City of Adelaide

Light Square/Wauwi Draft Master Plan

TRAFFIC ASSESSMENT REPORT

WGA250495

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August 2026

Revision History

REV	DATE	ISSUE	ORIGINATOR	CHECKER	APPROVER
A	18/07/2025	For information	DJ, AH, AK	JZ	HB
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CONTENTS

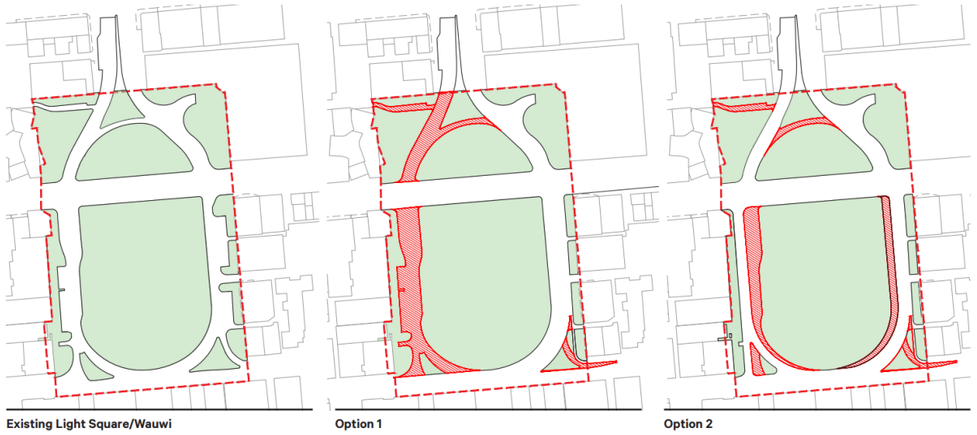
Figures

Tables

1 EXECUTIVE SUMMARY

The City of Adelaide (CoA) has developed a draft Master Plan to assess the feasibility of increasing the usable pedestrian and cyclist space within and around Light Square/Wauwi in the Adelaide CBD. CoA has selected the following two options in to achieve this desire for Light Square/Wauwi:

- Option 1 proposes to relocate the northbound carriageway from the west side of the Light Square/Wauwi to the east side, such that the northbound and southbound carriageways are co-located, and converting the existing 90° angle parking to parallel parking, increasing the space available within the centre of Light Square/Wauwi by up to 15% while providing a seamless connection along the western edge of Light Square/Wauwi.
- Option 2 proposes to retain the northbound and southbound carriageways separated by Light Square/Wauwi, with the number of traffic lanes in the northbound direction reduced from the current three to two lanes and the existing 90° angle parking converted to parallel parking, increasing the open space within the centre of Light Square/Wauwi by up to 9%.



Existing Light Square/Wauwi | Option 1 | Option 2

Legend	Existing Light Square/Wauwi	Option 1	Option 2
Total area within scope of Master Plan	39,108m²	39,108m²	39,108m²
Area of road surface	18,740m²	15,260m²	16,916m²
Area of road surface removed	N/A	4,096m²	2,895m²
Footpaths, lawns and gardens (green space)	20,368m²	19,752m²	19,297m²
Total area of green space	20,368m²	23,848m²	22,192m²
Percentage of green space	52%	61%	56%

Wallbridge Gilbert Aztec (WGA) has assessed the two draft masterplan options for traffic related impacts on various user groups, including development of traffic modelling assessment using Aimsun.

While both options aim to improve safety and amenity for pedestrians and cyclists within and around Light Square/Wauwi, their impacts on various movements through Light Square/Wauwi and on the broader transport network are significantly different.

- Option 1 has a significant impact on public transport as it removes and/or reroutes out-of-service bus movements currently turning or undertaking U-turns at Light Square/Wauwi – impacts on these movements need to be reviewed further in consultation with SAPTA during design development phase.
- Option 2 retains all existing public transport movements at Light Square/Wauwi; however, it was estimated to result in a minor increase in delays due to reduced capacity in the northbound direction.
- Option 1 improves west bound connectivity for Waymouth Street and avoids roundabout or use of footpaths by cyclist connectivity and amenity with an opportunity for an off-road shared use path within Light Square/Wauwi.
- Option 2 is considered to offer negligible improvements to the cycling network and amenities.
- Option 1 offers improved pedestrian connectivity, amenity and safety for the majority of movements as it proposes to replace unsignalised crossings with signalised crossings; there are a number of movements that may experience extended travel times compared to the existing situation.
- Option 2 has minimal impact on pedestrian connectivity and travel times.
- Both options have considered on street parking changes within Light Square/Wauwi to further increase pedestrian and cyclist usable space and safety, and removes reversing into traffic for parked vehicles.

Traffic modelling using Aimsun was undertaken for subarea model extracted from DIT's Tactical Adelaide Model (TAM) for the project. The traffic modelling findings for the modelled area indicate that:

- Option 1, in its current form and without considering any upgrades to intersections in the wider network from the Light Square/Wauwi, is expected to increase the travel time delays experienced by motorists across the network during the morning peak period. In addition, the modelling indicates a significant redistribution of traffic in the east west direction due to the reduced capacity through Light Square/Wauwi.
- Option 2 performs similarly to the existing network in the morning peak period; however, it is forecast to experience increased delays in the afternoon peak period.
- Delays across the network can be attributed to some of the key intersections, away from the Light Square/Wauwi reaching their capacity during the peak periods.
- Selected travel routes passing through the Light Square/Wauwi (e.g., eastbound, northbound, westbound and southbound) were estimated to experience varying levels of increase or decrease in travel times during the morning and afternoon model periods, as summarised in the table below.

ROUTE	BASELINE	OPTION 1	OPTION 2
Morning Model Period – Average Travel Time in Seconds			
Route 1 – Southbound	164	194 (+18%)	156 (-5%)
Route 2 – Northbound	161	220 (+37%)	170 (+5%)
Route 3 – Eastbound	194	174 (-11%)	208 (+7%)
Route 4 – Westbound	311	430 (+61%)	302 (-5%)
Afternoon Model Period – Average Travel Time in Seconds			
Route 1 – Southbound	147	126 (-14%)	142 (-3%)
Route 2 – Northbound	168	165 (-2%)	190 (+14%)
Route 3 – Eastbound	181	174 (-4%)	182 (+0.7%)
Route 4 – Westbound	187	202 (+8%)	243 (+31%)

Neither option prevents the movements of emergency vehicles, in particular the SAMFS vehicles travelling to/from North Adelaide via Morphett Street/Montefiore Road.

As the two options offer varying results for individual user groups, it will be critical to develop a hierarchy of the user groups to assess and compare the impacts of this assessment and community feedback, such that CoA can identify the preferred option, and balancing an increase in open space with vehicle movements. Both options are feasible and achieve community outcomes at different scales. It is noted that 17% vehicle users have an origin outside of the CBD in the morning of and 49% in the afternoon.

2 INTRODUCTION

2.1 LIGHT SQUARE/WAUWI DRAFT MASTER PLAN

The City of Adelaide (COA) has developed a draft Master Plan in response to the communities design for improved access, activation, safety and amenity for pedestrian and cyclists within and around Light Square/Wauwi .Increasing the usable pedestrian and cyclist space within and around the Light Square/Wauwi through modification to the road traffic movement and on street parking through Light Square/Wauwi.

This draft Master Plan aligns with the City's broader objective to revitalise the West End of Adelaide's Central Business District (CBD), with Light Square/Wauwi identified as a key public green space in the north-west of the city.

The draft Master Plan forms part of the Adelaide Park Lands Management Strategy - Towards 2036, and aims to transform Light Square/Wauwi into a more accessible, greener and safer open space. The site is a key green space in the city's north-west and is central to broader plans to revitalise the West End.

The two draft Master Plan options are shown in Figure 2-1 and Figure 2-2.

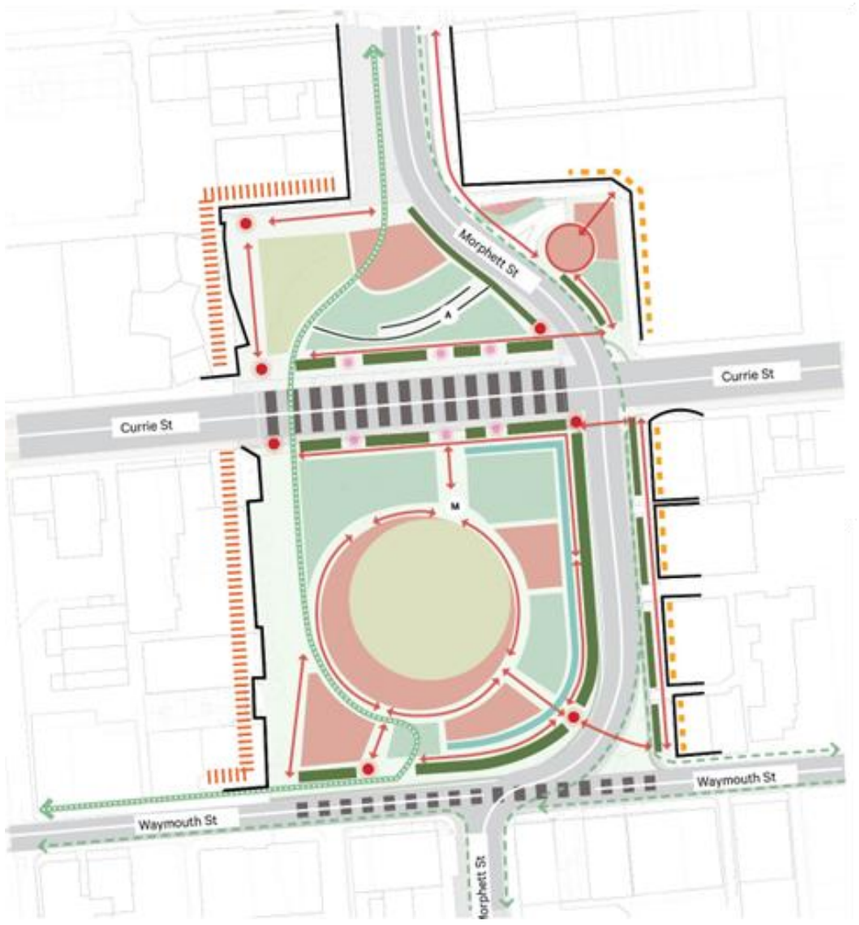


Figure 2-1: Light Square Upgrade Option 1

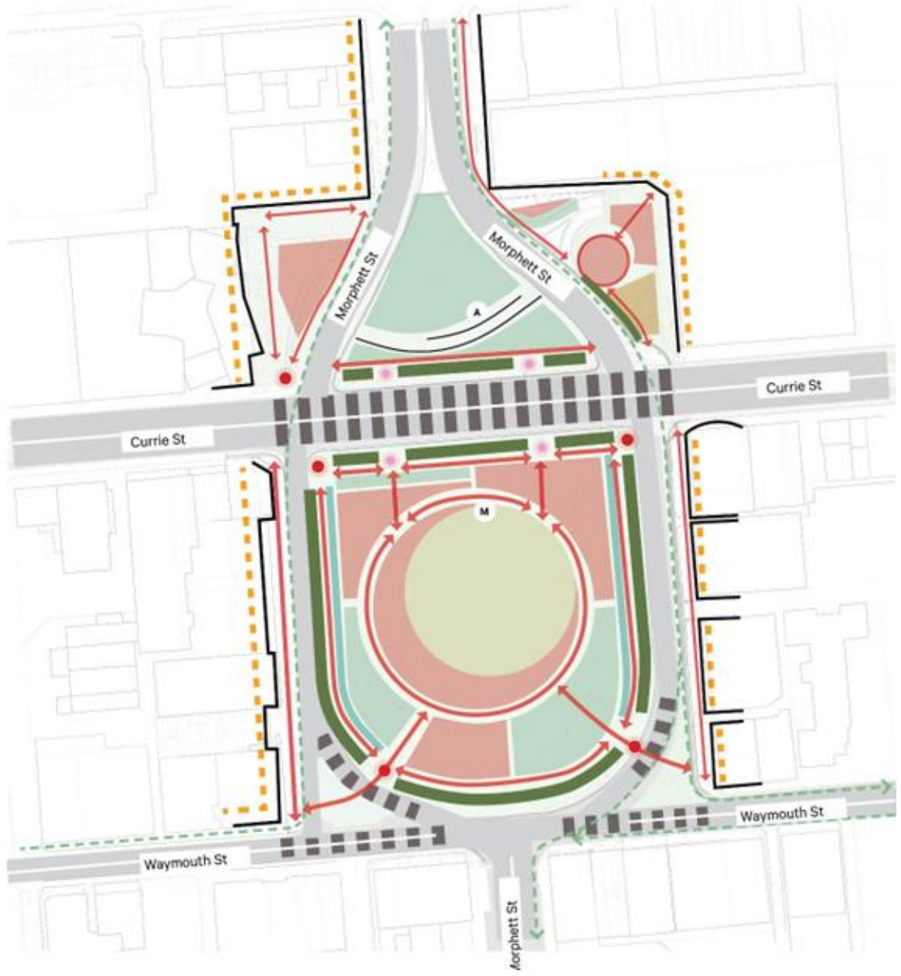


Figure 2-2: Light Square/Wauwi Upgrade Option 2

This report assesses the potential impacts of the proposed draft Master Plan options on passenger vehicles, emergency services, delivery vehicles, public transport, cyclists and pedestrians, accessing and/or passing through the Light Square/Wauwi, as well as an appreciation for potential impacts on the performance of a broader (CBD sub-area) transport network.

The draft Master Plan options for the Light Square/Wauwi upgrade are also included in Appendix A for reference.

3 METHODOLOGY

WGA developed a tailored approach to analyse and compare the two draft Master Plan options to assist the CoA with decision-making and further stakeholder and community engagement on the preferred draft Master Plan option. The adopted methodology was refined through discussions with the CoA and the Department of Infrastructure and Transport (DIT).

3.1 Establish Baseline Conditions

WGA sourced, collated and refined data from various sources, to establish the baseline conditions. Data was sourced from both government agencies and non-government agencies (private service providers). These data sources included the following:

- Location SA & Data SA (GIS layers, e.g., road hierarchy, crash statistics).
- CoA (Viva City Portal – Traffic Volumes, Pedestrian and Cyclist Movements).
- DIT (Average daily and hourly Bus movements through Light Square/Wauwi, Tactical Adelaide Model (TAM) Aimsun model for the study area).
- Strava® (Pedestrian and Cyclist – highly used cycling routes).
- Tom Tom Move® (Peak Period Origin-Destination and Link Traffic Volumes).
- AddInsight® (Traffic Signal phase and splits, loop detector counts, Travel Times).
- SAMFS information on fire truck movements through Light Square/Wauwi.
- Site observations by WGA Engineers during the morning (AM) and afternoon (PM) peak hours.

The collated and refined data was used to develop the baseline conditions that included the following considerations:

- Identifying traffic routes based on hourly traffic using select road links to/from the LS/A.
- Reviewing peak hour travel times along selected routes that would likely to be impacted due to one or both draft Master Plan options for the Light Square/Wauwi.
- Reviewing pedestrian and cyclist desire lines around and through Light Square/Wauwi.
- Reviewing bus movements – through, terminating at and undertaking a U-turn movements at Light Square/Wauwi.
- Emergency vehicle movements.

3.2 Traffic Modelling

A traffic modelling approach, aligning with DIT's Tactical Adelaide Model (TAM) Guidelines (published 30 August 2024), was developed considering the level of detail required for analysing the options. DIT has developed and manages updates to the whole of Adelaide TAM model, and any modelling exercise must be done in accordance with its TAM Guidelines.

Whilst the road infrastructure within the CBD is under the care and control of the CoA, DIT has the joint responsibility to manage and approve any changes to transport infrastructure within the CBD. The traffic modelling approach to compare the two options to the existing situation was developed in consultation with DIT and refined to achieve a balance between the project's draft master plan level of detail and DIT's level of detail for traffic modelling, noting that a detailed analysis will be required in the future to validate the preferred option. WGA's proposed traffic modelling approach is summarised in the Traffic Modelling Scoping Document included in Appendix B.

3.3 Findings

Findings from the traffic modelling and desktop analysis for the baseline (existing conditions) and the two options were compared to assess potential impacts on various user groups (vehicles, buses, cyclists, pedestrians and commercial vehicles).

3.4 Next Steps

The analysis presented in this report is aimed at assisting CoA in comparing the two options and informing the selection of the preferred draft Master Plan option for further design development. Upon selecting the preferred option for Light Square/Wauwi, detailed investigations will be required to validate the findings from the analysis presented in this report and identify and investigate mitigation measures, leading to the development of a detailed design.

4 EXISTING LIGHT SQUARE/WAUWI

4.1 Locality

Light Square/Wauwi is located in the northwestern quadrant of Adelaide's Central Business District (CBD), and forms part of a mixed-use urban environment comprising commercial, institutional (education), health, medium-density residential and student accommodation. Currie Street, Morphett Street and Waymouth Street provide direct access to Light Square/Wauwi.

Currie Street is a key public transport corridor with dedicated bus lanes in both directions. Morphett Street/Montefiore Road provides a key connection to Northern Adelaide and suburbs further to the north and northwest. Waymouth Street provides access to several offices and paid car parks. Waymouth Street is also a key east-west cycling route linking into Pirie Street (to the east of King William Street). Refer to Figure 4-1 for the locality plan.

Hindley Street, which runs parallel to Currie Street on the northern side, is a key destination during the weekend. Whilst Light Square/Wauwi is within a short walking distance from the universities and student accommodation, and less than 200 m from Hindley Street, it has additional capacity for events in the CBD.

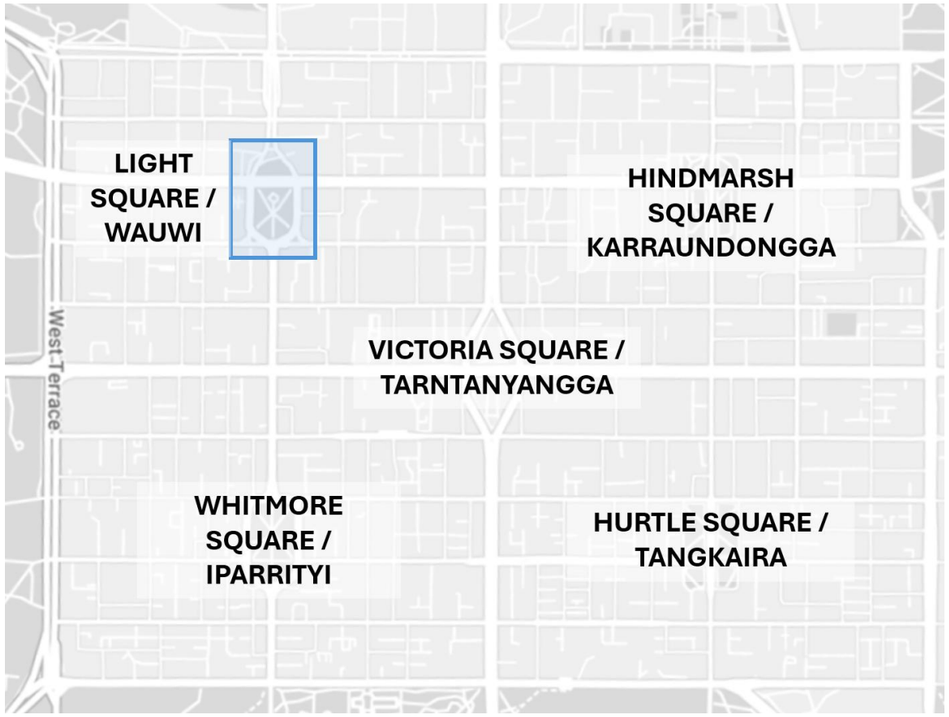


Figure 4-1: Locality Plan

4.2 Road Network/Layout

Currie Street, Morphett Street (including northbound & southbound legs through Light Square) and Waymouth Street are all classified as arterial roads under the DIT road hierarchy, attracting relatively high traffic volumes and forming part of key public transport routes.

Hindley Street, Currie Street, Waymouth Street, and Franklin Street are oriented east-west, whilst Morphett Street is oriented north-south. Playhouse Lane is a local street providing access to several off-street car parks.

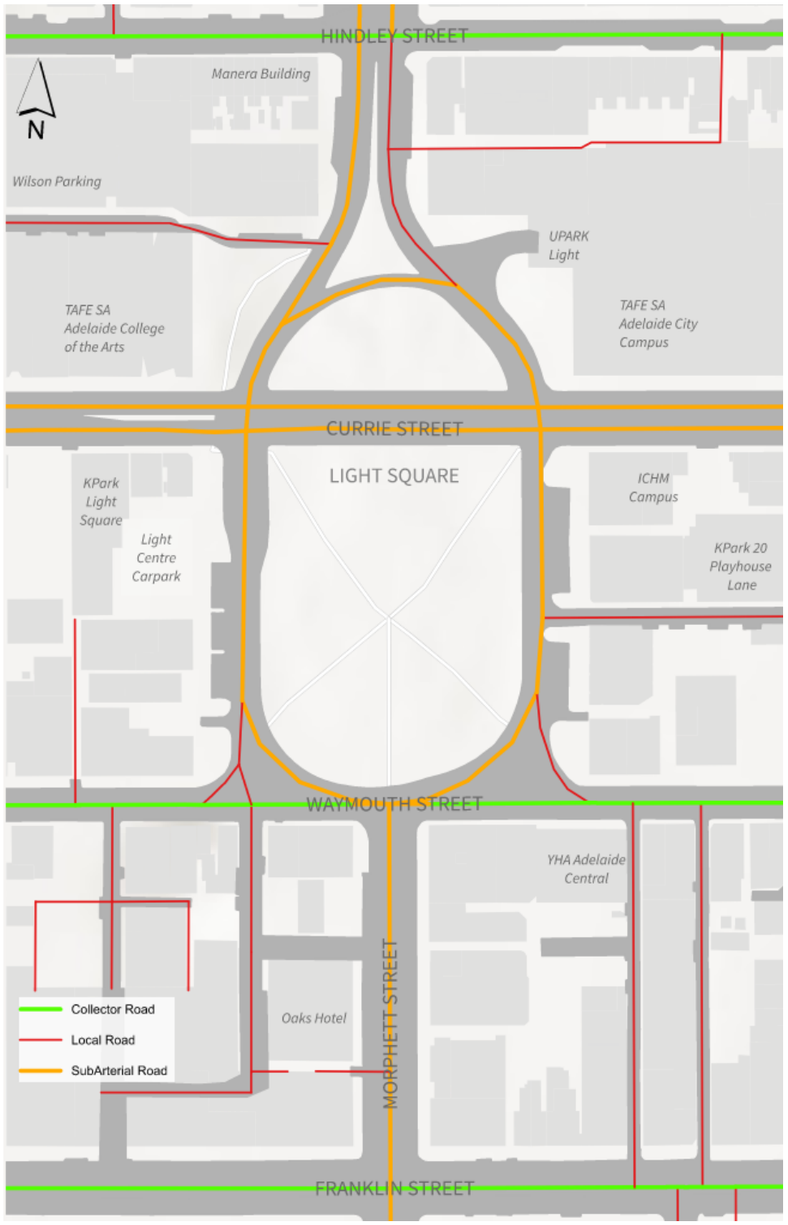


Figure 4-2: Road Hierarchy

4.3 Public Transport Network

Currie Street is classified as a *priority bus corridor* with dedicated Bus Lanes in both directions, operating from 7 am to 7 pm.

Morphett Street (north and south of the Light Square/Wauwi) operate at a standard frequency (service frequency varies from 10 minutes to 1 hour throughout the day)

Light Square/Wauwi is a key node in Adelaide's public transport network. Several bus routes operating along Currie Street terminate near Light Square/Wauwi. Light Square/Wauwi also offers the opportunity for terminating routes to undertake a U-turn (within the Light Square/Wauwi) before starting a new route/service. Several bus routes servicing Morphett Street (to/from south) and Montefiore Road (to/from north) are able to undertake right/left turns at the Light Square/Wauwi to access/exit the Currie Street bus corridor.

The City Connector bus service provides a free, frequent public transport service for travel within the CBD. The City Connector operates along Currie Street and Morphett Street/Montefiore Road, requiring buses to turn right and left at Light Square/Wauwi.

Additionally, the Light Square/Wauwi serves as a key connection for out-of-service buses

- Accessing the bus depot located on Currie Street/Clarendon Street, some 150m west of Light Square/Wauwi.
- Which turn around at Light Square/Wauwi and travel to a bus stop to start a new service.
- Which turn around and use the lay down area along the northern side of Currie Street (as shown in Figure 4-3) to wait before starting a new service.

Information sourced from the South Australian Public Transport Authority (SAPTA) has identified the following bus movements passing through Light Square/Wauwi.

Table 4-1: Average Daily Bus Movements through Light Square/Wauwi

DIRECTION	IN SERVICE	NOT IN-SERVICE	TOTAL
East – West (Through)	1,544	483	2,028
To/from North	260	93	353
To/from South	157	52	229
East-West U-Turns	0	56	56
North-South (Through)	0	23	23
North-South U-Turns	0	4	4
Total	1,961	711	2,682

An average of 2,682 buses are estimated to pass through the Light Square/Wauwi on a daily basis. Nearly 77% (2,051 out of 2,682) of the total buses traverse through the Light Square/Wauwi, i.e., not undertaking a turning movement.

The remaining 23% (631 out of 2,682) of the buses currently undertake a turning movement (right turn, left turn or a U-turn) at Light Square/Wauwi as shown in Figure 4-3, Figure 4-4 and Figure 4-5.

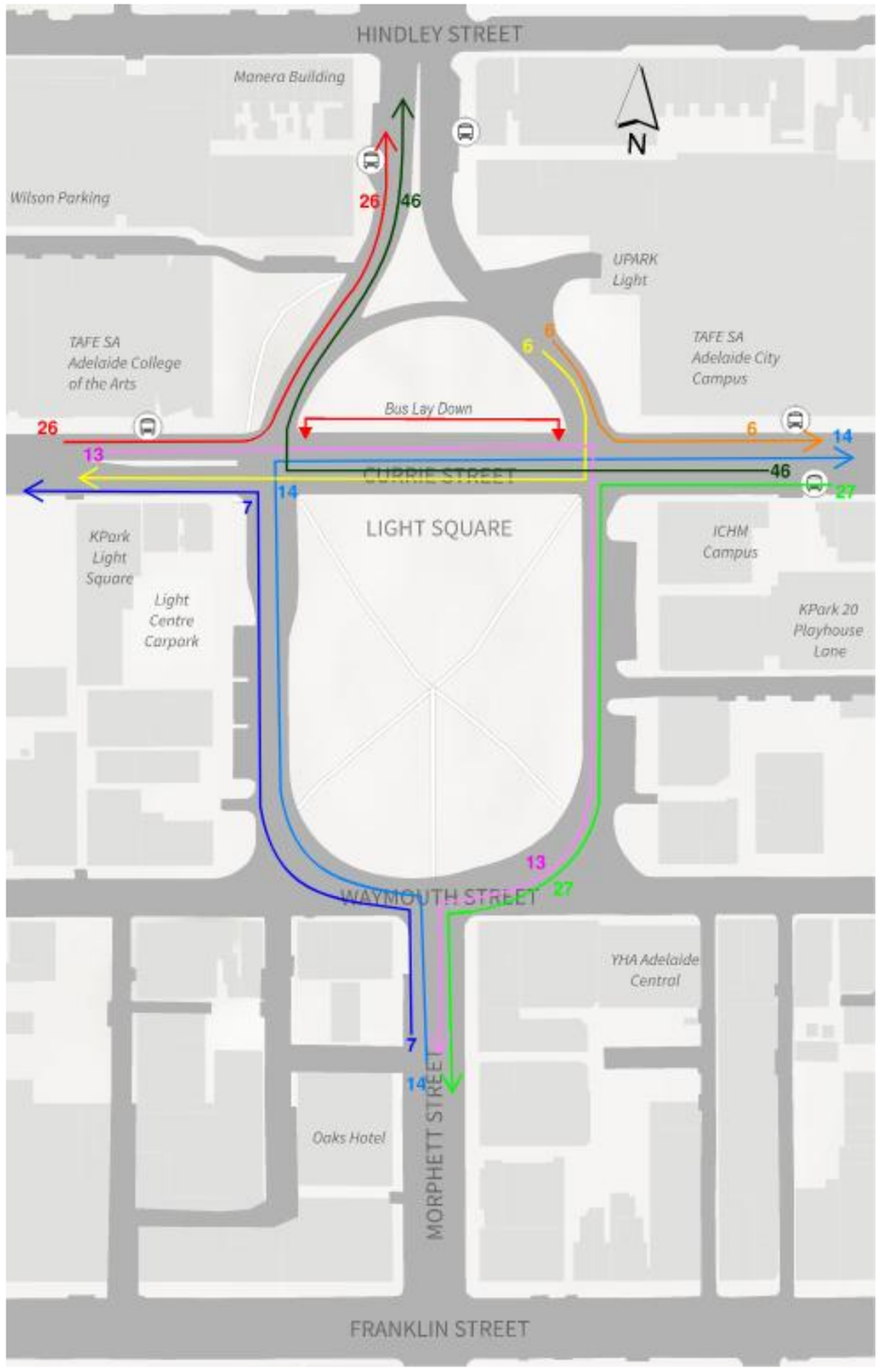


Figure 4-3: In Service Bus Services – Turning Movements at the Square

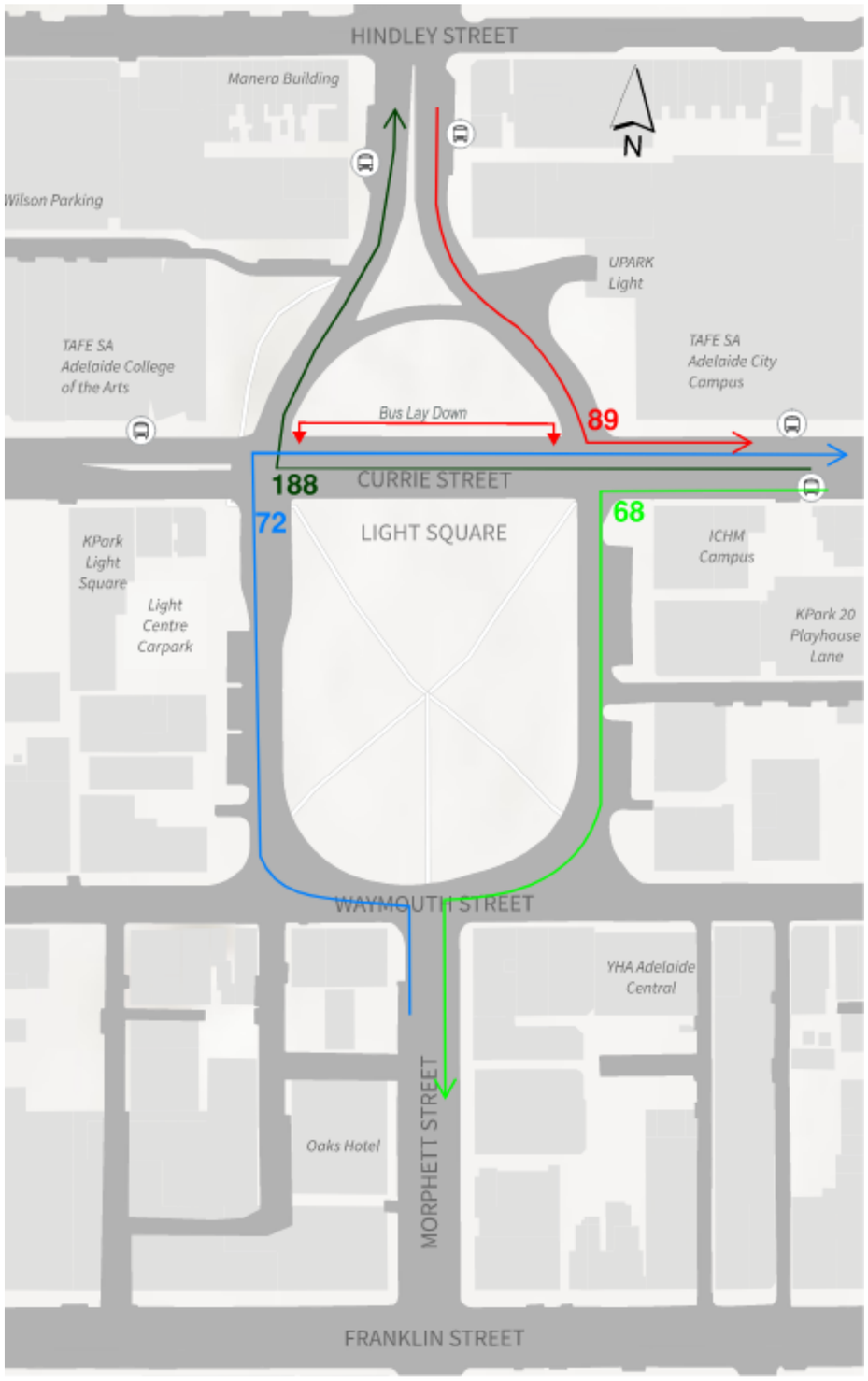


Figure 4-4: NOT In-Service Bus Services – Turning Movements at Light Square/Wauwi

