30 July 2020

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Willowtree Planning
(via email)

Attn: Travis Lythall, Senior Town Planner

RE: 657-703 Mamre Road, Kemps Creek – Amendments of the Exhibited Proposal (SSD 9522)

1 Introduction

Ason Group has been commissioned by Altis Property Partners (Altis) and Frasers Property Australia (FPA) to undertake a Traffic Impact Assessment (TIA) in relation to the development of warehouse logistics and industrial facilities hub at 657 - 769 Mamre Road in Kemps Creek (to be known as the Mamre South Precinct – MSP), within the Penrith City Council (PCC) Local Government Area.

A previous TIA supporting the original submission was prepared to respond to the requirements of the SEARs for the MSP proposal. Subsequently, the State Significant Development Application (SSD-9522) has undergone public exhibition with number of authorities requesting additional information to proceed with their respective assessment.

In response to those requests, several changes have been made to the Proposal, and Ason Group has been requested to provide a detailed comparison between the exhibited and the latest Proposals from transport and traffic perspective. In this regard, this letter has been prepared with reference to the following Traffic Impact Assessments:

- 0584r02v06 SSD TIA_657-703 Mamre Rd, Kemps Creek (Issue VI), Ason Group, 13 May 2019 (Previous TIA)
- 0584r04v4 SSD RtS TIA_657-769 Mamre Rd, Kemps Creek, Ason Group, 31 July 2020 (Latest TIA)

2 Overview of the Proposal

2.1 Removal of the Left In / Left Out Access on Mamre Road

The Previous TIA included a left in left out access to the Site from Mamre Road, however, this access has now been removed as part of the Latest TIA.

2.2 New Connection to the Lands to the South

The revised Master Plan included within the Latest TIA allows for a connection from the Site to the lands south of the Site (Southern Lots).

2.3 Built Form and Sequence Plans

The previous TIA has been prepared in the absence of detailed sequence plans and site access strategies on Mamre Road for each stage of the development.

It is emphasised that, in the latest Proposal, there will be no left in / left out access crossover on Mamre Road, all access to the Site is now provided via the signalised intersection of Mamre Road and Baker Lane (Southern Link Road (SLR)) for all stages.

Table 1 Comparison of Development Schedule and Site Access Strategy

Stages	Previous Proposal	Latest Proposal
Development Schedule		
Sequence 1A	163,671 m^2	166,225 m^2 (SSD Submission)
Sequence 1B	Not Applicable	421,820 m^2
Sequence 2	Not Applicable	421,820 m^2
Sequence 3	Not Applicable	421,820 m^2
MSP	**511,871 m^2 (Indicative; not part of the SSD)**	**421,820 m^2 (Indicative; not part of the SSD)**
Site Access Strategy on Mamre Road		
Sequence 1A	Primary access: Mamre Rd x Bakers Lane (SLR) Intersection Secondary Access: Left in / Left out access at the southern end of the Site	Mamre Rd x Bakers Ln (SLR) Intersection
Sequence 1B	Not Applicable	Mamre Rd x Bakers Ln (SLR) Intersection
Sequence 2	Not Applicable	Mamre Rd x SLR Intersection
Sequence 3	Not Applicable	Mamre Rd x SLR Intersection
MSP	To be confirmed	Mamre Rd x Bakers Lane (SLR) Intersection

For clarity – the latest TIA is based on the latest SSD with 16,225 m^2 of GFA which is modelled for Sequence 1A. However, for the purpose of conservative modelling assessment an indicative Ultimate Masterplan has been modelled for sequences 1B, 2 and 3 with a sum of 421,820 m^2.

Additionally, the Proposal now includes a new connection to the land to the south to provide access to the potential Southern Lots. In the previous TIA, future baseline SIDRA model has been developed for intersections along Mamre Road in the vicinity of the MSP in accordance with Mamre Road Upgrade strategy, and some additional improvements are suggested for the Mamre Road x Balers Lane (Southern Link Road) intersection, as shown below.

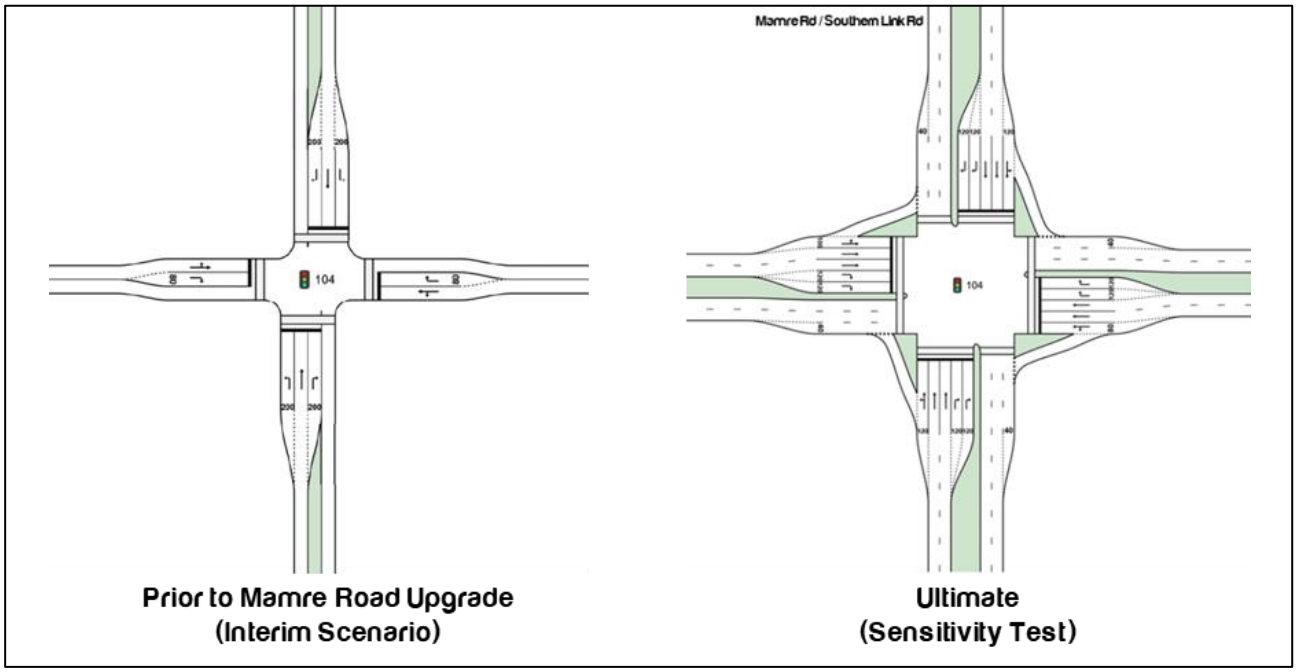

Figure 1: Intersection Configurations – Mamre Rd / Bakers Ln (SLR) – Previous Proposal

As detailed site access strategies on Mamre Rad were provided as part of the latest Proposal, SIDRA modelling for the future baseline scenario has now been undertaken with different proposed layout of the Mamre Road x Balers Lane (Southern Link Road) intersection for each sequence.

Sequence 1A:

An interim access connection which will be provided to/from the upgraded Mamre Road / Bakers Lane signalised intersection as presented in **Figure 1**. This sequence plan has been proposed to accommodate the SSD with 166,225 m^2 GFA and up to 2025 design year.

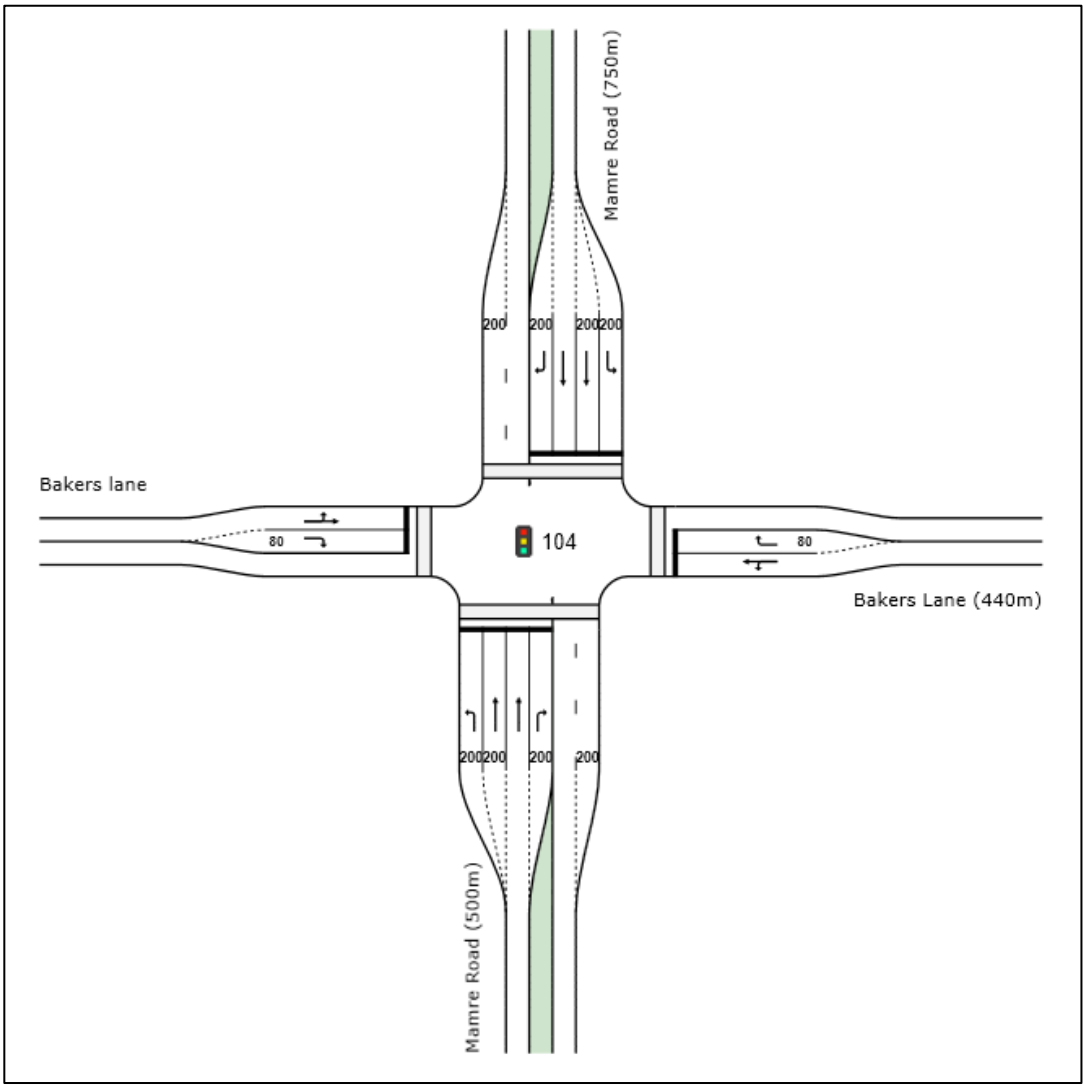

Figure 2: Sequence (1A) Mamre Road / Bakers Lane Signal layout

Sequence 1B:

It is noteworthy that Frasers and Altis intend to upgrade Mamre Road in this vicinity to 2 lanes in each direction (4 lanes in total) from the southern boundary of the Site to the signalised intersection of Mamre Road/Distribution Drive.

