



Telopea Concept Plan Area and Stage 1A

Transport and Accessibility Impact Assessment

Telopea

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1 Introduction

1.1 Overview

This report has been prepared by Ason Group on behalf of Frasers Property Telopea Developer Pty Ltd (Frasers) and accompanies a State Significant Development Application (SSDA) submitted to the Department of Planning, Industry and Environment (DPIE). The SSDA seeks Concept Approval, in accordance with Division 4.4 of the Environmental Planning and Assessment Act 1979 (EP&A Act), for the staged redevelopment of the Telopea Concept Plan Area (CPA), as well as detailed approval to construct the first stage of development, known as 'Stage 1A'.

This Transport Assessment (TAIA) provides an assessment of the relevant access, traffic, and parking characteristics of the Proposal; this has included consideration of the following:

- Existing and future base transport conditions.
- Existing and future public and active transport services and infrastructure.
- Future peak vehicular trip generation, and the potential impact of those trips on the local and sub-regional road network.
- Parking requirements and provision.
- A detailed assessment of access, car parking and servicing areas and facilities for Stage 1A.

1.2 Background

The Telopea CPA forms part of the 2017 Telopea Precinct Master Plan (Master Plan 2017), which was prepared by NSW Land and Housing Corporation (LAHC) and Parramatta City Council (Council) to facilitate the rezoning of the Telopea Precinct which occurred in December 2018. Master Plan 2017 seeks to revitalise the Telopea Precinct through the redevelopment of LAHC's social housing assets, as well as sites under private ownership, to deliver an integrated community with upgraded public domain and community facilities – and to capitalise on access to the new Parramatta Light Rail network.

The Telopea CPA predominately comprises land owned by LAHC. The proposed redevelopment of the Telopea CPA is part of the NSW Government Communities Plus program, which seeks to deliver new communities where social housing blends with private and affordable housing with good access to transport, employment, improved community facilities and open space. The program seeks to leverage the expertise and capacity of the private and non-government sectors.

In December 2019, the NSW Government announced that the Affinity consortium, comprising Frasers and Hume Community Housing, were awarded the contract to redevelop the Telopea CPA. The SSDA represents the first step in the delivery of the planned redevelopment of the Telopea CPA and the Stage 1A works will provide the first market housing development on the site, as well as a new arrival plaza for the Parramatta Light Rail.

1.3 Site Description

Telopea is located in the Parramatta Local Government Area (LGA). It is approximately 4km north-east of the Parramatta Central Business District (CBD), 6km south-west of Macquarie Park Strategic Centre, and 17km from Sydney CBD.

The Telopea CPA covers approximately 13.4 hectares and comprises 99 individual allotments. It currently accommodates 486 social housing dwellings, across a mix of single dwelling, townhouse, and 3-9 storey residential flat buildings together with the Dundas Community Centre, Dundas Branch Library, Community Health Centre, Hope Connect church, and Telopea Christian Centre.

The immediate surrounds comprise predominantly residential properties within an established landscape setting. The broader Telopea Precinct contains the Telopea Public School, a neighbourhood centre known as the Waratah Shops, and two large Council parks known as Sturt Park and Acacia Park.

1.4 Proposed Development

1.4.1 Telopea CPA

The SSDA seeks Concept Approval for the staged redevelopment of the Telopea CPA, as well as a detailed proposal for the first stage of development. The Concept Plan sets out the maximum building envelopes and GFA that can be accommodated across the Telopea CPA, and identifies the land uses and public infrastructure upgrades to be provided. The Concept Plan will establish the planning and development framework from which any future development application will be assessed.

The Concept Plan provides for:

- A mixed-use development including:
 - Approximately 4,500 dwellings, including a mix of social, affordable and market dwellings.
 - Inclusion of a new retail precinct with a new supermarket, food and beverage, and speciality retail.
 - Proposed childcare facility.
 - Proposed combined library and community centre.
 - Proposed combined Church and Residential Aged Care Facility.
- Delivery of new public open space, including:
 - A new light rail plaza.
 - Hill top park.
 - Eyles pedestrian link.
 - Open space associated with the proposed library.
- Retention of existing significant trees.
- Road and intersection upgrades.

- Cycle way upgrades.
- Upgrade of utility services.

The Telopea CPA is divided into four precincts known as Core, North, South, and East, and incorporate a total of 29 parcels. The Concept Plan proposal is further detailed in the Urban Design Report prepared by Bates Smart and Hassell, which forms part of the broader SSDA submission.

The Telopea CPA precincts and individual LAHC sites are shown in **Figure 1**, while the Telopea Precinct is shown in its local and sub-regional context in **Figure 2** and **Figure 3** respectively.

1.4.2 Stage 1A

The first stage of work to be delivered (Stage 1A) is located within the Telopea Core adjacent to Telopea Light Rail station (Telopea Station) and will include:

- Site establishment works, including demolition of all existing buildings and structures, tree removal, site preparation, excavation, and services augmentation.
- Construction of a new arrival plaza for the Parramatta Light Rail, incorporating a Community Pavilion.
- Construction of the Sturt Street extension, Light Rail crossing including Adderton Road intersection works and cycleway connection.
- Part demolition and upgrade of Sturt Street, including new kerb-realignment, new footpaths and landscaping, new parking bays, bus zones, line marking and crossings.
- Construction of Mews Street, a private road with fully directional access opposite the Wade Street/ Sturt Street intersection and a left-out only access to the New Link Road.
- Construction of a new public park surrounding the existing significant trees.
- Construction of residential flat buildings, up to 10-storeys in height, including studio, one, two and three-bedroom apartments.
- Construction of two basement levels, with access / egress via Sturt Street and Winter Street, including waste and loading facilities.
- Associated open space and landscaping works, including retention of existing significant trees, ground, and rooftop communal open space, and a publicly accessible through site link.

The Stage 1A proposal is further detailed in the Urban Design Report prepared by Plus Architecture and the Landscape Report prepared by Hassell, which again form part of the broader SSDA submission.



Figure 1 - Telopea Concept Plan Area and Stage 1A Site Source: Bates Smart and Hassell

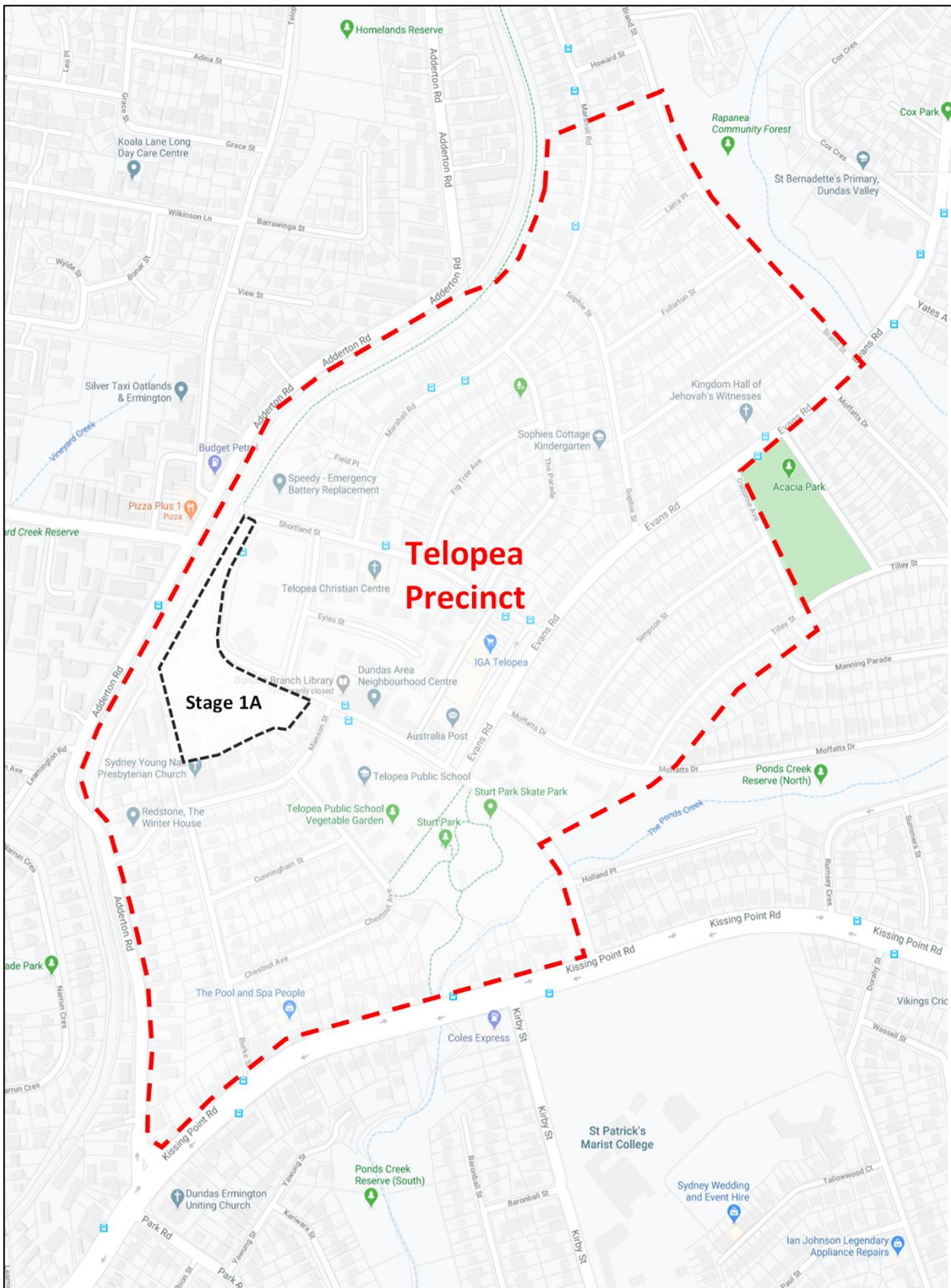


Figure 2 - Telopea Precinct Local Context

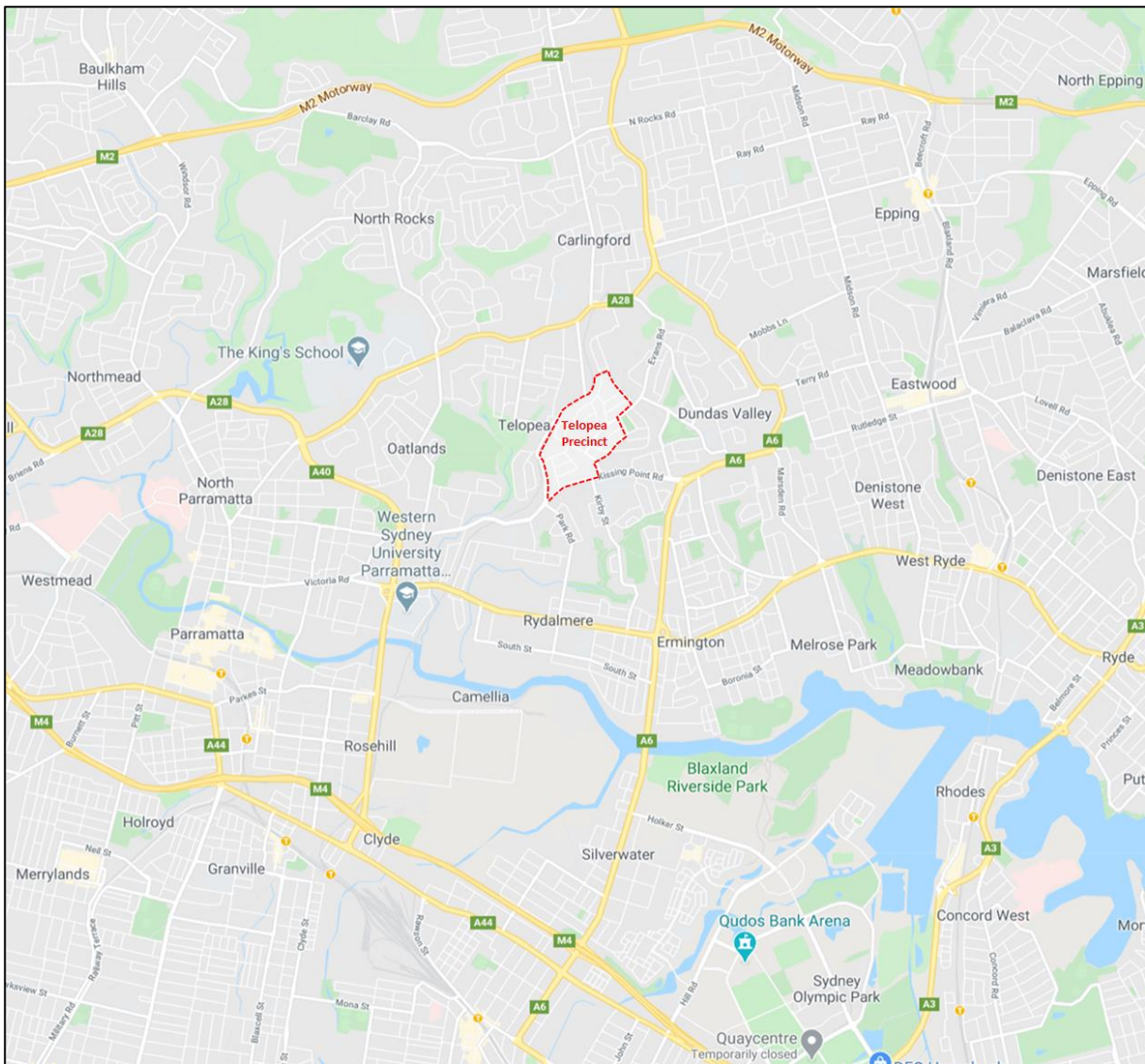


Figure 3 - Telopea Precinct Sub-Regional Context

1.5 Secretary's Environmental Assessment Requirements

Secretary's Environmental Assessment Requirements (SEARs) were issued by DPIE in regard to this Proposal. The SEARs outline the key areas for consideration in any subsequent development application (i.e., in the SSDA) with specific requirements providing the scope for an assessment of potential traffic and transport impacts arising from the Proposal.

The SEARs specifically relating to the traffic and transport characteristics of the Proposal are outlined in Table 1, which also provides a summary response to each SEAR, and reference to the section of this TAIA that provides a more detailed review of each requirement.

Table 1: Secretary's Environmental Assessment Requirements

SEARs	Summary Response
<p>The EIS must include:</p> <p>a Traffic and Transport Impact Assessment which provides:</p>	
<p>the predicted transport mode share split for the proposal development</p>	<p>The predicted transport mode share split for the Proposal is detailed at Section 4.4</p>
<p>an analysis of the existing traffic network, including the road hierarchy, current daily and peak hour vehicle movements and existing performance levels of nearby intersections</p>	<p>The existing road network infrastructure has been reviewed and detailed in Section 2 and the performance of the existing road network is outlined in Section 3.</p> <p>It is noted that this TAIA seeks to demonstrate consistency with the Precinct TTA and Precinct TTA Addendum that supported the rezoning. The previous Planning Proposal transport assessments focused on peak hour (not daily) analysis, as does this TAIA..</p>
<p>a forecast of additional daily and peak hour vehicle movements as a result of the proposal (using SIDRA modelling or similar at 5-year intervals) and identification of potential traffic impacts on road capacity, intersection performance and road safety (including pedestrian and cycle conflict)</p>	<p>The traffic analysis has been informed by previous assessments undertaken and detailed in the Precinct TTA and the Precinct TTA Addendum reports. This is detailed in Section 3.</p> <p>This has been reviewed and expanded upon in Section 5 with regard to the Telopea CPA, demonstrating the consistency of the current Proposal with that which informed the transport assessments that supported the rezoning.</p>
<p>information regarding the proposed new roads and upgraded connections, including cross sections of the new and upgraded roads for Stage 1A</p>	<p>Section 6 provides high-level details of Stage 1A including proposed public and site access infrastructure (refer Sections 6.2 & 6.3).</p> <p>Architectural and civil plans accompanying this submission should be referenced for more detailed information on Stage 1A infrastructure.</p>
<p>swept path assessment to demonstrate the new street designs can accommodate two-way bus movements with no impact to existing bus stops</p>	<p>This SEAR is addressed by the civil engineering documentation of this submission.</p>

and bus zones on Sturt Street, Marshall Road and Shortland Street	However, it is understood that the new streets have been designed so that they can accommodate two-way bus movements with no impact to existing bus stops and bus zones on Sturt Street, Marshall Road and Shortland Street.
proposals to mitigate any traffic impacts, including intersection upgrades to achieve acceptable performance	The required network upgrades detailed in previous traffic assessments are detailed in Section 3. Further analysis of the road network and the required upgrades is detailed in Section 5.
details of car parking provision, having regard to relevant parking rates, specifications, and standards (note: The Department supports suppressed car parking rates in highly accessible areas)	The details of car parking provision for Stage 1A are provided in Section 6.4.
identifies measures to mitigate traffic impacts on the operation of Telopea Public School	The overall proposal includes upgrades to existing local infrastructure (streets, intersections, public transport infrastructure and pedestrian & cyclist infrastructure. All new and upgraded streets within proximity of the school will (as necessary) have 40kmh school zone speed restrictions implemented.
details of proposed vehicular access, loading, deliveries and servicing arrangements, and any proposed infrastructure improvements or measures to reduce potential conflicts with pedestrians and cyclists.	The details of the Concept Plan and Stage 1A are provided in Section 5 and 6, respectively.
proposals to improve walking and cycling, such as connections into existing walking and cycling networks, high quality end-of-trip facilities and adequate bicycle parking for visitors, employees, and residents (provided in accordance with the relevant rates, specifications, and standards)	Discussion of bicycle parking provision and end-of-trip facilities are detailed in Sections 5 & 6. These provisions are designed to encourage alternative modes of transport for visitors and residents.
measures to promote sustainable travel choices for employees, residents, or visitors, such as minimising car parking provision, encouraging car share and public transport, cycling and	<ul style="list-style-type: none"> - Measures to promote sustainable travel choices are summarised in Sections 5 & 6.

walking, implementing a green travel plan and providing end of trip facilities	A green travel plan for Stage 1A would be submitted to Council and DPIE for approval prior to the issue of a Construction Certificate.
- a Construction Traffic Management and Pedestrian Management Plan (CPTMP) for Stage 1A providing details of, but not limited to the following:	<p>A detailed Construction Traffic & Pedestrian Management Plan for Stage 1A would be submitted to Council and DPIE for approval prior to the issue of a Construction Certificate.</p> <p>A preliminary Construction Traffic & Pedestrian Management Plan for Stage 1A is detailed in Section 8.</p>
predicted construction traffic movements, routes, and access arrangements	The preliminary Construction Traffic & Pedestrian Management Plan for Stage 1A details the proposed access in Section 8.12, and truck routes in Section 8.14.
an outline of how construction traffic impacts on existing traffic, pedestrian and cycle networks would be appropriately managed and mitigated	The preliminary Construction Traffic & Pedestrian Management Plan details the mitigation measures in Section 8.13
a consultation strategy for liaison with surrounding stakeholders, including other developments under construction and Parramatta Light Rail builder/contractor	A stakeholder consultation strategy is detailed in Section 8.8.
identification of the cumulative construction activities of the development and other projects within or around the development site, including the Parramatta Light Rail Project and private development. Proposed measures to minimise the cumulative impacts on the surrounding road network should be clearly identified and included in the CPTMP	A detailed Construction Traffic & Pedestrian Management Plan for Stage 1A would assess the cumulative traffic impacts of the construction activities in the surrounding road network prior to the issue of a Construction Certificate.
assess the impact of queuing at the proposed intersection of the Sturt Street extension and outline appropriate measures that would manage traffic impacts associated with this proposed intersection, to ensure the light rail corridor is not impacted by this proposed road crossing	The traffic analysis has been informed by previous assessments undertaken and detailed in the Precinct TTA and the Precinct TTA Addendum reports. This is detailed in Section 3 and includes commentary on the acceptability of the proposed Adderton Road and Sturt Street intersection.

	<p>Additional traffic modelling at this intersection has been undertaken in Section 5.11.3 which indicates that the proposed development would remain acceptable with a LoS B and no extended queuing to Sturt Street.</p> <p>The traffic analysis in this TAIA demonstrates consistency between the current Proposal (which includes the Adderton Road / Sturt Street intersection) and the approved Planning Proposal. Accordingly, the impacts of the proposed intersection and crossing of the light rail remain acceptable.</p>
provide details of all proposed works in and adjacent to the rail corridor including a strategic design drawing (2D).	This SEAR is addressed by the civil engineering documentation of this submission.

1.6 Stakeholder Consultation

A meeting was held between Ason Group, Frasers, TfNSW, Parramatta Council, and Parramatta Light Rail to discuss the future signal phasing and operations of the signalised intersection of the new Sturt Street/ Adderton Road intersection.

Feedback was received which has been incorporated into the SIDRA assessment below. Refer to **Appendix A** for a copy of the meeting minutes and accompanying email.

1.7 Reference Documents

1.7.1 Planning Controls

As stated, the Telopea CPA lies within the Parramatta LGA and is also subject to a number of State Government controls. Key planning controls and strategies referenced in the preparation of this TAIA include:

- Parramatta Local Environmental Plan 2011 (Parramatta LEP).
- Parramatta Development Control Plan 2011 (Parramatta DCP).
- Parramatta Bike Plan 2017 (Parramatta Bike Plan).
- State Environmental Planning Policy 65: Design Quality of Residential Apartment Development and Apartment Design Guide.
- State Environmental Planning Policy: Housing for Seniors or People with a Disability (SEPP Seniors).
- State Environmental Planning Policy (Affordable Rental Housing) 2009.

- A Vision for Telopea Master Plan Report 2017, prepared by Urbis (Master Plan 2017 Report).

It is noted that amendments to the Parramatta DCP are currently being finalised by Council for Telopea. Urbis, on behalf of Frasers provided a submission on the Draft Development Control Plan (DCP) for the Telopea Precinct, dated 11 June 2021. Within the submission, a number of inconsistencies were identified between the exhibited Draft DCP for the Telopea Precinct and the Telopea Master Plan and associated draft Voluntary Planning Agreement. These inconsistencies primarily relate to the movement network (including roads, intersections, bicycle and pedestrian networks) within the Core area of the Telopea Precinct. For example, throughout the Draft DCP Eyles Street is shown as a road with vehicle access. This is contrary to the Telopea Master Plan and associated draft Voluntary Planning Agreement which has been presented and discussed with Council on multiple occasions. As such, Ason Group has only referenced the controls proposed in the Draft Telopea DCP (May 2021) which are consistent with the Draft Telopea Master Plan and Voluntary Planning Agreement.

1.7.2 Transport Guidelines

This TA references general access, traffic and parking guidelines, including:

- Roads & Maritime Guide to Traffic Generating Developments 2002 (RMS Guide).
- Roads & Maritime Guide to Traffic Generating Developments – Updated Traffic Surveys 2013 (RMS Guide Update).
- Australian Standard 2890.1:2004: Parking Facilities – Off-Street Car Parking (AS 2890.1).
- Australian Standard 2890.2:2018: Parking Facilities – Off-Street Commercial Vehicle Facilities (AS 2890.2).
- Australian Standard 2890.3:2015: Parking Facilities – Bicycle Parking (AS 2890.3).
- Australian Standard 2890.6:2009: Parking Facilities – Off-Street Parking for People with a Disability (AS 2890.6).
- Transport for NSW (TfNSW) Traffic Control at Work Sites Technical Manual, Issue No.6, November 2020
- Department of Planning & Environment Environmental Impact Statement Guidelines.
- Transport for NSW (TfNSW) Guide to Transport Impact Assessments.
- TfNSW Integrated Public Transport Service Planning Guidelines, Sydney Metropolitan Area.

1.7.3 Transport Assessments

This TAIA also references a number of transport assessments which were instrumental in providing for the broader Telopea Precinct's Rezoning Approval in 2019 and the subsequent awarding of the development contract for the Telopea CPA to the Affinity Consortium. Key documents in this regard include:

- Telopea Urban Renewal Master Plan Traffic and Transport Assessment 2017, prepared by GTA Consultants (Telopea Precinct TTA).
- Telopea Priority Estate – Transport Study, Calibration and Validation Report 2017, prepared by Jacobs (Jacobs Report).
- Telopea Stage 1 Master Plan Traffic and Transport Assessment Addendum (Draft) 2017, prepared by GTA Consultants (Telopea Precinct TTA Addendum).

From the outset, it is important to state that the assessment of future traffic conditions further to the development of the Telopea CPA has specifically drawn on these reports. Essentially, Ason Group's task has been to ensure that the components of Stage 1A and the Concept Plan – and specifically land uses, yields, road network access and road network upgrades – are consistent with those detailed and specifically assessed in these transport reports.

Given the Rezoning Approval, it is our contention that if the traffic characteristics of Stage 1A and the Telopea CPA further to Concept Plan are not substantially different to those previously assessed, and the suite of recommended road network upgrades etc unchanged, then it is inherently the case that the relative 'impacts' of the development of the Telopea CPA (incorporating Stage 1A) are supportable on traffic and transport grounds.

2 The Existing Road Network

The existing key roads and intersections relevant to this TAIA are highlighted in **Figure 4** and detailed further in sections below.

2.1 Key Roads

2.1.1 Sturt Street

Sturt Street is a local collector road that runs south from Shortland Street and then south-east to Kissing Point Road. It generally provides 1 traffic lane in each direction and on-street parking. Sturt Street has a posted speed limit of 50km/h, as well as School Zone 40km/h restrictions adjacent to Telopea Public School.

2.1.2 Winter Street

Winter Street is an access lane that generally runs north-south from a cul-de-sac terminus to Adderton Street, respectively. It generally provides 1 traffic lane in each direction, though on-street parking can reduce traffic to 1 lane in some sections. Winter Street has a nominal speed limit of 50km/h.

2.1.3 Shortland Street

Shortland Street is a local road that runs east-west between Sturt Street and Evans Road, respectively. West of Marshall Road it provides 1 traffic lane in each direction and on-street parking; east of Marshall Street, the carriageway narrows to provide 1 traffic lane in each direction but only limited on-street parking. Shortland Street has a nominal local speed limit of 50km/h.

2.1.4 Evans Road

Evans Road is a collector road that runs north-south from Pennant Hills Road to Sturt Street, respectively. It generally provides 1 traffic lane in each direction and on-street parking and bus zones. Evans Road has a posted speed limit of 50km/h.

2.1.5 Marshall Street

Marshall Street is a local road that runs north-south from Hamilton Avenue to Shortland Street respectively, noting that a connection further north from Hamilton Avenue to Coleman Avenue provides an alternative route to Pennant Hills Road. It generally provides 1 traffic lane in each direction and on-street parking and bus zones. Marshall Street has a posted speed limit of 50km/h.



Figure 4: Key Roads & Intersections

2.1.6 Manson Street

Manson Street is a local road that generally runs north-south between Sturt Street and Adderton Road, respectively. It provides 1 traffic lane in each direction but only limited on-street parking due to the width of the carriageway. Manson Street has a posted speed limit of 50km/h, as well as School Zone 40km/h restrictions adjacent to Telopea Public School.

2.1.7 Adderton Road

Adderton Road is a collector road which runs north-south between Pennant Hills Road and Kissing Point Road, respectively. It provides 1 traffic lane in each direction as well as intermittent sections of on-street parking. Adderton Road has a posted speed limit of 50km/h.

2.1.8 Pennant Hills Road

Pennant Hills Road is an arterial road (A28) which generally runs north-south from the M1 at Wahroonga to Church Street, Parramatta, respectively. It provides 2-3 traffic lanes in each direction as well as additional lane infrastructure at key interchanges and intersections. In the vicinity of the Precinct, Pennant Hills Road has a posted speed limit of 60km/h.

2.1.9 Kissing Point Road

Kissing Point Road is an arterial road which runs east-west between Silverwater Road and James Ruse Drive, respectively. It generally provides 2-3 traffic lanes in each direction as well as additional lane infrastructure at key intersections. Kissing Point Road has a posted speed limit of 60km/h.

2.2 Key Intersections

2.2.1 Kissing Point Road & Sturt Street

A signalised intersection which provides for all movements to and from Sturt Street, and pedestrian crossings on the northern and eastern approaches.

2.2.2 Kissing Point Road & Adderton Road

A signalised intersection which provides for all movements to and from Adderton Road, and pedestrian crossings on the northern and eastern approaches.

2.2.3 Pennant Hills Road & Evans Road & Lloyds Avenue

A priority (Give Way) intersection which provides for all movements between Pennant Hills Road and Evans Road, while the Lloyd Avenue approach provides for a left turn to Pennant Hills Road only.

2.2.4 Pennant Hills Road & Coleman Avenue

A signalised intersection which provides for all movements between Pennant Hills Road and the Coleman Avenue northern approach, but No Right Turn restrictions for the right turn from Pennant Hills Road to the Coleman Avenue southern approach. Pedestrian crossings are provided on the northern, southern, and eastern approaches.

2.2.5 Pennant Hills Road & Adderton Road

A signalised intersection which provides for all movements to and from Adderton Road, and pedestrian crossings on the southern and western approaches.

2.2.6 Sturt Street & Evans Road

A local nominally priority (Give Way) intersection (with priority to Sturt Street), it provides for all movements and includes a dedicated right turn lane from Sturt Street to Evans Road.

2.2.7 Sturt Street & Evans Road

A local priority (Give Way) intersection (with priority to Sturt Street) which provides for all movements.

2.2.8 Adderton Road & Manson Street

A local priority intersection (with priority to Adderton Road) operating nominally under Give Way control which provides for all movements.

2.2.9 Evans Road & Shortland Street

A local priority (Give Way) intersection (with priority to Evans Road) which provides for all movements.

2.3 Existing Road Network Performance

2.3.1 Traffic Surveys

Traffic surveys were commissioned as part of the Precinct TTA at each of the key intersections identified above; these surveys were instrumental in the calibration and validation of the Precinct Aimsun Model developed by GTA and Jacobs to model the future traffic characteristics of the Telopea Precinct (see also **Section 3**).

In response to SEARs requirement requiring consideration of daily existing traffic volumes along the surrounding road network, Ason Group commissioned traffic surveys – in the form of Automatic Tube Counts (ATC) – at the locations shown in **Figure 5**.

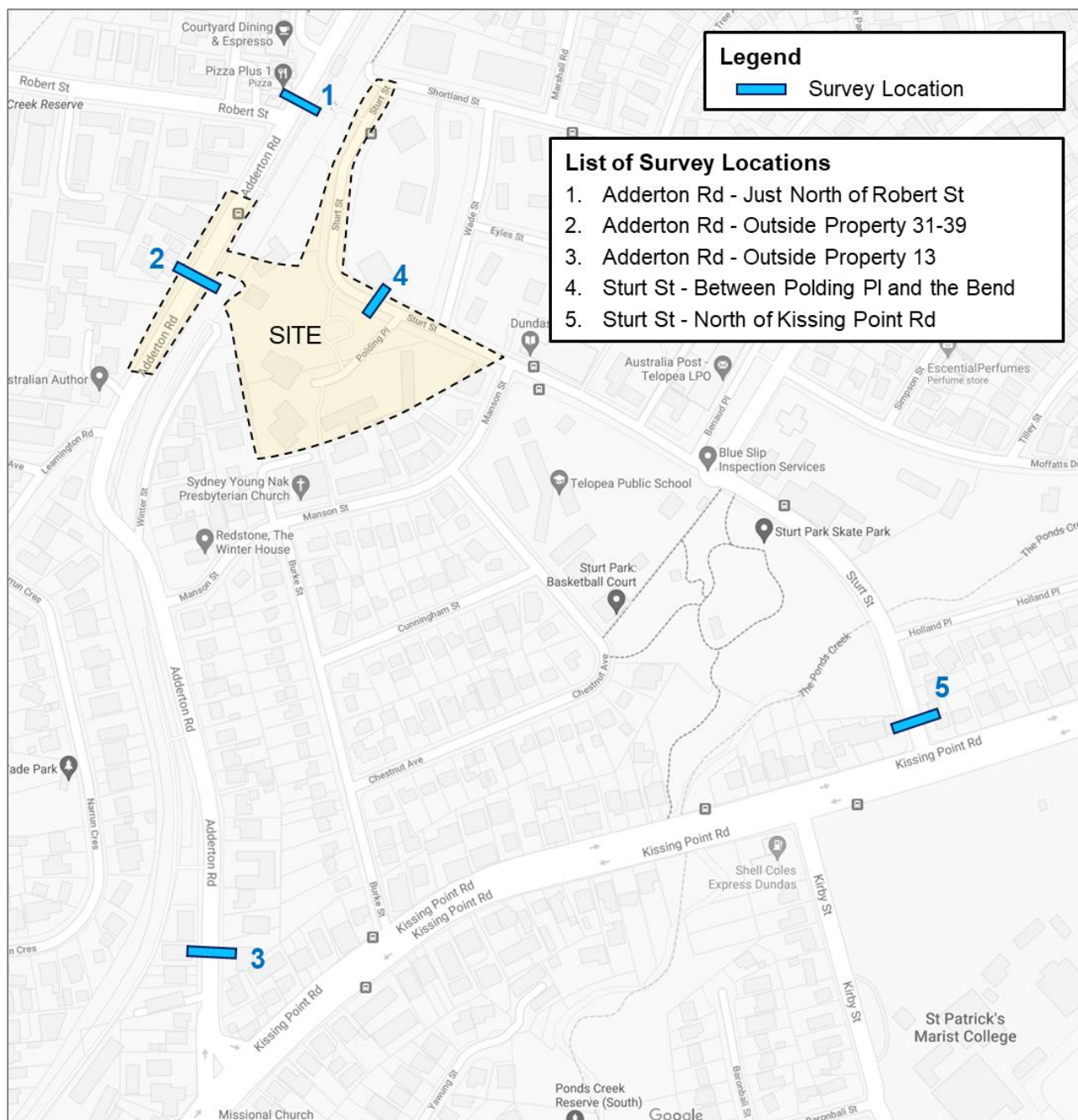


Figure 5: Automatic Tube Count Locations

At the above 5 mid-block locations, the following data were collected for 7 days, between 16 June to 23 June 2021:

- Traffic volumes (link count):
 - Hourly breakdown of each directional traffic,
 - Vehicle class: breakdown of each class according to Austroads classification.
- Vehicle speed:
 - Hourly breakdown of each directional traffic,
 - Vehicle class: all vehicles combined.