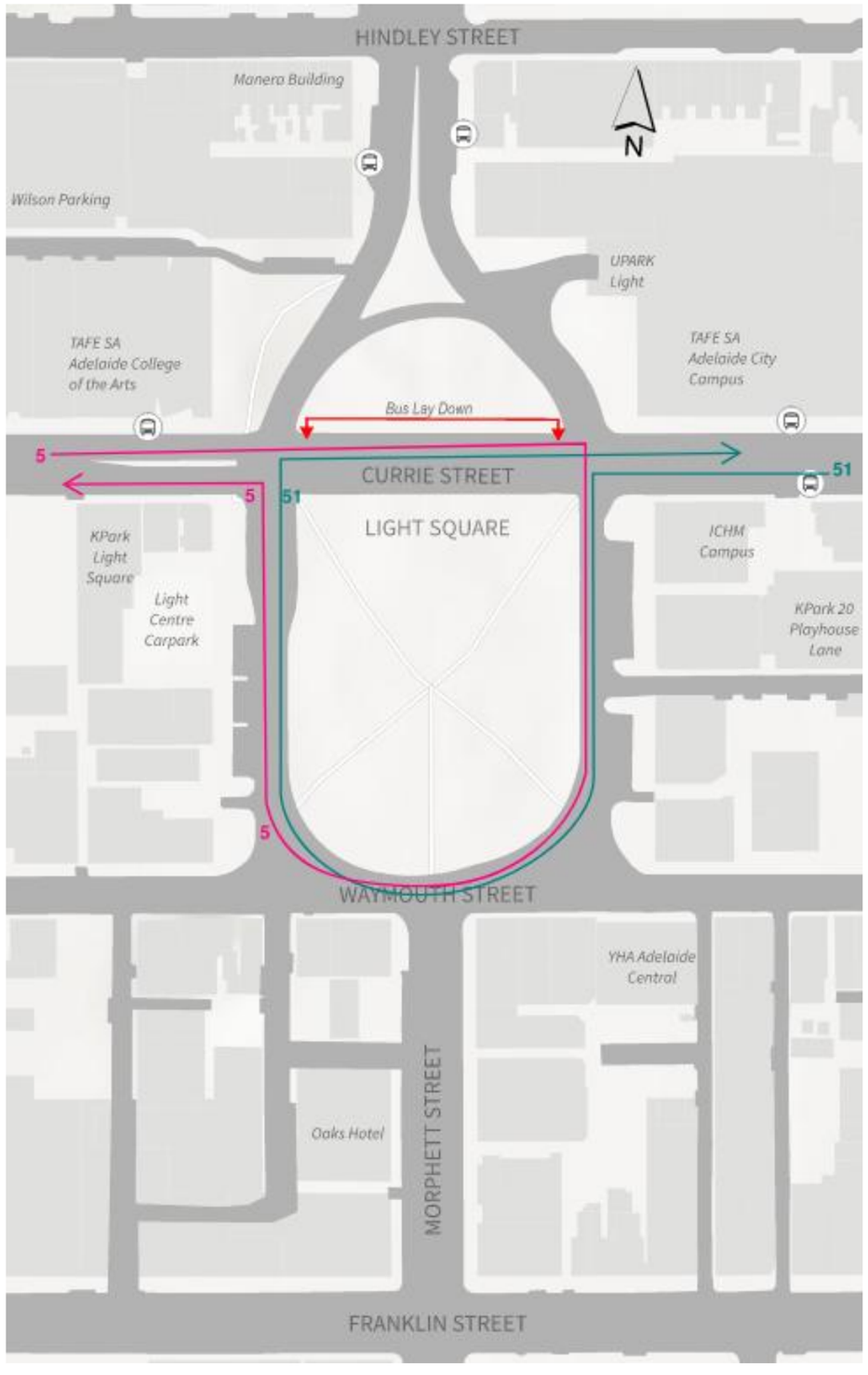


Figure 4-5: NOT In-Service Bus Services – U-Turns at the Light Square/Wauwi

4.4 Pedestrian Connectivity

Pedestrian connectivity within Light Square/Wauwi is considered to be limited for linear travel paths (e.g., east-west/north-south) and poor for diagonal travel paths (southwest–northeast/northwest–southeast) passing through the centre of Light Square/Wauwi.

Footpaths around the external periphery of the Light Square/Wauwi (i.e., along Light Square/Wauwi northbound and southbound legs) are a minimum 3.0 m wide and verge along the western outer edge in the range of 9.0 m. Paved paths are provided through the central Light Square/Wauwi, offering an opportunity to walk through Light Square/Wauwi and reduce overall walking distance for various pedestrian routes. Key pedestrian desire lines observed during the site visit are shown in Figure 4-6.

The following key pedestrian desire lines were observed at through and around Light Square/Wauwi:

1. Northwest (Currie Street) to southeast (Waymouth Street) – through Light Square/Wauwi.
2. Southwest (Waymouth Street) to northeast (Currie Street) - through Light Square/Wauwi.
3. East-west movements along the northern side via Currie Street.
4. East-west movements along the southern side of Waymouth Street.
5. North-south movements along the eastern side of the Light Square/Wauwi.
6. Pedestrians were also observed to use the north-south pedestrian crossing at Waymouth Street and Morphett Street intersection.

The diagonal pedestrian movements were considered to experience a below-average level of service, as pedestrians traversing diagonally through Light Square/Wauwi are required to cross up to four traffic flows:

- Up to two traffic flows at the Currie Street signalised intersection.
- An unsignalised crossing across the southbound (or northbound) leg of Light Square/Wauwi.
- An Unsignalised crossing across the left turn slip lane (to Waymouth Street in the southeastern corner or from Waymouth Street in the southwestern corner).

Diagonal pedestrian movements through Light Square/Wauwi require pedestrians to cross three traffic lanes at an unsignalised crossing in the southeastern corner and two traffic lanes in the southwestern corner. These unsignalised crossings expose pedestrians to a higher crash potential, rendering them unattractive. Site observations identified the following:

- 20 pedestrians (average during peak hour) use the unsignalised crossings in the southeastern corner.
- 30 pedestrians (average during peak hour) use the unsignalised crossing in the southwestern corner.
- 60 pedestrians (average during peak hour) use the signalised pedestrian crossing at the Waymouth Street intersection.

One crash involving a pedestrian, resulting in a minor injury, was reported during the most recent five-year period at the southeastern unsignalised pedestrian crossing. Refer to Section 4.6 for historical crash data analysis.

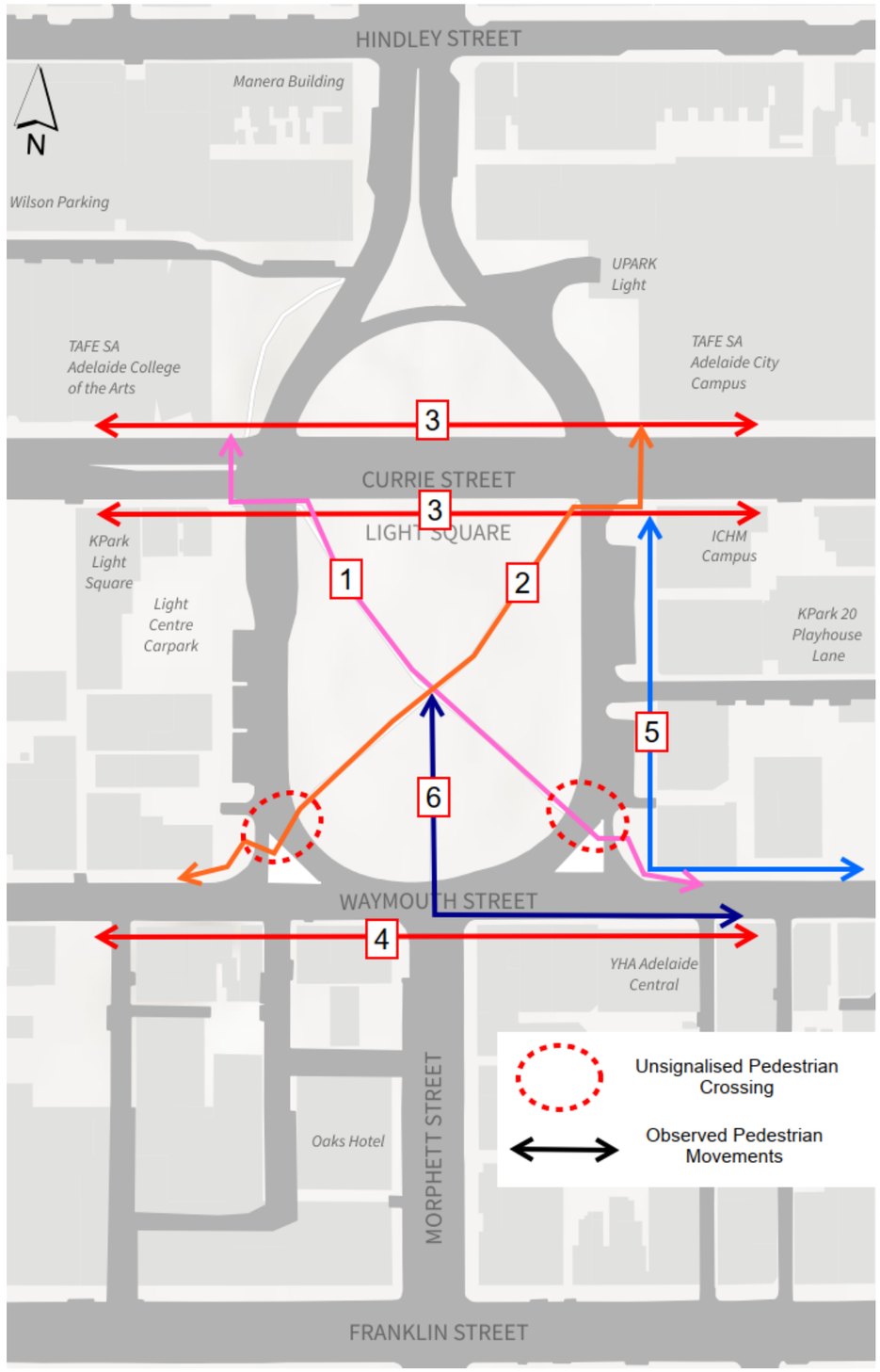


Figure 4-6: Pedestrian Connectivity and Desire Lines at Light Square/Wauwi

4.5 Cycling Connectivity

Light Square/Wauwi forms a key part of the cycling network within the CBD, linking with the key north-south bike route across the River Torrens (Montefiore Road bridge), the River Torrens Linear Trail and east-west bike route on Waymouth Street/Pirie Street.

Dedicated kerbside bicycle lanes are provided in the north-south direction through Light Square/Wauwi. Additionally, off-road sealed paths are provided through the Light Square/Wauwi centre and also a short path in the north-western corner of the Light Square/Wauwi (adjacent to the TAFE SA Adelaide College of Arts). Refer to Figure 4-7 for the existing cycling network at Light Square/Wauwi.

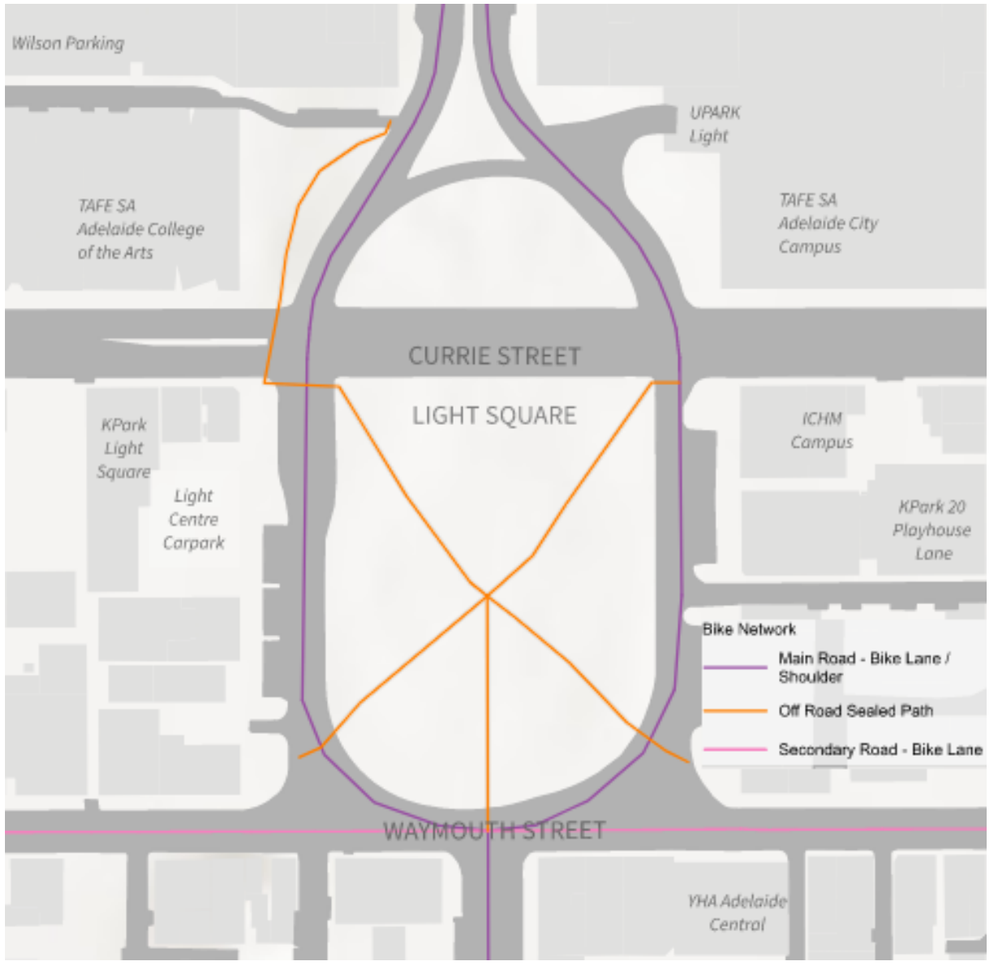


Figure 4-7: Existing Cycling Network at Light Square/Wauwi

The Strava® Metro Map was used to understand the existing cyclists' movements into and out of Light Square/Wauwi and its surroundings. Figure 4-8 and Figure 4-9 show typical cyclist movements during the AM and PM Peak Periods.

Figure 4-8: Typical Cyclist Volumes – AM Peak Period

As shown in Figure 4-8, while both Hindley Street and Waymouth Street have full-time on-street bicycle lanes, and no bicycle lanes along Currie Street, cyclist demand along Hindley Street and Currie Street was observed to be higher than along Waymouth Street (between West Terrace and Light Square) during the AM peak period.

Currie Street is not a designated cycling route; however, data from Viva City Data motion sensors identified cyclists regularly using the road (riding in the bus lane) and footpaths along it.

Figure 4-9: Typical Cyclist Movements – PM Peak Period

During the PM peak period, cyclists' demand on Waymouth Street (between Morphett Street and West Terrace) was estimated to be lower than on Currie Street and Hindley Street. Franklin Street was estimated to attract a significantly high demand, possibly due to an unsignalised intersection at West Terrace and Waymouth Street, which requires cyclists to cross up to eight traffic lanes. It appears the westbound cyclist demand shifts to Franklin Street or uses Light Square/Wauwi /Morphett Street to access the River Torrens Linear Park.

4.6 Crash History

Crash History Data for the most recent five-year period (2019 – 2023) sourced from the SA Location Viewer portal was reviewed and findings summarised in this section.

4.6.1 Total Crashes

The historical crash data indicated that a total of 72 crashes occurred within Light Square/Wauwi. In summary:

- 30% (21 crashes) resulted in casualties, with 8% (6 crashes) requiring hospitalisation due to serious injuries.
- The remaining 62% of crashes were classified as property damage only.
- 76% of crashes (55 out of 72) were reported to have occurred at the three signalised intersections.
- 17% (12 crashes) were classified as rear-end,
- 21% (15 crashes) were classified as side swipes, and
- 25% (18 crashes) were right-angle crashes.

Table 4-2: Total Crashes within the vicinity of Light Square/Wauwi

CRASH TYPE	RIGHT ANGLE	RIGHT TURN	REAR END	SIDE SWIPE	HIT PED	HIT FIXED OBJECT	BIKE	TOTAL	TOTAL INJURY	TOTAL PROPERTY DAMAGE
Number	18	7	13	16	15	3	(11)	**72**	23	49

Site observations have identified that right turns filter on Currie Street, allowing traffic to turn right to travel north (right turn at the western intersection) or south (right turn at the eastern intersection) when a safe gap is identified in the through traffic on Currie Street. Some of the right angle and right turn crashes can be attributed to these filter right turn movements at the traffic lights. A high number of side swipe and rear end crashes (40%) are typically due to driver inattention.

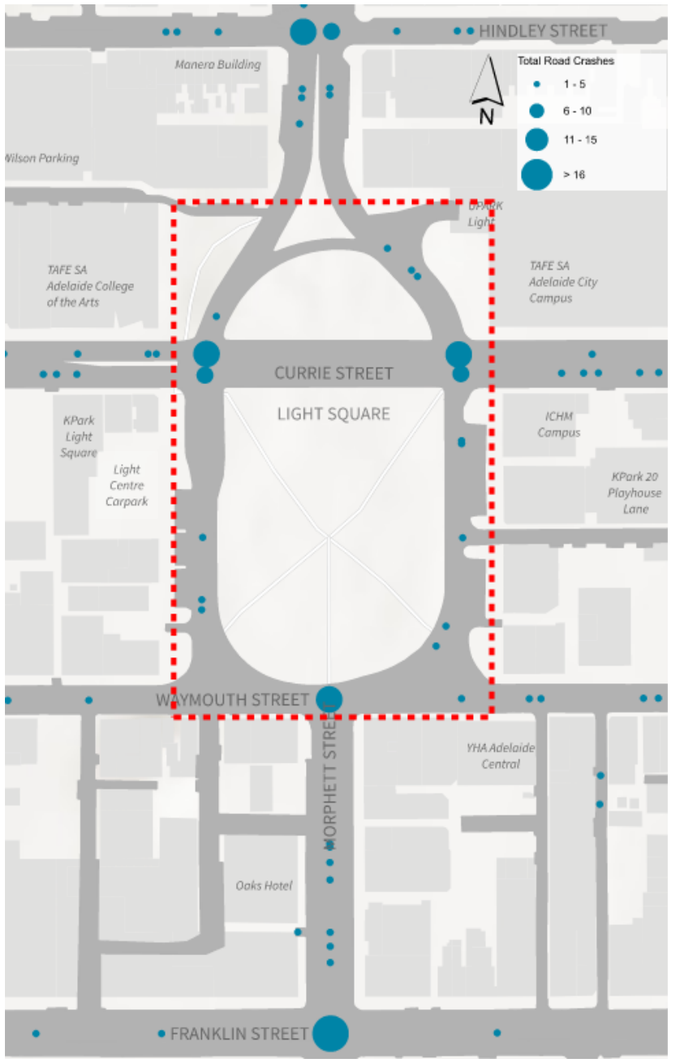


Figure 4-10: Total Road Crashes (Location SA :2019 – 23)

4.6.2 Cyclist and Pedestrian Crashes

A review of the crash data indicated that 26 out of 72 (36%) of crashes involved a pedestrian or a cyclist. As shown in Figure 4-11 the majority of the pedestrian crashes occurred at the two signalised intersections at Currie Street, while the majority of the cyclist crashes were reported at the Waymouth Street and Morphett Street intersection.

Two crashes were reported at mid-block locations where a designated pedestrian crossing is not provided. Four crashes at mid-block locations involving cyclists (3 on the eastern leg of Light Square/Wauwi and 1 on the western leg) were reported.

Six crashes involving cyclists were reported at the Waymouth Street/Morphett Street Intersection, with a significant majority being side swipe crashes indicating potential negligence by motorists.

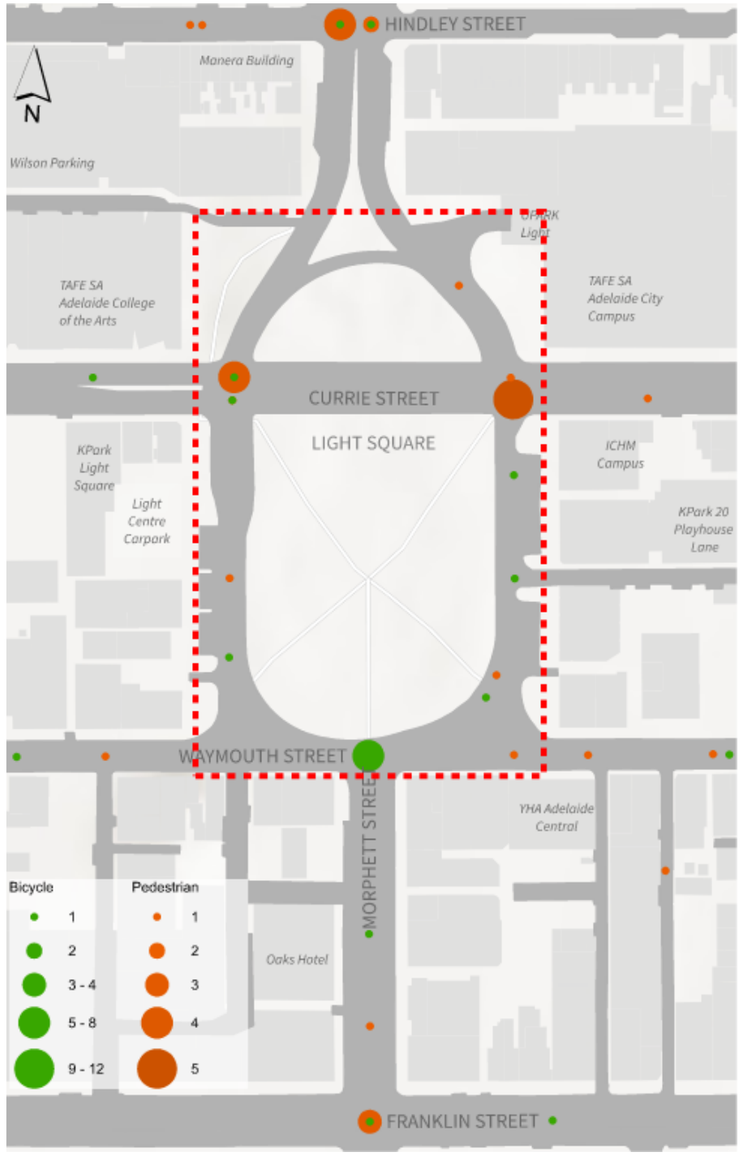


Figure 4-11: Road Crashes Involving Pedestrians and Cyclists (Location SA :2019 – 23)

4.7 Vehicle Movements

4.7.1 Peak Periods

The peak hour for an individual intersection is typically observed to occur between 7:00 am – 9:00 am (morning peak hour) and 3:00 pm – 6:00 pm (afternoon peak hour), the options have the potential to alter traffic movements throughout the day. Hence, traffic analysis is considered a three-hour peak period in the morning (7:00 am – 10:00 am) and in the afternoon (3:00 pm – 6:00 pm), which also aligns with the DIT's guidelines for the peak periods used for traffic modelling.

Several AddInsight receptors using 3G technology stopped collecting and transferring data since the 3G service disconnected in October 2024. WGA therefore extracted Tom Tom Move® and AddInsight data from August 2024 for consistency.

While it is acknowledged that some of the businesses within the CBD may experience a peak hour between 10am and 3pm, the traffic generation during the business peak hour is not observed to reach the same levels as that of the morning or afternoon commuter peak hours.

4.7.2 Traffic Entering and Exiting Light Square/Wauwi

To accurately identify impacts of the options, it is critical to understand the existing vehicular movement to, from and passing through Light Square/Wauwi WGA used origin-destination data from Tom Tom Move®, an analytics platform that uses GPS data collected from phones and navigation systems (within individual vehicles) to show discrete vehicle movements.

Figure 4-12 and Figure 4-13 shows the percentage of traffic entering and exiting Light Square/Wauwi from each approach, during the AM and PM peak periods, respectively.

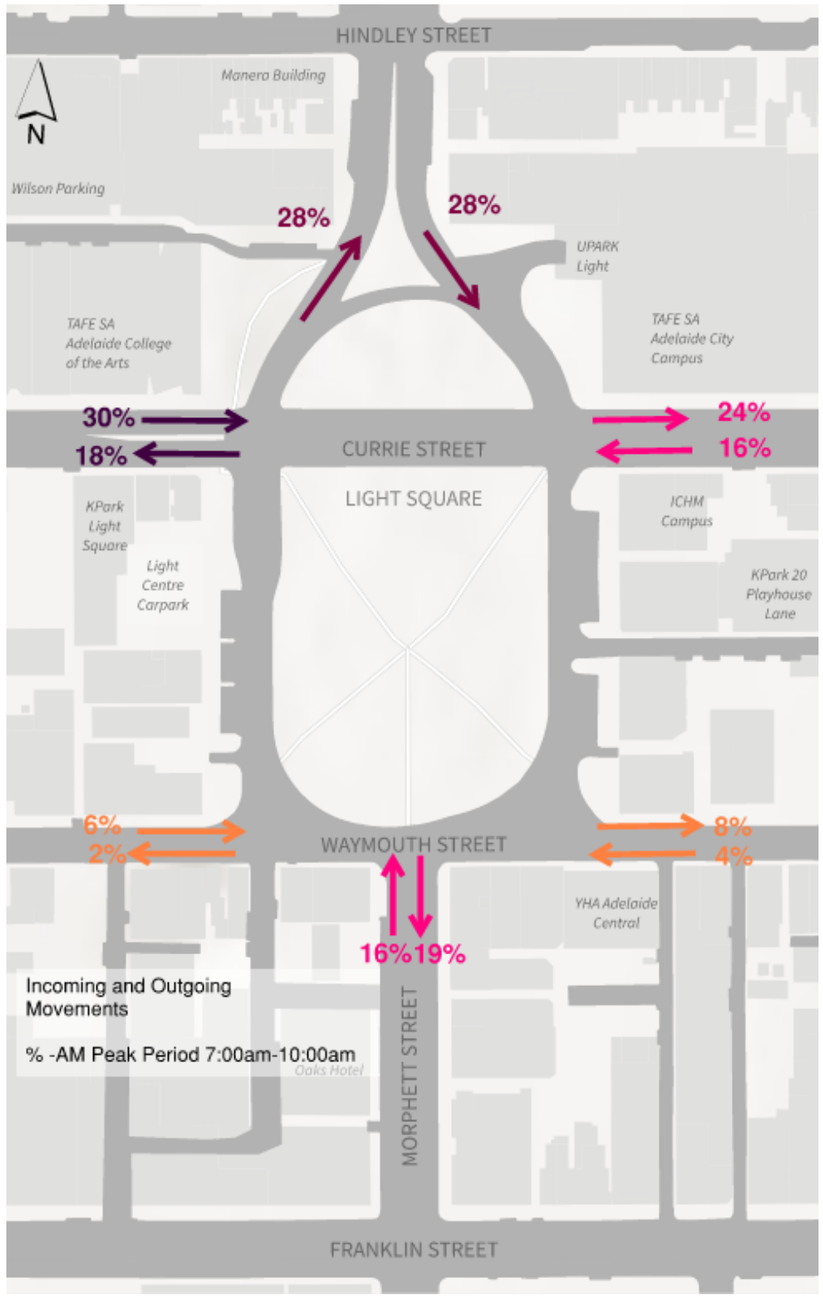


Figure 4-12: Origin Destination AM Peak Period (7:00am- 10:00am)

During the morning peak period, the majority of the traffic was estimated to enter Light Square/Wauwi via Currie Street west (30%), Morphett Street north (28%), Currie Street east (16%) and Morphett Street south (16%). The remaining traffic (10%) entered via Waymouth Street.

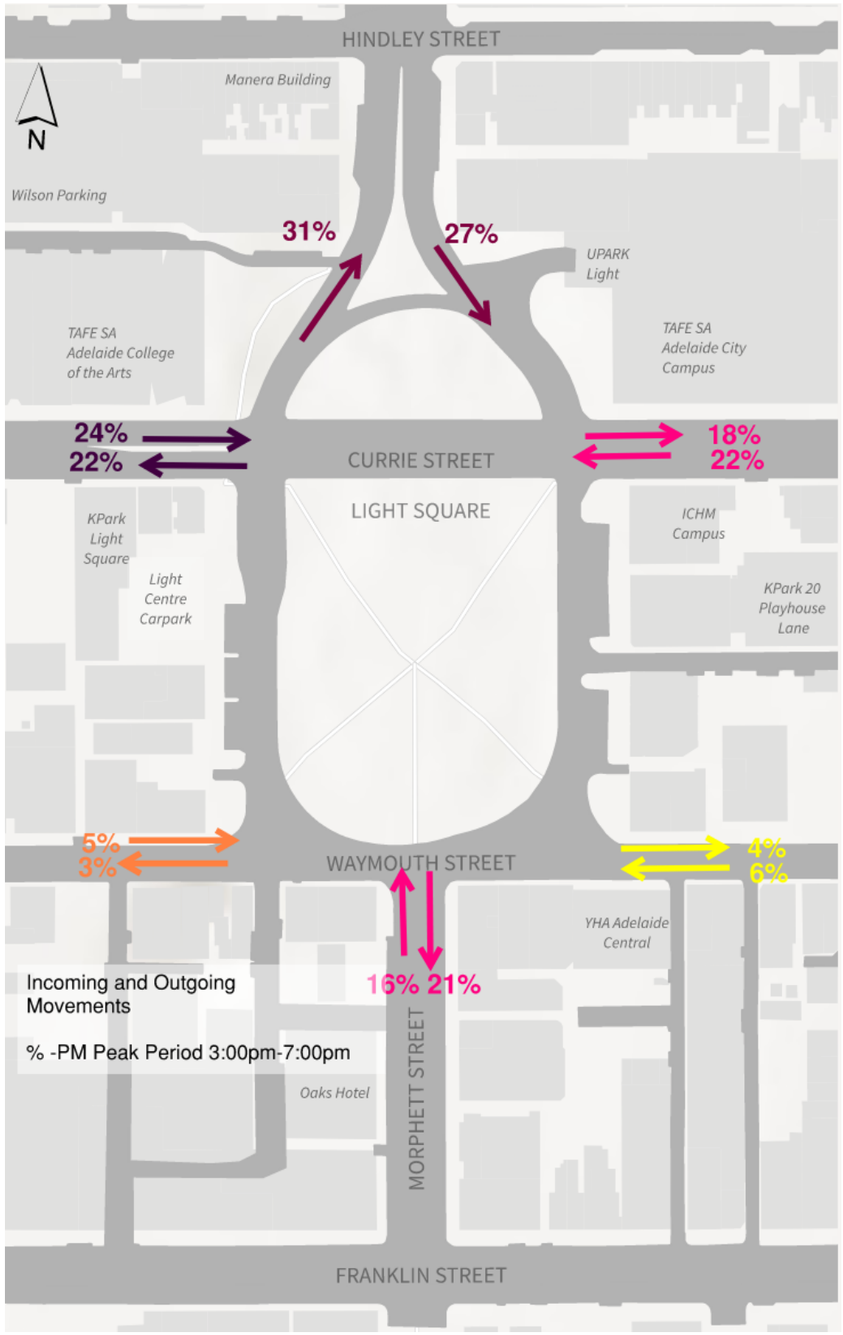


Figure 4-13: Origin Destination PM Peak Period (3:00pm -7:00pm)

During the afternoon peak period, the majority of the traffic was estimated to enter Light Square/Wauwi via Morphett Street north (27%), Currie Street west (24%), Currie Street east (22%) and Morphett Street south (16%). The remaining traffic (11%) entered via Waymouth Street.