Sequence 1B will therefore, follow Sequence 1A and is proposed to be delivered following completion of 4-lanes on Mamre Road from the southern boundary of the Site to the existing signalised intersection of Distribution Drive (offered by FPA and Altis). This Sequence is proposed to essentially accommodate the traffic from the ultimate masterplan (with 421,820 m^2) and the Southern Lots as well as the background growth after 2025. This Sequence shall be implemented should Altis OR FPA (OR Southern Lots) wish to increase the GFA over 166,225m^2 or by end of 2025 (Sequence 1A design life).

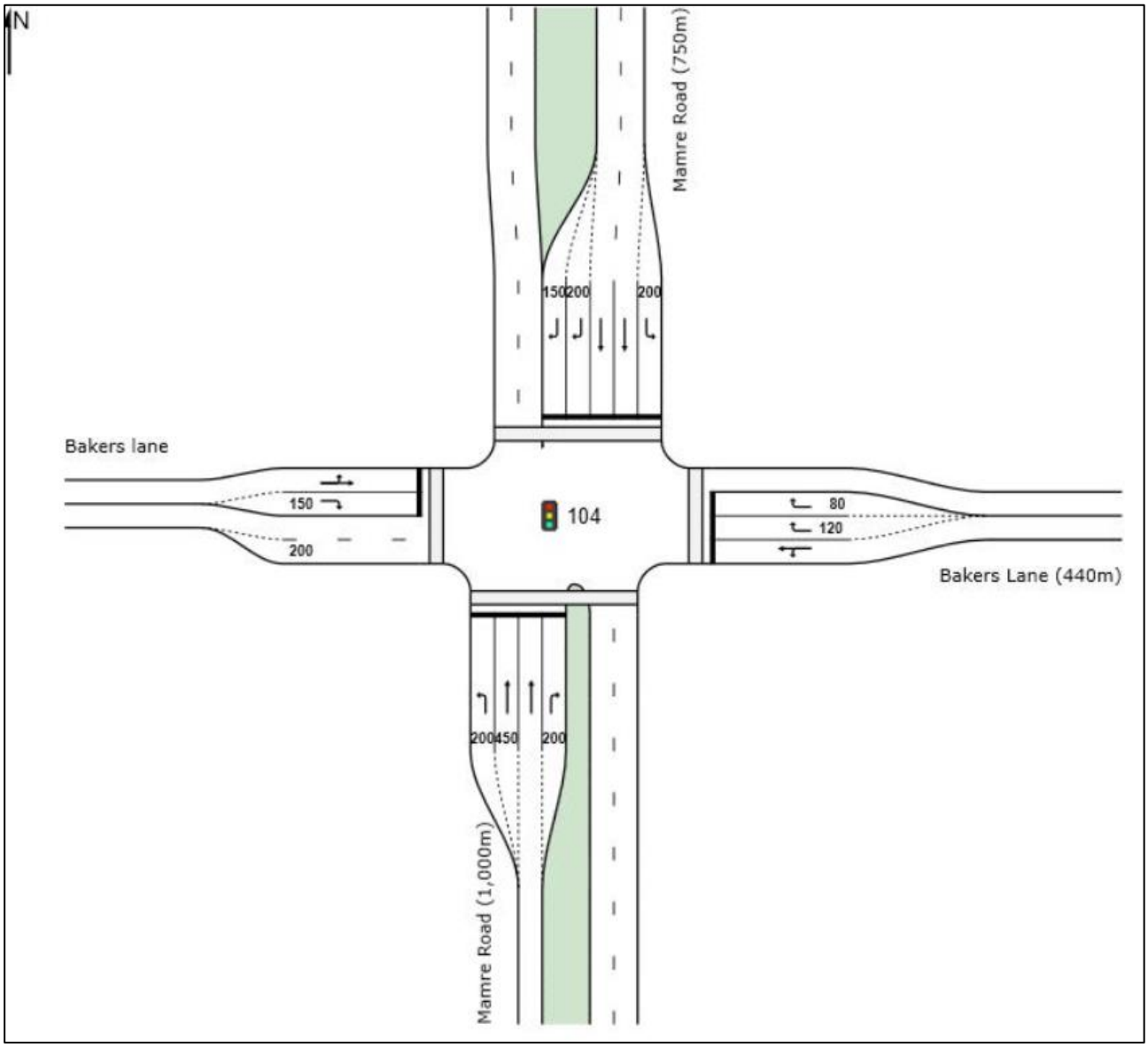

Figure 3: Sequence (1B) Mamre Road / Bakers Lane Signal layout

Sequence 2:

Sequence 2 will be delivered in the longer-term future and when Southern Link Road (SLR) will be delivered by TfNSW and terminated as a cul-de-sac at the access to the Site.

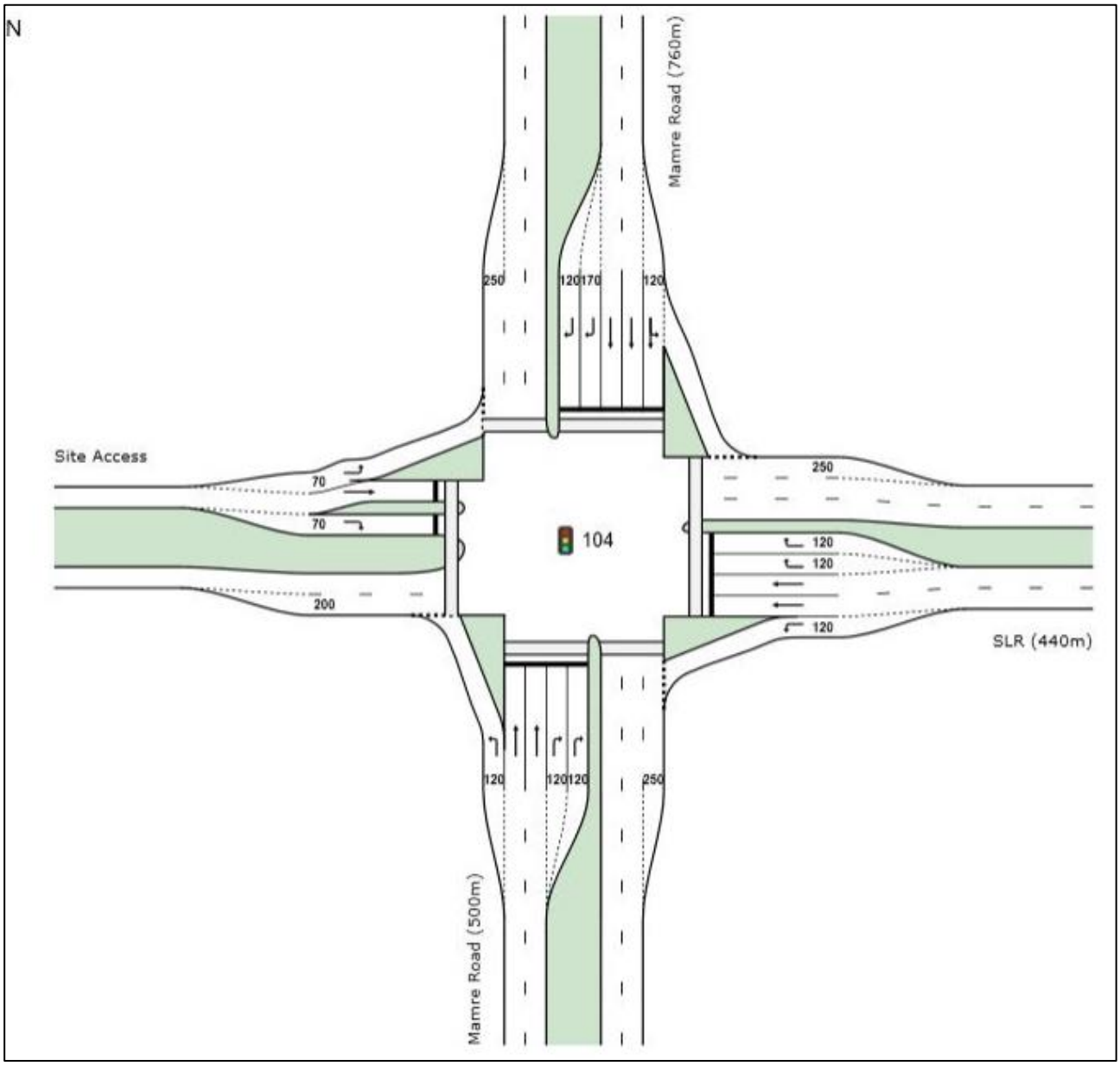

Figure 4: Sequence (2) Mamre Road / Bakers Lane Signal layout

Sequence 3:

Sequence 3 shows the ultimate configuration of the SLR in future and when it is extended west through the Site.