The average weekday daily total traffic counts of each survey location are summarised in **Table 2**, while the hourly profiles of two-way volumes are presented in **Figure 6**

Table 2: Daily Total Traffic – Average Weekday

#	Survey Location	Northbound	Southbound	Total
1	Adderton Rd - Just North of Robert St	5,126	4,396	9,522
2	Adderton Rd - Outside Property 31-39	6,029	5,545	11,574
3	Adderton Rd - Outside Property 13	6,061	5,564	11,625
4	Sturt St - Between Polding Pl and the Bend	246	194	440
5	Sturt St - North of Kissing Point Rd	4,802	4,365	9,167

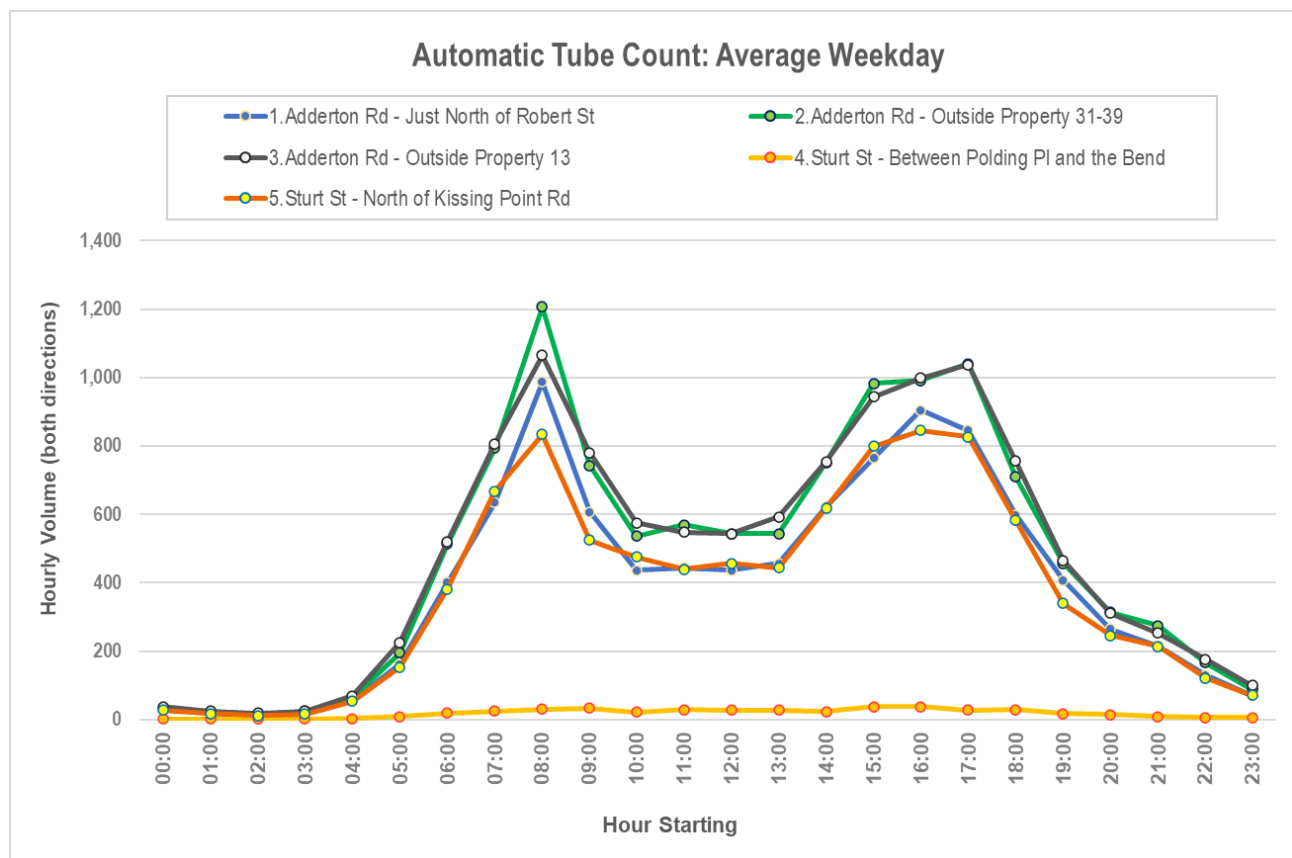


Figure 6: Daily Profile of Average Weekday Traffic

2.3.2 SIDRA Modelling

The initial assessment of intersection performance reported in the Precinct TTA was undertaken using SIDRA Intersection modelling. SIDRA provides a number of outputs by which to measure the performance of an intersection, including:

- **Average Vehicle Delay (AVD):** AVD (or average delay per vehicle in seconds) for intersections is used to determine an intersection's Level of Service (see below). For signalised intersections and roundabouts, the AVD reported relates to the average of all vehicle movements through the intersection, while for priority intersections it relates to the worst approach.
- **Degree of Saturation (DOS):** DOS is defined as the ratio of demand (arrival) flow to capacity.
- **Level of Service (LOS):** LOS is a comparative measure that provides an indication of the operating performance, based on AVD. As with AVD, LOS for signalised intersections and roundabouts relates to the average of all vehicle movements, while for priority intersections it relates to the approach with the highest average delay.

Table 3 provides a summary of the SIDRA recommended criteria for the assessment of intersections, which references LOS and AVD outlined in the RMS Guide.

Table 3: SIDRA Level of Service Criteria

Level of Service	Average Delay per Vehicle (s)	Traffic Signals & Roundabout	Give Way & Stop Signs
A	< 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays. Roundabouts require other control mode	At capacity, requires other control mode
F	70 <	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode or major treatment.

Source: SIDRA

2.3.3 2016 Intersection Operation

The Precinct TTA provides SIDRA outputs for the 2016 operation of the key intersections, including both local and interface (to Kissing Point Road and Adderton Road) Telopea Precinct intersections and key external intersections; these outputs are summarised in **Table 4**.

Table 4: Precinct TTA 2016 Intersection Operations

Intersection	Level of Service		Degree of Saturation		Average Delay (s)	
	AM	PM	AM	PM	AM	PM
Pennant Hill Rd & Adderton Rd	B	B	1.2	0.99	26	22
Pennant Hills Rd & Coleman Ave	A	A	0.78	0.69	14	13
Pennant Hills Rd & Evans Rd	E	E	0.91	0.86	66	58
Kissing Point Rd & Sturt St	B	A	0.73	0.94	16	14
Kissing Point Rd & Adderton Rd	B	B	0.81	0.91	27	25
Adderton Rd & Manson St	B	C	0.36	0.40	18	17
Sturt St & Manson St	A	A	0.00	0.01	6	6
Sturt St & Evans Rd	A	A	0.40	0.21	5	6
Evans Rd & Shortland St	B	A	0.27	0.14	11	6

Source: Precinct TTA

With reference to **Table 4**, the Telopea Precinct's local and interface intersections and most of the external intersections were found to be operating at an acceptable LOS, though delays and capacity constraints were evident at some of the Pennant Hills Road intersections.

3 Future Base Network Performance

3.1 Overview

The Precinct TTA was prepared by GTA in 2017 to examine Master Plan 2017 for LAHC; while providing a comprehensive assessment of Master Plan 2017, the following issues were subsequently raised by TfNSW in regard to the Precinct TTA:

- The Precinct TTA did not allow for detailed consideration of the impacts (or indeed benefits) of the Parramatta Light Rail, noting that this was more an issue of timing as the Parramatta Light Rail EIS was released after the Precinct TTA was completed.
- The Precinct TTA provided an assessment of existing and future intersection operations through a simple (yet entirely valid) methodology, being:
 - Surveys of existing conditions.
 - The application of background traffic growth forecasts to generate 2036 'base' traffic flows and intersection operations further to that growth alone.
 - A determination of road network upgrades required to accommodate background traffic growth alone.
 - A determination of the trip generation and distribution of the Telopea Precinct to key roads and intersections, and intersection operations further to that additional growth (above the background growth alone).
 - A determination of additional road network upgrades to accommodate the Telopea Precinct's traffic volumes.
 - The assignment of responsibility for road network upgrades to TfNSW (to accommodate background traffic growth alone) and the Telopea Precinct developers (to accommodate the additional Telopea Precinct traffic volumes).

With the Parramatta Light Rail EIS assessment material available, the Aimsun model developed by Jacobs for the Parramatta Light Rail assessment was made available for a more detailed assessment of the Telopea Precinct. Further to a process of additional calibration and validation by Jacobs and GTA in consultation with TfNSW, the Precinct Aimsun Model was developed; the results of the Precinct Aimsun Model were subsequently detailed in the Precinct TTA Addendum, as described further in sections below.

3.2 Precinct TTA Addendum Land Use and Yields

The assessment of Master Plan 2017 provided by GTA in the Precinct TTA Addendum is based on land uses and yields in line with those proposed in the Concept Plan. The Telopea Precinct land uses, and yields adopted in the Precinct TTA Addendum are summarised in **Table 5**.

Table 5: Precinct TTA Addendum Land Uses and Yields

TTA Addendum Land Uses	Yields
Market Dwellings	3,216
Social & Affordable Dwellings	1,091
Town Houses	193
Total Dwellings	4,500
Retail	7,000m ²
Community	3,000m ²

Source: Precinct TTA Addendum

It is worth noting that the above dwelling yields are additional to the approximately 1,458 existing dwellings that are within the Master Plan area.

3.2.1 Background Traffic Growth

2016 and 2036 trip matrices from the Strategic Traffic Forecasting Model (STFM) were provided by TfNSW, and linear growth calculated and applied to the Precinct Aimsun Model for both AM and PM peak periods. The growth factors determined in the Precinct TTA Addendum for the key regional roads are shown in **Table 6**, noting that a separate detailed assignment of background traffic growth (based on the regional increases) was undertaken for growth in local roads, though details of such are not available (but were inherently approved by TfNSW).

Table 6: Precinct TTA Addendum Annual Growth 2016 – 2036

Location	2016			2036		Difference		Growth % per annum	
	AM		PM	AM	PM	AM	PM	AM	PM
Pennant Hills Rd near Marsden Rd	13,690	8,780	17,819	11,706	4,130	2,925	1.5%	1.70%	
Kissing Point Rd near Stewart Place	7,018	6,878	8,672	8,526	1,653	1,647	1.60%	1.20%	

3.3 2036 Base Intersection Operations

Table 7 summarises the results of detailed SIDRA testing of 2036 Base volumes (i.e. no Precinct development traffic), while the intersection operation outputs from the Precinct Aimsun Model are provided in **Figure 7** and **Figure 8** for the AM and PM peak periods, respectively.

Table 7: 2036 Base SIDRA Intersection Operations

Intersection	Level of Service		Degree of Saturation		Average Delay (s)	
	AM	PM	AM	PM	AM	PM
Pennant Hill Rd & Adderton Rd	B	D	0.82	0.96	17	47
Pennant Hills Rd & Coleman Ave	C	A	0.93	0.77	39	5
Pennant Hills Rd & Evans Rd	B	A	0.82	0.67	18	8
Pennant Hills Rd & Marsden Rd	C	B	0.88	0.89	31	28
Kissing Point Rd & Sturt St	B	A	0.83	0.77	22	13
Kissing Point Rd & Adderton Rd	F	F	1.08	1.08	117	77
Kissing Point Rd & Park Rd	F	F	1.09	1.16	72	90
Kissing Point Rd & Silverwater Rd	C	E	0.81	1.08	29	65
Kissing Point Rd & Quarry Rd	B	A	0.70	0.52	21	15
Kissing Point Rd & Stewart St	B	F	0.79	1.20	23	114

Source: Precinct TTA Addendum

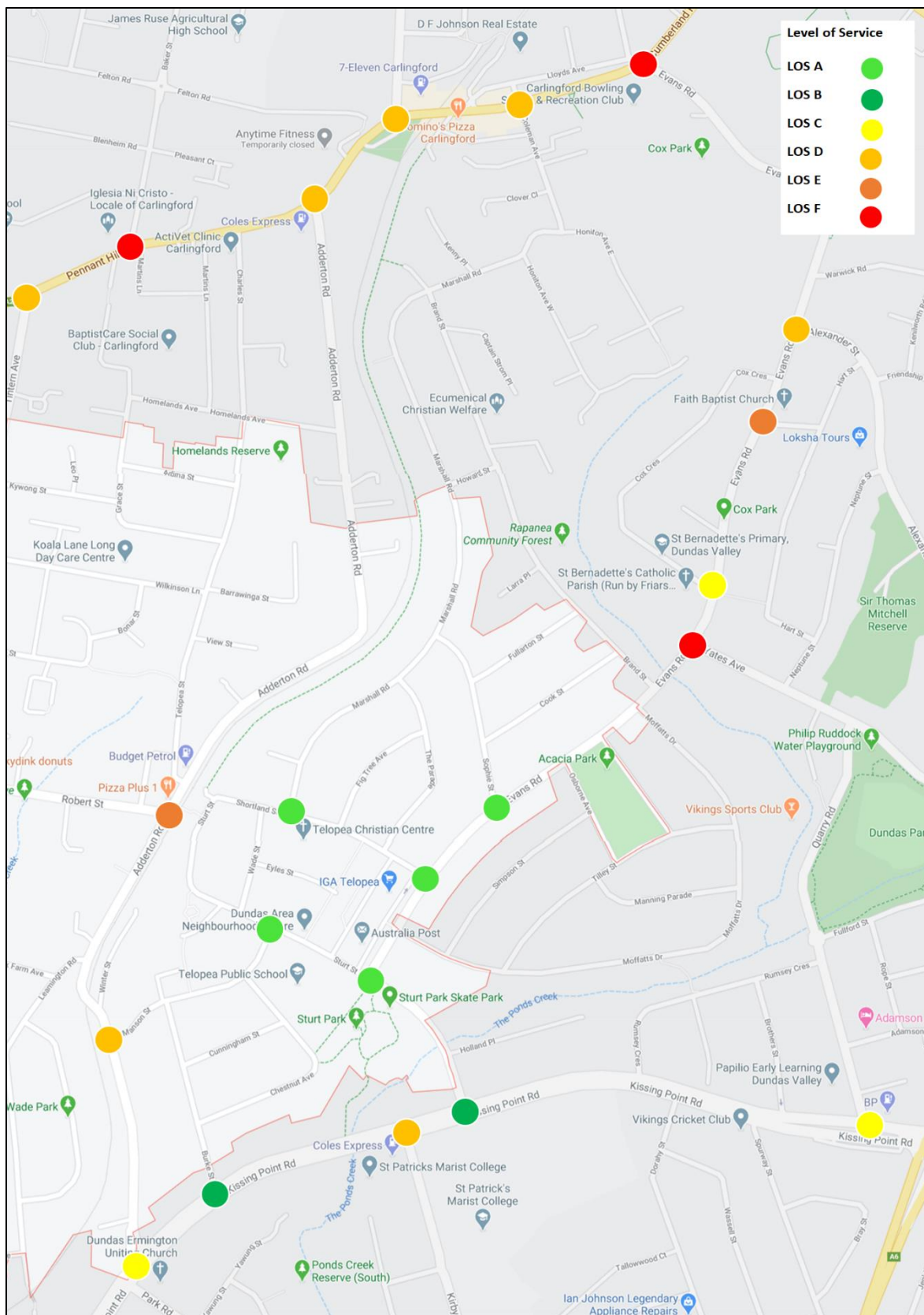


Figure 7: 2036 Base Precinct Aimsun Intersection Operations AM Peak Period

Source: Precinct TTA Addendum

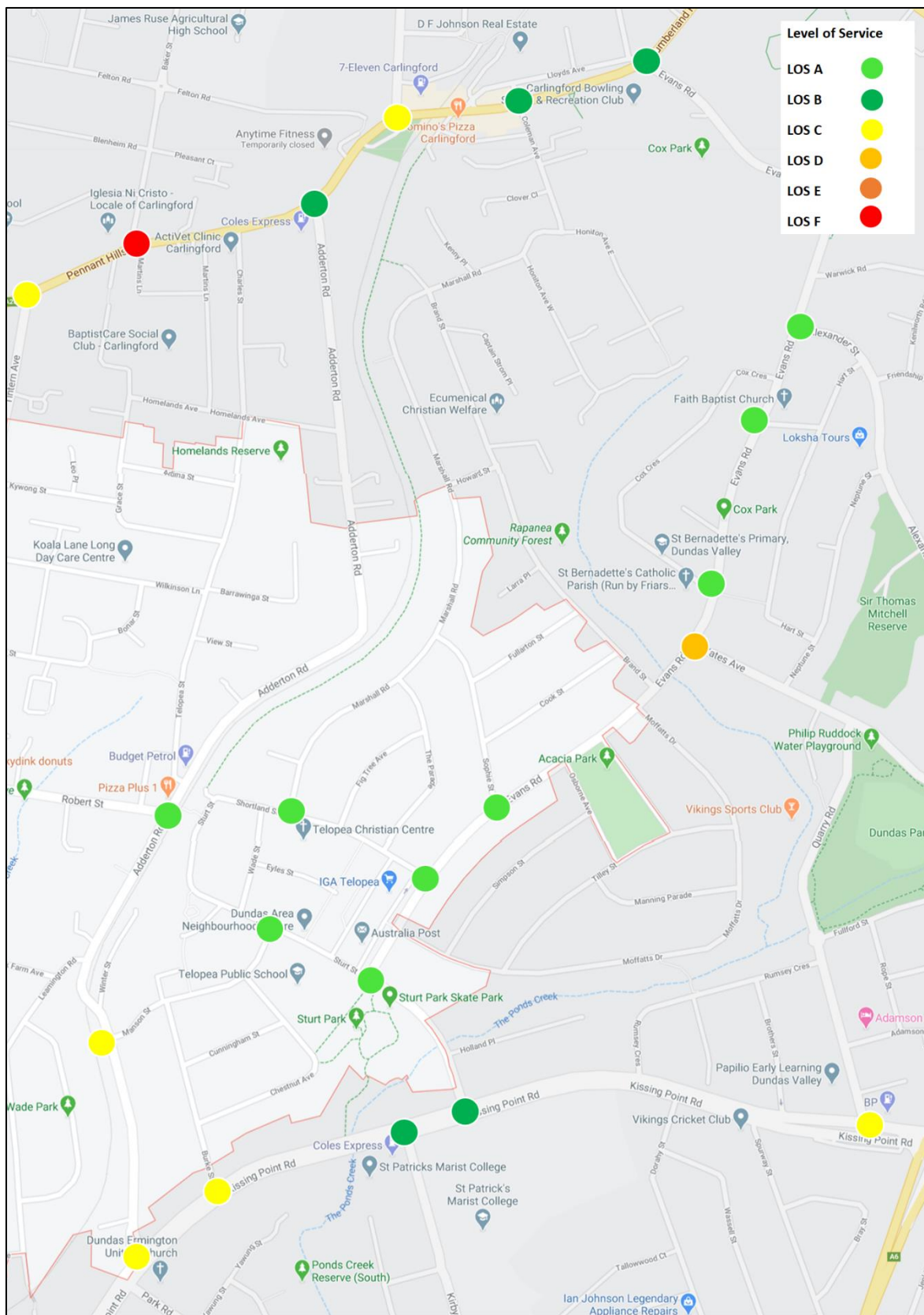


Figure 8: 2036 Base Precinct Aimsun Intersection Operations PM Peak Period

Source: Precinct TTA Addendum

3.4 Base 2036 Network Upgrades

With reference to the above, a number of the key external (to the Telopea Precinct) intersections were determined to operate at or over capacity under 2036 Base conditions, and as such require upgrades to provide for future base traffic volumes regardless of the development of the Telopea Precinct.

In response, the Precinct TTA Addendum details the upgrades required at these intersections; figures showing these upgrades are provided in **Appendix B** and summarised in **Table 8**.

Table 8: 2036 Base Traffic Road Network Upgrades

Intersection	Road Network Upgrade Requirements - 2036 Base Traffic		
	Required Upgrades	Proposed Control	Trigger
Pennant Hill Rd & Adderton Rd	<ul style="list-style-type: none"> • 3 through lanes on Pennant Hills Rd 	Signals	Background Growth
Pennant Hills Rd & Coleman Ave	<ul style="list-style-type: none"> • 3 through lanes on Pennant Hills Rd • Linemark 1 left lane and 1 through / right lane on Coleman Ave (north and south approaches) 	Signals	Background Growth
Pennant Hills Rd & Evans Rd & Lloyds Ave	<ul style="list-style-type: none"> • New traffic signals • Close Lloyds Ave (north approach) • 3 through lanes on Pennant Hills Rd • 75m and 100m right turn lanes on Pennant Hills Rd (west approach) • 55m right turn lane on Evans Rd • 1 left/right short lane on Evans Rd • Additional 150m departure lane on Evans Rd 	Signals	Background Growth
Kissing Point Rd & Adderton Rd	<ul style="list-style-type: none"> • 3 right turn lanes on Adderton Rd • 55m left turn slip lane on Adderton Rd • 20m left turn continuous slip lane on Kissing Point Rd (west approach) • Additional 100m departure lane on Adderton Rd (north approach) 	Signals	Background Growth
Kissing Point Rd & Park Rd	<ul style="list-style-type: none"> • Linemark 1 left / right lane and 1 right lane on Park Rd • 20m left turn continuous slip lane on Kissing Point Rd (east approach) 	Signals	Background Growth

	• Additional 90m departure lane at Park Rod (south approach)		
Kissing Point Rd & Silverwater Rd	• 3 through lanes on Kissing Point Rd, including one 60m approach lane eastbound	Signals	Background Growth
Kissing Point Rd & Quarry Rd	• 3 through lanes on Kissing Point Rd, including one 60m approach lane eastbound • New traffic signals, with staged turning area removed • 3 through lanes on Kissing Point Rd (westbound) • 4 through lanes on Kissing Point Rd (eastbound) including a 100m kerbside short lane	Signals	Background Growth
Kissing Point Rd & Stewart St	• 4 through lanes on Kissing Point Rd (westbound) including a 75m kerbside short lane • 3 through lanes on Kissing Point Rd (eastbound)	Signals	Background Growth

3.5 Revised Network Upgrades

Further to the upgrade recommendations detailed in the Precinct TTA Addendum, subsequent discussions were held between LAHC, TfNSW and Roads & Maritime in regard to some of the upgrade recommendations. As a result of these discussions, TfNSW and Roads & Maritime commissioned GTA to undertake additional analysis of a number of intersections to determine whether some of the upgrades previously recommended in the Precinct TTA Addendum (to provide for the Telopea Precinct) were required.

As a result, revisions to the intersection upgrades, and to the responsible parties for those upgrades, were then agreed with TfNSW and Roads & Maritime. These changes include the following:

- **Kissing Point Road & Adderton Road:** Upgrade works at this intersection would be funded by a Special Infrastructure Contribution and undertaken by TfNSW.
- **Kissing Point Road & Sturt Street:** Upgrade works at this intersection would be undertaken by TfNSW, with no additional upgrades required specifically to accommodate the Telopea Precinct.
- **Sturt Street & Evans Road:** The upgrade of this intersection has been completed by Council in the 2020 – 2021 Financial year. A single lane roundabout has been provided and is operational.

In addition, Roads & Maritime provided the following advice (20 October 2018) in regard to the intersection of Pennant Hills Road & Evans Road:

Traffic Control Signals and associated civil works (within the existing road corridors) shall be installed at the existing intersection of Pennant Hills Road/Evans Road/Lloyds Avenue on road safety grounds with the design and construction undertaken to Roads and Maritime's requirements. The geometric design and trigger point

for this intersection upgrade linked to development yield (social housing components exempted) will need to be agreed between Roads and Maritime and LAHC in due course as part of any satisfactory arrangements [sic] provisions.

The funding mechanism for these works is expected to also comprise a Special Infrastructure Contribution; the broader upgrade at this intersection, i.e., outside of the existing carriageways, would remain the responsibility of TfNSW and Roads & Maritime.

4 Public and Active Transport

4.1 Parramatta Light Rail

4.1.1 Overview

The Parramatta Light Rail is an integral part of the State Government's transport and planning strategy for Parramatta and Western Sydney, and is specifically designed to:

- Provide for new urban development focused on the Parramatta Light Rail stations.
- Provide a frequency of services that will reduce car dependency, particularly for the local trips which make up such a high proportion of daily household trips.
- Provide opportunities for more active travel both within proximity to each station, and along the entire route further to the development of adjacent active transport infrastructure.
- Generally, improve urban amenity and liveability along the entire Parramatta Light Rail corridor.

4.1.2 Parramatta Light Rail Stage 1

Stage 1 of the Parramatta Light Rail is currently under construction and will connect the Telopea Precinct with the Parramatta CBD and Westmead Health Precinct, as well as adjacent suburbs, education, cultural and recreational centres along the Parramatta Light Rail route. Parramatta Light Rail services are expected to commence in 2023, and will provide:

- High-frequency 'turn-up-and-go' services seven days a week, departing every 7 - 8 minutes in peak periods.
- Modern and comfortable air-conditioned vehicles integrated with the Opal card network.
- New light rail and pedestrian zones along Church Street and Macquarie Street in the Parramatta CBD.
- A new active transport link (walking and bike-riding path) between Carlingford and Parramatta adjacent to the Parramatta Light Rail line.

The Parramatta Light Rail Stage 1 route is shown in **Figure 9**, which also shows the State Government's preferred route for Parramatta Light Rail Stage 2, which is discussed further in Section 4.1.3.

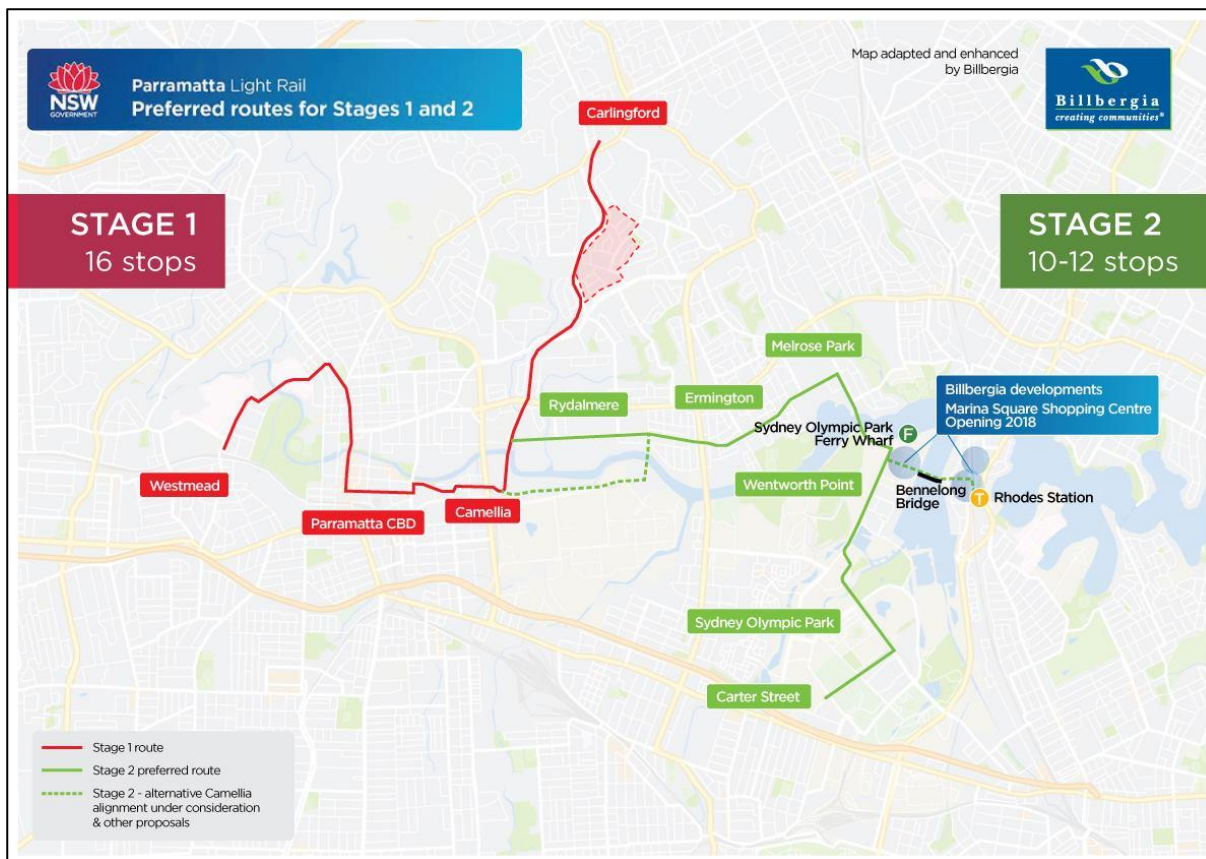


Figure 9: Parramatta Light Rail

4.1.3 Parramatta Light Rail Stage 2

In 2016, the State Government announced their preferred option for Parramatta Light Rail Stage 2, which would run north of the Parramatta River from Rydalmere through Ermington and Melrose Park, and then across the Parramatta River via a new public and active transport bridge to Wentworth Point and then through to Sydney Olympic Park.

As stated in the announcement, this route was considered the best option as it would provide a fully integrated transport and land use plan for Greater Parramatta and the Sydney Olympic Park peninsula and connect directly with fast rail and future metro services to the Sydney CBD. In the context of this TA, Parramatta Stage 2 would also provide Telopea CPA residents, employees, and visitors with additional travel route options via Sydney Metro West at Olympic Park (see also Section 4.1.4).

While no funding commitments have been made towards Parramatta Light Rail Stage 2, the State Government has recently raised the potential to fast track the project as part of the economic and infrastructure response to (what are current) Covid-19 conditions.

4.1.4 Sydney Metro West

More recently, the State Government has committed to the Sydney Metro West project, which will provide a direct connection between Parramatta and Sydney via key urban development centres including Sydney Olympic Park and the Bays Estate. Sydney Metro West will effectively double the capacity of the (currently constrained) T1 Western Line between Parramatta and the City, and in turn free up capacity across the metropolitan rail network.

4.2 Bus Service

The Telopea CPA is serviced by 3 bus routes, one being a relatively local service (Route 513) while the other 2 routes (Route 521 and Route 545) offer sub-regional connections to Parramatta, Chatswood, Epping, and Eastwood. These routes are shown in Figure 10, which also indicates the 400m pedestrian walking distance from bus stops on Kissing Point Road (Route 521) which show that these stops are well within walking distance for a high number of future Telopea CPA residents, employees, and visitors.

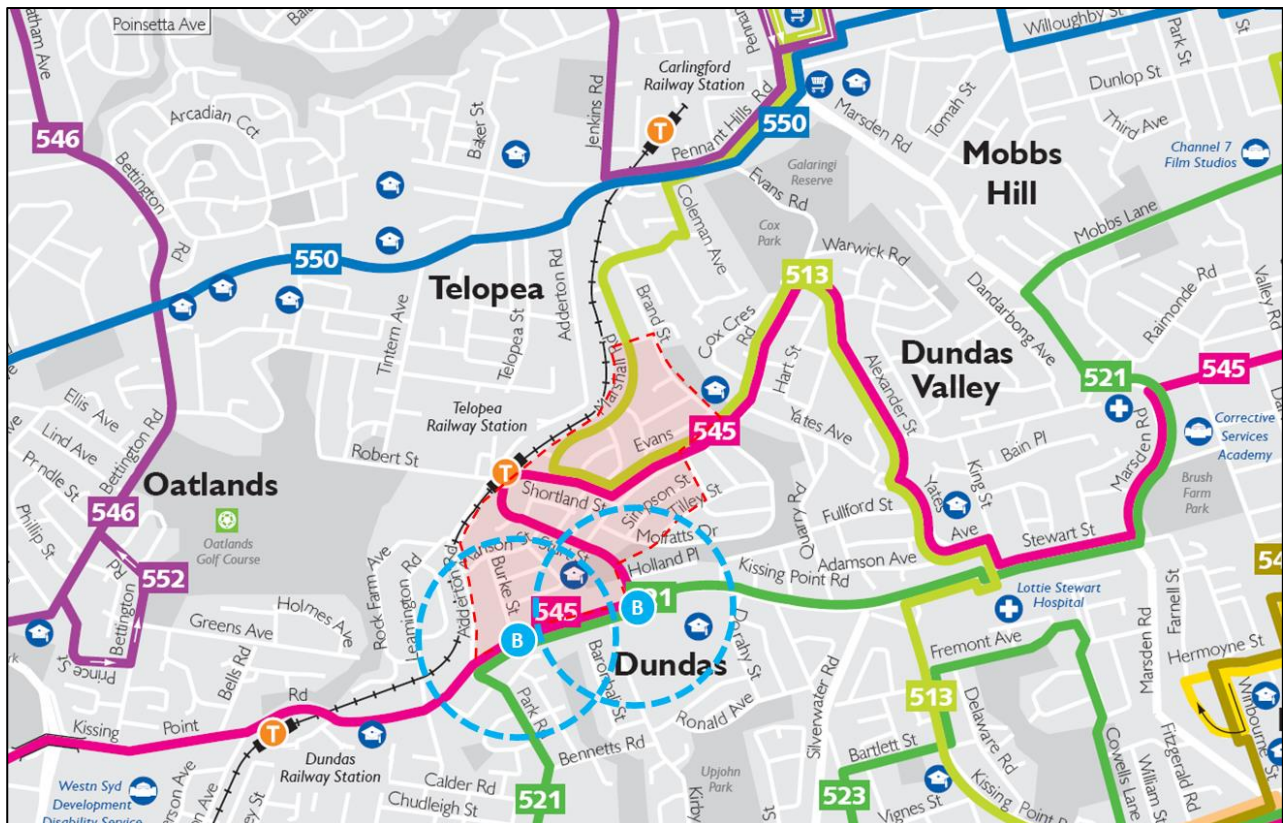


Figure 10: Bus Services

The potential use of these services is further heightened by the frequency of services and their connectivity to major sub-regional centres and transport interchanges, as summarised in **Table 9**.

Table 9: Bus Routes and Headways

Route #	Route	Peak Headway	Off-Peak Headway
513	Meadowbank to Carlingford	30 min	60 min
521	Parramatta to Eastwood	60 min	60 min
545	Parramatta to Chatswood via Eastwood	10 min	15 min

It is noted that the Parramatta Light Rail EIS suggests that ongoing consideration will be given to additional bus routes to further maximise the use of the Parramatta Light Rail as it develops, and its maximum capabilities assessed.

4.3 Active Transport

4.3.1 Existing Active Transport Infrastructure

CoP provides extensive cycle and shared path infrastructure across the LGA and continues to further upgrade and expand the active transport network with reference to the Parramatta Bike Plan. An overview of the CoP cycling network is provided in **Figure 11**, while cycling infrastructure in the immediate vicinity of the Telopea CPA is shown in **Figure 12**.