Nearly a third (31%) of the traffic leaving Light Square/Wauwi was estimated to travel north on Morphett Street, with Currie Street (east and west legs) and Morphett Street south contributing similar splits, between 18 to 21%.

4.8 Emergency Vehicle Movements

The South Australian Metropolitan Fire Services (SAMFS) station is located on Wakefield Street in Adelaide CBD. It is understood that bridges on King William Street and Frome Road across the River Torrens have a load limit of 26 tonnes, which restricts the movements of SAMFS fire trucks. As such, Montefiore Road (via Light Square/Wauwi) provides the only access to and from North Adelaide for SAMFS vehicles; the alternative access routes via the inner ring route would be significantly longer. The most direct route between the Wakefield Fire Station and North Adelaide passes through Light Square/Wauwi. Both options propose retaining the north-south traffic movement as it currently feasible.

Currently, there is no coordination of traffic signals for emergency vehicles in within Light Square/Wauwi; however, this could be developed as part of the preferred option. Implementing signal coordination has the potential to significantly reduce emergency response times and improve overall traffic flow.

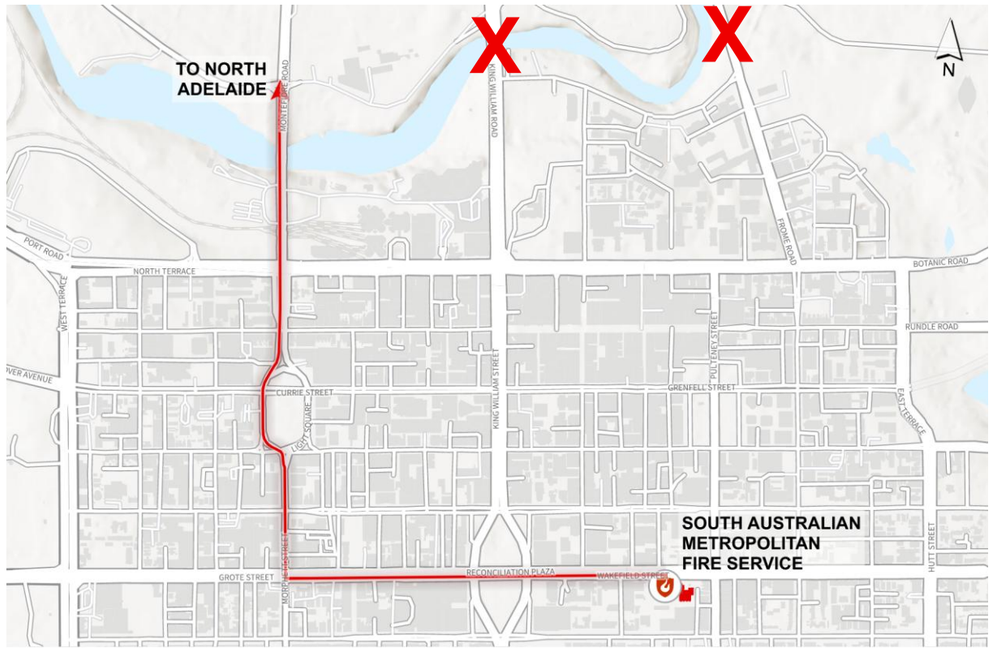


Figure 4-14: Emergency Vehicle Route

4.9 Origin and Destination

4.9.1 Traffic From/To North

TomTom Move indicated that, during the AM Peak Period 17% of the traffic travelling southbound on the Montefiore Road bridge (crossing the River Torrens) is passing through Light Square/Wauwi to a destination outside the CBD. In comparison, the remaining 83% is believed to have a destination within the CBD.

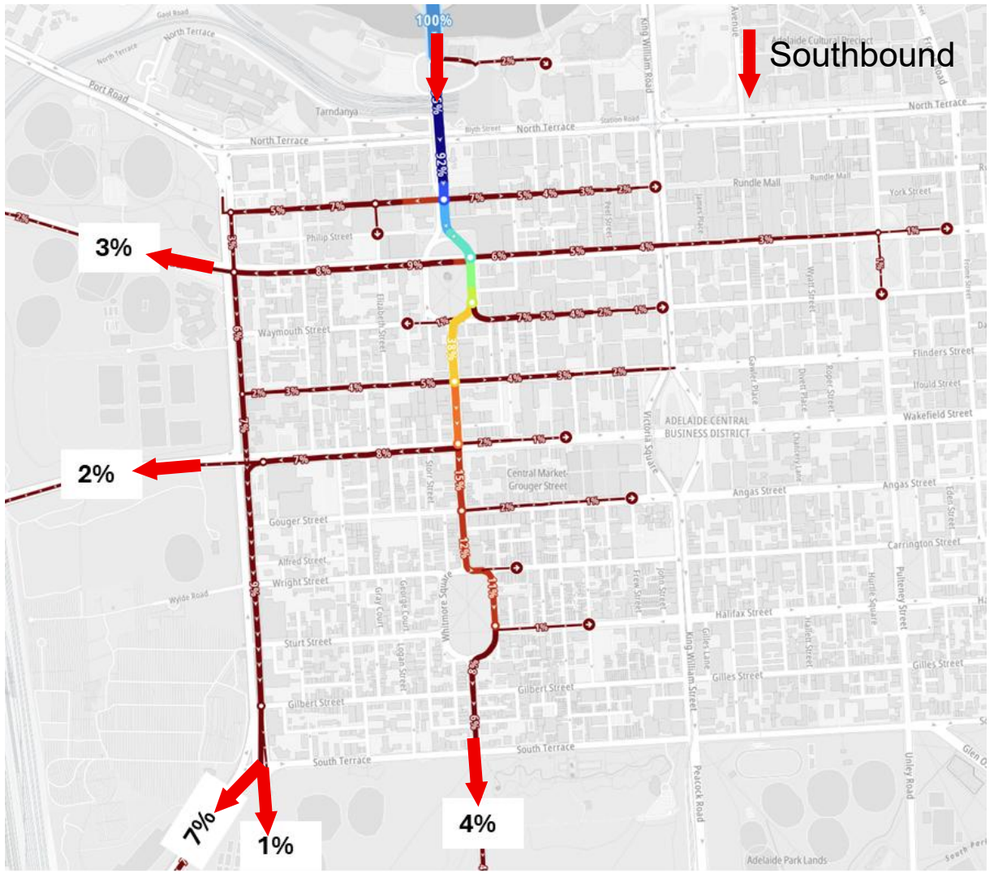


Figure 4-15: Destination of traffic travelling southbound across the River Torrens AM Peak Period (Montefiore Road)

During the afternoon peak periods, over a quarter (27%) of the traffic travelling in the southbound direction on the Montefiore Road bridge was estimated to have a destination outside the CBD.

During the morning peak period, nearly half (49%) of the traffic using the Montefiore Road bridge travelling northbound was estimated to originate outside the CBD and pass through Light Square/Wauwi. In particular, 22% of the traffic entered the CBD via Anzac Highway, 11% via Sir Lewis Cohen Avenue (which becomes Morphett Street within the CBD), before passing through Light Square/Wauwi to travel northbound across the River Torrens (Montefiore Road bridge).

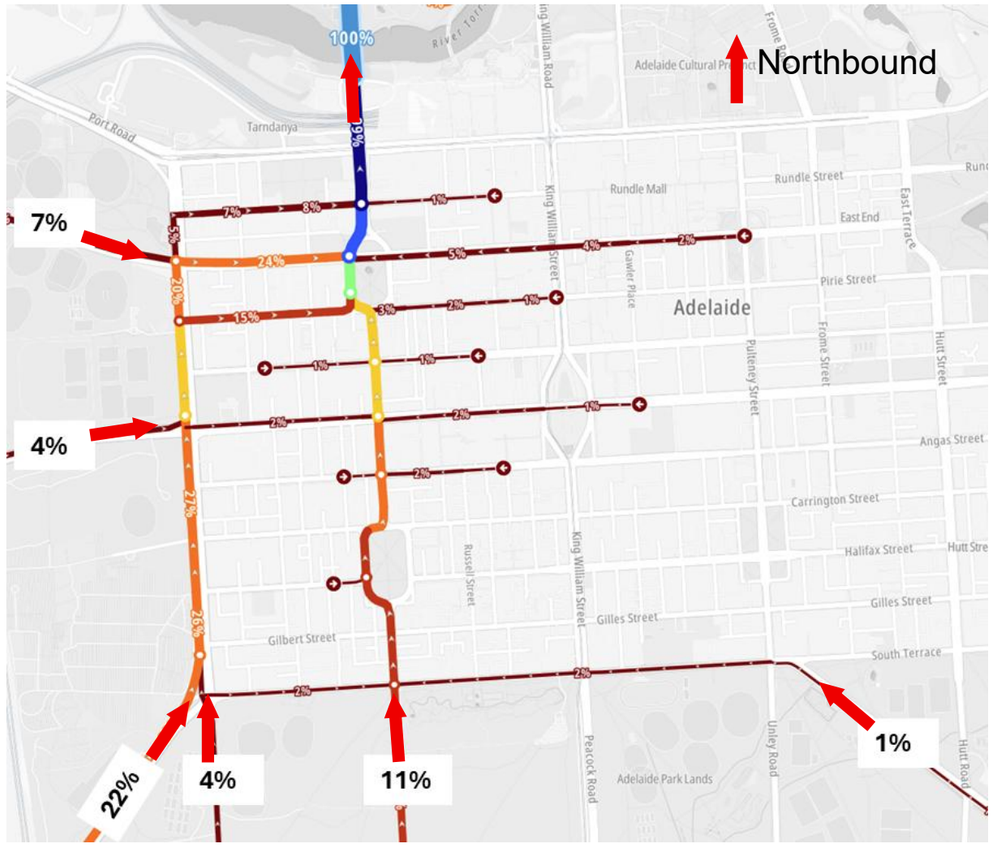


Figure 4-16: Origin of traffic travelling northbound across the River Torrens PM Peak Period (Montefiore Road)

During the afternoon peak period, nearly a third (49%) of the traffic travelling northbound on the Montefiore Road Bridge originated outside the CBD.

Based on TomTom Move Origin-Destination analysis, between 17% (in the morning peak period) and 48% (in the afternoon peak period) of the traffic passing through the Light Square/Wauwi is estimated to have an origin or destination outside the CBD. Namely, nearly 1 in 5 vehicles in the morning peak period and 1 in 2 vehicles in the afternoon peak period are 'passing traffic', using the Light Square/Wauwi and the CBD road network to access a destination in North Adelaide or beyond (outside the CBD).

4.9.2 Substitute for Restricted Right Turns at King William Street Intersections

Right turns at the majority of the intersections along King William Street are restricted from 7:00 am to 7:00 pm on weekdays. With right turn restrictions into and out of side streets, traffic originating from the eastern half of the CBD and travelling to north and northwest have limited options in Frome Street or Pulteney Street, leading to North Terrace or travel to Morphett Street (to Churchill Road/ Prospect Road) or West Terrace (to Port Road).

As shown in Figure 4-17, a small 5% in the AM Peak Period and 10% in the PM Peak Period, of the traffic undertaking right turn from Currie Street to travel north on Morphett Street/Montefiore Road was estimated to originate to the east of King William Street.

Similar to Currie Street, up to 5% of the traffic turning right at Waymouth Street to travel north through Light Square/Wauwi was estimated to originate from the east of King William Street.

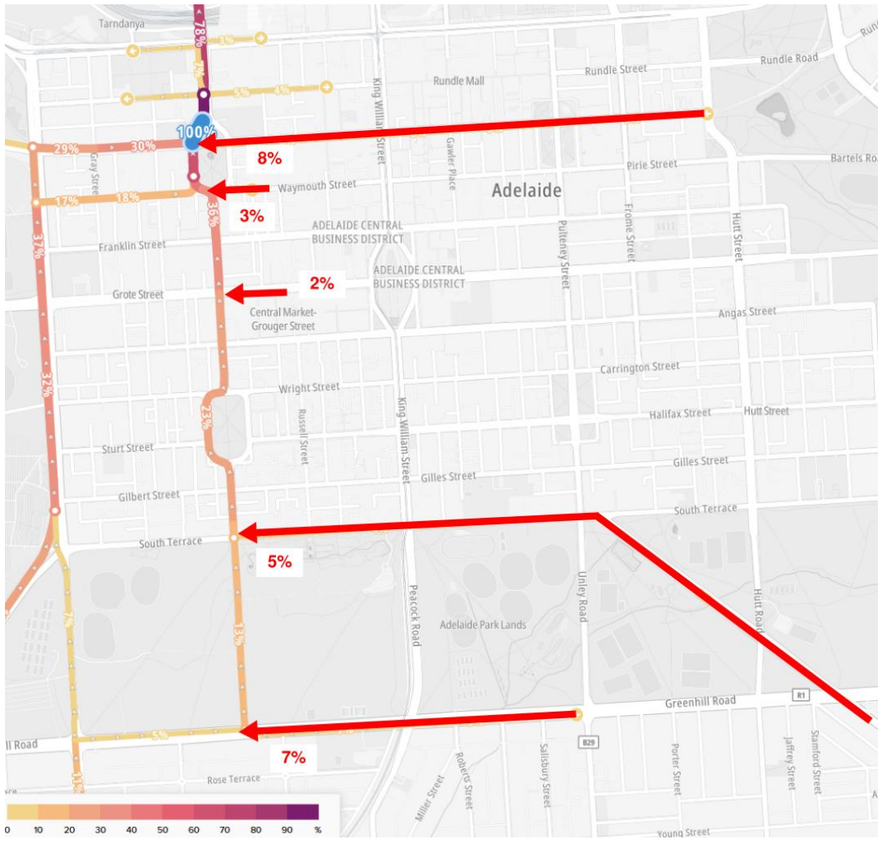


Figure 4-17: Substitute for Restricted Right Turns at King William AM Peak Period

4.10 Parking

4.10.1 On-Street Parking

Time-restricted, paid, on-street parking is provided on both the eastern and western sides of Light Square/Wauwi, with each side configured with 19 angled (90°) parking bays. The existing parking provision at Light Square/Wauwi is summarised in Table 4-3.

Table 4-3: Existing Parking Provision at Light Square/Wauwi

STANDARD BAYS	ACCESSIBLE BAYS	LOADING ZONE	TOTAL
Light Square/Wauwi – East Leg			
13 standard bays 2 Plug in Electric Vehicles 2 with no parking during 8am – 6pm*	1	1*	16
Light Square/Wauwi – West Leg			
17 standard bays 2 Permit Zone bays*	1	-	18

* not included in parking provision calculations

Thus, a total of 34 parking bays, including 30 standard bays, 2 accessible bays, 2 EV bays and 2 accessible bays, are provided at Light Square/Wauwi Two (2) bays on the eastern side, with parking restrictions during daytime (no parking 8am – 6pm), and two (2) permit bays on the western side were not counted in the general parking calculations due to the existing parking restrictions for these bays. These four bays, however, increase the total parking provision at Light Square/Wauwi to a total of 38 bays.

Figure 4-18: Light Square/Wauwi – Eastern Side Parking Conditions

Additionally, on the western side, there is a motorcycle parking area located immediately north of the Light Centre Carpark's access.

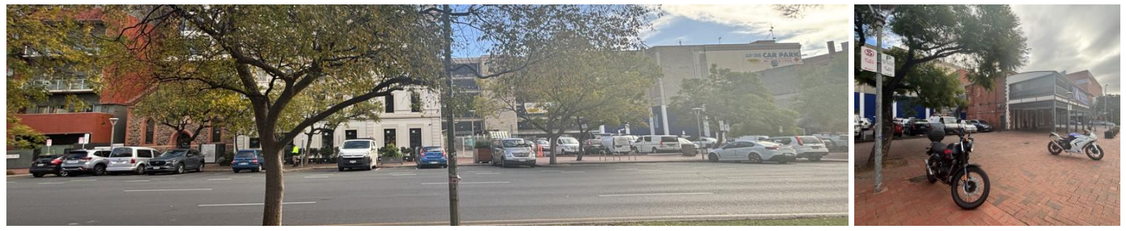


Figure 4-19: Light Square/Wauwi – Western Side Parking Conditions

The CoA has installed in-ground sensors to monitor the usage of on-street parking and loading zones throughout the CBD. Table 4-4 shows the maximum utilisation of these spaces during paid parking hours. Analysis of the sensor data revealed that the peak period for parking demand on both sides of the street occurs between 6:00 PM and 8:00 PM.

Table 4-4: On-Street Parking Utilisation

PARKING LOCATION	TIME PERIOD	MAX UTILISAITON (%)
Light Square/Wauwi – East Leg	Average (during paid hours)	54%
	Peak (6:00 pm – 8:00 pm)	85%
Light Square/Wauwi – West Leg	Average (during paid hours)	56%
	Peak (6:00 pm – 8:00 pm)	60%

Accessible parking bays were estimated to experience a consistent 46% utilisation on both sides, while the loading zone averaged 30%. Two Electric Vehicle bays on the eastern side were occupied on average 56% of the time.

Site observations identified that during the morning peak period, the northeastern area (just south of Currie Street intersection) was frequently used for drop-offs.

The on-street angle (90°) parking on both sides of Light Square/Wauwi has 4.8 m long parking bays allowing up to 0.6 m overhang over the kerb. Up to 5.8 m manoeuvring space is provided between the bicycle lanes. The overall arrangement provides up to 15.6 m width between the traffic lane and the kerb, which exceeds the Australian Standard (AS2890.5-2018) for On-street Parking requirements of 13.7 m for 90° angle parking.

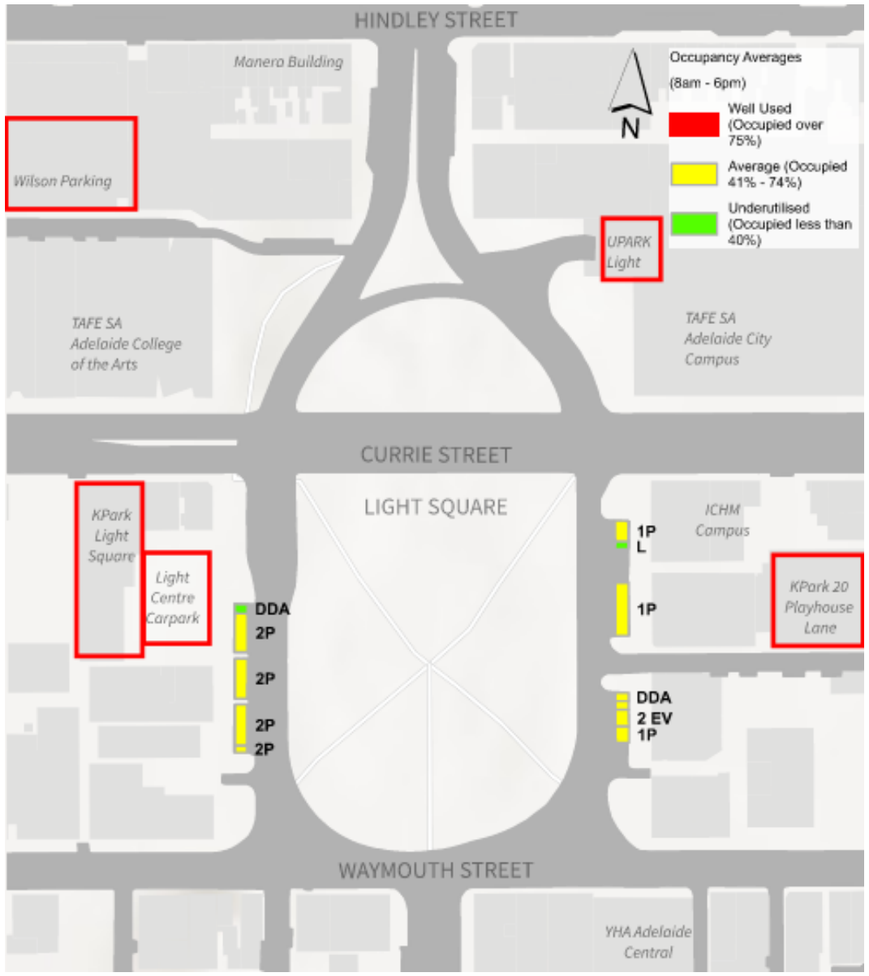


Figure 4-20: Parking Utilisation in the Light Square/Wauwi

4.10.2 Off-Street Parking

There are a multiple of undercover paid car parks in the vicinity of the Light Square/Wauwi, as shown in Figure 4-20.

4.10.2.1 UPark by City of Adelaide

Data was sourced for the UPark Light Square/Wauwi located at the rear of the TafeSA campus and UPark Topham Mall, both operated by CoA. Other car parks are not operated by CoA, hence occupancy data was not available.

Data for UPark Light Square/Wauwi facility indicated that the majority of traffic movements into the car park occurs between 8:00 am and 9:00 am, with 50% of the total car park capacity arriving during this time. This aligns with the discounted early bird entry cutoff period at 9.30 am and TafeSA classes start times. Similarly, highest traffic movements (exit) from the car park were observed to occur between 5pm and 6pm, again aligning with the end of business hours including that of TafeSA.

Data for UPark Topham Mall also indicated peak hour movements occurring between 8.00 am and 9.00 am, and 5.00PM and 6.00PM. UPark Topham Mall is accessible via the northern leg of the signalised intersection at Waymouth Street and Bentham Street.

4.10.2.2 KPark

KPark operates three car parks at/ near Light Square/Wauwi:

- 149 Currie Street – with two-way access off Currie Street (Approximately 260 spaces).
- 53 Light Square – directly accessible from the northbound leg of Light Square/Wauwi (Approximately 70 spaces).
- 20 Playhouse lane – accessible from the southbound leg of Light Square/Wauwi and Gilles Arcade linking to Currie Street (Estimated 375 spaces).

The KPark facility at 53 Light Square/Wauwi has its only access from the northbound leg of Light Square; thus, all traffic entering and exiting uses the northbound leg of Light Square/Wauwi.

Site observation identified traffic to/from the KPark facility on Playhouse Lane entering and exiting Light Square/Wauwi during peak hours.

4.10.2.3 Care Park

Care Park operates the Henry Waymouth Car Park (100 Waymouth Street) located at the northern end of Young Street. The subject car park has 680 parking spaces with main (two-way) access from Young Street and an exit-only access onto Bloor Court, offering an easy egress for vehicles to Currie Street.

5 LIGHT SQUARE/WAUWI REIMAGINED

5.1 Draft Master Plan Options

5.1.1 Option 1 – Light Square/Wauwi Northbound Carriageway shifted to the east

Option 1 for Light Square/Wauwi proposes to shift the northbound carriageway of Light Square/Wauwi between Waymouth Street (southern end) and Philip Street (northern end) to the east.

The potential relocation of the northbound carriageway to the east will necessitate converting the 90° parking on the eastern side of Light Square/Wauwi to parallel parking, thereby improving safety and increasing available space in Light Square/Wauwi. While the northbound carriageway will be shifted adjacent to the southbound carriageway (to the east of Light Square/Wauwi), access to the Light Centre Car Park, waste removal and emergency access to properties along the western edge of Light Square/Wauwi (69 to 79 Light Square/Wauwi must be maintained.

Option 1 will result in the following movements being removed:

- Northbound right turn from Light Square/Wauwi (at Currie Street western intersection)
- Westbound right turn from Waymouth Street to Light Square/Wauwi northbound
- Southbound right turn from Light Square/Wauwi (to travel westbound on Waymouth Street)
- Northbound U-Turn and right turn into UPark TafeSA car park
- Pedestrian Crossing at the western intersection on Currie Street

Option 1 will:

- Introduce a new movement that currently is not provided for – Eastbound through movement on Waymouth Street.
- Rearrange the pedestrian crossing at Waymouth Street and Morphett Street to provide crossings across all four approaches to the intersection.

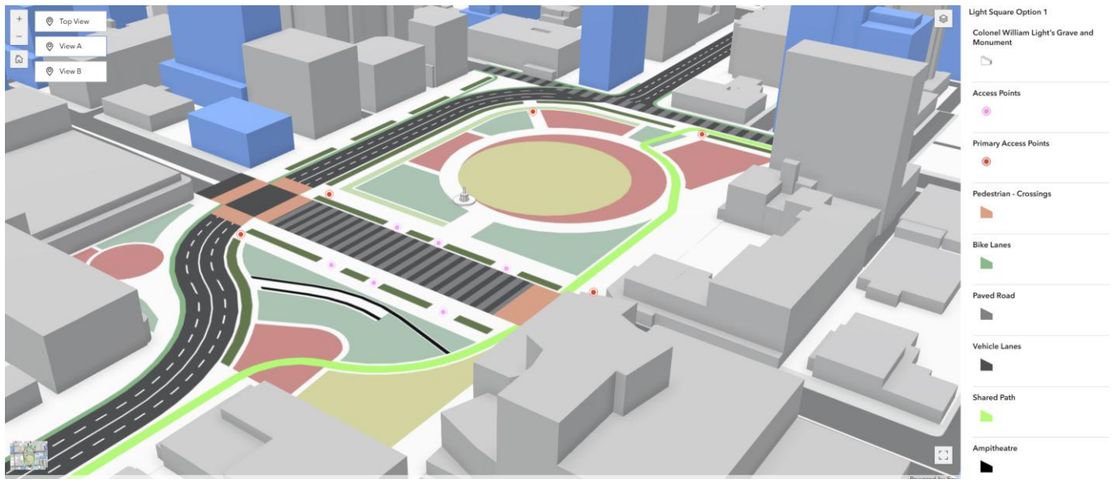


Figure 5-1: Light Square/Wauwi – Draft Master Plan Option 1

Under existing conditions, vehicles travelling eastbound on Waymouth Street can travel north on Light Square/Wauwi (western leg), turn right onto Currie Street, turn right onto Light Square/Wauwi (eastern leg) and turn left onto Waymouth Street to travel eastbound. This movement will be simplified through the provision of eastbound through movement on Waymouth Street.

Left turns at the Currie Street and Light Square/Wauwi (eastern intersection) and Waymouth Street and Morphett Street intersection will be retained.

Option 1 can also include converting 90° angle parking on both sides of Light Square/Wauwi to parallel parking, which will reduce the overall parking provision from the existing 38 spaces to 20 spaces in Light Square/Wauwi and increase the green space within and around Light Square/Wauwi.

The relocation of the northbound carriageway, along with the parallel parking, can increase the usable space in the Light Square/Wauwi by up to 9% whilst returning the western edge of Light Square/Wauwi for Park Lands purposes.

5.1.2 Option 2 – Reduced and Relocated Northbound and Southbound Carriageways

Option 2 proposes to reduce the number of northbound lanes (on the western leg of Light Square/Wauwi) from the current three lanes to two lanes.

Option 2 can also include conversion of the current 90° angle parking on both sides of the Light Square/Wauwi to parallel parking, which, along with the removal of one northbound traffic lane, can increase the usable space in Light Square/Wauwi by up to 15%.

Option 2 will retain all existing traffic movements at the three signalised intersections, as well as pedestrian crossings.

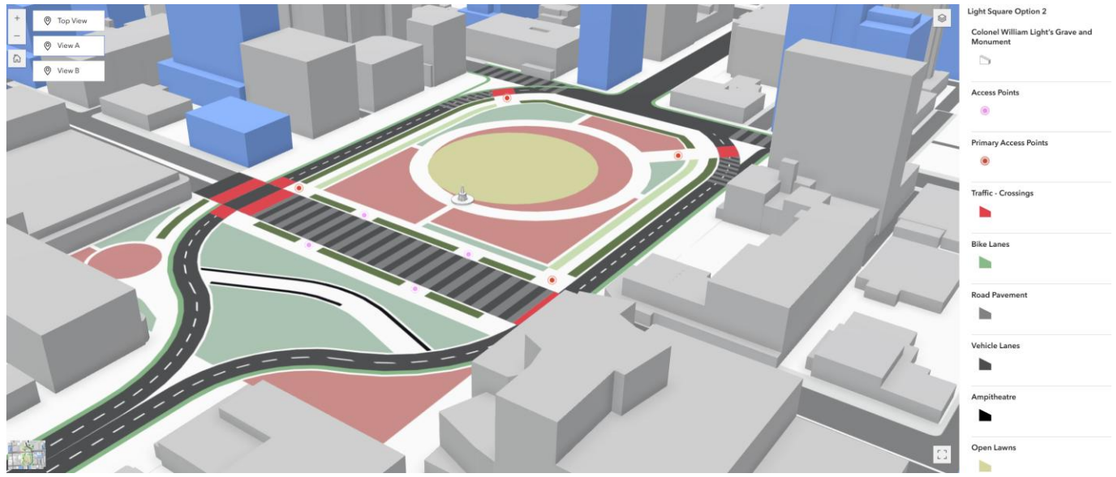


Figure 5-2: Light Square/Wauwi – Draft Master Plan Option 2

5.2 Impacts on On-Street Parking and Loading Zone

Vehicles manoeuvring into and out of the 90° angle parking spaces are required to cross the bicycle lane when parking and exiting these bays, thus increasing the potential of a crash's severity. Research (Elvik and Vaa, 2004) has found that converting angle parking to parallel parking can reduce casualty crashes by up to 35%.

Both options proposed can accommodate converting the existing 90° parking to parallel parking, which, while improving safety, will reduce the parking provision within Light Square/Wauwi. The conversion of the existing parking to parallel can achieve up to 18 parking spaces – nine (9) spaces on both the eastern and western legs of Light Square/Wauwi, resulting in a loss of 20 parking spaces (from the existing 38 bays, including the 2 permit and 2 out-of-business-hours parking spaces). Refer to Table 5-1 for impact on on-street parking within Light Square/Wauwi.

The parking provision estimated in Table 5-1 is the overall kerbside parking space availability. Allocation of these parking spaces for various user groups, e.g., Accessible parking bays, EV charging bays, loading bays, would need to be determined during the concept design phase of the project.

Table 5-1: Impacts on On-Street Parking

LOCATION	EXISTING 90° PARKING	PARALLEL PARKING	CHANGE
Western Side	19	9	-10
Eastern Side	19	9	-10
Total	38	18	-20

5.3 Impacts on Bus Movements

Both options retain the east-west and north-south through movements, thus not impacting the bus movements travelling through Light Square/Wauwi.

Option 1 proposes to remove right and U-turn movements as described in Section 5.1.1 which will impact the ability of in-service and not-in-service buses undertaking these turning movements at the Light Square/Wauwi as discussed below.

A significant number of non-service buses currently use the Light Square/Wauwi to perform U-turns; a majority of buses start a new service at a bus stop near Light Square/Wauwi, while others use it to turn around and head in another direction. These (U-turn) movements cannot be accommodated under Option 1.

Buses currently doing a U-Turn within Light Square/Wauwi will need to use the bus depot located on Currie Street, approximately 120 m west of the Light Square/Wauwi. All other bus movements may be redirected to Grey Street, located approximately 300 metres west of Light Square/Wauwi or to West Terrace where a new signalised intersection may be required.

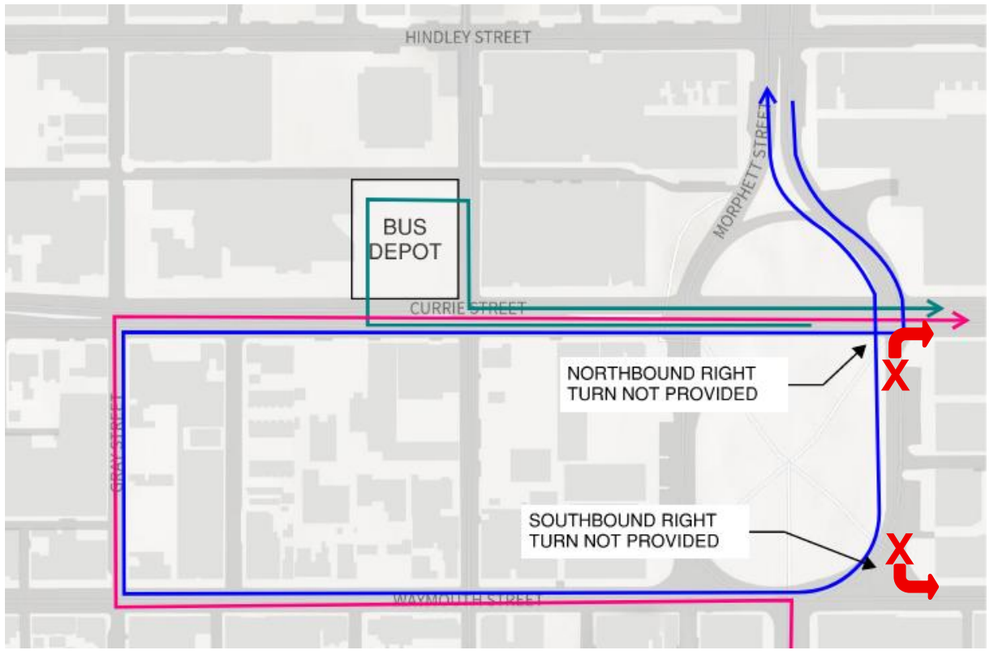


Figure 5-3: Bus Rerouting – Draft Master Plan Option 1

Option 2 retains all the turning movements at the three signalised intersections in Light Square/Wauwi, thus not impacting on any bus movements currently passing ‘through’ or undertaking a turning movement within Light Square/Wauwi.