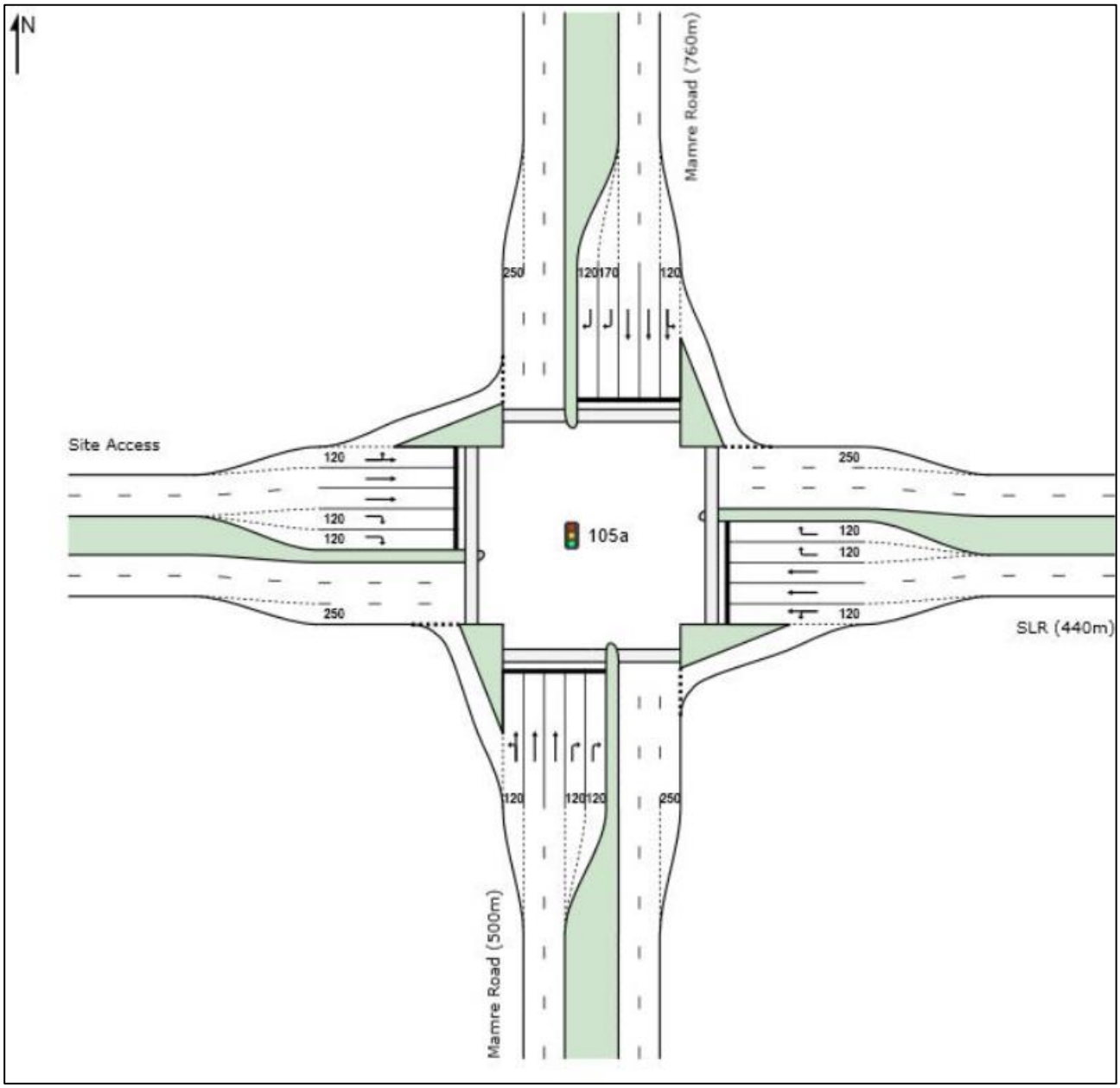

Figure 5: Sequence (3) Mamre Road / Bakers Lane Signal layout

3 Traffic Generation

In response to Penrith City Council (PCC) and TfNSW's request of inclusion of likely traffic generation of the Southern Lots in the network analysis, a sum of 20,000 m^2 GFA has been allowed in the modelling to account for potential development to the south.

Trip generation rates have NOT been changed since the previous assessments, however, due to the provision of detailed MSP sequence plans and the additional allowance of the Southern Lots, the total trip generation associated with the Proposal has been changed, as summarised in the below table.

Table 2: Traffic Generation Comparison

Time Period	Previous Proposal		Latest Proposal	
	(Sequence 1A GFA only) (without Potential Southern Lots)	(Potential MSP total) (without Potential Southern Lots)	(Sequence 1A GFA only 166,225 m^2) (without Potential Southern Lots)	(Potential MSP total, 421,820 m^2) (with Potential Southern Lots)
AM Peak	405	1,266	410	1,042
PM Peak	297	931	302	768
Daily	4,322	13,581	4,388	11,136

4 Operational Traffic Impacts

In the previous TIA, the operational traffic impacts have only been assessed for the following 2 scenarios:

- Interim Scenario: Existing baseline + SSDA (sequence 1A only)
- Sensitivity Test: Future baseline + Potential MSP total

However, the latest TIA includes a total of 5 traffic scenarios modelled in additional to the 2018 existing base case, as listed below.

Table 3: Summary of Modelling Scenarios – Latest TIA

Scenario	Year		Access Strategy Phase				Includes Southern Lots
	2025	2026	Sequence 1A[4] (Bakers Ln)	Sequence 1B (Bakers Ln)	Sequence 2 SLR	Sequence 3 SLR (with extension)	
0[1]	☑		☑				
1	☑			☑			
1	☑			☑			☑
2		☑			☑		
2		☑			☑		☑
3		☑				☑	
3		☑				☑	☑

Note: 1) Undertaken as part of the original SSDA. Sensitivity testing for isolated SIDRA has been undertaken for 2025.

5 Parking Requirement

Car parking schedule is now included in the latest TIA, which indicates sufficient car parking provision for the entire MSP and each individual lot.

6 Preliminary Construction Traffic Management Plan

The latest TIA now includes a preliminary Construction Traffic Management Plan to provide an understanding of the likely traffic impacts during the constriction period.

7 Design Review

Design review including swept path analysis for the proposed warehouses/industrial facilities have been included in the latest TIA submission package, whereas the previous TIA did not include a design section.

We trust the above is of assistance and please contact either the undersigned or Ali Rasouli should you have any queries or require further information in relation to the above.

Yours sincerely,

Sara Hu
Traffic Engineer – Ason Group
Email: sara.hu@asongroup.com.au

[END]

Traffic Impact Assessment

Proposed Warehouse, Logistics and Industrial Facilities Hub
657-769 Mamre Road, Kemps Creek

Ref: 0584r04v4
3/08/2020

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Appendices

1 Introduction

1.1 Background

Ason Group has been commissioned by Altis Property Partners (Altis) and Frasers Property Australia (FPA) to undertake a Traffic Impact Assessment (TIA) in relation to the development of warehouse logistics and industrial facilities hub at 657 - 769 Mamre Road in Kemps Creek (the Site, also referred to Mamre South Precinct (MSP) in this report), within the Penrith City Council (PCC) Local Government Area. A previous TIA (referred to as 0584r02v06 and dated 13/05/2019) supporting the original submission was prepared to respond to the requirements of the SEARs for the MSP proposal (refer **Appendix A**). Subsequently, the State Significant Development Application (SSD-9522) has undergone public exhibition with number of authorities requesting additional information to proceed with their respective assessment.

Accordingly, this revised TIA is prepared as a Response to Submissions (RtS) to the relevant authorities. As part of the RtS the following major changes – related to traffic and transport – to the revised submission has been provided:

- A revised SSDA plan for the site (refer **SSD-MRM-DA-009 / Issue H**).
- Removal of the proposed left in / left out access road from Mamre Road,
- Allowance for a connection to/from the neighbouring lands to the south of the Site (the Southern Lots).
- Offering to advance delivery of 2 lanes on Mamre Road in each direction from southern boundary of the Site to Distribution Drive.

Accordingly, this TIA includes revised traffic modelling to assess the impact of the above-mentioned changes to the proposal. Furthermore, a separate RtS table has been prepared and provided in **Appendix B** which outlines Ason Group's response to the relevant comments raised by various authorities.

1.2 Original Submission

For context the exhibited Master Plan (exhibited MP) on the DPIE website allowed for the following built-form:

- A total of **163,671m^2** of building floor area, comprising:
  - 155,411m^2 warehouse/industrial GFA; and
  - 8,260m^2 of ancillary office.

1.3 Overview

The revised Master Plan (Revised MP) – as proposed for this SSD submission – has been developed having regard for the comments and feedback from the assessing authorities review during the exhibition period. Revised Development comprises a total of 8 Lots, including 10 warehouse/industrial facility and associated offices as shown in **Figure 1**. The proposed access strategy follows 3 Sequences which will be discussed in detail later in this report. Furthermore — as can be seen in below figure — the proposal offers a connection to the neighbouring sites to the immediate south.

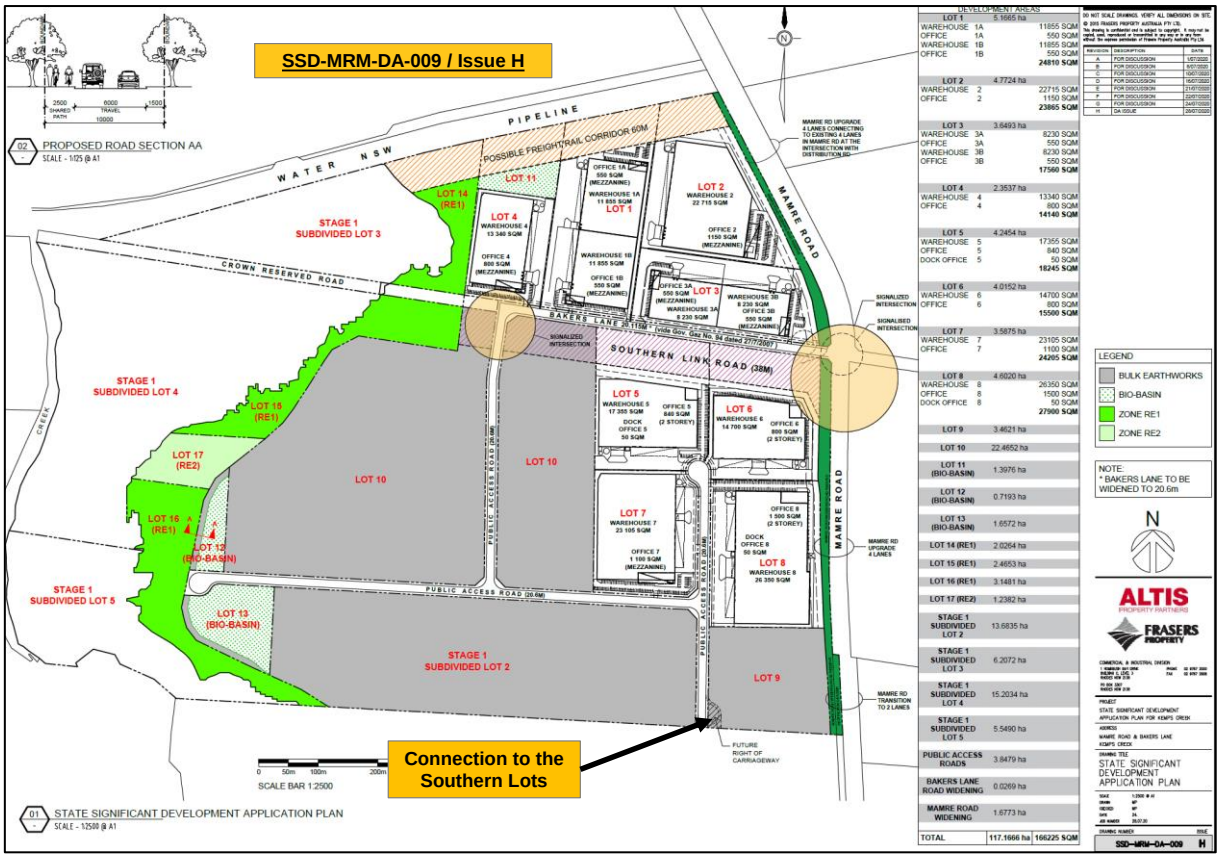


Figure 1: MSP Revised SSDA Master Plan

A total of **166,225m²** of building floor area is proposed under Revised MP, comprising:

- 157,735 m² warehouse/industrial GFA; and
- 8,490 m² of ancillary office.

