1

Option 1 Low 1 assumes removal of the western north-south pedestrian crossing facility at the Cotter Road / Dargie Street / Kirkpatrick Street intersection, Figure 5.2. This allows additional green time to be reallocated to Cotter Road through movements, improving eastbound performance. Minor phasing adjustments further support eastbound flow particularly in the AM peak period.

As a result, this Option represents the least intervention, providing some performance improvements to traffic flow, although reducing pedestrian capacity across the intersection.

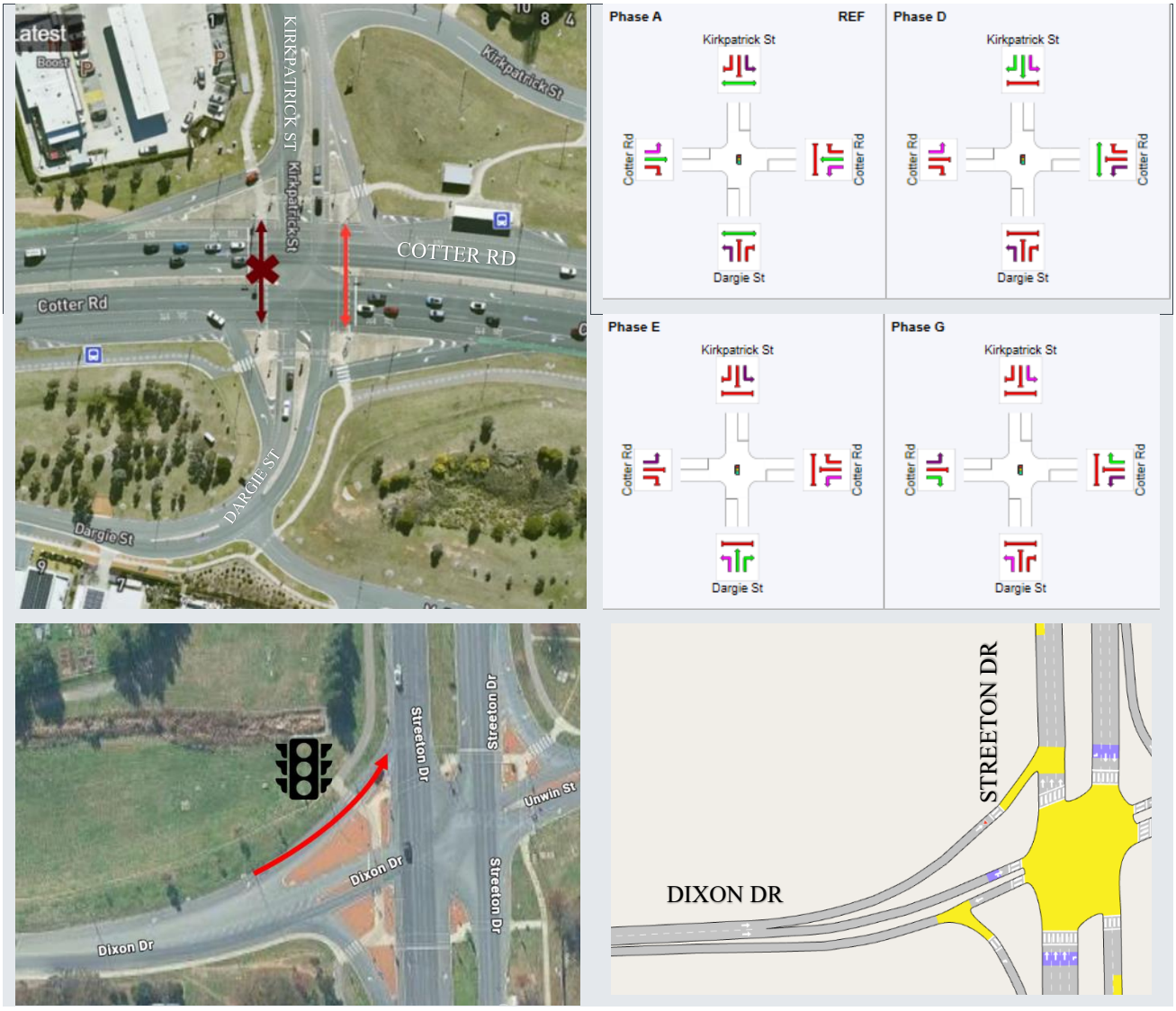


Figure 5.2 Option 1 Low 1 schematic

5.1.2 Option 2

Option 2 Low 2 assumes that the N-S pedestrian crossings are split, reducing the passage clearance. Includes minor phasing adjustments to the Kirkpatrick Drive / Dargie Street intersection marginally increasing Cotter Road eastbound flows. These changes would require minor median works, although intervention level is still quite low. Unlike Option 1 the pedestrian facility is retained.

Option also assumes Unwin Street westbound approach left turn slip onto Streeton Drive northbound is signalised to aid in gating traffic flow downstream on Cotter Road.

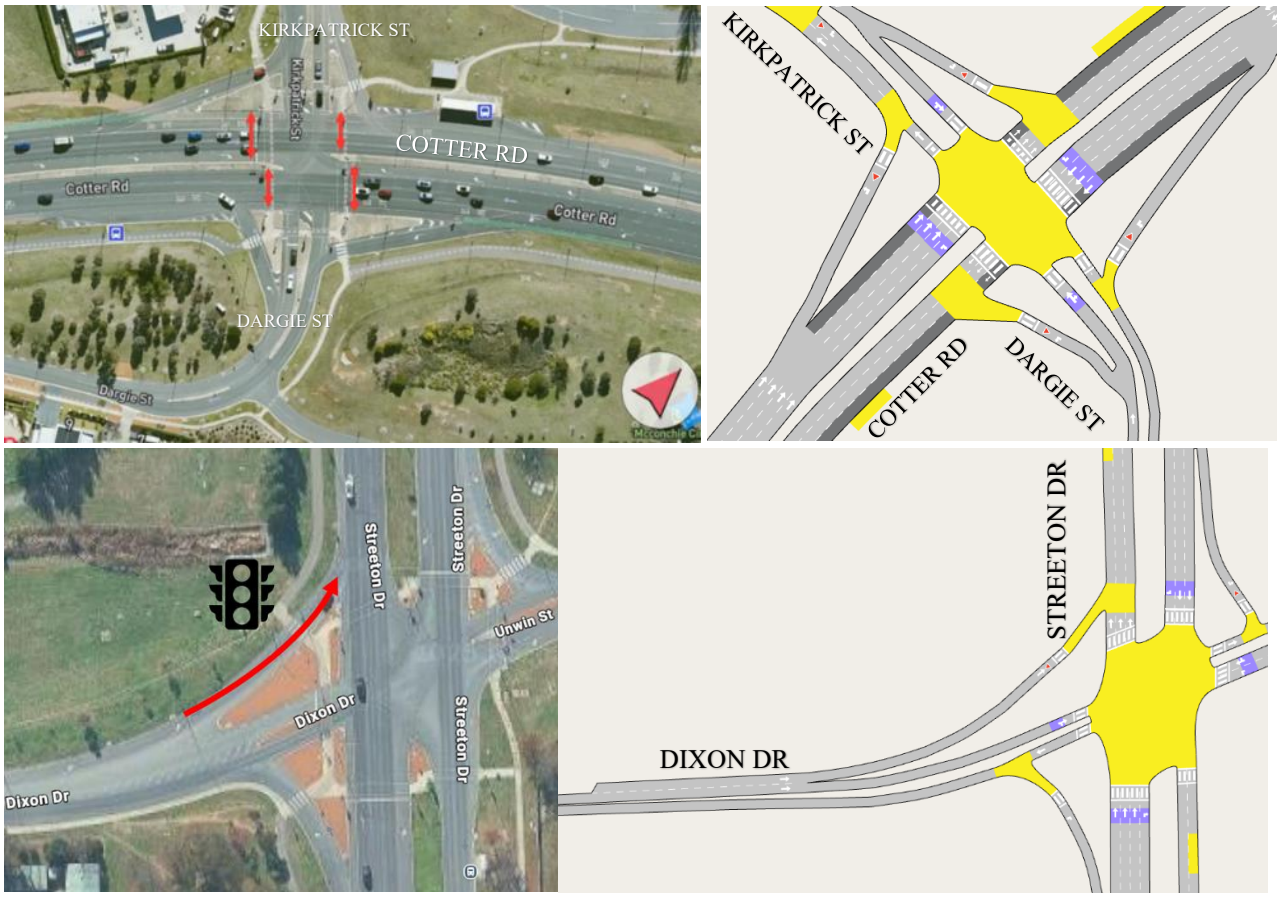


Figure 5.3 Option 2 Low 2 schematic

5.1.3 Option 3

Option 3 combines the interventions from Options 1 and 2, Figure 5.4. It assumes removal of the western north-south pedestrian crossing at the Cotter Road / Dargie Street / Kirkpatrick Street intersection, allowing additional green time for Cotter Road through movements.

It also incorporates split pedestrian crossing to reduce passage clearance and applies minor phasing adjustments to further support eastbound flow during the AM peak.

This Option requires a little more intervention when compared to the previous two options requiring median works and the removal of a crossing.

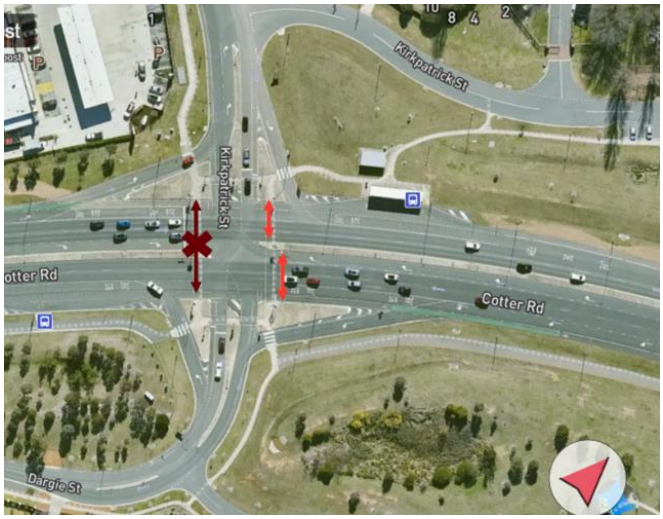


Figure 5.4 Option 3 Medium 1 schematic

As with the previous options, the Unwin Street westbound approach left turn slip to Streeton Drive northbound is signalised to assist downstream gating (Figure 5.5).

Figure 5.5 Option 3 Low 1 schematic – Streeton Drive / Dixon Drive / Unwin Street

5.1.4 Option 4

This Option adds right-turn lanes on both Kirkpatrick Drive and Dargie Street to improve traffic flow. By shortening the signal time needed for those turns, more green time can be given to Cotter Road through traffic. However, the existing road geometry does not support a double diamond setup layout – insufficient road width to allow concurrent right turns. The existing lanes are assumed to maintain current movements (right turn and through), but some widening and small median changes are needed on the side roads to increase turning storage. Pedestrian crossings are split to reduce passage clearance time, allows reallocation of time to the traffic phase with the dominant flows.

As a result of these changes, there is a moderate increase to the capacity for Cotter Road eastbound flows. However, a medium level of intervention is required to make the pedestrian crossing changes as well changes to the road geometry.

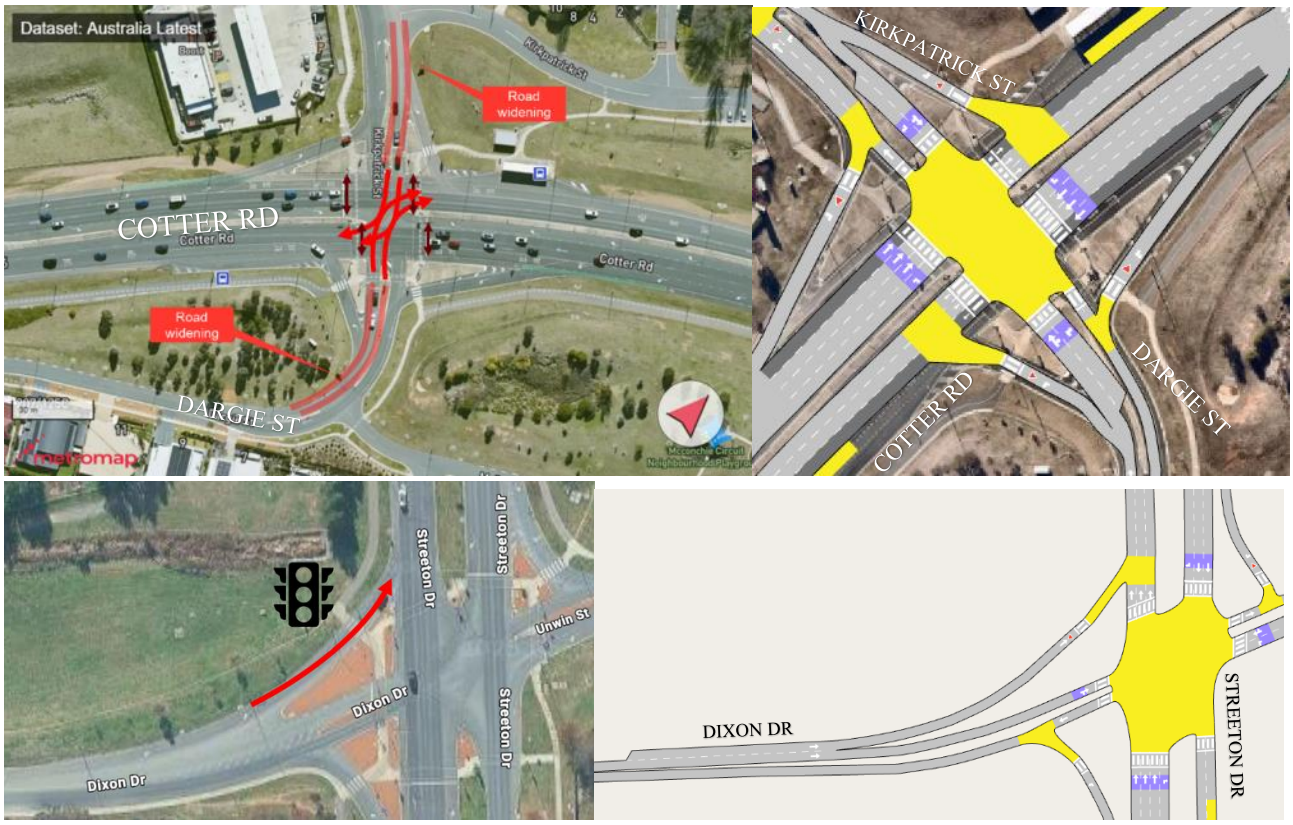


Figure 5.6 Option 4 Medium 2 schematic

It is assumed that the west approach left turn slip from Dixon Drive to Streeton Drive northbound is signalised to support downstream traffic on Cotter Road, essentially gating vehicles. The combination of these, and gating north and south approaches (through timing adjustments on Phase D and E) at the Kirkpatrick Street / Dargie Street intersection, which moderately increases the capacity for Cotter Road eastbound flows.

5.1.5 Option 5

Option 5 High 1 focuses on public transport priority measures – mainly for busses, paired with a longer signal cycle time to support bus movements when Cotter Road eastbound corridor is congested. It includes a full-length bus lane running from Streeton Drive to Tuggeranong Parkway (see Figure 5.7), giving buses a dedicated corridor and reducing delays during peak periods. As with the previous options, the Dixon Drive left turn slip to Streeton Drive northbound is signalised to assist downstream flows.

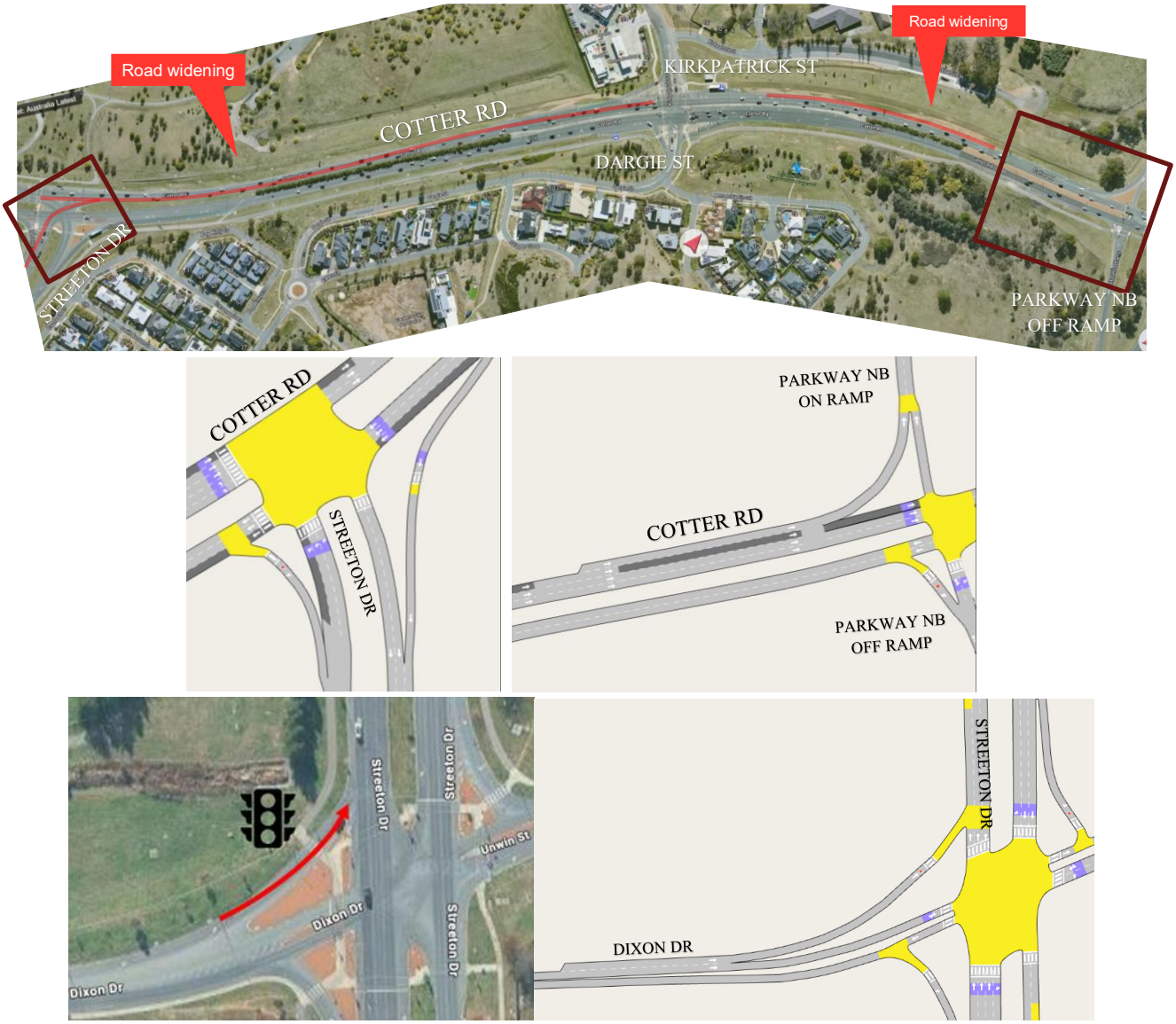


Figure 5.7 Option 5 High 1 schematic

The Option also adopts a right-turn queue jump from Streeton Drive, allowing buses to bypass general traffic and position themselves for a cleaner run through the intersection, see Figure 5.7. At the Tuggeranong Parkway northbound on-ramp, Option 5 allows for buses to continue straight from the left lane, see Figure 5.7. This would be supported by clear lane markings—bus lane continuation lines followed by a merge line for left-turning vehicles. A short bus lane extension (or queue jump) is also assumed, running up to the intersection stop line beside the left-turn slip lane island.

This creates space for one or two buses to move forward independently of general traffic. If a shoulder exists, this may only require line marking; otherwise, minor pavement widening behind the island is assumed.

To further reduce bus delay, a bus priority signal is assumed at the Tuggeranong Parkway northbound on/off ramp. This would give buses a brief head start at the beginning of the through phase, helping them clear the intersection without getting stuck behind turning vehicles.