Table 5-2: Impacted Bus Movements through Light Square/Wauwi

DIRECTION	IN SERVICE	NOT IN-SERVICE	TOTAL	OPTION 1	OPTION 2
Northbound Right Turn (Light Square/Wauwi to Currie St eastbound)	72	14	86	Use Grey Street	No change
Westbound U-Turns	0	51	51	Use bus depot	No change
Eastbound U-Turns	0	5	5	Use Grey Street	No change
Northbound U-Turns	0	2	2	Use Grey Street	No change
Southbound U-Turns	0	2	2	Use Grey Street	No change
Total	72	74	146		

Grey Street is a relatively narrow two-way street with on-street parking (on the western side) and also forms part of cycling network with sharrows in the southbound direction. The feasibility of buses turning into and out of Grey Street at its intersections with Waymouth Street and Currie Street, and potential impacts on the on-street parking and cyclist movements will need to be assessed.

The alternative route will be for the buses to travel to West Terrace, however, as the West Terrace and Waymouth Street intersection is unsignalised, it may result in excessive delays during peak hours when it is difficult to turn right out of Waymouth Street. Should West Terrace be considered for the bus turnaround route, signalisation of the subject intersection may be required to facilitate safer and efficient bus movements.

5.4 Impacts on Off-Street Parking Accessibility

Option 2 retains all existing movements at the signalised intersection within Light Square/Wauwi thus not impacting accessibility of off-street paid car parks.

Option 1, however, proposes to remove some of the right turn and U-turn movements within Light Square/Wauwi and adversely impacts accessibility for abutting properties and off-street car parks as discussed below.

5.4.1 Properties Along the Northbound Leg of Light Square/Wauwi

The draft Master Plan Option 1 will shift the northbound carriageway to the east of Light Square/Wauwi, impacting the accessibility of the KPark facility at 53 Light Square/Wauwi, which has its only access from the northbound leg of Light Square/Wauwi.

5.4.2 Properties Along the Southbound Leg of Light Square/Wauwi

Option 1 will shift the northbound carriageway to the east of Light Square/Wauwi , which is not considered to impact access arrangements for properties along the southbound leg of Light Square/Wauwi and the car park on Playhouse Lane.

5.4.3 Waymouth Street

Option 1 will:

- Remove the southbound right turn and U-turn movements from Light Square/Wauwi (southbound leg) at the Waymouth Street/Morphett Street Intersection.
- Remove the westbound right turn from Waymouth Street to the Light Square/Wauwi northbound leg.

The removal of southbound right turn and U-turn movements can impact the accessibility of properties along the northbound leg of Light Square/Wauwi, including the KPark facility at 53 Light Square/Wauwi.

The removal of the westbound right turn movement from Waymouth Street can impact traffic exiting from the Henry Waymouth and UPark Topham Mall car parks. Traffic exiting from these two car parks was observed to use Waymouth Street to travel north (Morphett Street/Montefiore Road).

As the Henry Waymouth Car Park (100 Waymouth Street) has a secondary exit linking to Currie Street (via Bloor Court), the impact of removing the westbound right turn at the signalised intersection is likely to be minor compared to the UPark Topham Mall, which has its only access from Waymouth Street. Traffic from the UPark Topham Mall, which is currently turning right at the Waymouth Street/Morphett Street intersection to travel north, will be forced to use alternative routes, e.g., travelling south on Bentham Street, turning right at Franklin Street and turning right at Morphett Street before travelling north through the Light Square/Wauwi.

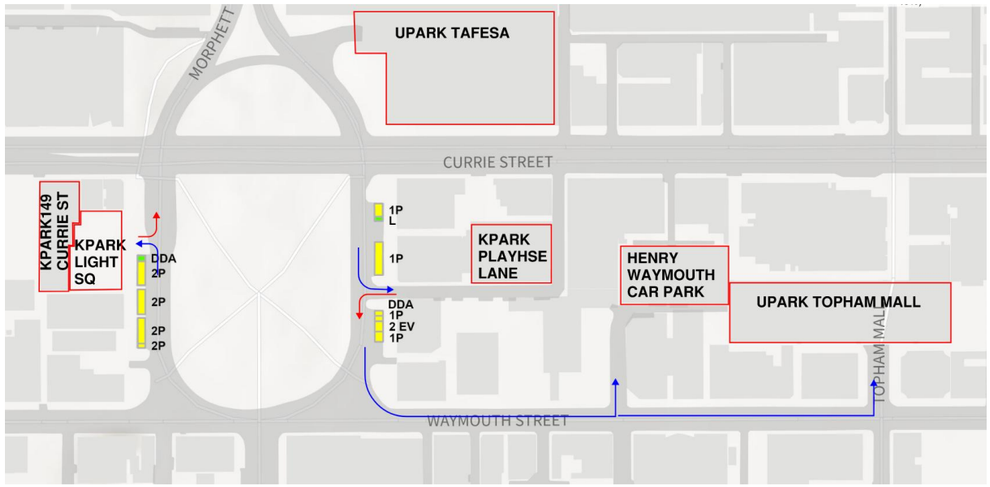


Figure 5-4: Off-street Car Park Accessibility

5.5 Impacts on Active Transport Users

5.5.1 Draft Master Plan Option 1

Option 1 presents an opportunity to retain on-street bicycle lanes in the north-south direction along Morphett Street or relocate to an off-road shared use path either through Light Square/Wauwi or along the eastern edge. Details of such a shared use path will need to be developed in during the detailed design phase, and through engagement with the internal and external stakeholders.

With the additional walking to/from the Currie Street east intersection, Option 1 was estimated to:

- Add up to 2 minutes (120 seconds) of delay for the walk between northwest (Currie Street West) and southeast (Waymouth Street East).
- Add up to 2 minutes (120 seconds) of delay for the walk between northwest (Currie Street West) and southwest (Waymouth Street West).
- Not impact on other pedestrian movements through the Light Square/Wauwi.

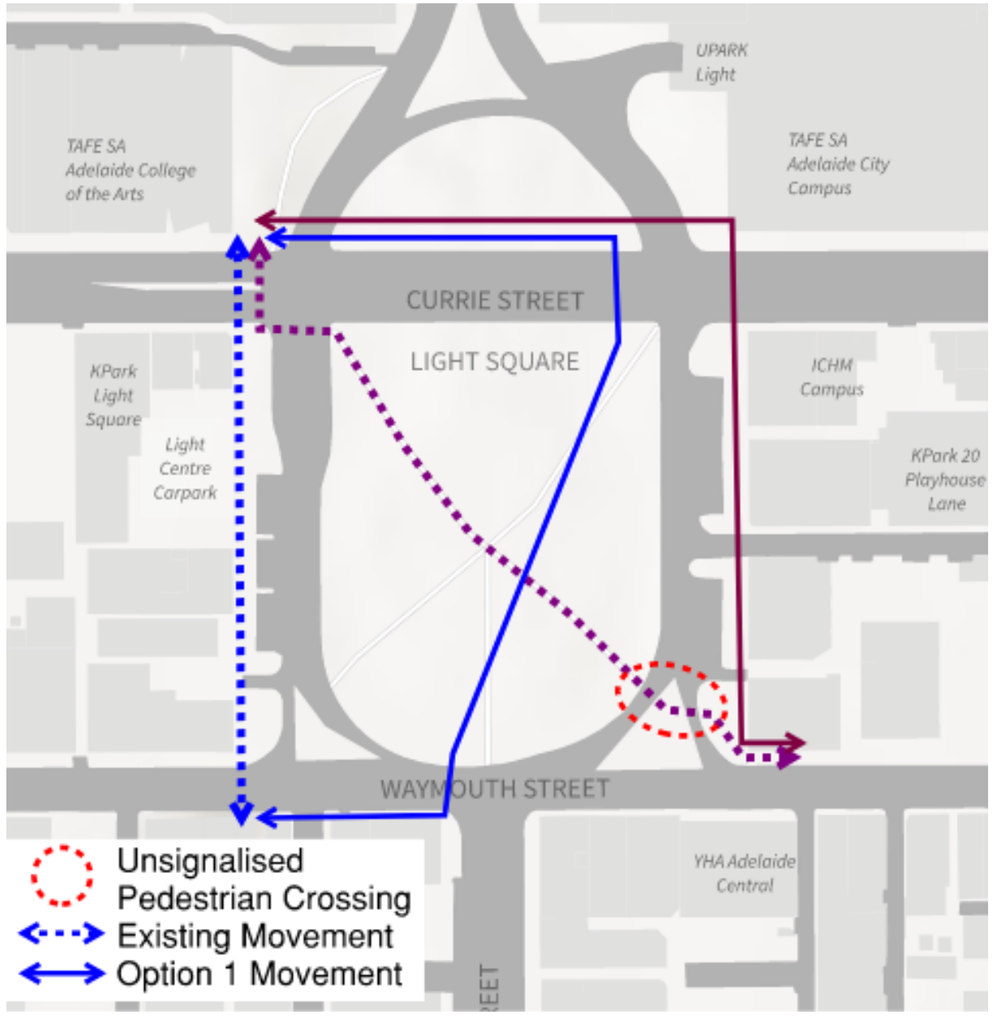


Figure 5-5: Impact on Pedestrian Movements – Option 1

As Option 1 removes the western signalised intersection on Currie Street and Light Square/Wauwi, future development of Option 1 should include a provision of pedestrian crossing (either a refuge or a signalised crossing) at the same location to minimise these impacts.

While Option 1 will impact on some of the pedestrian movements, it also improves some other pedestrian movements as shown in Figure 5-6.

In particular, the removal of unsignalised crossings at the southwestern and southeastern corners of the Light Square/Wauwi will minimise the need for pedestrians to cross flowing traffic and improve the signalised crossing at Morphett Street/Waymouth Street Intersection.

These improvements can yield similar savings (reduction of up to 120 seconds/2 minutes) in travel times for pedestrians through Light Square/Wauwi.

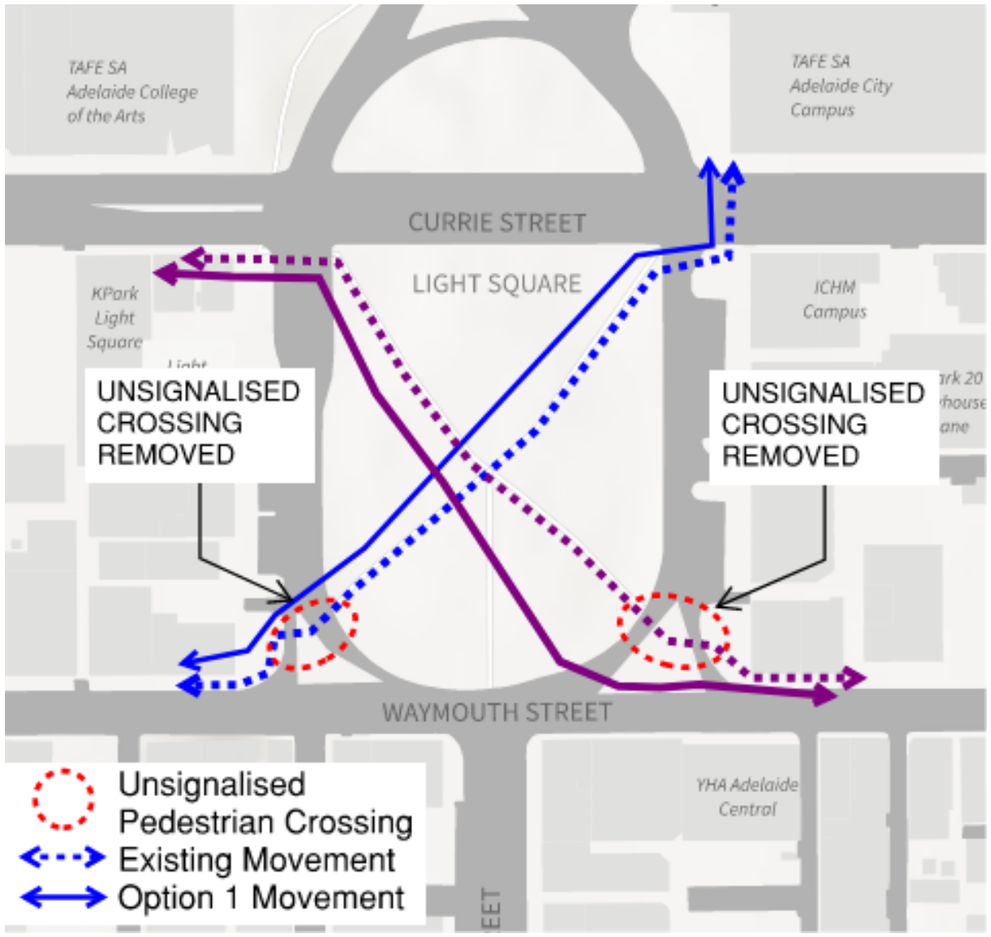


Figure 5-6: Improved Pedestrian Movements – Option 1

5.5.2 Draft Master Plan Option 2

Option 2 retains all existing intersection movements, and is not considered to adversely impact pedestrian and cyclist movements through Light Square/Wauwi.

6 TRAFFIC ANALYSIS

6.1 Draft Master Plan Options

To ensure a robust analysis of these two proposed options WGA engaged with DIT to obtain approval to use their TAM model for this assessment. Any changes that impact the potential routing of traffic can have impacts outside the project area and DIT's TAM model can consider this without having to prepare a new model. Additionally, DIT being the authority that also manages and operates the public transport network is a key stakeholder in the performance of this corridor to ensure the key east – west public transport bus link through Currie and Grenfell Streets is not impacted.

The modelling generally follows the DIT development processes but is also tailored to suit the unique design and movement changes proposed for Light Square/Wauwi upgrade options.

The Model extents was identified through discussions and collaboration with CoA and DIT, as shown in Figure 6-1.

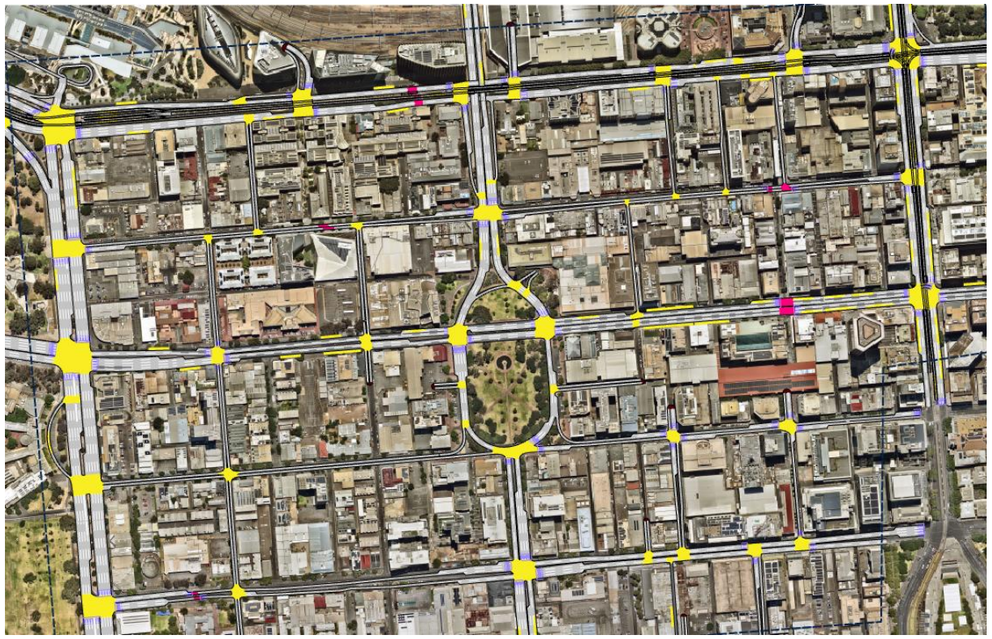


Figure 6-1 Modelling Area

The traffic modelling was undertaken using AIMSUN Next for the following two scenarios:

- TAM Subarea Base Case (BC2024)
- TAM Subarea Project Case models (PC-O1 and PC-O2)

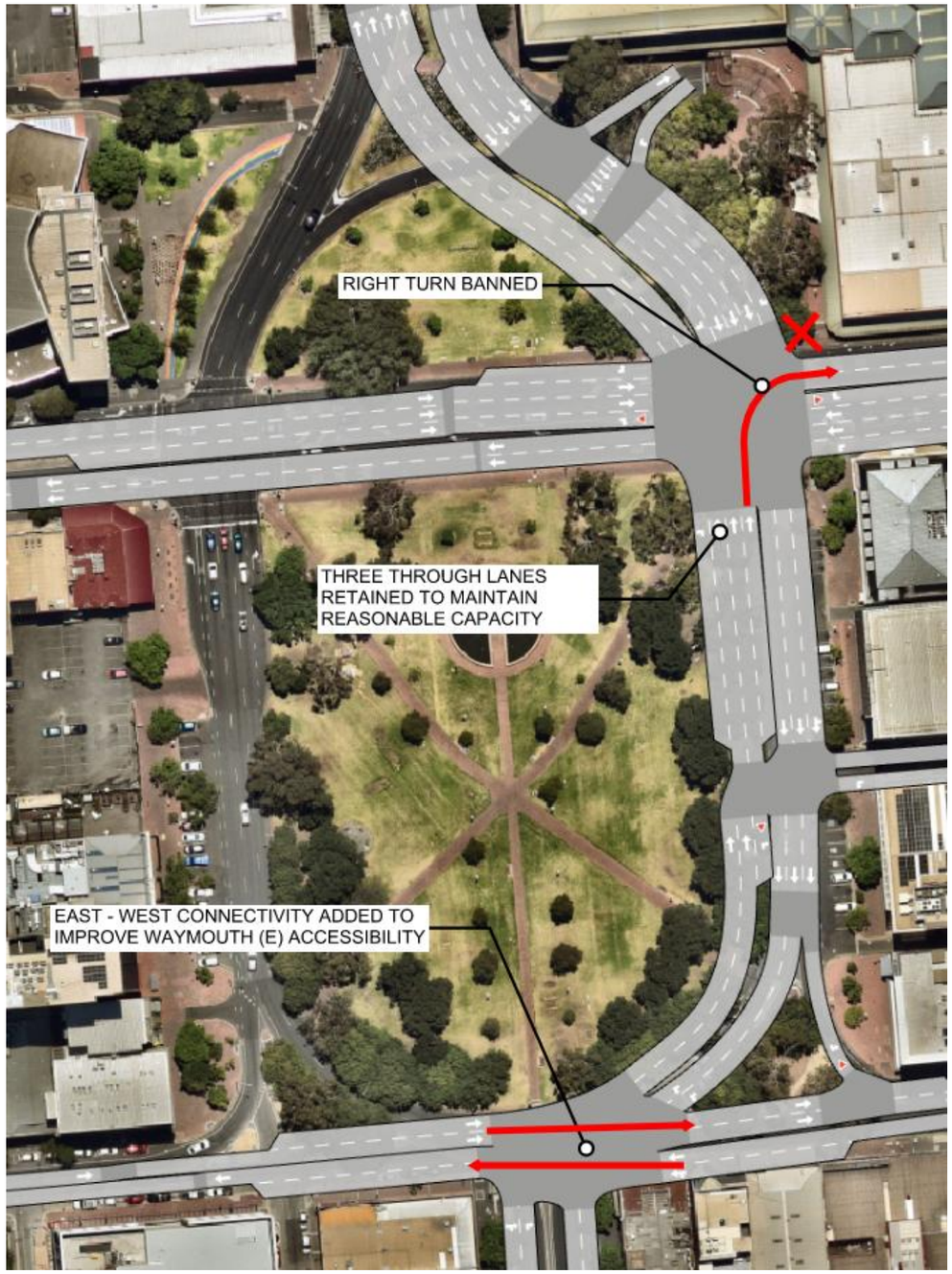


Figure 6-2 Option 1

Figure 6-3 Option 2

6.2 Modelling Summary

Outputs from the AIMSUN traffic model for the baseline condition and two options were compared, and the findings are summarised in this section. Only key (non-technical) outputs have been included for clarity.

The modelling outputs summarised in this section include the following:

- Delay graphs for the extent of the area modelled.
- Travel times for key movements.
- Volume plots for key movements.

Our findings provide a comparison of how the overall performance of the selected subarea network and changes to travel times along key travel routes passing through Light Square/Wauwi.

6.2.1 Average Delay (network)

Network average delay is a key indicator of performance as it considers the delay above free flow conditions averaged across every vehicle present within the study area. Whilst the differences between these profiles may be in the order of seconds, when evaluated across the entire study area for up to 45,000 vehicles during peak periods this can be a significant increase in delay. The evaluation is based on the average delay per vehicle in seconds as shown in Chart 6-1 (Morning Peak Period) and Chart 6-2 (Afternoon Peak Period).

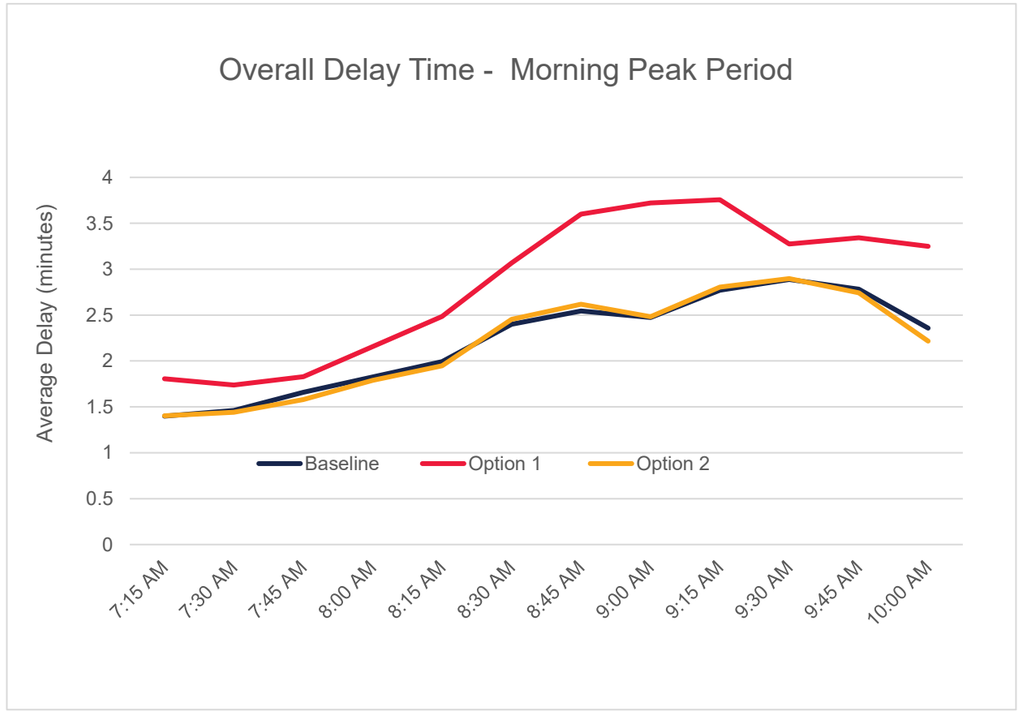


Chart 6-1: Model Performance - Overall Delay in the Morning Model Period

Option 1 results in a one minute delay during the AM period but comparative levels with the base line during the PM period. This is primarily due to the reduction in intersection performance by transferring the demand from two signalised intersections to one. The current dual intersection arrangement provides additional capacity in the form of being able to maintain all turning movements without additional phases being required to be added to the site specifically with the right turns from the north and south approaches being able to be run concurrently with the north/south through movements. By changing to a single site these are required to be run in a separate phase which results in reduced capacity with the only option to improve by adding capacity in the form of additional lanes at the intersection.

Some traffic does direct to the new through movement added to the Waymouth and Morphett Road Intersection but not with enough capacity to ameliorate the delays at the single intersection on Currie Street that was previously serviced by two intersections.

In summary the combination of reduced capacity of a single site and the requirement for traffic to reroute to alternative corridors which are also at capacity results in increased delays for Option 1 in its current form. Some changes were considered and added to the current Option 1 in the form of retaining three through lanes for northbound traffic at the intersection of Currie Street and Morphett Road but primarily the reduced capacity is resulting in traffic being pushed to parallel east – west corridors in an attempt to balance delays as shown further within Section 6.3. Whilst outside the scope of this analysis if Option 1 is a key priority it is recommended all movements be considered for the Currie Street intersection with increased capacity and or consider further enhancements/capacity at the Waymouth Street and Morphett Road Intersection to manage the demands from the car parks to the east of this site.

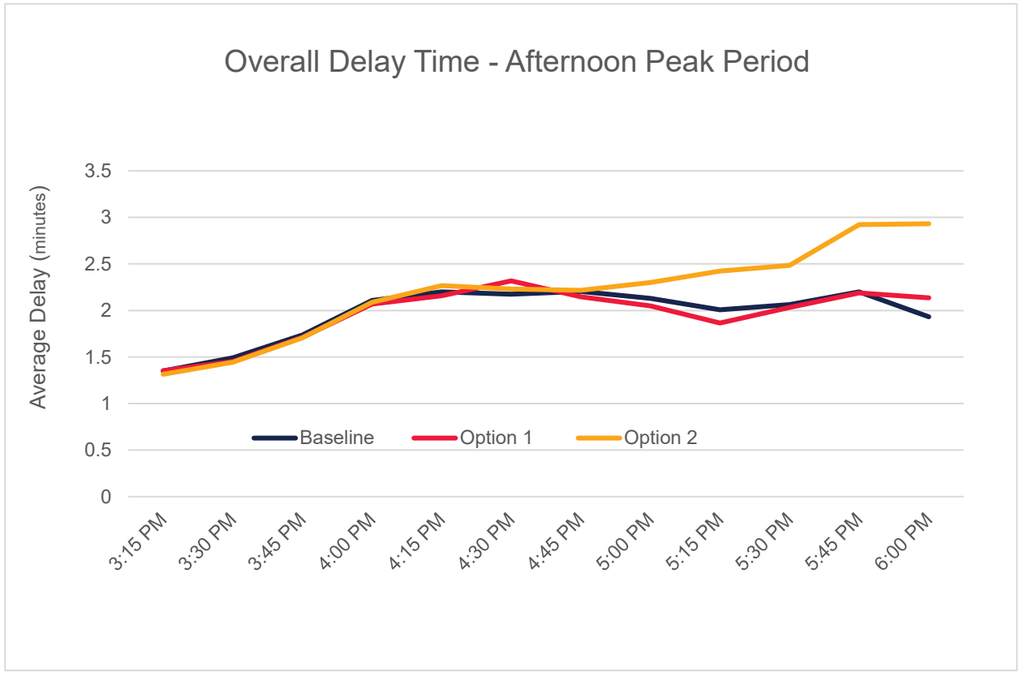


Chart 6-2: Model Performance - Overall Delay in the Afternoon Model Period

Option 2 typically performs within a reasonable margin of the current baseline performance with little difference during the AM peak period. Some delays are experienced during the PM peak period as a result of the reduced northbound capacity for traffic exiting to the north across the Morphett Road bridge as the priority is required to be maintained for east – west flows across Currie Street.

6.2.2 Travel Time Plots Key Routes Morning Model Period

The subarea model's performance (average delay) was compared for the Baseline and two draft Master Plan options, for the AM Model Period (7:00 am-10:00 am) for the following key routes:

- Route 1 – Morphett Street/Montefiore Road (N) to Morphett Street (S): Southbound Travel Route
- Route 2 – Morphett Street (S) to Morphett Street/Montefiore Road (N): Northbound Travel Route
- Route 3 – Currie Street (West) to Currie Street (East): Eastbound Travel Route
- Route 4 – Currie Street (East) to Currie Street (West): Westbound Travel Route

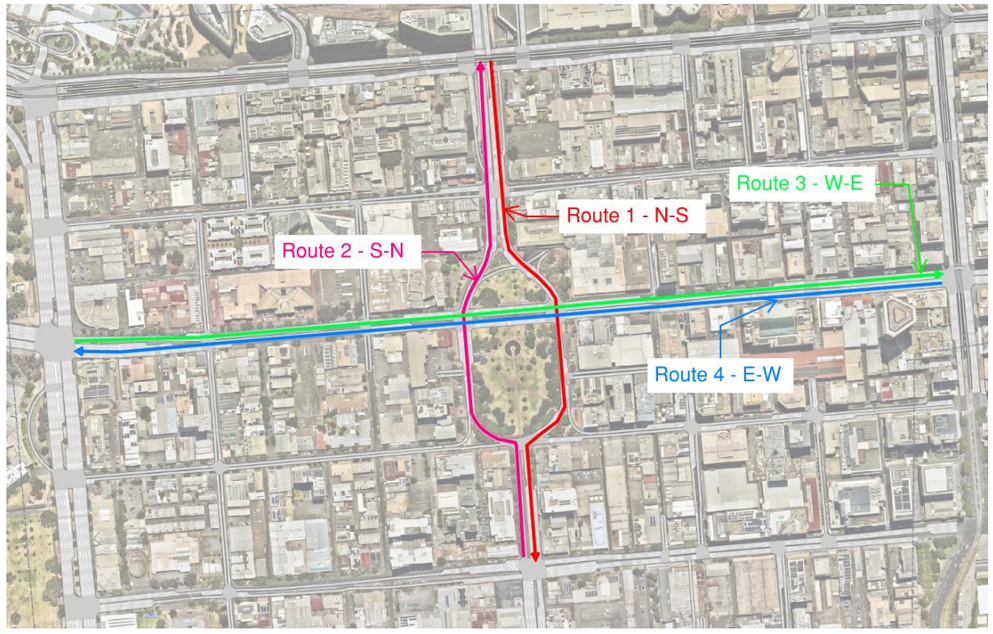


Figure 6-4 Key Travel Routes

The average travel times for the four selected routes are summarised in Table 6-1.

Table 6-1: Peak Hour Travel Time Comparison for Selected Routes

ROUTE	BASELINE	OPTION 1	OPTION 2
Morning Model Period – Average Travel Time in Seconds			
Route 1 – Southbound	164	194 (+18%)	156 (-5%)
Route 2 – Northbound	161	220 (+37%)	170 (+5%)
Route 3 – Eastbound	194	174 (-11%)	208 (+7%)
Route 4 – Westbound	311	430 (+61%)	302 (-5%)
Afternoon Model Period – Average Travel Time in Seconds			
Route 1 – Southbound	147	126 (-14%)	142 (-3%)
Route 2 – Northbound	168	165 (-2%)	190 (+14%)
Route 3 – Eastbound	181	174 (-4%)	182 (+0.7%)
Route 4 – Westbound	187	202 (+8%)	243 (+31%)

When compared to the baseline conditions, individual routes were estimated to experience varying levels of increase or decrease in travel times for the two options and from the morning model period to the afternoon model period. For example:

- Routes 1 and 2 in Option 1 were estimated to experience an increase in travel time in the morning model period but a reduction in the afternoon model period.
- Route 3 in Option 1 was estimated to experience a decrease in the morning model period but an increase in travel time in the afternoon model period.
- Route 4 in Option 1 was estimated to experience an increase in travel times during both the morning and afternoon model periods.
- Route 1 in Option 2 was estimated to experience a reduction in travel times during both the morning and afternoon model periods.
- Routes 2 and 3 in Option 2 were estimated to experience an increase in travel times during both the morning and afternoon model periods.
- Route 3 in Option 2 was estimated to experience a decrease in the morning model period but an increase in travel time in the afternoon model period.

Average travel times for each travel route are presented in Charts 6-3 to Chart 6-10.