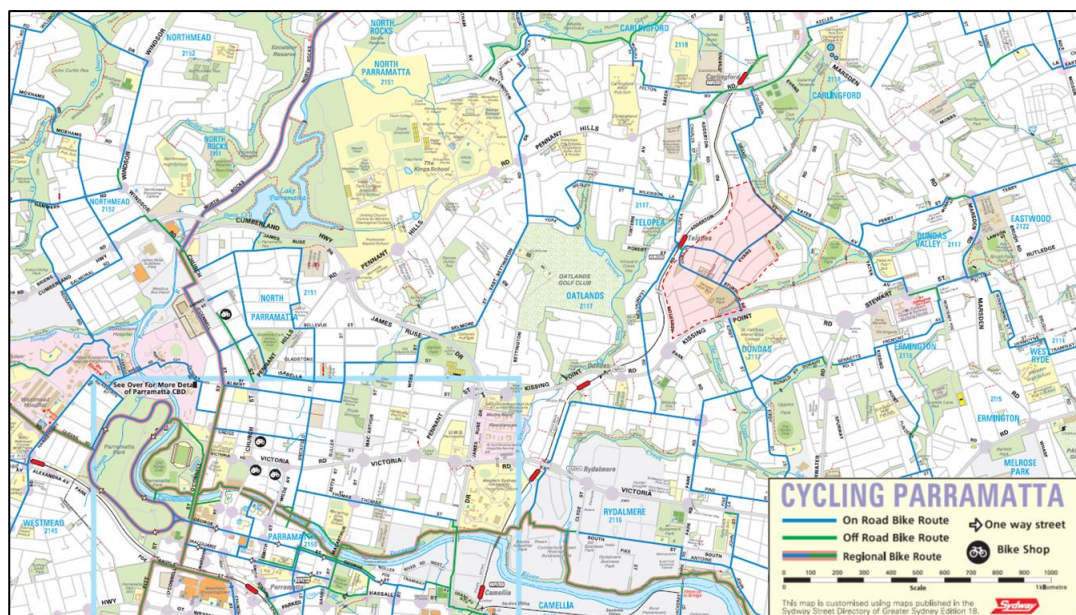


Figure 11: City of Parramatta Cycle Routes

Source: Council

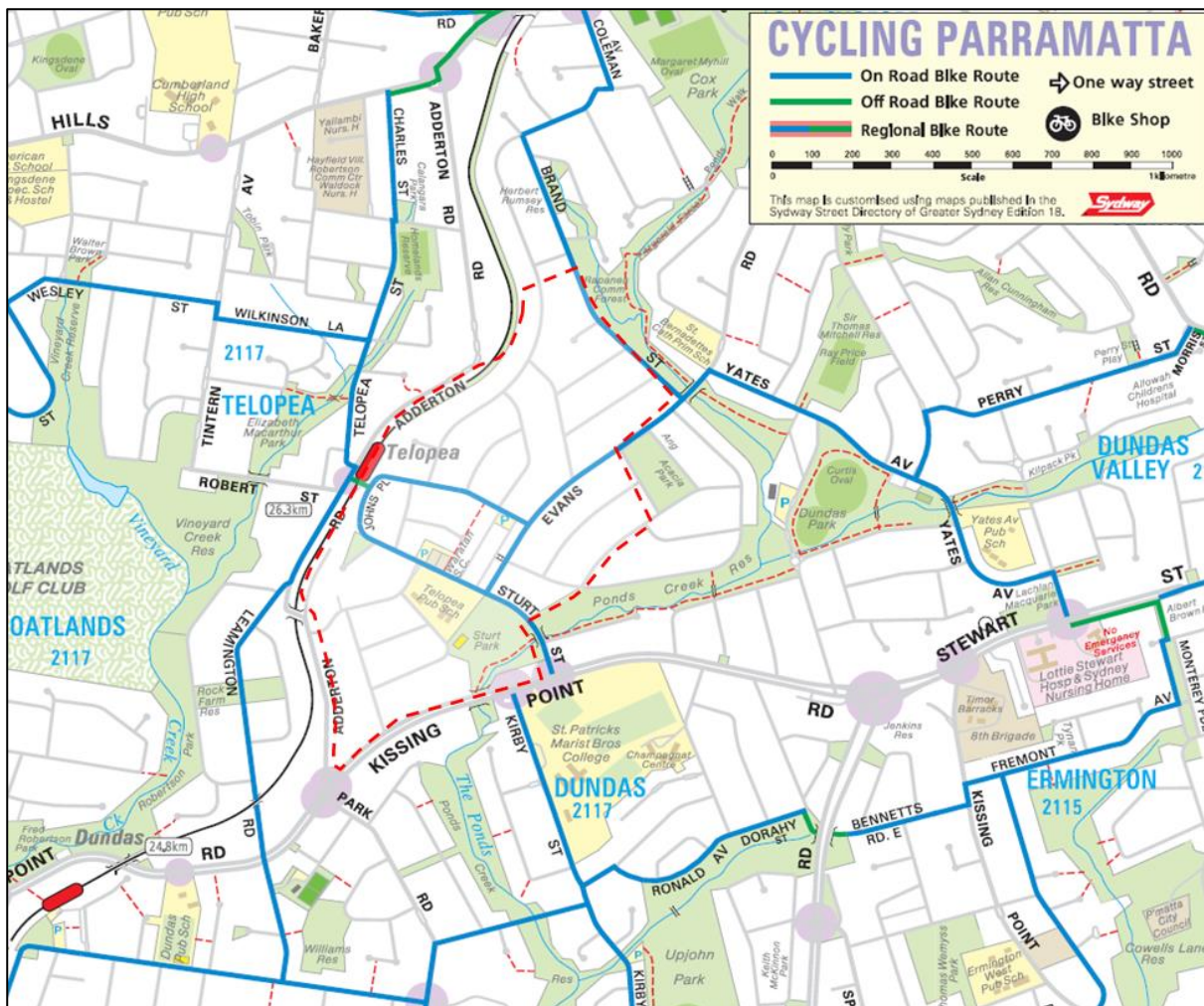


Figure 12: Local Cycle Paths

Source: Parramatta Bike Plan

4.3.2 Future Active Transport Infrastructure

As part of the Parramatta Light Rail a new active transport corridor will be developed adjacent to the rail line, linking from Carlingford in the north through to the Parramatta CBD and then Westmead. Not only will this be a significant piece of active transport infrastructure in its own right, but it will also provide connections to sub-regional and regional transport facilities including:

- The Parramatta Valley Cycleway.
- All Parramatta Light Rail stations.
- T1 North Shore & Western Line stations.

There is also the potential for the extension of the active transport corridor along the Parramatta Light Rail Stage 2, which includes the public and active transport bridge over Parramatta River which would in turn provide active access through to Sydney Olympic Park and Sydney Metro West.

The Parramatta Light Rail Stage 1 active transport corridor is shown in **Figure 13**.

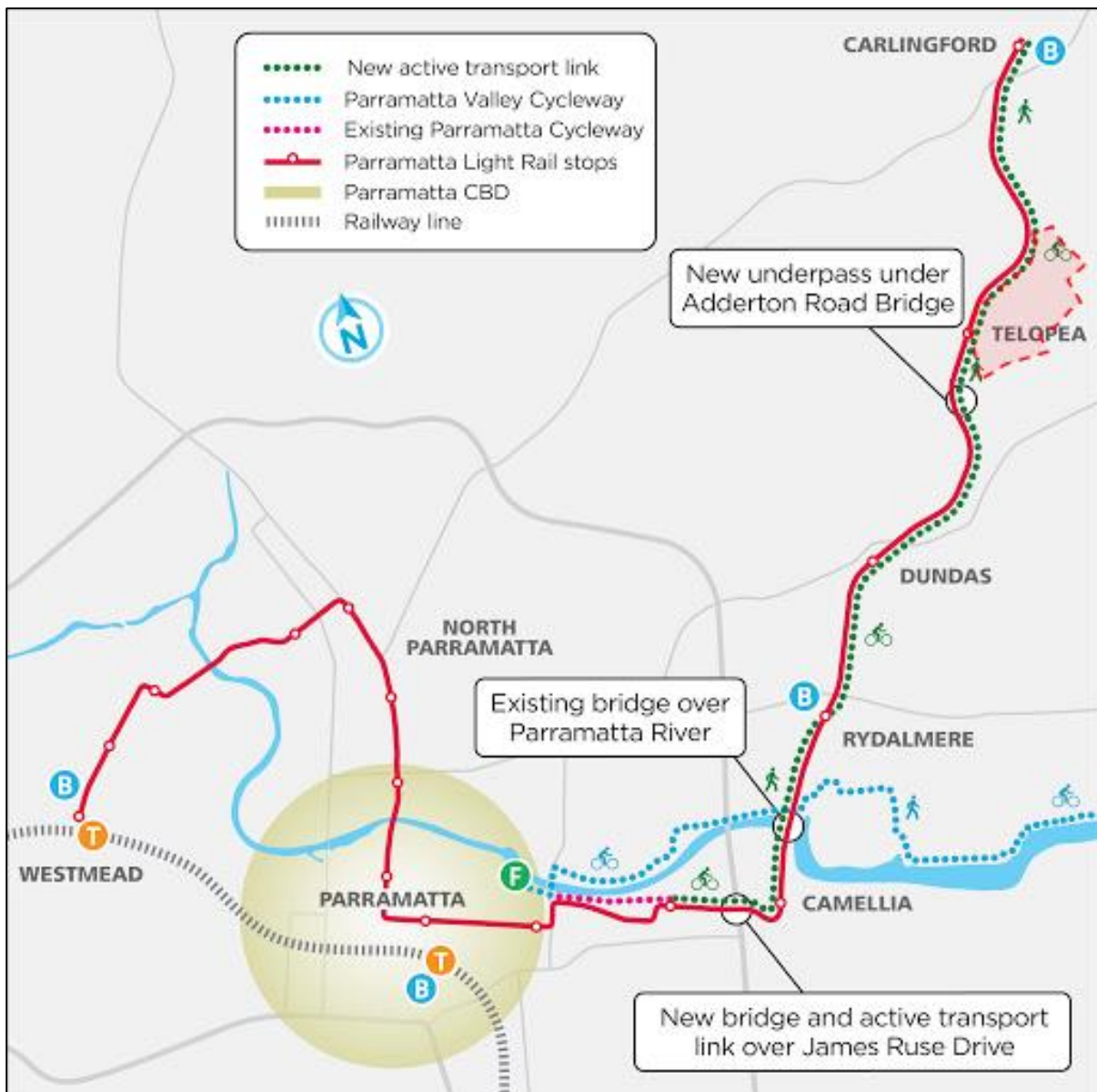


Figure 13: Parramatta Light Rail Stage 1 Active Transport

Source: State Government

Of course, the Concept Plan itself also provides significant internal active transport infrastructure across the Telopea CPA, as well as key links to external active (and public) transport. These provisions are discussed further in Section 5.3.

4.4 Mode Share Targets

With reference to sections above, the provision of significant public and active transport services and infrastructure, as well as the provision of retail, educational, community and recreational facilities within the Telopea CPA, means that there is excellent potential to reduce the private vehicle trip generation of future Telopea CPA residents, employees, and visitors.

In this regard, the Precinct TTA Addendum outlines model shift targets, which are based on the mode share profiles of a number of benchmark suburbs that provide a similar land-use mix and access to public and active

transport. These mode split targets are detailed in Table 4.1 of the Precinct TTA Addendum, which is reproduced in **Table 10**.

Table 10: Telopea Precinct Mode Split Targets

Travel Mode	Car Driver	Car Passenger	Rail	Bus	Cycling	Walk	Work at Home/ Did Not Work
Existing	62.7%	3.6%	16.1%	4.3%	0.7%	1.1%	11.3%
Target	45.0%	6.0%	27.0%	6.0%	2.0%	3.0%	11.0%

Source: Precinct TTA Addendum

It is the opinion of Ason Group that these are very realistic mode split targets.

5 Telopea Concept Plan Area

5.1 Overview

As previously discussed, the Concept Plan provides for a mixed-use development across the Telopea CPA in line with the provisions of Master Plan 2017, and moreover generally consistent with the land uses and yields assessed in the Precinct TTA Addendum.

The Concept Plan land use components and yields are summarised in **Table 11**.

Table 11: Concept Plan Components

Dwelling	Yields
Market Dwellings	3,505
Affordable Dwellings	259
Town Houses	740
Total Dwellings	4,504
Retail	7,785m ²
Commercial (Community Centre, Library, Child Care Centre and Church)	3,000m ² - 6,250m ²
RACF	120

Source: Frasers

5.2 Vehicle Access

The Concept Plan provides for the repurposing of many existing roads within the Telopea CPA, as well as new roads, road connections and road closures. These changes, which are essentially limited to the Telopea Core and its immediate surrounds, are shown in **Figure 14**.

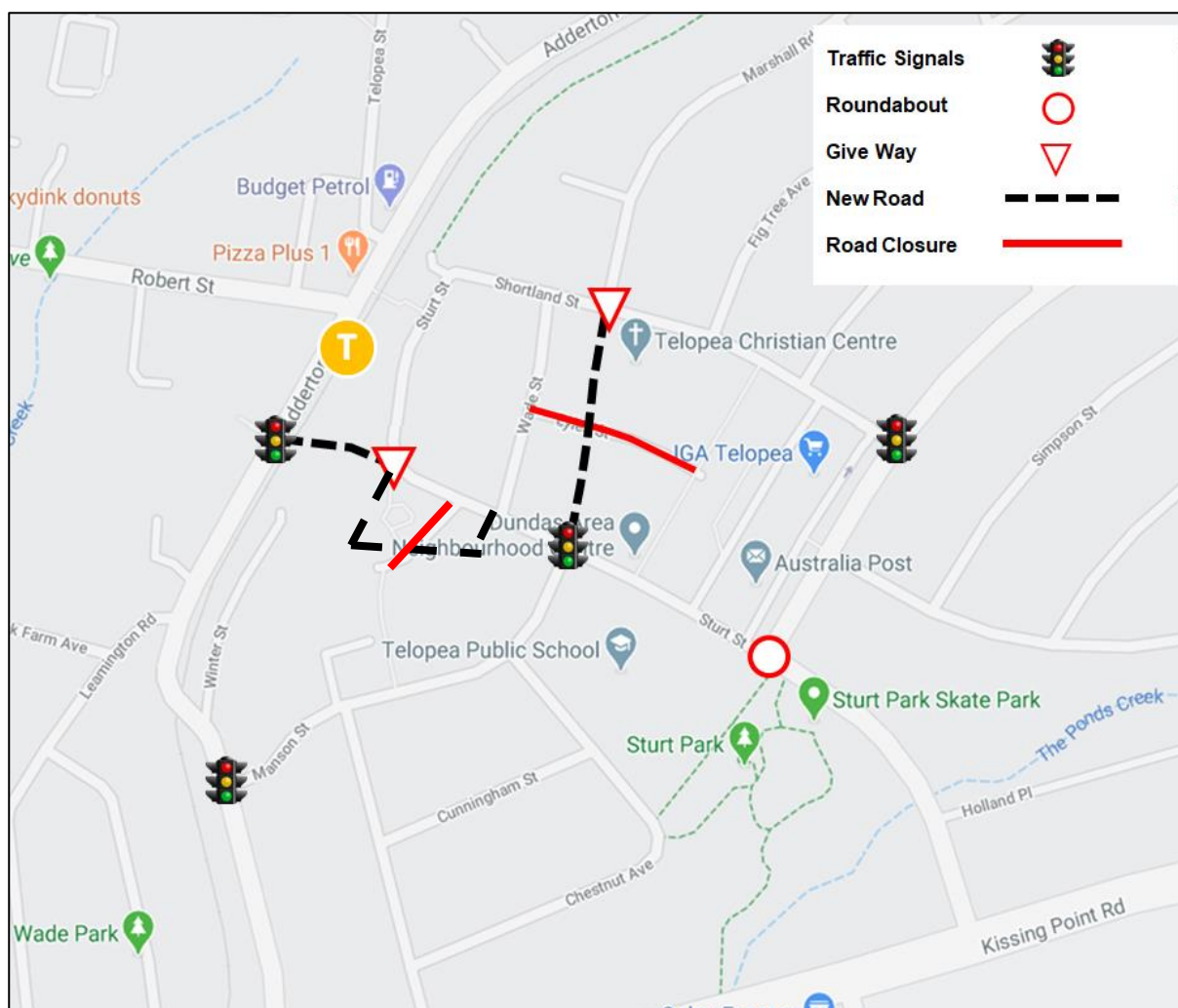


Figure 14: Concept Plan Road Network Changes

With reference to **Figure 14**, the internal road network and intersection controls proposed in the Concept Plan are essentially the same as those assessed/proposed in the Precinct TTA Addendum, with the addition of a new private road which will provide access to the subject site (Mews Street).

As discussed previously, the upgrade of the intersection of Sturt Street & Evans Road (currently anticipated to be a roundabout) will be funded by Council, with the design to be finalised subject to the design of Telopea Core.

5.3 Public & Active Transport Provisions

5.3.1 Public Transport

As previously discussed, Parramatta Light Rail will provide a station at Telopea immediately adjacent to the Telopea Core.

With regard to bus services, the existing routes detailed in Section 4.2 will be retained, and all key roads and intersections designed to accommodate bus movements appropriately. New bus stops will be provided in

Sturt Street immediately adjacent to Telopea Station to maximise the potential for multi-modal public (and active) transport trips.

5.3.2 Active Transport

The road network across the Telopea Core has specifically been revised to maximise green space and, moreover, to provide direct and accessible active transport connections between all parts of the Telopea CPA and Telopea Station.

New pedestrian crossing facilities will be provided in Sturt Street between the internal Telopea Core green link and Telopea Station in what will be very much a shared space, while signalised pedestrian crossings will be provided with all new signalised intersections. The type of crossing facility to be provided is subject to further detailed Warrants Assessment against the TfNSW Supplement to AS1742.10, and requires the Local Traffic Committee approval.

Road profiles across the Telopea CPA provide for shared paths and/or on-road cycleway, ensuring safe and direct access between all parts of the Telopea CPA and the Parramatta Light Rail Active Transport Corridor. It is also anticipated that End of Journey facilities will be provided near Telopea Station and in close proximity to the retail, community, and recreational attractors; further details of these facilities would be provided in future Development Applications for individual sites across the Telopea CPA.

Further details in regard to new active transport infrastructure are provided in Section 4.3.2.

5.4 Precinct TTA Addendum Trip Rates and Traffic

The Precinct TTA Addendum adopted trip rates for the different components of the Telopea Precinct are largely based on the mode split targets discussed in Section 4.4 as well as consideration of broader Journey to Work data and the RMS Guide. They also consider the specific characteristics of the different types of dwellings within the Telopea Precinct, and the anticipated internalisation of retail, community, and recreational trips. The Precinct TTA Addendum trip rates are summarised in **Table 12**.

Table 12: Precinct TTA Addendum Trip Rates

Precinct Component	Peak Hour Trip Rate
Dwellings <400m from Telopea Station	0.31 vehicle trips per dwelling
Dwellings >400m from Telopea Station	0.65 vehicle trips per dwelling
Social Housing	0.04 vehicle trips per dwelling
Retail AM	1.75 vehicle trips per 100m ²
Retail PM	3.5 vehicle trips per 100m ²

Source: Precinct TTA and Precinct TTA Addendum

Further to the above, the total residential trip generation of the Telopea Precinct, including a breakdown to all travel modes in accordance with the mode split targets, is summarised in Table 5.1 of the Precinct TTA Addendum, which is reproduced in **Table 13**.

Table 13: Precinct TTA Addendum Residential Trip Generation

Peak Hour Trips	Car Driver	Car Passenger	Rail	Bus	Cycling	Walk	Work at Home/ Did Not Work	Total
Target Mode	45%	6%	27%	6%	2%	3%	11%	100%
Trips	1,448	193	869	193	64	97	354	3,218

Source: Precinct TTA Addendum

With reference to **Table 13**, the key volume with regard to the traffic assessment provided in the Precinct TTA Addendum is the residential vehicle trip generation of 1,448 trips in both the AM and PM peak hours. Further referencing the retail vehicle trip generation rates detailed in **Table 12** above, the total peak hour trip generation of the Telopea Precinct as estimated in the Precinct TTA Addendum is:

- 1,571 vehicle trips in the AM peak hour.
- 1,693 vehicle trips in the PM peak hour.

5.5 Residential Trip Rates Review

It is the opinion of Ason Group that the trips rates adopted in the Precinct TTA Addendum represent absolute maximum trip rates for the traffic assessment. This conclusion is based on a number of factors, which are discussed in sections below.

5.5.1 Affordable Housing

The trip generation of affordable dwellings is significantly lower than that of market dwellings; this is due to a number of factors, but inherently the case given the lower parking requirements for such dwellings detailed in SEPP 65. Based on our work on other sites, affordable dwellings generate less than 50% of the generation of market dwellings, and in some instances closer to the generation of social dwellings.

5.5.2 Melrose Park Urban Renewal

In our recent work on the Melrose Park urban renewal project, surveys were undertaken of numerous existing urban estates to develop appropriate trip rates for the detailed traffic assessment (also using Aimsun) provided in the Melrose Park Transport Management & Accessibility Plan (the Melrose TMAP). As agreed with TfNSW

and the broader Project Control Group for the Melrose TMAP, a rate of 0.25 vehicle trips per dwelling in the peak hours was adopted for the assessment.

Melrose Park has many of the same characteristics as the Telopea Precinct, and may also be serviced by the Parramatta Light Rail Stage 2 (if built along the current preferred alignment); however, the TMAP concluded that even without Parramatta Light Rail Stage 2, mode split targets (similar to those proposed for the Telopea Precinct) could still be met further to the provision of high frequency buses and a public and active transport bridge (over Parramatta River) linking to Sydney Olympic Park and Sydney Metro West.

The trip rate of 0.25 vehicle trips per dwelling in the peak hours was also applied equally across all of Melrose Park, i.e., there was no distinction in trip rates between those dwellings within 400m of public transport (either the Parramatta Light Rail Stage 2 corridor or Victoria Road bus corridor) and those outside of 400m of these corridors (see further below).

5.5.3 SEPP 65 and the Apartment Design Guide

The Apartment Design Guide was developed as part of the then State Environmental Planning Policy No 65 – Design Quality of Residential Apartment Development to establish the policy direction for residential apartment development in NSW. The Apartment Design Guide is still a key reference for apartment development.

The Apartment Design Guide provides the following in regard to parking provision:

Objective 3J-1

Car parking is provided based on proximity to public transport in metropolitan Sydney and centres in regional areas...for development in the following locations:

- on sites that are within 800 metres of a railway station or light rail stop in the Sydney Metropolitan Area...

the minimum car parking requirement for residents and visitors is set out in the Guide to Traffic Generating Developments, or the car parking requirement prescribed by the relevant council, whichever is less.

Essentially, the Apartment Design Guide acknowledges that parking requirements for dwellings within 800m of rail or light rail can be reduced to a minimum because of that level of access to quality public transport, with 800m being a well acknowledged acceptable walking distance (approximately 10 minutes) to rail or light rail. And of course, the reduced parking (as proposed in the Draft Telopea DCP) results in lower vehicle trip generation.

5.5.4 Residential Trip Rates Review Summary

With reference to sections above, it is the opinion of Ason Group that a more appropriate vehicle trip generation rate for the market dwellings would be 0.25 vehicle trips per dwelling, and for the affordable 0.12 vehicle trips

per dwelling, in both the AM and PM peak hours. The social dwelling trip rate adopted in the Precinct TTA Addendum matches our surveys of similar sites across Sydney.

A summary of the resultant residential trip generation of the Telopea CPA as provided for in the Concept Plan is provided in **Table 14**.

Table 14: Revised Residential Trip Rates

Concept Plan Component	Dwellings	Peak Hour Trip Rate	Peak Hour Trips
Market Dwelling	3505	0.25	876
Affordable Dwellings	259	0.12	31
Social Dwellings	740	0.04	30
Total			937

With reference to **Table 14**, the residential components of the Telopea CPA are expected to generate 937 peak hour vehicle trips; this represents a reduction in residential trip generation of some 35% from the trips assigned in the Precinct TTA Addendum.

5.6 Additional Concept Plan Trips

The Concept Plan provides 7,785m² of retail space, a slight increase when compared to the Precinct TTA Addendum; based on the trip rates detailed in **Table 12**, the retail component of the Telopea CPA would generate:

- 136 vehicle trips in the AM peak hour.
- 272 vehicle trips in the PM peak hour.

The overwhelming majority of community and recreational trips are anticipated to be internal trips.

In addition the Concept Plan provide a 120 bed RACF. Adopting a trip generation of 0.1 vehicle trips in the PM peak hour (consistent with the RMS guide 2002) and acknowledging that the RACF is expected to generate very minimal trips during the AM peak hour, results in the RACF component of the Telopea CPA generating 12 vehicle trips in the PM peak hour.

5.7 Telopea Precinct Daily Trip Generation

A daily trip generation has been assessed utilising TfNSW (previously RMS) Traffic Generation studies. A comparison of the RMS Guide's traffic generation rates for residential uses including dwelling houses, medium density units and higher density flats was undertaken to understand the relationship between the AM/PM peak hour trip rates to the daily trip rates. By aggregating the AM and PM peak hour trip rates, it was found that the

daily trip rate would be approximately five (5) times the trip generation of the combined AM/PM peak hour trip rates.

A recent traffic generation study for NSW small suburban shopping centres was undertaken by Bitzios Consulting for RMS in 2018. The study undertook traffic generation research on a number of small shopping centres across NSW with GLFA less than 10,000m² which would fit into the category of the Telopea's proposed retail space of 7,785m². A comparison of the daily trips of 13 small suburban shopping centres ranging between 2,000m² to 10,000m² GLFA indicates that there would be an average daily trip rate of 79 daily trips per 100m². However, as detailed in the Precinct TTA, it is assumed that 50% of the trips would be from external areas while the other 50% of the trips would be internalised as either walking or linked trips. As such, applying a 50% reduction results in 39.5 daily trips per 100m² GFA.

For the RACF, the RMS Guide suggests a daily trip rate of 1 trip per 1 dwelling. This has been adopted in the daily traffic assessment.

It is assumed that the majority of community related developments would be internalised trips to support the Telopea community. It is further noted that the proposed community facilities would replace some of the existing community uses in the area. Nonetheless, a daily trip rate has been investigated for each of the community related land uses and again it is reiterated that these community developments would have most of their trips occurring internally.

The church daily trip rate for weekdays is assumed to be negligible as larger religious activities would likely take place on weekends. As such, a nominal 30 daily trips have been assumed for the church to account for clerical workers and for small group sessions that occur sporadically in the evening after peak hours.

A trip generation survey study for childcare centres was undertaken by TEF consulting for RMS in 2015. A total of 12 childcare centres were surveyed, however, Site S4 was chosen as the study site for this report as it has a comparable GFA of 740m² against the proposed 750m² by Stage 1. Site S4 is located at 81 Clanville Road, Roseville, NSW and operates as a long day care centre for 90 children with 15 employees. A 5-day survey was taken between 6:30am to 9:30am and 2:30pm to 6:00pm and the operating hours of the childcare is between 7:30am to 6:00pm. An average weekday total AM and PM period traffic of 273 vehicle trips was recorded. As such, 300 vehicle daily trips have been assumed for the Telopea Stage 1 childcare which would have similar children and staff counts and accounts for any minor trips within the inter-peak period.

In lieu of any library and community trip rates endorsed by TfNSW, the RMS Guide's office and commercial daily vehicle trip rate of 10 vehicles per 100m² GFA has been adopted. This has been similarly used for the Hurstville Civic Precinct traffic assessment which has similar land uses including a proposed library, function centre and museum/gallery.

The following table details the total daily traffic generation for the precinct:

Table 15: Daily Trip Generation

Concept Plan Component	Yield	Daily Trip Rate Factor	Daily Trips
Market Dwelling	1,752 Combined AM and PM peak-hour Trips	5 X (Combined AM and PM peak-hour Trips)	8,760
Affordable Dwellings	62 Combined AM and PM peak-hour Trips	5 X (Combined AM and PM peak-hour Trips)	310
Social Dwellings	60 Combined AM and PM peak-hour Trips	5 X (Combined AM and PM peak-hour Trips)	300
Total Residential	-	-	9,370
Community Centre and Library (Community)	3,000m ²	10 daily trips per 100m ²	300*
Child Care (Community)	740m ² (Assumed 90 children)	Assumed to have similar traffic generation as the study site for S4 Roseville	300*
Church (Community)	2,500m ²	Assuming limited clerical worker trips and small groups trips	30*
Total Community	-		630*
Retail	7,785m ²	39.5 daily trips per 100m ²	3,076
RACF	120 dwellings	1 daily trip per dwelling	120
Total Non-Residential	-		3,196
Total Stage 1 Daily Internal and External Trips			13,195
Total Stage 1 Daily External Trips (excluding community trips)			12,566

* Assumed to be internalised trips within the Telopea Precinct.

5.8 Telopea Precinct Trip Generation Summary

With reference to sections above, the Precinct TTA Addendum assigns a total of 1,571 and 1,693 vehicle trips in the AM and PM peak hours, respectively. By comparison, the assessment above indicates that the Telopea CPA further to the Concept Plan would generate some 1,073 and 1,221 vehicle trips in the AM and PM peak hours, respectively.

In both peak hours, this represents a reduction from the trips assigned in the Precinct TTA Addendum of approximately 30%.

5.9 Trip Distribution

There is no information to suggest that the trip distribution characteristics of the Telopea CPA further to the Concept Plan would in any way differ to the trip distribution determined in the Precinct Aimsun Model, given that:

- The Concept Plan provides for the same internal road network and external road network connections as modelled.
- The Concept Plan provides the same level of access to public and active transport and internal retail, community, and recreational services as considered in the model.
- Frasers propose no changes to the suite of road network upgrades recommended in the Precinct TTA Addendum to accommodate the trip generation of the Telopea CPA.

5.10 2036 + Telopea CPA Road Network Operations

Intersection operation outputs from the Precinct Aimsun Model are provided in **Figure 15** and **Figure 16** for the AM and PM peak periods respectively for the 2036 Base + Precinct traffic assignment, while **Table 16** summarises the results of detailed SIDRA testing for the same peak periods.

It is noted that these results are based on the road network upgrades required to accommodate Base 2036 traffic volumes and the additional road network upgrades required to accommodate the additional traffic volumes generate by the Telopea Precinct (see also **Table 17**).

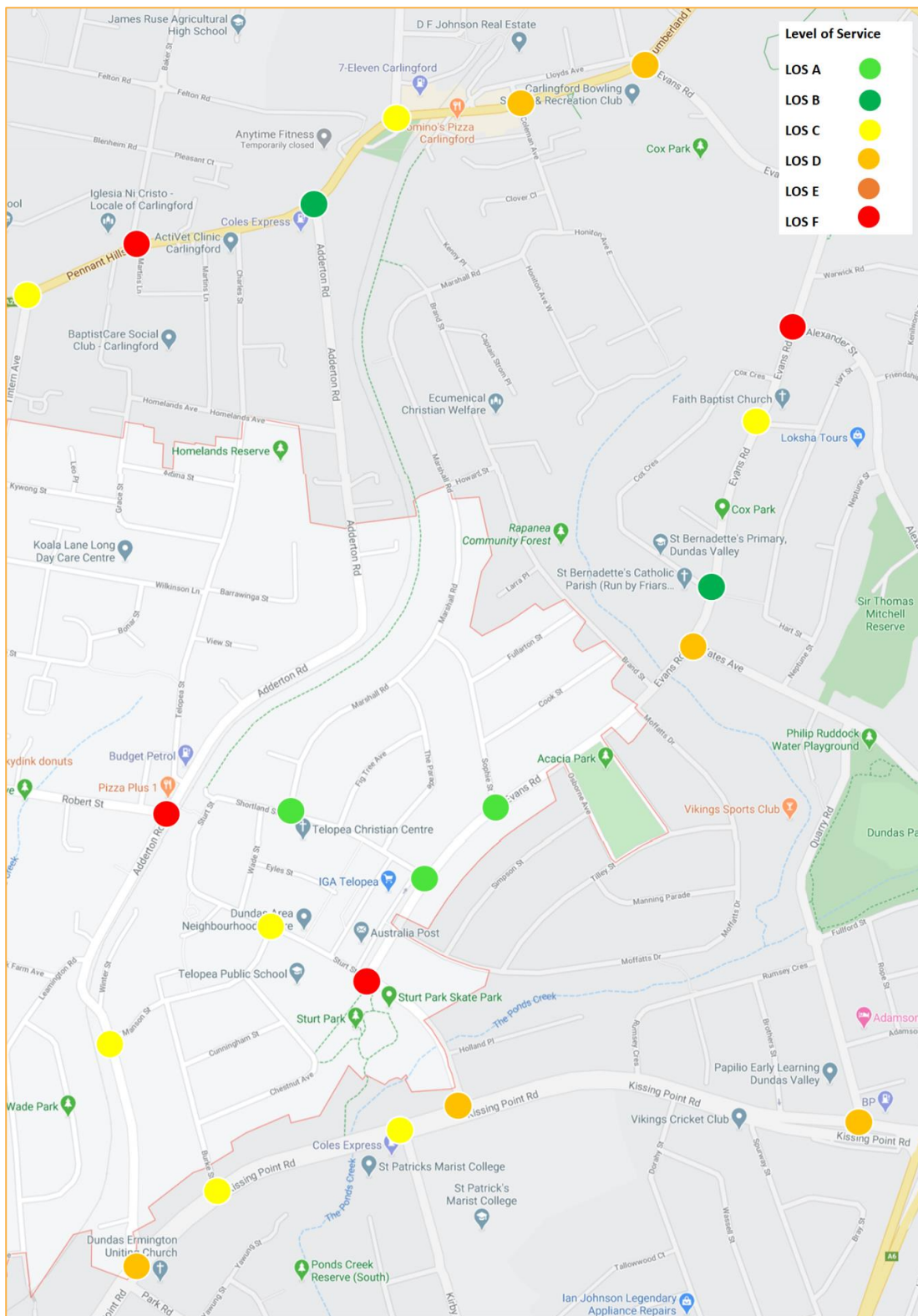


Figure 15: 2036 Base + Telopea Precinct Aimsun Intersection Operations AM Peak Period

Source: Precinct TTA Addendum

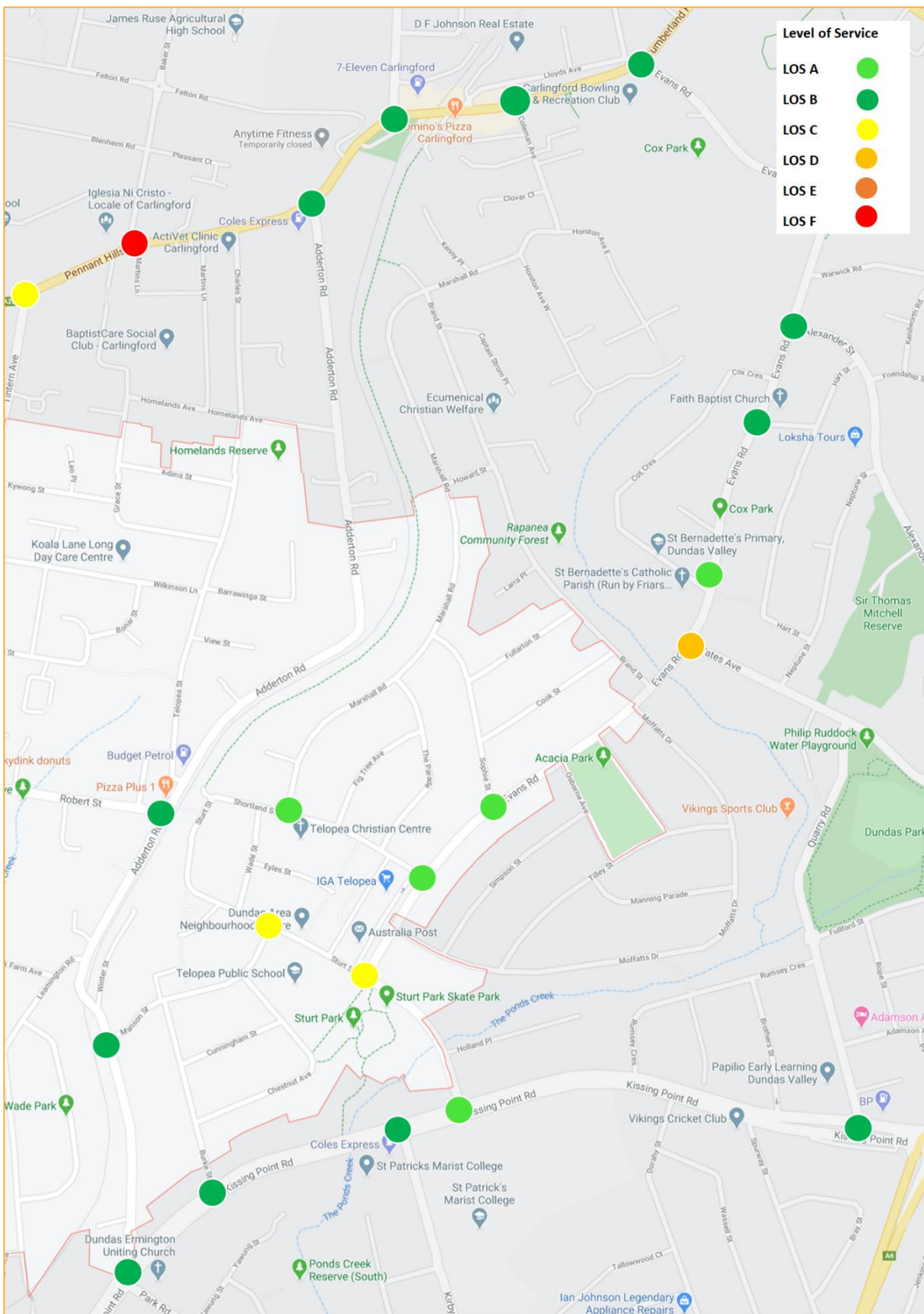


Figure 16: 2036 Base + Telopea Precinct Aimsun Intersection Operations PM Peak Period

Source: Precinct TTA Addendum

Table 16: 2036 Base + Telopea Precinct SIDRA Intersection Operations

Intersection	Level of Service		Degree of Saturation		Average Delay (s)	
	AM	PM	AM	PM	AM	PM
Pennant Hill Rd & Adderton Rd	B	D	0.84	0.97	21	46
Pennant Hills Rd & Coleman Ave	D	A	0.98	0.76	50	6
Pennant Hills Rd & Evans Rd	C	A	0.95	0.79	32	10
Pennant Hills Rd & Marsden Rd	C	B	0.9	0.86	32	27
Kissing Point Rd & Sturt St	C	B	0.86	0.76	33	14
Kissing Point Rd & Adderton Rd	F	E	1.10	1.06	138	66
Kissing Point Rd & Park Rd	F	F	1.10	1.25	76	152
Kissing Point Rd & Silverwater Rd	C	F	0.97	>1.50	36	>180
Kissing Point Rd & Quarry Rd	B	B	0.85	0.75	24	20
Kissing Point Rd & Stewart St	C	F	0.95	1.32	30	170

Source: Precinct TTA Addendum

5.11 Base 2036 + Telopea Precinct Road Network Upgrades

5.11.1 Precinct Road Network Upgrades

With reference to the figures and tables above, a number of the key intersections were determined to operate at or over capacity under 2036 Base + Telopea Precinct conditions even further to the upgrades required (by others) to accommodate the 2036 Base traffic volumes alone. In response, the Precinct TTA Addendum details the additional upgrades required across the road network to appropriately accommodate the Telopea Precinct traffic volumes.