The signal times at Kirkpatrick Drive have also been altered to mimic more frequent pedestrian activations, like the future base case operations. This Option has the cycle time is extended to 140 seconds, which helps accommodate the additional bus priority phases and increased Cotter Road traffic flow. Together, these elements aim to improve travel time for public transport while maintaining throughput for general traffic.

5.1.6 Option 6

Option 6 High 2 builds on the layout of Option 5 but shifts the focus away from dedicated bus priority, removing the existing eastbound Bus Priority Lane approach to Kirkpatrick Street. Instead of a full-length bus lane, the added lane from Streeton Drive to Tuggeranong Parkway is assumed to be unrestricted, available to all general traffic. While this removes the bus jump at the Parkway, it retains the additional right-turn lane on Streeton Drive, which helps manage turning volumes and reduce delays at the intersection. See Figure 5.8 for the assumed tie-in points for the additional general traffic lanes for this option.

Figure 5.8 Option 6 High 2 schematic

The signal times at Kirkpatrick Drive have been altered to mimic more frequent pedestrian activations, like the future base case operations. Like earlier options, the westbound left-turn slip from Dixon Drive to Streeton Drive northbound is signalised to support downstream traffic flow. This Option prioritises the general traffic through put at the Cotter Road pinch point at Kirkpatrick Drive / Dargie Street intersection, requiring a similar level of road geometry adjustments to cater for the new lane considered a high level of intervention.

5.1.7 Option 7

Option 7 High 3 offers a balanced approach to improving both general traffic and public transport performance, without the higher intervention levels seen in earlier ‘High’ options (i.e., reduced length of additional lanes). It includes a T2 lane that gives priority vehicles a head-start at Kirkpatrick Drive before merging into an added lane toward Tuggeranong Parkway as per Figure 5.9.

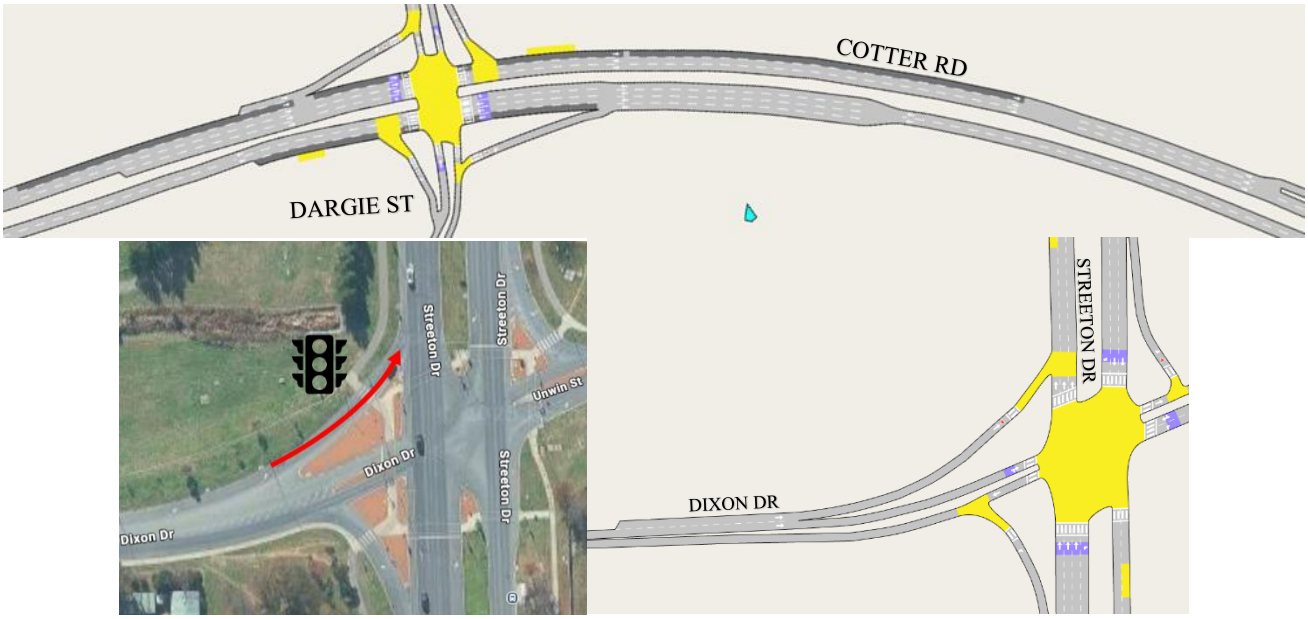


Figure 5.9 Option 7 High 3 schematic

This will help give a good compromise to performance along Cotter Road, also requiring fewer physical changes to the road geometry as opposed to a new full-length lane. The signal times at Kirkpatrick Drive have been altered to mimic more frequent pedestrian activations, similar to the future base case operations.

6 Assessment criteria

Each of the shortlisted options will be compared against specified criteria to determine a ranking of each of the options. The criteria will be graded using an Multi Criteria Analysis (MCA) method of scoring, with the criteria contributing towards a certain project objective. Each criteria will be given a score between 1 and 5 (inclusive) with 5 being the best score possible and 1 being the worst score possible. Thus, the preferred option from the MCA assessment would be the one with the highest overall score once all the criteria and project objectives have been scored.

An overview of the chosen criteria is shown below. Details on how each individual criteria are scored has been provided in Appendix B.

Table 6.1 Options assessment summary criteria

PROJECT OBJECTIVE	CRITERIA	DESCRIPTION	MEASURE
Fit within future planning	Projects	Alignment with other planned and proposed projects in the area	Qualitative assessment
	Bus and transport operation	Impacts on the bus corridor and its alignment to future plans for public transport	Qualitative assessment
Traffic performance	Travel time	Reduction in travel time for general road users	Traffic modelling outputs: travel time of general traffic along the corridor
	Network performance	Network performance of the model	Traffic modelling outputs: model wide average network delay
	LoS	Level of service measured at intersections based on the delay to road users	Traffic modelling outputs: LoS along Cotter Road at the intersections of Streeton Drive and Kirkpatrick Drive
Sustainable transport	Bus travel time	Reduction of bus travel time along the rapid transit corridor due to improving prioritisation and minimising delays at intersections.	Traffic modelling outputs: travel time of bus routes along the corridor
	Reliability / variability in bus travel times	Impact on design changes on the operations of bus routes from, based on the deviations to travel time .	Traffic modelling outputs: difference between the lowest and highest travel time of bus routes along the corridor during the peak periods
	Active user accessibility	Providing new connections between desired origins and destinations for active transport users	Qualitative assessment

PROJECT OBJECTIVE	CRITERIA	DESCRIPTION	MEASURE
	Active user experience	Delay to active transport users	Qualitative assessment
Safety	SSA	Application of the Safe System Assessment/Approach to inform safety impacts of options in accordance with TIA Guidelines, to demonstrate that the proposed arrangement will not create any significant safety concerns for all type of road users.	Based on the SSA analysis with consideration of the "Design Guide: Best practices for urban streets"
Implementation impact	Landscaping impact	Impacts to existing landscaping and opportunities for new landscape treatments	Qualitative assessment
	Cost of construction	Indicative cost estimates including impacts to utilities and construction works	Qualitative assessment
	Constructability / time frame	Ease of construction within a reasonable timeframe	Qualitative assessment:
	Network impact	Impact on the surrounding freight and orbital networks.	Qualitative assessment

7 Options assessment

Each shortlisted Option has been assessed against a defined set of criteria using a Multi Criteria Analysis (MCA). Appendix B sets out the detailed scoring rules and weightings. The following section provides summary of how each shortlisted Option performed against the MCA criteria, highlighting the key scores and the reasoning behind them.

To achieve a project objective score, each criteria within each project objective is assigned a score (based upon the performance of the option) and a weighting (percentage [%], based upon the criteria's contribution to that objective). Once each of the criteria are scored and weighted, an average weighted score is calculated for each project objective for each option.

7.1 Fit within future planning

Options 1–4 maintain compatibility with future planning but offer limited strategic benefit (score 2). Option 5 achieves the highest score (4) by adding a dedicated bus lane, strongly supporting the rapid bus corridor objectives. Option 6 performs poorly (score 1) as it removes bus priority measures, conflicting with sustainable transport goals. Option 7 (score 3) enhances the corridor with a T2 lane, aligning well with wider planning objectives and future light rail integration.

Each of the two criteria have been weighted evening as they are considered equally as important in their contributions to future planning.

Table 7.1 Fit with future planning criteria scoring

Item	Criteria	Weighting	Base	Option 1 (L1)	Option 2 (L2)	Option 3 (M1)	Option 4 (M2)	Option 5 (H1)	Option 6 (H2)	Option 7 (H3)
1	**Fit within future planning**									
1a	**Projects**	50%	2	2	2	2	3	2	2	2
1b	**Operations / bus**	50%	2	2	2	2	2	4	1	3
	Weighted Score		**2**	**2**	**2**	**2**	**3**	**3**	**2**	**3**

In summary (Table 7.1), Options 4 (M2), 5 (H1), and 7 (H3) rank highest with weighted score of **3**, indicating the strongest alignment with future planning objectives, while all other options score **2**, reflecting moderate alignment.

7.1.1 Projects

Options 1 to 3 make minor signal adjustments to the pedestrian crossings; it does not preclude inclusion for longer-term planned and proposed infrastructure commitments; therefore, it has been scored 2.

Option 4 increases right turning capacity out of the Kirkpatrick Street which works towards of the North Weston secondary site access preferred Option of increasing capacity coming out; nor does not preclude inclusion for the South-West Corridor SW10 – Cotter Road Interchange Upgrade). Therefore, it has been scored 3.

Option 5 and 6 do not preclude inclusion of future planned works. In that the additional lane does not prevent a secondary access tying in mid-block (between Streeton Drive and Kirkpatrick Street), nor does this options footprint extend into the longer term planned South-West Corridor (SW10 – Cotter Road Interchange Upgrade). Therefore, it has been scored 2.

Option 7 does not preclude inclusion of future planned works. In that the T2 queue jump lane does not prevent a secondary access tying in mid-block (between Streeton Drive and Kirkpatrick Street) nor does this options footprint extend into the longer term planned South-West Corridor (SW10 – Cotter Road Interchange Upgrade). Therefore, it has been scored 2.

7.1.2 Bus and transport operation

With considerations with bus and transport operation, options 1 to 4 does not preclude inclusion of future planned works/ strategic planning perspective; therefore, it has been scored a 2.

Option 5 has been scored the highest with a 4, as the addition of a bus lane through the project corridor strongly aligns with planned works/strategic context of strengthening the rapid bus corridor.

Option 6 may preclude inclusion of future planned works/ strategic planning perspective as removal of the bus queue jumps and reallocating more road reserve for general traffic moves away from supporting the rapid bus corridor along Cotter Road. Particularly when the corridor currently services more than 10 buses in the peak periods, this Option moves away from sustainable transport strategic objects; therefore, it has been scored a 1.

Option 7 does not preclude inclusion of the future light rail project. However, it strengthens the strategic Rapid bus corridor with the provision of a T2 lane which is working towards wider planning objectives. Therefore, it has been scored a 3.

7.2 Traffic performance

Traffic performance has been assessed across three key criteria: Travel Time, Network Performance, and Level of Service (LOS). Each option was scored relative to the base case, with higher scores indicating better performance outcomes.

Travel time has been given a higher weighted when compared to the other two criteria due to travel time improvements being one of the main goals of this project. Network performance and LOS are then considered to be equally important to each other at a rate half of that of travel time.

Table 7.2 Traffic performance

Item	Criteria	Weighting	Base	Option 1 (L1)	Option 2 (L2)	Option 3 (M1)	Option 4 (M2)	Option 5 (H1)	Option 6 (H2)	Option 7 (H3)
2	**Traffic Performance**									
2a	**Travel time**	50%	1	2	2	2	2	2	3	3
2b	**Network performance**	25%	1	2	3	3	3	3	4	3
2c	**LOS**	25%	3	4	4	4	4	4	4	4
	Overall Score		**2**	**3**	**3**	**3**	**3**	**3**	**4**	**3**

Option 6 (H2) delivers the strongest traffic performance with an overall score of 4 (Table 7.2), driven by significant improvements in network delay and travel time. This is not surprising as this option adds a general traffic lane increasing capacity through the project corridor. All other options, except the base case, achieve balanced gains with scores of 3, while the base case remains least effective at 2, reinforcing the need for intervention to enhance corridor efficiency.

7.2.1 Travel time

As the travel time criteria is to be scored relative to reductions compared the base case, the base case is to be assigned the lowest possible score as all the options improve on the overall travel times. All options deliver improvements in travel time compared to the base case, which is assigned the lowest score of 1. Options 1–5 achieve moderate gains (score 2), while Options 6 and 7 provide the greatest reductions in travel time, scoring 3.

7.2.2 Network performance

When compared to the base case, average network delay across each of the options decreases. As a result, the lowest possible score will be assigned to the base case, with the options scored based relative, based on their improvement on the delay. Option 1 see a small improvement to network performance ad thus given a score of 2. Options 2–5 and 7

achieve strong improvements (score 3), while Option 6 performs best overall with a score of 4, indicating the most significant reduction in network delay.

7.2.3 LoS

LOS is based on intersection delay categories. All options improve overall LOS compared to the base case, which scores 3, with every Option achieving a score of 4, reflecting consistent enhancement in intersection performance. Only the morning AM peak was considered for this analysis as it was the worst performing time period.

7.3 Sustainable transport

Option 7 (H3) achieves the highest overall score (4) in Table 7.3, offering the best balance between bus reliability improvements and maintaining active transport accessibility. Options 2, 3, 4, 5, and 6 score moderately (3), each providing some benefits but with trade-offs—particularly Options 5 and 6, which negatively impact active user experience despite gains in bus performance. Option 1 scores lowest (2) due to minimal improvements, while the base case remains least aligned with sustainable transport objectives.

In terms of weightings, both public transport metrics were given higher percentages than the two active transport criteria. This is due to the Cotter Road being a part of the Canberra's RAPID bus network, while not a part of the active transport network.

Table 7.3 Sustainable transport

Item	Criteria	Weighting	Base	Option 1 (L1)	Option 2 (L2)	Option 3 (M1)	Option 4 (M2)	Option 5 (H1)	Option 6 (H2)	Option 7 (H3)
3	**Sustainable transport**									
3a	**Bus travel time**	30%	1	1	1	1	1	2	3	3
3b	**Reliability / variability in bus travel times**	30%	1	1	1	1	1	4	3	5
3c	**Active user accessibility**	20%	5	3	5	3	5	5	5	5
3d	**Active user experience**	20%	5	4	4	3	4	1	2	3
	Overall Score		**3**	**2**	2	**2**	2	**3**	**3**	**4**

7.3.1 Bus travel time

As bus travel times tend to improve in the proposed options, the base case will be given the lowest score (1) as a basis for comparison. Due to the lack of changes to bus infrastructure in Option 1- 4, changes to bus travel time are not present and thus will be scored the same as the base case.

Based on the tidal flow observed on Cotter Road, the critical bus movements would be the eastbound buses in the AM peak periods, and the westbound buses in the PM peak periods. The bus movements are more largely affected in the three high intervention scenarios, where additional lanes (or dedicated bus lanes) may be able to provide additional travel time reductions for buses independently from the general traffic. Options 6 and 7 on average provided higher bus travel time (scoring 3) compared to Option 5 (Scoring 2).

7.3.2 Reliability / variability in bus travel times

As bus reliability and variability in bus travel times improve in the proposed options, the base case will be given the lowest score (1) as a basis for comparison. Due to the lack of changes to bus specific infrastructure in Option 1- 4, changes to bus reliability are not significant and thus will be scored the same as the base case.

Similarly to the bus travel time, the bus movements are more largely affected in the three high intervention scenarios (Options 5 to 7), where additional lanes (or dedicated bus lanes) may be able to provide additional travel time reductions

for buses independently from the general traffic. Options 7 had the least average variance in travel time (score of 5), followed by Option 5 (score 4) and Option 6 (score 3).

7.3.3 Active user accessibility

Changes to the active user accessibility tend to degrade through the invention levels as connections are removed or made less direct due to geometry changes in the road layout. As a result, the base case has the highest score (5) with accessibility measured relative to this baseline score.

No new connections are proposed in Option 1 and Option 3 however there are some changes to the north-south pedestrian crossing at the Cotter / Kirkpatrick Drive / Dargie Street intersection when compared to the base case. In this option, it is proposed that the western N-S pedestrian crossing will be removed, thus downgrading the score compared to the base case (score 3).

No new connections are proposed in Option 2, 4-7 and no connections are removed, thus this Option is given the same accessibility score as the base case (5)

7.3.4 Active user experience

Active user experience itself decreases through the invention levels as phasing times are modified, and single staged crossings are removed and replaced with two staged crossings that can add delays. Thus, a score of 5 will be assigned to the base case with increased delays measured relative.

The impact on the active user experience in Option 1 is minor, although minor phasing changes do occur at the intersections with Cotter / Kirkpatrick Drive / Dargie Street the removal of the N-S pedestrian crossing on the western leg will increase overall delays through the intersection for active transport users when compared to the base case, although only slightly. It has been scored 4.

The impact on the active user experience in Option 2 and Option 4 is mainly the result of changes to the N-S pedestrian crossings at the Cotter / Kirkpatrick Drive / Dargie Street intersection. These changes involve the conversion of both existing single stage crossings into two stage crossings, increasing the overall crossing time for pedestrians. Thus, a lower score is given when compared to the base case and a similar score to Option 1 (Score 4)

The impact on the active user experience in Option 3 is mainly the result of changes to the N-S pedestrian crossings at the Cotter / Kirkpatrick Drive / Dargie Street intersection. These changes involve the conversion of the existing single stage crossing on the eastern leg into a two-stage crossing, thus increasing the overall crossing time for pedestrians. Further, the removal of the pedestrian crossing on the western leg further worsens the average delay (Score 3).

The impact on the active user experience occurs is significant in Option 5. Firstly, the addition of a new lane on Cotter Road between Streeton Drive and Tuggeranong Parkway increases the overall crossing distance for all N-S along this corridor. Secondly, the phase timings at the Cotter / Kirkpatrick Drive / Dargie Street intersection led to a longer overall cycle time of 140s, thus increasing the average wait time for pedestrians on all legs. This Option is the least friendly to active users and thus is given the lowest score (1) out of all the options.

The impact on the active user experience occurs is significant in Option 6. The addition of a new lane on Cotter Road between Streeton Drive and Tuggeranong Parkway increases the overall crossing distance for all N-S along this corridor, negatively impacting the active user experience. It has been given the score: 2

The impact on the active user experience occurs is significant in Option 7. The addition of a new lane on Cotter Road between Kirkpatrick Drive and Tuggeranong Parkway increases the overall crossing distance for all N-S along this corridor, negatively impacting the active user experience although due to the shorter length of the additional lane when compared to Options 5 and 6, the impact is not quite as large. It has been scored 3.

7.4 Safety

7.4.1 SSA

Options 4 and 6 appear to offer general overall improvements, with Option 5 being neutral and the others potentially being worse outcomes. Weightings are not required for the safety project objective as it only contains one criteria, that being the SSA.

Table 7.4 Safe System matrix for safe roads and roadsides and safe speeds

Item	Criteria	Weighting	Base	Option 1 (L1)	Option 2 (L2)	Option 3 (M1)	Option 4 (M2)	Option 5 (H1)	Option 6 (H2)	Option 7 (H3)
5	**Safety**									
4a	**SSA Overall total score out of 384**	100%	120	127	121	122	116	120	118	123
	Overall Score		3	1	2	2	4	3	4	2

In all options explored, the signalisation of the left turn slip at Dixon Drive onto Streeton drive makes a marked improvement on the future base case from 100/320 to 72/320.

7.5 Implementation impact

Implementation impacts show a clear trade-off between construction complexity and network benefits. Options 1–3 score highest overall (4) due to minimal landscaping changes, low cost, and ease of constructability, but deliver only modest network improvements. Option 4 offers balanced performance (score 3), with moderate construction impacts and better network gains. Options 5 and 6 score lowest overall (2) because of significant cost, constructability challenges, and major landscaping impacts, despite strong network benefits—Option 6 achieving the highest network impact score of 5. Option 7 provides a middle ground (score 3), combining moderate implementation impacts with substantial network improvements.