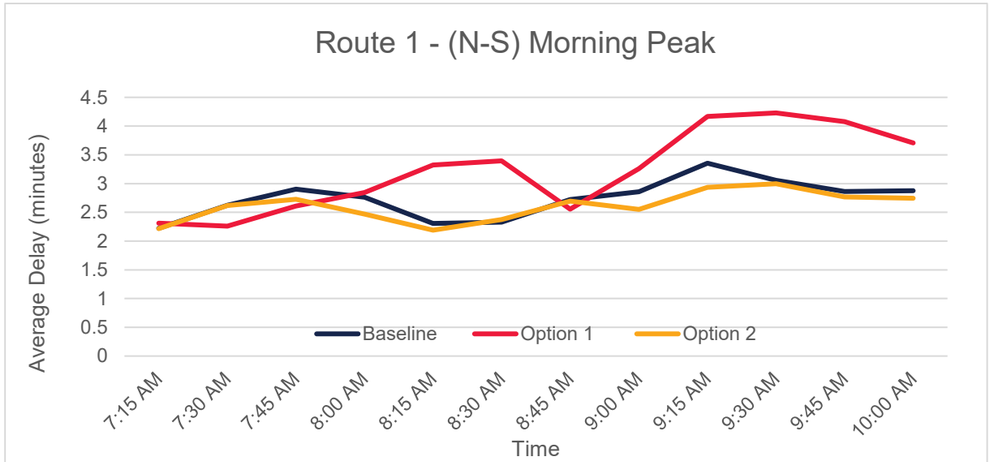


Chart 6-3: Montefiore Road/Morphett Street – Light Square/Wauwi – Morphett Street (N-S) Morning Model Period

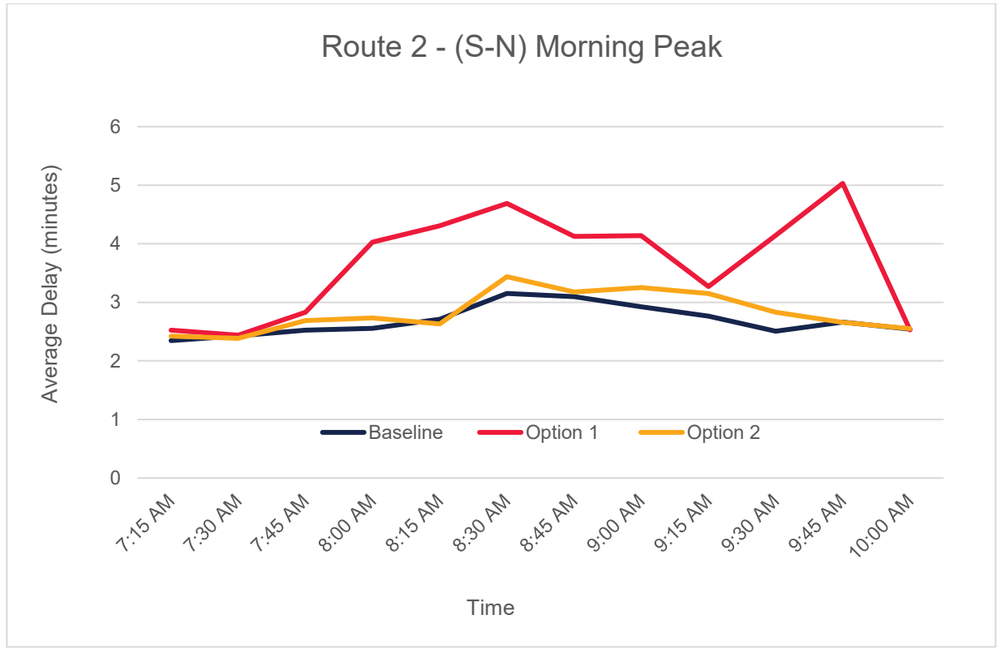


Chart 6-4: Morphett Street – Light Square/Wauwi – Morphett Street/Montefiore Road (S-N) Morning Model Period

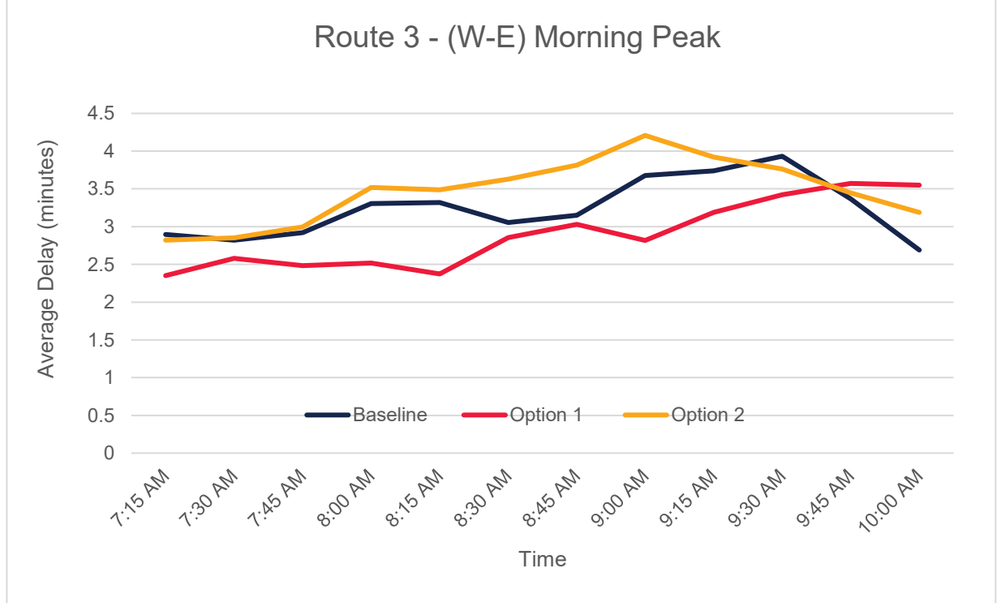


Chart 6-5: West Terrace – Currie Street – Grenfell Street (W-E) Morning Model Period

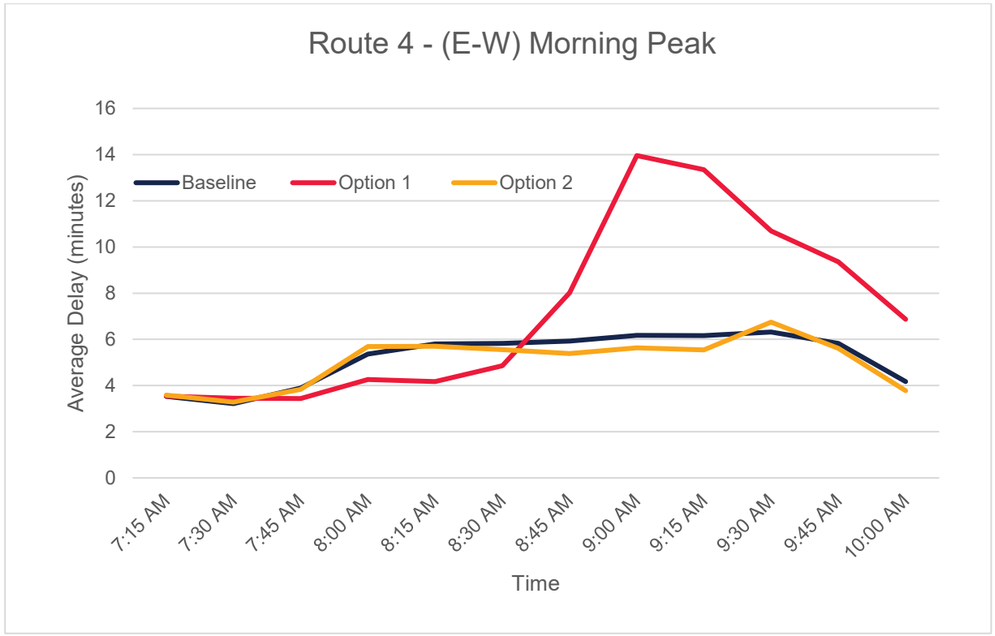


Chart 6-6: Grenfell Street – Currie Street – West Terrace (E-W) Morning Model Period

6.2.3 Travel Time Plots Key Routes Afternoon Model Period

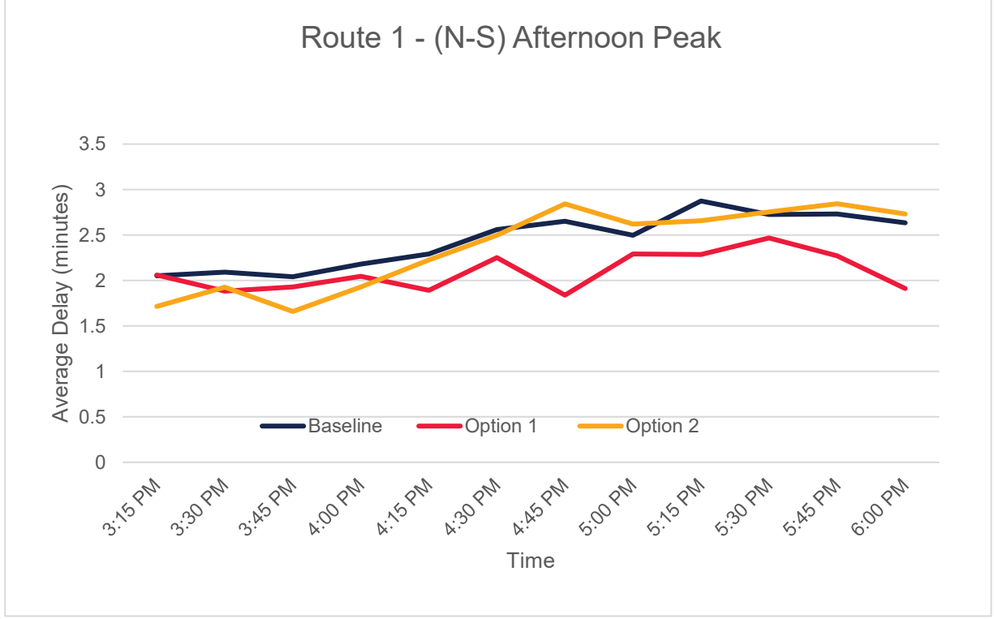


Chart 6-7: Montefiore Road/Morphett Street – Light Square/Wauwi – Morphett Street (N-S) Afternoon Model Period

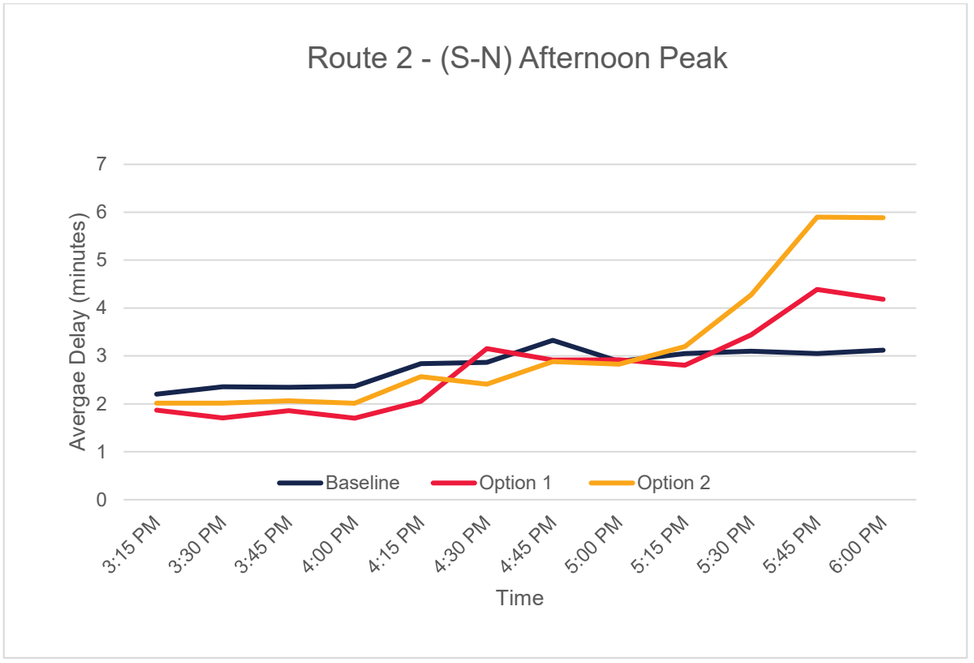


Chart 6-8: Morphett Street – Light Square/Wauwi – Morphett Street/Montefiore Road (S-N) Afternoon Model Period

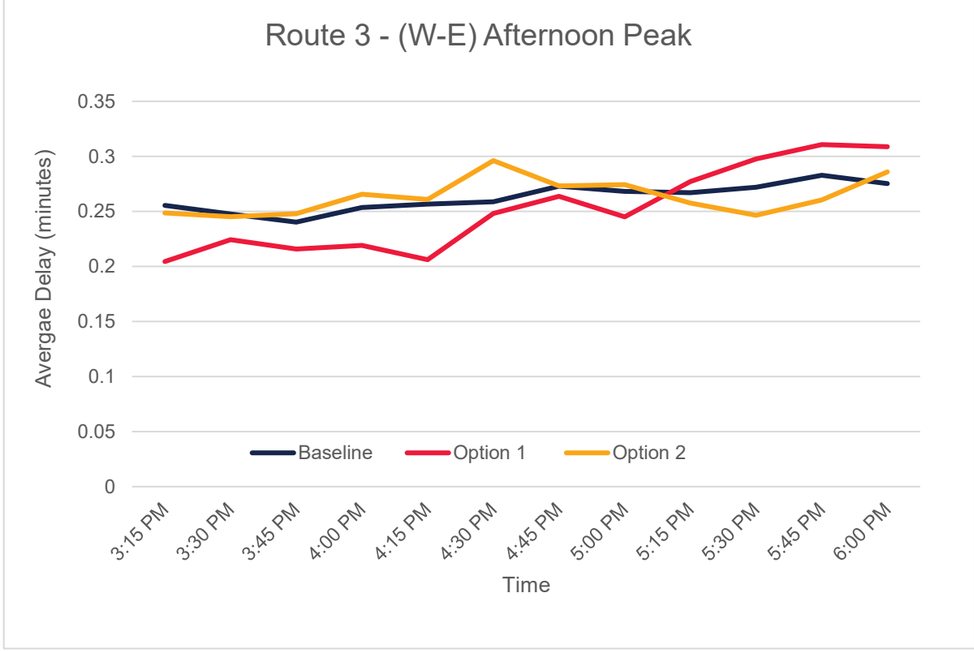


Chart 6-9: West Terrace – Currie Street – Grenfell Street (W-E) Afternoon Model Period

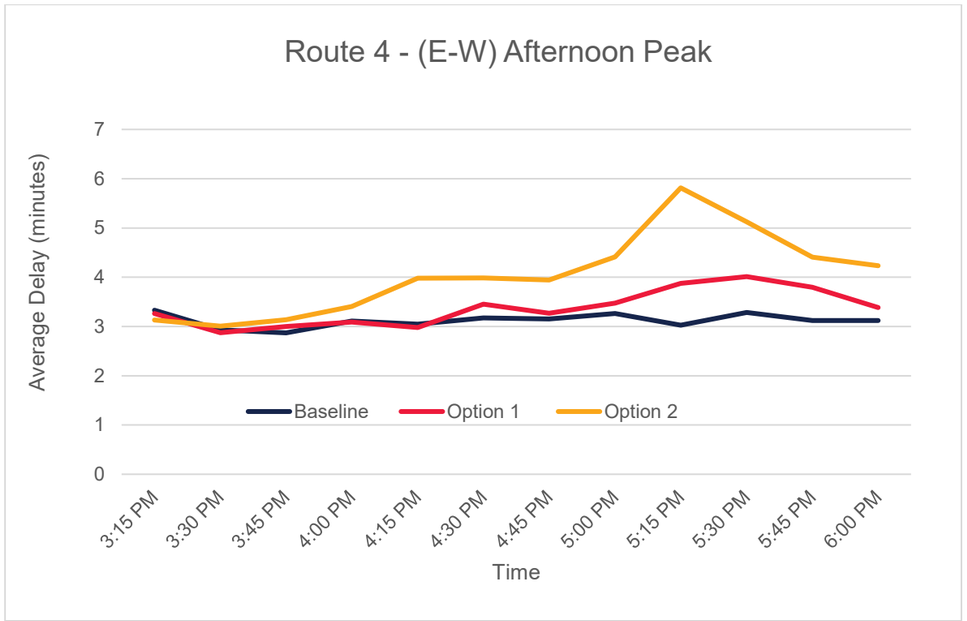


Chart 6-10: Grenfell Street – Currie Street – West Terrace (E-W) Afternoon Model Period

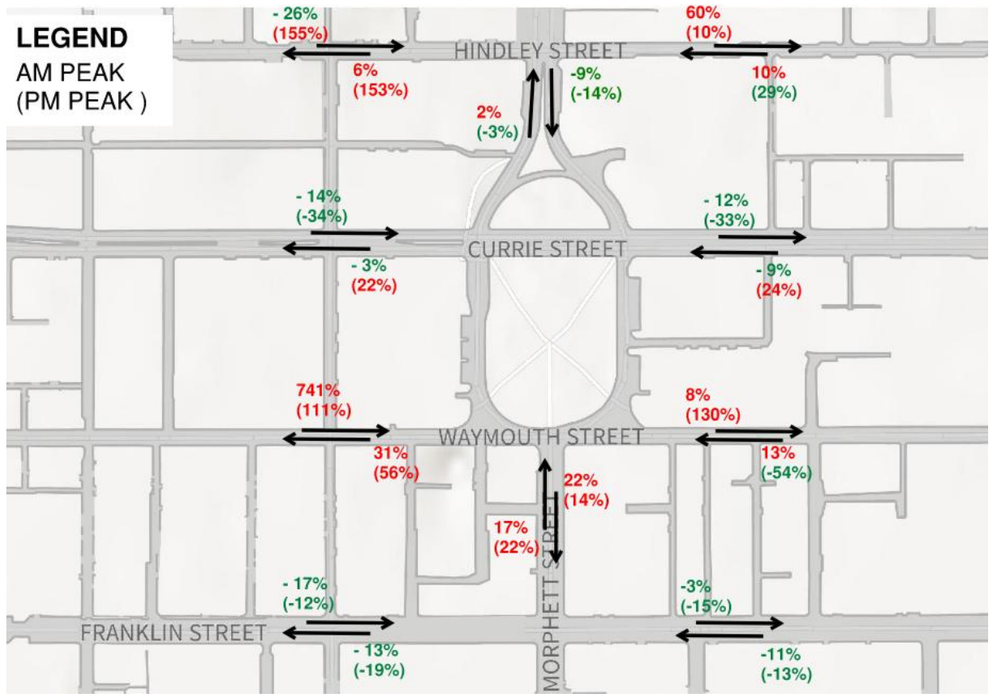


Figure 6-5: Option 1- Percentage Change in Volume from Existing

6.3 Link Volumes

Link volumes are a metric for comparing performance and or change across the network as they provide a good indication as to resultant capacity of corridors within the model resulting from changes between the options. These volumes have been reported as percentage differences between the existing base line. If volumes remain consistent then this indicates the option does not impact current flows and maintains current performance. Should significant changes be observed then this indicates a network/corridor that is experience increased delays with the model compensating by redistributing to alternative corridors.

6.3.1 Option 1

The modelling indicates a significant redistribution of traffic throughout the area. Some streets, such as sections of Waymouth and Hindley Streets, are expected to see substantial increases in traffic—up to 741% in the morning peak period. Suggesting these areas becoming gridlocked. Moderate increases in other segments reflect the shifting of traffic patterns as vehicles reroute through alternative paths.

6.3.2 Option 2

Compared to existing conditions, the modelling suggests a relatively balanced redistribution of traffic around Light Square/Wauwi. Most changes are typically within ±10%, indicating that the proposed option is unlikely to cause major network disruptions. A notable exception is the eastern section of Hindley Street, which shows a significant increase in traffic volumes (47% AM, 108% PM), potentially identifying a future issue.

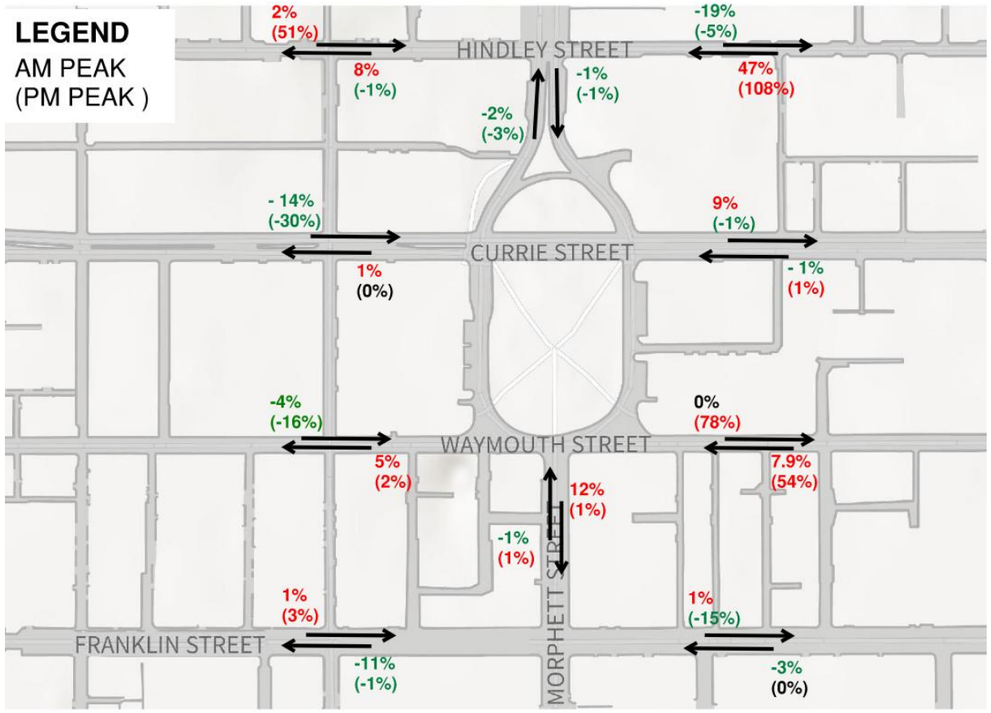


Figure 6-6: Option 2- Percentage Change in Volume from Existing

7 SAFE SYSTEMS ASSESSMENT

A Safe Systems Assessment (SSA) has been undertaken in accordance with the DIT Safe System Assessment Guidelines and has been included in Appendix C for reference. A SSA is a formal safety evaluation that checks how well a transport initiative aligns with the goal of eliminating fatal and serious injuries. Effectively, the lower the score the lower the expected road crash injuries associated with the initiative.

A reduction in SSA score was achieved for both options; this is expected to be largely due to the general traffic calming effect, improved offset to roadside hazards, reduced intersections (points of conflict), and other minor improvements through the works.

The following scores were obtained from the Safer Systems Assessment:

- Existing Light Square/Wauwi /Intersections Before: 228/448
- Option 1 Light Square/Wauwi /Intersections: 188/448
- Option 2 Light Square/Wauwi /Intersections: 180/448

7.1 Existing

The existing Light Square/Wauwi and intersections have a SSA score of 228 out of 448, indicating significant room for safety improvement. Current conditions include a high number of conflict points at intersections, limited separation from roadside hazards, and outdated road design features that do not align with modern safety principles.

7.2 Option 1

Option 1 reduces the SSA score to 188, showing some improvement largely due to better hazard offsets, and a reduction in intersection-related conflicts. However, this option introduces safety concerns by shifting to an oncoming-adjacent traffic lane arrangement, which increases the risk of head-on collisions due to reduced separation between opposing lanes.

7.3 Option 2

Option 2 achieves the greatest improvement, lowering the SSA score further to 180. This is attributed to better separation between traffic lanes, fewer pedestrian conflict points, and overall alignment with safer systems principles. The design likely provides a more forgiving road environment with fewer opportunities for severe crashes due to separated north/south movements.

7.4 Other Recommendations

To further enhance safety under either option, the following additional treatments have been recommended:

- Consideration of the removal of all roadside hazards (particularly fixed objects such as non-frangible tree trunks) that are brought closer to the road through either option.
- Providing additional measures to segregate vulnerable users and road traffic.
- Discouraging uncontrolled vulnerable user road crossings (across trafficable road spaces).
- Consideration of median treatments to restrain errant vehicles from entering the opposing lanes (Option 1)
- Where on-road cycling lanes are provided, look to increase bicycle/vehicle separation (e.g. Frome Road model)
- Red light cameras at the site could provide supporting treatment that would encourage compliant road user behaviour.

8 SUMMARY AND NEXT STEPS

8.1 Modelling Summary

Findings from the traffic modelling using Aimsun are summarised below:

- Option 1 was estimated to have a negative impact on the wider network as the average delay (per vehicle) was estimated to increase by up to 1 minute and 15 seconds in the Morning Model Period.
- Option 2 was estimated to perform similarly to the Baseline conditions with negligible variation in delay times.
- Option 1 redistributes existing traffic entering Light Square/Wauwi to parallel road corridors, due to the reduced capacity. Hence, this further congestion and delays within the CBD but outside Light Square/Wauwi.

8.2 Impacts on Bus Movements

Option 1 will remove the right turn and U-turn at the Waymouth Street/Morphett Street/ Light Square/Wauwi intersection, as well as to the north of Currie Street. Both these locations are used by an average of 74 not-in-service buses every day. These buses will be required to either use the bus depot at the corner of Currie Street and Clarendon Street or use Currie Street, Grey Street, Waymouth Street and Light Square/Wauwi to turn around.

8.3 Impacts on On-Street Parking

Both options include a sub-option to convert existing 90° angle parking to parallel parking, resulting in a reduction of up to 20 on-street parking spaces in Light Square/Wauwi. The impact of the reduction on the overall on-street parking provision and composition of the resultant provision (parking bays, loading zone, EV charging, permit parking bays etc.) will need to be assessed in detail and tested with the community and businesses.

8.4 Impacts on Off-Street Car Parks

Option 1 will remove the right turn and U-turn movements at the Waymouth Street/Morphett Street/ Light Square/Wauwi Intersection, as well as the right turn in the northbound direction at Currie Street. The removal of these turn movements is anticipated to impact traffic currently exiting from the two car parks on Waymouth Street and passing through Light Square/Wauwi. In particular, traffic seeking to travel north of Light Square/Wauwi will be required to undertake longer travel, impacting travel times.

Option 2 retains all traffic movements at Light Square/Wauwi, and is not estimated to impact on the operations of the off-street car parks.

8.5 Impacts on Active Transport Users

Both options present opportunities to improve cycling infrastructure through a mix of improved on-street and off-street (shared-use path) bicycle lanes.

The removal of the western intersection on Currie Street was estimated to impact on pedestrian movements particularly between the northwest (Currie Street West) and southeast (Waymouth Street East) and between northwest (Currie Street West) and southwest (Waymouth Street West) on account of additional walking distance to/from the Currie Street east intersection.

Option 1 provides off road cycling for the north / south movement on the western side.

8.6 Emergency Vehicle Movements

Both draft Master Plan Options for Light Square/Wauwi upgrade will retain the north-south and east-west movements through Light Square/Wauwi, thus not considered to impact on the movement of emergency vehicles.

8.7 Property Access

Access to the western properties is maintained in both options.

8.8 Next Steps

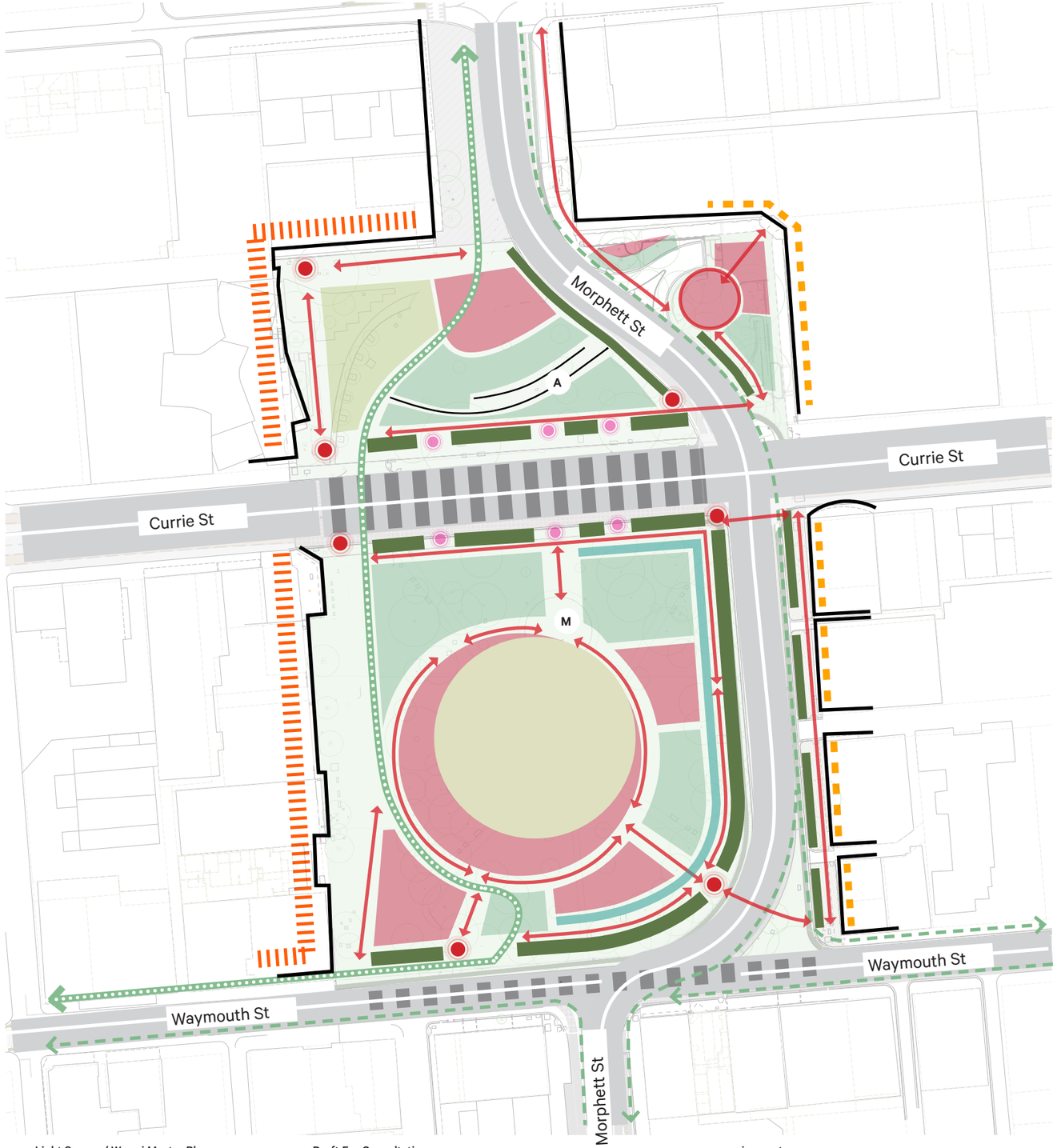
Based on the assessment and findings presented in this report, we estimate the following steps will be required to assist CoA in validating the preferred draft master plan option and developing it further for a detailed assessment.

- Detailed traffic modelling in accordance with DIT's master specification (RD-GM-D4) to assess wider network impacts, including planned/committed projects by CoA.
- Stakeholder community engagement on parking and loading zone impacts.
- Develop concept layout to assess feasibility of parallel parking and impacts on services, amenities, option for off-road shared use path etc.
- Consultation with SAPTA on potential rerouting of buses (in case Option 1 is selected as the preferred option).

APPENDIX A
LIGHT SQUARE/WAUWI DRAFT MASTER PLAN OPTIONS

Master Plan: Option 1

Option 1 will reduce road pavement by 22% and increase usable space in the Square by 9%, by transforming movement in and around the Square. It will connect people with surrounding uses and activities with north south through traffic relocated to the eastern side of the Square. This will activate and return the western edge of the Square to Park Lands Purposes, increase safety, space for trees and cooling and open up more green space to enhance safety, wellbeing and activation. This map shows the potential for small and medium activity spaces, an enhanced northern section and western frontages with direct access to the Square.



ENVIRONMENT

- Green edge
- Feature gardens
- Open lawns
- WSUD
- Events/flexible space*
- Direct Square active building frontage
- Building frontage

CONNECTION

- Primary access point
- Access point
- Primary pedestrian path
- Shared use zone
- Cycle lane**
- Vehicle lane
- Paved roadway

Key Points

A	Level Change - Potential amphitheatre
M	Monument

OPTION 1 ACHIEVES:

Active Edge	Creation of 270m of direct Square active building frontage.
Safety	Replacement of road crossings with direct access to open space.
Greening	Replacement of 4,096m^2 (22%) of road pavement with green space. An increase in green space of 9% and an increase in space for biodiversity of 14%.
Tree Canopy	An increase in tree canopy of 30%.
Open Activity Spaces	An increase in open lawns for open activity spaces of 35%.