It is important to note that the Lots included in the grey area in the following Figure 2 are excluded from this SSD and will be subject to future DA submissions.

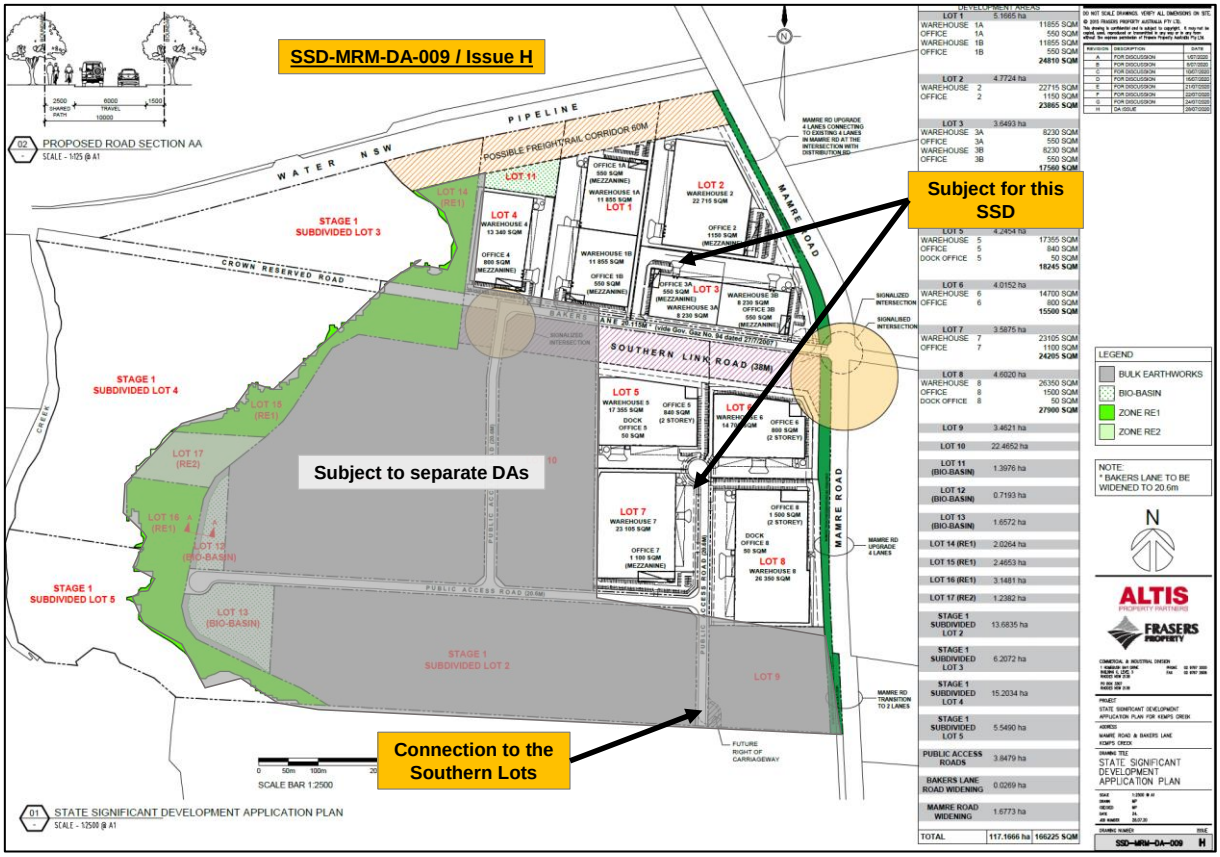


Figure 2: Lots Subject to this SSD

Additionally, an indicative ultimate Master Plan (Ultimate MP), which includes this SSD and the remaining portion of the land (subject to separate DAs – Lots included in the grey area above), has been provided to Ason Group for the purpose of conservative traffic modelling / assessment. The indicative Ultimate MP comprises a total of 18 Lots, including 26 warehouse/industrial facility and associated offices.

A total of **421,820m²** of building floor area is estimated under the indicative Ultimate MP, comprising:

- 401,250 m² warehouse/industrial GFA; and
- 20,570 m² of ancillary office GFA.

It is noteworthy that the SIDRA modelling undertaken as part of this TIA (for sequences 1B, 2 and 3) refers to the Ultimate MP GFAs for conservativeness. However, SIDRA modellings undertaken for Sequence 1A has been undertaken for the SSD GFAs (166,225 m^2).

1.4 Response to SEARs

The Secretary's Environmental Assessment Planning Requirements (SEARs) for the preparation of an Environmental Impact Statement (EIS) is included in **Appendix A**.

A summary of relevant SEARs requirements relating to the traffic and transport related aspects is presented in **Table 1**. This also includes reference to the relevant sections of the TIA where each requirement is addressed.

Table 1: Response to SEARs

Requirement	Relevant Section of TIA
A quantitative Traffic Impact Assessment prepared in accordance with relevant Penrith City Council, Austroads and Roads and Maritime Services guidelines.	This Traffic Impact Assessment (TIA), covers all critical expectations of the Council, Austroads and RMS for traffic reporting and is in line with the TIA structure and checklist suggested by TfNSW (TfNSW, *Draft Guide to Transport Impact Assessments*, 2018).
Details of all daily and peak traffic and transport movements likely to be generated by the development (vehicle type, public transport) during construction and indicative operation.	A preliminary Construction Traffic Management Plan (CTMP) is included in Section 7; which provides context for the anticipated traffic volumes of the Proposal on the surrounding road network. It is expected that separate Construction Traffic Management(s) would be prepared for each Lot which will discuss the anticipated construction traffic volumes. Furthermore, the operational traffic estimates and relevant modelling has been undertaken in Section 5.
Impacts on the safety and capacity of the surrounding road network and access points, using SIDRA or similar modelling, to assess impacts from current traffic counts and cumulative traffic from existing and proposed development.	SIDRA results for relevant modelling scenarios have been undertaken and included in appendices of this report. The SIDRA performance reviews is also addressed in Section 5. It is noteworthy that the upgrades envisaged to the existing Mamre Road / Bakers Lane for different sequences will improve the pedestrian safety at this intersection by providing a pedestrian crossing opportunity.
Demonstrate that sufficient loading/unloading, car parking and pedestrian and cyclist facilities have been provided for the development.	Relevant parking rates based on Roads and Maritime Services (RMS) *Guide to Traffic Generating Developments*, are included in Section 6.1. These rates are sought for the SSDA and addressed in Section 6.2. Pedestrian and cycling amenity will be provided through the Site's internal roads. It is expected that connectivity to individual developments is detailed further for each lot separately.

Requirement	Relevant Section of TIA
Details and a justification of access to, from and within the site (vehicular and pedestrian).	Details of SSD access arrangements are provided in Section 2.
Details of road upgrades, new roads or access points required for the development, if necessary.	A number of road / intersection upgrades are envisaged in this vicinity. Identified upgrades to support non-development traffic is discussed in Section 4. Additional upgrades (or required connections to the regional road network) are also discussed in this section. Of particular importance, the Applicant now seeks to fund advancement of upgrade works on Mamre Road from the southern boundary of the Site to the existing Distribution Drive signalised intersection.
Consideration of the western connection of the Southern Link Road and road widening requirements for Mamre Road, in consultation with RMS.	The Proposal make allowance for — but does not rely upon — a western extension of the Southern Link Road. Reference should be made to the above Sections with regard to future road upgrades both “with” and “without” development of this Site. The 3 sequences of road works to Bakers Lane are proposed and detailed further in Section 2.
Consideration of the proposed Western Sydney Freight Line, including the width of the corridor and how this will be considered in the layout of the proposal, in consultation with TfNSW.	Consultation has been undertaken with TfNSW and, in response, the Proposal sets aside land along the northern boundary to allow for the possible future freight rail corridor.
Details of how the proposal would allow connection to future land uses to the south of the site.	A connection is proposed which connects the Site to the immediate neighbouring lots to the south.

A preliminary CTMP has been provided in Section 7. It is expected that a detailed CTMP will be prepared for the SSD prior to issue of the Construction Certificate (CC). That CTMP will have detailed information regarding the construction work and its associated traffic impact on the surrounding road network.

1.5 Objectives

The key objectives of this TIA are:

- To assess the impact of the proposal on the performance of the road network in the proximity of the Site; and
- Where required, identify necessary upgrades to mitigate any adverse impacts.

1.6 Methodology

To achieve the above objectives, Ason Group has undertaken the following tasks:

- Commissioned and reviewed traffic data for the key intersections in the locality. Key local intersection traffic volumes were surveyed to assist with developing a Base Case.
- Reviewed the planned future road network to establish context for any required road infrastructure improvements.
- Assessment of the traffic generation and distribution characteristics of the proposal.
- Review of the intersection capacity (using SIDRA Network) on the surrounding road network under different sequential access options.

1.7 References

In preparing this report, Ason Group has referenced the following documents:

- *Mamre West Land Investigation Area, Planning Proposal Mamre Road, Western Sydney Priority Growth Area*, prepared by Ason Group (ref: 0124r03v3) and dated 23 February 2016 (MWP TIA).
- *Stage 1 SSDA, Proposed Warehouse and Logistics Hub; 585-649 Mamre Road, Orchard Hills, Western Sydney Priority Growth Area* (the SSD TIA), prepared by Ason Group (ref: 0124r04v2) and dated 5 April 2016. This report was submitted as a State Significant Development (SSD) application for Stage 1 (Lots 7, 8 and internal roads) of the Mamre West Precinct.
- *Mamre Road Upgrades Kerrs Road to M4 Motorway*, prepared by Roads and Maritime Services (RMS) and dated November 2017.
- *0584r02v06 SSD TIA_657-703 Mamre Rd, Kemps Creek, Issue VI*, Ason Group Issue VI, 13/05/2018.

In addition, this TIA also refers to the following general guidelines and Standards:

- Roads and Maritime Services (RMS), *Guide to Traffic Generating Developments*, 2002 (RMS Guide).
- Roads and Maritime Services (RMS), *Guide to Traffic Generating Developments Updated Traffic Surveys*, 2013.

2 Overview of Proposal

A detailed description of the proposal is provided in the planning submissions prepared by Willowtree Planning. Reference should also be made to the relevant SSD plan included in **Figure 1**. Nevertheless, a summary of the key aspects relevant to this traffic and transport assessment are provided below.

The SSD comprises of:

- A total of **166,225 m^2** of building floor area, comprising:
  - 157,735 m^2 warehouse/industrial GFA; and
  - 8,490 m^2 of ancillary office.
- A number of internal road connections.
- A connection to the adjoining neighbours to the south.
- Designated 60.0 m of land to be set-aside for a possible freight rail corridor on the northern boundary of the development.