Landscaping and network impacts were weighted significantly lower than cost and constructability / time frame as they are less likely to influence the decision-making process for choosing a desired option.

Table 7.5 Implementation impact

Item	Criteria	Weighting	Base	Option 1 (L1)	Option 2 (L2)	Option 3 (M1)	Option 4 (M2)	Option 5 (H1)	Option 6 (H2)	Option 7 (H3)
5	**Implementation impact**									
5a	**Landscaping impact**	10%	5	5	4	3	2	1	1	2
5b	**Cost of construction**	37.5%	5	5	4	4	3	1	1	2
5c	**Constructability / time frame**	37.5%	5	4	4	4	3	1	1	2
5d	**Network impact**	15%	5	5	5	5	5	4	3	5
	Overall Score		**4**	**4**	**4**	4	**3**	1	**2**	2

7.5.1 Landscaping impact

As this is the base case, there are no proposed construction works and thus the impact is zero, thus the highest score is given (5). Due to the low intervention level of Option 1 with the proposed changes only to signal phasing, the impact to landscaping is negligible and is scored the same as the future base case (5).

The proposed changes in Option 2 would involve the conversion of the two N-S crossing at the intersection of Cotter / Kirkpatrick Drive / Dargie Street to two stage crossings. This may require some minor adjustments to the median kerbing

on both the eastern and the western legs to accommodate the changes. Thus, landscaping impacts are higher than the base case (score 4).

The proposed changes in Option 3 would involve the conversion of one of the N-S crossings at the intersection of Cotter / Kirkpatrick Drive / Dargie Street to two stage crossing. This may require some minor adjustments to the median kerbing on the eastern leg to accommodate the changes. Thus, landscaping impacts are slightly higher than the base case (3).

The proposed changes in Option 4 would involve the conversion of the two N-S crossing at the intersection of Cotter / Kirkpatrick Drive / Dargie Street to two stage crossings. This may require some minor adjustments to the median kerbing on both the eastern and the western legs to accommodate the changes. Furthermore, some lane widening on the northern and southern legs is required thus further adding to the landscaping impact (given a score of 2).

The proposed changes in Options 5 and 6 would involve the addition of a new full-length lane along Cotter Road between Streeton Drive and Tuggeranong Parkway. This would require extensive change to road geometry and kerbing, thus resulting is a significant impact to landscaping. Therefore, these options have been given a score of 1.

The proposed changes in Option 7 would involve the addition of a new full-length lane along Cotter Road between Kirkpatrick Drive and Tuggeranong Parkway, and the creation of a bus head start section at the Cotter / Kirkpatrick Drive / Dargie Street intersection. This would require extensive change to road geometry and kerbing, although due to the shorter length of the additional lane when compared to Options 5 and 6, the impact is not quite as large and has been given a score of 2.

7.5.2 Cost of construction

Due to the lack of proposed changes in the future base case, the cost of construction for the base case is given the highest score (5). Due to the low intervention level of Option 1 the cost of construction is very minor and thus is given a score like that of the base case (5).

Due to the low intervention level of Options 2 and 3, the cost of construction is minor and thus is given a score just slightly lower (4) that of the base case.

Due to the medium intervention level of Option 4, the cost of construction is not insignificantly, mainly due to the required road widening on the northern and southern legs and the addition of a median strip on the eastern and western legs thus is given a moderate score (3) for the cost of construction.

Due to the high intervention level of Options 5 and 6, the cost of construction is major, due to the additional full-length lane along Cotter Road between Streeton Drive and Tuggeranong Parkway, thus is given a very lowest score (1) for the cost of construction.

Due to the high intervention level of Option 7 the cost of construction is significant, due to the additional full-length lane along Cotter Road between Kirkpatrick Drive and Tuggeranong Parkway, thus is given a low score (2) for the cost of construction, although not quite as low as Options 5 and 6 due to the shorter length of the additional lane.

7.5.3 Constructability / time frame

Due to the lack of proposed changes in the future base case, the cost of construction for the base case is given the highest score (5).

Due to the low intervention level of Option 1 to 3, the time frame and constructability of the proposed changes are not significant and can be carried out quickly with relatively little construction impact, thus a score only slighter lower than the base case is given (Score: 4).

The time frame and constructability of the proposed changes in Option 4 can be carried moderate time frame, with the road widening taking up the bulk of the timing. Thus, the constructability of this Option is not as high as the previous options – Score 3.

The time frame and constructability of the proposed changes in Option 5 and Option 6 would be large due to the scale of the works along Cotter Road, with the additional lane taking up most of the construction resources. Thus, the constructability of this Option is very high. These options have been given a score of 1.

The time frame and constructability of the proposed changes in Option 7 would be large due to the scale of the works along Cotter Road, with the additional lane taking up most of the construction resources. Thus, the constructability of this Option is high, although not quite as high as options 5 and 6 due to the shorter length of the additional lane. It has been given a score of 2.

7.5.4 Network impact

There is no impact to the orbital or freight networks in the base case due to the lack of intervention. As each of the options have either a negative impact or negligible impact on the surrounding orbital freight network (in particular the impact of traffic density on Tuggeranong Parkway). Thus the base case is given a score of 5.

Options 1 to 4 and option 7 do not substantially impact the level of traffic density on the Tuggeranong Parkway and thus are scored the same as the base case (5).

Option 5, does see a minor increase in traffic on the Tuggeranong Parkway and is therefore given a score slightly lower than that of the base case (4).

Option 6 sees the largest increase to traffic density on the Tuggeranong Parkway, althought the impact is still not major, thus a score of 3 is given for this option.

8 Options assessment comparison

Once the project objectives have been scored in Section 7, the overall score for each Option can be calculated. The five project objectives are first weighted depending on their perceived contribution to the overall score, with 20% being an average weighting if weighted all evenly. The weights given for each project objective is shown in Table 8.1.

Table 8.1 Project objective weightings and reasonings

PROJECT OBJECTIVE	WEIGHTING (PERCENTAGE TOWARDS TOTAL)
Fit within future planning	17.5%
Traffic performance	22.5%
Sustainable transport	20%
Safety	20%
Implementation impact	20%

The only two objectives weighted differently from the average are Fit within future planning and Traffic performance, with the later given a slightly higher weight and the former given a slightly lower percentage. This is due to traffic performance being a core focus for the project, while fit within future planning considered less significant when compared to the other objectives.

Once weighted, the final scores are summed to return and weighted score for each Option a score which is out of a possible 50.

The MCA summary (Table 8.2) indicates that Option 4 (M2) remains the strongest performer with a weighted total of 30, supported by high scores in safety and traffic performance. Options 6 (H2) and 7 (H3) follow closely at 28 and 29 respectively, with Option 6 excelling in traffic performance and safety, while Option 7 offers the best sustainable transport outcome. Options 1–3 and Option 5 score lower (24–27), reflecting limited improvements across objectives. The base case score moderately with a score of 28, mainly due to a strong implementation impact score.

Table 8.2 MCA summary by project objective and weighted total

	Base	Option 1 (L1)	Option 2 (L2)	Option 3 (M1)	Option 4 (M2)	Option 5 (H1)	Option 6 (H2)	Option 7 (H3)
Fit within future planning	2	2	2	2	3	3	2	3
Traffic Performance	2	3	3	3	3	3	4	3
Sustainable transport	3	2	2	2	2	3	3	4
Safety	3	1	2	2	4	3	4	2
Implementation impact	5	5	4	4	3	1	1	2
Weighted Total (out of 50)	**28**	**24**	**27**	**25**	**30**	**26**	**28**	**29**

While the Cotter Road Options traffic study primarily addresses short-term traffic improvements, these are influenced by constraints from projects already underway—most notably the Molonglo Bridge construction which is due for completion in 2026. These short-listed options are intended to influence travel behaviour in the near term by improving east–west connectivity and alleviating congestion on Cotter Road. Looking ahead, Option 6 offers stronger alignment with the region's long-term growth strategy as development continues and transport demand increases. In contrast Option 5 presents an opportunity toward sustainable transport strategic objectives by supporting mode shift and enhancing network resilience of the rapid bus corridor - rather than in isolation at this short section of Cotter Road. Both options reflect future planning priorities and are worth further exploration for longer term implementation..

9 Conclusion

The MCA analysis shows that the highest scoring option is Option 4 (M2), followed by both Options 6 (H2) and 7 (H3), reflecting strong performance across multiple objectives, particularly safety and traffic efficiency. In contrast, lower intervention options, despite scoring well on implementation impact, perform poorly in other areas—especially safety—resulting in low overall scores.

A notable observation is that four options score below the base case, with two exceeding and one matching it. This suggests that some lower intervention options could negatively affect sustainable transport and safety outcomes, making the alternative of no intervention more desirable than these options.

These findings should not be considered in isolation, as different weightings could influence the results. The current scoring reflects project objectives at this point in time. Looking ahead, Options 6 and 7 align strongly with longer-term planning goals and should be explored as next steps as the region continues to develop and transport demands grow.

Their potential to support mode shift and network resilience warrants further consideration alongside short-term measures shaped by existing projects, such as the Molonglo Bridge completion in 2026, which will influence travel behaviour in the near term.

It should be further noted that the travel time advantages proposed by the options might be limited by the size of the intervention area. A fuller suite of bus priority intervention along the length of the rapid bus route along with a wider mode shift analysis could yield clearer results for longer-term options.

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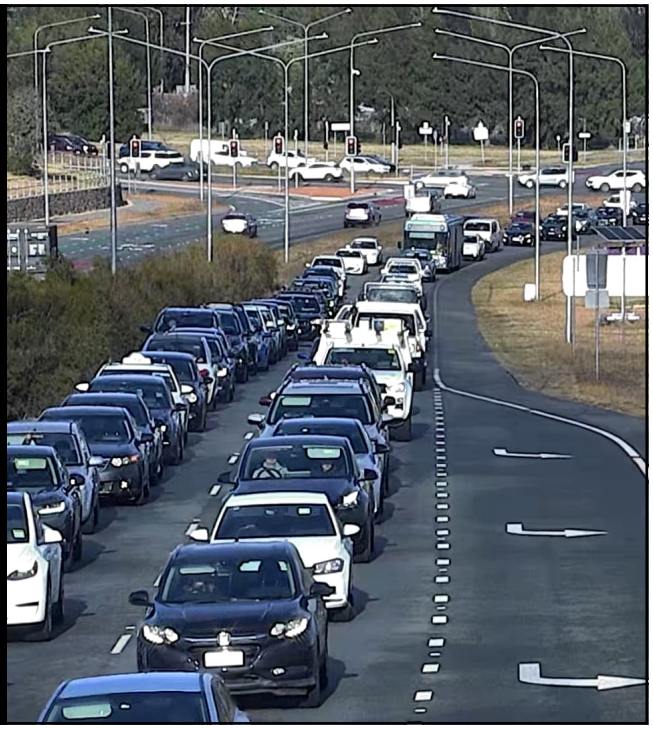
Appendix A

Options Workshop

COTTER ROAD OPTIONS



INTERVENTION OPTIONS WORKSHOP
September 2025

1

We acknowledge Aboriginal and Torres Strait Islander Peoples and their ongoing connection to lands, sea and sky and pay our respects to Elders past and present.

As people who have influence over the built environment, we recognise our responsibility to ensure First Peoples culture and connections to Country are strong and continue into the future.

Artwork by
Michael Hromek, Budawang
Technical Executive – Indigenous (Architecture), Design and Knowledge

2

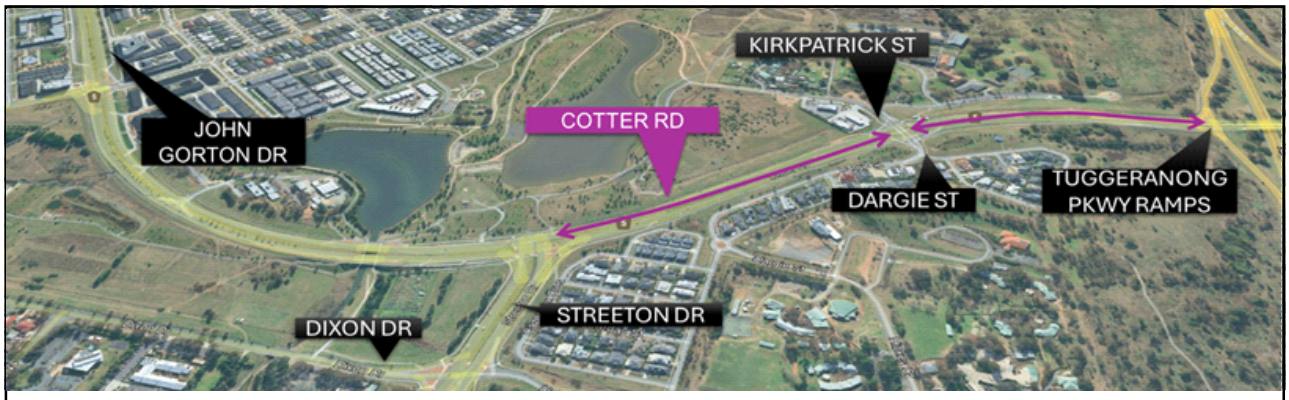
Agenda

Topic	Timing
Welcome and introductions	5 mins
Context and baseline — Corridor objectives — Planning context — Identified constraints — Modelling approach	20mins
Presentation of potential options Breakout discussion / Whiteboarding	60mins
Refinement and prioritisation — Refining / adding shortlisted interventions — Option prioritisation	20mins
Next steps	5 mins
Close	

3

CONTEXT AND BASELINE

4



Objectives and context

Project objective:

- *Identify and evaluate short-term, practical treatments to enhance traffic flow and public transport efficiency along Cotter Road between Streeton Drive and the southbound Tuggeranong Parkway on-ramp.*

Workshop objective:

- Collaboratively refine and prioritise the shortlisted interventions to align further assessment.

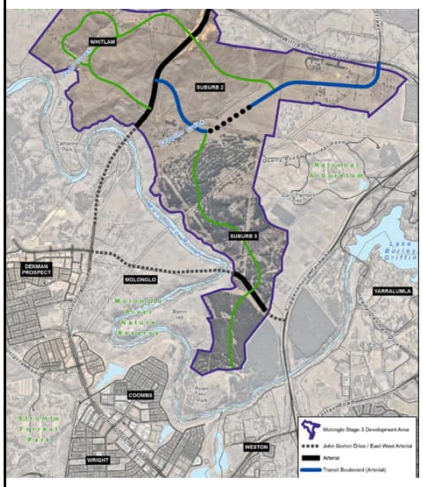
5

Project methodology

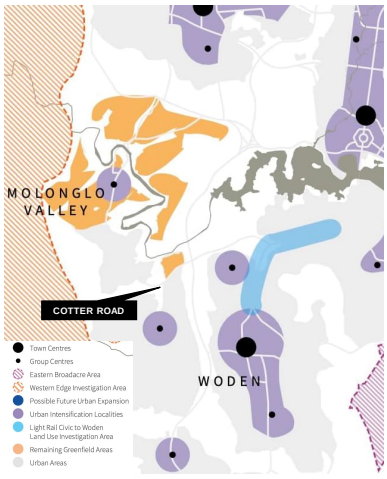
Part 1 – Model Calibration & Validation	Part 2 – Options Identification & Development	Part 3 – Options Assessment	Part 4 – Reporting
Task 1.1 – Traffic Surveys	**Task 2.1 –** Background Review	**Task 3.1 –** Comparative Traffic and Safety Options	**Task 4.1 –** Draft Report Compilation
Task 1.2 – Review and update model	**Task 2.2 –** Existing Conditions Analysis	**Task 3.2 –** (Optional) Cost Estimates	**Task 4.2 –** Stakeholder Review and Finalisation
Task 1.3 – Future Base Model	**Task 2.3 –** Identification of Interventions	**Task 3.3 –** Options Assessment Technical Memo	
	Task 2.4 – SIDRA Model Setup		
	Task 2.5 – Intervention Workshop		
	Task 2.6 – Options Modelling		
	Task 2.7 – Model Reporting and Model Submission		

6

Planning context cont.

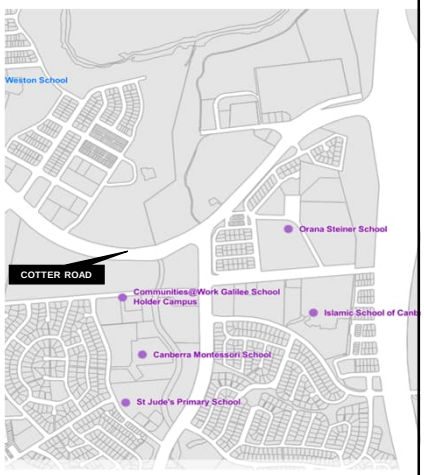


Molonglo Valley Stage 3



Nearby Developments

- Molonglo Valley expansion
- Amber Fields Village

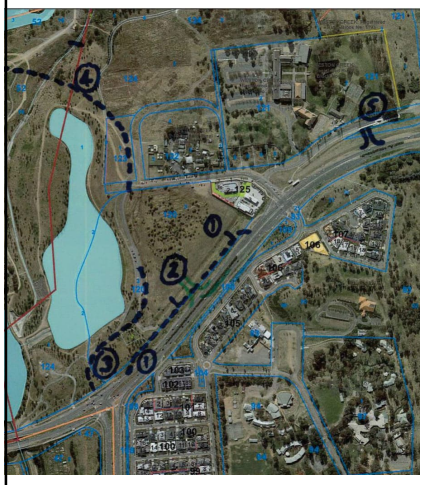


Schools

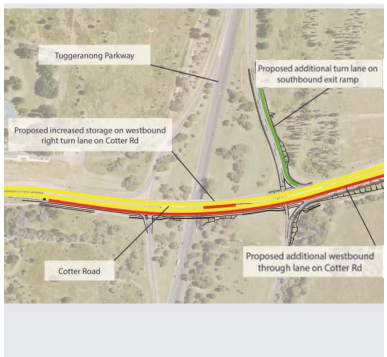
- Varying start times either 8:30 or 9:00am

7

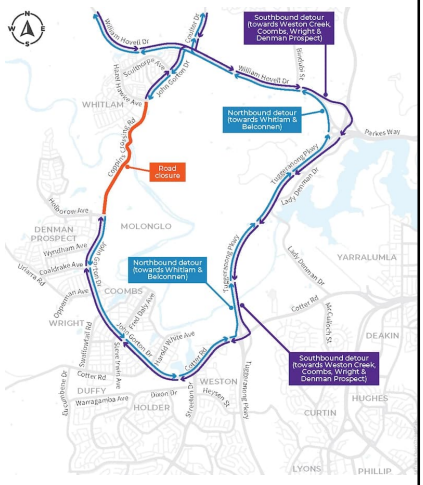
Planning context and long-term infrastructure commitments



North Weston secondary site access



South-West Corridor (SW10 – Cotter Rd Interchange Upgrade)

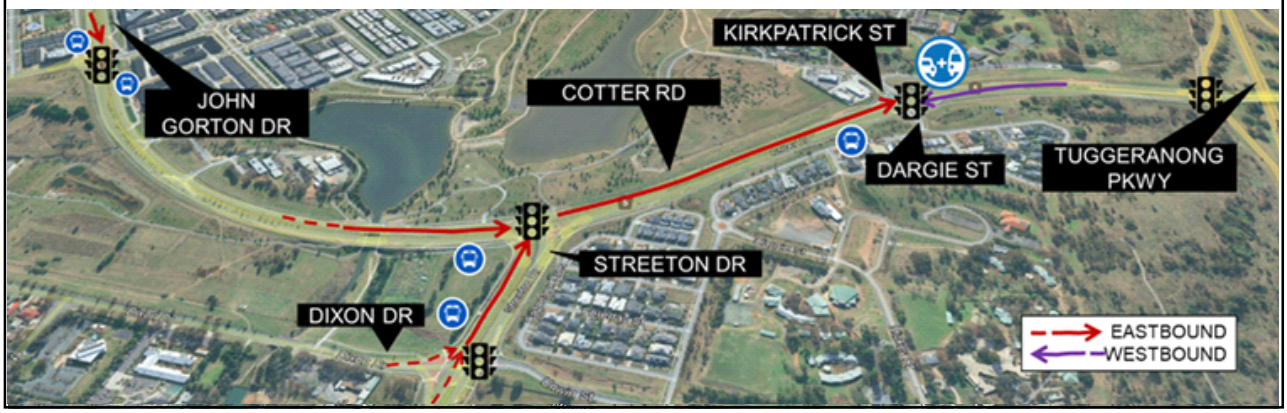


Molonglo River Bridge construction

8

Existing conditions – corridor constraints

- **Signal Bottleneck at Kirkpatrick St**
  Primary pinch point causing upstream delays and queue spillback.
- **High Commuter Volumes from Molonglo**
  Rapid population growth outpaces corridor capacity, especially AM peak eastbound.
- **Limited Alternative Routes**
  Dependency on Cotter Rd until Molonglo River Bridge completed (2026).
- **Intersection Geometry & Merge Conflicts**
  Turn lanes and ramp merges constrain flow and reduce effective capacity.
- **Signal Timing Saturation**
  SCATS adaptive control reaches limits under peak demand; multi-cycle delays common.
- **Modal Interactions**
  Bus re-entry, pedestrian phases contribute to friction and delay.