These upgrades are summarised in **Table 17**, while intersection layouts are provided in **Appendix B**. Per the comments of Roads & Maritime in regard to the Pennant Hills Road & Evans Road intersection, it is anticipated that the trigger point for all upgrades will be linked to the staged development of the Telopea CPA, and necessarily be agreed with Roads & Maritime and Council (see also Section 5.11 below).

Table 17: 2036 Base + Telopea Precinct Road Network Upgrades

Intersection	Telopea Precinct Road Network Upgrades			
	Required Upgrades	Control	Trigger	Funding
Pennant Hill Rd & Adderton Rd	<ul style="list-style-type: none"> • Increase length of the turn bay in Adderton Rd (south) from 80m to 100m 	Signals	Dwelling numbers	SIC
Kissing Point Rd & Sturt St	<ul style="list-style-type: none"> • Additional 150m right turn lane in Kissing Point Rd (east approach) • Additional 100m departure lane in Sturt St 	Signals	Dwelling numbers	TfNSW
Adderton Rd & New Link Rd	<ul style="list-style-type: none"> • New three leg signalised intersection • 1 lane approach on New Link Rd and Adderton Rd (south approach) • Separated 100m left turn lane in Adderton Rd (north approach) • 45m right turn bay in Adderton Rd (south approach) 	Signals	Dwelling numbers	Precinct
Adderton Rd & Winter St	<ul style="list-style-type: none"> • Left turns only 	Priority	Stage 1A	Precinct
Adderton Rd & Manson St	<ul style="list-style-type: none"> • New traffic signals • Additional 55m through lane in Adderton Rd northbound • Additional 40m through lane in Adderton Rd southbound • Additional 40m right turn bays on each approach 	Signals	Dwelling numbers	Precinct
Manson St & Sturt St	<ul style="list-style-type: none"> • New traffic signals • Convert to 4 leg intersection • Additional 40m right turn bays on each approach 	Signals	Dwelling numbers	Precinct
Sturt St & Evans Rd	<ul style="list-style-type: none"> • New single lane roundabout was completed in 2020/2021 Financial Year. 	Roundabout	Dwelling numbers	Council
Evans St & Shortland St	<ul style="list-style-type: none"> • New traffic signals • 45m right turn bays on western and northern approaches 	Signals	Dwelling numbers	Precinct

Source: Precinct TTA Addendum

5.11.2 Adderton Road & Manson Street Design

Further to the above, Ason Group has examined the design of the intersection of Adderton Road & Manson Street, with a specific focus on the Precinct TTA Addendum recommended design to determine whether any modifications could be made to the GTA upgrade, whilst maintaining satisfactory performance.

The SIDRA models prepared for the Precinct TTA Addendum (i.e., subsequent to the Precinct Aimsun modelling) have been provided to Ason Group by GTA and include the forecast traffic volumes at the intersection further to background traffic growth and the development of the Telopea Precinct. Ason Group has used these flows to undertake SIDRA analysis of the intersection based on the design shown in **Figure 17**.

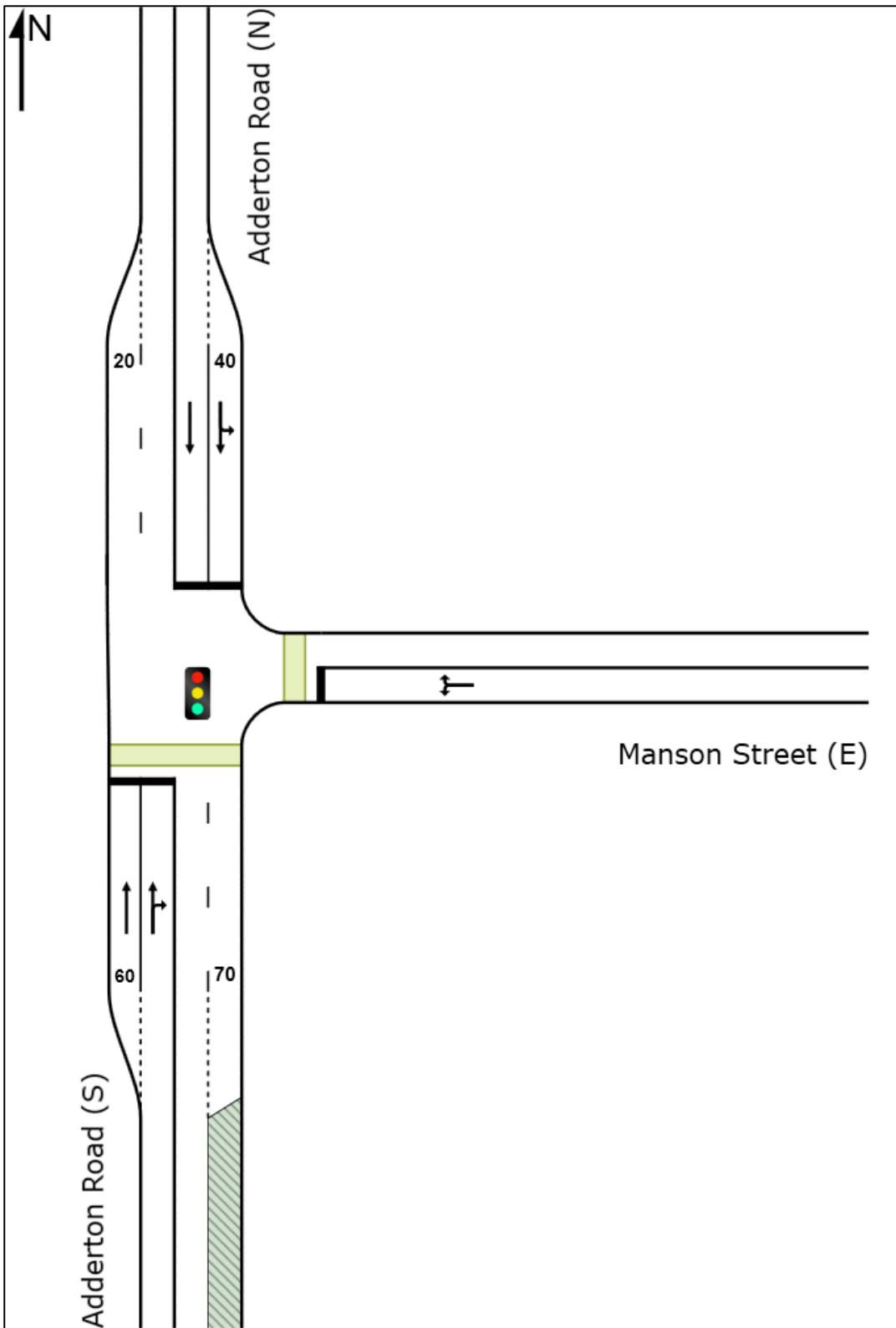


Figure 17: Adderton Road & Manson Street Revised Design

The SIDRA analysis indicates the intersection would operate within acceptable parameters in both the AM and PM peak periods, with moderate delays. It should be noted that queue lengths extend towards the intersection of Kissing Point Road and Adderton Road during the PM peak. The SIDRA output summaries for this analysis are provided in **Appendix C**.

5.11.3 Adderton Road & New Link Road Modelling

As part of the SEARs, Ason Group has undertaken an updated analysis of the proposed Adderton Road / New Link Road intersection. This intersection involves a signalised light rail level crossing along New Link Road to form an intersection with Adderton Road to the west. The New Link Road connects Adderton Road to the west and Sturt Street to the east across the light rail track.

The following SIDRA layout has been modelled with advice from SIDRA Support and the latest J. Wyndham Prince civil plans (Plan Number: 110500-04-DA1001) for the light rail crossing. This is an updated and more accurate representation of the future operation of the intersection than modelled in the Precinct TTA report:

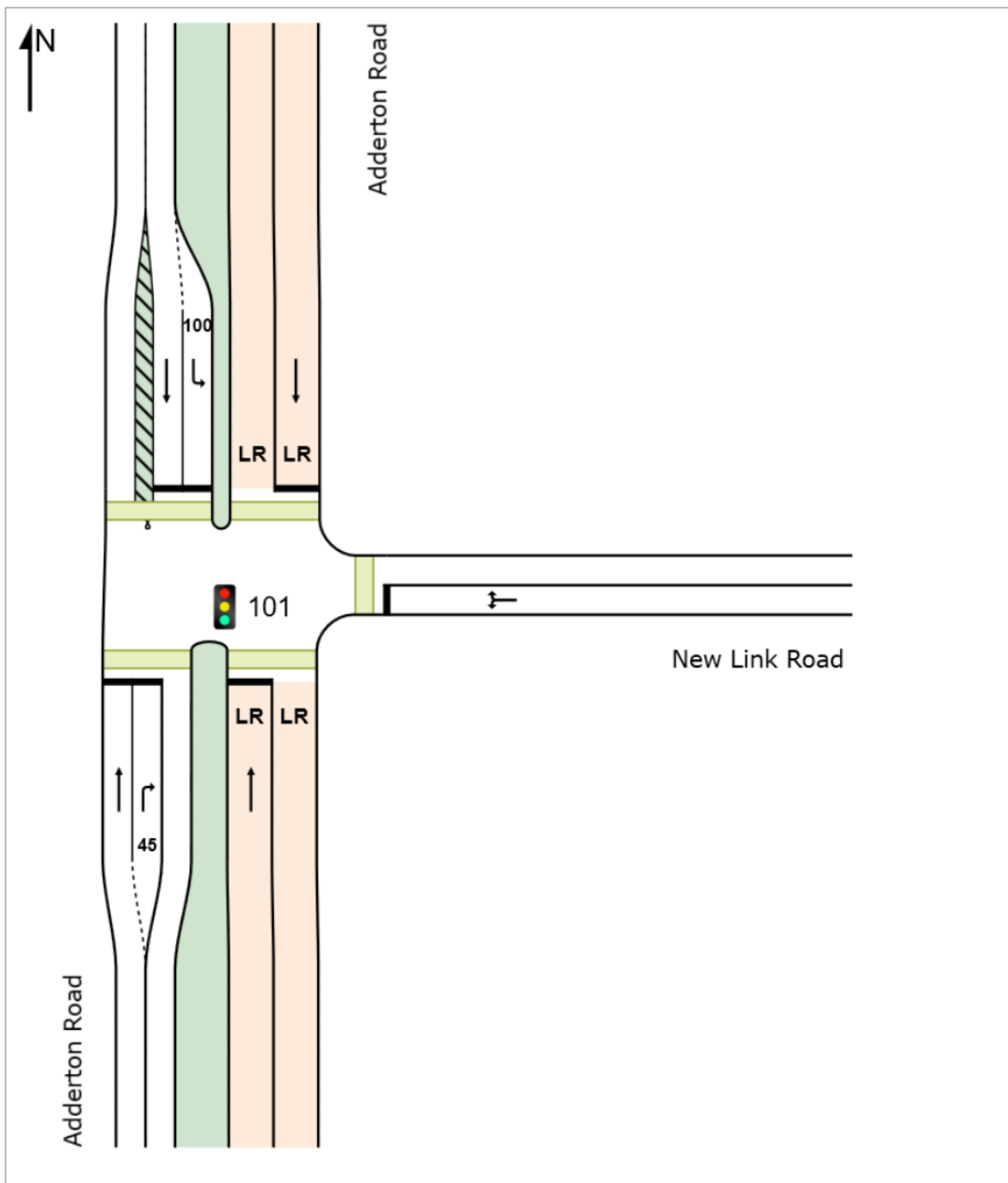


Figure 18: SIDRA Layout of Adderton Road / New Link Road / LRT Level Crossing

Analysis of the trip generation out of the New Link Road indicates that around 6% of the total traffic generation would enter and exit via the New Link Road. Ason Group has therefore undertaken three scenario testing to understand the impacts of the traffic generation:

- Original GTA Precinct TTA Trip Distribution (referred as 'GTA Based')
- Revised Telopea CPA Yields with Precinct TTA Addendum Rates ('Reduced Trip Rates' or RTR)
- Revised Telopea CPA Yields with Revised Residential Rates ('Conservative Trip Rates' or CTR)

The trip distribution of the future traffic generation can be found in the SIDRA Movement Analysis in **Appendix C** which has been distributed in accordance with GTA's SIDRA results. In summary, the in and out splits of the New Link Road is 52% and 48% respectively for the AM Peak. This trip distribution is reversed during the PM Peak.

Ason Group organised a meeting with TfNSW on 13 July 2021 to establish an understanding and agreement of the assumptions in relation to signal phasing inputs of this intersection in SIDRA model. A number of signal input assumptions were confirmed by TfNSW in that meeting. In addition, on 29 July 2021, TfNSW provided details signal phasing information (TCS plan) of the T-intersection of Sunnyholt Road / James Cook Drive at Blacktown, which is currently operating with an adjacent intersection for a T-way. Ason Group has reviewed the supplied TCS plan and taken into consideration all suggestions from TfNSW to develop the SIDRA model for Adderton Road / New Link Road. In addition, Ason Group has consulted SIDRA Support and reviewed relevant Parramatta Light Rail website documents.

The following key modelling parameters have been adopted, in accordance with TfNSW advice:

- Signal Cycle Time: 120 seconds.
- Filter not allowed for Right turn into New Link Road.
- Inter-green time of 7 seconds has been adopted instead of the typical 6 seconds.
- Light Rail operation frequency: Eight (8) services in each direction during the peak hours.
- Light Rail Transit has a speed of 20km/hr with a length of 45m and 7.0 PCU.
- A minimum green time of 18s to 22s has been adopted for the Light Rail Transit (LRT) phase. This LRT phase would operate as a variable phase (demand dependent).
- Signalised Pedestrian Crossing:
 - Signalised Pedestrian Crossing provided on each leg of the intersection.
 - Separate signalised pedestrian crossing on Light Rail Corridor (either side of New Link Road).
 - Pedestrian demand: 200 pedestrian per hour on each crossing; peak flow factor: 95%.
 - Walking speed 1.2 m/s
 - Minimum walk time (red arrow for opposing vehicles): 8 seconds on Adderton Road and New Link Road.

- Minimum clearance time: 16 seconds on Adderton Road and 8 seconds on New Link Road.
- Increased negotiation distance for vehicles exiting New Link Road as the stop line is set back behind the LRT tracks

The following signal phasing inputs have been adopted in the SIDRA assessment:

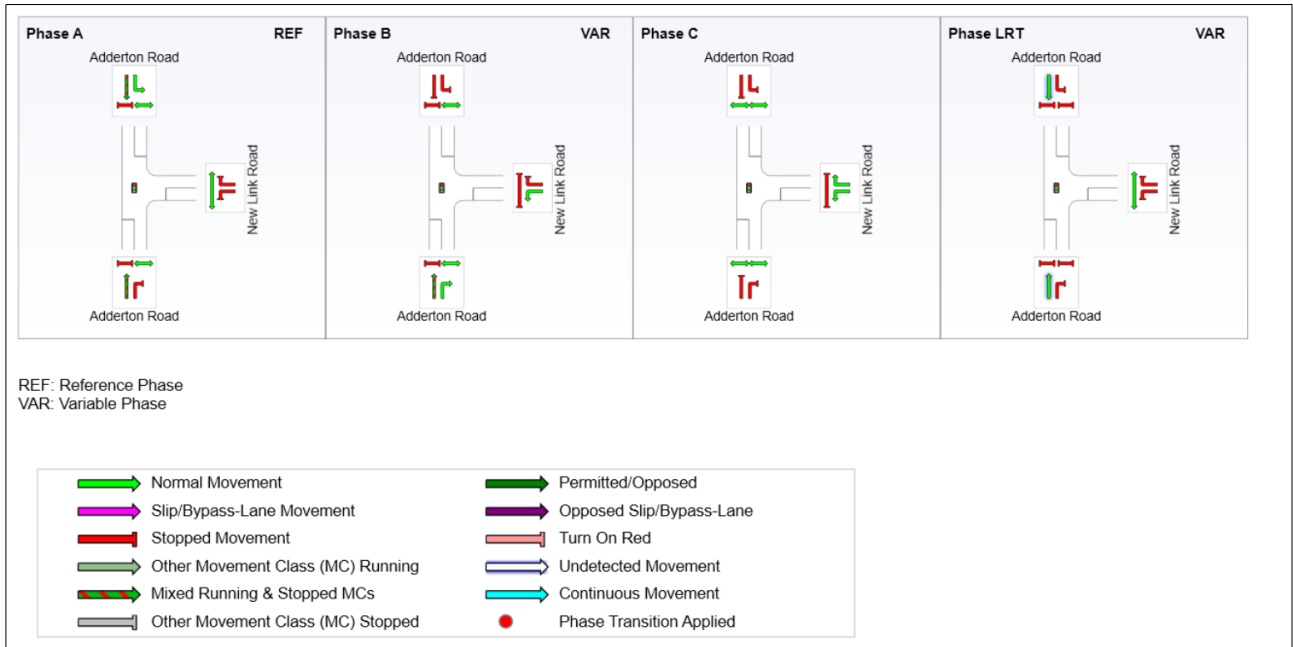


Figure 20: Adderton Road & New Link Road Modelled Signal Phasings

It is important to note that-

- Of the two signalised pedestrian crossings on each leg of Adderton Road, the ones on the eastern side represents crossing across the Light Rail Corridor.
- Phases A, B and C would only allow road vehicle and / or pedestrian movements only, i.e. Light Rail movements would NOT be allowed across this intersection during these phases.
- Phase transitions have also been applied to left turning movement from New Link Road at the end of Phase B to ensure pedestrian safety at the cost of reducing green time for road vehicles.
- Light Rail movements are only allowed in phase LRT, when there is a demand. The vehicular through movement along Adderton Road – albeit being permitted during this phase – would remain undetected so as to prevent running the LRT phase any longer than required.

The following table details the SIDRA modelling result for the three tested trip generation scenarios:

Table 18: Adderton Road / New Link Road SIDRA Summary

Scenario	AVD (s)	DOS	New Link Road Queue Length (m)	LOS
Future AM - GTA Precinct TTA	18.3	0.771	25.3	B
Future PM - GTA Precinct TTA	53.5	1.108	15.5	D
Future AM - Revised Scheme - Precinct TTA Addendum Trip Rates	16.9	0.765	15.6	B
Future PM - Revised Scheme - Precinct TTA Addendum Trip Rates	42.9	1.056	10.7	D
Future AM - Revised Scheme - Revised Trip Rates	18.3	0.771	25.3	B
Future PM - Revised Scheme - Revised Trip Rates	53.4	1.108	16.1	D

Under all scenarios, the intersection would operate with acceptable delays (LOS D or better) with moderate queue lengths that contain within the available queue storage space of the New Link Road (60m). For context, the Precinct TTA Addendum results forecast a LOS B at this intersection.

5.12 Future Road Network Operations Summary

5.12.1 Precinct TTA Addendum Summary

With reference to the future intersection operations detailed in Table 16, the Precinct TTA Addendum provides the following comment:

From the SIDRA intersection modelling results, it can be observed that:

The existing layout / controls of the key internal intersections would typically not have sufficient capacity to accommodate Telopea Stage 1¹ development traffic, with unsatisfactory (LOS F) observed at all four intersections during the AM peak hour.

¹ The Telopea Stage 1 Precinct is consistent with the Telopea Precinct presented in Figure 2

These key internal intersections would operate satisfactorily during both AM and PM peak hours with the proposed upgrades, except for the Sturt Street/ Evans Road intersection where local area traffic management is required along Evans Road to reduce the effect of through traffic.

The external intersections assessed would operate satisfactorily (LOS D or better), with the exception of:

- Kissing Point Road / Adderton Road (AM & PM peaks)
- Kissing Point Road / Park Road (AM & PM peaks)
- Kissing Point Road / Silverwater Road (PM peak)
- Kissing Point Road / Stewart Street (PM peak)

The above external intersections do not have sufficient capacity to accommodate the forecast background traffic growth. There is limited opportunity to improve these intersections beyond the upgrades already identified and any additional traffic (including Stage 1 development traffic) will only lead to increased delays at this intersection.

Based on the above, the overall impact of the Stage 1 development traffic is limited and can be appropriately managed.

With reference to the sections above, the Precinct TTA Addendum essentially concludes that further to the suite of road network upgrades, including those require to accommodate Base 2036 traffic volumes alone, and additional upgrades to accommodate the Telopea Precinct traffic volumes, the Telopea Precinct is supported.

5.12.2 Road Network Upgrade Schedule

The Precinct TTA Addendum details a suite of upgrades across the external (to the Telopea Precinct) road network required to accommodate background traffic growth; as discussed previously, these upgrades would be the responsibility of TfNSW.

With regard to the road network upgrades required to accommodate the Telopea Precinct traffic volumes, the Precinct TTA Addendum reports that all of the upgrades detailed in Table 17 above would be required by 2023 other than those at the Pennant Hills Road & Adderton Road, and Kissing Point Road & Sturt Street intersections.

It is noted that the Stage 1A proposal itself provides for a number of these Telopea Precinct road network upgrades from the outset and that moreover there is no information to suggest that the full upgrade works as recommended in the Precinct TTA Addendum could not also be provided by 2023 as part of other Telopea Precinct site developments.

A timeframe for the key upgrades in the external road network will require further consultation with TfNSW as part of future Development Applications for sites within the Telopea Precinct.

5.13 Concept Plan Traffic Assessment Summary

With reference to sections above, Ason Group has determined that:

- The trip generation of the Telopea CPA further to the Concept Plan is expected to be significantly less than assigned in the Precinct TTA Addendum.
- There is no information to suggest that the trip distribution of the Telopea CPA would be different to that determined in the Precinct TTA Addendum.
- There is no proposed reduction to the suite of road network upgrades recommended in the Precinct TTA Addendum and subsequent GTA modelling undertaken for TfNSW and Roads & Maritime.
- The proposed revisions to the design of the intersection of Adderton Road & Manson Street have no impact on the operation of the intersection as reported in the Precinct TTA Addendum.
- The updated modelling of Adderton Road & New Link Road has comparable intersection performance as reported in the Precinct TTA Addendum.
- The proposed restrictions to right turn movements to and from Winter Street at Adderton Road would have no impact on the general distribution of trips as assigned in the Precinct TTA Addendum.

As a result, the development of the Telopea CPA in line with the Concept Plan would at worst result in the same (inherently approved) road network operations; however, with specific consideration of residential vehicle trip rates, it is expected that the trip generation of the Telopea CPA would actually be some 30% lower than assigned in the Precinct TTA Addendum. This suggests that the road network and key intersections will operate with significantly less delay than determined in the Precinct TTA Addendum further to the proposal upgrades.

In summary therefore, Ason Group has determined that the Concept Plan development proposal for the Telopea CPA is entirely supportable further to traffic considerations.

6 Stage 1A

6.1 Overview

Stage 1A represents the first development within the Telopea CPA, and will provide the following:

- 443 market dwellings, including:
 - 3 studio apartments,
 - 156 one-bedroom apartments,
 - 242 two-bedroom apartments, and
 - 42 three-bedroom apartments.
- Access driveway to Mews Street and Winter Street.
- 416 on-site car parking spaces, comprising:
 - 372 residential car parking spaces; and
 - 44 residential visitor car parking spaces
- 2 on-street car share spaces.
- 83 motorcycle parking spaces.
- 473 bicycle parking spaces, comprising:
 - 443 residential bicycle parking spaces; and
 - 30 residential visitor bicycle parking spaces.
- On-site servicing facilities.

In addition, Stage 1A will see the construction of key pieces of public infrastructure, including:

- The upgrade of Sturt Street between Evans Road and a new road connection across the rail line to Marshall Road.
- The signalisation of the intersection of Adderton Road & Sturt Street.
- The upgrade of Sturt Street adjacent to Station Plaza.
- Station Plaza and associated community infrastructure.
- Mews Street, a new private road connecting to Sturt Street providing fully directional access at its eastern connection and a left-out only at its western connection.

Detailed plans of Stage 1A are provided elsewhere in the SSDA submission.

6.2 Stage 1A Public Infrastructure

6.2.1 Overview

As discussed, Stage 1A provides for the construction of some of the essential public infrastructure required to accommodate the trip generation of Stage 1A and the broader Telopea CPA. These works are shown in **Figure 21** and discussed further below, noting that detailed engineering and urban design plans of all works are provided elsewhere in the SSDA that this TAIA accompanies.

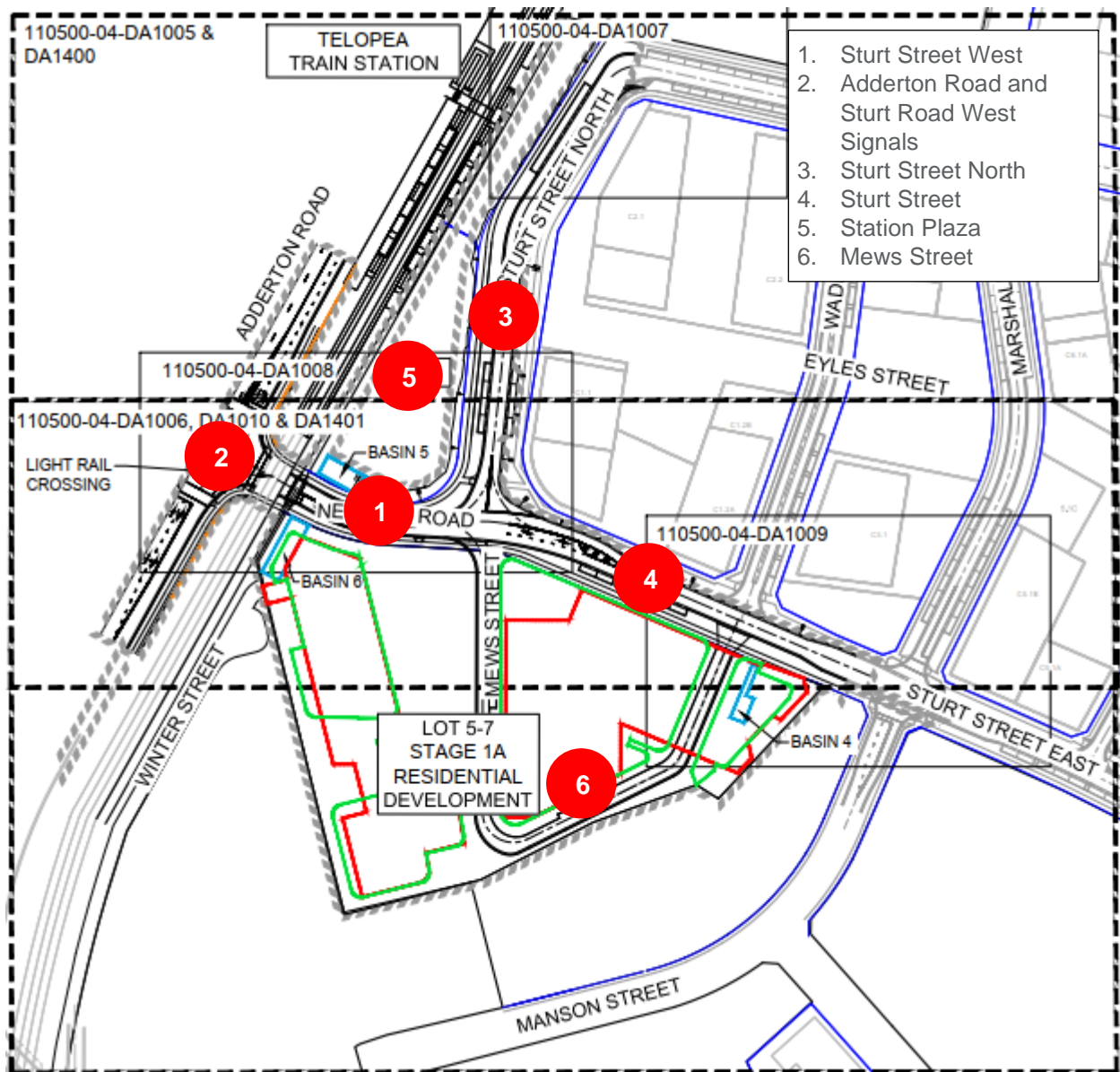


Figure 21: Stage 1A Key Infrastructure Works

6.2.2 Sturt Street West

With reference to **Figure 21**, a new extension of Sturt Street (termed Sturt Street West for ease of reference) will be constructed across the rail line between Adderton Road and Sturt Street to the immediate north-west of the Stage 1A Site in accordance with the recommendations of the Precinct TTA Addendum.

This will provide an important and immediate connection between the Telopea Core and Adderton Road, which in turn provides key access to the north (Pennant Hills Road) and south (Kissing Point Road).

The proposed cross-sections are provided below in **Figure 22**.

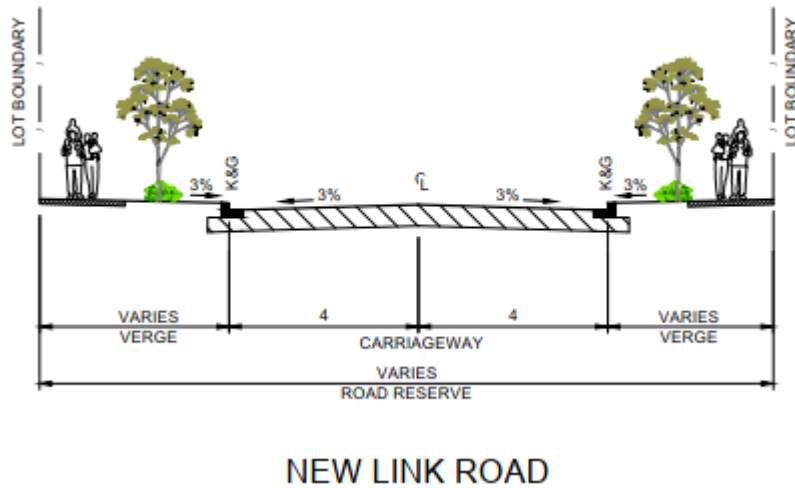


Figure 22: Sturt Street West Design Profile

6.2.3 Adderton Road & Sturt Road Intersection

Further to the above, the intersection of Adderton Road & Sturt Street West will be upgraded to provide a signalised intersection. The design of the intersection is shown in **Figure 23**, noting that the design is in accordance with the Precinct TTA Addendum recommendation.