Furthermore, the proposed access strategy for the SSDA is envisaged to be delivered in 3 sequences as explained in the figures and descriptions below.

Sequence 1A:

An interim access connection which will be provided to/from the upgraded Mamre Road / Bakers Lane signalised intersection. In summary, this Sequence will be in place to accommodate traffic associated with the revised SSD MP with a sum of **166,225 m^2 of GFA** of development and up to a design life of up to 2025.

Accordingly, any additional GFA from the Site and/or from the lands to the south of the Site (Southern Lots) will have to wait until completion of Sequence 1B. Furthermore, in the event that no additional GFA is expected for the Site or for the Southern Lots, the Project Team shall ensure that the Sequence 1B will be constructed and delivered by end of 2025.

For context a reduced copy of Sequence 1A layout is provided, together with the planned Costin Roe functional roadworks plan, in **Figure 3**.

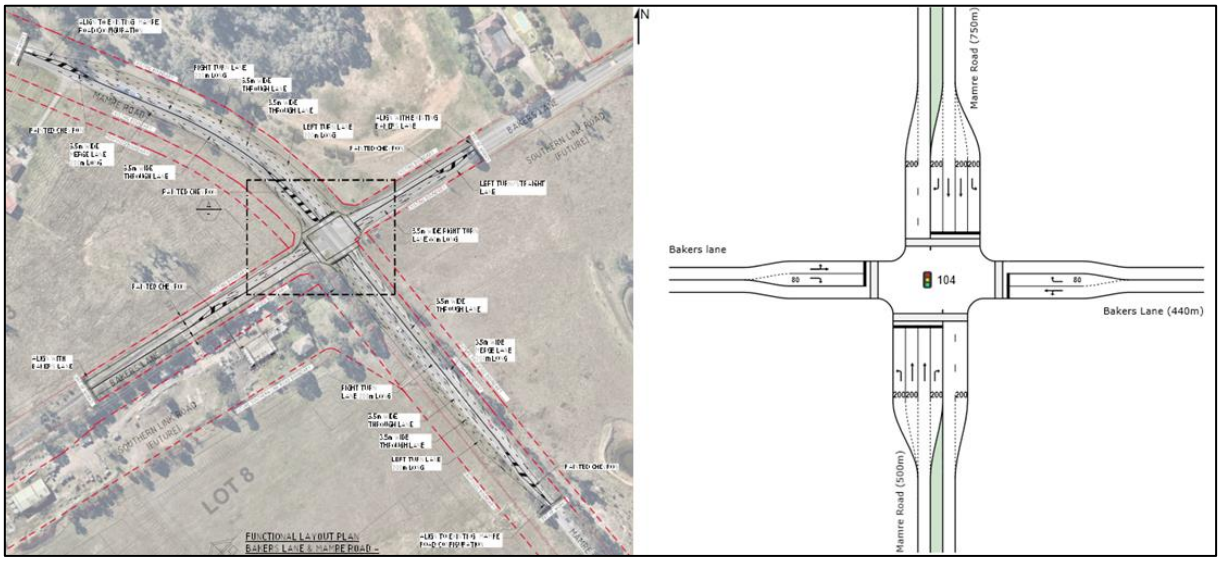


Figure 3: Sequence (1A) Mamre Road / Bakers Lane Signal layout

Sequence 1B:

Sequence 1B will follow Sequence 1A and is proposed to be delivered following completion of 4-lanes on Mamre Road from the southern boundary of the Site to the existing signalised intersection of Distribution Drive (offered by FPA and Altis). This Sequence comprises some additional upgrades to the Sequence 1A at Bakers Lane signalised intersection with Mamre Road and is proposed to essentially accommodate the traffic from the SSD and the Southern Lots as well as the background growth after 2025. This Sequence shall be implemented should Altis OR FPA (OR Southern Lots) wish to increase the GFA over 166,225 m^2 or by end of 2025 (Sequence 1A design life). A copy of the SIDRA layout related to this Sequence as well as the Costin Roe design are provided in **Figure 4**.

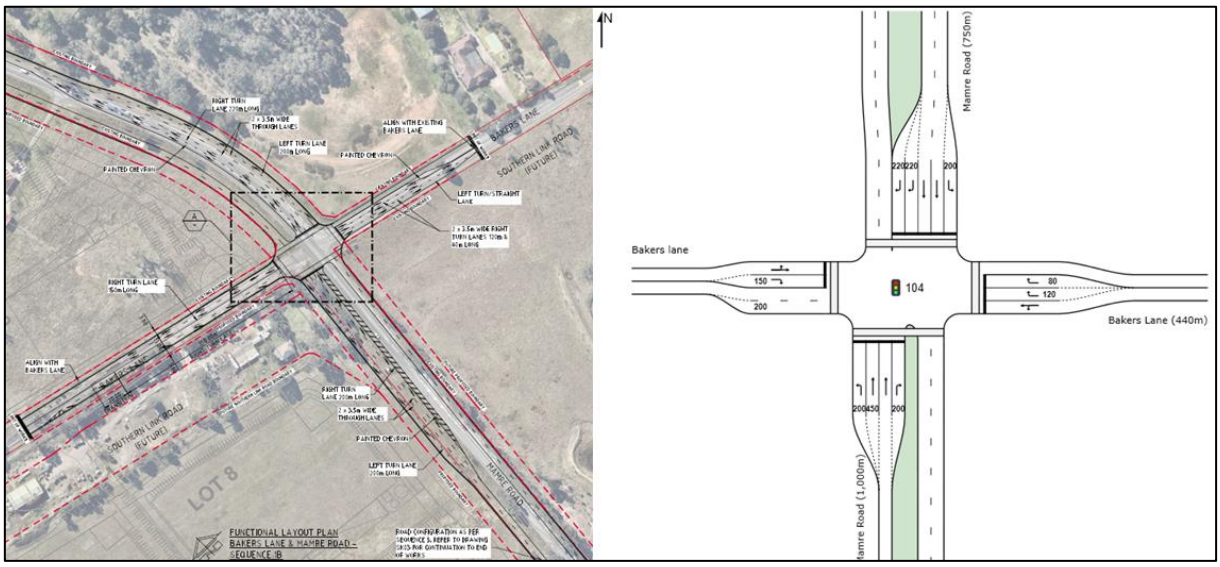


Figure 4: Sequence (1B) Mamre Road / Bakers Lane Signal layout

Sequence 2:

Sequence 2 will be delivered in the longer-term future and when Southern Link Road (SLR) will be delivered by TfNSW and terminated as a cul-de-sac at the access to the Site.

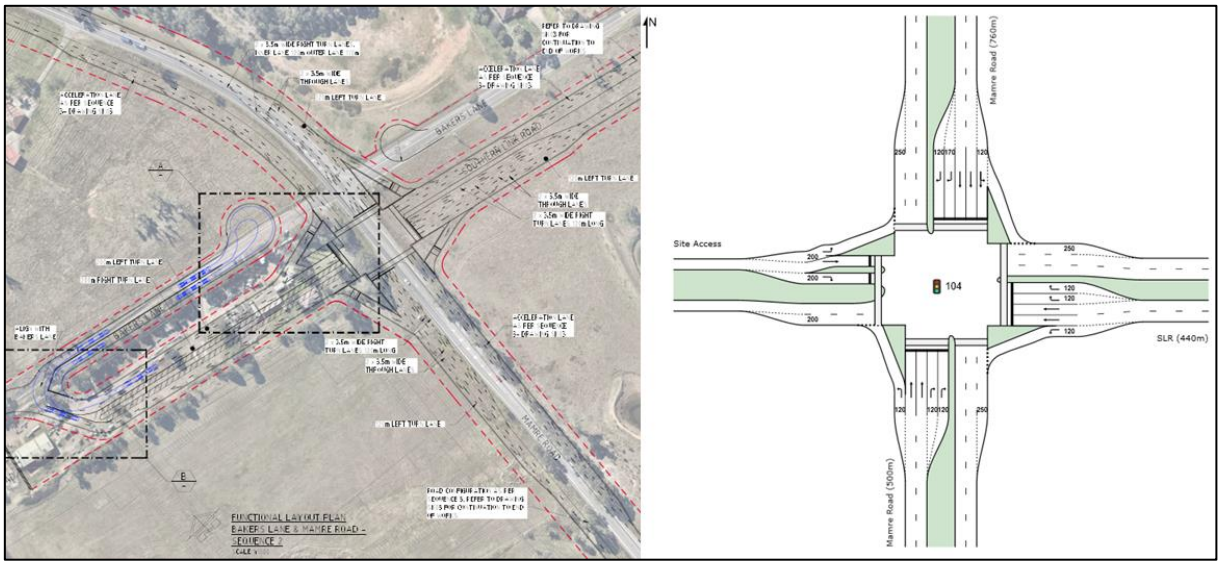


Figure 5: Sequence (2) Mamre Road / Bakers Lane Signal layout

Sequence 3:

Sequence 3 shows the ultimate configuration of the SLR in future and when it is extended west through the Site.

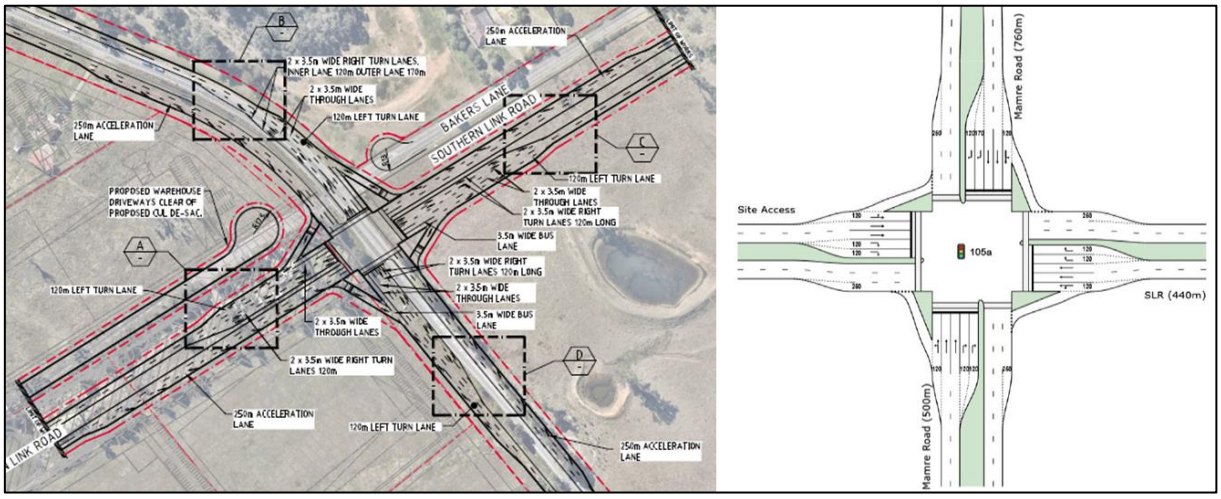


Figure 6: Sequence (3) Mamre Road / Bakers Lane Signal layout

3 Existing Conditions

3.1 Site Location

The Site is located within the Penrith City Council LGA and is bordered by Mamre Road to the east; the Sydney Water Warragamba Pipeline to the north; South Creek to the west; and rural land to the south. Properties included within the Site are as follows:

- Lot 34 in DP1118173
- Lot X in DP421633
- Lot Y in DP421633
- Lot 1 in DP1018318
- Lot 22 in DP258414

3.2 Existing Site Traffic Generation

The Site does not currently generate any significant traffic volumes. As such, and for the purposes of a conservative assessment, the additional traffic associated with the development is considered as a NET increase in traffic to the surrounding road network.