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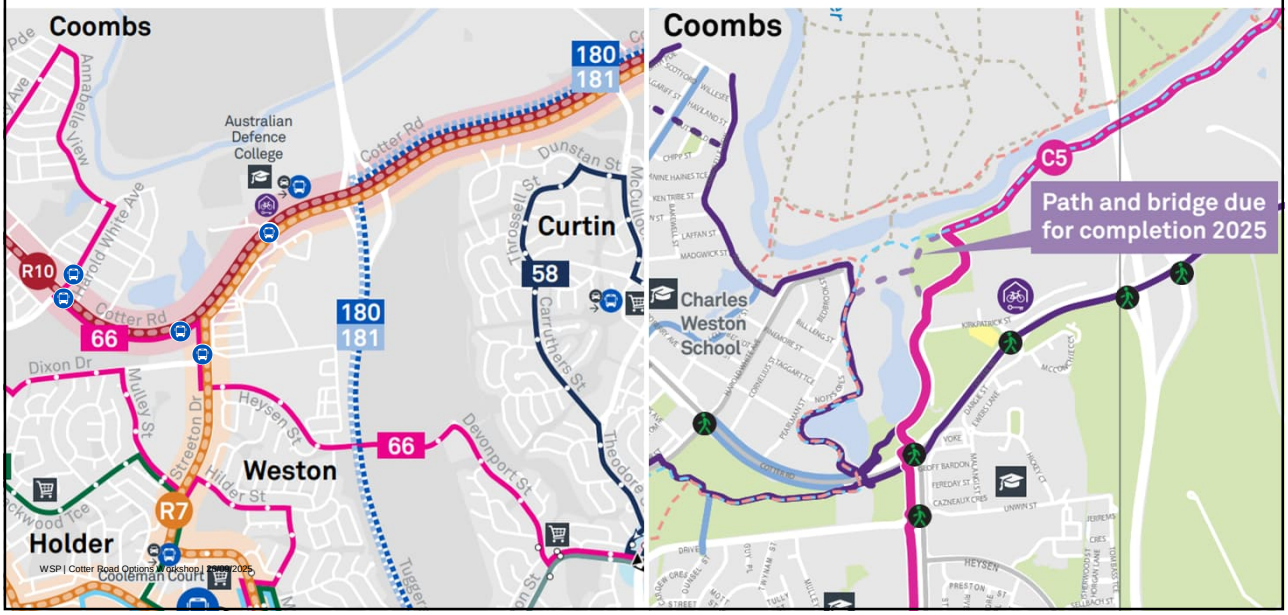
Existing conditions – bus and active transport

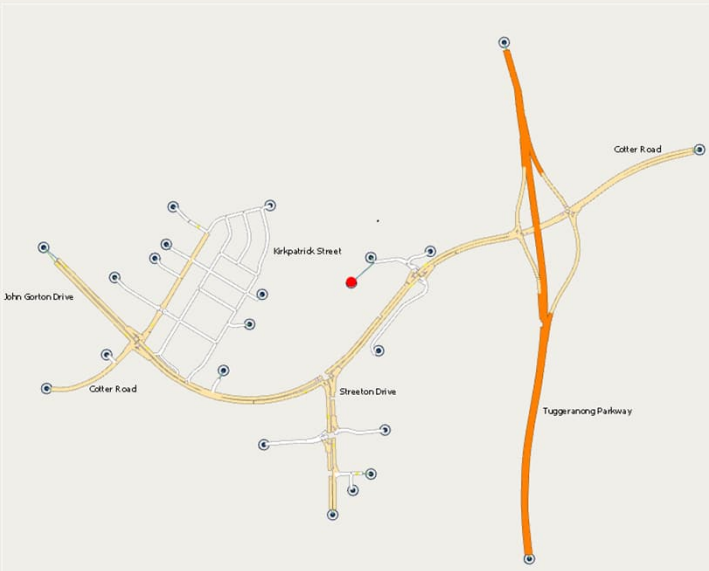


10

Crash history

Modelling approach and evaluation

1. Recalibrate and validate the Aimsun micro-simulation North Weston base traffic models
2. Test interventions using SIDRA intersection modelling and benchmark performance against existing baseline conditions
3. Refine up to 8 shortlisted treatments through a CED stakeholder workshop **[this workshop]**
4. Use Aimsun to assess network-wide traffic flow impacts for the 2031 future base and access scenarios



Cotter Road / Kirkpatrick Street / Dargie Street

- AM peak brings heavy eastbound through traffic
- Westbound right-turns into Kirkpatrick Street requires extended green time to clear queues
- Frequent N-S pedestrian calls on Cotter Road interrupt signal cycles

These competing demands lead to long queues with spillback and upstream delays, making this intersection the corridor's pinch point.

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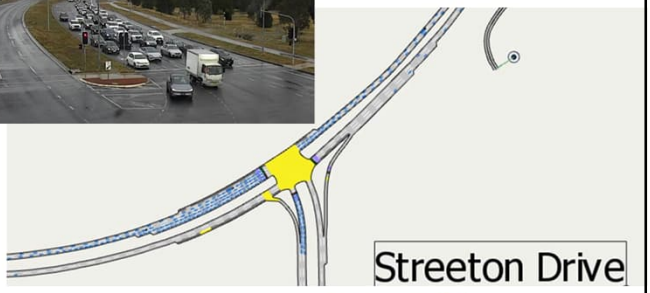
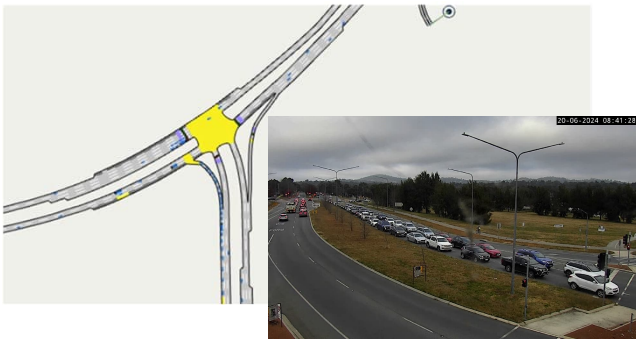
Cotter Road / Streeton Drive





AM Peak

- Eastbound through traffic dominates, contributing to delays
- Queues spill back from downstream (Kirkpatrick Street), blocking the Streeton Drive right-turn
- Traffic cycles are long able to clear all vehicles, causing recurring upstream spillback.

PM Peak

- Westbound is the primary flow, with the corridor generally performing well
- The priority-controlled left exit from Streeton Drive frequently queues back to the upstream signals at Dixon Drive

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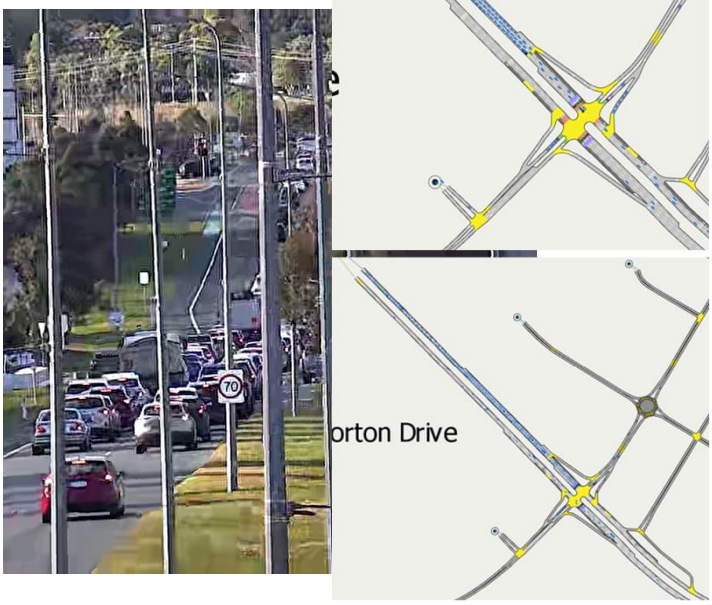
Cotter Road / John Gorton Drive / Harold White Avenue

AM Peak

- Eastbound through traffic is the primary movement
- Queues spillback from downstream, creating delays
- Traffic signals don't fully clear eastbound movements, adding to the congestion build up

PM Peak

- Westbound movements is the primary flow, with some eastbound queues
- The eastbound queues arise from local demand (right turn into Fred Daly Avenue)



15

INTERVENTION OPTIONS

— Collaborative Whiteboard link: Cotter Road Options Workshop

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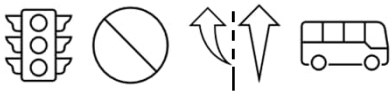
Mitigations by scale of intervention



Low

- **Signal adjustments**
- **Movement changes**

Medium

- **Pedestrian crossing modifications**
- **Additional turn lanes**
- **Median adjustments**

High

- **Additional travel lanes – road widening**

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Intervention options summary

Category	ID	Mitigation	Location
Signal Adjustments	1a	Increase cycle times to 140s.	All signals between Josh Gorton Drive and Parkway
	1b	Introduce available phases according to traffic demands (eg: right turn overlap phases)	Kirkpatrick Street / Dargie Street and Streeton Drive / Cotter Road
	1c	Cotter Road priority. Gate traffic from upstream side roads.	All signals between Josh Gorton Drive and Parkway
	1d	Introduce left turn lane signals. Control and limit Dixon Drive traffic flow.	Dixon Drive left turn onto Streeton Drive
	1e	Right turn every second cycle, providing more green time for Cotter Road eastbound flows.	Cotter Road, right turn into Kirkpatrick Street
	1f	Right turn every second cycle, providing more green time for Cotter Road eastbound flows.	Dargie Road, right turn into Cotter Road
Movement Changes	2a	Remove a N-S pedestrian crossing facility.	Cotter Street / Dargie Street / Kirkpatrick Street
	2b	Make Dargie Street left out only. Divert traffic in this area to use Unwin St – removes rat-run.	Cotter Street / Dargie Street / Kirkpatrick Street
	2c	Convert N/S pedestrian crossings to split crossings. Minor median works required.	Cotter Street / Dargie Street / Kirkpatrick Street
Additional lanes	3a	Triple right turn for general traffic. Minor widening and merging on Cotter Road.	Streeton Drive right turn onto Cotter Road
	3b	Bus queue jump for right turn buses. Minor widening and merging on Cotter Road.	Streeton Drive right turn onto Cotter Road
	3c	Bus lane eastbound on Cotter Road	Eastbound, between Streeton Drive and Kirkpatrick Drive / Tuggeranong Pkway on-ramp
	3d	Additional general traffic lane eastbound	Eastbound, between Streeton Drive and Kirkpatrick Drive / Tuggeranong Pkway on-ramp
	3e	T2 lane eastbound	Eastbound, between Streeton Drive and Kirkpatrick Drive / Tuggeranong Pkway on-ramp
	3f	(3b + 3c) Bus lane eastbound on Cotter and bus jump on Streeton northbound	Eastbound, between Streeton Drive and Kirkpatrick Drive / Tuggeranong Pkway on-ramp
	3g	(3a + 3d) Additional general traffic lane eastbound plus additional right turn lane from Streeton onto Cotter Road.	Eastbound, between Streeton Drive and Kirkpatrick Drive / Tuggeranong Pkway on-ramp
Additional lanes + Signal Adjustments	4a	Add separate right turn lanes to Dargie and Kirkpatrick. Allows for more flexible signal operation.	Cotter Street / Dargie Street / Kirkpatrick Street
	4b	4a + 2c	Cotter Street / Dargie Street / Kirkpatrick Street

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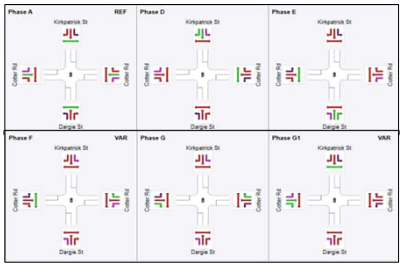
2031 Base intersection performance (SIDRA)

I-08 TCS 253 –Cotter Road / Dargie Street / Kilpatrick Street (8:00-9:00am)

Intersection Leg (Approach)	Degree of Saturation	Average Delay (s)	LoS	95% Back of Queue (m)
South: Dargie Street				
Left Turn	0.009	11.8	B	1.1
Through	0.378	43.5	D	54.3
Right Turn	0.378	48.0	D	54.3
East: Cotter Road				
Left Turn	0.124	8.2	A	5.9
Through	1.088	149.8	F	376.2
Right Turn	2.092	1058.6	F	389.4
North: Kirkpatrick Street				
Left Turn	0.142	14.3	B	23.7
Through	0.144	40.9	D	19.5
Right Turn	0.144	45.3	D	19.5
West: Cotter Road				
Left Turn	0.128	9.2	A	11.2
Through	2.261	1200.8	F	1980.8
Right Turn	0.196	100.9	F	8.6
Overall Intersection	2.261	728.7	F	1980.8



Phase	A	D	E	G
Phase Change Time (sec)	0	38	71	105
Green Time (sec)	30	26	26	7
Phase Time (sec)	37	34	34	15
Phase Split	31%	28%	28%	13%
Phase Frequency (%)	100.0	100.0	100.0	100.0

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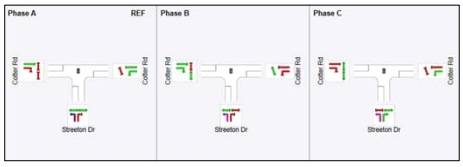
2031 Base intersection performance (SIDRA)

I-05 TCS 44 – Streeton Drive / Cotter Road (8:00-9:00am)

Intersection Leg	Degree of Saturation	Average Delay (s)	LoS	95% Back of Queue (m)
South: Streeton Drive				
Left Turn	0.521	11.9	B	64.4
Right Turn	0.705	46.0	D	157.9
East: Cotter Road				
Left Turn	0.529	24.3	C	140.3
Through	0.644	47.4	D	100.7
West: Cotter Road				
Through	0.721	23.9	C	238.3
Right Turn	0.672	48.9	D	130.4
Overall Intersection	0.721	32.9	C	238.3



Phase	A	B	C
Phase Change Time (sec)	0	32	73
Green Time (sec)	25	34	39
Phase Time (sec)	32	42	46
Phase Split	27%	35%	38%
Phase Frequency (%)	100.0	100.0	100.0

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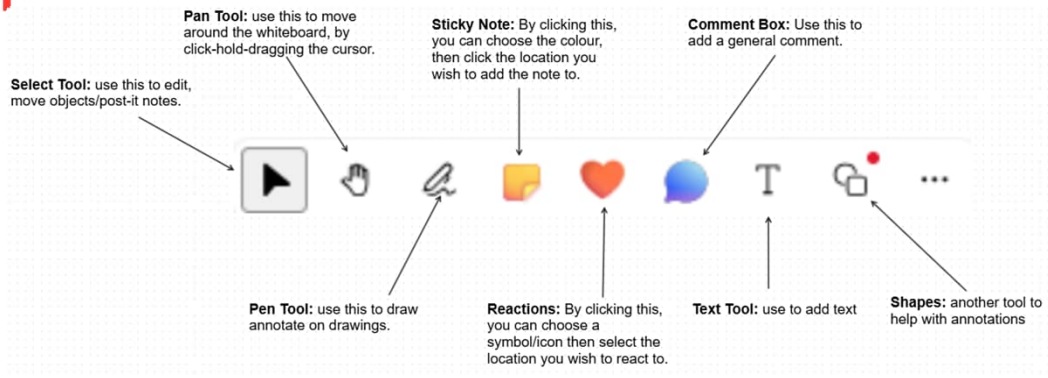
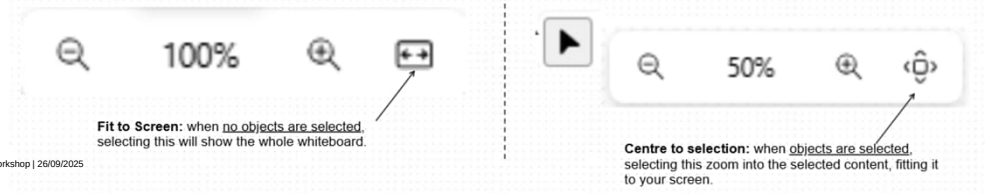
Using the whiteboard



Moving around the whiteboard



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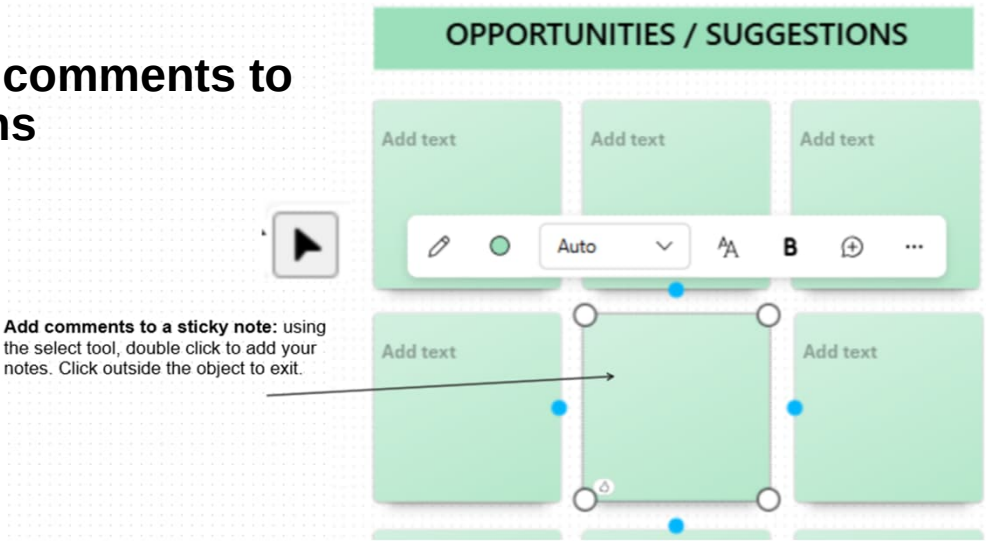
Add your comments to the options



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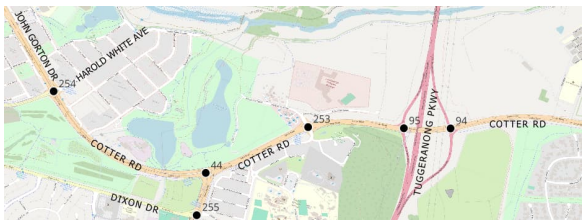
Signal Adjustments 1a -1c