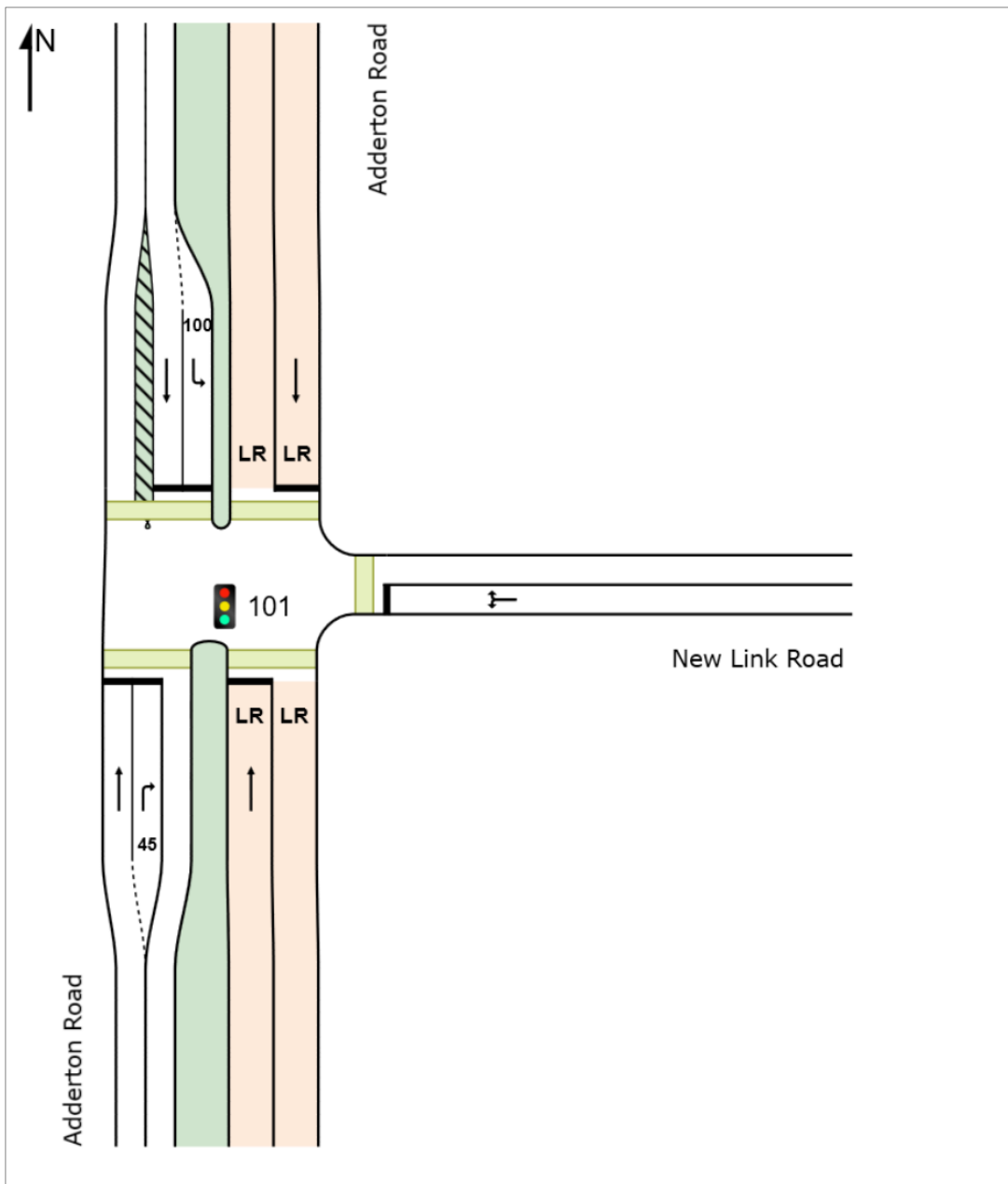
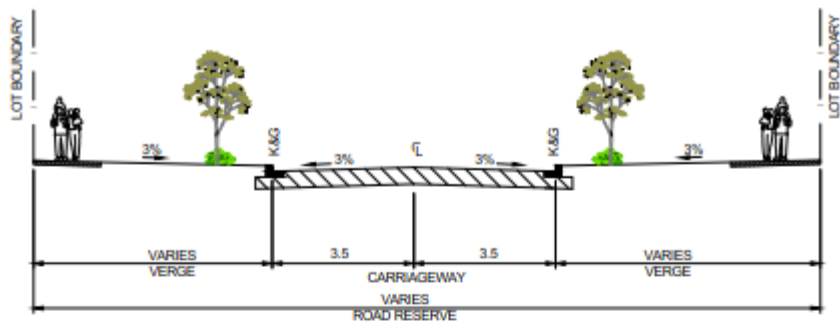


Figure 23: Adderton Road & Sturt Street West Upgrade

6.2.4 Sturt Street North

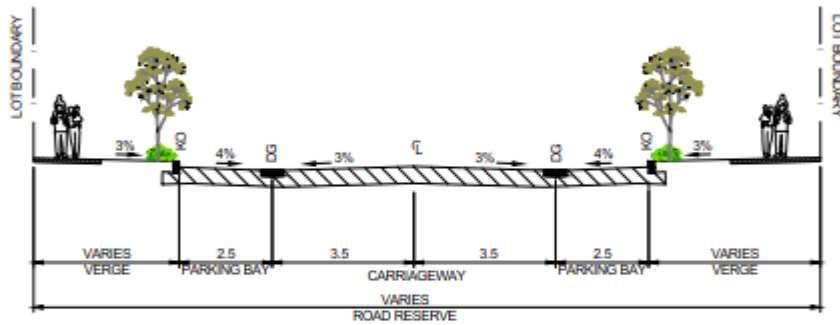
With reference to **Figure 21**, Sturt Street adjacent to Station Plaza (termed Sturt Street North for ease of reference) will be upgraded through to Shortland Street as part of Stage 1A. The upgrade includes new shared paths on both sides of the road, on-street drop-off, car share and bus bays and a central pedestrian crossing linking the Telopea Core's green corridor with Station Plaza and Telopea Station. The Stage 1A works will extend to a point just to the south of Shortland Street, the upgrade of which will be undertaken at a future time and necessarily be the subject of a separate application.

Figure 24 shows the concept design and profile for Sturt Street North, while the broader connectivity across the Telopea Core is shown in **Figure 25**.



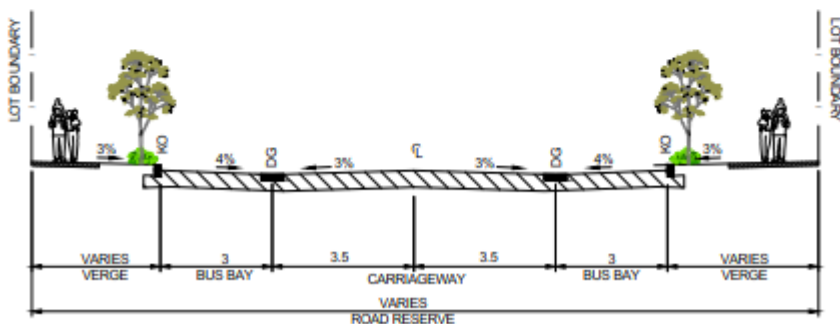
STURT STREET NORTH

1:100



STURT STREET NORTH - PARKING BAYS

1:100



STURT STREET NORTH - BUS BAYS

1:100

Figure 24: Sturt Street North Design Profile

Source: Bates Smart

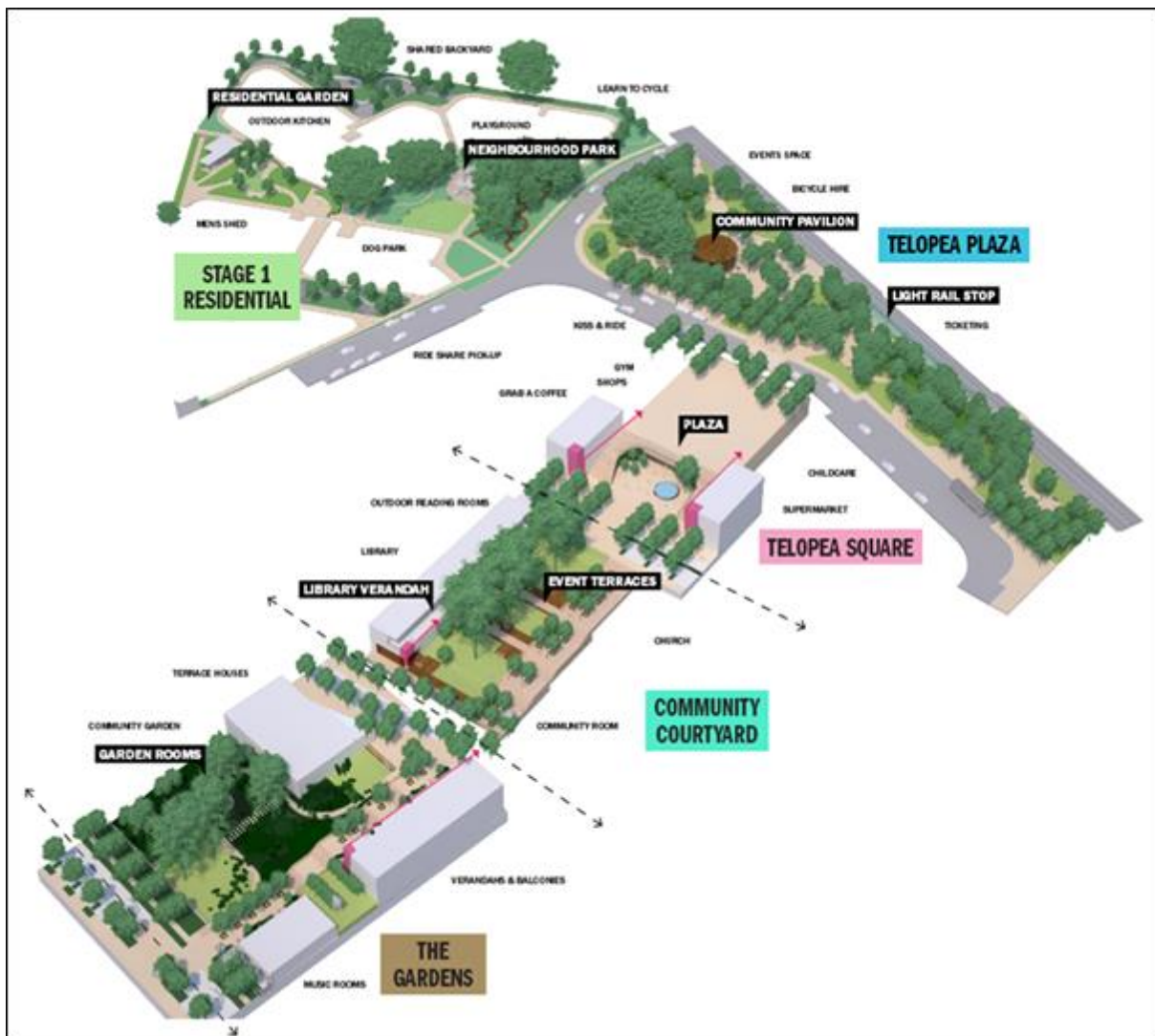


Figure 25: Telopea Core Connectivity

Source: Bates Smart

6.2.5 Sturt Street

Sturt Street between Sturt Street North and Manson Street will also be upgraded as part of Stage 1A and will provide the same profile as Sturt Street North. The Stage 1A works will extend to a point just to the west of the intersection of Sturt Street & Manson Street with New Marshall Road. The upgrade of this intersection (and Sturt Street east of Manson Street) will be undertaken at a future time and necessarily be the subject of a separate application.

The proposed Sturt Street East cross-section is shown in **Figure 26**.

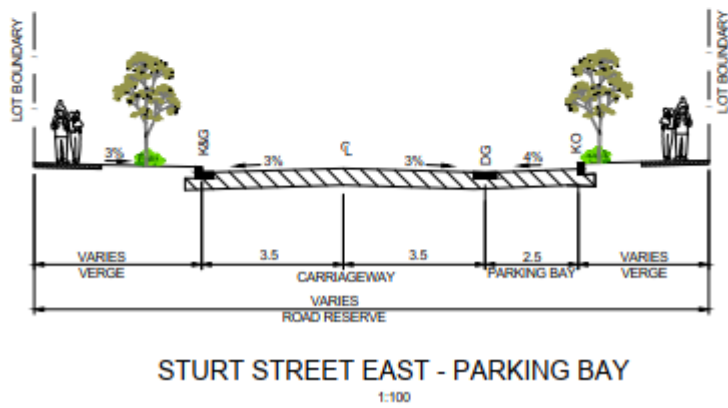
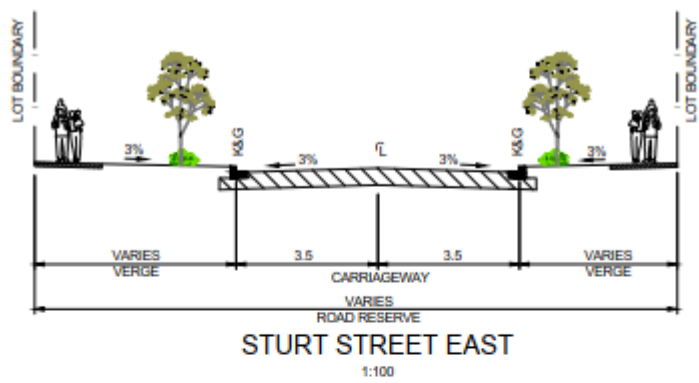


Figure 26: Sturt Street East Design Profile

6.2.6 Station Plaza

Stage 1A also provides for the development of Station Plaza, one of the most important elements of the Telopea Core, and indeed the broader Telopea CPA. Station Plaza will provide the following:

- A central transport interchange, with light rail, bus stops, taxi, kiss & ride, ride share and personal mobility rental stations (e-bikes, segways and scooters);
- A transport customer service kiosk;
- A community pavilion and flexible open space for events (social enterprise markets, community festivals); and
- Multiple open spaces with seating, games (chess, table tennis) between new and existing trees and planting.

The Station Plaza Concept Plan is shown in **Figure 27**.

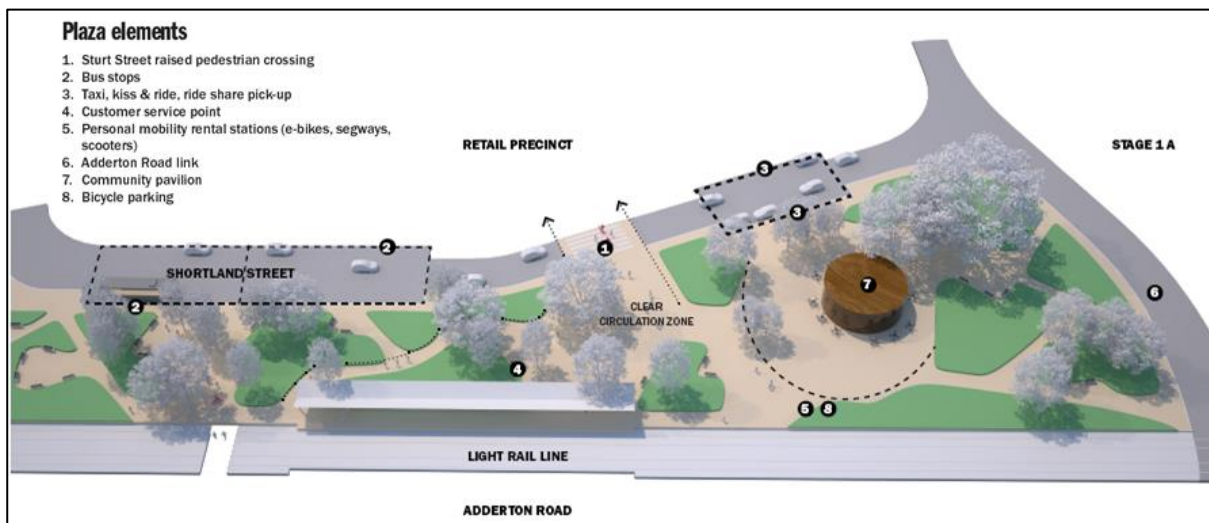


Figure 27: Station Plaza Concept Plan

Source: Bates Smart

6.2.7 Mews Street

Stage 1A includes a new private road. Mews Street, connecting the site access to Sturt Street. Mews Street proposes two cross-sections, a two-way carriageway for the eastern portion and a one-way northbound carriageway for the western portion, as shown below in Figure 28. The design of Mews Street has been completed by the projects Civil Team, refer to these drawings and report for further details.

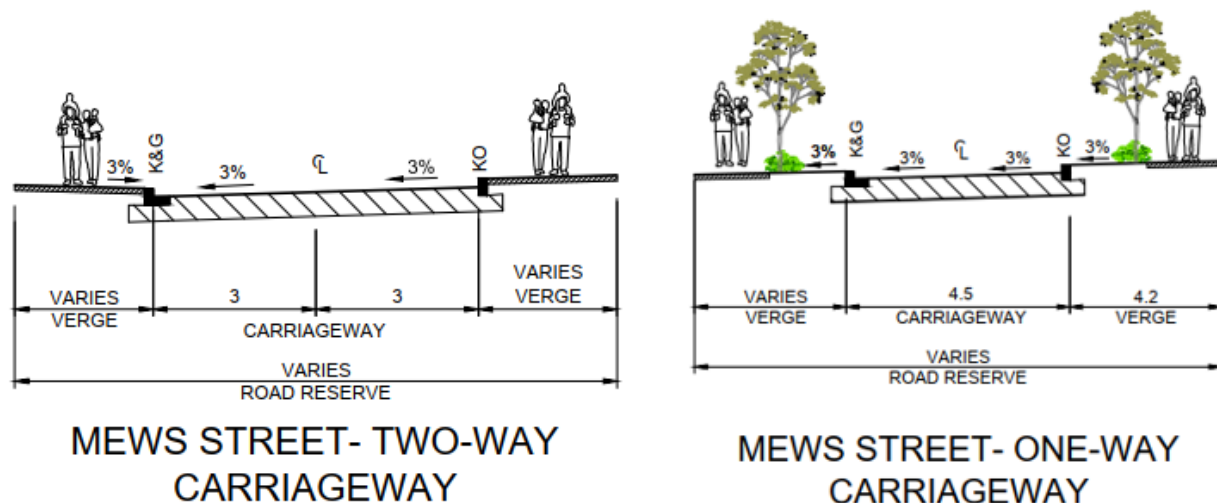


Figure 28: Mews Street Cross-section

6.2.8 Adderton Road & Winter Street

As requested by Council – and as is appropriate given the provision of access via Winter Street to Adderton Road – the Concept Plan (and the Stage 1A proposal) requires that movements at the intersection of Adderton Road & Winter Street to be restricted to left in/left out only. It is noted that internal residential access is available through the Stage 1A site, and that as such these restricted movements are still provided for efficiently via the Stage 1A access point via Mews Street, Sturt Street and then the broader internal network.

6.3 Site Access

6.3.1 Vehicle Access

Vehicle access to the Stage 1A Site will be available from 2 locations, Mews Street and Winter Street. Mews Street has been designed to enable two-way movements along the eastern portion to/from the site entrance and one-way northbound movements along the western portion with vehicles only permitted to exit to the left at Sturt Street.

Movements at the internal intersection of Mews Street and the basement driveway will be prioritised to the basement driveway. Convex mirrors and appropriate signage will also be installed to further enhance safety.

Given the connectivity between the basement parking areas, the distribution of trips to each driveway would be largely based on trip distribution to/from the local and sub-regional road network. Further, the location of the private road in relation to the future signalised intersection of Sturt Street & Manson Road suggests the potential for movements at the eastern intersection of Sturt Street and Mews Street to be fully directional and left out only at the western intersection.

A determination in this regard would be further examined as part of the future design of the Sturt Street & Manson Road intersection, but equally would be unlikely to result in any significant changes in trip distribution to those previously determined in the Precinct TTA Addendum.

6.3.2 Pedestrian Access

Pedestrian access to the Stage 1A Site would be available directly from Sturt Street, as well as via entry points from the Neighbourhood Park and Residential Garden to the west of the Stage 1A Site and via the private access road.

6.4 Parking

6.4.1 Parking Rates

As discussed previously, a Draft Telopea DCP is currently under review by Council; notwithstanding, the minimum parking rates proposed in the Draft Telopea DCP have been adopted for the assessment of the Stage 1A parking requirements and are summarised in **Table 19**.

Table 19: Draft Telopea DCP Parking Rates

Land Use	Minimum Parking Rates	
Residential flat buildings, shop top housing or mixed-use development with a residential accommodation component	Studio	0.6 spaces
	1	0.6 spaces
	2	0.9 spaces
	3+	1.4 spaces
	Visitor	1 per 10 dwellings, including any on-street parking
	Bicycle	1 storage space per dwelling 1 storage space per 15 dwellings for visitors
Car share spaces	A minimum of 1 space for developments with 50 or more dwellings, to be located on-street where practicable	

With reference to **Table 19**, **Table 20** provides a summary of the resulting car parking requirements for Stage 1A.

Table 20: Stage 1A Draft Telopea DCP Car Parking Requirements

Stage 1A	Studio	1 Bed	2 bed	3 Bed	Visitor	Total
Dwellings	3	156	242	42	443	
Parking Rate	0.6	0.6	0.9	1.4	0.10	
Total	2	94	218	59	44	417

6.4.2 Car Parking Provision

Stage 1A will provide a total of 416 on-site car parking spaces, including 372 residential car parking spaces and 44 visitor car parking spaces.

6.4.3 On-Street Visitor Parking

The Draft Telopea DCP allows for the provision of residential visitor car parking on-street. Given the significant amount of new on-street parking that will be delivered as part of the Concept Plan, and particularly parking within the Telopea Core, this is in our opinion entirely appropriate.

Notwithstanding, the quantum of on-street parking within the Telopea Core needs to provide not only for Site 1A but other future sites. As such, Ason Group has assessed the potential on-street residential visitor parking demand that might be generated in the Telopea Core were all residential sites to provide the same proportion (approximately 50%) of on-site visitor parking as proposed in Stage 1A.

The results of this analysis are provided in **Table 21**, and are based on the Concept Plan yields within the Telopea Core.

Table 21: On-Street Residential Visitor Parking Demand in Telopea Core

Building	Total Dwellings	Visitor Parking	On-Site Provision	Off-Site Required
C1	330	33	17	16
C2	444	44	23	22
C3	130	13	7	6
C5	121	12	6	6
C6	142	14	7	7
C7	130	13	7	6
C8	146	15	7	7
C9	473	47	23	23
Total	1,916	192	97	94

With reference to **Table 21**, the on-street residential visitor parking demand further to all development in the Telopea Core is expected to be approximately 96 parking spaces.

Based on the Concept Plan, the Telopea Core would provide approximately 130 on-street parking spaces, not including car share spaces. In addition, the mixed-use components of the Telopea Core would provide on-site parking in accordance with the Draft Telopea DCP, and indeed to the satisfaction of future tenants so as to make retail floorspace in particular, financially viable.

As such, the analysis indicates that there would be more than enough on-street parking provided to meet the residential visitor parking demand per the Draft Telopea DCP, and indeed extra capacity to meet visitor parking demands generated by adaptable and social housing (for which a visitor parking rate does not apply).

With specific reference to Stage 1A, the upgrade of Sturt Street adjacent to the Site would provide 29 on-street parking spaces, 2 of which would be designated as car share spaces (see Section 6.5). As such, the on-street visitor parking spaces required to provide full compliance with the Draft Telopea DCP could be provided as part of Stage 1A.

Finally, it is anticipated that individual development sites would adhere to this general proportion of on and off-street residential visitor parking into the future; if one site, for example, seeks to provide all visitor spaces off-site, it would reduce the available on-street capacity and potentially require other sites to provide more visitor parking on-site to make up the shortfall. Based on our discussions with Frasers, this is not expected to be the case, but it would be important for future transport assessments for individual sites to provide similar analysis to that above to ensure on-street visitor parking is available proportionally for the Telopea Core sites.

6.5 Additional Parking Requirements

With reference to the Draft Telopea DCP and the Parramatta DCP, **Table 22** provides a summary of the additional Stage 1A parking requirements for bicycle spaces, accessible/adaptable spaces, motorcycle spaces and car share spaces. It is anticipated that the Parramatta DCP rates that are not included in the Draft Telopea DCP at this time would be upon its finalisation.

Table 22: Additional Stage 1A Parking Requirements

Stage 1A	Resident Bicycle	Visitor Bicycle	Adaptable Accessible	Motorcycle	Car Share
Dwellings	443	30	443		
Parking Spaces				416	416
Parking Rate	1	0.07	5% of dwellings	1/25 car spaces	1/Site with + 50 car spaces
Total	443	30	22	17	1

With reference to **Table 22**, Stage 1A is required to provide a minimum of:

- 473 bicycle spaces, including 443 resident spaces and 30 visitor spaces.
- 22 accessible/adaptable parking spaces, including 2 accessible visitor spaces.
- 17 motorcycle spaces.
- 2 car share spaces adjacent to the Site in Sturt Street (see further below).

As noted above, Stage 1A would provide 2 car share spaces immediately adjacent to the Stage 1A Site in Sturt Street, which is the most accessible location for such spaces, and a further 16 car share spaces (for a total of 18 car share spaces) would be provided across the Telopea Core to ensure ease of access to car share for all future residents. In addition, the proposal seeks to provide 83 motorcycle parking spaces, well in excess of the minimum requirements.

A design review of on-site parking areas is provided in Section 7.

6.6 Servicing

Stage 1A provides 2 service areas. The private road service area (accessed via Sturt Street) would be the primary servicing area, and further to the utilisation of a turntable provides access to service bays capable of accommodating vehicles up to and including a Heavy Rigid Vehicle (HRV) as required in the Parramatta DCP Waste Management Plan for residential developments over 5 storeys. Waste management would be solely undertaken via the Mews Street service area.

Winter Street would provide access to a smaller service area catering for vehicles up to and including a Small Rigid Vehicle (SRV); this service area is provided to reduce the distance between residential dwellings across the western part of Stage 1A and to accommodate general requirements such as removalists and smaller delivery vehicles.

A design review of the on-site service areas is provided in Section 7.

6.7 Trip Generation & Distribution

6.7.1 Trip Generation

With reference to the trip rates adopted in the Precinct TTA Addendum, Stage 1A would generate approximately 143 trips per hour in both the AM and PM peak periods. However, given consideration of the location of Stage 1A with proximity to Telopea Station and the broader Telopea Core; the review of trip rates provided in Section 5.5 and the reduced parking rates adopted in the Draft Telopea DCP, it is anticipated that the Stage 1A Site would generate approximately 111 trips in the peak periods.

6.7.2 Trip Distribution

Given the 2 access driveways, vehicle trips would be split between Mews Street/ Sturt Street and Winter Street largely based on broader local and sub-regional origins and destinations. With reference to the distribution profile outlined in Section 5.3 and Section 7.22 of the Precinct TTA Addendum, as well as the proposed local road network upgrades (including restricting movements at the intersection of Adderton Road & Winter Street to left in/left out only), it is estimated that:

- 85% - 90% of trips would use the Mews Street/ Sturt Street driveway.
- 10% - 15% of trips would use the Winter Street driveway.

The distribution of Stage 1A Site trips to the key interface intersections and then the sub-regional network is anticipated to be essentially identical to the trip distribution determined in the Precinct TTA Addendum.

6.8 Traffic Impacts

The road upgrades detailed in Section 6.2 above would be completed prior to the anticipated completion of Stage 1A in 2026/2027, as will the other key road network upgrades as detailed in **Table 17** and of course the Parramatta Light Rail will have commenced services.

It is noted that the Precinct TTA Addendum recommends that these Precinct required upgrades be completed by 2023; however, there is obviously no need for these upgrades prior to the Precinct development, and indeed prior to any site occupancy (i.e., not until 2026/2027).

With reference again to the advice provided by Roads & Maritime in regard to the Pennant Hills Road & Evans Road upgrade (Section 3.6) it is anticipated that upgrades would be staged based on dwelling occupancies within the Telopea CPA, details of which would be determined in consultation with TfNSW, Roads & Maritime and Council.

As stated, once developed, and occupied, Stage 1A is anticipated to generate up to 143 peak hour trips in accordance with the Precinct TTA Addendum trip rates, though this is anticipated to be a very conservative estimate. Notwithstanding, the Telopea CPA would at this time be generating only approximately 10% of its total future trip generation, which of course tallies with the fact that Stage 1A represents approximately 10% of the future total dwelling estimate for the Telopea CPA (4,700 dwellings).

Once occupied, the trips generated by Stage 1A would utilise a road network which has been upgraded to provide for some 10 times the trips generated by Stage 1A; as such, **it can only be concluded that the trip generation of Stage 1A would be easily accommodated by the road network, and that as such the Stage 1A proposal is entirely supportable further to traffic considerations.**

6.9 Green Transport Initiatives

Forming part of the Stage 1A proposal, active transport infrastructure in the form of footpaths, bicycle parking, motorcycle parking and car share parking all form part of the infrastructure initiatives forming part of the proposal.

In addition, the following initiatives could be considered and form part of a Green Travel Plan prior to Occupation Certificate, including:

- Consider provision of transport services information via screens located at the building lobby or lift to inform future residents of the next available service;
- Provide details and maps of walking, cycling and public transport connections to encourage active travel modes as part of a welcome pack for new residents;
- Consider if additional bicycle and walking infrastructure requirements during the detailed design phase;
- In the planning of future car share services, consider incentives such as a discounted joining fee for residents to sign up to the car share services;

- Encourage the establishment of cycling group via the Owners Corporation communications for residents of the development to develop interest in cycling;
- Provision of communal bicycle maintenance equipment within communal areas.

It is considered that much of the infrastructure initiatives can be considered during the detailed design phase of the project to assist in achieving the objectives of reducing the reliance on private vehicle modes of transport.

7.1 Design Standards

- AS2890.1:2004 for car parking areas.
- AS2890.2:2018 for commercial vehicle loading areas.
- AS2890.3:2015 for bicycle parking areas;
- AS2890.6:2009 for accessible (disabled) parking.

The external road network including the design of Mews Street has been prepared by others and as such is not included in the below assessment.

7.2.1 Site Access

▪ Car Park Access	Mews Street - 7.06m combined width at the building line
	Winter Street - 6.60m combined width at the building line
▪ Loading Access	Mews Street – 8.36m width at the building line

- Mews Street (85% of the total - 352 car spaces) Category 3 Access Driveway (6-8m entry width and 6-8m exit width) for developments fronting local roads and providing between User Class 1/1A parking spaces)
- Winter Street (15% of the total - 62 car spaces) Category 1 Access Driveway (3.0-5.5m combined entry/exit) for developments fronting local roads and providing between User Class 1/1A parking spaces.

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- The design of both accessways has been assessed with swept path analysis (B99 design vehicle and SRV for Winter Street) and accommodates the spatial requirements for ingress and egress.
- Queuing theory analysis has been undertaken to account for the peak period arrivals (PM) to ensure the 98th percentile queue is accommodated within the property boundary.
 - With 66 arrivals during the PM peak at the Mews Street access (85% of 70% of 111 veh/hr), the analysis estimates the 98th percentile queue is 1 vehicles or 6.0 metres. The proposed roller shutter door and access control point is proposed to be located approximately 10.5 metres within the property boundary and this queue is therefore satisfied complying with AS2890.1:2004.
 - With 12 arrivals during the PM peak at the Winter Street access (15% of 70% of 111 veh/hr), the analysis estimates the 98th percentile queue is 0 vehicles. The proposed roller shutter door and access control point is proposed to be located approximately 9.0 metres within the property boundary and this queue is therefore satisfied complying with AS2890.1:2004. complying with AS2890.1:2004.

The use of a license plate recognition system assists with improving the capacity at the site access for regular uses, on the basis that on entry, the majority of vehicles can enter contact free, which reduces the dwell time on entry.

In summary, a merit assessment has been undertaken for the proposed car park access. It has been concluded that the driveways satisfy the operational requirements and characteristics for the proposed development and complies with the principles of AS2890.1:2004 (these being the key safety and spatial requirements).

The Mews Street loading dock has been designed to accommodate vehicles up to 12.5m in length, with the Winter Street access have been designed to accommodate vehicles up to 6.5m in length. Swept path analysis attached at **Appendix D** confirms the loading area design and vehicle crossings can accommodate the nominated vehicle sizes.

7.2.2 Ramps

- The internal ramps have been provided with the following ramp profiles, which are in accordance with the requirements of AS 2890.1:2004 and/or AS 2890.2:2018. Each has been provided with a minimum width of 6.1m (5.5m clear width and 300mm wide kerbs on either side) and splayed to enable satisfactory two-way simultaneous movements.
 - Winter Street Access (SRV Access)
 - Initial 1:20 gradient ramp for 6.0m;
 - Midblock 1:8 gradient for 5.81m; and
 - Final 1:12 gradient for 4.0m.
 - Typical 3.0m Floor to Floor Clearance (B99 Access)
 - Initial 1:8 gradient for 2.0m;
 - Midblock 1:4 gradient for 9.75m; and
 - Final 1:8 gradient for 2.5m

- 3.2m Floor to Floor Clearance (B99 Access)
 - Initial 1:8 gradient for 2.0m;
 - Midblock 1:4 gradient for 10.55m; and
 - Final 1:8 gradient for 2.5m
 - 1:20 gradient ramps with the parking modules
 - A maximum 1:20 gradient ramp has been provided within the parking modules, as required.
- The proposal does not provide a RL change from the Mews Street access.

7.2.3 Parking Modules & Internal Circulation

- Minimum two-way circulation width of 5.8m.
- Minimum one way circulation width of 3.6m.
- Residential parking spaces are designed in accordance with a User Class 1A and are provided with a minimum space length of 5.4m, width of 2.4m and a minimum aisle width of 5.8m.
- Small car spaces with a minimum spaces length of 5.0m, width of 2.4m and a minimum aisle width of 5.8m.
- Accessible car parking spaces provided with a minimum space length of 5.4m, width of 2.4m (for both the space and adjacent shared zone) and a minimum aisle width of 5.8m.
- A minimum 1.0m blind aisle extension.

7.2.4 Headroom Requirements

- A minimum headroom of 4.5m is provided to the HRV on-site loading bay, turntable and access thereto via Mews Street.
- A minimum headroom of 3.5m is provided to the SRV on-site loading bay and access thereto via Winter Street.
- A general minimum headroom of 2.2m is applied throughout the car parking levels.
- An increased headroom of 2.5m is provided above all accessible parking spaces.

7.2.5 Bicycle Facilities

- Horizontal bicycle parking spaces provided with a clearance envelope of 1.8m in length, a centre to centre spacing of 1.0m and an access aisle of 1.5m.
- A minimum access path width of 1.5m to bicycle storage locations.
- AS 2890.3:2015 requires a minimum 20% of the bicycle parking provision to be provided in a horizontally mounted arrangement. As all of the on-site spaces are proposed within a horizontally mounted arrangement, this requirements has been readily exceeded.

7.2.6 Loading

- HRV loading dock turntable provided with a 12.5m diameter and 13.5m clearance envelope.
- SRV loading dock provided with a minimum length of 6.4m and a width of 3.5m.

7.2.7 Traffic Management

It is recommended that a detailed traffic management plan, including a signage and linemaking plan, and any other desirable traffic management devices (e.g. Speed Humps, Wheel Stops, Warning Devices etc) be prepared prior to the Construction Certification.

7.2.8 Design Summary

The internal configuration of the Site – including light and heavy vehicular access, car parking and servicing areas – comply with the requirements of the Australian Standards of AS2890.1:2004, AS2890.2:2018, AS2890.3:2015 and AS2890.6:2009. Refer to **Appendix D** for the Swept Path Assessment.

8 Preliminary Construction Traffic Management and Pedestrian Management Plan

8.1 Overview

The proposed Stage 1A works consists of the following components of works considered as part of this Preliminary Construction Traffic Management Plan.

- Bulk earth works associated with Stage 1A as identified in the Civil Design drawings
- Construction works associated with the development of the Stage 1A building.
- Construction works associated with the construction of Mews Street and associated access driveways to Sturt Street and Winter Street.
- Intersection upgrade works – East side of Adderton Road, between Robert Street and Leamington Road.
- The upgrade of Sturt Street between Marshall Street / Manson Street and a new road connection across the light rail line to Adderton Road.
- The signalisation of the intersection of Adderton Road & Sturt Street.

Detailed plans of Stage 1A are provided elsewhere in the SSDA submission.

This Preliminary Construction Traffic Management and Pedestrian Management Plan outlines principles that shall be adopted by the appointed contractors for the project and is subject to a detailed Construction Traffic Management and Pedestrian Management Plan that forms part of a Construction Management Plan to be prepared and commissioned by the incumbent contractor engaged for the civil works, construction works, and intersection upgrade works.

This Preliminary Construction and Pedestrian Management Plan has been prepared by personnel who hold the TfNSW (formerly RMS) *Prepare a Work Zone Traffic Management Plan* certification. Details of the accredited personnel is provided below:

- Dora Choi – Certification No. 0051848825

8.2 Overall Principles of Construction Traffic and Pedestrian Management

The overall principals of traffic management during construction activities include:

- Minimising the impact on pedestrian and cyclist safety and movements
- Maintaining appropriate emergency vehicle, public transport, school bus, service vehicle access

- Minimising the impact to existing traffic on adjacent roads and intersections
- Minimising the loss of on-street parking
- Maintaining access to / from adjacent properties
- Restricting construction vehicle movements to designated routes to / from the site
- Managing and controlling construction vehicle activity near the site
- Ensuring construction activity is carried out in accordance with Council's approved hours of work.

8.3 Proposed Work Hours

The construction work will vary depending on the phase of construction, type of construction, coordination requirements with other construction and associated activities.