3.3 Road Network

With reference to **Figure 5**, the key local roads influenced by the application include:

- **Mamre Road** – an arterial road servicing traffic between the Great Western Highway and M4 to the north and Elizabeth Drive to the south. In the vicinity of the MSP, Mamre Road generally provides 2 lanes for two-way traffic, with additional through movement and turning infrastructure at key intersections, specifically at Erskine Park Road and James Erskine Drive. Mamre Road has a posted speed limit of 80km/h.
- **Erskine Park Road** – a sub-arterial road servicing traffic between the Great Western Highway and M4 to the north, Mamre Road to the south-west, as well as linking Lenore Drive (Erskine Park Link Road) to the M7 to the east. Erskine Park Road provides 4 lanes for two-way traffic north-east from the intersection of Mamre Road. Erskine Park Road has a posted speed limit of 70km/h.
- **James Erskine Drive** – a local industrial access road, providing local access for the Erskine Park Industrial Precinct, which lies to the east of Mamre Road, northeast of the Precinct. James Erskine Drive provides 4 lanes for two-way traffic and provides additional turning infrastructure on the approach to Mamre Road. On-street parking is permitted; however, demand for this parking is low and therefore rarely used.
- **Bakers Lane (East)** – a two lane undivided Local Road which operates under a 60km/hr sign posted speed limit. Bakers Lane (East) provides primary access to a number of local schools and

colleges in the area, with School Zone speed limit restrictions (40km/h) in operation during school peak periods. At discussed previously, at present, Bakers Lane (East) forms a Signalised T intersection with Mamre Road (see also Section 3.4 below).

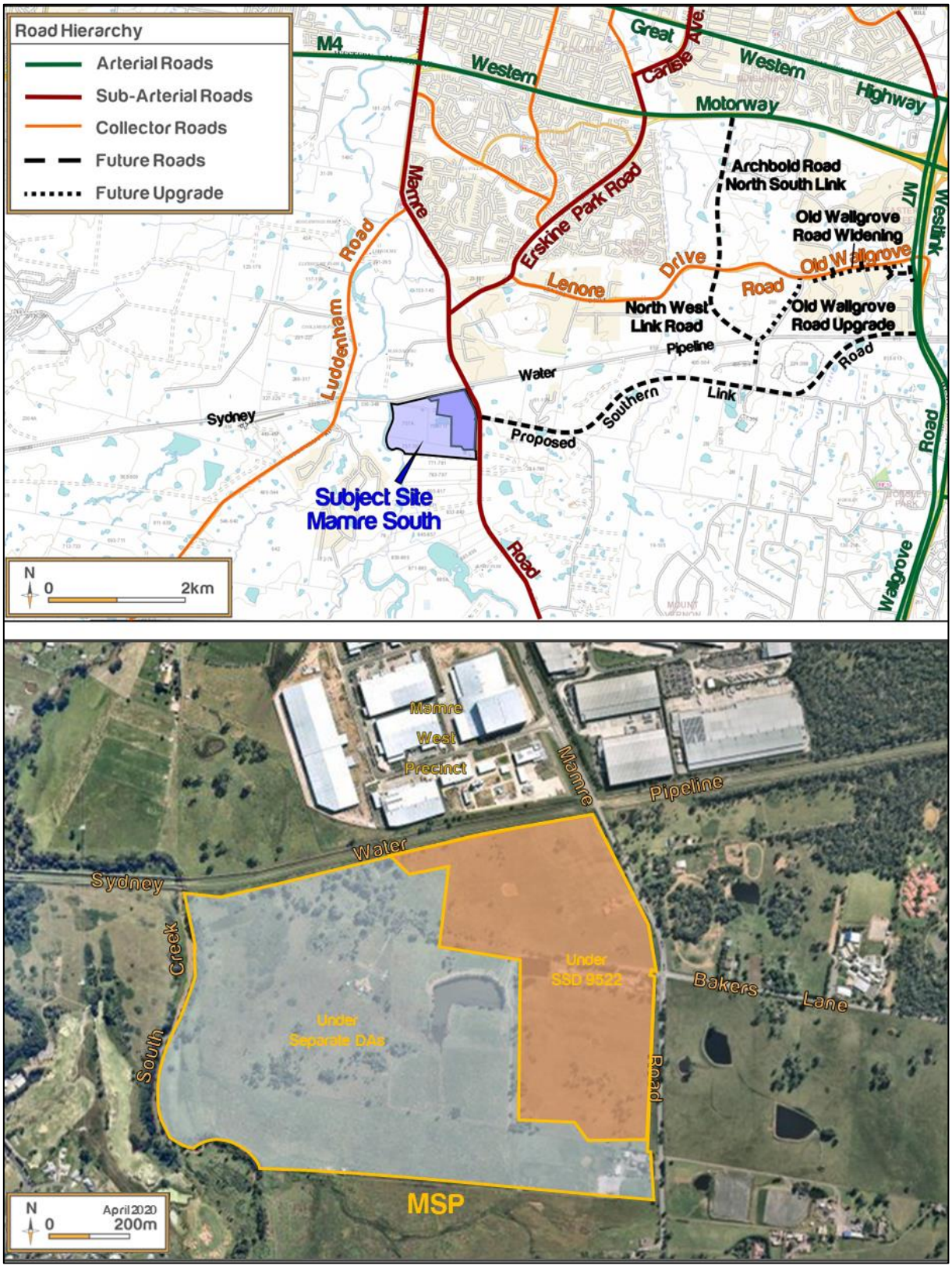


Figure 7: Existing Road Network

3.4 Key Intersections

The key intersection in the vicinity of the MSP is the existing Signalised intersection of Mamre Road / Bakers Lane which is shown in **Figure 8**.

Figure 8: Existing Intersection of Mamre Road / Bakers Lane

At present this intersection effectively operates as a signalised T intersection, with the Mamre Road and Bakers Lane (East) approaches under signal control, while the minor Bakers Lane (West) approach operates under priority (Stop) control.

It is noted that there are currently no restrictions to movements to or from Bakers Lane (West).

The performance of this intersection during a typical weekday AM and PM peak periods in May 2018 have been assessed further to on-site observations and using SIDRA Network software.

Other key intersections in this vicinity which have been reviewed as part of this TIA are shown in **Figure 7** and are as follows:

1. Signalised intersection of Mamre Road / Erskine Park Road.
2. Signalised intersection of Mamre Road / James Erskine Drive.
3. Signalised intersection of Mamre Road / Distribution Drive.

Figure 9:Key intersections in the vicinity of the Site

3.5 Existing Network Traffic Volumes

Existing traffic volumes at key intersections in this vicinity were surveyed during weekday AM and PM peak periods, on a typical weekday in May 2018. The results of the traffic surveys are detailed in **Appendix C**.

3.6 Intersection Performance – Existing Baseline (May 2018)

The performance of the key intersections in the vicinity of the MSP has been analysed using the SIDRA Network computer program which outputs a range of performance measures, in particular:

- Average Vehicle Delay (AVD) – The AVD (or average delay per vehicle in seconds) for intersections also provides a measure of the operational performance of an intersection and is used to determine an intersection's Level of Service (see below). For signalised intersections, the AVD reported relates to the average of all vehicle movements through the intersection. For priority (Give Way, Stop & Roundabout controlled) intersections, the AVD reported is that for the movement with the highest AVD.
- Level of Service (LOS) – This is a comparative measure that provides an indication of the operating performance, based on AVD.

The following table provides a recommended baseline for assessment as per the RMS Guide:

Table 2 : Level of Service Criteria for Intersections

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way and Stop Signs
A	less than 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	More than 70	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode or major treatment.

The results of the SIDRA Network analysis are summarised in **Table 3**.

Table 3: SIDRA Network Results – Existing Baseline (May 2018)

Intersection	Period	Intersection Delay	Level of Service
Mamre Road / Bakers Lane	AM	18.2	B
	PM	47.2	D
Mamre Road / Distribution Drive [1]	AM	na	na
	PM	na	na
Mamre Road / James Erskine Drive	AM	12.3	A
	PM	15.1	B
Mamre Road / Erskine Park Road	AM	23.9	B
	PM	29.1	C

Notes 1: The traffic associated with the signalised intersection of Mamre Road / Distribution Drive was not fully settled at the time of the surveys and as such the baseline does not allow for assessment of this intersection. Furthermore, this intersection will be converted to a LILO in longer term future.

It can be seen from above that Mamre Road / Bakers Lane intersection operates at its capacity under existing PM peak hour conditions with an average delay of 47.2 seconds. A number of upgrades have been identified for the road network to increase the intersection capacity and support further growth, as discussed in Section 4.

3.7 Public Transport

3.7.1 Existing Bus Services

The existing bus services in the vicinity of the MSP are shown in **Figure 8**.