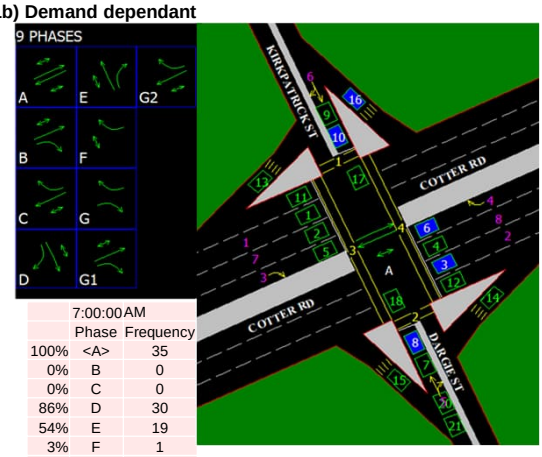


1a) Adjust cycle time (global)

- Update to HCL 140 sec

TCS			7-8 AM	8-9AM
	HCL	XCL	Modelled Cycle Length	
44	120	100	100	120
94	120	100	100	120
95	117	100	100	120
253	120	100	100	120
254	120	100	100	100
255	120	110	100	120

1b) Demand dependant



7:00:00 AM		
	Phase	Frequency
100%	<A>	35
0%	B	0
0%	C	0
86%	D	30
54%	E	19
3%	F	1
94%	G	33

1c) Cotter Road Priority (gate traffic)

- limit access from side roads, gate traffic upstream and more green time. Implement additional road detectors to monitor queue
- *Dargie Street*
  - *Increased phase time for Cotter Road through movements, reduction in phase time for Kirkpatrick Street*
- *Streeton Drive*
  - *Increase phase time for Cotter Road eastbound movements*

Option 1d

- Signal adjustments
  - Add signals to control left turn flow from Dixon Drive
  - Extend left turn lane marking on Dixon Drive

Option 1e

- Signal adjustments
  - Right turn every second cycle into Kirkpatrick Street

Option 1f

- Signal adjustments
  - Limit Dargie Street, through/right turns to every second cycle

SIDRA Results – Signal Adjustments
Cotter Rd / Dargie St / Kirkpatrick

Option	DoS	Delay (s)	LoS	95% queue (m)
Base	2.261	728.7	F	1980.8 (Eastbound Through)
1a	1.763	455.2	F	1694.6 (Eastbound Through)
1b	1.478	327.1	F	1365.6 (Eastbound Through)
1a + 1b	1.325	231.3	F	1221.7 (Eastbound Through)
1c	1.417	260.0	F	1290.4 (Eastbound Through)
1e	2.055	602.2	F	1862.7 (Eastbound Through)
1f	1.545	328.8	F	1441.3 (Eastbound Through)

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SIDRA Results – Signal Adjustments
Streeton Drive / Cotter Road

Option	DoS	Delay (s)	LoS	95% queue (m)
Base	0.721	32.9	C	238.3 (Eastbound Through)
1a	0.708	36.9	D	267.5 (Eastbound Through)
1b	0.721	32.9	C	238.3 (Eastbound Through)
1a + 1b	0.708	36.9	D	267.5 (Eastbound Through)
1c	0.916	34.0	C	209.6 (Streeton Dr Right Turn)

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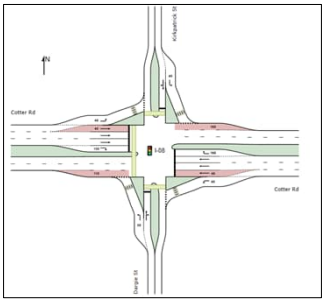
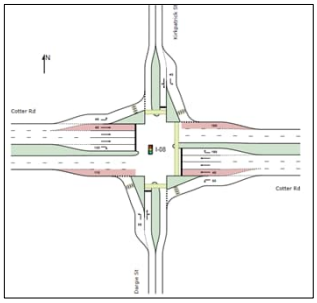
Movement Changes 2a – 2c



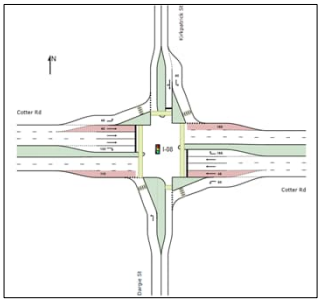
2a) Eastern N-S Pedestrian crossing removal

- Cotter Street / Kirkpatrick Street / Dargie Street



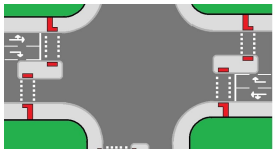
2a) Western N-S Pedestrian crossing removal

- Cotter Street / Kirkpatrick Street / Dargie Street



2b) Turning movement bans

- Dargie Street NB Through & Right Turn lane



2c) Staged pedestrian crossing

Cotter Street / Kirkpatrick Street / Dargie Street

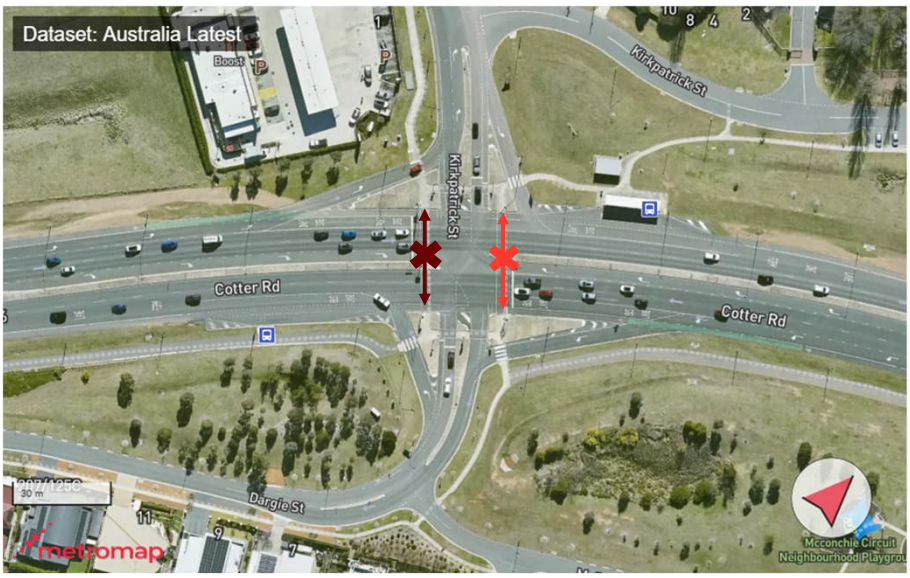
Option 2a

Pedestrian crossing removal

- Remove eastern pedestrian crossing

OR

- Remove western pedestrian crossing



Option 2b

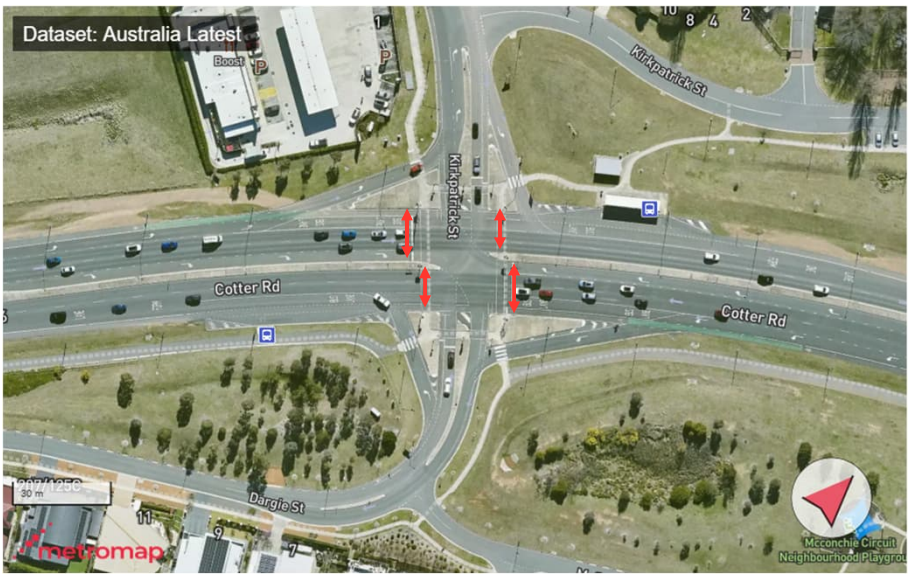
Turning movement bans

- Dargie Street NB Through & Right Turn lane removed
- Dargie Street is left turn only with traffic diverted to Unwin Street.
- Lane adjustments may be required at Unwin / Streeton Dr intersection

Option 2c

Staged pedestrian crossings

- Existing approx. 2.6m medians (AGRD Part 4 = 2.4m min).



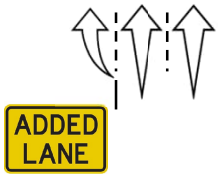
SIDRA Results – Movement changes
Cotter Rd / Dargie St / Kirkpatrick

Option	DoS	Delay (s)	LoS	95% queue (m)
Base	2.261	728.7	F	1980.8 (Eastbound Through)
2a (East Crossing)	1.465	280.9	F	1327.9 (Eastbound Through)
2a (West Crossing)	1.478	310.0	F	1365.6 (Eastbound Through)
2b	2.120	672.0	F	1902.1 (Eastbound Through)
2c	1.238	176.5	F	1033.8 (Eastbound Through)

Additional lanes 3a – 3g

Along Cotter Road:
- Tuggeranong Parkway on-ramp <> Kirkpatrick Street
- Kirkpatrick Street <> Streeton Drive
- Streeton Drive <> John Gorton Drive

General traffic lanes



Dedicated bus lanes

Dedicated T2 lanes

Option 3a/b

Triple right turn from Streeton Drive

- 3a - for general traffic
- 3b - buses only

Option 3c/d/e

Additional eastbound lane

Road widening required

- 3c – Bus lane
- 3d – general traffic lane, existing bus queue jumps are removed
- 3e – T2 transit lane (assumed 15% lane utilisation for light vehicles)

Option 3c/d/e - continued

Additional eastbound lane

Road widening required

- 3c – Bus lane – extend existing lanes
- 3d – general traffic lane, existing bus queue jumps are removed
- 3e – T2 transit lane (assumed 15% lane utilisation for light vehicles)

Option 3f/g

Additional eastbound lane and additional right turn from Streeton

Road widening required

- 3f – Bus only
- 3g – general traffic

SIDRA Results – Additional lanes
Cotter Rd / Dargie St / Kirkpatrick

Option	DoS	Delay (s)	LoS	95% queue (m)
Base	2.261	728.7	F	1980.8 (Eastbound Through)
3a	N/A			
3b	N/A			
3c	2.261	728.7	F	1980.8 (Eastbound Through)
3d	1.627	460.6	F	1114.3 (Eastbound Through)
3e	2.116	625.1	F	1778.1 (Eastbound Through)
3f	As per option 3c			
3g	As per option 3d			

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SIDRA Results – Additional lanes
Streeton Drive / Cotter Road

Option	DoS	Delay (s)	LoS	95% queue (m)
Base	0.721	32.9	C	238.3 (Eastbound Through)
3a	0.680	31.9	C	220.2 (Eastbound Through)
3b	0.719	32.9	C	233.8 (Eastbound Through)
3c	0.721	32.9	C	238.3 (Eastbound Through)
3d	0.687	31.0	C	155.8 (Eastbound Through)
3e	0.692	32.5	C	221.4 (Eastbound Through)
3f	0.719	32.9	C	233.8 (Eastbound Through)
3g	0.635	31.0	C	146.1 (Eastbound Through)

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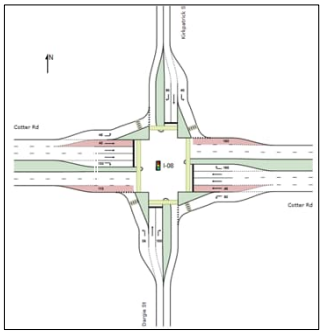
Additional lanes + Signal changes 4a – 4b

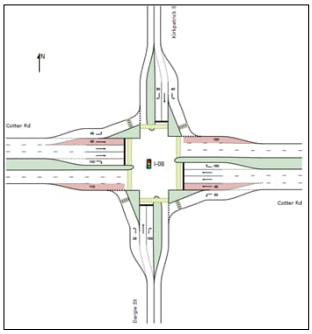
4a) Independent Right Turn Lanes

- Cotter Street / Kirkpatrick Street / Dargie Street



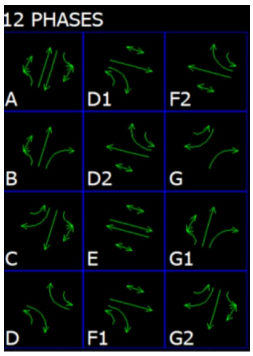
4b) Independent Right Turn Lanes with staged N-S Pedestrian crossings

- Cotter Street / Kirkpatrick Street / Dargie Street



Double Diamond phasing

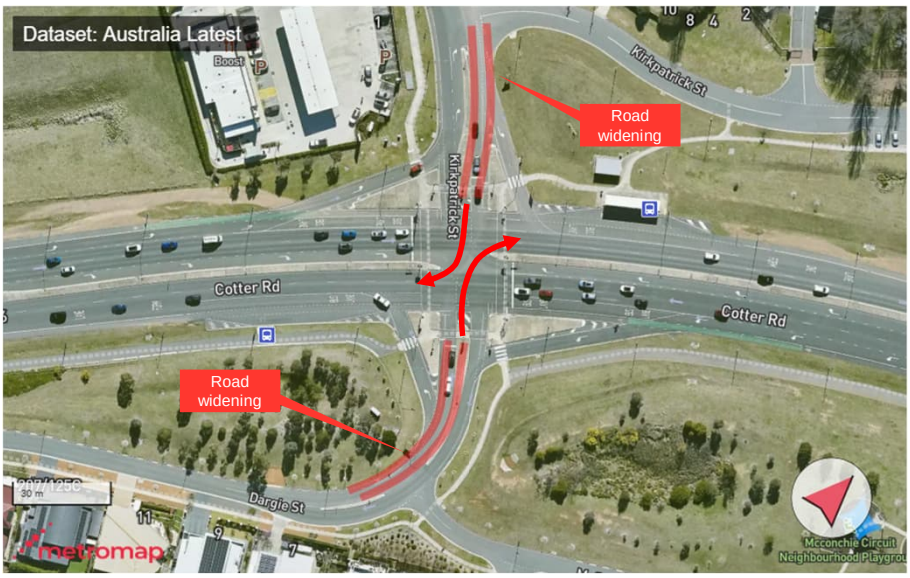
- Dedicated RT lanes allow flexible phasing



Option 4a

Additional right turn lanes

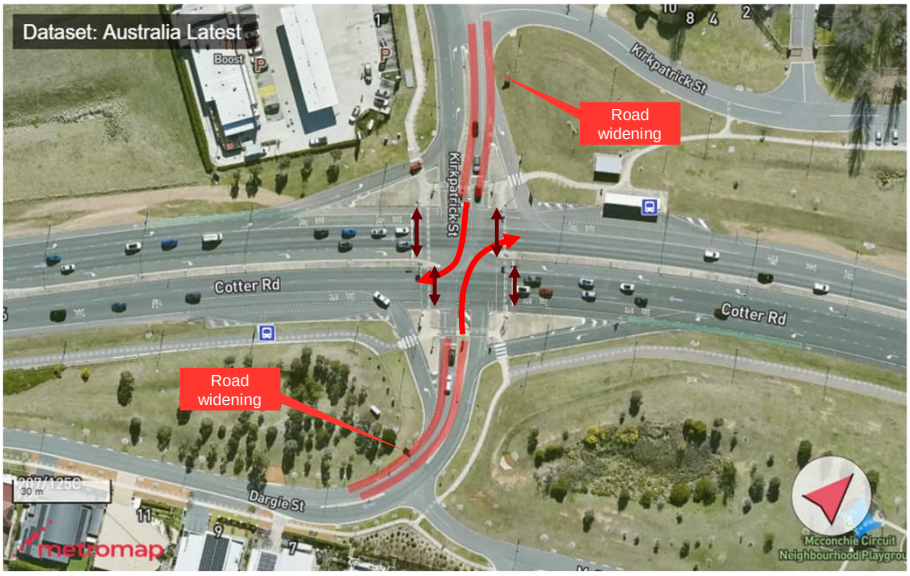
- Allows double diamond operation and overlaps
- Required road widening on side roads and minor median adjustments



Option 4b

Additional right turn lanes and Staged pedestrian crossings

- Allows double diamond operation and overlaps
- Required road widening on side roads and minor median adjustments



SIDRA Results – Additional lanes Cotter Rd / Dargie St / Kirkpatrick

Option	DoS	Delay	LoS	95% queue
Base	2.261	728.7	F	1980.8 (Eastbound Through)
4a	1.581	356.6	F	1479.3 (Eastbound Through)
4b	1.117	105.9	F	830.4 (Eastbound Through)

REFINEMENT AND PRIORITISATION

- Refining / adding shortlisted interventions
- Prioritise top 8 options

https://forms.office.com/e/APgZ9fSSg7

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Next Steps

- The Whiteboard will be open for one week to collate comments and suggestions
- We will collate all comments and feedback
- High-level assessment of additional / adjusted options – seeking improvement over existing options
- Agree final list and develop Aimsun models

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Project methodology

Part 1 – Model Calibration & Validation	Part 2 – Options Identification & Development	Part 3 – Options Assessment	Part 4 – Reporting
Task 1.1 – Traffic Surveys	**Task 2.1 –** Background Review	**Task 3.1 –** Comparative Traffic and Safety Options	**Task 4.1 –** Draft Report Compilation
Task 1.2 – Review and update model	**Task 2.2 –** Existing Conditions Analysis	**Task 3.2 –** (Optional) Cost Estimates	**Task 4.2 –** Stakeholder Review and Finalisation
Task 1.3 – Future Base Model	**Task 2.3 –** Identification of Interventions	**Task 3.3 –** Options Assessment Technical Memo	
	Task 2.4 – SIDRA Model Setup		
	Task 2.5 – Intervention Workshop		
	Task 2.6 – Options Modelling		
	Task 2.7 – Model Reporting and Model Submission		

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THANK YOU

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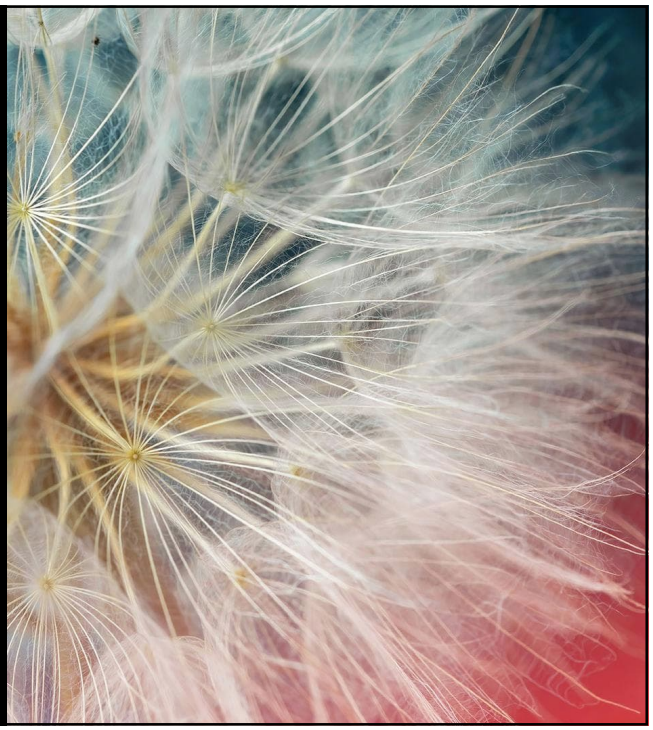

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Appendix B

Multi Criteria Assessment

B1 Fit with future planning

B1.1 Projects

Alignment with longer-term planned and proposed infrastructure commitments within the Cotter Road study area. Mainly alignment with the following:

— North Weston secondary site access: Option 7, refer to Section 2.5.3.