8.3.1 Building Works Associated with Stage 1A building

For construction works associated with the Development of Stage 1A building, it is anticipated that standard construction working hours will be applicable for general construction activities:

- Monday to Friday: 7:00AM to 6:00PM.
- Saturday: 8:00AM to 1:00PM.
- Sunday and Public holidays: No planned work.

It may (on occasions) be necessary to undertake night works to minimise disruption to traffic however any works undertaken outside of these times will only occur with prior approval from Council.

8.3.2 Civil Works / Road Works forming part of Stage 1A works

For civil works, intersection works, and road works forming part of the Stage 1A scope, work hours are subject to confirmation following coordination with Transport for NSW Sydney Coordination Office, Parramatta Light Rail, and City of Parramatta, as well as key stakeholders identified in Section 8.8 of this report.

It is anticipated that road works at the following locations are likely to consist of night works:

- Adderton Road – line marking works
- Adderton Road / New Road Connection (extension of Sturt Street) intersection works

Civil works within the local road network and within the Stage 1A building site are expected to be undertaken within general construction hours as outlined in Section 8.3.1.

Any night works or works outside of standard construction hours will only occur with prior approval from TfNSW and Council.

8.4 Contractor Parking

Limited on-site parking will be available to construction workers and contractors.

The incumbent contractor will be required to ensure contractors working on the project are aware of the limited availability of on-site parking, and any reliance on on-street parking shall comply with parking restrictions displayed.

The incumbent contractors shall provide details of on-site parking based on construction works staging and availability of suitable areas within the site.

Should parking be not available for specific stages of works, it is the incumbent contractor's responsibility to prepare relevant plan and documentation to ensure contractor parking demand and associated management measures are documented, implemented, continually monitored and managed.

8.5 Worker Induction

All workers and subcontractors engaged on-site would be required to complete a site induction. The induction should include permitted access routes to and from the construction site for all vehicles, as well as standard environmental, work, health, and safety (WHS), driver protocols and emergency procedures.

Any workers required to undertake works or traffic control within the public domain would be suitably trained and covered by adequate and appropriate insurances.

8.6 Authorised Traffic Controller

There is likely to be a requirement for authorised traffic controller(s) to be present throughout the bulk earthworks, civil works, and construction stages of the project. The responsibilities are likely to include:

- Pedestrian and cyclist management, to ensure that adverse conflicts between vehicle movements and pedestrians do not occur.
- Supervision of all vehicle movements across pedestrian footpaths and nearby sensitive interfaces.
- Supervision of all loading and unloading of construction materials during the deliveries in the construction phase of the project.
- Management and supervision of road closures / lane closures for specific activities.
- Monitoring of traffic conditions whilst Traffic Guidance Schemes are implemented to ensure no conflict with existing Traffic Control Devices along the public roadway.

8.7 Public Transport Services

Two existing public bus routes operate within the area affected by the Stage 1A works. The routes are:

- Route 545 – Parramatta to Macquarie Park. Stops that will be affected by Stage 1A works are the bus stops along Sturt Street (Telopea Station, Sturt Street, Stop ID 211711)
- Route 611W – Macarthur GHS to Stewart St & Kissing Point Rd. Stops that will be affected by Stage 1A works are the bus stops along Sturt Street (Telopea Station, Sturt Street, Stop ID 211711)

Whist not specifically serviced by Stop 211711 along Sturt Street, due to the de-commissioning of the T6 Carlingford Line for the Parramatta Light Rail Project, Route 535 – Carlingford to Parramatta currently operates as a rail replacement bus service and operates along Adderton Road. A temporary pedestrian pathway is maintained between the Sturt Street bus stop concerned and Adderton Road to cater for pedestrian access across the light rail reserve.

Considering the proposed civil works along Sturt Street North, between the new Sturt Street East and Shortland Street, temporary re-routing of the Routes 545 and 611W will be required. It is recommended that considerations be made to ensure that staging of civil works allow for the temporary route diversion along Wade Street whilst works occur along Sturt Street North. Temporary replacement bus stops are likely to be required and are subject to further consultation with TfNSW and the bus operator.

Pedestrian connectivity across the light rail alignment between Shortland Street / Sturt Street North and Adderton Road will need to be maintained and shall form part of the consultation required to inform the Detailed CTPMP to be prepared by the incumbent contractor.

8.8 Stakeholder Engagement Plan

Frasers will liaise with relevant stakeholders regarding construction schedules and trucks routes and will raise any potential conflict with stakeholder at the earliest time. Stakeholder consultation actions required by Frasers are detailed in **Table 23**.

Table 23: Stakeholder Consultation Actions

Stakeholder	Action
TfNSW	Frasers to submit CTMP to stakeholder. Frasers to liaise with stakeholder to address comments and re-submit final CTMP
City of Parramatta	Frasers to submit CTMP to stakeholder. Frasers to liaise with stakeholder to address comments and re-submit final CTMP
Transport Management Centre (TMC)	Frasers to submit CTMP to stakeholder. Frasers to liaise with stakeholder to address comments and re-submit final CTMP

NSW Police	Frasers to submit CTMP to stakeholder. Frasers to liaise with stakeholder to address comments and re-submit final CTMP
Parramatta Light Rail Team	Frasers to submit CTMP to stakeholder. Frasers to liaise with stakeholder to address comments and re-submit final CTMP Frasers to maintain regular contact with stakeholder for coordination purpose throughout construction works
Emergency Services	Frasers to attend fortnightly meetings with TfNSW and Emergency Services
NSW Land and Housing Corporation (LAHC)	Frasers to submit CTMP to stakeholder. Frasers to liaise with stakeholder to address comments and re-submit final CTMP
Waratah Shops (along Benaud PI)	Frasers to submit CTMP to stakeholder. Frasers to liaise with stakeholder to address comments and re-submit final CTMP
Telopea Public School	Frasers to submit CTMP to stakeholder. Frasers to liaise with stakeholder to address comments and re-submit final CTMP
Dundas Area Neighbourhood Centre	Frasers to submit CTMP to stakeholder. Frasers to liaise with stakeholder to address comments and re-submit final CTMP
Telopea Christian Centre (Church of Christ)	Frasers to submit CTMP to stakeholder. Frasers to liaise with stakeholder to address comments and re-submit final CTMP
Montessori Pre-school	Frasers to submit CTMP to stakeholder. Frasers to liaise with stakeholder to address comments and re-submit final CTMP
Waratah Centre	Frasers to submit CTMP to stakeholder. Frasers to liaise with stakeholder to address comments and re-submit final CTMP
Sophie's Cottage Kindergarten	Frasers to submit CTMP to stakeholder. Frasers to liaise with stakeholder to address comments and re-submit final CTMP

8.9 Pedestrian Management Principles During Construction

The proposed works consists of road works, civil works, intersection works that are likely to result in some footpath closures due to the nature of works required.

The following principles provide guidance to the incumbent contractors to assist with the planning and staging of construction activities to minimise impact to pedestrian movements and shall form part of the detailed CTPMP. Key considerations being:

- Pedestrian access to / from each of the properties occupied along roadways adjacent to the works area shall be maintained at all times.
- Pedestrian connection between Adderton Road and Sturt Street North / Shortland Street shall be maintained to ensure suitable connectivity to / from the rail replacement bus service Route 535 is maintained. Should the maintenance of pedestrian connectivity be not possible due to the nature of works, consultation with TfNSW / Council and the Bus Operator shall be undertaken to seek agreement on suitable mitigations measures, such as the temporary re-routing of bus services.
- Pedestrian pathways adjacent to works area shall be protected by hoarding. If the pedestrian pathway is adjacent to areas where deep excavation works are being undertaken, additional no-go areas shall be allowed for within the works area to improve pedestrian safety.
- Temporary pedestrian pathways may be required as part of the pedestrian diversion strategy. Temporary pedestrian pathways shall be constructed to suitable standards in accordance with Council requirements. Temporary lighting may be required and subject to review by lighting engineer to ensure compliance with relevant Australian Standards.
- Should pedestrian diversion be required, detailed TGS outlining the relevant pedestrian diversion signage, temporary kerb ramps (where required), and whether Authorised Traffic Controllers will be in place to support the temporary diversion shall be prepared and submitted to TfNSW / Council for approvals.
- Traffic controller(s) shall be present at the site accesses to manage pedestrian and vehicular traffic to ensure public safety while construction vehicles enter and exit the site. Pedestrians will not be directed to use the other footpath by use of signage alone. Also, traffic controls would need to be in accordance with AS1742.3 and RMS 'Traffic Control at Worksites' manual at all times.
- Should any unforeseen activities require the temporary closure of any existing pedestrian access, a TGS should be developed and implemented by the contractor to ensure a safe alternative for pedestrians traversing these routes in the vicinity of the site.

8.10 Staging and Duration of Works

Detailed staging and duration of works is not available at the time of preparation of this preliminary CTPMP.

Considering that the road works requires the creation of a new access road that crosses the Parramatta Light Rail works that is being undertaken, detailed staging of works will require consultation and coordination with the Parramatta Light Rail, Transport for NSW, and Council to enable the development of a coordinated Construction Traffic and Pedestrian Management Plan.

It is recommended that a condition be included in the SSD requiring a Detailed Construction Traffic and Pedestrian Management Plan prior to the commencement of bulk earthworks within the Stage 1A site.

8.11 Construction Vehicle Types and Estimated Traffic Volumes

Construction traffic will generally incorporate:

- Vehicles up to the dimensions of a Truck + Dog Trailers and 19m long Articulated Vehicle for removal of spoil and transportation of material.
- Concrete mixer trucks up to 12m in length.

Any oversize vehicles using local roads to access the site would require additional Council and/or Transport for NSW approval.

The maximum number of trucks accessing the site is subject to the development of a detailed construction staging plan upon the appointment of the contractor.

8.12 Site Access

Construction vehicles accessing the site are expected to travel in a forward-in and forward-out direction. Due to the footprint of the works area, multiple site access points are anticipated and expected to be via Winter Street and Sturt Street East for works associated with the construction of Stage 1A building.

8.13 Construction Mitigation Measures

Construction of the above development would generate a moderate increase in traffic on the surrounding road network. In this regard, the following measures should be undertaken to minimise the impacts of the construction activities of the development:

- A construction fence and suitably classed Hoarding shall be provided along site boundaries / works area boundaries to provide safe pedestrian access. The fencing / hoardings should be maintained for the duration of the construction program associated with the stage of works being undertaken.
- Traffic control would be required to manage and regulate traffic movements into and out of the site during construction, with pedestrian priority provided during peak hour periods and to maintain accessibility to public transport facilities.
- Disruption to road users should be kept to a minimum by scheduling intensive delivery activities outside of road network peak hours.
- Supervised traffic control will be required where two-way flow is restricted over any length of the roadway, depending on the number of truck movements required and would be managed outside of peak hour vehicle and pedestrian activity.

8.14 Truck Routes

It is proposed that construction vehicles enter and exit the Site via the routes shown in **Figure 29** and **Figure 30**. A copy of the truck route maps shall be provided to all drivers prior to attending the Site.

The access and egress routes are to be utilised by all construction vehicles associated with the Site and represents the shortest route between the local and regional road network – hence minimising the impacts of the construction process. No trucks are to be queued on local roads. Mobile phones and two-way radios will be used to coordinate truck arrivals.

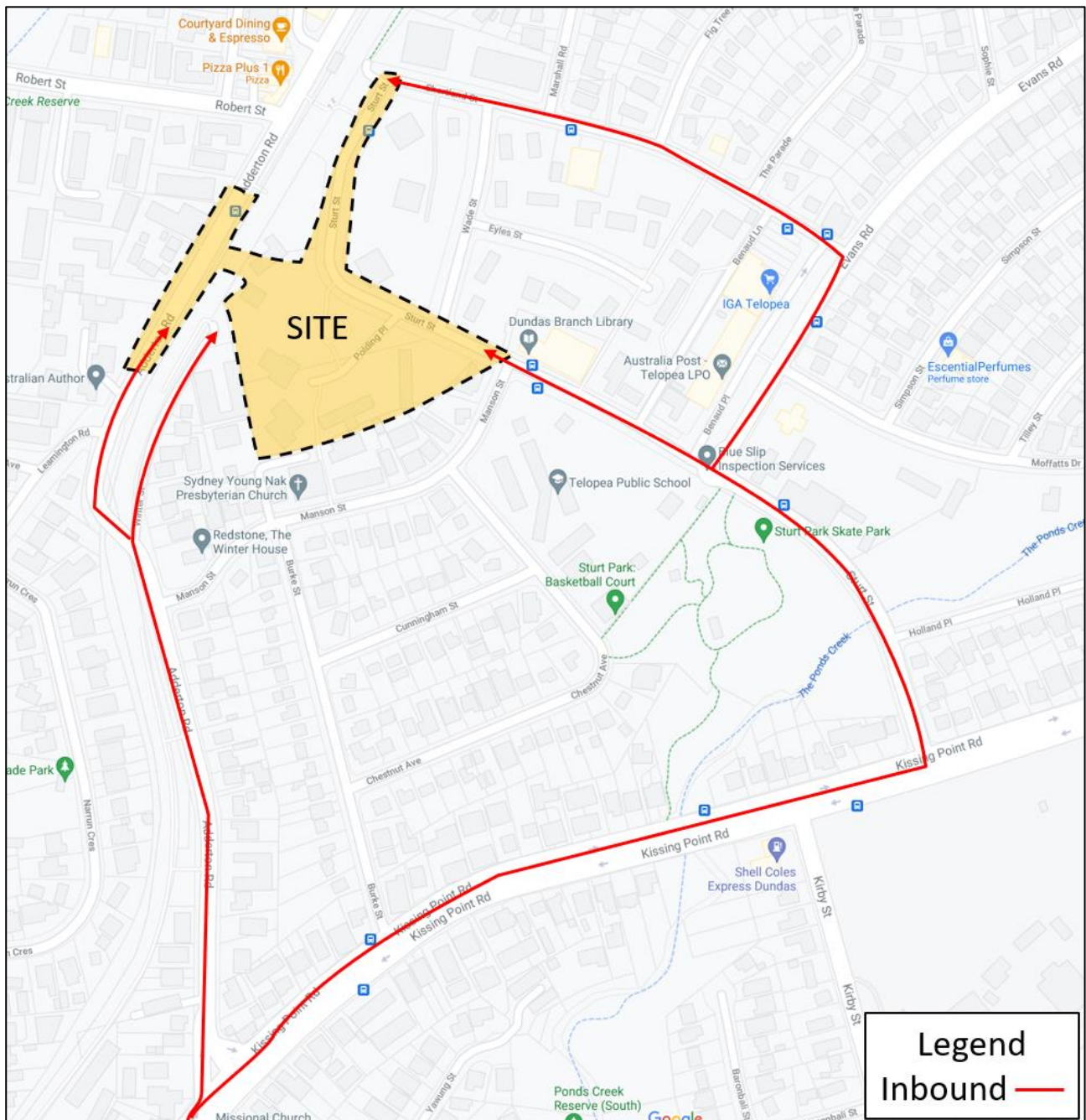


Figure 29: Construction Traffic Routes - Inbound



Figure 30: Construction Traffic Routes - Outbound

9 Conclusions and Recommendations

Ason Group has prepared a detailed assessment of the relevant access, traffic, and parking characteristics of the development of the Telopea CPA including Stage 1A of the Telopea CPA, including existing and future traffic conditions, public and active transport and parking and servicing requirements.

Further to this assessment, Ason Group provides the following conclusions

- The Concept Plan provides for development of the Proposal in line with previous reports and strategies supporting the original Rezoning Approval, and moreover development that is consistent with the Telopea CPA components assessed in the Precinct TTA Addendum.
- The Site is provided with excellent access to public and active transport services and infrastructure, further enhanced by the suite of pedestrian and cycle infrastructure, and the provision of bus capable roads, provided for in the Concept Plan.
- The Concept Plan provides for significant retail, community, and recreational facilities within the Telopea CPA, which will result in the internalisation of trips and therefore the generation of fewer external vehicle trips for the day-to-day requirements of the future residential population.
- The Telopea CPA is anticipated to generate some 30% fewer vehicle trips in the peak periods than assigned in the Precinct TTA Addendum, upon which the Rezoning Approval was based with respect traffic and transport considerations. This results from consideration of reduced residential trip generation rates approved by TfNSW and Roads & Maritime for similar sites, the fact that all dwellings are within 800m walking distance of Telopea Station, the use of maximum parking rates, and recognition of the significantly lower trip generation of affordable and social housing.
- Notwithstanding, the Concept Plan provides for significant new internal and interface road network infrastructure to support the future traffic demands of the Telopea CPA that is consistent with the road network infrastructure recommendations in the Precinct TTA Addendum and subsequent TfNSW and Roads & Maritime analysis.
- Given these factors, it can only be concluded that the road network will operate at an appropriate level of service further to the development of the Proposal.
- Parking requirements for the Telopea CPA will generally meet the rates determined in the final Telopea DCP. A reduction in residential visitor parking requirements, and the provision of a proportion of residential visitor parking on-street as proposed in the Concept Plan, is certainly justified considering the potential for shared use of the retail and community parking given the different peak demand periods for that parking.
- Parking requirements for Stage 1A have been determined with reference to the Draft Telopea DCP submission prepared by Urbis and the Draft Telopea DCP.
- The design of access driveways, parking and servicing areas will be the subject of future detailed Development Applications for individual sites within the Telopea CPA and would necessarily be required

to provide compliance with the appropriate Australian Standards. In relation to Stage 1A, all access driveways, parking and servicing areas have been designed with reference to the appropriate Australian Standards and that compliance with these Standards would be provided as a standard Condition of Consent in any future approval, which would allow for any minor revisions to the Stage 1A Site plans.

- The external design elements (Mews Street, Intersection upgrades and road reconfigurations) have been designed by the projects Civil team and as such, have not been included in the aforementioned assessment.

In summary, Ason Group has concluded that the development of the Telopea CPA including Stage 1A is entirely supportable further to traffic and transport considerations.

Appendix A. Stakeholder Consultation Minutes

Tanya Chen

From: Sharif Hasan
Sent: Thursday, 15 July 2021 3:03 PM
To: Neil.LEITCH@transport.nsw.gov.au; Billy.Yung@transport.nsw.gov.au; Mark Ozinga; brendan.j.pegg@transport.nsw.gov.au; Maziar.Neyakivi@transport.nsw.gov.au; vic.naidu@transport.nsw.gov.au; Serena Li; brett.morrison4@transport.nsw.gov.au; David.Goodenough@transport.nsw.gov.au; shannon.s.souksavong@transport.nsw.gov.au; Bobby.Yazdani@transport.nsw.gov.au; Chris.Koukoutaris@frasersproperty.com.au; Scott.Clohessy@frasersproperty.com.au
Cc: Dora Choi; Tanya Chen
Subject: RE: Telopea LR Level Crossing - Signal Phasing - Meeting Minutes
Attachments: Telopea Light Rail - Meeting - 2021 07 13.pdf

Hi Everyone,

Please see attached minutes of Telopea Light Rail Level Crossing meeting on Tuesday 13 July 2021. Let me know if you would like to modify anything in the attachment.

Hi Neil,

Kindly share the signal phasing information of the intersection of Sunnyholt Road / James Cook Drive (Blacktown) at your earliest convenience.

Best Regards,

Sharif Hasan

Senior Traffic Engineer | Ason Group

T: +61 2 9083 6601 | M: +61 450 870 345 | E: sharif.hasan@asongroup.com.au
A: Suite 17.02, Level 17, 1 Castlereagh Street, Sydney NSW 2000

-----Original Appointment-----

From: Sharif Hasan
Sent: Monday, 5 July 2021 12:06 PM
To: Billy.Yung@transport.nsw.gov.au; Mark Ozinga; brendan.j.pegg@transport.nsw.gov.au; Maziar.Neyakivi@transport.nsw.gov.au; vic.naidu@transport.nsw.gov.au; Serena Li; brett.morrison4@transport.nsw.gov.au; Dora Choi; Tanya Chen
Subject: Telopea LR Level Crossing - Signal Phasing
When: Tuesday, 13 July 2021 9:00 AM-10:00 AM (UTC+10:00) Canberra, Melbourne, Sydney.
Where: Microsoft Teams Meeting

Hi All,

Booking a time to discuss the Layout and Signal Phasing for the traffic modelling assessment of Telopea Light Rail Level Crossing intersection.

Meeting agenda: Ason Group will be seeking advice and clarification from TfNSW on:

- 1. Planned frequency or number of Light Rail Services in peak hours (AM / PM, two-way) at this intersection.**
- 2. Signal Phasing for this intersection.**

- 3. Cycle time for the intersection.**
- 4. Average Phase time and Inter-green time for LRT.**
- 5. Will the right turn from the South be fully controlled or allowed to filter?**
- 6. 'Minimum Green Time' and 'Minimum Walk Time' for the signalised pedestrian crossing on each leg.**
- 7. During peak hours, the number of pedestrians crossing the north leg is expected to be very high in future, due to its proximity to the Light Rail stop. Is it acceptable to run the ped across the north leg at the same time as the side road phase for vehicles?**

The most recent email chain is attached for reference.

Kind regards,
Sharif

Microsoft Teams meeting

Join on your computer or mobile app

[Click here to join the meeting](#)

[Learn More](#) | [Meeting options](#)

Teloepa LR Level Crossing - Signal Phasing Meeting

Date: Tuesday 13 July 2021

Time: 9:00 am – 10:00 am.

Attendees:

#	Name	Organisation	Email
1	Brett Morrison (BM)	TfNSW	Brett.Morrison4@transport.nsw.gov.au
2	David Goodenough (DG)	TfNSW	David.Goodenough@transport.nsw.gov.au
3	Vic Naidu (VN)	TfNSW	Vic.Naidu@transport.nsw.gov.au
4	Serena Li (SL)	TfNSW	Serena.Li2@transport.nsw.gov.au
5	Billy Yung (BY)	TfNSW	Billy.Yung@transport.nsw.gov.au
6	Shannon Souksavong (SS)	TfNSW	shannon.s.souksavong@transport.nsw.gov.au
7	Bobby Yazdany (BO)	TfNSW	Bobby.Yazdani@transport.nsw.gov.au
8	Neil Leitch (NL)	TfNSW	Neil.LEITCH@transport.nsw.gov.au
9	Maziar Neyakivi (MN)	TfNSW	Maziar.Neyakivi@transport.nsw.gov.au
10	Brendan Pegg (BP)	TfNSW	brendan.j.pegg@transport.nsw.gov.au
11	Chris Koukoutaris (CK)	Frasers	Chris.Koukoutaris@frasersproperty.com.au
12	Scott Clohessy (SC)	Frasers	Scott.Clohessy@frasersproperty.com.au
13	Dora Choi (DC)	Ason	dora.choi@asongroup.com.au
14	Tanya Chen (TC)	Ason	tanya.chen@asongroup.com.au
15	Sharif Hasan (SH)	Ason	sharif.hasan@asongroup.com.au

Meeting minutes:

- DC outlined the background including - Frasers engaging Ason to carry out traffic / transport assessment of Stage 1 of Teloepa Development, and as part of the SEARs request came through from TfNSW there is a requirement of modelling the Light Rail Level Crossing intersection at Teloepa across the planned extension of Sturt Street to connect Adderton Road.
- DG questioned whether the design was provided by the Parramatta Light Rail team. CK responded that it was prepared by Frasers' civil engineers, who has an MOU with the Parramatta Light Rail team and prepared this plan accordingly. CK also confirmed that Frasers will be constructing this at their own cost (i.e. TfNSW funding is not required).
- Key queries from Ason regarding signal phasing, and TfNSW responses:

#	Ason query	TfNSW response
1	Planned frequency or number of Light Rail Services in peak hours (AM / PM, two-way) at this intersection	8 in each direction
2	Signal Phasing for this intersection	NL advised he would send through details signal phasing information of a similar intersection of Sunnyholt Road / James Cook Drive at Blacktown which is currently operating. Ason can adopt the LRT assumptions based on T-way information that intersection.
3	Cycle time for the intersection	120 seconds
4	Average Phase time and Inter-green time for LRT	As above #2
5	Will the right turn from the South be fully controlled or allowed to filter?	No filter
6	'Minimum Green Time' and 'Minimum Walk Time' for the signalised pedestrian crossing on each leg	Preferred a separate phase for Ped crossing. 6 to 10 seconds minimum green time, minimum walk time based on distance and ped speed 1.2 m/s.

- NL also advised that the signal phasing has to be carefully coded to address all the safety concerns such as banning LRT movement (i.e. Red T for both LRT directions) during A phase to ensure the north-left movements are safe. Each phase start and finish points should be carefully checked, to replicate the phasing of Sunnyholt Road / James Cook Drive.
- A signal phasing diagram needs to be prepared to clearly show which movement is not running in a given phase (e.g. LRT not running in Phase A)
- SS expressed concerns about the pedestrians crossing the Light Rail Corridor and indicated that it MUST be a signalised crossing to get approval from TfNSW.

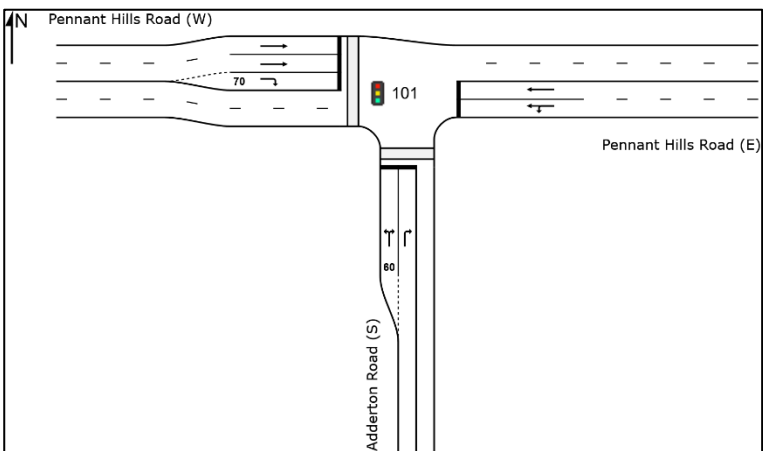
Next Steps:

- Neil Leitch will send signal phasing information of Sunnyholt Road / James Cook Drive at Blacktown.
- Ason will carry out SIDRA modelling and document the assumptions accordingly.
- Ason will provide Billy Yung with a copy of the final traffic report as part of the SSDA submission prior to the report being uploaded into the planning portal.

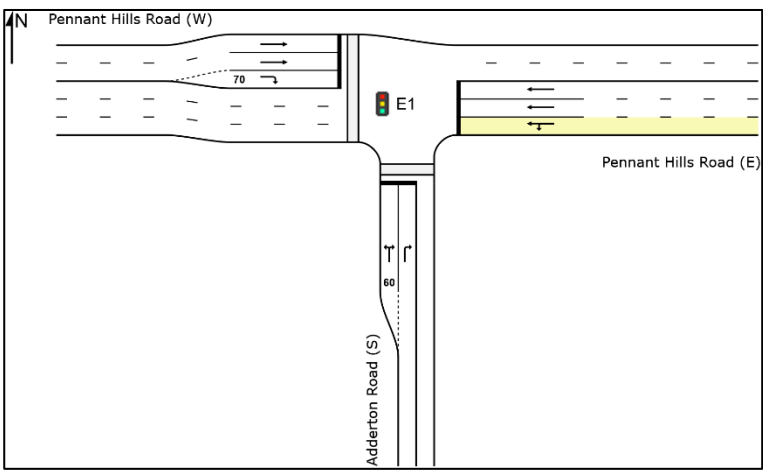
Appendix B. Intersection Upgrades

Pennant Hills Road & Adderton Road

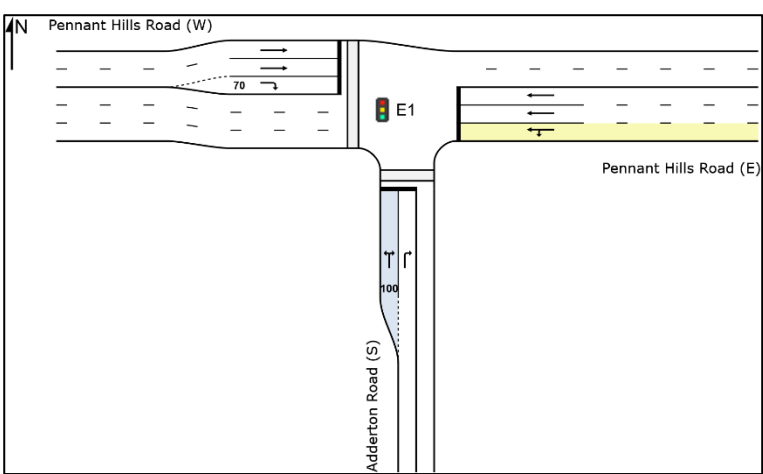
Existing



2036 Base Upgrade (TfNSW)

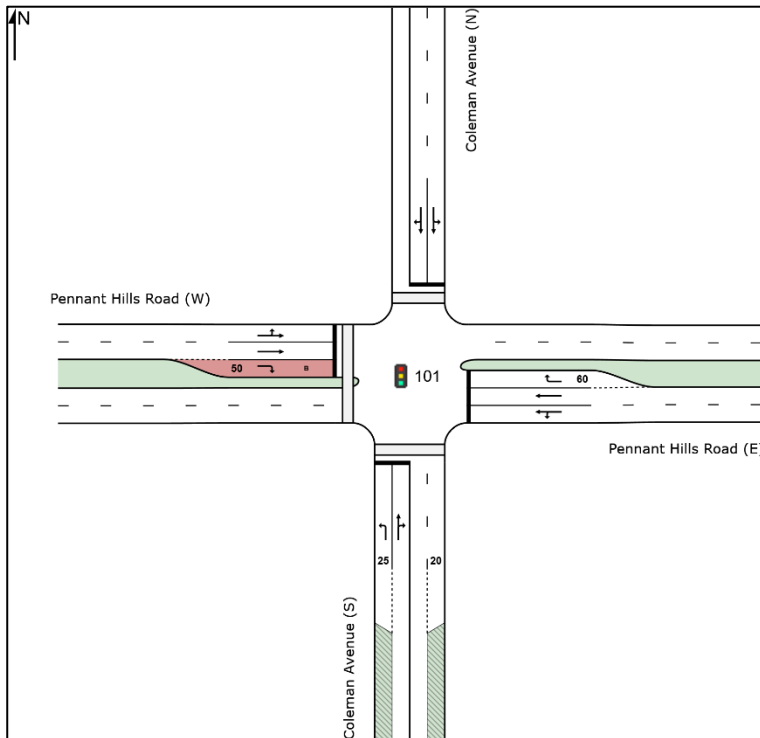


2036 Ultimate Upgrade (TfNSW)

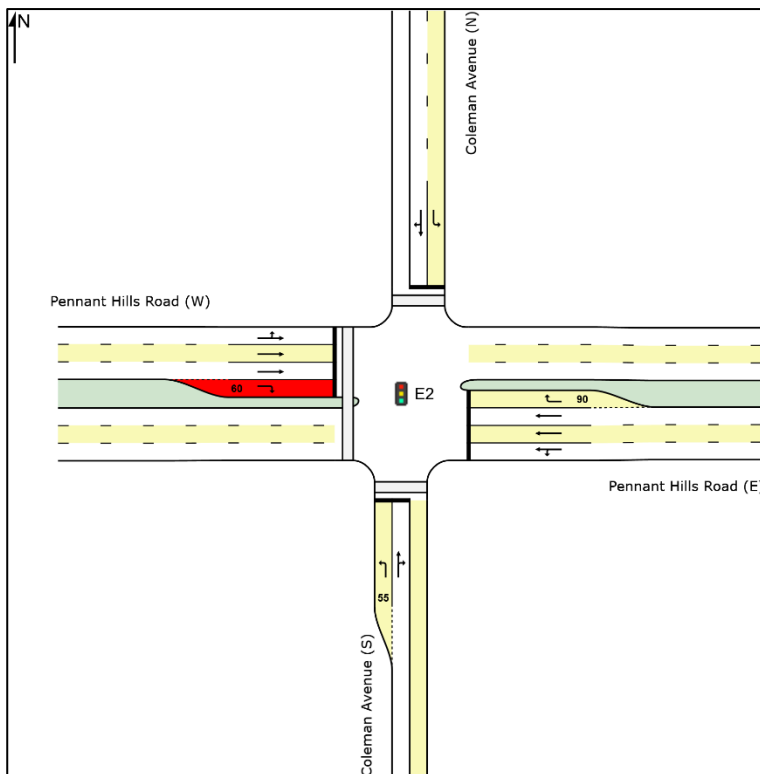


Pennant Hills Road & Coleman Avenue

Existing

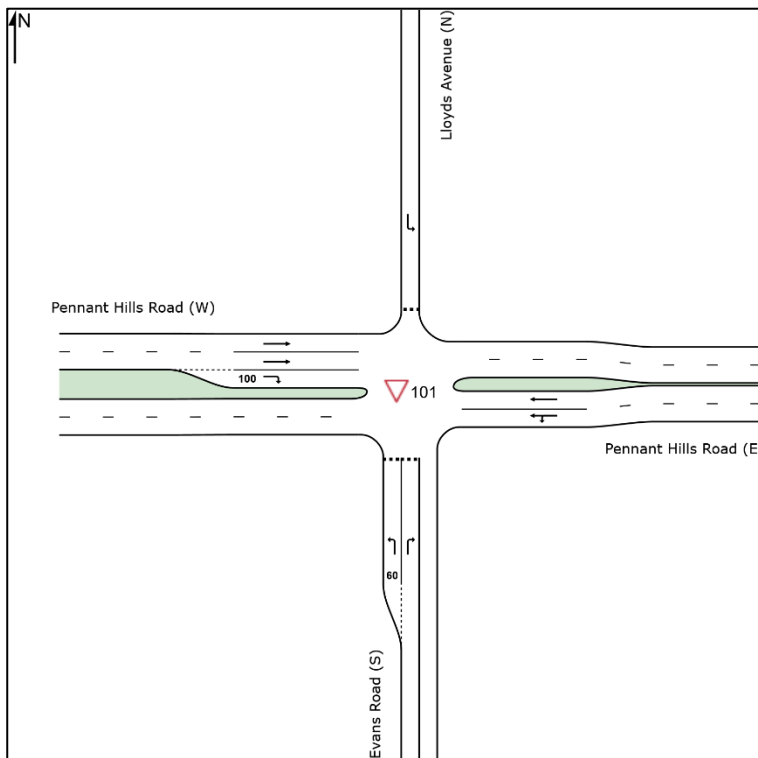


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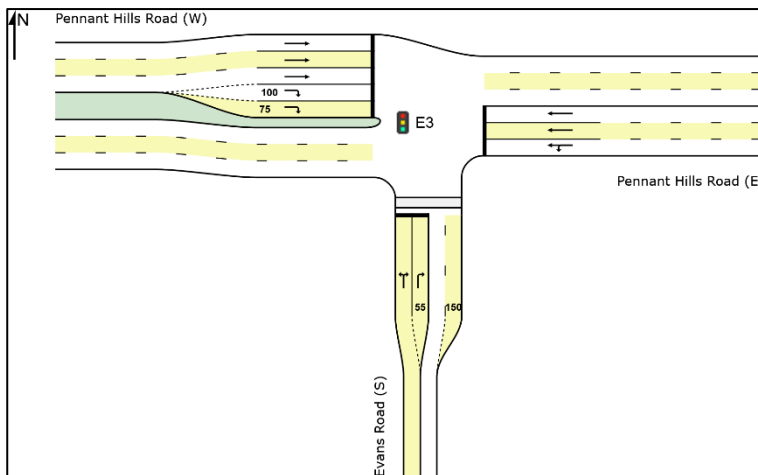


Pennant Hills Road & Evans Road

Existing



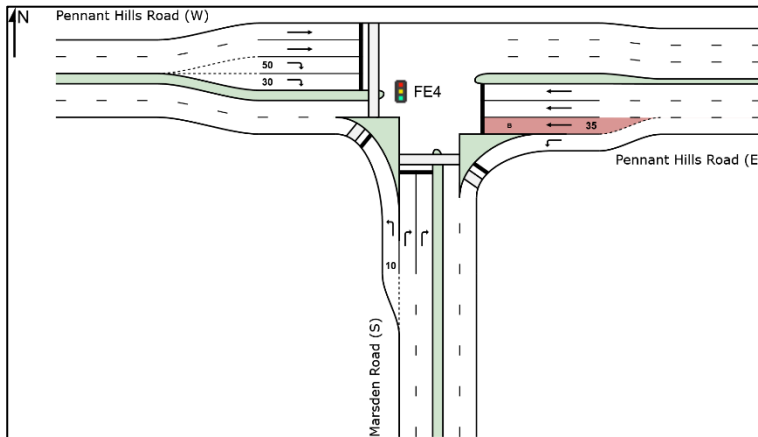
2036 Ultimate Upgrade (TfNSW)



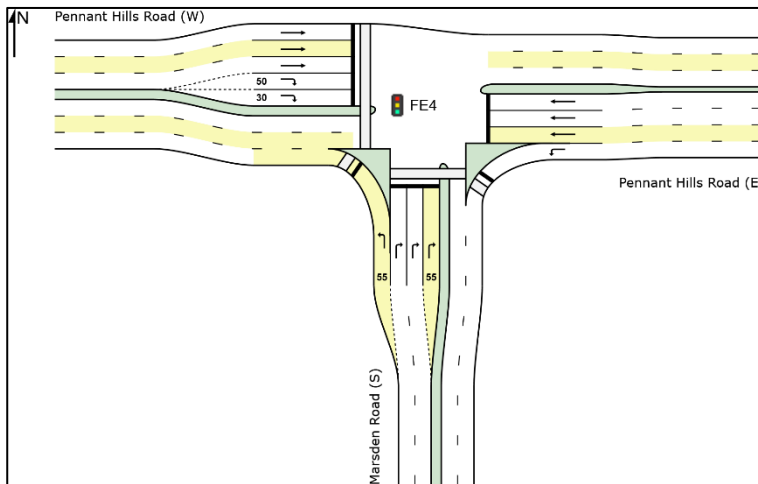
In regard to the upgrade of the Pennant Hills Road & Evans Road intersection, as reported in the **Section 3.6** of the TA an interim design - to be funded by a Special Infrastructure Contribution - will be undertaken within the existing carriageways. The design of this interim intersection upgrade will be completed by Roads & Maritime.