* Detailed design to define open spaces that will allow for a range of activities at various scales
**Detailed design to define at grade/separated

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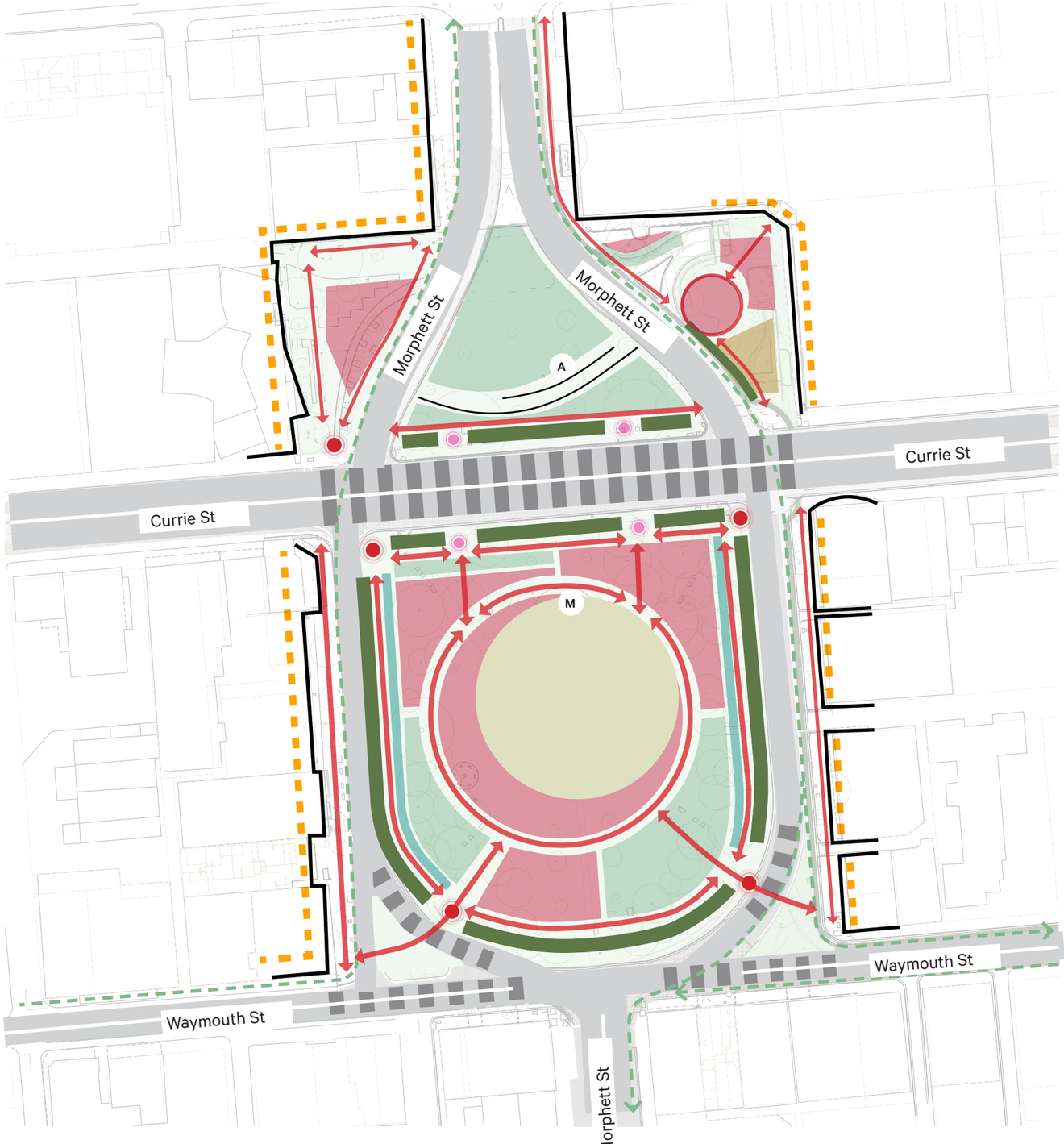
Master Plan: Option 2

Option 2 will reduce road pavement by 15% and increase usable green space in the Square by 4% by reducing the number of traffic lanes on the south-east and south-west of the Square. This will open up more space for trees and cooling, reduce the impact of traffic and improve access to the Square. This map shows potential for an enhanced northern section, access points into the Square and small to medium activity spaces.



ENVIRONMENT

- Green edge
- Feature gardens
- Open lawns
- WSUD
- Events/flexible space
- Building frontage

CONNECTION

- Primary access point
- Access point
- Primary pedestrian path
- Cycle lane*
- Vehicle lane
- Paved roadway

Key Points

A	Level Change - Potential amphitheatre
M	Monument

OPTION 2 ACHIEVES:

Safety	Removal of 2 vehicle slip lanes.
Greening	Replacement of 2,895m^2 (15%) of road pavement with green space. An increase in green space of 4% and an increase in space for biodiversity of 13%.
Tree Canopy	An increase in tree canopy of 25%.
Open Activity Spaces	An increase in open lawns for open activity spaces of 20%.

* Detailed design to define open spaces that will allow for a range of activities at various scales
**Detailed design to define at grade/separated

CITY OF ADELAIDE

APPENDIX B
TRAFFIC MODELLING SCOPING DOCUMENT

TRAFFIC MODELLING SCOPING DOCUMENT

PROJECT NO.: WGA250495
DOCUMENT NO: WGA250495-RP-TT-0001-B
DATE: 28 MAY 2025

COMPANY NAME	Department for Infrastructure and Transport
ATTENTION	Keyvan Pourhassan, Department for Infrastructure and Transport (DIT)
SUBJECT	Traffic Modelling Scoping Document (TMSD) – Light Square (Wauwi) Upgrade
PREPARED BY	Amol Kingaonkar, Jason Zafry

1. INTRODUCTION

The City of Adelaide (CoA) has engaged WGA to undertake a high-level planning investigation for the Light Square Master Plan in the Adelaide CBD. The project involves comparing two options to consider increasing green space within and around the square.

The traffic study will provide the Council with further information regarding the benefits and impacts of the two proposed high-level design options with regard to traffic movement. This work will complement other planning and design initiatives currently underway within the precinct.

This document outlines a high-level methodology and approach for traffic modelling. This approach has been adopted due to the project's time requirements and offers flexibility and requires a different approach to the typical DIT modelling process, which would be preferred and undertaken as required during further planning phases of the project.

2. OVERVIEW

2.1 Project Background

CoA has developed two options as part of the Light Square Master Plan.

Option 1 (O1) will reduce road pavement by 22% and increase usable space in the square by 9%, by transforming movement in and around the square. It will connect people with surrounding uses and activities, with north-south through traffic relocated to the eastern side of the square. This will activate and return the western edge of the square to Park Lands Purposes, increase safety, space for trees and cooling and open up more green space to enhance safety, wellbeing and activation. This map shows the potential for small and medium activity spaces, an enhanced northern section and western frontages with direct access to the square.

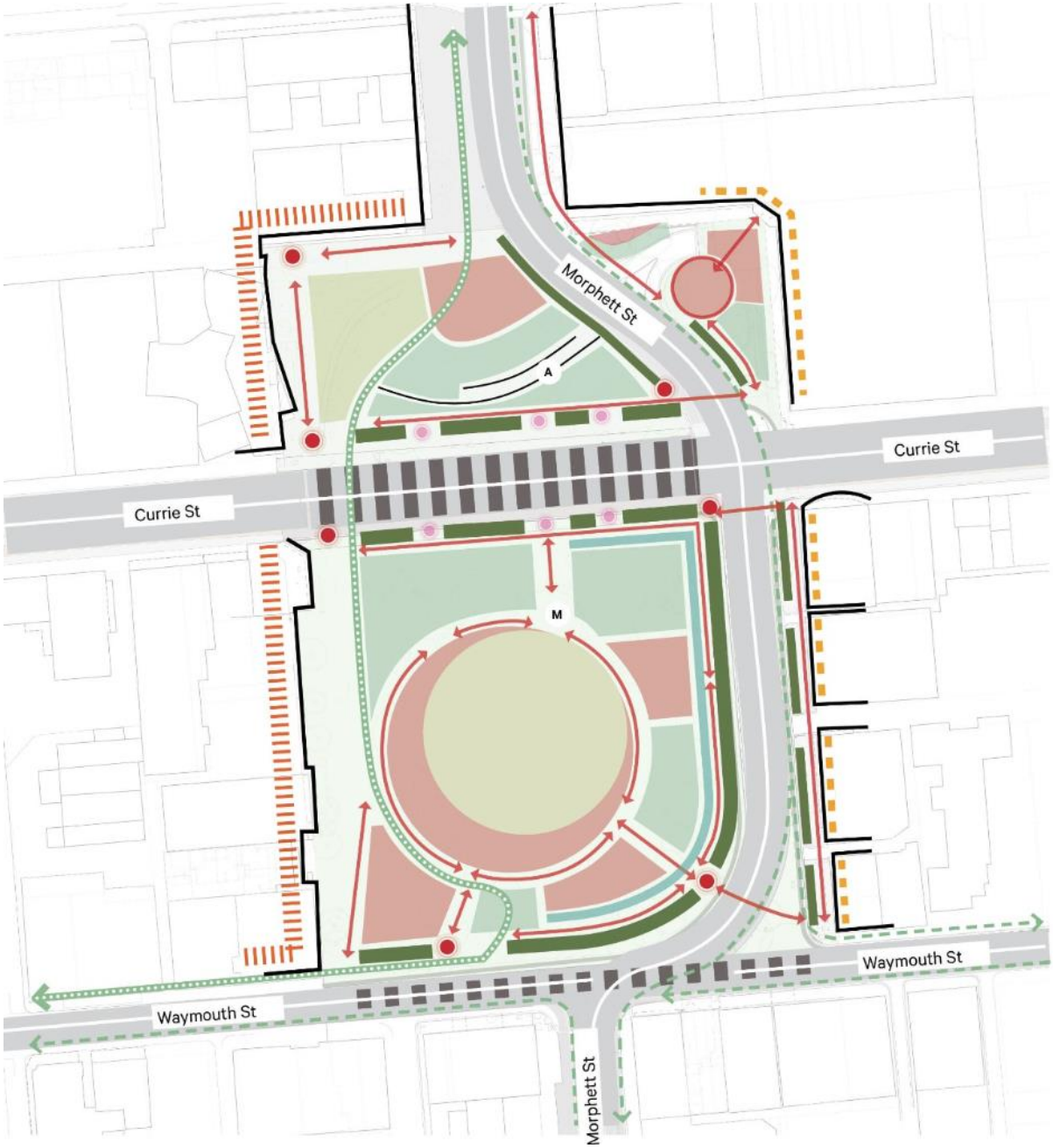


Figure 1: Light Square Wauwi Master Plan Option 1

Option 2 (O2) will reduce road pavement by 15% and increase usable green space in the Square by 4% by reducing the number of traffic lanes on the south-east and south-west of the Square. This will open up more space for trees and cooling, reduce the impact of traffic and improve access to the Square. This map shows potential for an enhanced northern section, access points into the Square and small to medium activity spaces.

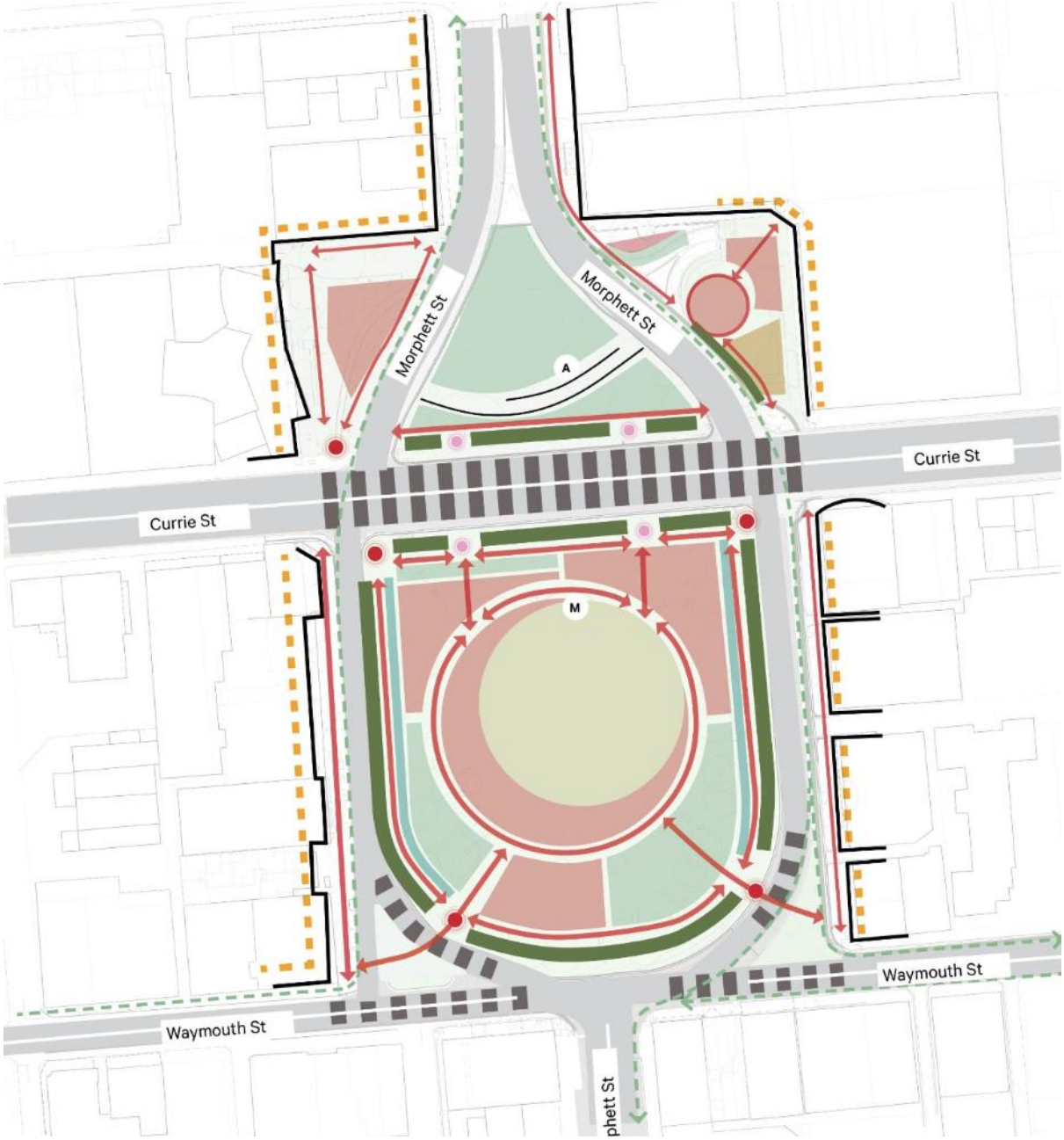


Figure 2: Light Square / Wauwi Master Plan Option 2

2.2 Purpose

The purpose of the proposed traffic modelling exercise is to assess the impacts of both options to inform CoA decision-making. The traffic modelling will be used to

1. Compare the network performance (for the subarea extent identified through discussions with DIT) for the two options with the existing operations.
2. Compare individual intersection performance (of the three intersections within the square), and
3. Compare Public Transport (bus) movements along Currie Street and for bus routes (and not in service buses) requiring right turns at Currie Street intersections.

4. Compare walking and cycling connectivity for the two options, considering impacts and benefits at three signalised intersections within the square.

WGA met with Andrew Every (SAPTA) and is waiting to receive current, future and out-of-service movements to the Clarendon St depot, which will be used in the model. This includes possible extensions of selected bus routes to the nWCH. The extent of the model will not be limited to the square; it will be extended to understand impacts on up and downstream intersections for all approaches.

2.3 Scope of Works

We propose to undertake the traffic modelling in two stages, using two subarea models from the Tactical Adelaide Model (TAM), as discussed below.

2.3.1 TAM – Macro Subarea Model

The extent of the TAM Macro Subarea Model proposed for this analysis is shown in Figure 2.

Figure 3: Light Square / Wauwi Masterplan Options

The TAM Macro Subarea Model will be used to determine the wider trip impacts of the two options. It will provide a rapid strategic assessment and determine how the proposed changes may impact vehicular route assignment. This assessment will enable identification of any routes / paths that currently travel through the Square but shouldn't or may not be required (to travel through the square), subject to changes to/in the wider network e.g., T2D project.

The modelling will be undertaken generally in accordance with DIT's Master Specification, RD-GM-D4 and the TAM Modelling Guidelines. However, given time constraints in completing this analysis by mid-June, it may not be possible to undertake the full calibration and validation process in accordance with the TAM Guidelines. Instead, WGA has proposed an alternative approach to calibrating and validating the TAM Micro Subarea Model, as explained in Section 3.4.

WGA will submit the TAM Subarea Model (with the corresponding report) for DIT to review subject to Council approval.

2.3.2 TAM – Micro Subarea Model

Upon conclusion of Stage 1 (DIT's review of the TAM Macro Subarea Model), WGA will proceed to develop the TAM Micro Subarea model, with indicative extents as shown in Figure 3.

The TAM Micro Subarea Model extent was identified through discussions and collaboration with CoA and DIT, as shown in Figure 4.

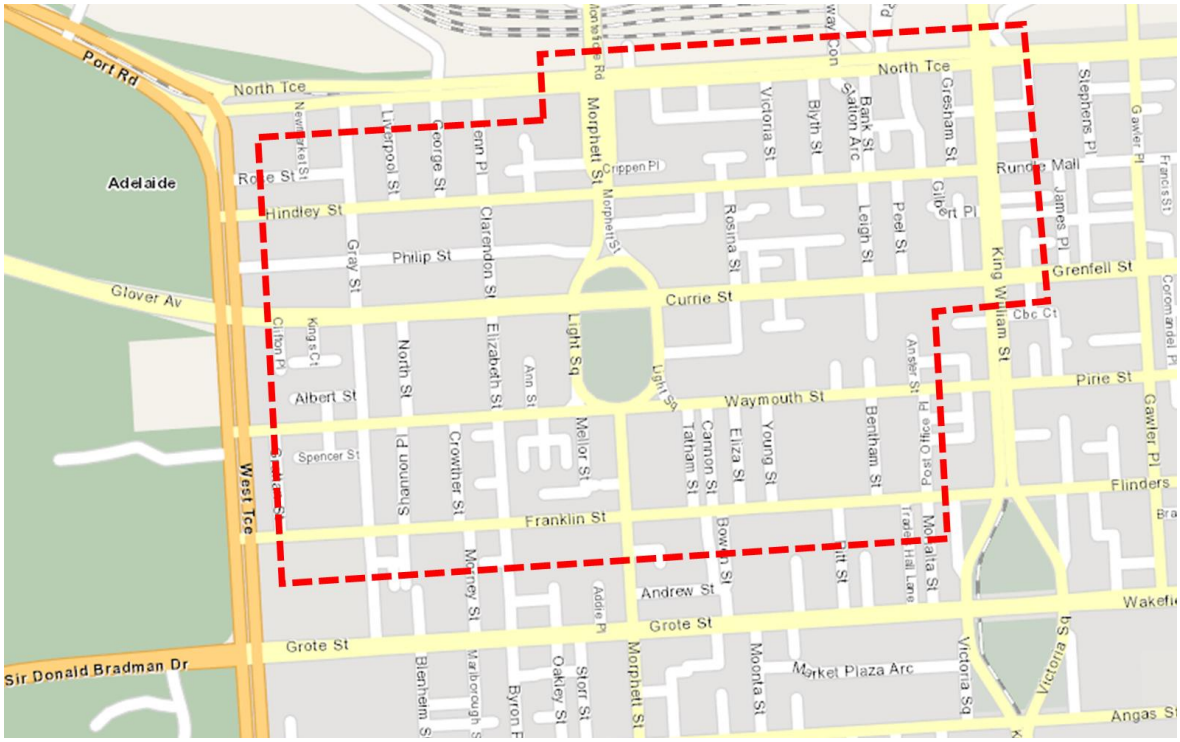


Figure 4: Indicative TAM Micro Subarea Model Extent

As discussed with DIT in a meeting on 28/05/2025, WGA will include King William Street intersections at North Terrace, Hindley Street and Currie Street/Grenfell Street in the TAM Micro Subarea model. However, these intersections will not be calibrated and will only be used to capture route choices and the impact of Hindley Street's one-way operations.

WGA will submit the TAM Micro Subarea Model (with the corresponding report) for DIT to review subject to Council approval.

3. PROPOSED TRAFFIC MODELLING APPROACH

3.1 Modelling Software

Aimsun Next 23.0.1 (2021-02-07) will be used to develop the TAM Subarea (Base Case) and TAM Subarea (Project Case) models.

SIDRA modelling is not part of this scope, except for using t to inform preliminary phasing for use within AIMSUN based on similar operational requirements of existing sites.

3.2 Model Scenarios

The following scenarios will be developed for each intersection assessed.

SCENARIO	DETAILS	YEAR
Base Case	TAM Micro Subarea Model calibrated using data extracted from various sources as discussed in Section 3.4	BC 2024
Project Case	TAM Micro Subarea models for two options PC-O1: N-S carriageways of Light Square on the east PC-O2: N-S carriageways of Light Square with potential reduction in traffic lanes and turn restrictions	PC 2024

Project Case modelling will assess the impacts of the proposed two options for Light Square Master Plan and compare them against the baseline conditions (BC2024)

3.3 Model Periods

TAM Micro and Micro Subarea modelling will cover the typical AM and PM peak periods as listed in Table 1 below.

Table 1: Modelling Periods and Scenarios

MODEL	DETAILS	YEAR
TAM Micro Subarea	• AM Peak Period 7.00 AM to 10.00 AM • PM Peak Period 3.00 PM to 6.00 PM	BC 2024 PC 2024

No interpeak period modelling will be undertaken as the aim of this study is to assess the impact of the two options on peak commuter traffic during weekdays.

3.4 Calibration and Validation

WGA is working on a strict delivery timeframe, requiring the draft analysis report to be delivered by mid-June. As such, detailed calibration and validation for TAM models in accordance with DIT traffic modelling guidelines cannot be undertaken. Instead, WGA will use data extracted from the following sources to inform model development, calibration, and validation.

- AddInsight
  - Loop Detector Counts (estimates)
  - Signal Phase Splits (estimates)
  - Travel Time estimates for selected routes
- Tom Tom
  - Route Choices to/from/through Light Square
  - Travel Time estimates for selected routes
  - Link volumes
- Traffic Signal Plans
  - Sourced from CoA – inform loop detector data and signal phase details (AddInsight)
- VIVA City (City of Adelaide)
  - Screen line counts for vehicles and pedestrians at TS3031 & TS3032
- Bus movements 3 x Light Square intersections only
  - GTFS Data (where available)
  - Adelaide Metro website

Calibration will be undertaken for 15-min intervals

Calibration and validation will generally be undertaken in accordance with Section 3.5.7.3.8 of the TAM Modelling Guidelines, considering the following criteria.

Table 2: Calibration and Validation

ATTRIBUTE	SOURCE	VALIDATION
Travel Time	Tom Tom (Link Analysis)	AddInsight
Travel Paths	TAM / Local knowledge	Tom Tom (Link analysis)
Traffic Volumes	TAM	AddInsight + Tom Tom (O-D Analysis)
Bus Movements	Adelaide Metro / GTFS	CoA VIVA
Signal Cycle & Phasing	TAM model	AddInsight, Sight Observations

The following intersections are being used for the OD adjustment process following the TAM guidelines and RDS procedures.

SITE	SOURCE
Currie Street / Morphett Street (West)	Addinsight SCATS output (turning movements verified for shared lanes)
Currie Street / Morphett Street (West)	Addinsight SCATS output (turning movements verified for shared lanes)
King William Street / Currie Street / Grenfell Street	Addinsight SCATS output (turning movements verified for shared lanes)
Waymouth Street / Morphett Street (South)	Addinsight SCATS output (turning movements verified for shared lanes)
Morphett Street / Hindley Street	Addinsight SCATS output (turning movements verified for shared lanes)

3.5 Measures of Performance

Measures of performance will include (but not limited to) the following:

- Volume/capacity analysis
- Link analysis
- Total vehicles
- Total travelled distance (VKT)
- Total hours travelled (VHT)
- Average delay
- Number of stops/vehicle
- Total stops
- Travel times for key paths
- Travel times for buses

3.6 Assumptions and Limitations

COA Projects in the precinct

It is understood that CoA is currently undertaking other planning studies within the precinct, including Hindley Street One Way movement, TAFE Campus Master Plan and residential developments. As these studies are still progressing and confidential (not in the public domain) with CoA yet to decide on these projects, it may be premature to include any of these projects in the traffic modelling assessment for Light Square. Until a decision is made, this project should be considered a standalone assessment.

As discussed in the meeting with DIT/NMS/CoA (28/05/2025), WGA will include the Hindley Street one-way option (westbound traffic movement) for Option 1 for the Light Square Master Plan.

Traffic Modelling Guidelines

This is a high-level TIA, and the modelling approach will be generally in accordance with DIT guidelines and fit for purpose, noting that CoA has indicated that detailed modelling will be undertaken subject to the decision on the Master Plan option informed by the findings from this assessment.

Departures from DIT standard specs shall be noted in the report. Council's timeframe requirements and the high-level nature of the master plans set the level of available design detail. Further modelling is expected in the next design phase following the Council's decision to proceed with concept design based on a preferred option.

4. DELIVERABLES

Deliverables for this study will include the following:

Table 3: Modelling Deliverables

DELIVERABLE	DESIGN STAGE
Traffic Modelling Scoping Document – TMSD (this document)	Planning Investigations
Traffic Modelling Report + Base Case TAM Subarea model (.ang)	Planning Investigations
Updated Traffic Modelling Report + Project Case TAM Micro Subarea model (.ang)	Planning Investigations

We trust this traffic modelling scoping document meets your expectations. If you have any questions or want to discuss any aspect of this document, please contact us to discuss further.

APPENDIX C
SAFE SYSTEMS ASSESSMENT

WGA

City of Adelaide

Light Square / Wauwi Master Plan

DRAFT SAFE SYSTEM ASSESSMENT REPORT

WGA250495

WGA250495-RP-TT-0001_A

July 2025

Revision History

REV	DATE	ISSUE	ORIGINATOR	CHECKER	APPROVER
A	18/07/2023	Concept/Draft	JH	JZ	HB

CONTENTS

Figures

No table of figures entries found.

Tables

No table of figures entries found.

DOCUMENT MANAGEMENT

To be read in conjunction of Safe System Guideline

Internal	Knet# 13551921
External	https://www.DIT.sa.gov.au/standards/roads-all#roaddesignoutputs

COA APPROVALS – SAFE SYSTEMS ASSESSMENT

CONSULTATION			
Discipline	**Reviewer**	**Comments**	**Date**
Road & Marine Assets			
Traffic Operations			
Safety Strategy			
Technical Services			
Planning Division			

TECHNICAL APPROVAL	
☐	I approve the use of the mitigating treatments for this this project as detailed, subject to any conditions outlined below.
☐	I reject the use of the mitigating treatments and request further consideration.
☐	I endorse
Name: *MANAGER, TECHNICAL SERVICES*	
Signature:	**Date:**

EXECUTIVE APPROVAL (If Deemed Necessary for Projects >5 million)	
☐	I approve
☐	I reject
Name: *COMMISSIONER OF HIGHWAYS/DELEGATE*	
Signature:	**Date:**

1 SAFE SYSTEM ASSESSMENT

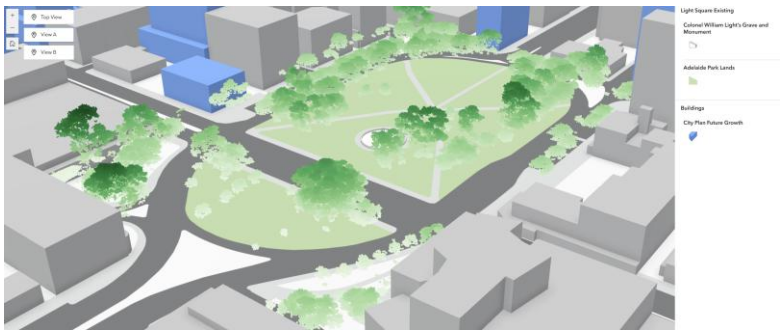
1.1 Assessment Details

1.1.1 Type of Assessment

A “quick” version of the Safer Systems Assessment (SSA) has been undertaken for the conceptual phase of the proposed design.

Wallbridge Gilbert Aztec (WGA) has been engaged by the City of Adelaide (CoA) to undertake planning investigation for CoA controlled “Light Square / Wauwi Master Plan”.