— South-West Corridor (SW10 – Cotter Road Interchange Upgrade), refer to Section 2.5.4

Table B.1 Scoring criteria for other planned and proposed projects in the area

MCA score	Alignment with other planned and proposed projects in the area
1	Precludes inclusion of future planned works
2	Does not preclude inclusion of future planned works
3	Working towards future planned works
4	Alignment with planned works
5	Enhances future planned works

B1.2 Bus and transport operation

Impacts on the bus corridor and its alignment to plans for public transport from a strategic planning perspective. Mainly alignment with the following:

— Rapid bus corridor, (refer to Section 4.2)

— Future Light Rail, Molonglo to City (refer to Section 2.5.5)

The scoring is to be a qualitative one; whether the proposed Option precludes or broadly aligns with future planning for public transport.

Table B.2 Scoring criteria for bus and transport operation

MCA score	Impacts on the bus corridor and its alignment to future plans for public transport
1	Precludes inclusion of future planned works
2	Does not preclude inclusion of future planned works/strategic context
3	Working towards future planned works/strategic context
4	Alignment with planned works/strategic context
5	Enhances future planned works/strategic context

B2 Traffic performance

B2.1 Travel time

Travel time along Cotter Road for each of the options can be extracted from the Aimsun model results. Both directions of travel along the road during the 2 hour AM peak are to be used, as this is when travel time is the most impacted by congestion.

Table B.3 Scoring criteria for travel time

MCA score	Reduction in travel time when compared to Base
1	0 – 15%
2	15 – 30%
3	30 – 45%
4	45 – 60%
5	≥ 60%

Table B.4 Travel time scoring for Option 1

AM PEAK HOUR	ROUTE	OPTION 1		
		DIFF TO BASE	DIFF TO BASE (PERCENT)	MCA SCORE
7:00 – 8:00	Eastbound	-01:22	-26%	2
	Westbound	+00:03	+2%	1
8:00 – 9:00	Eastbound	-04:36	-33%	3
	Westbound	-01:13	-26%	2
			AVERAGE	2

Table B.5 Travel time scoring for Option 2

AM PEAK HOUR	DIRECTION	OPTION 2		
		DIFF TO BASE	DIFF TO BASE (PERCENT)	MCA SCORE
7:00 – 8:00	Eastbound	-01:12	-23%	2
	Westbound	-00:02	-1%	1
8:00 – 9:00	Eastbound	-02:25	-17%	2
	Westbound	-01:12	-26%	2
			AVERAGE	1.75 (rounded to 2)

Table B.6 Travel time scoring for Option 3

AM PEAK HOUR	DIRECTION	OPTION 3		
		DIFF TO BASE	DIFF TO BASE (PERCENT)	MCA SCORE
7:00 – 8:00	Eastbound	-01:41	-32%	3
	Westbound	00:00	0%	1
8:00 – 9:00	Eastbound	-06:00	-43%	3
	Westbound	-01:16	-27%	2
			AVERAGE	2.25 (rounded to 2)

Table B.7 Travel time scoring for Option 4

AM PEAK HOUR	DIRECTION	OPTION 4		
		DIFF TO BASE	DIFF TO BASE (PERCENT)	MCA SCORE
7:00 – 8:00	Eastbound	-01:28	-28%	2
	Westbound	-00:08	-5%	1
8:00 – 9:00	Eastbound	-06:35	-47%	4
	Westbound	-01:18	-28%	2
			AVERAGE	2.25 (rounded to 2)

Table B.8 Travel time scoring for Option 5

AM PEAK HOUR	DIRECTION	OPTION 5		
		DIFF TO BASE	DIFF TO BASE (PERCENT)	MCA SCORE
7:00 – 8:00	Eastbound	-00:58	-18%	2
	Westbound	+00:14	+8%	1
8:00 – 9:00	Eastbound	-06:34	-47%	4
	Westbound	-01:09	-25%	2
			AVERAGE	2.25 (rounded to 2)

Table B.9 Travel time scoring for Option 6

AM PEAK HOUR	DIRECTION	OPTION 6		
		DIFF TO BASE	DIFF TO BASE (PERCENT)	MCA SCORE
7:00 – 8:00	Eastbound	-02:47	-53%	4
	Westbound	-00:04	-3%	1
8:00 – 9:00	Eastbound	-08:46	-63%	5
	Westbound	-00:33	-12%	1
			AVERAGE	2.75 (rounded to 3)

Table B.10 Travel time scoring for Option 7

AM PEAK HOUR	DIRECTION	OPTION 7		
		DIFF TO BASE	DIFF TO BASE (PERCENT)	MCA SCORE
7:00 – 8:00	Eastbound	-02:35	-49%	4
	Westbound	+00:33	+19%	1
8:00 – 9:00	Eastbound	-09:38	-69%	5
	Westbound	-00:35	-13%	1
			AVERAGE	2.75 (rounded to 3)

B2.2 Network performance

Model wide network performance indicators can be pulled directly from the Aimsun results. Average network delay can be taken as a good measure for performance across the entire modelled region. The change in average delay when compared to the Base case will be used for scoring.

Table B.11 Scoring criteria for network performance

MCA score	Reduction in travel time when compared to Base
1	0 – 10%
2	10 – 20%
3	20 – 30%
4	30 – 40%
5	≥ 40%

Table B.12 Network performance scoring for Option 1

PEAK	OPTION 1 (SECONDS/KM)		
	DIFF TO BASE	DIFF TO BASE (PERCENT)	MCA SCORE
AM Peak	-16.3	-19%	2
PM Peak	-7.2	-15%	2
		Average	2

Table B.13 Network performance scoring for Option 2

PEAK	OPTION 2 (SECONDS/KM)		
	DIFF TO BASE	DIFF TO BASE (PERCENT)	MCA SCORE
AM Peak	-20.4	-24%	3
PM Peak	-5.5	-11%	2
		Average	2.5 (rounded to 3)

Table B.14 Network performance scoring for Option 3

PEAK	OPTION 3 (SECONDS/KM)		
	DIFF TO BASE	DIFF TO BASE (PERCENT)	MCA SCORE
AM Peak	-28.7	-34%	4
PM Peak	-7.8	-16%	2
		Average	3

Table B.15 Network performance scoring for Option 4

PEAK	OPTION 4 (SECONDS/KM)		
	DIFF TO BASE	DIFF TO BASE (PERCENT)	MCA SCORE
AM Peak	-32.9	-39%	4
PM Peak	-7.4	-15%	2
		Average	3

Table B.16 Network performance scoring for Option 5

PEAK	OPTION 5 (SECONDS/KM)		
	DIFF TO BASE	DIFF TO BASE (PERCENT)	MCA SCORE
AM Peak	-21.6	-26%	3
PM Peak	-7.5	-16%	2
		Average	2.5 (rounded to 3)

Table B.17 Network performance scoring for Option 6

PEAK	OPTION 6 (SECONDS/KM)		
	DIFF TO BASE	DIFF TO BASE (PERCENT)	MCA SCORE
AM Peak	-46.0	-55%	5
PM Peak	-6.7	-14%	2
		Average	3.5 (rounded to 4)

Table B.18 Network performance scoring for Option 7

PEAK	OPTION 7 (SECONDS/KM)		
	DIFF TO BASE	DIFF TO BASE (PERCENT)	MCA SCORE
AM Peak	-39.1	-47%	4
PM Peak	-7.0	-15%	2
		Average	3

B2.3 LoS

Level of service will be taken from two intersections in the model, due the influence the options have the average delay at and the level of intervention at these locations. These two intersections are:

Cotter Road / Streeton Drive

Cotter Road / Kirkpatrick Drive / Dargie Street

In terms of scoring for the MCA, the following scores can represent LoS categories:

Table B.19 Scoring criteria for level of service (LoS)

MCA score	LoS
1	E or F
2	D
3	C
4	B
5	A

Table B.20 LoS scoring for the base case

INTERSECTION	AM PEAK HOUR	BASE Case	
		LOS	MCA SCORE
Streeton Drive	7:00 – 8:00	C	3
	8:00 – 9:00	D	2
Kirkpatrick Drive	7:00 – 8:00	B	4
	8:00 – 9:00	C	3
		AVERAGE	3

Table B.21 LoS scoring for Option 1

INTERSECTION	AM PEAK HOUR	BASE	OPTION 1	
		LOS	LOS	MCA SCORE
Streeton Drive	7:00 – 8:00	C	B	4
	8:00 – 9:00	D	D	2
Kirkpatrick Drive	7:00 – 8:00	B	B	4
	8:00 – 9:00	C	B	4
			AVERAGE	3.5 (rounded to 4)

Table B.22 LoS scoring for Option 2

INTERSECTION	AM PEAK HOUR	BASE	OPTION 2	
		LOS	LOS	MCA SCORE
Streeton Drive	7:00 – 8:00	C	B	4
	8:00 – 9:00	D	D	2
Kirkpatrick Drive	7:00 – 8:00	B	B	4
	8:00 – 9:00	C	B	4
			AVERAGE	3.5 (rounded to 4)

Table B.23 LoS scoring for Option 3

INTERSECTION	AM PEAK HOUR	BASE	OPTION 3	
		LOS	LOS	MCA SCORE
Streeton Drive	7:00 – 8:00	C	B	4
	8:00 – 9:00	D	C	3
Kirkpatrick Drive	7:00 – 8:00	B	B	4
	8:00 – 9:00	C	B	4
			AVERAGE	3.75 (rounded to 4)

Table B.24 LoS scoring for Option 4

INTERSECTION	AM PEAK HOUR	BASE	OPTION 4	
		LOS	LOS	MCA SCORE
Streeton Drive	7:00 – 8:00	C	B	4
	8:00 – 9:00	D	C	3
Kirkpatrick Drive	7:00 – 8:00	B	A	5
	8:00 – 9:00	C	B	4
			AVERAGE	4

Table B.25 LoS scoring for Option 5

INTERSECTION	AM PEAK HOUR	BASE	OPTION 5	
		LOS	LOS	MCA SCORE
Streeton Drive	7:00 – 8:00	C	B	4
	8:00 – 9:00	D	C	3
Kirkpatrick Drive	7:00 – 8:00	B	B	4
	8:00 – 9:00	C	B	4
			AVERAGE	3.75 (rounded to 4)

Table B.26 LoS scoring for Option 6

INTERSECTION	AM PEAK HOUR	BASE	OPTION 6	
		LOS	LOS	MCA SCORE
Streeton Drive	7:00 – 8:00	C	B	4
	8:00 – 9:00	D	C	3
Kirkpatrick Drive	7:00 – 8:00	B	A	5
	8:00 – 9:00	C	B	4
			AVERAGE	4

Table B.27 LoS scoring for Option 7

INTERSECTION	AM PEAK HOUR	BASE	OPTION 7	
		LOS	LOS	MCA SCORE
Streeton Drive	7:00 – 8:00	C	B	4
	8:00 – 9:00	D	B	4
Kirkpatrick Drive	7:00 – 8:00	B	A	5
	8:00 – 9:00	C	B	4
			AVERAGE	4.25 (rounded to 4)

B3 Sustainable transport

B3.1 Bus travel time

Based on the tidal flow observed on Cotter Road, the critical bus movements would be the eastbound buses in the AM peak periods, and the westbound buses in the PM peak periods. The bus movements are more largely affected in the three high intervention scenarios, where additional lanes (or dedicated bus lanes) may be able to provide additional travel time reductions for buses independently from the general traffic.

In terms of MCA grading, a reduction in travel time of 15% will bump the scoring up such that the bands will look like:

Table B.28 Scoring criteria for bus travel time

MCA score	Reduction in travel time
1	0 – 15%
2	15 – 30%
3	30 – 45%
4	45 – 60%
5	≥ 60%

Table B.29 Bus travel time scoring for Option 5

OPTION 5	PEAK HOUR	DIFF TO BASE	DIFF TO BASE (PERCENT)	MCA SCORE
AM peak	7:00 – 8:00 (am)	-00:53	-17%	2
	8:00 – 9:00 (am)	-06:36	-48%	4
PM peak	4:00 – 5:00 (pm)	-00:19	-9%	1
	5:00 – 6:00 (pm)	-00:43	-19%	2
			AVERAGE	2.25 (rounded to 2)

Table B.30 Bus travel time scoring for Option 6

OPTION 6	PEAK HOUR	DIFF TO BASE	DIFF TO BASE (PERCENT)	MCA SCORE
AM peak	7:00 – 8:00 (am)	-02:27	-47%	4
	8:00 – 9:00 (am)	-08:23	-61%	5
PM peak	4:00 – 5:00 (pm)	-00:11	-5%	1
	5:00 – 6:00 (pm)	-00:49	-21%	2
			AVERAGE	3

Table B.31 Bus travel time scoring for Option 7

OPTION 7	PEAK HOUR	DIFF TO BASE	DIFF TO BASE (PERCENT)	MCA SCORE
AM peak	7:00 – 8:00 (am)	-02:41	-51%	4
	8:00 – 9:00 (am)	-10:15	-75%	5
PM peak	4:00 – 5:00 (pm)	+01:46	+52%	1
	5:00 – 6:00 (pm)	+00:05	+2%	1
			AVERAGE	2.75 (rounded to 3)

B3.2 Reliability / variability in bus travel time

The difference between the lowest and the highest travel time for a bus will give a picture on how reliable the bus service along the corridor is. The Cotter Road section on approach to Kirkpatrick Drive / Dargie Street where there is up to 14 bus services travelling through in the peak hour will be the focus for this criteria. In terms of MCA, the total variance in travel times across each peak hour and in each direction will be summed, with a lower variance scoring better.

Table B.32 Scoring criteria for reliability / variability in bus travel times

MCA score	Difference in bus travel time (mm:ss)
1	≥ 4
2	3 – 4
3	2 – 3
4	1 – 2
5	0 – 1

Based on the tidal flow observed on Cotter Road, the critical bus movements would be the eastbound buses in the AM peak periods, and the westbound buses in the PM peak periods. The bus movements are more largely affected in the three high intervention scenarios (Options 5 to 7), where additional lanes (or dedicated bus lanes) may be able to provide additional travel time reductions for buses independently from the general traffic.

Table B.33 Reliability / variability in bus travel times scoring for options 5-7

PEAK PERIOD	DIRECTION	HOUR 1			HOUR 2		
		Option 5	Option 6	Option 7	Option 5	Option 6	Option 7
AM	Eastbound	00:00:25	00:00:37	00:00:07	00:00:37	00:01:23	00:00:38
	Westbound	00:00:24	00:00:23	00:00:12	00:01:03	00:03:07	00:00:41
PM	Eastbound	00:00:02	00:00:03	00:00:07	00:00:19	00:00:23	00:00:02
	Westbound	00:00:33	00:00:15	00:00:16	00:00:28	00:00:04	00:00:12
Total variation		0:01:24	0:01:18	0:00:42	0:02:27	0:04:57	0:01:33
MCA Score		4	4	5	3	1	4

Table B.1 Overall Reliability / variability in bus travel times scores for options 5-7

	OPTION 5	OPTION 6	OPTION 7
Overall MCA score	3.5 (rounded to 4)	2.5 (rounded to 3)	4.5 (rounded to 5)

B3.3 Active user accessibility

This is a measure how the proposed changes from the Option lead to additional or fewer active transport connections. An example of this might be the removal of a pedestrian crossing leg from an intersection.

Table B.34 Scoring criteria for active user accessibility

MCA score	Change to active user accessibility
1	No viable active transport connections
2	Very few active transport connections
3	Active transport connections have been cutback, requiring detours
4	Active transport connections exist but have been cutback, but good alternatives are provided
5	Active transport connections have been unaffected (base case)

B3.4 Active user experience

The active transport user experience criteria differs from accessibility in that it measures the change in delays to active transport users in the study area. This is primarily impacted by the intervention at the Cotter Road / Kirkpatrick Drive / Dargie Street intersection. A decrease in a user's experience could be the change of a single stage crossing to a two stage crossing as this would increase an average pedestrian crossing time.

Table B.35 Scoring criteria for active user experience

MCA score	Change to active user experiance
1	Modifications to pedestrian crossings leading to major delays when crossing roads
2	Modifications to pedestrian crossings leading to significant delays when crossing roads
3	Modifications to pedestrian crossings leading to moderate delays when crossing roads
4	Modifications to pedestrian crossings leading to minor delays when crossing roads
5	No impact to travel times for active transport users

B4 Safety

B4.1 Safe system approach

The Safe System approach provides the technical methodology to move towards the Vision Zero goal. The Safe System approach relies on – safe speeds, safe roads and roadsides, safe vehicles, as well as safe people and safe behaviours. The framework has been used to assess the degree of the options developed is aligned with the Safe Safety objectives and moving closer to a Safe System outcome.

Figure 10.1 Vision Zero strategy

The overall safety performance is moderate–poor under future base case conditions was scored **120/384** for the Cotter Road project corridor. For the MCA, scores are scaled against a baseline SSA total of 120, with a score of 3 representing this midpoint. Proposed interventions should aim to reduce the SSA overall score relative to the future base case.

Table B.36 Scoring criteria for travel time

MCA score	Overall SSA Score
1	> 126
2	121-125
3	120
4	115-119
5	≤ 114

Refer to Appendix C – Safe Systems Approach review for the SSA matrix and scoring methodology.

B5 Implementation impact

B5.1 Landscaping impact

The impact on landscaping can be determined by the level of intervention required to the physical geometry of the area, for example a low impact would be changes to traffic signals, a medium impact would be road widening or the addition of median strips, and a high impact would be the addition of a traffic lane.

Table B.37 Scoring criteria for landscaping impact

MCA score	Landscaping impact
1	Major earthworks or road geometry modifications
2	Significant earthworks or road geometry modifications
3	Moderate earthworks or road geometry modifications
4	Minor earthworks or road geometry modifications
5	No major earthworks or road geometry modifications

B5.2 Cost of construction

Cost of construction is estimation of what cost the overall intervention of an Option may amount to. A good judge of the costs would be to follow the level of overall intervention required, with phasing changes resulting in very little cost when compared to road geometry changes.

Table B.38 Scoring criteria for cost of construction

MCA score	Cost of construction
1	Major costs required to carry out the intended works
2	Significant costs required to carry out the intended works
3	Moderate costs required to carry out the intended works
4	Some costs required to carry out the intended works
5	Little to no cost to carry out the intended works

B5.3 Constructability / time frame

The level of constructability in any particular Option would dictate how easy the proposed changes are to implement within a short time frame. Thus, the details of the interventions would to be considered.

Table B.39 Scoring criteria for constructability / time frame

MCA score	Constructability / time frame
1	Interventions required a very large sized time frame for implementation
2	Interventions required a large sized time frame for implementation
3	Interventions required a moderately sized time frame for implementation
4	Interventions that can be carried out very quickly
5	No time or construction required

B5.4 Network impact

Network impact would be a measure of how the changes influence surrounding orbital and freight networks, particularly the impact to traffic density on the Tuggeranong Parkway.

Table B.40 Scoring criteria for network impact

MCA score	Network impact
1	Major positive impact to the surrounding freight network and orbital corridors
2	Significant positive impact to the surrounding freight network and orbital corridors
3	Moderate positive impact to the surrounding freight network and orbital corridors
4	Some positive impact to the surrounding freight network and orbital corridors
5	No impact to the surrounding freight network and orbital corridors

Appendix C

Safe Systems Approach review

APPENDIX C-1
Methodology and summary

C1.1 SSA scoring methodology

When formatting headings on this follower page, please use the appropriate Appendix Heading No Number styles.

SSA scoring methodology

For each treatment an indication is provided on how safety is influenced, whether this be by reducing exposure (indicated with an E), likelihood (L) and/or severity (S). They are defined as:

Road user exposure: Who is on the road, how many of them and for how long they are exposed to crash risk. Typical exposure measures include AADT, side-road traffic volumes, counts of motorcyclists, cyclists and pedestrians (including crossings and footpath use), road length, and time spent on the road.

Crash likelihood: Factors that influence how likely a crash is to occur by changing the opportunity for conflict or the rate of human error. This covers design and operational elements such as number of conflict points, proximity to roadside hazards, separation of opposing traffic, intersection control (priority, signals, movement bans), speed, sight distance, horizontal and vertical alignment, driver guidance and warning, and maintenance practices and timing.

Crash severity: Factors that determine how serious injuries would be if a crash happens. These are generally tied to the kinetic energy involved and how it is transferred in a collision, for example impact speeds, collision angles and the presence or severity of roadside hazards.