Pennant Hills Road & Marsden Road

Existing

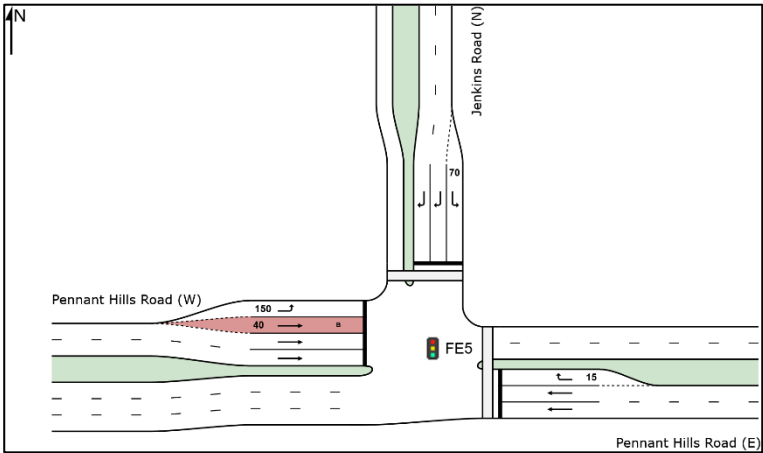


2036 Ultimate Upgrade (TfNSW)

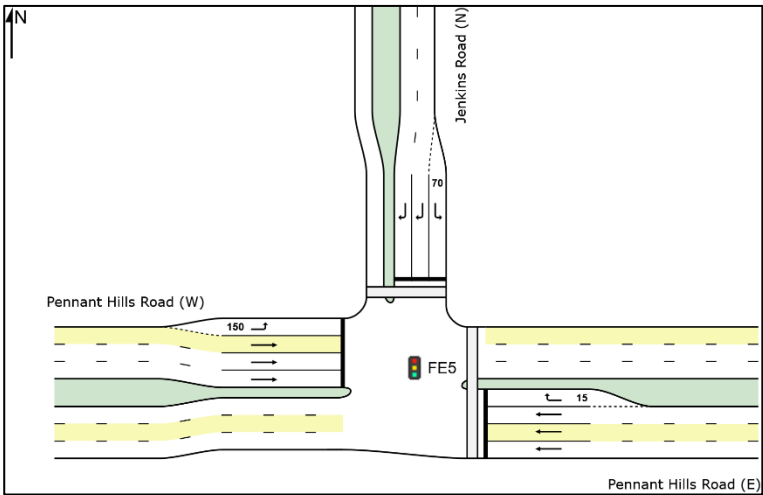


Pennant Hills Road & Jenkins Road

Existing

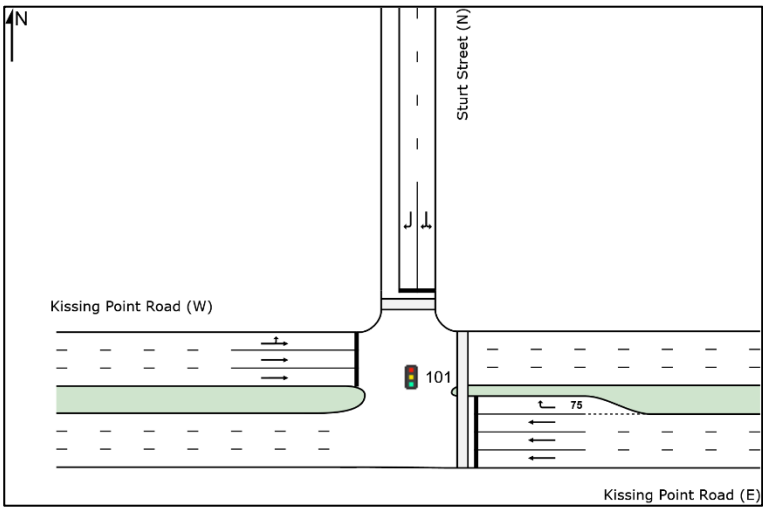


2036 Ultimate Upgrade (TfNSW)

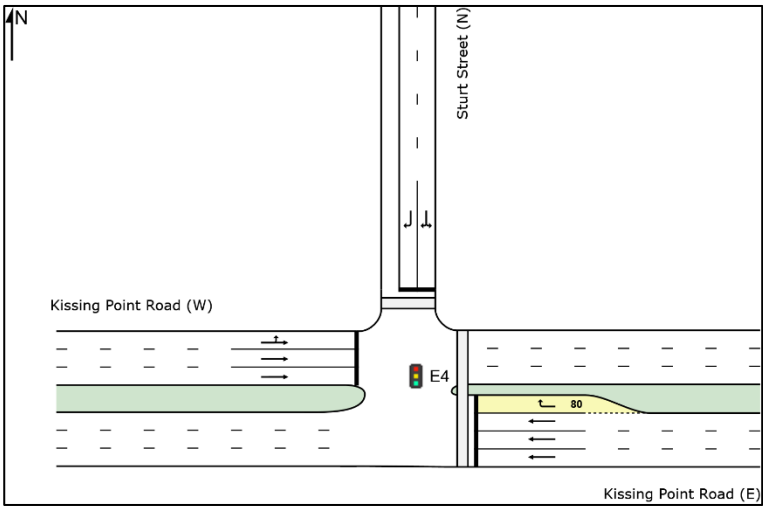


Kissing Point Road & Sturt Street

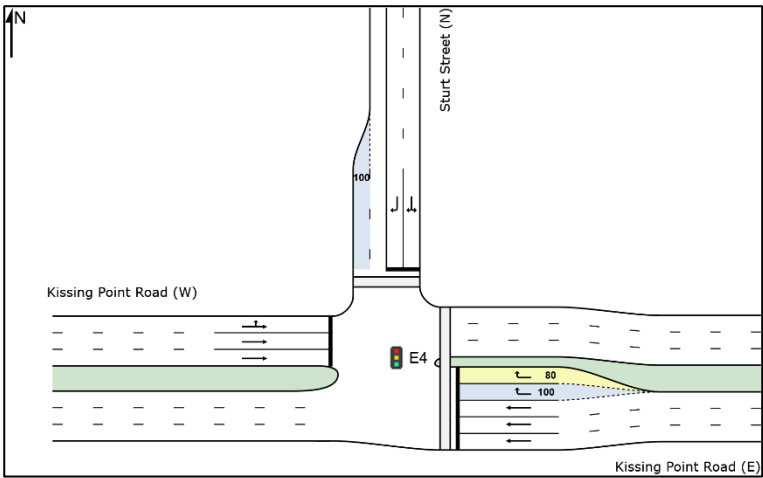
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2036 Base Upgrade (TfNSW)

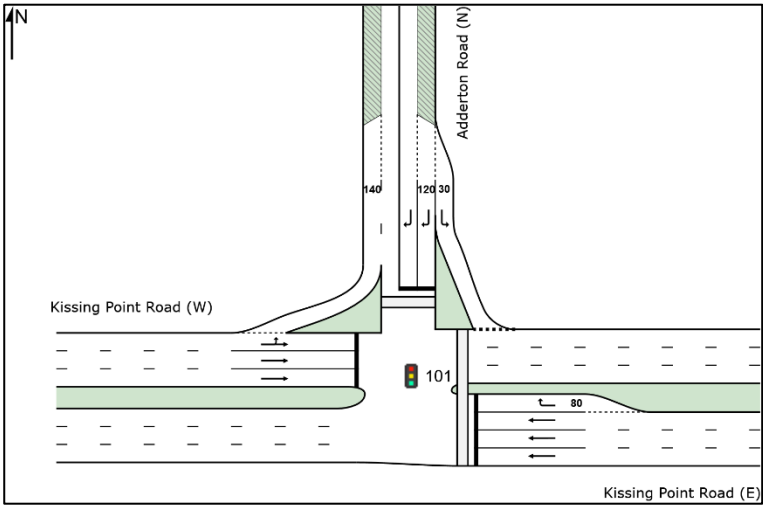


2036 Ultimate Upgrade (TfNSW)

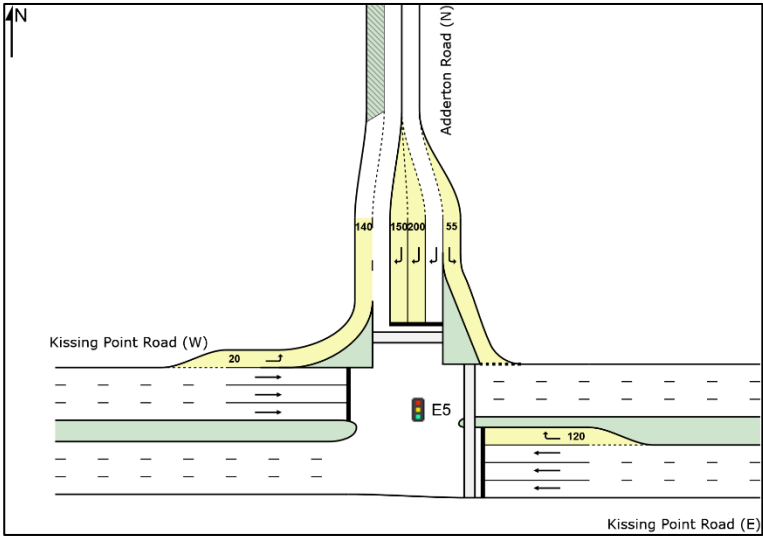


Kissing Point Road & Adderton Road

Existing

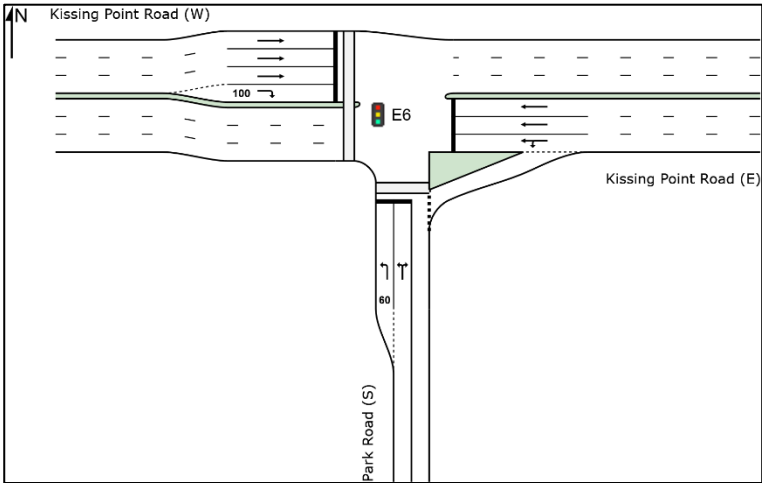


2036 Ultimate Upgrade (TfNSW)

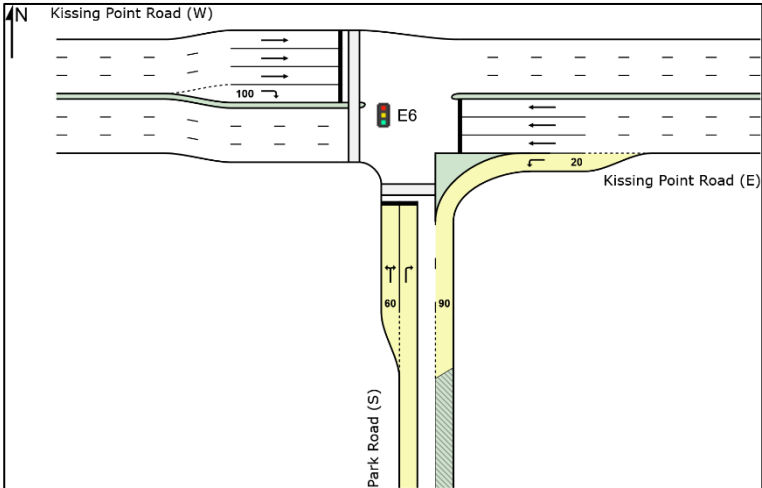


Kissing Point Road & Park Road

Existing

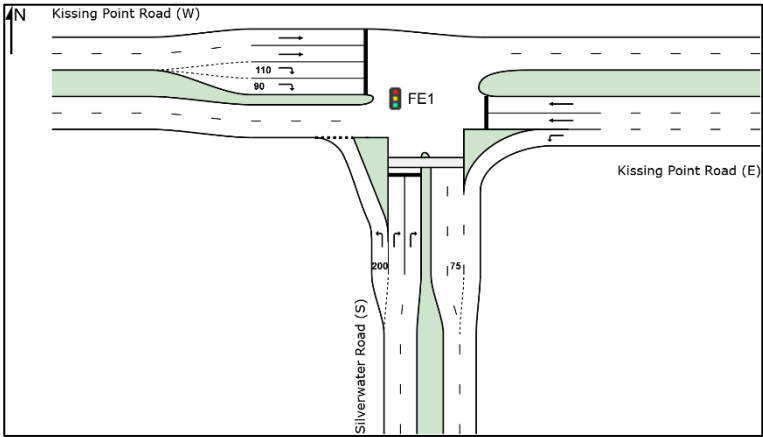


2036 Ultimate Upgrade (TfNSW)

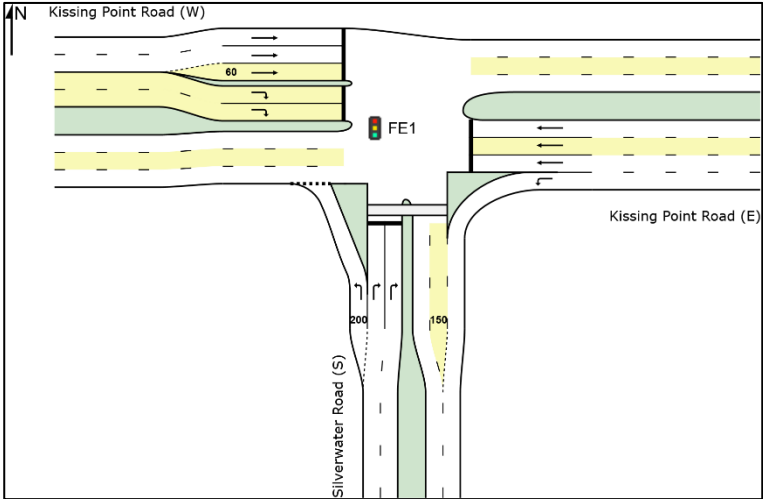


Kissing Point Road & Silverwater Road

Existing

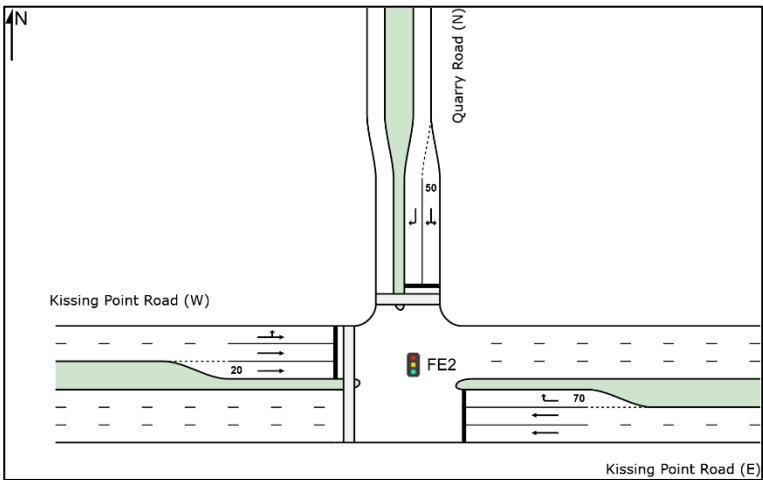


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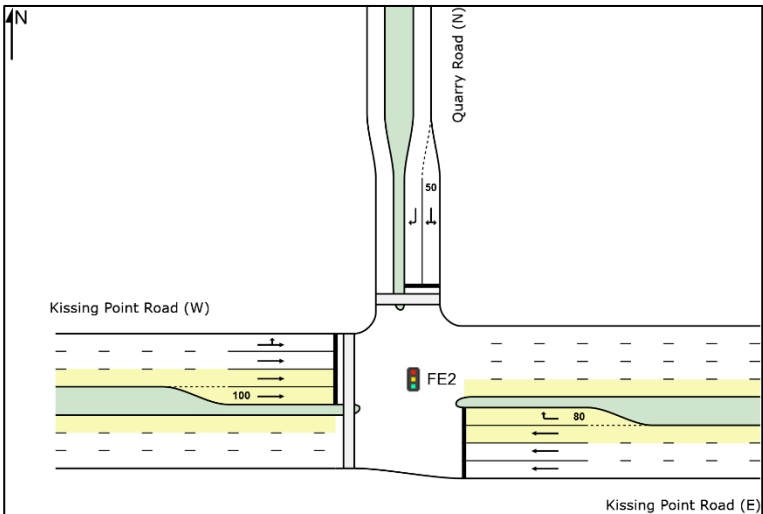


Kissing Point Road & Quarry Road

Existing

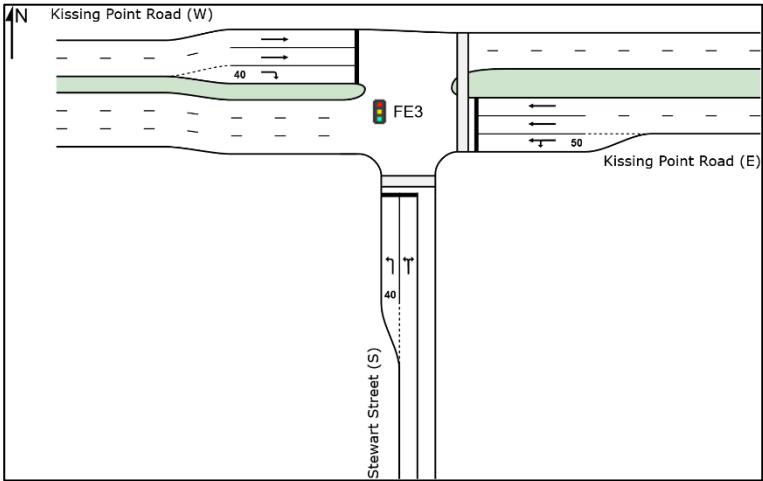


2036 Ultimate Upgrade (TfNSW)

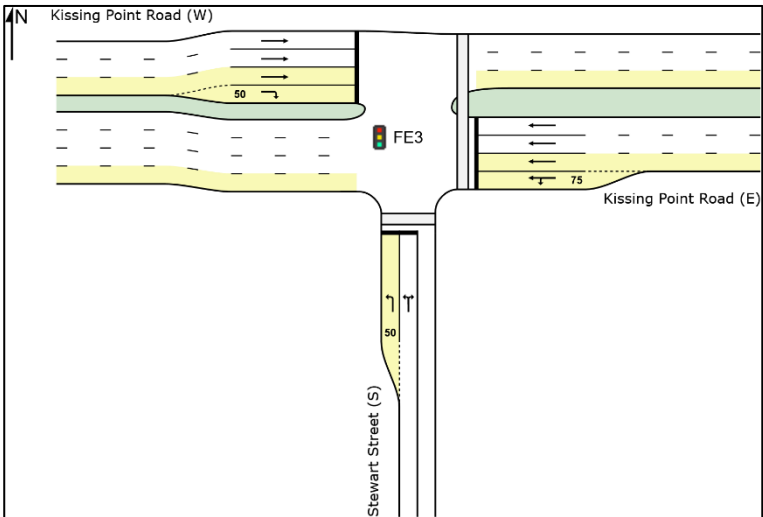


Kissing Point Road & Stewart Street

Existing

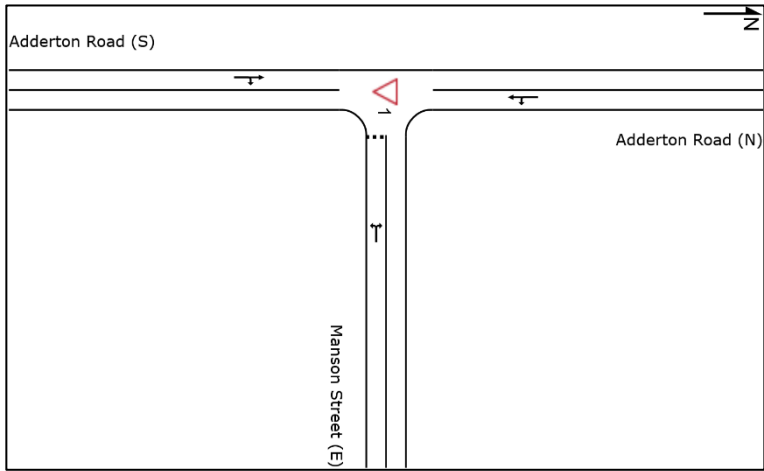


2036 Ultimate Upgrade (TfNSW)

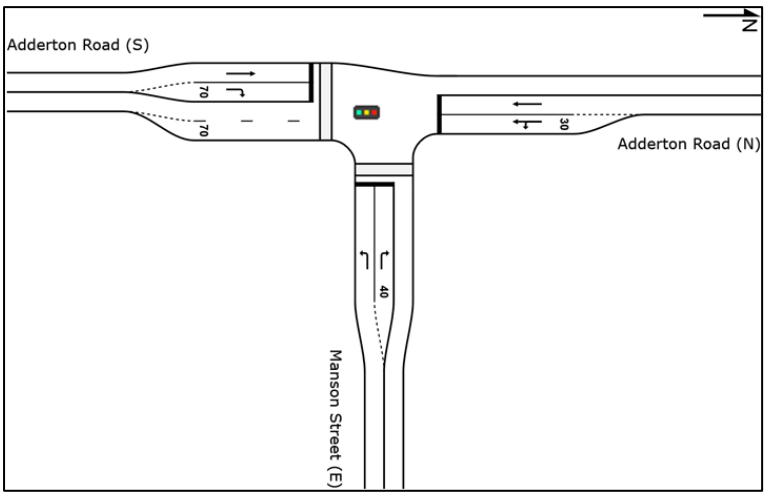


Adderton Road & Manson Street

Existing

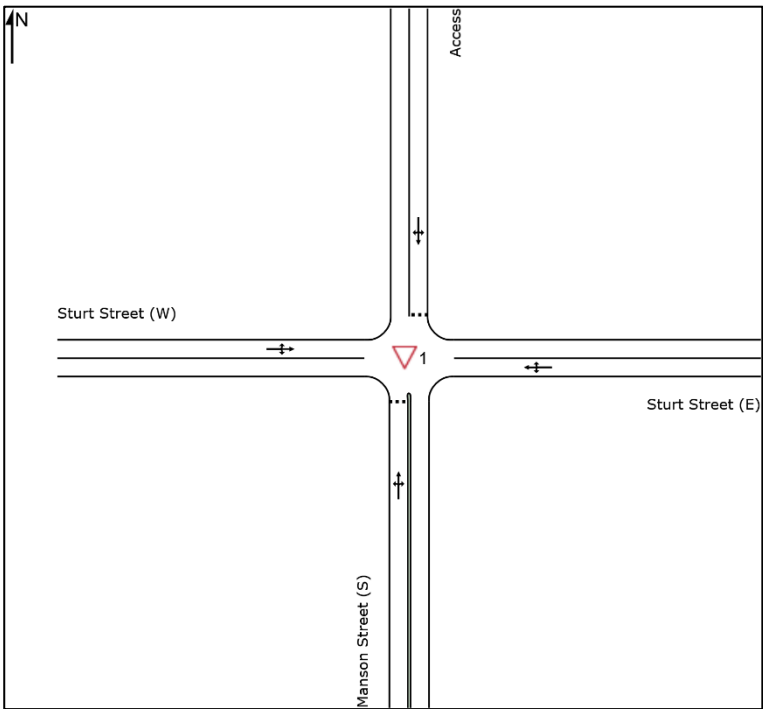


Precinct Upgrade (Frasers)

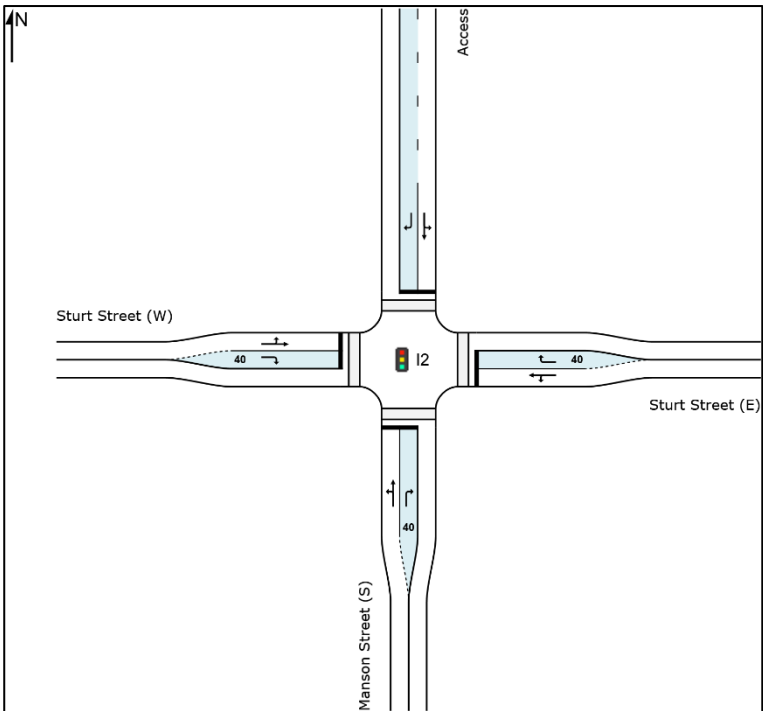


Sturt Street & Manson Street

Existing

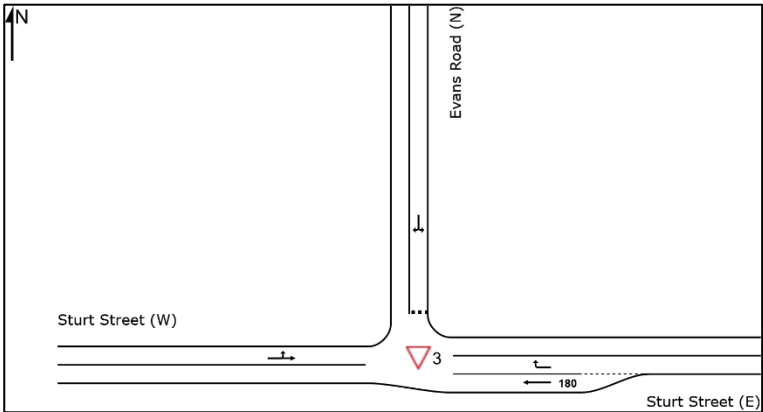


Precinct Upgrade (Frasers)

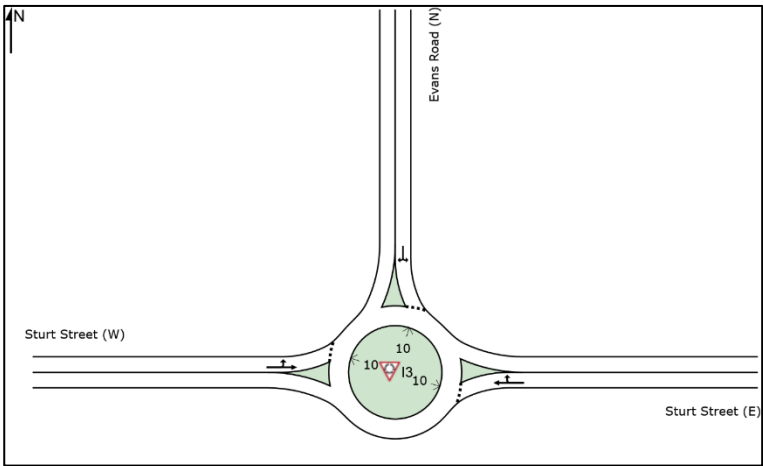


Sturt Street & Evans Road

Existing

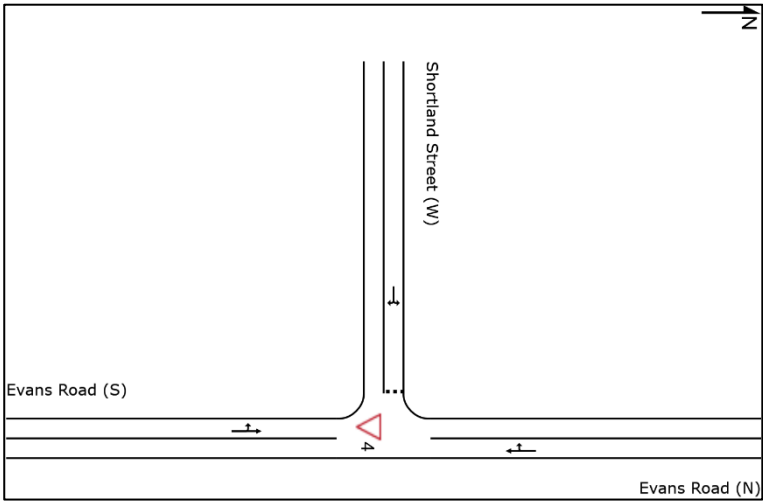


Precinct Upgrade (Council)

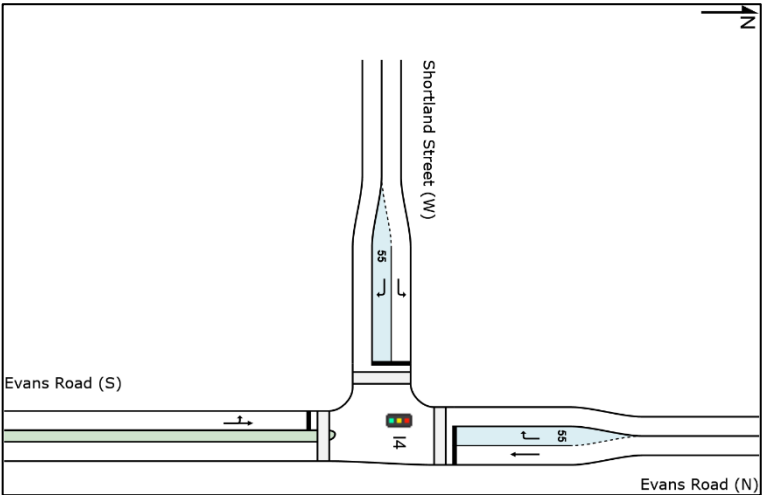


Evans Road & Shortland Street

Existing



Precinct Upgrade (Fraser's)



Appendix C. SIDRA Output Summaries

MOVEMENT SUMMARY

 **Site: 101 [Adderton Rd / New Link Rd - Future AM (Site Folder: GTA Based)]**

Adderton Road / New Link Road Future AM

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Adderton Road														
2	T1	459	18	483	3.9	0.329	6.0	LOS A	9.0	64.2	0.37	0.33	0.37	27.3
3	R2	22	0	23	0.0	0.125	57.7	LOS E	1.3	8.9	0.94	0.70	0.94	18.8
Approach		481	18	506	3.7	0.329	8.4	LOS A	9.0	64.2	0.39	0.34	0.39	26.9
East: New Link Road														
4	L2	5	0	5	0.0	* 0.756	92.5	LOS F	3.6	25.3	1.00	0.94	1.30	15.9
6	R2	42	0	44	0.0	* 0.756	92.0	LOS F	3.6	25.3	1.00	0.94	1.30	15.9
Approach		47	0	49	0.0	0.756	92.1	LOS F	3.6	25.3	1.00	0.94	1.30	15.9
North: Adderton Road														
7	L2	28	0	29	0.0	0.045	31.8	LOS C	1.1	7.8	0.69	0.68	0.69	28.0
8	T1	822	27	865	3.3	* 0.771	19.4	LOS B	36.4	260.0	0.80	0.74	0.80	39.4
Approach		850	27	895	3.2	0.771	19.8	LOS B	36.4	260.0	0.80	0.73	0.80	38.9
All Vehicles		1378	45	1451	3.3	0.771	18.3	LOS B	36.4	260.0	0.66	0.61	0.67	32.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE [Ped ped Dist] m		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec						sec	m	m/sec
South: Adderton Road												
P11	Stage 1	200	211	51.8	LOS E	0.7	0.7	0.93	0.93	227.5	210.9	0.93
P12	Stage 2	200	211	54.6	LOS E	0.7	0.7	0.96	0.96	230.5	211.0	0.92
East: New Link Road												
P2	Full	200	211	51.8	LOS E	0.7	0.7	0.93	0.93	225.6	208.6	0.92
North: Adderton Road												
P31	Stage 1	200	211	54.6	LOS E	0.7	0.7	0.96	0.96	230.5	211.0	0.92
P32	Stage 2	200	211	51.8	LOS E	0.7	0.7	0.93	0.93	229.2	212.9	0.93
All Pedestrians		1000	1053	52.9	LOS E	0.7	0.7	0.94	0.94	228.7	210.9	0.92