1.1.2 Existing Layout



1.1.3 Existing Bike Network (dashed lines are dedicated facilities)

1.1.4 Traffic Volumes (Location SA Viewer 2024 data)

1.1.5 Crash Information (Location SA Viewer 2019-2023)

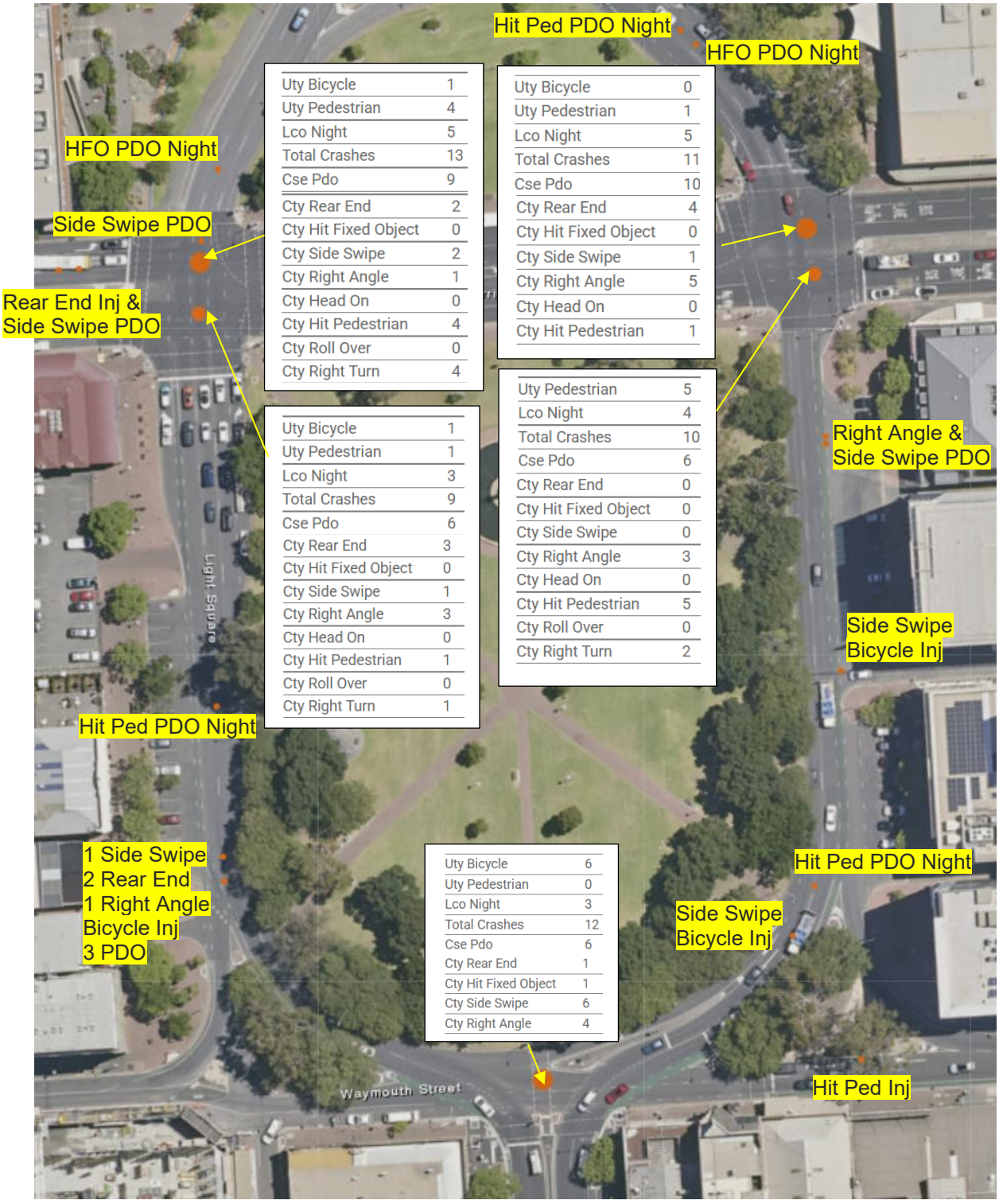
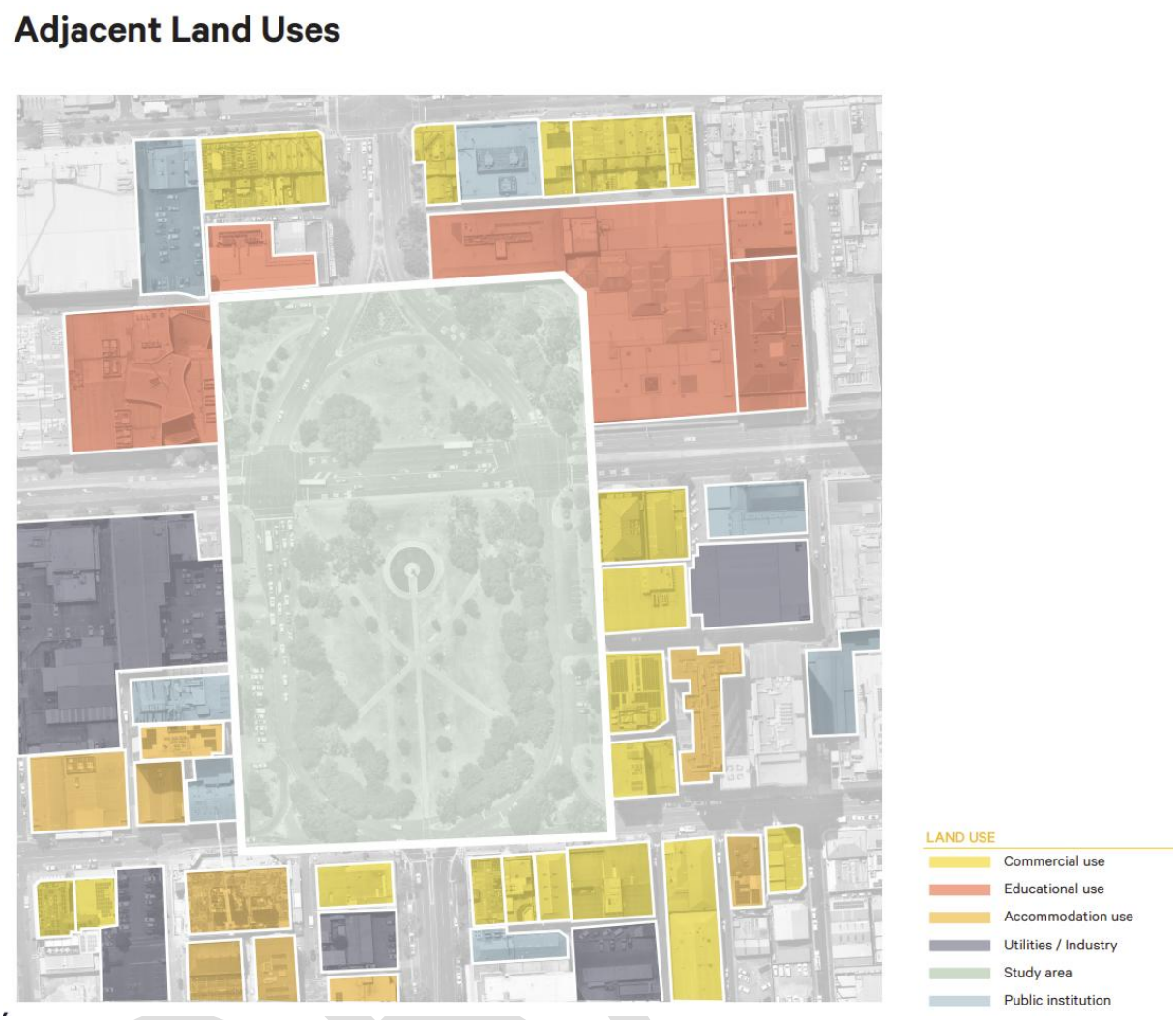


Table 1 – Crashes within the Light Square (note that the main report has a larger catchment)

Crash Type	RA	RT	RE	SS	Hit Ped	HFO	Bike	**TOTAL**	TOTAL INJURY	TOTAL PDO
Number	18	7	13	16	15	3	(11)	**72**	23	49
%	25.0%	9.7%	18.1%	22.2%	20.8%	4.2%	(15.3%)	**100%**	31.9%	68.1%

1.1.6 Adjacent Lane Uses (from Master Plan)



1.1.7 Assessment Team

This assessment has been conducted by Justin Henderson, Senior Civil and Transport Engineer and Jason Zafry, Senior Transport Planner. Justin and Jason have completed the Safety Systems Assessment training in early 2020 and both are Senior Road Safety Auditors with over 20 years' experience each in the field of traffic and transport engineering.

1.1.8 Meetings and Site Inspections

Not undertaken at concept stage.

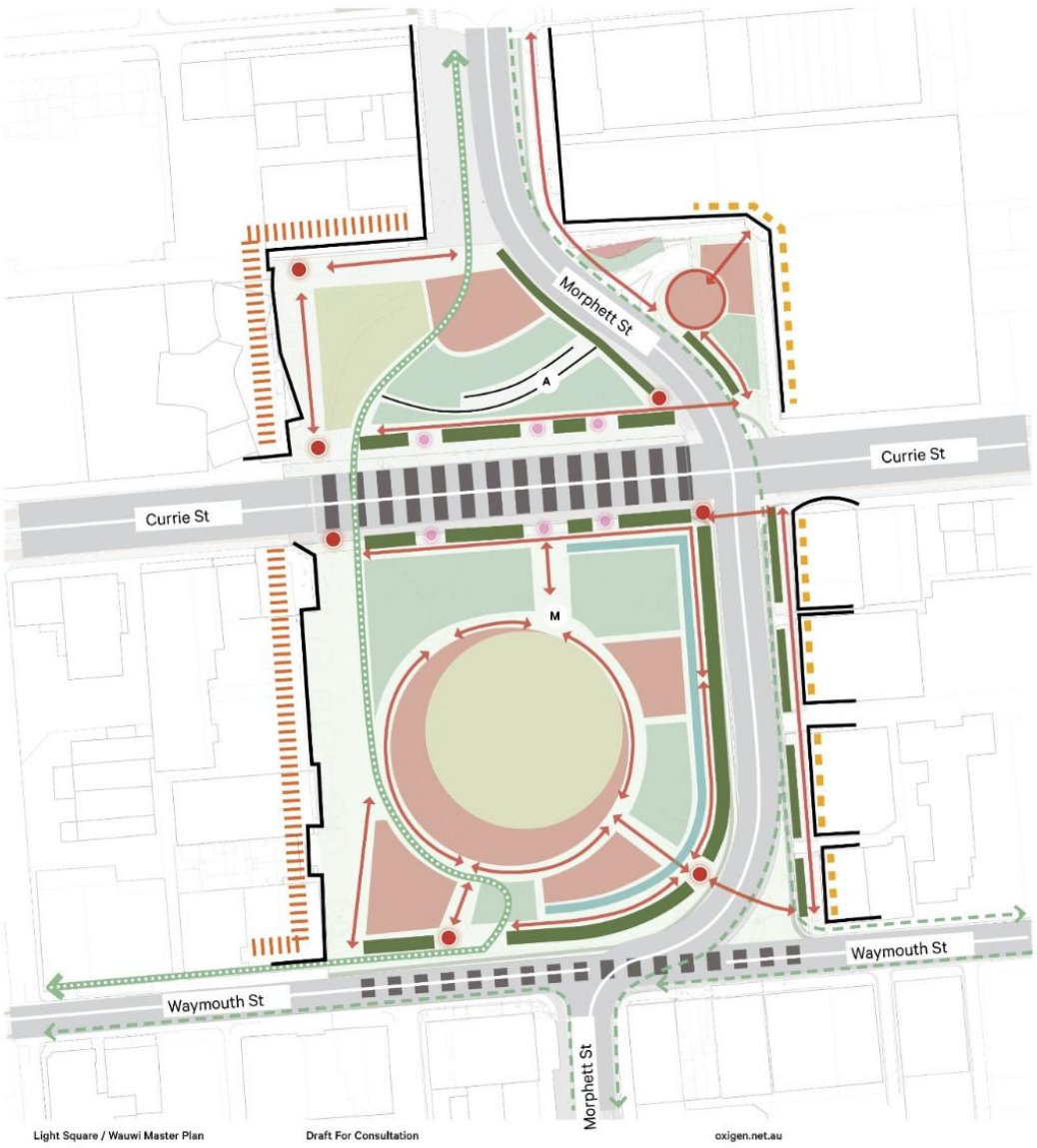
1.1.9 Project Objectives and Context

Table 1-3: Project Context

PROMPTS	COMMENTS
What is the reason for the project? Is there specific crash type risk? Is it addressing specific issues such as poor speed limit compliance, road access, congestion, future traffic growth, freight movement, amenity concerns from the community, maintenance/asset renewal, etc.	The upgraded light square is proposed to improve amenity, increase public/green space, and also encourage active transport whist improving active transport safety. Improvements should also reduce the likelihood, and wherever possible, the severity of crashes/incidents for all road users. The changes may decrease the overall vehicle / traffic operational efficiency of the intersection.
What is the function of the road? Consider location, roadside land use, area type, speed limit, intersection type, presence of parking, public transport services and vehicle flows. What traffic features exist nearby (e.g., upstream, and downstream)? What alternative routes exist?	CoA does not typically define the roads as particular routes. Currie Street, Morphett Street (including Light Square's Northbound & Southbound legs) and Waymouth Street are all classified as arterial roads (attracting high traffic volumes and forming part of key public transport routes). Significant pedestrian generation attractions adjoin the sites, resulting in high volumes of cyclist and pedestrians. Generally the alternative through routes are the surrounding East/West/North/South Tce however these do not have a direct connection to Morphett St and Montefiore Road (bridge) direct linkage to North Adelaide.
What is the speed environment? What is the current speed limit? Has it changed recently? Is it similar to other roads of this type? How does it compare to Safe System speeds? What is the acceptability of lowering the speed limit at this location?	The default urban/city speed limit is 50 km/h. The operating speeds actually achieved in this area are likely to be lower than 50km/h (assume around 30-40km/h). The operating speeds are generally "safer system" for vehicle-vehicle conflict but not vulnerable users. Lowering of speed limit (or traffic calming measures) is a possibility.
What **road users** are present? Consider the presence of elderly pedestrians, school children and cyclists. Also note what facilities are available to vulnerable road users (e.g., signalised crossings, bicycle lanes, school speed limits, etc.)	There are several key land uses adjacent to the intersection which generate specific road user types: Businesses, Entertainment, Hotels, University Generally, "high pedestrian access" and moderate cycling activity. Signalised intersection ped crossings are controlled. High volumes of public transport patronage.
What is the **vehicle** composition? Consider the presence of heavy vehicles (and what type), motorcyclists and other vehicles using the roadway.	The vehicle composition is a mix of regular urban traffic, and some freight volume (although likely to be smaller rigid vehicles, 19m semi maximum). Cyclists and pedestrians are present in high volumes at this site as indicated by the above road users. Motorcycles would be consistent with typical urban volumes.

1.2 Proposed Works

1.2.1 Option 1 Concept Design



ENVIRONMENT
- Green edge
- Feature gardens
- Open lawns
- WSUD
- Events/flexible space*
- Direct Square active building frontage
- Building frontage

CONNECTION
- Primary access point
- Access point
- Primary pedestrian path
- Shared use zone
- Cycle lane**
- Vehicle lane
- Paved roadway

Key Points
- A Level Change - Potential amphitheatre
- M Monument

OPTION 1 ACHIEVES:

Active Edge	Creation of 270m of direct Square active building frontage.
Safety	Replacement of road crossings with direct access to open space.
Greening	Replacement of 4,096m² (22%) of road pavement with green space. An increase in green space of 9% and an increase in space for biodiversity of 14%.
Tree Canopy	An increase in tree canopy of 30%.
Open Activity Spaces	An increase in open lawns for open activity spaces of 35%.

* Detailed design to define open spaces that will allow for a range of activities at various scales
**Detailed design to define at grade/separated

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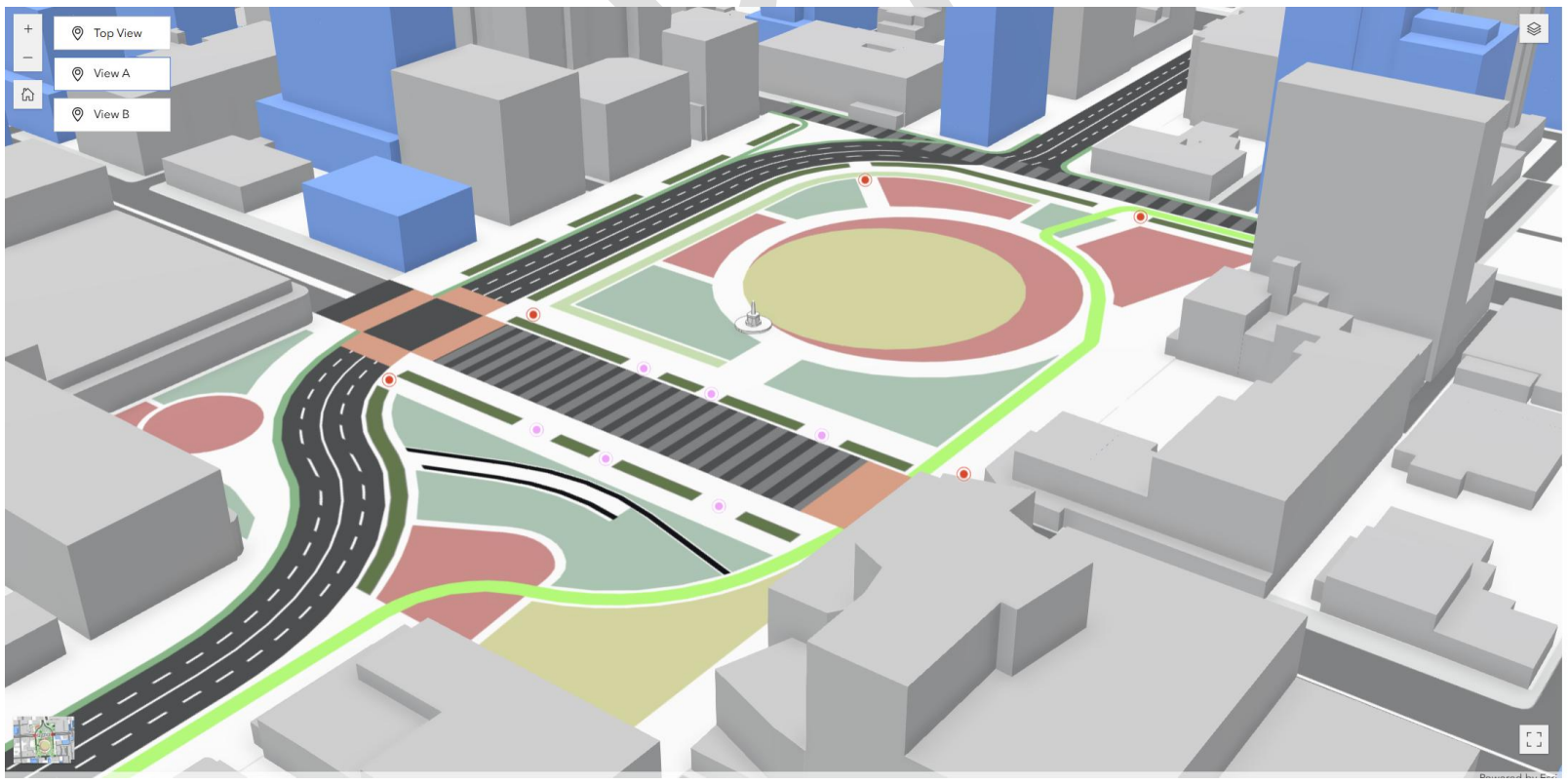


Light Square Option 1

Colonel William Light's Grave and Monument

Access Points

Primary Access Points

Pedestrian - Crossings

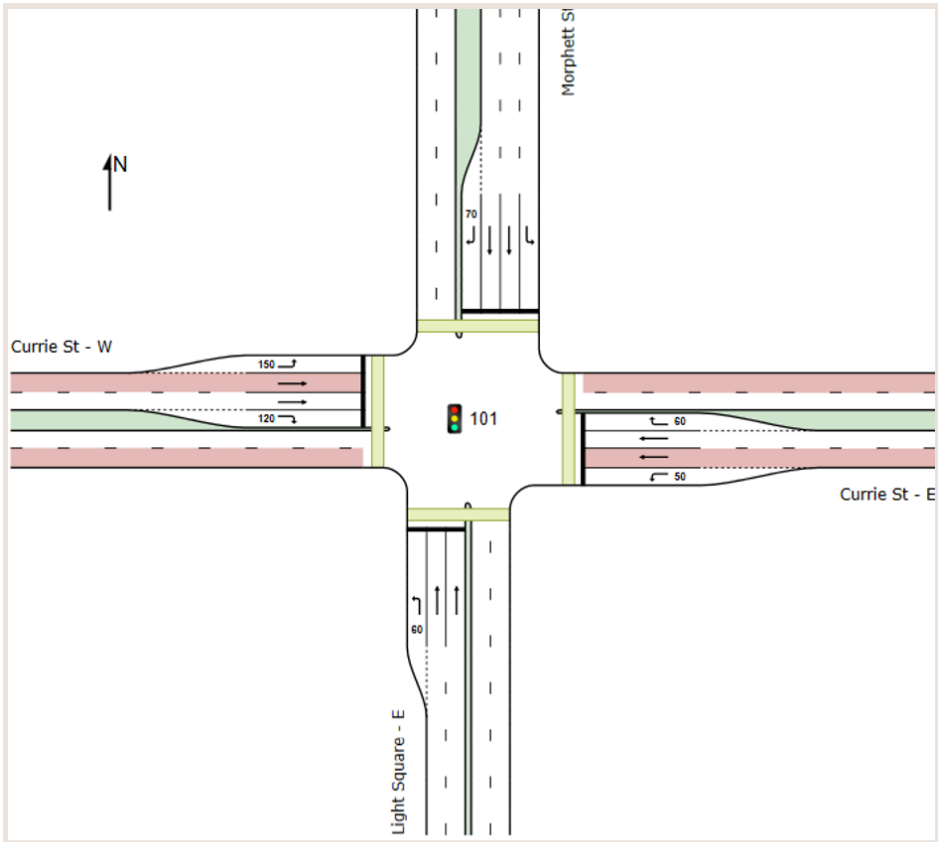
Bike Lanes

Paved Road

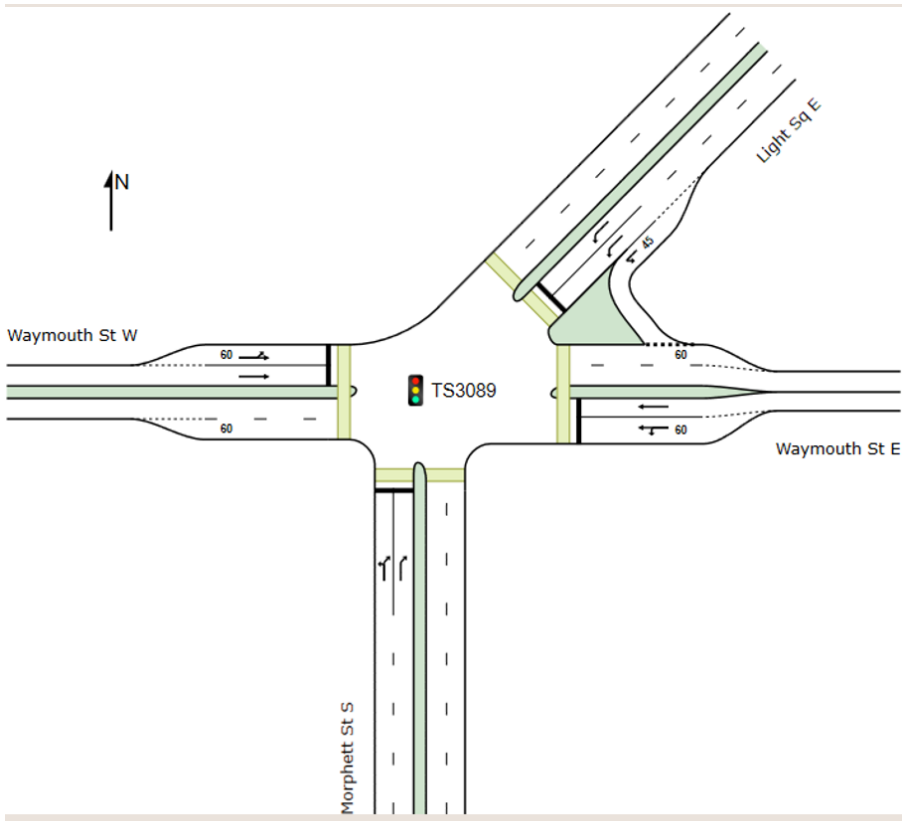
Vehicle Lanes

Shared Path

Ampitheatre



Currie Street East - Proposed Option 1 Arrangement



Southern Intersection – Proposed Option 1 Arrangement

Option 1

Relocate North-South vehicle movement along Morphett Street to the eastern side of the Square only. This option will maintain East-West movement on Currie and Waymouth Street.

1 Relocates traffic movement to the eastern side of the Square.

2 Pushes the road carriageways to the east within the existing carparking and pedestrian footpath zones.

3 Achieves vehicle access to properties on the western side of the Square from existing laneways running off Currie and Waymouth Streets.

4 Introduces a right turn from Waymouth onto Morphett Street when travelling from the west.

5 Introduces the ability to continue to travel east along Waymouth Street through the Morphett Street intersection when travelling from the west.

6 Removes the right turn from Morphett onto Currie Street when travelling from the south.

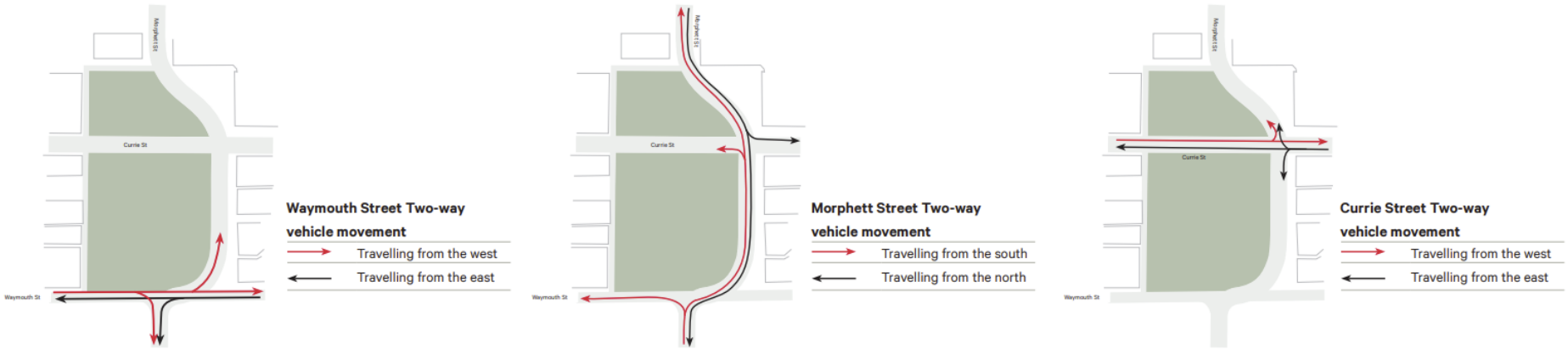
7 Removes the right turn from Morphett St onto Currie St when travelling from the North.

8 Removes the right turn onto Morphett Street from Currie Street when travelling from the west.

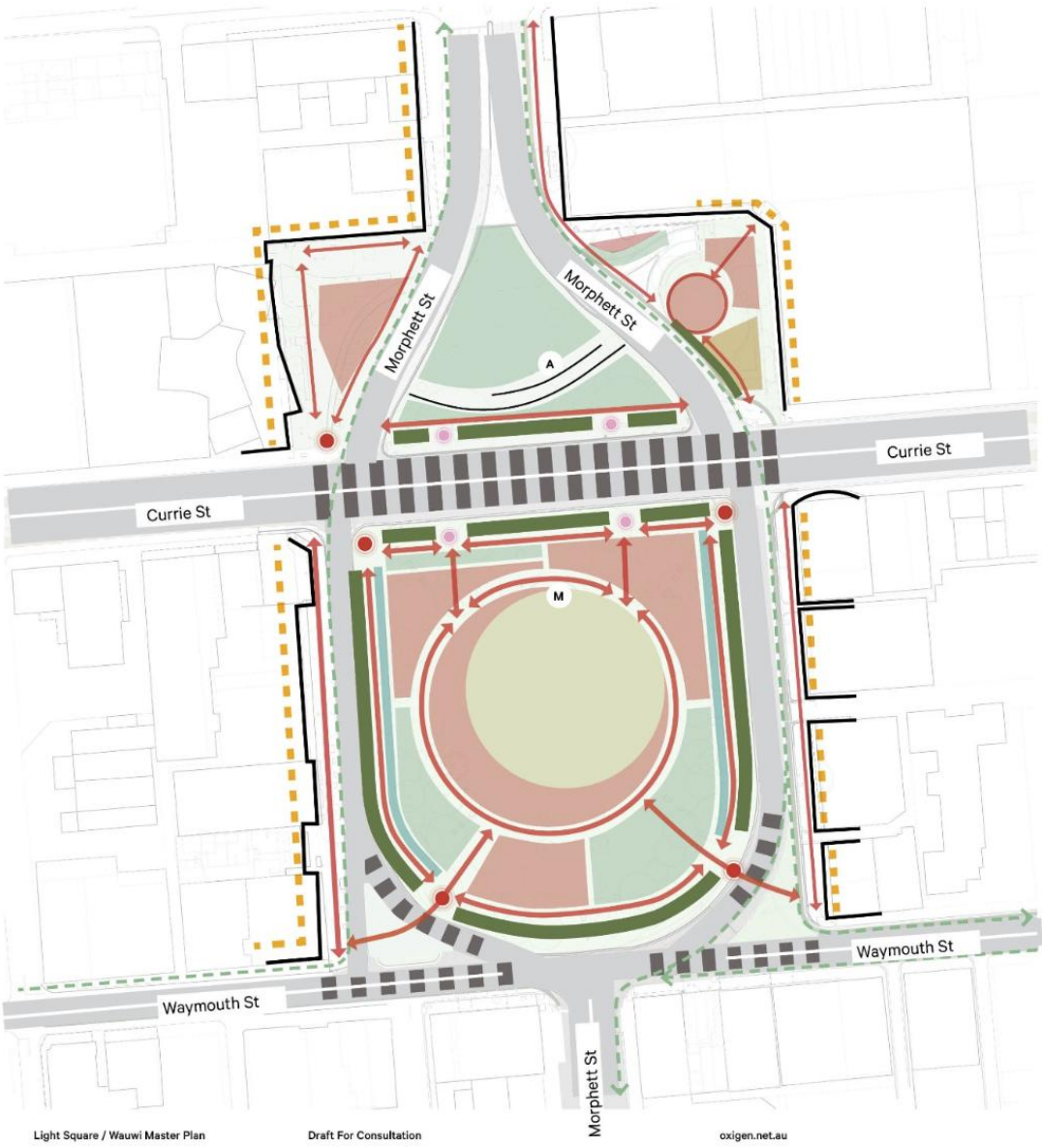
9 Removes the right turn onto Morphett Street from Currie Street when travelling from the East. Alternatively right turn movement outside peak hours can be provided.

10 A bus only right turn bay can be provided from Currie Street when travelling from the East.

Option 1



1.2.2 Option 2 Concept Design



ENVIRONMENT
- Green edge
- Feature gardens
- Open lawns
- WSUD
- Events/flexible space
- Building frontage

CONNECTION
- Primary access point
- Access point
- Primary pedestrian path
- Cycle lane*
- Vehicle lane
- Paved roadway

Key Points
- A — Level Change - Potential amphitheatre
- M — Monument

OPTION 2 ACHIEVES:

Safety	Removal of 2 vehicle slip lanes.
Greening	Replacement of 2,895m² (15%) of road pavement with green space. An increase in green space of 4% and an increase in space for biodiversity of 13%.
Tree Canopy	An increase in tree canopy of 25%.
Open Activity Spaces	An increase in open lawns for open activity spaces of 20%.