Table C.1 Safe System matrix for safe roads and roadsides and safe speeds

	RUN-OFF-ROAD	HEAD-ON	INTERSECTION	OTHER	PEDESTRIAN	CYCLIST	
Exposure	AADT; length of road segment **/4**	AADT; length of road segment **/4**	AADT for each approach; intersection size **/4**	AADT; length of road segment **/4**	AADT; pedestrian numbers; crossing width; length of road segment **/4**	AADT; cyclist numbers; pedestrians **/4**	
Likelihood	Speed; geometry; shoulders; barriers; hazard offset; guidance and delineation **/4**	Geometry; separation; guidance and delineation; speed **/4**	Type of control; speed; design, visibility; conflict points **/4**	Speed; sight distance; number of lanes; surface friction **/4**	Design of facilities; separation; number of conflicting directions; speed **/4**	Design of facilities; separation; speed **/4**	
Severity	Speed; roadside features and design (e.g. flexible barriers) **/4**	Speed **/4**	Impact angles; speed **/4**	Speed **/4**	Speed **/4**	Speed **/4**	
PRODUCT	**/64**	**/64**	**/64**	**/64**	**/64**	**/64**	**/388**

The scoring system adopted is as described in the following table.

Table C.2 Safe System matrix scoring system

SCORE	ROAD USER EXPOSURE	CRASH LIKELIHOOD	CRASH SEVERITY
0	there is no exposure to a certain crash type. This might mean there is no side flow or intersecting roads, no cyclists, no pedestrians, or motorcyclists).	there is only minimal chance that a given crash type can occur for an individual road user given the infrastructure in place. Only extreme behaviour or substantial vehicle failure could lead to a crash. This may mean, for example, that two traffic streams do not cross at grade, or that pedestrians do not cross the road.	should a crash occur, there is only minimal chance that it will result in a fatality or serious injury to the relevant road user involved. This might mean that kinetic energies transferred during the crash are low enough not to cause a fatal or serious injury (FSI), or that excessive kinetic energies are effectively redirected/dissipated before being transferred to the road user. Users may refer to Safe System critical impact speeds for different crash types, while considering impact angles, and types of roadside hazards/barriers present
1	volumes of vehicles that may be involved in a particular crash type are particularly low, and therefore exposure is low. For run-of-road, head-on, intersection and 'other' crash types, AADT is < 1 000 per day. For cyclist, pedestrian and motorcycle crash types, volumes are < 10 units per day.	it is highly unlikely that a given crash type will occur	should a crash occur, it is highly unlikely that it will result in a fatality or serious injury to any road user involved. Kinetic energies must be fairly low during a crash, or the majority is effectively dissipated before reaching the road user.
2	volumes of vehicles that may be involved in a particular crash type are moderate, and therefore exposure is moderate. For run-of-road, head-on, intersection and 'other' crash types, AADT is between 1 000 and 5 000 per day. For cyclist, pedestrian and motorcycle crash types, volumes are 10–50 units per day.	it is unlikely that a given crash type will occur.	should a crash occur, it is unlikely that it will result in a fatality or serious injury to any road user involved. Kinetic energies are moderate, and the majority of the time they are effectively dissipated before reaching the road user.
3	volumes of vehicles that may be involved in a particular crash type are high, and therefore exposure is high. For run-of-road, head-on, intersection and 'other' crash types, AADT is between 5 000 and 10 000 per day. For cyclist, pedestrian and motorcycle crash types, volumes are 50–100 units per day	it is likely that a given crash type will occur.	should a crash occur, it is likely that it will result in a fatality or serious injury to any road user involved. Kinetic energies are moderate, but are not effectively dissipated and therefore may or may not result in an FSI
4	volumes of vehicles that may be involved in a particular crash type are very high, or the road is very long, and therefore exposure is very high. For run-of-road, head-on, intersection and 'other' crash types, AADT is > 10 000 per day. For cyclist, pedestrian and motorcycle crash types, volumes are > 100 units per day	the likelihood of individual road user errors leading to a crash is high given the infrastructure in place (e.g. high approach speed to a sharp curve, priority movement control, filtering right turn across several opposing lanes, high speed).	should a crash occur, it is highly likely that it will result in a fatality or serious injury to any road user involved. Kinetic energies are high enough to cause an FSI crash, and it is unlikely that the forces will be dissipated before reaching the road user

APPENDIX C-2
SSA scoring of future base case

Intersection of Cotter Road and Dargie Street as well as Road Extent from Streeton Drive to Parkway Northbound Off Ramp.

	Run-off road	Head-on	Intersection	Other		Pedestrian	Cyclist
Exposure Comments:	AADT >10,000 veh/day	AADT >10,000 veh/day	AADT >10,000 veh/day	AADT >10,000 veh/day		>100 pedestrians/day	>100 cyclists/day
Exposure Score:	Base Case 4/4	Base Case 4/4	Base Case 4/4	Base Case 4/4		Base Case 4/4	Base Case 4/4
Likelihood Comments:	Factors influencing likelihood: • Clear Sightlines • Street Lighting • Lanes are wide (>3.5m) • Kerbs alongside the carriageway.	Factors influencing likelihood: • -All opposing movements are separated by wide central dividing medians.	Factors influencing likelihood: • High traffic congestion in area. • Intersection congestion may cause motorists to push out from slip lanes or push through orange lights at the intersection rather than waiting another cycle and take smaller gaps than are generally considered safe. • Congestion may lead to vehicles being caught within the intersection. • Cycle times of intersection may influence vehicle delays. • Street Lighting	Factors influencing likelihood: • Provision of separate bus lanes at intersection • Buses merge back into adjacent lanes after intersections.		Factors influencing likelihood: • High traffic congestion in area. • Signalised pedestrian crossings on all legs along. • Zebra crossings at all slip lanes. • Pedestrian paths and pram ramps. • Street Lighting	Factors influencing likelihood: • Dedicated bicycle lanes along carriageway. • No bicycle lanes on slip lanes. • Bicycles travel directly across frontage of slip lane. • High traffic congestion in area. • Street Lighting
Likelihood Score:	Base Case 2/4	Base Case 1/4	Base Case 3/4	Base Case 2/4		Base Case 2/4	Base Case 2/4
Severity Comments:	Factors influencing severity: • Unshielded hazards along the roadside (lighting poles) • Posted speed limit of 80 km/h	Factors influencing severity: • Opposing vehicle crashes. • Posted speed limit of 80 km/	Factors influencing severity: • Posted speed limit of 80 km/ • Cross intersection could lead to side impacts on vehicles.	Factors influencing severity: • Posted speed limit of 80 km/ • Vehicle size (bus) interacting with other vehicles.		Factors influencing severity: • Direct impact between vehicle and pedestrian. • Vehicle speeds are likely to be higher than 30km/h	Factors influencing severity: • Direct impact between vehicle and cyclist. • Vehicle speeds are likely to be higher than 30km/h
Severity Score:	Base Case 2/4	Base Case 2.5/4	Base Case 2.5/4	Base Case 2/4		Base Case 3/4	Base Case 3/4
Product (multiply scores above for crash type)	**Base Case 16/64**	**Base Case 10/64**	**Base Case 30/64**	**Base Case 16/64**		**Base Case 24/64**	**Base Case 24/64**
TOTAL – Future Base Case							**120/384**

Dixon Drive left onto Streeton Drive

	Run-off road	Head-on	Intersection	Pedestrian	Cyclist
Exposure Comments:	AADT >10,000 veh/day	Left turn slip lane with no oncoming traffic movements	AADT >10,000 veh/day	>100 pedestrians/day	>100 cyclists/day
Exposure Score:	Base Case 4/4	Base Case -/4	Base Case 4/4	Base Case 4/4	Base Case 4/4
Likelihood Comments:	Factors influencing likelihood: • No additional road shoulder • Clear Sightlines • Street Lighting • Lanes are wide (>3.5m) • Kerbs alongside the carriageway.	Factors influencing likelihood: • -	Factors influencing likelihood: • High traffic congestion in area. • Intersection congestion may cause motorists to push out from the slip lane and take smaller gaps than are generally considered safe. • Pedestrian priority crossing may lead to irregular interruptions of traffic movement leading to motorist frustration at missing gaps onto main carriageway. • Street Lighting • Give way control for vehicles onto main carriageway.	Factors influencing likelihood: • High traffic congestion in area. • Potential vehicle encroachment over pedestrian priority crossing. • Formal zebra crossing for pedestrians. • Pedestrian paths and pram ramps. • Single lane for pedestrians to cross. • Street Lighting	Factors influencing likelihood: • No bicycle lanes on slip lane. • Bicycles travel directly across frontage of slip lane. • High traffic congestion in area. • Street Lighting
Likelihood Score:	Base Case 2/4	Base Case -/4	Base Case 3/4	Base Case 2/4	Base Case 3/4
Severity Comments:	Factors influencing severity: • Unshielded hazards along the roadside (lighting poles) • Speeds are likely to be low (less than 50km/h)	Factors influencing severity: • -	Factors influencing severity: • Likely side on impact between vehicles. • Speeds are likely to be low (less than 50km/h)	Factors influencing severity: • Direct impact between vehicle and pedestrian. • Speeds are likely to be higher than 30km/h	Factors influencing severity: • Direct impact between vehicle and cyclist. • Speeds are likely to be higher than 30km/h
Severity Score:	Base Case 2/4	Base Case -/4	Base Case 2/4	Base Case 3/4	Base Case 3/4
Product **(multiply scores above for crash type)**	**Base Case** **16/64**	**Base Case** **0/64**	**Base Case** **24/64**	**Base Case** **24/64**	**Base Case** **36/64**
TOTAL – Future Base Case					**100/320**

APPENDIX C-3
SSA scoring of shortlisted options

Option 1

Site Intersection of Cotter Road and Dargie Street

Summary of proposed modifications: Removal of pedestrian crossing on western leg.

	Run-off road		Head-on		Intersection		Other		Pedestrian		Cyclist	
Exposure Comments:	AADT >10,000 veh/day		AADT >10,000 veh/day		AADT >10,000 veh/day		AADT >10,000 veh/day		>100 pedestrians/day		>100 cyclists/day	
Exposure Score:	Base Case 4/4	Option 1 4/4	Base Case 4/4	Option 1 4/4	Base Case 4/4	Option 1 4/4	Base Case 4/4	Option 1 4/4	Base Case 4/4	Option 1 4/4	Base Case 4/4	Option 1 4/4
Likelihood Comments:	Factors influencing likelihood: • Clear Sightlines • Street Lighting • Lanes are wide (>3.5m) • Kerbs alongside the carriageway.		Factors influencing likelihood: • -All opposing movements are separated by wide central dividing medians.		Factors influencing likelihood: • High traffic congestion in area. • Intersection congestion may cause motorists to push out from slip lanes or push through orange lights at the intersection rather than waiting another cycle and take smaller gaps than are generally considered safe. • Congestion may lead to vehicles being caught within the intersection. • Cycle times of intersection may influence vehicle delays. • Street Lighting Design Factors: • Increased cycle time for vehicles resulting in shorter delays and reduced congestion. • Increased cycle time may allow for increased time for vehicles to clear the intersection.		Factors influencing likelihood: • Provision of separate bus lanes at intersection • Buses merge back into adjacent lanes after intersections.		Factors influencing likelihood: • High traffic congestion in area. • Signalised pedestrian crossings on all legs along. • Zebra crossings at all slip lanes. • Pedestrian paths and pram ramps. • Street Lighting Design Factors: • Removal of pedestrian crossing on western leg may lead to some pedestrians crossing at an uncontrolled point rather than using signalised route.		Factors influencing likelihood: • Dedicated bicycle lanes along carriageway. • No bicycle lanes on slip lanes. • Bicycles travel directly across frontage of slip lane. • High traffic congestion in area. • Street Lighting	
Likelihood Score:	Base Case 2/4	Option 1 2/4	Base Case 1/4	Option 1 1/4	Base Case 3/4	Option 1 2.5/4	Base Case 2/4	Option 1 2/4	Base Case 2/4	Option 1 3/4	Base Case 2/4	Option 1 2/4
Severity Comments:	Factors influencing severity: • Unshielded hazards along the roadside (lighting poles) • Posted speed limit of 80 km/h		Factors influencing severity: • Opposing vehicle crashes. • Posted speed limit of 80 km/		Factors influencing severity: • Posted speed limit of 80 km/ • Cross intersection could lead to side impacts on vehicles.		Factors influencing severity: • Posted speed limit of 80 km/ • Vehicle size (bus) interacting with other vehicles.		Factors influencing severity: • Direct impact between vehicle and pedestrian. • Vehicle speeds are likely to be higher than 30km/h		Factors influencing severity: • Direct impact between vehicle and cyclist. • Vehicle speeds are likely to be higher than 30km/h	
Severity Score:	Base Case 2/4	Option 1 2/4	Base Case 2.5/4	Option 1 2.5/4	Base Case 2.5/4	Option 1 2.5/4	Base Case 2/4	Option 1 2/4	Base Case 3/4	Option 1 3/4	Base Case 3/4	Option 1 3/4
Product (multiply scores above for crash type)	**Base Case 16/64**	**Option 1 16/64**	**Base Case 10/64**	**Option 1 10/64**	**Base Case 30/64**	**Option 1 25/64**	**Base Case 16/64**	**Option 1 16/64**	**Base Case 24/64**	**Option 1 36/64**	**Base Case 24/64**	**Option 1 24/64**
TOTAL – Future Base Case											**120/384**	
TOTAL – Option 1											**127/384**	

Option 2

Site: Intersection of Cotter Road and Dargie Street

Summary of proposed modifications: Staged Pedestrian crossings – east and west legs

	Run-off road		Head-on		Intersection		Other		Pedestrian		Cyclist	
Exposure Comments:	AADT >10,000 veh/day		AADT >10,000 veh/day		AADT >10,000 veh/day		AADT >10,000 veh/day		>100 pedestrians/day		>100 cyclists/day	
Exposure Score:	Base Case 4/4	Option 2 4/4	Base Case 4/4	Option 2 4/4	Base Case 4/4	Option 2 4/4	Base Case 4/4	Option 2 4/4	Base Case 4/4	Option 2 4/4	Base Case 4/4	Option 2 4/4
Likelihood Comments:	Factors influencing likelihood: • Clear Sightlines • Street Lighting • Lanes are wide (>3.5m) • Kerbs alongside the carriageway.		Factors influencing likelihood: • -All opposing movements are separated by wide central dividing medians.		Factors influencing likelihood: • High traffic congestion in area. • Intersection congestion may cause motorists to push out from slip lanes or push through orange lights at the intersection rather than waiting another cycle and take smaller gaps than are generally considered safe. • Congestion may lead to vehicles being caught within the intersection. • Cycle times of intersection may influence vehicle delays. • Street Lighting Design Factors: • Increased cycle time for vehicles resulting in shorter delays and reduced congestion. • Increased cycle time may allow for increased time for vehicles to clear the intersection.		Factors influencing likelihood: • Provision of separate bus lanes at intersection • Buses merge back into adjacent lanes after intersections.		Factors influencing likelihood: • High traffic congestion in area. • Signalised pedestrian crossings on all legs along. • Zebra crossings at all slip lanes. • Pedestrian paths and pram ramps. • Street Lighting Design Factors: • Staggering of crossings may lead to some pedestrians trying to cross when there is insufficient time.		Factors influencing likelihood: • Dedicated bicycle lanes along carriageway. • No bicycle lanes on slip lanes. • Bicycles travel directly across frontage of slip lane. • High traffic congestion in area. • Street Lighting	
Likelihood Score:	Base Case 2/4	Option 2 2/4	Base Case 1/4	Option 2 1/4	Base Case 3/4	Option 2 2.5/4	Base Case 2/4	Option 2 2/4	Base Case 2/4	Option 2 2.5/4	Base Case 2/4	Option 2 2/4
Severity Comments:	Factors influencing severity: • Unshielded hazards along the roadside (lighting poles) • Posted speed limit of 80 km/h		Factors influencing severity: • Opposing vehicle crashes. • Posted speed limit of 80 km/		Factors influencing severity: • Posted speed limit of 80 km/ • Cross intersection could lead to side impacts on vehicles.		Factors influencing severity: • Posted speed limit of 80 km/ • Vehicle size (bus) interacting with other vehicles.		Factors influencing severity: • Direct impact between vehicle and pedestrian. • Vehicle speeds are likely to be higher than 30km/h		Factors influencing severity: • Direct impact between vehicle and cyclist. • Vehicle speeds are likely to be higher than 30km/h	
Severity Score:	Base Case 2/4	Option 2 2/4	Base Case 2.5/4	Option 2 2.5/4	Base Case 2.5/4	Option 2 2.5/4	Base Case 2/4	Option 2 2/4	Base Case 3/4	Option 2 3/4	Base Case 3/4	Option 2 3/4
Product (multiply scores above for crash type)	**Base Case 16/64**	**Option 2 16/64**	**Base Case 10/64**	**Option 2 10/64**	**Base Case 30/64**	**Option 2 25/64**	**Base Case 16/64**	**Option 2 16/64**	**Base Case 24/64**	**Option 2 30/64**	**Base Case 24/64**	**Option 2 24/64**
TOTAL – Future Base Case											**120/384**	
TOTAL – Option 2											**121/384**	

Option 3

Site: Intersection of Cotter Road and Dargie Street **Summary of proposed modifications:** – Staged Pedestrian crossings on east leg and removal of crossing on west leg

	Run-off road		Head-on		Intersection		Other		Pedestrian		Cyclist	
Exposure Comments:	AADT >10,000 veh/day		AADT >10,000 veh/day		AADT >10,000 veh/day		AADT >10,000 veh/day		>100 pedestrians/day		>100 cyclists/day	
Exposure Score:	Base Case 4/4	Option 3 4/4	Base Case 4/4	Option 3 4/4	Base Case 4/4	Option 3 4/4	Base Case 4/4	Option 3 4/4	Base Case 4/4	Option 3 4/4	Base Case 4/4	Option 3 4/4
Likelihood Comments:	Factors influencing likelihood: • Clear Sightlines • Street Lighting • Lanes are wide (>3.5m) • Kerbs alongside the carriageway.		Factors influencing likelihood: • -All opposing movements are separated by wide central dividing medians.		Factors influencing likelihood: • High traffic congestion in area. • Intersection congestion may cause motorists to push out from slip lanes or push through orange lights at the intersection rather than waiting another cycle and take smaller gaps than are generally considered safe. • Congestion may lead to vehicles being caught within the intersection. • Cycle times of intersection may influence vehicle delays. • Street Lighting Design Factors: • Increased cycle time for vehicles resulting in shorter delays and reduced congestion. • Increased cycle time may allow for increased time for vehicles to clear the intersection.		Factors influencing likelihood: • Provision of separate bus lanes at intersection • Buses merge back into adjacent lanes after intersections.		Factors influencing likelihood: • High traffic congestion in area. • Signalised pedestrian crossings on all legs along. • Zebra crossings at all slip lanes. • Pedestrian paths and pram ramps. • Street Lighting Design Factors: • Removal of pedestrian crossing on western leg may lead to some pedestrians crossing at an uncontrolled point rather than using signalised route. • Staggering of crossings may lead to some pedestrians trying to cross when there is insufficient time.		Factors influencing likelihood: • Dedicated bicycle lanes along carriageway. • No bicycle lanes on slip lanes. • Bicycles travel directly across frontage of slip lane. • High traffic congestion in area. • Street Lighting	
Likelihood Score:	Base Case 2/4	Option 3 2/4	Base Case 1/4	Option 3 1/4	Base Case 3/4	Option 3 2/4	Base Case 2/4	Option 3 2/4	Base Case 2/4	Option 3 3/4	Base Case 2/4	Option 3 2/4
Severity Comments:	Factors influencing severity: • Unshielded hazards along the roadside (lighting poles) • Posted speed limit of 80 km/h		Factors influencing severity: • Opposing vehicle crashes. • Posted speed limit of 80 km/		Factors influencing severity: • Posted speed limit of 80 km/ • Cross intersection could lead to side impacts on vehicles.		Factors influencing severity: • Posted speed limit of 80 km/ • Vehicle size (bus) interacting with other vehicles.		Factors influencing severity: • Direct impact between vehicle and pedestrian. • Vehicle speeds are likely to be higher than 30km/h		Factors influencing severity: • Direct impact between vehicle and cyclist. • Vehicle speeds are likely to be higher than 30km/h	
Severity Score:	Base Case 2/4	Option 3 2/4	Base Case 2.5/4	Option 3 2.5/4	Base Case 2.5/4	Option 3 2.5/4	Base Case 2/4	Option 3 2/4	Base Case 3/4	Option 3 3/4	Base Case 3/4	Option 3 3/4
Product (multiply scores above for crash type)	**Base Case 16/64**	**Option 3 16/64**	**Base Case 10/64**	**Option 3 10/64**	**Base Case 30/64**	**Option 3 20/64**	**Base Case 16/64**	**Option 3 16/64**	**Base Case 24/64**	**Option 3 36/64**	**Base Case 24/64**	**Option 3 24/64**
TOTAL – Future Base Case											**120/384**	
TOTAL – Option 3											**122/384**	

Option 4

Site: Intersection of Cotter Road & Dargie Street **Summary of proposed modifications:** – Provision of dual right turn lanes on north & south legs; staggering of east & west pedestrian crossings.