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

 **Site: 101 [Adderton Rd / New Link Rd - Future PM (Site Folder: GTA Based)]**

Adderton Road / New Link Road Future AM

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Adderton Road														
2	T1	864	29	909	3.4	* 0.655	9.1	LOS A	26.0	185.6	0.55	0.51	0.55	26.8
3	R2	27	0	28	0.0	0.030	18.8	LOS B	0.8	5.7	0.52	0.61	0.52	29.1
Approach		891	29	938	3.3	0.655	9.4	LOS A	26.0	185.6	0.55	0.51	0.55	26.7
East: New Link Road														
4	L2	27	0	28	0.0	0.463	40.2	LOS C	2.2	15.5	1.00	0.74	1.00	25.7
6	R2	27	0	28	0.0	* 0.463	39.8	LOS C	2.2	15.5	1.00	0.74	1.00	25.8
Approach		54	0	57	0.0	0.463	40.0	LOS C	2.2	15.5	1.00	0.74	1.00	25.7
North: Adderton Road														
7	L2	23	0	24	0.0	0.261	67.5	LOS E	1.5	10.2	0.99	0.71	0.99	18.9
8	T1	345	16	363	4.6	1.108	168.4	LOS F	40.0	285.5	1.00	1.67	2.12	14.7
Approach		368	16	387	4.3	1.108	162.1	LOS F	40.0	285.5	1.00	1.61	2.05	14.8
All Vehicles		1313	45	1382	3.4	1.108	53.5	LOS D	40.0	285.5	0.69	0.83	0.99	21.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE [Ped ped Dist] m		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec						sec	m	m/sec
South: Adderton Road												
P11	Stage 1	200	211	51.8	LOS E	0.7	0.7	0.93	0.93	227.5	210.9	0.93
P12	Stage 2	200	211	54.6	LOS E	0.7	0.7	0.96	0.96	230.5	211.0	0.92
East: New Link Road												
P2	Full	200	211	51.8	LOS E	0.7	0.7	0.93	0.93	225.6	208.6	0.92
North: Adderton Road												
P31	Stage 1	200	211	54.6	LOS E	0.7	0.7	0.96	0.96	230.5	211.0	0.92
P32	Stage 2	200	211	51.8	LOS E	0.7	0.7	0.93	0.93	229.2	212.9	0.93
All Pedestrians		1000	1053	52.9	LOS E	0.7	0.7	0.94	0.94	228.7	210.9	0.92

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

 **Site: 101 [Adderton Rd / New Link Rd - (RTR) - Future AM (Site Folder: Revised Scheme - Reduced Trip Rates)]**

Adderton Road / New Link Road Future AM

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Adderton Road														
2	T1	459	18	483	3.9	0.329	6.0	LOS A	9.0	64.2	0.37	0.33	0.37	27.3
3	R2	14	0	15	0.0	0.079	57.2	LOS E	0.8	5.6	0.94	0.68	0.94	18.9
Approach		473	18	498	3.8	0.329	7.5	LOS A	9.0	64.2	0.38	0.34	0.38	27.0
East: New Link Road														
4	L2	3	0	3	0.0	* 0.484	87.8	LOS F	2.2	15.6	1.00	0.80	1.01	16.4
6	R2	27	0	28	0.0	* 0.484	87.3	LOS F	2.2	15.6	1.00	0.80	1.01	16.5
Approach		30	0	32	0.0	0.484	87.4	LOS F	2.2	15.6	1.00	0.80	1.01	16.5
North: Adderton Road														
7	L2	18	0	19	0.0	0.029	31.6	LOS C	0.7	5.0	0.68	0.66	0.68	28.1
8	T1	822	27	865	3.3	* 0.765	19.4	LOS B	36.4	260.0	0.80	0.74	0.80	39.4
Approach		840	27	884	3.2	0.765	19.7	LOS B	36.4	260.0	0.80	0.74	0.80	39.0
All Vehicles		1343	45	1414	3.4	0.765	16.9	LOS B	36.4	260.0	0.66	0.60	0.66	33.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE [Ped ped Dist] m		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec						sec	m	m/sec
South: Adderton Road												
P11	Stage 1	200	211	51.8	LOS E	0.7	0.7	0.93	0.93	227.5	210.9	0.93
P12	Stage 2	200	211	54.6	LOS E	0.7	0.7	0.96	0.96	230.5	211.0	0.92
East: New Link Road												
P2	Full	200	211	51.8	LOS E	0.7	0.7	0.93	0.93	225.6	208.6	0.92
North: Adderton Road												
P31	Stage 1	200	211	54.6	LOS E	0.7	0.7	0.96	0.96	230.5	211.0	0.92
P32	Stage 2	200	211	51.8	LOS E	0.7	0.7	0.93	0.93	229.2	212.9	0.93
All Pedestrians		1000	1053	52.9	LOS E	0.7	0.7	0.94	0.94	228.7	210.9	0.92

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

 **Site: 101 [Adderton Rd / New Link Rd - (RTR) - Future PM (Site Folder: Revised Scheme - Reduced Trip Rates)]**

Adderton Road / New Link Road Future AM

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance															
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed	
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m					
South: Adderton Road															
2	T1	864	29	909	3.4	* 0.636	8.0	LOS A	24.3	173.9	0.52	0.48	0.52	27.0	
3	R2	18	0	19	0.0	0.020	18.2	LOS B	0.5	3.7	0.51	0.59	0.51	29.3	
Approach		882	29	928	3.3	0.636	8.3	LOS A	24.3	173.9	0.52	0.48	0.52	26.9	
East: New Link Road															
4	L2	18	0	19	0.0	0.412	41.6	LOS C	1.5	10.7	1.00	0.72	1.00	25.3	
6	R2	18	0	19	0.0	* 0.412	41.1	LOS C	1.5	10.7	1.00	0.72	1.00	25.4	
Approach		36	0	38	0.0	0.412	41.4	LOS C	1.5	10.7	1.00	0.72	1.00	25.3	
North: Adderton Road															
7	L2	16	0	17	0.0	0.181	67.0	LOS E	1.0	7.0	0.99	0.69	0.99	19.0	
8	T1	345	16	363	4.6	1.056	130.6	LOS F	34.8	248.8	1.00	1.50	1.87	17.5	
Approach		361	16	380	4.4	1.056	127.8	LOS F	34.8	248.8	1.00	1.46	1.84	17.6	
All Vehicles		1279	45	1346	3.5	1.056	42.9	LOS D	34.8	248.8	0.67	0.77	0.90	23.4	

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE [Ped ped Dist] m		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec						sec	m	m/sec
South: Adderton Road												
P11	Stage 1	200	211	51.8	LOS E	0.7	0.7	0.93	0.93	227.5	210.9	0.93
P12	Stage 2	200	211	54.6	LOS E	0.7	0.7	0.96	0.96	230.5	211.0	0.92
East: New Link Road												
P2	Full	200	211	51.8	LOS E	0.7	0.7	0.93	0.93	225.6	208.6	0.92
North: Adderton Road												
P31	Stage 1	200	211	54.6	LOS E	0.7	0.7	0.96	0.96	230.5	211.0	0.92
P32	Stage 2	200	211	51.8	LOS E	0.7	0.7	0.93	0.93	229.2	212.9	0.93
All Pedestrians		1000	1053	52.9	LOS E	0.7	0.7	0.94	0.94	228.7	210.9	0.92

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

 **Site: 101 [Adderton Rd / New Link Rd - (CTR) - Future AM (Site Folder: Revised Scheme - Conservative Trip Rates)]**

Adderton Road / New Link Road Future AM

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Adderton Road														
2	T1	459	18	483	3.9	0.329	6.0	LOS A	9.0	64.2	0.37	0.33	0.37	27.3
3	R2	22	0	23	0.0	0.125	57.7	LOS E	1.3	8.9	0.94	0.70	0.94	18.8
Approach		481	18	506	3.7	0.329	8.4	LOS A	9.0	64.2	0.39	0.34	0.39	26.9
East: New Link Road														
4	L2	5	0	5	0.0	* 0.756	92.5	LOS F	3.6	25.3	1.00	0.94	1.30	15.9
6	R2	42	0	44	0.0	* 0.756	92.0	LOS F	3.6	25.3	1.00	0.94	1.30	15.9
Approach		47	0	49	0.0	0.756	92.1	LOS F	3.6	25.3	1.00	0.94	1.30	15.9
North: Adderton Road														
7	L2	28	0	29	0.0	0.045	31.8	LOS C	1.1	7.8	0.69	0.68	0.69	28.0
8	T1	822	27	865	3.3	* 0.771	19.4	LOS B	36.4	260.0	0.80	0.74	0.80	39.4
Approach		850	27	895	3.2	0.771	19.8	LOS B	36.4	260.0	0.80	0.73	0.80	38.9
All Vehicles		1378	45	1451	3.3	0.771	18.3	LOS B	36.4	260.0	0.66	0.61	0.67	32.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE [Ped ped Dist] m		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec						sec	m	m/sec
South: Adderton Road												
P11	Stage 1	200	211	51.8	LOS E	0.7	0.7	0.93	0.93	227.5	210.9	0.93
P12	Stage 2	200	211	54.6	LOS E	0.7	0.7	0.96	0.96	230.5	211.0	0.92
East: New Link Road												
P2	Full	200	211	51.8	LOS E	0.7	0.7	0.93	0.93	225.6	208.6	0.92
North: Adderton Road												
P31	Stage 1	200	211	54.6	LOS E	0.7	0.7	0.96	0.96	230.5	211.0	0.92
P32	Stage 2	200	211	51.8	LOS E	0.7	0.7	0.93	0.93	229.2	212.9	0.93
All Pedestrians		1000	1053	52.9	LOS E	0.7	0.7	0.94	0.94	228.7	210.9	0.92

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

 **Site: 101 [Adderton Rd / New Link Rd - (CTR) - Future PM (Site Folder: Revised Scheme - Conservative Trip Rates)]**

Adderton Road / New Link Road Future AM

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance															
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed	
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m					
South: Adderton Road															
2	T1	864	29	909	3.4	* 0.656	9.1	LOS A	26.0	185.6	0.55	0.51	0.55	26.8	
3	R2	28	0	29	0.0	0.031	18.8	LOS B	0.8	5.9	0.52	0.61	0.52	29.1	
Approach		892	29	939	3.3	0.656	9.4	LOS A	26.0	185.6	0.55	0.51	0.55	26.7	
East: New Link Road															
4	L2	28	0	29	0.0	0.480	40.3	LOS C	2.3	16.1	1.00	0.74	1.00	25.7	
6	R2	28	0	29	0.0	* 0.480	39.8	LOS C	2.3	16.1	1.00	0.74	1.00	25.7	
Approach		56	0	59	0.0	0.480	40.1	LOS C	2.3	16.1	1.00	0.74	1.00	25.7	
North: Adderton Road															
7	L2	24	0	25	0.0	0.272	67.6	LOS E	1.5	10.6	1.00	0.71	1.00	18.9	
8	T1	345	16	363	4.6	1.108	168.4	LOS F	40.0	285.5	1.00	1.67	2.12	14.7	
Approach		369	16	388	4.3	1.108	161.9	LOS F	40.0	285.5	1.00	1.61	2.05	14.8	
All Vehicles		1317	45	1386	3.4	1.108	53.4	LOS D	40.0	285.5	0.70	0.83	0.99	21.8	

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

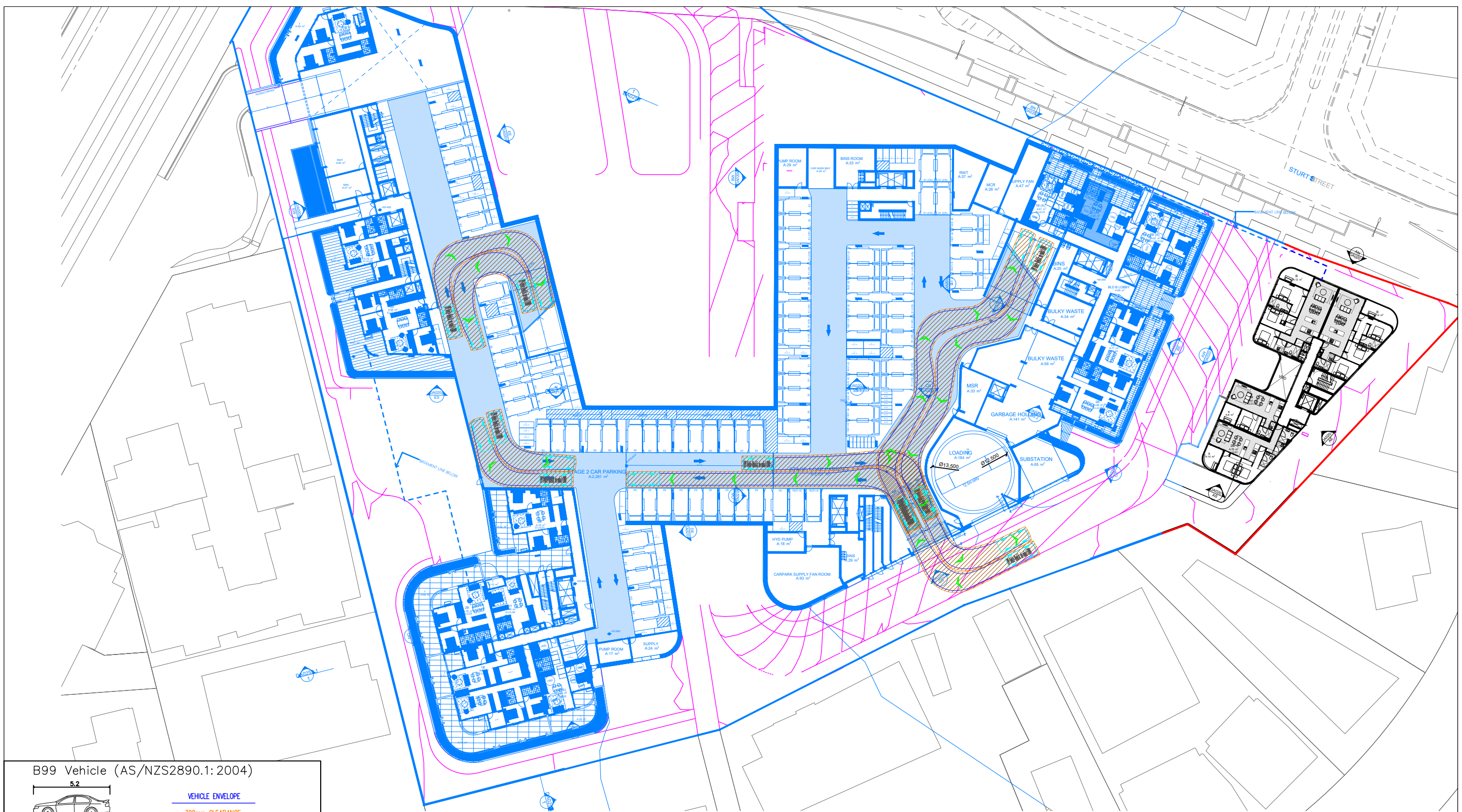
Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE [Ped ped Dist] m		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec						sec	m	m/sec
South: Adderton Road												
P11	Stage 1	200	211	51.8	LOS E	0.7	0.7	0.93	0.93	227.5	210.9	0.93
P12	Stage 2	200	211	54.6	LOS E	0.7	0.7	0.96	0.96	230.5	211.0	0.92
East: New Link Road												
P2	Full	200	211	51.8	LOS E	0.7	0.7	0.93	0.93	225.6	208.6	0.92
North: Adderton Road												
P31	Stage 1	200	211	54.6	LOS E	0.7	0.7	0.96	0.96	230.5	211.0	0.92
P32	Stage 2	200	211	51.8	LOS E	0.7	0.7	0.93	0.93	229.2	212.9	0.93
All Pedestrians		1000	1053	52.9	LOS E	0.7	0.7	0.94	0.94	228.7	210.9	0.92

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

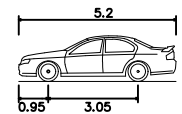
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Appendix D. Swept Path Assessment



B99 Vehicle (AS/NZS2890.1: 2004)



VEHICLE ENVELOPE

300mm CLEARANCE

Overall Length 5.200m
Overall Width 1.940m
Overall Body Height 2.000m
Min Body Ground Clearance 0.312m
Track Width 1.840m
Lock to Lock Time 4.00 sec
Curb to Curb Turning Radius 6.30m

CONSULTANTS		
MASTERPLAN	<input type="checkbox"/> BATES SMART	T: 02 8354 9100
URBAN & LANDSCAPE	<input type="checkbox"/> HASSELL	T: 02 9161 2000
CIVIL ENGINEER	<input type="checkbox"/> J WYNDENHAM PRINCE	T: 02 4750 3388
OPTIC / HERITAGE / TOWN PLANNING	<input type="checkbox"/> UNIS	T: 02 9233 7621
TRAFFIC ENGINEER	<input type="checkbox"/> ASON GROUP	T: 02 9083 6601
FIRE ENGINEER	<input type="checkbox"/> AFFINITY FIRE	T: 02 9134 0580

CONSULTANTS		
ACCESSIBILITY	<input type="checkbox"/> WALL TO WALL CONSULTING	T: 0402 850 870
ACOUSTIC	<input type="checkbox"/> WHITE HORSE CONSULTING	T: 0408 728 303
STRUCTURAL ENGINEER	<input type="checkbox"/> ROBERT BIRD	T: 02 8246 3260
WASTE MANAGEMENT / WIND CONSULTANT	<input type="checkbox"/> SLR	T: 02 9428 9168

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#plusarchitecture

FOR INFO	
PROJECT Telopea Masterplan Lot 5-7 Telopea 2117 Stage 1A Residential	DRAWING TITLE LOWER GROUND FLOOR PLAN
SCALE 1:300 @A1	PLOT DATE 13/07/2021
DATE 17/02/2020	CHECKED DC
DRAWN WS, DC, SH	DRAWING NO.
JOB NO.	

Notes:

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BASE PLANS SUPPLIED BY PLUS ARCHITECTURE ON 14/07/2021
SWEPT PATHS ADOPTING A MAXIMUM DESIGN SPEED OF 10 KM/HR AND 300MM CLEARANCE

Document Info:

Drawn by: Tanya Chen
File name: AG0796-15-v01.dwg

Client:

FRASERS PROPERTY AUSTRALIA

Project:

P0796
STURT STREET, TELOPEA

Drawing Title:

TELOPEA STAGE 1A
LOWER GROUND SWEPT PATH ASSESSMENTS

Date:

14-Jul-21

Scale @ A3:

1:600

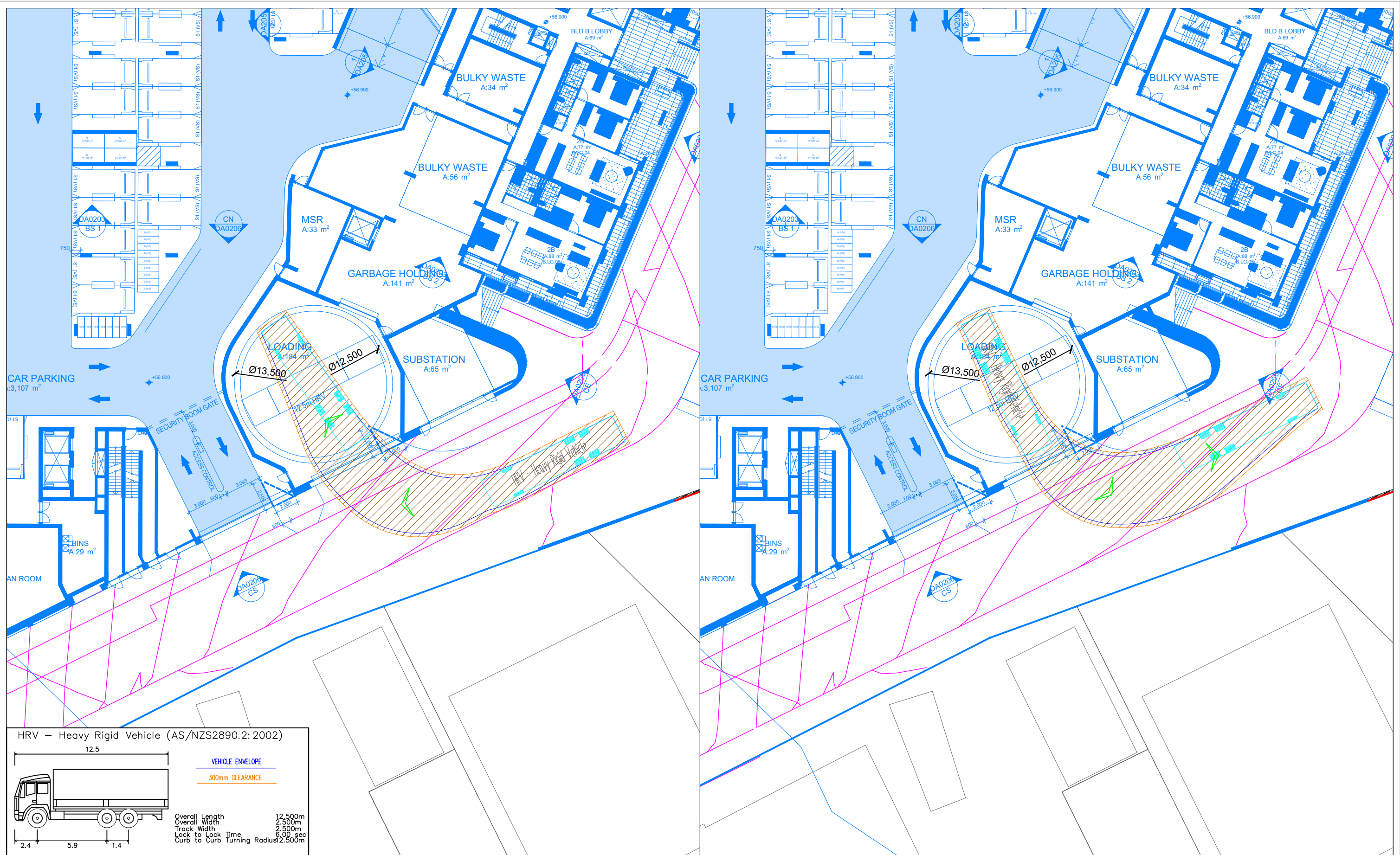
Drawing Number:

AG01

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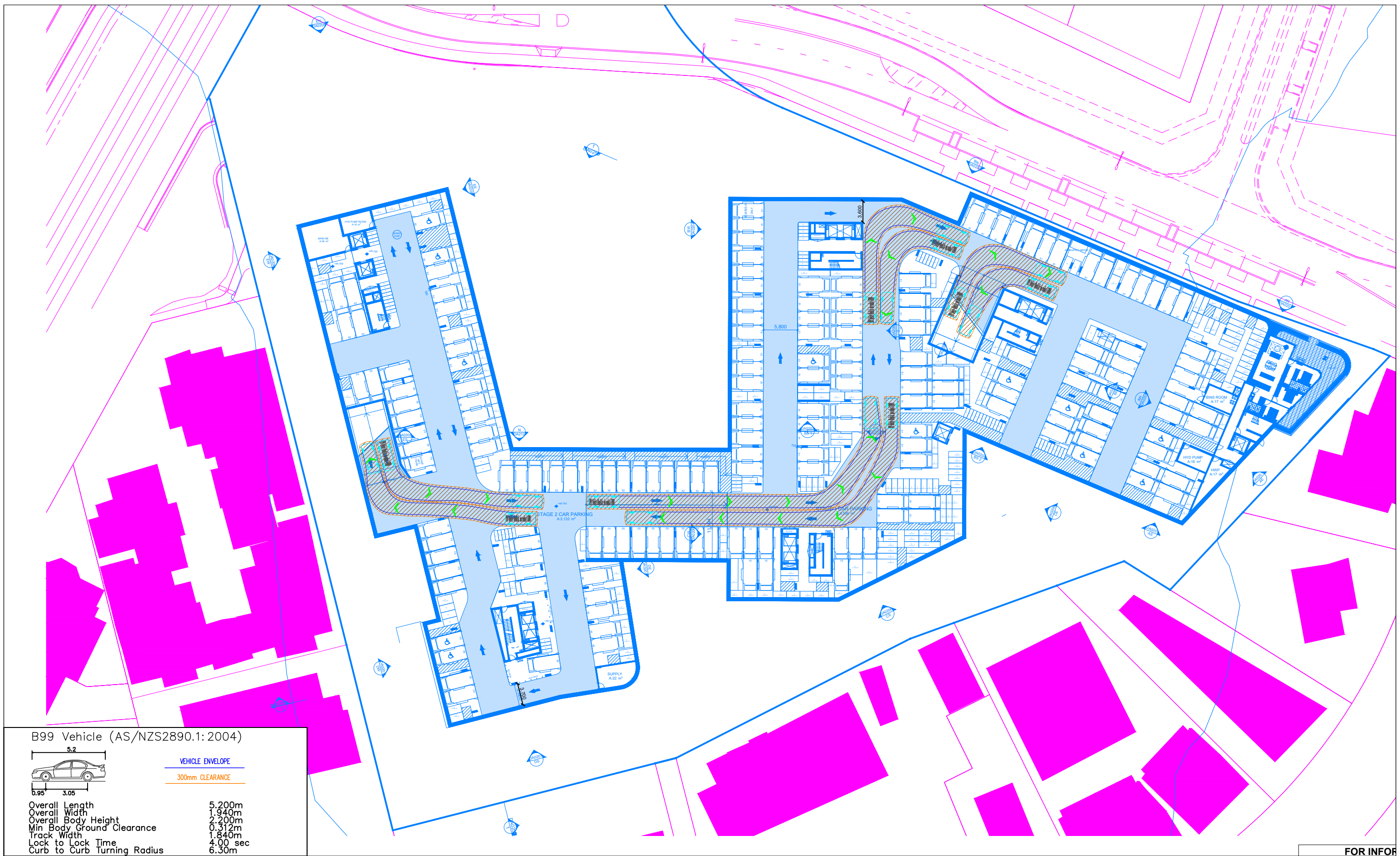
<p>Notes:</p> <p>THIS DRAWING IS PROVIDED FOR INFORMATION PURPOSES ONLY AND SHOULD NOT BE USED FOR CONSTRUCTION.</p> <p>BASE PLANS SUPPLIED BY PLUS ARCHITECTURE ON 14/07/2021</p> <p>SWEPT PATHS ADOPTING A MAXIMUM DESIGN SPEED OF 10 KM/HR AND 300MM CLEARANCE</p>	<p>Document Info:</p> <p>Drawn by: Tanya Chen</p> <p>File name: AG0796-15-v01.dwg</p> <p>Client:</p> <p>FRASERS PROPERTY AUSTRALIA</p>	<p>Project:</p> <p>P0796</p> <p>STURT STREET, TELOPEA</p> <p>Drawing Title:</p> <p>TELOPEA STAGE 1A</p> <p>LOWER GROUND HRV SWEPT PATH ASSESSMENTS</p>	<p>Date:</p> <p>14-Jul-21</p> <p>Scale @ A3:</p> <p>1:400</p> <p>Drawing Number:</p> <p>AG02</p>	<p>asongroup</p> <p>Suite 17.02, Level 17, 1 Castlereagh St Sydney NSW 2000</p> <p>info@asongroup.com.au</p>
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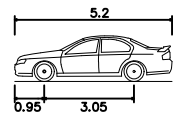
Notes: THIS DRAWING IS PROVIDED FOR INFORMATION PURPOSES ONLY AND SHOULD NOT BE USED FOR CONSTRUCTION. BASE PLANS SUPPLIED BY PLUS ARCHITECTURE ON 14/07/2021 SWEEP PATHS ADOPTING A MAXIMUM DESIGN SPEED OF 10 KM/HR AND 300MM CLEARANCE		Document Info: Drawn by: Tanya Chen File name: AG0796-15-v01.dwg		Project: P0796 STURT STREET, TELOPEA		Date: 14-Jul-21	
Client: FRASERS PROPERTY AUSTRALIA		Drawing Title: TELOPEA STAGE 1A BASEMENT 1 SWEEP PATH ASSESSMENT		Scale @ A3: 1:600		Drawing Number: AG03	
						Suite 17.02, Level 17, 1 Castlereagh St Sydney NSW 2000 info@asongroup.com.au	



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B99 Vehicle (AS/NZS2890.1: 2004)



VEHICLE ENVELOPE

300mm CLEARANCE

Overall Length 5.200m
Overall Width 1.940m
Overall Body Height 2.200m
Min Body Ground Clearance 0.312m
Track Width 1.840m
Lock to Lock Time 4.00 sec
Curb to Curb Turning Radius 6.30m

Notes:

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BASE PLANS SUPPLIED BY PLUS ARCHITECTURE ON 14/07/2021
SWEEP PATHS ADOPTING A MAXIMUM DESIGN SPEED OF 10 KM/HR AND 300MM CLEARANCE

Document Info:

Drawn by: Tanya Chen
File name: AG0796-15-v01.dwg

Client:

FRASERS PROPERTY AUSTRALIA

Project:

P0796
STURT STREET, TELOPEA

Drawing Title:

TELOPEA STAGE 1A
BASEMENT 2 SWEEP PATH ASSESSMENT

Date:

14-Jul-21

Scale @ A3:

1:600

Drawing Number:

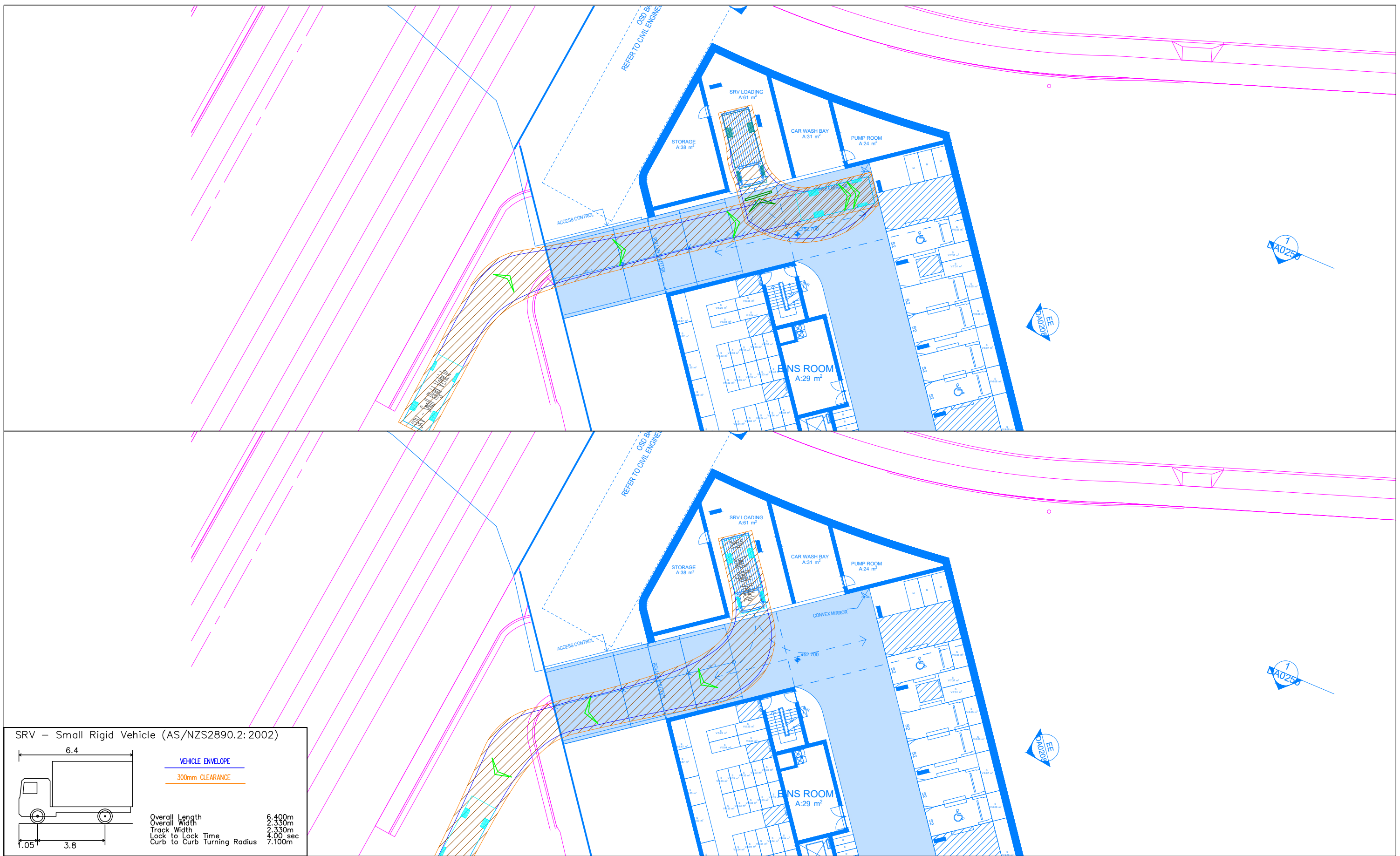
AG06

FOR INFO

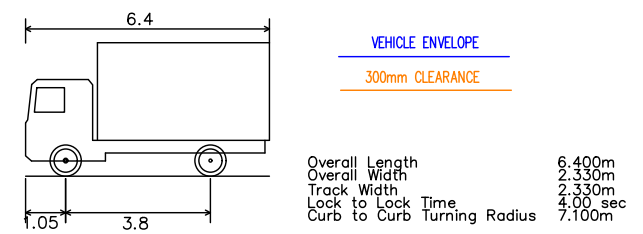
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SRV – Small Rigid Vehicle (AS/NZS2890.2:2002)



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SWEEP PATHS ADOPTING A MAXIMUM DESIGN SPEED OF 10 KM/HR AND 300MM CLEARANCE

Document Info:

Drawn by: Tanya Chen
File name: AG0796-15-v01.dwg

Client:

FRASERS PROPERTY AUSTRALIA

Project:

P0796
STURT STREET, TELOPEA

Drawing Title:

TELOPEA STAGE 1A
BASEMENT 1 SRV SWEEP PATH ASSESSMENT

Date:

14-Jul-21

Scale @ A3:

1:300

Drawing Number:

AG05

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BASE PLANS SUPPLIED BY PLUS ARCHITECTURE ON 14/07/2021
SWEEP PATHS ADOPTING A MAXIMUM DESIGN SPEED OF 10 KM/HR AND 300MM CLEARANCE

Document Info:

Drawn by: Tanya Chen
File name: AG0796-15-v01.dwg

Client:

FRASERS PROPERTY AUSTRALIA

Project:

P0796
STURT STREET, TELEPEA

Drawing Title:

TELEPEA STAGE 1A
BASEMENT 2 SWEEP PATH ASSESSMENT

Date:

14-Jul-21

Scale @ A3:

1:600

Drawing Number:

AG07

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