* Detailed design to define open spaces that will allow for a range of activities at various scales
**Detailed design to define at grade/separated

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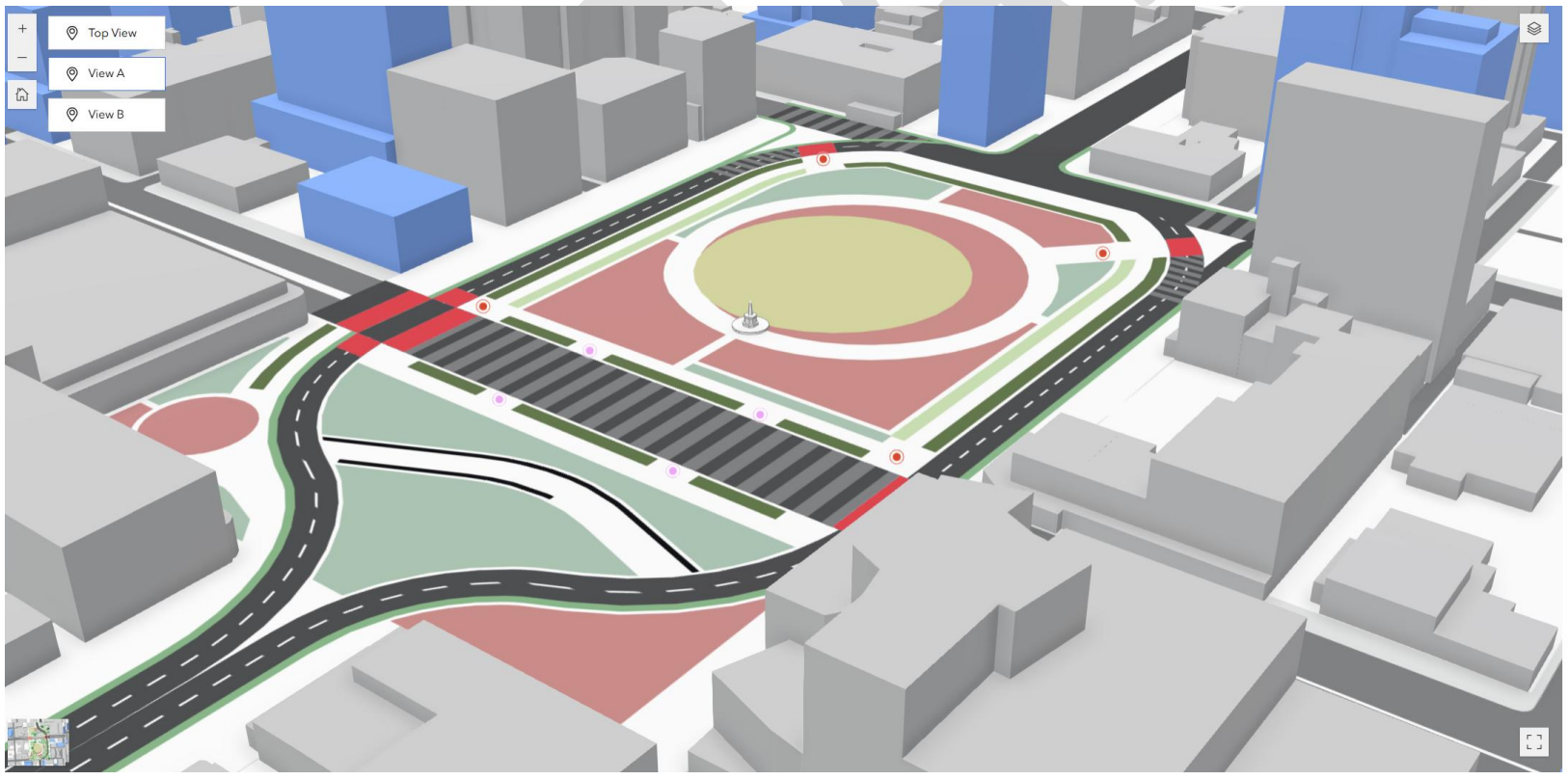
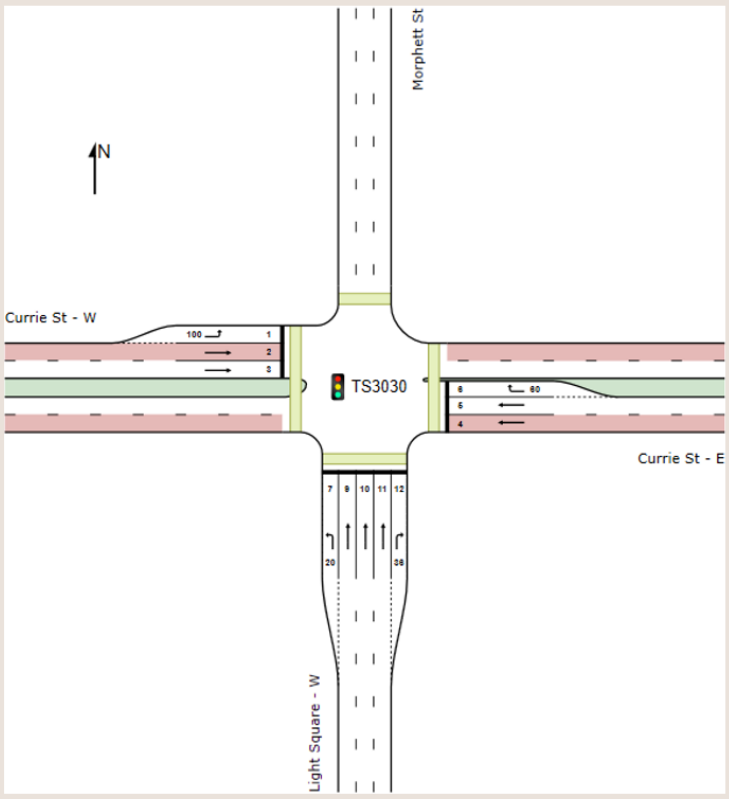
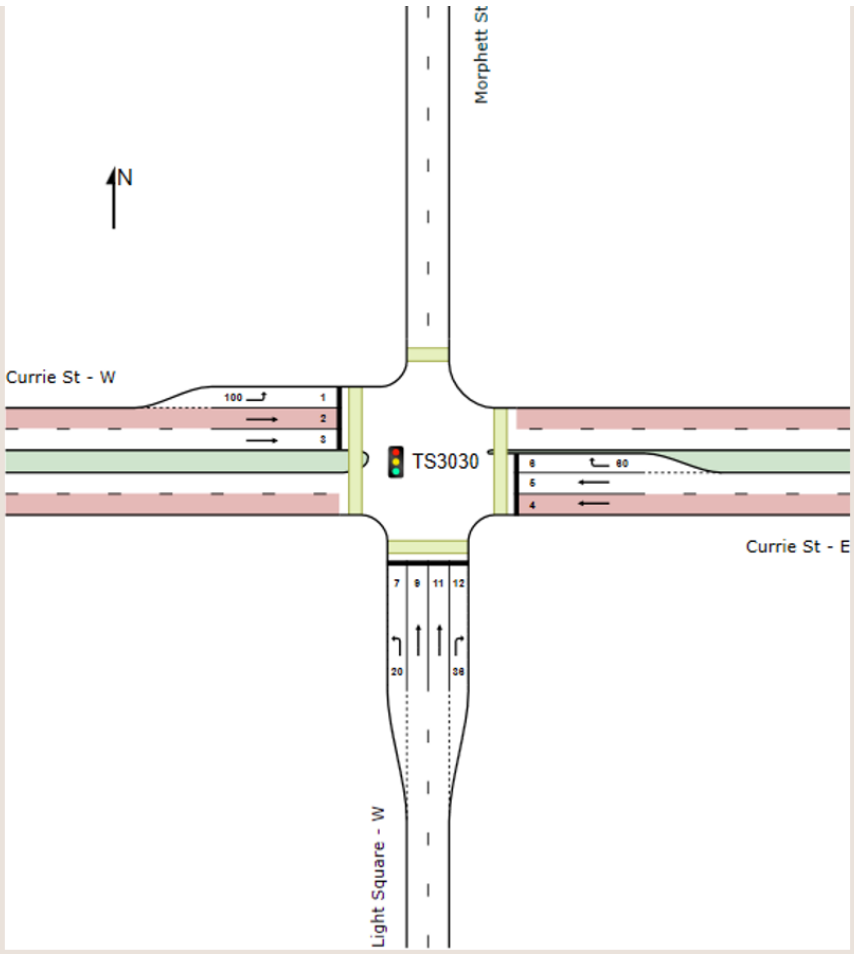


Reimagined Light Square/Wauwi
Option 2



Currie Street West - Existing Arrangement



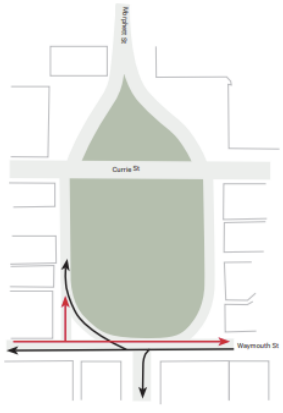
Currie Street West – Existing Arrangement

Option 2

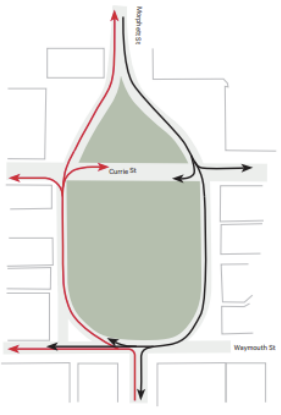
Retains vehicle movement along Morphett Street either side of the Square and increases the central green area of the Square by removing slip lanes, pushing the traffic lanes outwards and reducing the width of the current parking and pedestrian verges.

1. Retains the existing north south traffic movement along Morphett Street but relocates the road carriageways outwards.
2. Includes limited loading and access carparks on the eastern side.
3. Retains existing lane configuration at signalised intersections.
4. Introduces the ability to continue to travel east along Waymouth Street through the Morphett Street intersection when travelling from the west.

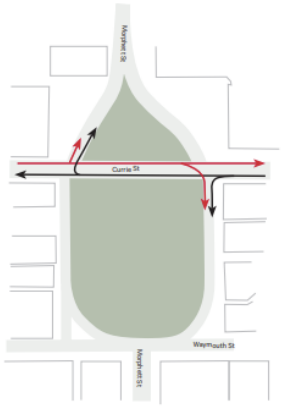
Option 2



Waymouth Street Two-way vehicle movement
- Travelling from the west
- Traveling from the east



Morphett Street Two-way vehicle movement
- Travelling from the south
- Travelling from the north



Currie Street Two-way vehicle movement
- Travelling from the west
- Travelling from the east

1.3 Safe System Assessment Matrices

The SSA matrix has been populated with reference to section 9 of the Assessment Guideline.

Table 1-5: SSA Matrix Light Square / Wauwi (Before Treatment)

	Run-off road	Head-on	Intersection	Other	Pedestrian	Cyclist	Motorcyclists
Exposure Comments:	The site has 53,000 VPD. Assume 35% of this volume within outer traffic lanes (18,500 VPD).	The site has 53,000 VPD. Assume only 5% of this volume is susceptible to head on due to traffic separation (2,650 VPD). Alternative test is Currie Leg 19,100 VPD has 25% traffic in RT lanes exposed (4,775 VPD).	The site has 53,000 VPD entering the intersections.	Side swipe on approach to intersection – the high amount of adjacent turning traffic. Assume 25% of the total volume is changing lanes preparing for turning. (13,250 VPD)	The site has no pedestrian counts, it is expected that well in excess of 100 pedestrians are within the project site on a daily basis, due to the location of ped generating attractions in the area	The site has no cyclist counts, it is expected that well in excess of 100 cyclists are within the project site (on road) on a daily basis	It is expected that well in excess of 100 motorcyclists are within the project site (on road) on a daily basis
Exposure Score:	4/4	2/4	4/4	4/4	4/4	4/4	4/4
Likelihood Comments:	Factors that increase the likelihood include: • Frequently spaced street trees etc immediately adjacent to (behind) the kerb at the central to southern end of light square • High volumes of traffic changing lanes on approach to the intersection to assume the correct turn lane create potential zones of vehicular conflict and resultant ricochet into roadside • Roadside furniture within the CZW eg Traffic Signal Poles/light poles, • Semi-frangible items (Light and Sign poles etc) • Deviating alignment, some hazards to outside of curves Factors that decrease the likelihood include: • There are three (3) HFO recorded crashes in 5 years - <5% of crashes	Factors that increase the likelihood include: • High volumes of traffic changing lanes on approach to the intersection to assume the correct turn lane create potential zones of vehicular conflict – head on could be a secondary crash type after a side swipe or avoidance manoeuvre Factors that decrease the likelihood include: • Out of 72 crashes recorded in a 5-year period, none were head on • Light Square separates opposing traffic streams virtually eliminating head on risk for much of the alignment. • Raised medians are present throughout the remainder of light square intersection approaches providing separation between opposing vehicles • Currie and Waymouth Legs are straight approach. Currie separated by RT Lanes (increase separation)	Factors that increase the likelihood include: • From 5-year crashes, the predominant crash type is right angle (18 of 72 or 25%). • Right Turn accounts for 7 out of 72 crashes (9.7%) • Rear End crashes (13 of 72) • Poor traffic flow due to alignment of intersections contributes to start stop traffic and increase risk of rear end crashes • High Traffic Turning movements • RT from Currie (westbound) to Morphett (northbound) is a filtered turn (green arrow drops out). • Curving alignment through intersection (lane placement issues) Factors that decrease the likelihood include: • Intersection controlled by lights and no filtered left or right turn phases (except Currie WB to Morphett NB) • Some movements EG right turn are banned EG Waymouth St direct to Morphett St or do not have oncoming conflicting traffic (Morphett to Currie - westbound). • Currie St has one lane in each direction bus lane 7am-7pm	Factors that increase the likelihood include: • High turning movements and cross traffic movements to enter correct lane to turn • Meandering alignments on Morphett St/Light Square • Commercial and Property access adjacent to site • Parking movements adjacent to site • From 5 year crashes, 16 of 72 (22.2%) crashes were side swipe type • High volumes of entering traffic from adjacent legs Factors that decrease the likelihood include: • Reasonable delineation in the form of lighting, line marking	Factors that increase the likelihood include: • Very high vehicular volumes passing adjacent to footpaths • Commercial establishments around the site • High night time activity (night clubs and accommodation) • The footpaths are located immediately adjacent to the road eg Currie St and areas of Morphett St (low separation if vehicle is errant) • Lack of fencing at crossing locations to contain peds\ • The site has recorded 15 hit pedestrian crashes in 5 years (of the total 72 crashes this is 20.8%) • Crossing of Morphett St South end is uncontrolled at 2 locations Factors that decrease the likelihood include: • Three signals have signalised pedestrian crossings • Generally compliant DDA infrastructure • The layout provides controlled crossing opportunities • Wide medians provide some refuge for peds • Lighting present on site (may be less than current standard)	Factors that increase the likelihood include: • 11 cyclist injury crashes in 5 years (3/72=15.3%) • Cyclists mixing with turning traffic • No protected “on road” facilities for left turns • No Hook turn facilities • Multiple conflict zones • High volumes of food delivery services on bicycles Factors that decrease the likelihood include: • bike lane facilities provided • Green line marking in conflict zones • On road and off-road facilities	Factors that increase the likelihood include: • Adjacent turning volumes • High incidents of late lane change manoeuvres • Opportunity for motorcycles to be obscured by larger vehicles such as 4WD etc • RT from Currie (westbound) to Morphett (northbound) is a filtered turn (green arrow drops out). • High volumes of food delivery scooters Factors that decrease the likelihood include: • No filtered turns at the signalised intersections (except Currie to Morphett) • As per “intersections”
Likelihood Score:	2.5/4	1/4	3/4	3/4	3.5/4	2.5/4	3/4
Severity Comments:	Factors that increase the severity include: • Many fixed objects are unyielding eg large trunked trees, very close to road Factors that decrease the severity include: • Due to congestion and controlled intersection traffic speeds are generally slower and survivable within an enclosed vehicle	Factors that increase the severity include: • Head on impacts will occur at impact speeds that could possibly cause serious injuries or fatalities Factors that decrease the severity include: • Physical separation (medians) allows some vehicle speed to wash off	Factors that increase the severity include: • A right angle crash has the potential to occur where the bullet vehicle carries enough speed that will inflict serious or fatal injuries on the target vehicle • 18 injury crashes at 3 intersections combined (25%) Factors that decrease the severity include: • Speed of bullet vehicle are in the lower order and orientation for rear end crash type	Factors that decrease the severity include: • The bullet vehicle is generally not orientated to dissipate enough force to cause serious injuries	Factors that increase the severity include: • Vulnerable road user exposed to speeds that will likely cause serious or fatal injuries • Pedestrians may be intoxicated leading to poor decision making	Factors that increase the severity include: • Vulnerable road users exposed to speeds that will likely cause serious or fatal injuries	Factors that increase the severity include: • Vulnerable road users that are exposed to speeds that will likely cause serious or fatal injuries
Severity Score:	2.5/4	2.5/4	2.5/4	2/4	4/4	4/4	4/4
Product (multiply scores above for crash type)	**25/64**	**5/64**	**30/64**	**24/64**	**56/64**	**40/64**	**48/64**
						TOTAL	**228/448**

Table 1-6: SSA Matrix Light Square / Wauwi (Option 1)

	Run-off road	Head-on	Intersection	Other	Pedestrian	Cyclist	Motorcyclists
Exposure Comments:	The site has 53,000 VPD. Assume 35% of this volume within outer traffic lanes (18,500 VPD).	The site has 53,000 VPD. The new works will incur 50% of traffic to be adjacent/oncoming (26,500)	The site has 53,000 VPD entering the intersections.	Side swipe on approach to intersection – the high amount of adjacent turning traffic. Assume 15% of the total volume is changing lanes preparing for turning. (7950 VPD)	The site has no pedestrian counts, it is expected that well in excess of 100 pedestrians are within the project site on a daily basis, due to the location of ped generating attractions in the area	The site has no cyclist counts, it is expected that well in excess of 100 cyclists are within the project site (on road) on a daily basis	It is expected that well in excess of 100 motorcyclists are within the project site (on road) on a daily basis
Exposure Score:	4/4	4/4	4/4	3/4	4/4	4/4	4/4
Likelihood Comments:	Factors that increase the likelihood include: • Frequently spaced street trees etc immediately adjacent to (behind) the kerb at the central to southern end of light square, however some would be removed through road widening. • High volumes of traffic changing lanes on approach to the intersection to assume the correct turn lane create potential zones of vehicular conflict and resultant ricochet into roadside • Roadside furniture within the CZW eg Traffic Signal Poles/light poles, • Semi-frangible items (Light and Sign poles etc) • Deviating alignment, some hazards to outside of curves Factors that decrease the likelihood include: • Opportunities for safer roadside design through design process	Factors that increase the likelihood include: • High volumes of traffic changing lanes on approach to the intersection to assume the correct turn lane create potential zones of vehicular conflict – head on could be a secondary crash type after a side swipe or avoidance manoeuvre • Morphett Street only separated by a 1m wide kerbed median • Deviating alignment Factors that decrease the likelihood include: • Currie and Waymouth Legs are straight approach. Currie separated by RT Lanes (increase separation) • Currie and Waymouth are paved thresholds with traffic calming	Factors that increase the likelihood include: • Poor traffic flow due to alignment of intersections contributes to start stop traffic and increase risk of rear end crashes • High Traffic Turning movements • Removal of U Turn at north and LT onto Waymouth St may transfer crashes to other areas of network due to lack of freedom of movement. Factors that decrease the likelihood include: • Intersections reduced from 3 to 2 • Number of conflict points overall reduced • Intersection controlled by lights and no filtered left or right turn phases • No Filtered turns, many right turn movements are banned • Scheme eliminates right turns from Morphett St south into Currie St and also Waymouth St • No traffic from the NW Quadrant car park	Factors that increase the likelihood include: • High turning movements and cross traffic movements to enter correct lane to turn • Meandering alignments on Morphett St/Light Square • Commercial and Property access adjacent to site • Parking movements adjacent to site • From 5 year crashes, 16 of 72 (22.2%) crashes were side swipe type Factors that decrease the likelihood include: • Intersections reduced from 3 to 2 • Number of conflict points overall reduced • Reasonable delineation in the form of lighting, line marking • Scheme eliminates right turns from Morphett St south into Currie St and also Waymouth St • Removal of U Turn at north and LT onto Waymouth St reduces risk of entering traffic side swiping through traffic	Factors that increase the likelihood include: • Very high vehicular volumes passing adjacent to road crossings • Commercial establishments around the site • High night time activity (night clubs, restaurants and accommodation) • Lack of fencing at crossing locations to contain peds • No medians provide for refuge for peds (1m median too narrow), more overall lanes to cross and gap in traffic flow harder to pick. • South-East crossing appears to be uncontrolled • Zebra / Wombat cant be used over 2 lanes each direction Factors that decrease the likelihood include: • Better separation of footpaths in mid sections • Intersections reduced from 3 to 2 • Two signals have signalised pedestrian crossings and Currie St converted to a “Victoria Square” style of environment which is more pedestrian friendly • Number of conflict points overall reduced • The layout provides controlled crossing opportunities • Lighting upgrades	Factors that increase the likelihood include: • Cyclists mixing with turning traffic • No protected on road facilities for left turns • No Hook turn facilities • Multiple conflict zones • High volumes of food delivery services on bicycles • Crossing of Waymouth and Currie St unclear, are these controlled crossings? • Capture of all cyclist movements still a concern Factors that decrease the likelihood include: • bike lane facilities provided off road • intersections reduced from 3 to 2 • Number of conflict points overall reduced • The layout provides controlled crossing opportunities • Green line marking in conflict zone (southbound) • Shared path on northbound side with very good separation. • Improve Lighting	Factors that increase the likelihood include: • Adjacent turning volumes • High incidents of late lane change manoeuvres • Opportunity for motorcycles to be obscured by larger vehicles such as 4WD etc • RT from Currie (westbound) to Morphett (northbound) is a filtered turn (green arrow drops out). • High volumes of food delivery scooters • Deviating alignment Factors that decrease the likelihood include: • No filtered turns at the signalised intersections and reduced turning movements • intersections reduced from 3 to 2 • Number of conflict points overall reduced • Calmed environment, slower speeds encouraged • As per “intersections”
Likelihood Score:	2/4	3/4	2.5/4	2.5/4	3/4	2/4	2/4
Severity Comments:	Factors that increase the severity include: • Fixed objects are unyielding eg large trunked trees, very close to road Factors that decrease the severity include: • Due to congestion and controlled intersection traffic speeds are generally slower and survivable within an enclosed vehicle	Factors that increase the severity include: • Head on impacts will occur at impact speeds that could possibly cause serious injuries or fatalities Factors that decrease the severity include: • Physical separation (medians) allows some vehicle speed to wash off	Factors that increase the severity include: • A right angle crash has the potential to occur where the bullet vehicle carries enough speed that will inflict serious or fatal injuries on the target vehicle Factors that decrease the severity include: • Speed of bullet vehicle are in the lower order and orientation for rear end crash type	Factors that decrease the severity include: • The bullet vehicle is generally not orientated to dissipate enough force to cause serious injuries	Factors that increase the severity include: • Vulnerable road user exposed to speeds that will likely cause serious or fatal injuries • Pedestrians may be intoxicated leading to poor decision making	Factors that increase the severity include: • Vulnerable road users exposed to speeds that will likely cause serious or fatal injuries	Factors that increase the severity include: • Vulnerable road users that are exposed to speeds that will likely cause serious or fatal injuries Factors that decrease the likelihood include: • Calmed environment, slower speeds encouraged
Severity Score:	2.5/4	2.5/4	2.5/4	2/4	3.5/4	3.5/4	3.5/4
Product (multiply scores above for crash type)	**20/64**	**30/64**	**25/64**	**15/64**	**42/64**	**28/64**	**28/64**
						TOTAL	**188/448**

Table 1-7: SSA Matrix Light Square / Wauwi (Option 2)

	Run-off road	Head-on	Intersection	Other	Pedestrian	Cyclist	Motorcyclists
Exposure Comments:	The site has 53,000 VPD. Assume 50% of this volume within outer traffic lanes (18,500 VPD).	The site has 53,000 VPD. Assume only 5% of this volume is susceptible to head on due to traffic separation (2,650 VPD). Alternative test is Currie Leg 19,100 VPD has 25% traffic in RT lanes exposed (4,775 VPD).	The site has 53,000 VPD entering the intersections.	Side swipe on approach to intersection – the high amount of adjacent turning traffic. Assume 25% of the total volume is changing lanes preparing for turning. (13,250 VPD)	The site has no pedestrian counts, it is expected that well in excess of 100 pedestrians are within the project site on a daily basis, due to the location of ped generating attractions in the area	The site has no cyclist counts, it is expected that well in excess of 100 cyclists are within the project site (on road) on a daily basis	It is expected that well in excess of 100 motorcyclists are within the project site (on road) on a daily basis
Exposure Score:	4/4	2/4	4/4	4/4	4/4	4/4	4/4
Likelihood Comments:	Factors that increase the likelihood include: • Roadside hazards are still present (although offsets increased) • High volumes of traffic changing lanes on approach to the intersection to assume the correct turn lane create potential zones of vehicular conflict and resultant ricochet into roadside • Roadside furniture within the CZW eg Traffic Signal Poles/light poles, • Semi-frangible items (Light and Sign poles etc) • Deviating alignment, some hazards to outside of curves Factors that decrease the likelihood include: • Opportunities for safer roadside design through design process • Offset of street trees increased as lane displaced to park land	Factors that increase the likelihood include: • High volumes of traffic changing lanes on approach to the intersection to assume the correct turn lane create potential zones of vehicular conflict – head on could be a secondary crash type after a side swipe or avoidance manoeuvre Factors that decrease the likelihood include: • Light Square separates opposing traffic streams virtually eliminating head on risk for much of the alignment. • Raised medians are present throughout the remainder of light square intersection approaches providing separation between opposing vehicles • Currie and Waymouth Legs are straight approach. Currie separated by RT Lanes (increase separation) • Currie and Waymouth are paved thresholds with traffic calming	Factors that increase the likelihood include: • Poor traffic flow due to alignment of intersections contributes to start stop traffic and increase risk of rear end crashes. Worsened due to lane loss. • More competition for lost lane space • High Traffic Turning movements • RT from Currie (westbound) to Morphett (northbound) is a filtered turn (green arrow drops out). • Curving alignment through intersection (lane placement issues) • Removal of U Turn at north and LT onto Waymouth St may transfer crashes to other areas of network due to lack of freedom of movement. Factors that decrease the likelihood include: • Intersection controlled by lights and no filtered left or right turn phases (except Currie WB to Morphett NB) • Some movements EG right turn are banned EG Waymouth St direct to Morphett St or do not have oncoming conflicting traffic (Morphett to Currie - westbound). • Currie St has one lane in each direction bus lane 7am-7pm	Factors that increase the likelihood include: • High turning movements and cross traffic movements to enter correct lane to turn (slight reduction due to loss of one lane) • Meandering alignments on Morphett St/Light Square • Commercial and Property access adjacent to site • Parking movements adjacent to site (some rationalisation) • High volumes of entering traffic from adjacent legs Factors that decrease the likelihood include: • Reasonable delineation in the form of lighting, line marking • Reduced lanes so less lane changing • Removal of U Turn at north and LT onto Waymouth St reduces risk of entering traffic side swiping through traffic	Factors that increase the likelihood include: • Very high vehicular volumes passing adjacent to road crossings • Commercial establishments around the site • High night time activity (night clubs, restaurants and accommodation) • Lack of fencing at crossing locations to contain peds • South-East crossing appears to be uncontrolled • Zebra / Wombat cant be used over 2 lanes each direction Factors that decrease the likelihood include: • Better separation of footpaths in mid sections • Two signals have signalised pedestrian crossings and Currie St converted to a “Victoria Square” style of environment which is more pedestrian friendly • Reduced Crossing Distances • The layout provides controlled crossing opportunities • Lighting Upgrades	Factors that increase the likelihood include: • Cyclists mixing with turning traffic • No protected “on road” facilities for left turns • No Hook turn facilities • Multiple conflict zones • High volumes of food delivery services on bicycles • Reduced lanes might “constrain” position for cyclists Factors that decrease the likelihood include: • bike lane facilities provided • Green line marking in conflict zones • On road and off-road facilities • Project presents opportunities to do some cyclist facilities better with improvements on current • Currie St converted to a “Victoria Square” style of environment which is safer for cyclist movements • Improve lighting	Factors that increase the likelihood include: • Adjacent turning volumes • High incidents of late lane change manoeuvres • Existing intersection movement largely retained • Opportunity for motorcycles to be obscured by larger vehicles such as 4WD etc • RT from Currie (westbound) to Morphett (northbound) is a filtered turn (green arrow drops out). • High volumes of food delivery scooters • Reduction in lane numbers may result in more competition for available lane space Factors that decrease the likelihood include: • No filtered turns at the signalised intersections (except Currie to Morphett) • Calmed environment, slower speeds encouraged • As per “intersections”
Likelihood Score:	2/4	1/4	3/4	2.5/4	3/4	2/4	2.5/4
Severity Comments:	Factors that increase the severity include: • Many fixed objects are unyielding eg large trunked trees, very close to road Factors that decrease the severity include: • Due to congestion and controlled intersection traffic speeds are generally slower and survivable within an enclosed vehicle	Factors that increase the severity include: • Head on impacts will occur at impact speeds that could possibly cause serious injuries or fatalities Factors that decrease the severity include: • Physical separation (medians) allows some vehicle speed to wash off	Factors that increase the severity include: • A right-angle crash has the potential to occur where the bullet vehicle carries enough speed that will inflict serious or fatal injuries on the target vehicle • 18 injury crashes at 3 intersections combined (25%) Factors that decrease the severity include: • Speed of bullet vehicle are in the lower order and orientation for rear end crash type	Factors that decrease the severity include: • The bullet vehicle is generally not orientated to dissipate enough force to cause serious injuries	Factors that increase the severity include: • Vulnerable road user exposed to speeds that will likely cause serious or fatal injuries • Pedestrians may be intoxicated leading to poor decision making	Factors that increase the severity include: • Vulnerable road users exposed to speeds that will likely cause serious or fatal injuries	Factors that increase the severity include: • Vulnerable road users that are exposed to speeds that will likely cause serious or fatal injuries Factors that decrease the likelihood include: • Calmed environment, slower speeds encouraged
Severity Score:	2.5/4	2.5/4	2.5/4	2/4	3.5/4	3.5/4	3.5/4
Product (multiply scores above for crash type)	**20/64**	**5/64**	**30/64**	**20/64**	**42/64**	**28/64**	**35/64**
						TOTAL	**180/448**

1.4 Treatments to Improve Safe System Alignment

Treatments that will improve the Safe System alignment of the project.

Primary treatments are those measures that have the potential to eliminate or come close to eliminating the risk of fatal and serious injury (FSI) crashes. Supporting treatments are effective in reducing the risk of crashes but not to the extent of a primary treatment (i.e., there is a residual moderate or significant crash risk). Implementation of a primary treatment should be given priority over a supporting treatment that may be targeting a similar crash risk.

Table 1-9: Primary Treatments

TREATMENTS FOR CONSIDERATION	PROJECT RESPONSE
Provide additional space or parking indents for provision of emergency services vehicle parking or space for broken down vehicles out of main alignment	
Provide separate parking areas where reversing into through lanes of traffic is avoided	
Provide vulnerable user crossing treatments on Currie Street and Waymouth Street. Uncontrolled crossings should be discouraged, but if they are required, provide pedestrian refuge for staged crossings, wombat style traffic speed limiting devices with narrowing/protuberances if possible.	
Install pedestrian fencing at areas where shared paths deviate, and/or some “herding” of pedestrians to controlled crossing locations would be beneficial	
Incorporate sheltered cycle infrastructure at intersections (for example Frome Road Model)	
Improve or segregate cyclists from the road network (both options). This may be by encouraging the use of the shared path network. Provide widened bike lanes (both Options)	
Consideration to removing all roadside hazards within a reasonable distance from trafficable road space. Consideration to providing barriers to roadside hazards that cannot be removed and / or shield adjacent pedestrians on footpaths adjoining trafficable road space	
Widened raised median or barriers/impact absorbing bollards within medians to prevent head on crash risk for Option 1 (whilst not creating sight line impediments)	

Table 1-10: Supporting Treatments

TREATMENTS FOR CONSIDERATION	PROJECT RESPONSE
Speed/red light running enforcement through the installation of red light/speed cameras at intersections.	

2 ADDITIONAL SAFE SYSTEM COMPONENTS

As part of this SSA, consideration has been given to other components that comprise the Safe System i.e., road users, vehicles, and post-crash care. Issues identified as relevant to this project are listed in Table .

Table 2: Other Safe System Components

PILLAR	PROMPTS	COMMENTS/ISSUES
Road user	Are road users likely to be alert and compliant? Are there factors that might influence this? What are the expected compliance and enforcement levels (alcohol/drugs, speed, road rules and driving hours)? What is the likelihood of driver fatigue? Can enforcement activities be conducted safely? Are there special road users (e.g., entertainment precincts, elderly, children, on-road activities, motorcyclist route), distraction by environmental factors (e.g., commerce, tourism) or risk-taking behaviours?	Yes, although may be DUI occurring due to adjoining venues Compliance as generally expected for urban environment (see above). Fatigue is not expected here. Enforcement likely downstream of the intersection (Montefiore Bridge etc). Yes – the commercial shopping, education, catering and entertainment facilities adjacent challenges for risk taking and special needs road users. However generally parks are available close to premises.
Vehicle	What level of alignment is there with the ideal of safer vehicles? Are there factors that may attract large numbers of unsafe vehicles? Is the percentage of heavy vehicles too high for the proposed/existing road design? Is this route used by recreational motorcyclists? Are there resources in the area to detect non-roadworthy, overloaded, or unregistered vehicles and thus remove them from the network? Can enforcement activities be undertaken safely? Has vehicle breakdown been catered for?	This project does not address safer vehicles It is expected that the majority of vehicles are roadworthy. Not a recreational m/c route. No Relatively. The site has very limited parking at the intersection as road space is required for flow.
Post-crash care	Are there issues that might influence safe and efficient post-crash care in the event of a severe injury (e.g., congestion, access, stopping space)? Do emergency and medical services operate as efficiently as possible? Are other road users and emergency response teams protected during a crash event? Are drivers provided the correct information to address travelling speeds on the approach and adjacent to the incident? Is there reliable information available via radio, VMS etc? Is there provision for e-safety (i.e., safety systems based on modern information and communication technologies, C-ITS)?	The site has very limited parking at the intersection as road space is required for flow. At this intersection police would need to set up lane blocks for emergency services. VMS could be integrated with this site. Potentially yes.

2.1 Conclusions

To achieve the reduced scores provided for the preferred options will require the implementation of modern design principles.

The following scores were obtained from the Safer Systems Assessment:

- Existing Light Square / Intersections Before: 228/448
- Option 1 Light Square / Intersections: 188/448
- Option 2 Light Square / Intersections: 180/448

A reduction in SSA score was achieved for both options, this is expected to be largely due to an expected general traffic calming effect, improved offset to roadside hazards, reduced intersections (points of conflict) and other minor improvements through the works.

Option 2 indicates the greatest SSA improvement. This is likely due to Option 1 moving toward an oncoming-adjacent traffic lane arrangement, where head on crash risk is increased (separation of opposing lanes is actually reduced on existing resulting in significantly higher exposure). Option 1 also encounters issues with pedestrians crossing traffic lanes (traffic moving in north and south directions) and minimal area for them to store (refuge within the median).

Whilst the proposed project(s) demonstrates opportunities for improvement toward the safer systems model there are additional treatments suggested to further provide additional safety within the infrastructure.

The suggested supporting treatments are covered within Table 1-9 and Table 1-10, namely:

- Consideration to removal of all roadside hazards (particularly fixed objects such as non-frangible tree trunks) that are bought closer to the road through either option.
- Providing additional measures to segregate vulnerable users and road traffic.
- Discouraging uncontrolled vulnerable user road crossings (across trafficable road spaces).
- Consideration of median treatments to restrain errant vehicles from entering the opposing lanes (Option 1)
- Where on road cycling lanes are provided, look to increase bicycle/vehicle separation (e.g. Frome Road model)
- Red light cameras at the site could provide supporting treatment that would encourage compliant road user behaviour.

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