	Run-off road		Head-on		Intersection		Other		Pedestrian		Cyclist	
Exposure Comments:	AADT >10,000 veh/day		AADT >10,000 veh/day		AADT >10,000 veh/day		AADT >10,000 veh/day		>100 pedestrians/day		>100 cyclists/day	
Exposure Score:	Base Case 4/4	Option 4 4/4	Base Case 4/4	Option 4 4/4	Base Case 4/4	Option 4 4/4	Base Case 4/4	Option 4 4/4	Base Case 4/4	Option 4 4/4	Base Case 4/4	Option 4 4/4
Likelihood Comments:	Factors influencing likelihood: • Clear Sightlines • Street Lighting • Lanes are wide (>3.5m) • Kerbs alongside the carriageway.		Factors influencing likelihood: • -All opposing movements are separated by wide central dividing medians.		Factors influencing likelihood: • High traffic congestion in area. • Intersection congestion may cause motorists to push out from slip lanes or push through orange lights at the intersection rather than waiting another cycle and take smaller gaps than are generally considered safe. • Congestion may lead to vehicles being caught within the intersection. • Cycle times of intersection may influence vehicle delays. • Street Lighting Design Factors: • Provision of additional right turn lanes on north and south legs will facilitate increased traffic movements through these turns in shorter time periods allowing increased overall intersection capacity. • Increased cycle time for vehicles resulting in shorter delays and reduced congestion. • Increased cycle time may allow for increased time for vehicles to clear the intersection.		Factors influencing likelihood: • Provision of separate bus lanes at intersection • Buses merge back into adjacent lanes after intersections.		Factors influencing likelihood: • High traffic congestion in area. • Signalised pedestrian crossings on all legs along. • Zebra crossings at all slip lanes. • Pedestrian paths and pram ramps. • Street Lighting Design Factors: • Staggering of crossings may lead to some pedestrians trying to cross when there is insufficient time.		Factors influencing likelihood: • Dedicated bicycle lanes along carriageway. • No bicycle lanes on slip lanes. • Bicycles travel directly across frontage of slip lane. • High traffic congestion in area. • Street Lighting	
Likelihood Score:	Base Case 2/4	Option 4 2/4	Base Case 1/4	Option 4 1/4	Base Case 3/4	Option 4 2/4	Base Case 2/4	Option 4 2/4	Base Case 2/4	Option 4 2.5/4	Base Case 2/4	Option 4 2/4
Severity Comments:	Factors influencing severity: • Unshielded hazards along the roadside (lighting poles) • Posted speed limit of 80 km/h		Factors influencing severity: • Opposing vehicle crashes. • Posted speed limit of 80 km/		Factors influencing severity: • Posted speed limit of 80 km/ • Cross intersection could lead to side impacts on vehicles.		Factors influencing severity: • Posted speed limit of 80 km/ • Vehicle size (bus) interacting with other vehicles.		Factors influencing severity: • Direct impact between vehicle and pedestrian. • Vehicle speeds are likely to be higher than 30km/h		Factors influencing severity: • Direct impact between vehicle and cyclist. • Vehicle speeds are likely to be higher than 30km/h	
Severity Score:	Base Case 2/4	Option 4 2/4	Base Case 2.5/4	Option 4 2.5/4	Base Case 2.5/4	Option 4 2.5/4	Base Case 2/4	Option 4 2/4	Base Case 3/4	Option 4 3/4	Base Case 3/4	Option 4 3/4
Product(multiply scores above for crash type)	**Base Case 16/64**	**Option 4 16/64**	**Base Case 10/64**	**Option 4 10/64**	**Base Case 30/64**	**Option 4 20/64**	**Base Case 16/64**	**Option 4 16/64**	**Base Case 24/64**	**Option 4 30/64**	**Base Case 24/64**	**Option 4 24/64**
TOTAL – Future Base Case											**120/384**	
TOTAL – Option 4											**116/384**	

Option 5

Site: Road Extent from Streeton Drive to Parkway NB Off Ramp. **Summary of proposed modifications:** Provision of dedicated bus lane (tying into bus lanes at intersection) along corridor.

	Run-off road		Head-on		Intersection		Other		Pedestrian		Cyclist	
Exposure Comments:	AADT >10,000 veh/day		AADT >10,000 veh/day		AADT >10,000 veh/day		AADT >10,000 veh/day		>100 pedestrians/day		>100 cyclists/day	
Exposure Score:	Base Case 4/4	Option 5 4/4	Base Case 4/4	Option 5 4/4	Base Case 4/4	Option 5 4/4	Base Case 4/4	Option 5 4/4	Base Case 4/4	Option 5 4/4	Base Case 4/4	Option 5 4/4
Likelihood Comments:	Factors influencing likelihood: • Clear Sightlines • Street Lighting • Lanes are wide (>3.5m) • Kerbs alongside the carriageway. Design Factors: • Additional carriageway widening reduces road shoulder and offsets to potential roadside hazards.		Factors influencing likelihood: • -All opposing movements are separated by wide central dividing medians.		Factors influencing likelihood: • High traffic congestion in area. • Intersection congestion may cause motorists to push out from slip lanes or push through orange lights at the intersection rather than waiting another cycle and take smaller gaps than are generally considered safe. • Congestion may lead to vehicles being caught within the intersection. • Cycle times of intersection may influence vehicle delays. • Street Lighting		Factors influencing likelihood: • Provision of separate bus lanes at intersection. • Buses merge back into adjacent lanes after intersections. Design Factors: • Additional bus lanes along road section reduces needs for buses to merge back into adjacent lanes either side of intersections.		Factors influencing likelihood: • High traffic congestion in area. • Signalised pedestrian crossings on all legs along. • Zebra crossings at all slip lanes. • Pedestrian paths and pram ramps. • Street Lighting		Factors influencing likelihood: • Dedicated bicycle lanes along carriageway. • No bicycle lanes on slip lanes. • Bicycles travel directly across frontage of slip lane. • High traffic congestion in area. • Street Lighting	
Likelihood Score:	Base Case 2/4	Option 5 2.5/4	Base Case 1/4	Option 5 1/4	Base Case 3/4	Option 5 3/4	Base Case 2/4	Option 5 1.5/4	Base Case 2/4	Option 5 2/4	Base Case 2/4	Option 5 2/4
Severity Comments:	Factors influencing severity: • Unshielded hazards along the roadside (lighting poles) • Posted speed limit of 80 km/h		Factors influencing severity: • Opposing vehicle crashes. • Posted speed limit of 80 km/		Factors influencing severity: • Posted speed limit of 80 km/ • Cross intersection could lead to side impacts on vehicles.		Factors influencing severity: • Posted speed limit of 80 km/ • Vehicle size (bus) interacting with other vehicles.		Factors influencing severity: • Direct impact between vehicle and pedestrian. • Vehicle speeds are likely to be higher than 30km/h		Factors influencing severity: • Direct impact between vehicle and cyclist. • Vehicle speeds are likely to be higher than 30km/h	
Severity Score:	Base Case 2/4	Option 5 2/4	Base Case 2.5/4	Option 5 2.5/4	Base Case 2.5/4	Option 5 2.5/4	Base Case 2/4	Option 5 2/4	Base Case 3/4	Option 5 3/4	Base Case 3/4	Option 5 3/4
Product (multiply scores above for crash type)	**Base Case 16/64**	**Option 5 20/64**	**Base Case 10/64**	**Option 5 10/64**	**Base Case 30/64**	**Option 5 30/64**	**Base Case 16/64**	**Option 5 12/64**	**Base Case 24/64**	**Option 5 24/64**	**Base Case 24/64**	**Option 5 24/64**
TOTAL – Future Base Case											**120/384**	
TOTAL – Option 5											**120/384**	

Option 6

Site: Road Extent from Streeton Drive to Parkway NB Off Ramp.

Summary of proposed modifications: Provision of additional unrestricted lane along corridor.

	Run-off road		Head-on		Intersection		Other		Pedestrian		Cyclist	
Exposure Comments:	AADT >10,000 veh/day		AADT >10,000 veh/day		AADT >10,000 veh/day		AADT >10,000 veh/day		>100 pedestrians/day		>100 cyclists/day	
Exposure Score:	Base Case 4/4	Option 6 4/4	Base Case 4/4	Option 6 4/4	Base Case 4/4	Option 6 4/4	Base Case 4/4	Option 6 4/4	Base Case 4/4	Option 6 4/4	Base Case 4/4	Option 6 4/4
Likelihood Comments:	Factors influencing likelihood: • Clear Sightlines • Street Lighting • Lanes are wide (>3.5m) • Kerbs alongside the carriageway. Design Factors: • Additional carriageway widening reduces road shoulder and offsets to potential roadside hazards.		Factors influencing likelihood: • -All opposing movements are separated by wide central dividing medians.		Factors influencing likelihood: • High traffic congestion in area. • Intersection congestion may cause motorists to push out from slip lanes or push through orange lights at the intersection rather than waiting another cycle and take smaller gaps than are generally considered safe. • Congestion may lead to vehicles being caught within the intersection. • Cycle times of intersection may influence vehicle delays. • Street Lighting Design Factors: • Additional lane along road section provides additional capacity in the network and potentially increases intersection capacities.		Factors influencing likelihood: • Provision of separate bus lanes at intersection. • Buses merge back into adjacent lanes after intersections. Design Factors: • Separate bus lanes are removed to accommodate additional all use lane. Buses now have to contend with other movements on the network.		Factors influencing likelihood: • High traffic congestion in area. • Signalised pedestrian crossings on all legs along. • Zebra crossings at all slip lanes. • Pedestrian paths and pram ramps. • Street Lighting		Factors influencing likelihood: • Dedicated bicycle lanes along carriageway. • No bicycle lanes on slip lanes. • Bicycles travel directly across frontage of slip lane. • High traffic congestion in area. • Street Lighting	
Likelihood Score:	Base Case 2/4	Option 6 2.5/4	Base Case 1/4	Option 6 1/4	Base Case 3/4	Option 6 2/4	Base Case 2/4	Option 6 2.5/4	Base Case 2/4	Option 6 2/4	Base Case 2/4	Option 6 2/4
Severity Comments:	Factors influencing severity: • Unshielded hazards along the roadside (lighting poles) • Posted speed limit of 80 km/h		Factors influencing severity: • Opposing vehicle crashes. • Posted speed limit of 80 km/		Factors influencing severity: • Posted speed limit of 80 km/ • Cross intersection could lead to side impacts on vehicles		Factors influencing severity: • Posted speed limit of 80 km • Vehicle size (bus) interacting with other vehicles.		Factors influencing severity: • Direct impact between vehicle and pedestrian. • Vehicle speeds are likely to be higher than 30km/h		Factors influencing severity: • Direct impact between vehicle and cyclist. • Vehicle speeds are likely to be higher than 30km/h	
Severity Score:	Base Case 2/4	Option 6 2/4	Base Case 2.5/4	Option 6 2.5/4	Base Case 2.5/4	Option 6 2.5/4	Base Case 2/4	Option 6 2/4	Base Case 3/4	Option 6 3/4	Base Case 3/4	Option 6 3/4
Product (multiply scores above for crash type)	**Base Case** **16/64**	**Option 6** **20/64**	**Base Case** **10/64**	**Option 6** **10/64**	**Base Case** **30/64**	**Option 6** **20/64**	**Base Case** **16/64**	**Option 6** **20/64**	**Base Case** **24/64**	**Option 6** **24/64**	**Base Case** **24/64**	**Option 6** **24/64**
TOTAL – Future Base Case											**120/384**	
TOTAL – Option 6											**118/384**	

Option 7

Site: Road Extent from Streeton Drive to Parkway NB Off Ramp.

Summary of proposed modifications: Provision of T2 lane along corridor.

	Run-off road		Head-on		Intersection		Other		Pedestrian		Cyclist	
Exposure Comments:	AADT >10,000 veh/day		AADT >10,000 veh/day		AADT >10,000 veh/day		AADT >10,000 veh/day		>100 pedestrians/day		>100 cyclists/day	
Exposure Score:	Base Case 4/4	Option 7 4/4	Base Case 4/4	Option 7 4/4	Base Case 4/4	Option 7 4/4	Base Case 4/4	Option 7 4/4	Base Case 4/4	Option 7 4/4	Base Case 4/4	Option 7 4/4
Likelihood Comments:	Factors influencing likelihood: • Clear Sightlines • Street Lighting • Lanes are wide (>3.5m) • Kerbs alongside the carriageway. Design Factors: • Additional carriageway widening reduces road shoulder and offsets to potential roadside hazards.		Factors influencing likelihood: • -All opposing movements are separated by wide central dividing medians.		Factors influencing likelihood: • High traffic congestion in area. • Intersection congestion may cause motorists to push out from slip lanes or push through orange lights at the intersection rather than waiting another cycle and take smaller gaps than are generally considered safe. • Congestion may lead to vehicles being caught within the intersection. • Cycle times of intersection may influence vehicle delays. • Street Lighting Design Factors: • Additional T2 lane along road section provides additional capacity in the network and potentially increases intersection capacities.		Factors influencing likelihood: • Provision of separate bus lanes at intersection. • Buses merge back into adjacent lanes after intersections. Design Factors: • Separate bus lanes are removed to accommodate additional T2 lane. Buses now have to contend with other movements on the network.		Factors influencing likelihood: • High traffic congestion in area. • Signalised pedestrian crossings on all legs along. • Zebra crossings at all slip lanes. • Pedestrian paths and pram ramps. • Street Lighting		Factors influencing likelihood: • Dedicated bicycle lanes along carriageway. • No bicycle lanes on slip lanes. • Bicycles travel directly across frontage of slip lane. • High traffic congestion in area. • Street Lighting	
Likelihood Score:	Base Case 2/4	Option 7 2.5/4	Base Case 1/4	Option 7 1/4	Base Case 3/4	Option 7 2.5/4	Base Case 2/4	Option 7 2.5/4	Base Case 2/4	Option 7 2/4	Base Case 2/4	Option 7 2/4
Severity Comments:	Factors influencing severity: • Unshielded hazards along the roadside (lighting poles) • Posted speed limit of 80 km/h		Factors influencing severity: • Opposing vehicle crashes. • Posted speed limit of 80 km/		Factors influencing severity: • Posted speed limit of 80 km/ • Cross intersection could lead to side impacts on vehicles.		Factors influencing severity: • Posted speed limit of 80 km • Vehicle size (bus) interacting with other vehicles.		Factors influencing severity: • Direct impact between vehicle and pedestrian. • Vehicle speeds are likely to be higher than 30km/h		Factors influencing severity: • Direct impact between vehicle and cyclist. • Vehicle speeds are likely to be higher than 30km/h	
Severity Score:	Base Case 2/4	Option 7 2/4	Base Case 2.5/4	Option 7 2.5/4	Base Case 2.5/4	Option 7 2.5/4	Base Case 2/4	Option 7 2/4	Base Case 3/4	Option 7 3/4	Base Case 3/4	Option 7 3/4
Product (multiply scores above for crash type)	**Base Case 16/64**	**Option 7 20/64**	**Base Case 10/64**	**Option 7 10/64**	**Base Case 30/64**	**Option 7 25/64**	**Base Case 16/64**	**Option 7 20/64**	**Base Case 24/64**	**Option 7 24/64**	**Base Case 24/64**	**Option 7 24/64**
TOTAL – Future Base Case											**120/384**	
TOTAL – Option 7											**123/384**	

Dixon Drive left onto Streeton Drive

Summary of proposed modifications: Signalisation of pedestrian crossing over left turn slip lane. Note: This modification is applicable to Options 1 – 7.

	Run-off road		Head-on		Intersection		Pedestrian		Cyclist	
Exposure Comments:	AADT >10,000 veh/day		Left turn slip lane with no oncoming traffic movements		AADT >10,000 veh/day		>100 pedestrians/day		>100 cyclists/day	
Exposure Score:	Base Case 4/4	Design Option 4/4	Base Case -/4	Design Option -/4	Base Case 4/4	Design Option 4/4	Base Case 4/4	Design Option 4/4	Base Case 4/4	Design Option 4/4
Likelihood Comments:	Factors influencing likelihood: • No additional road shoulder • Clear Sightlines • Street Lighting • Lanes are wide (>3.5m) • Kerbs alongside the carriageway.		Factors influencing likelihood: • -		Factors influencing likelihood: • High traffic congestion in area. • Intersection congestion may cause motorists to push out from the slip lane and take smaller gaps than are generally considered safe. • ~~Pedestrian priority crossing may lead to irregular interruptions of traffic movement leading to motorist frustration at missing gaps onto main carriageway.~~ • Street Lighting • Give way control for vehicles onto main carriageway. Design Factors: • Signalised crossing. • More regularity for stoppages to vehicles and can prioritise vehicle flow.		Factors influencing likelihood: • High traffic congestion in area. • Potential vehicle encroachment over pedestrian priority crossing. • ~~Formal zebra crossing for pedestrians.~~ • Pedestrian paths and pram ramps. • Single lane for pedestrians to cross. • Street Lighting Design Factors: • Signalised crossing. • Improved driver awareness of crossing leading to lower vehicle speeds on approach •		Factors influencing likelihood: • No bicycle lanes on slip lane. • Bicycles travel directly across frontage of slip lane. • High traffic congestion in area. • Street Lighting Design Factors: • Signalised crossing. • Improved driver awareness of crossing leading to lower vehicle speeds on approach	
Likelihood Score:	Base Case 2/4	Design Option 2/4	Base Case -/4	Design Option	Base Case 3/4	Design Option 2/4	Base Case 2/4	Design Option 1.5/4	Base Case 3/4	Design Option 2.5/4
Severity Comments:	Factors influencing severity: • Unshielded hazards along the roadside (lighting poles) • Speeds are likely to be low (less than 50km/h)		Factors influencing severity: • -		Factors influencing severity: • Likely side on impact between vehicles. • Speeds are likely to be low (less than 50km/h)		Factors influencing severity: • Direct impact between vehicle and pedestrian. • ~~Speeds are likely to be higher than 30km/h~~ Design Factors: • Vehicle approach speeds likely to be reduced due to higher awareness of crossing due to signals.		Factors influencing severity: • Direct impact between vehicle and cyclist. • ~~Speeds are likely to be higher than 30km/h~~ Design Factors: • Vehicle approach speeds likely to be reduced due to higher awareness of crossing due to signals.	
Severity Score:	Base Case 2/4	Design Option 2/4	Base Case -/4	Design Option -/4	Base Case 2/4	Design Option 2/4	Base Case 3/4	Design Option 2.5/4	Base Case 3/4	Design Option 2.5/4
Product(multiply scores above for crash type)	**Base Case 16/64**	**Design Option 16/64**	**Base Case 0/64**	**Design Option 0/64**	**Base Case 24/64**	**Design Option 16/64**	**Base Case 24/64**	**Design Option 15/64**	**Base Case 36/64**	**Design Option 25/64**
TOTAL – Future Base Case									**100/320**	
TOTAL – Design Options 1-7									**72/320**	

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