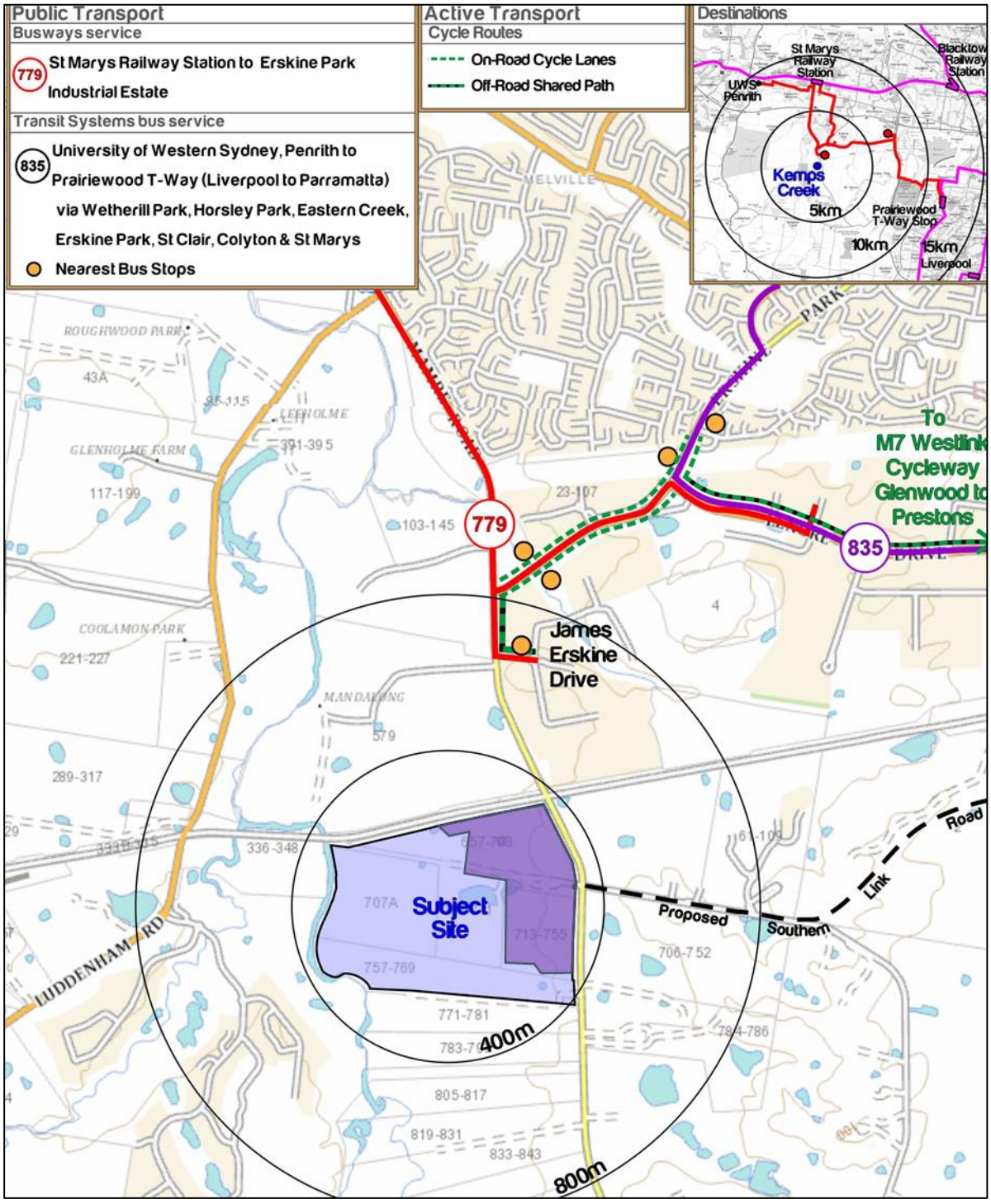


Figure 10: Public Transport Services & Cycling Routes

It is evident that the MSP is not directly serviced by public transport operations at this time. Notwithstanding, opportunities for future connections have been identified and are discussed further below.

3.7.2 Future Bus Service Opportunities

While it is apparent that the MSP will be well served by a future road network, it is nonetheless important that people have the opportunity to use public transport, which requires significantly improved connectivity to the broader area in the first instance. This could be possible through an extension of the 779-bus route to include stops within the future internal road network of the MSP. This route would provide a direct connection to St Mary's railway station and to the broader transport network.

The planning of bus services in Sydney is governed by the *NSW Service Planning Guidelines*, which aims to establish Strategic Transport Corridors and a hierarchy of bus route types that:

- link to Regional centres (such as Penrith and Mt Druitt).
- pass through patronage generators such as district centres, TAFE colleges, hospitals and universities.
- connect with other transport modes (trains, ferries and other buses).
- are multifunctional (serving journeys to work, education, shopping and recreation).
- are direct and frequent.
- meet the network planning principles.

It is also the case that the establishment of public transport services as early as possible in the development stages of the area is important to achieve a culture of public transport use from the outset. To make public transport a viable choice in the study area, the services should ideally:

- integrate with existing bus services in the area.
- connect to regional centres of Penrith, Mt Druitt and Blacktown.
- in the long term connect to areas such as Leppington in the South West Growth Centre, Prairiewood and the Liverpool to Parramatta T-Way.

3.8 Cycling

There are opportunities and infrastructure for cyclists to access the Site via Mamre Road which have been readily allowed for and proposed as part of the Mamre Road Upgrade project.

Furthermore, bicycle lanes are provided along Erskine Park Road and sections of Mamre Road, in addition to carriageway shoulders that could also be utilised by cyclists. Notwithstanding, there are opportunities to improve cycling infrastructure through the provision of shared paths along Mamre Road fronting the MSP that could be connected to paths along Erskine Park Road.

4 Future Context

4.1 Planned Upgrades

It is known that the road network in the general vicinity of the Site is due to receive significant road upgrades in future as part of the Mamre Road Upgrade strategy.

As discussed before, the Applicant(s) propose to upgrade Mamre Road to 2-lanes in each direction (4-lanes in total) from the southern boundary of the Site to the existing Distribution Drive signalised intersection. It is noted that these upgrade works are separate to that proposed by RMS (now part of TfNSW) as part of other regional projects (Mamre Road Upgrades and Southern Link Road projects). Modelling assumptions for the major proposed road upgrades in the immediate vicinity of the Site are extracted from Mamre Road Upgrade document prepared by RMS in November 2017 and also reference has been made to the RMS website.

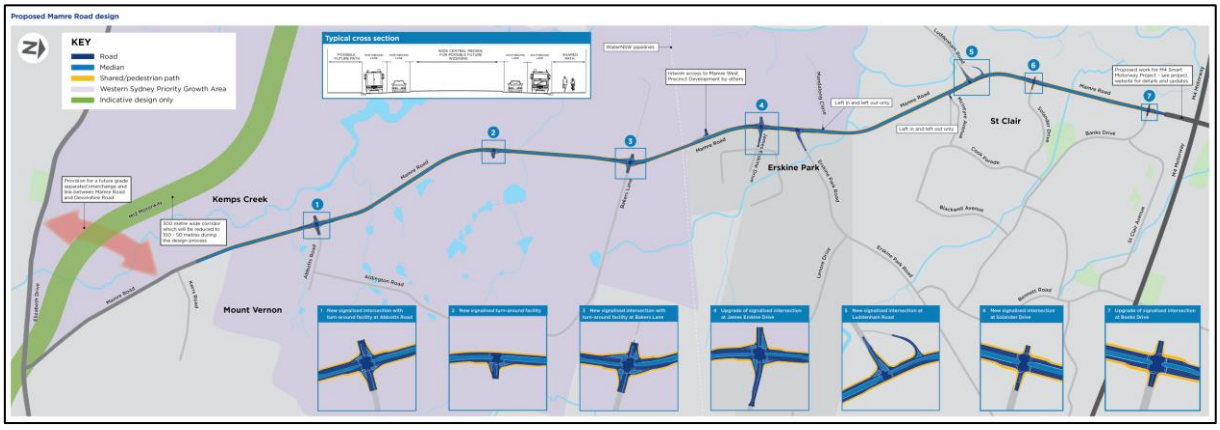


Figure 11: Mamre Road Upgrade Concept Design

In February 2019, the NSW Government announced $220M funding for a 3.8-kilometre section of the Mamre Road Upgrade between M4 Motorway and Erskine Park Road (including this signal) to:

"…transform the existing two-lane undivided road into a four-lane divided road, providing a safer, higher-capacity link. The Mamre Road upgrade will also be future proofed, allowing another two lanes to be added down the track,"

This makes it clear that the additional upgrades offered by the Applicant(s) will form a continuation of RMS planned upgrades and provides significant link capacity improvements for this vicinity. Furthermore, based on our recent liaison with the Mamre Road Upgrade Team at TfNSW (former RMS) the following timelines have been outlined for this regional upgrade:

- TfNSW (former RMS) are currently undertaking surveys to develop the concept design and have invited tenders for the concept design and environmental assessment. TfNSW expects to present this design to the community in early 2021,
- Construction is expected to start by 2023,
- The aim is to complete this upgrade work by 2026 in time for the airport,
- Late 2025 is TfNSW expected date for completion for Stage 1 regional upgrade including the intersection of Mamre Road and Erskine Park Road.

Accordingly, by late 2025 that Altis and FPA will construct the Mamre Road upgrades (to 4 lanes) from southern boundary of the Site and existing Distribution Drive, both upgrades offer a strategic benefit for the locality.

4.2 Future Network Layouts

Having regard for the above and for the modelling process as part of this TIA the following timing has been adopted:

- 2020 to 2025 construction and occupation of a sum of 166,225 m^2 of GFA development at the Site, with Sequence 1A access arrangement,
- 2025 for construction of Sequence 1B and full development GFA completion and occupation,
- 2026 expected the SLR connection to Mamre Road will be delivered as well as other regional upgrades to the key intersections as part of the Mamre Road Upgrade strategy (by RMS). Whilst Stage 2 of the Mamre Road Upgrade may be currently unfunded, it is expected that the substantial developer investments in the area (not limited to that of Altis / FPA in relation to the subject site) would be reasonably expected to bring forward network planning / funding for these works.

Furthermore, all modelling scenarios except the Sequence 1A scenario assume 2 lanes in both directions (4 lanes in total) on Mamre Road from the southern boundary of the Site to Distribution Drive — now offered by FPA and Altis as part of the Proposal to bring forward planned road infrastructure investment.

It is noted that James Erskine Drive / Mamre Road has been considered as a four-way signalised intersection after 2026; consistent with Mamre Road Upgrade plans and access strategy for the Mamre West Precinct (now referred to as First Estate).

Similarly, the Mamre Road / Distribution Drive intersection is modelled as a signalised T-junction in baseline scenario before being converted to a left-in, left-out intersection for 2026 in accordance with the access strategy for the Mamre West Precinct.

In consultation with TfNSW, it has been considered that the planned works associated with Mamre Road / Erskine Park Road in 2026 are likely to have been implemented prior to this – namely late 2025. Thus, the updated configuration of this intersection has been considered in modelling for 2025 Sequence 1B.

With reference to above, the following figures provide more detail in regard to the future intersection layouts as adopted for this study.

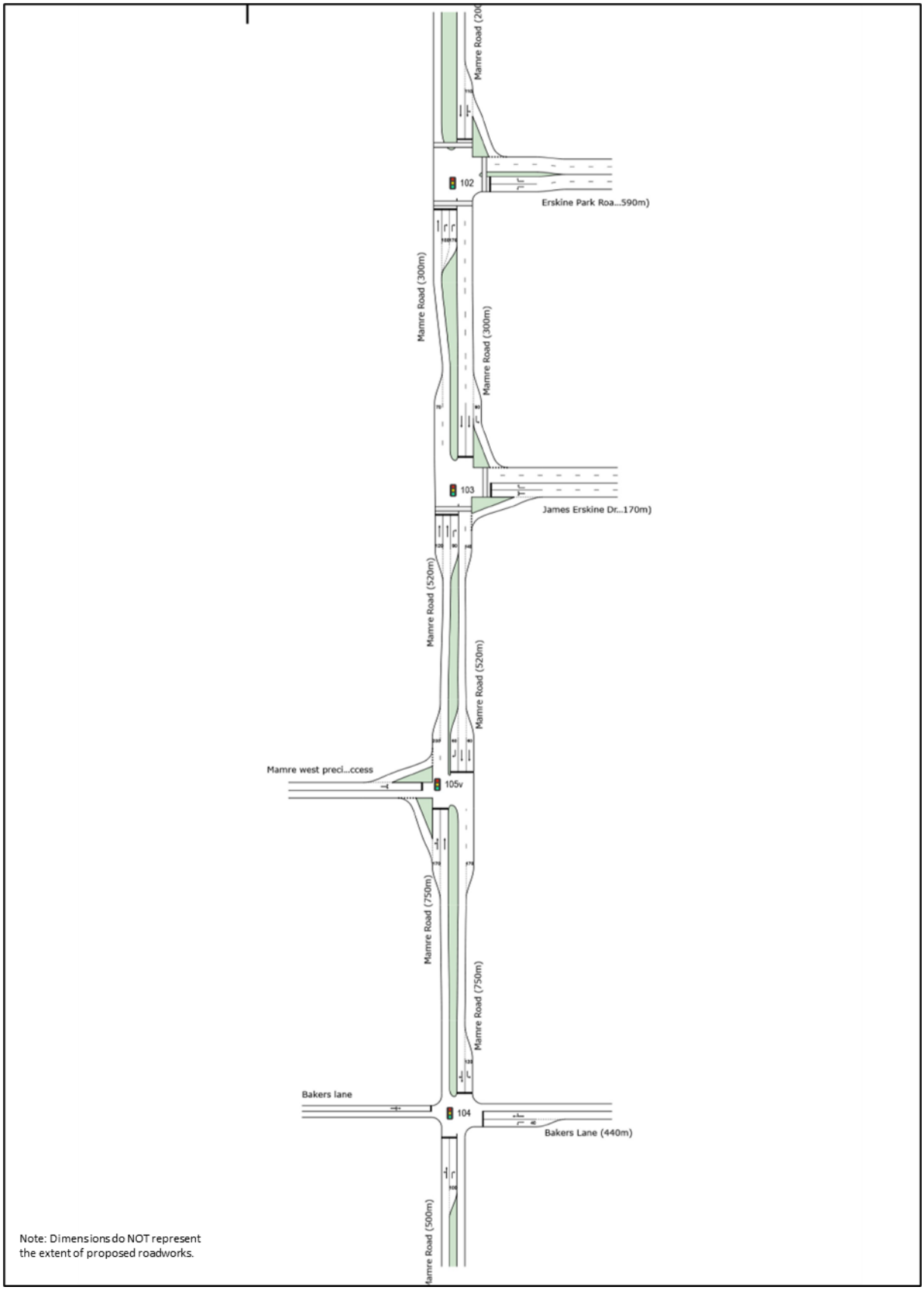


Figure 12: 2018 Existing Baseline Network

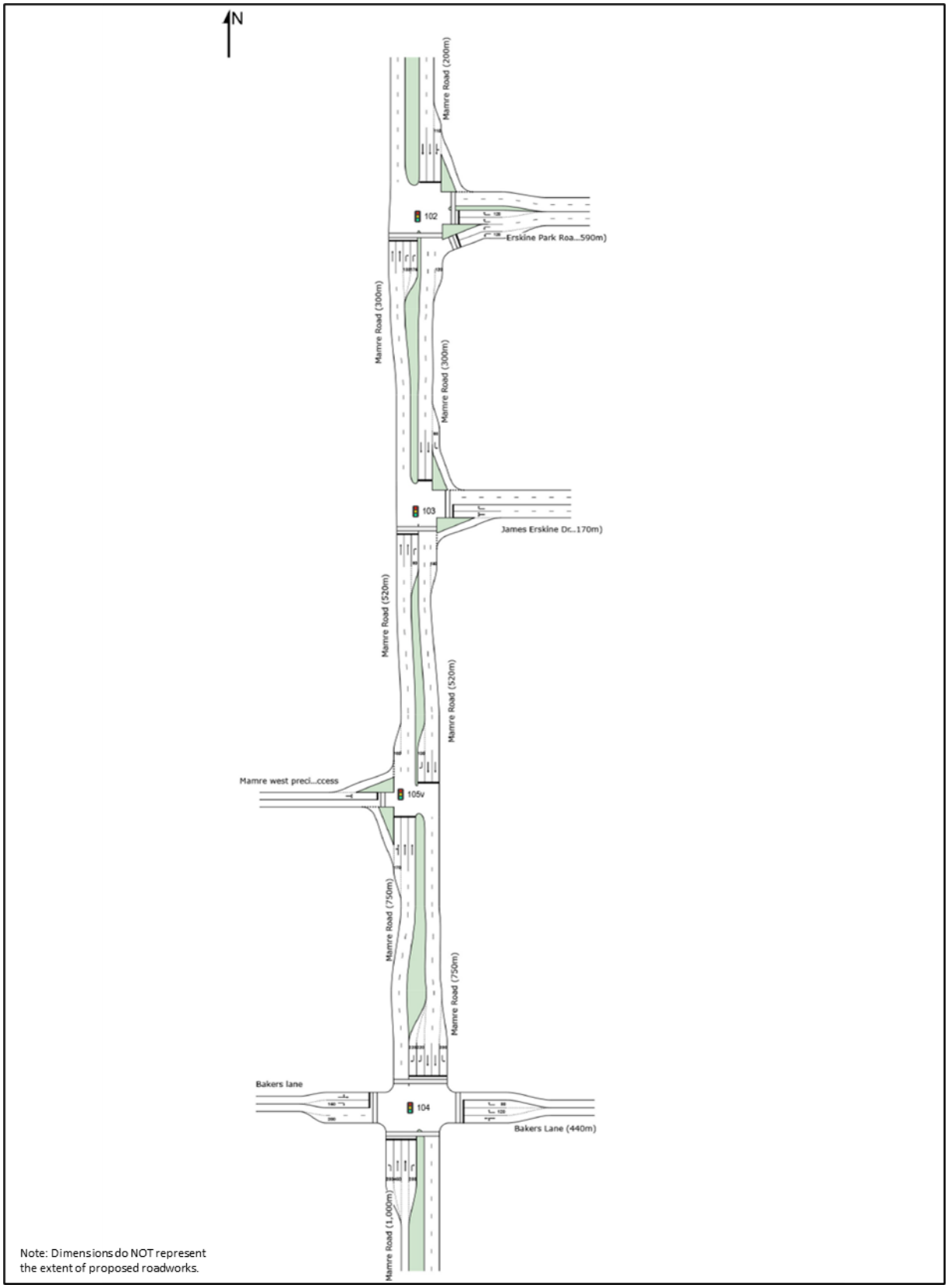


Figure 13: 2025 Future Network with Sequence 1B (Bakers Lane)

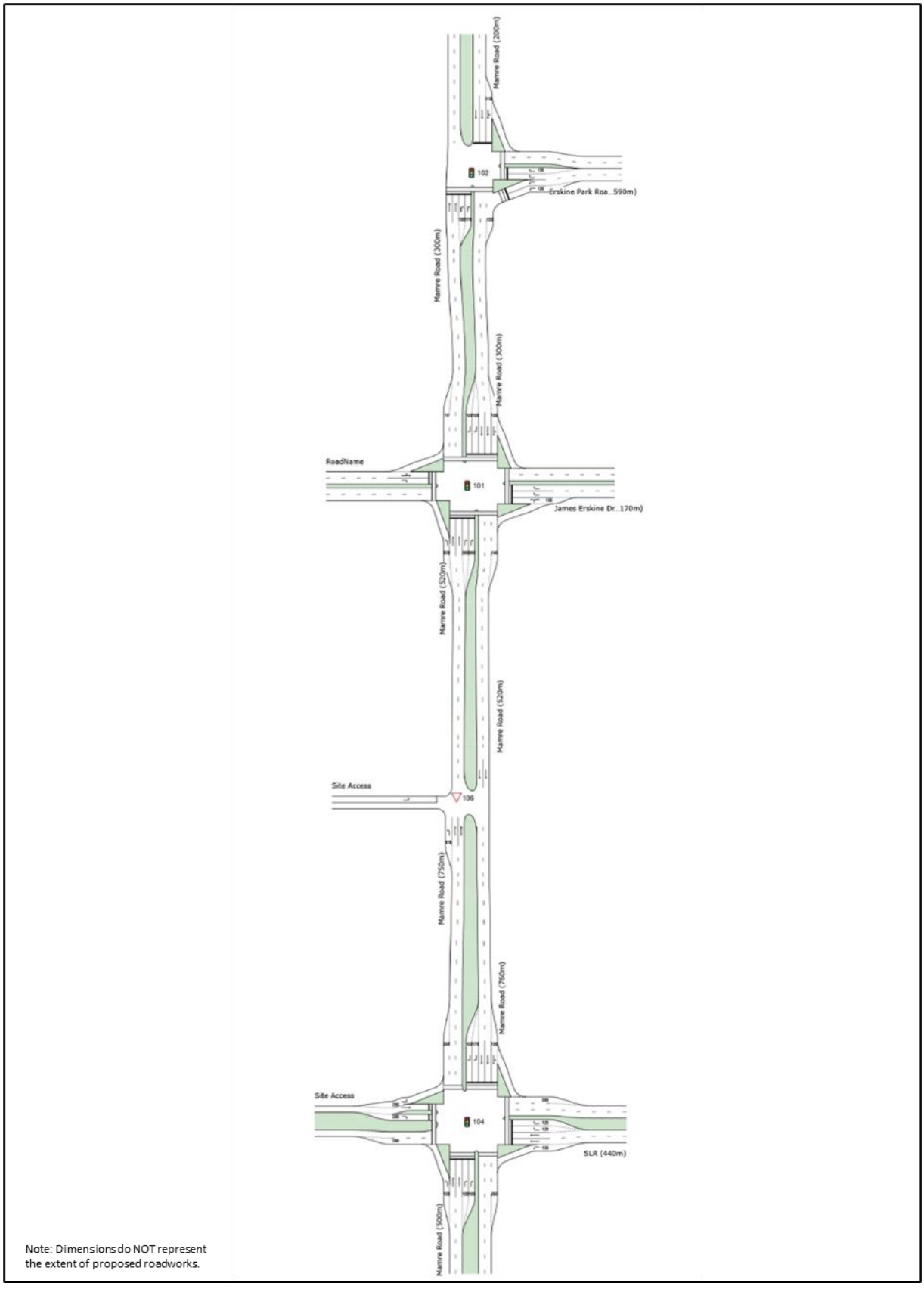


Figure 14: 2026 Future Network with Sequence 2 (SLR)

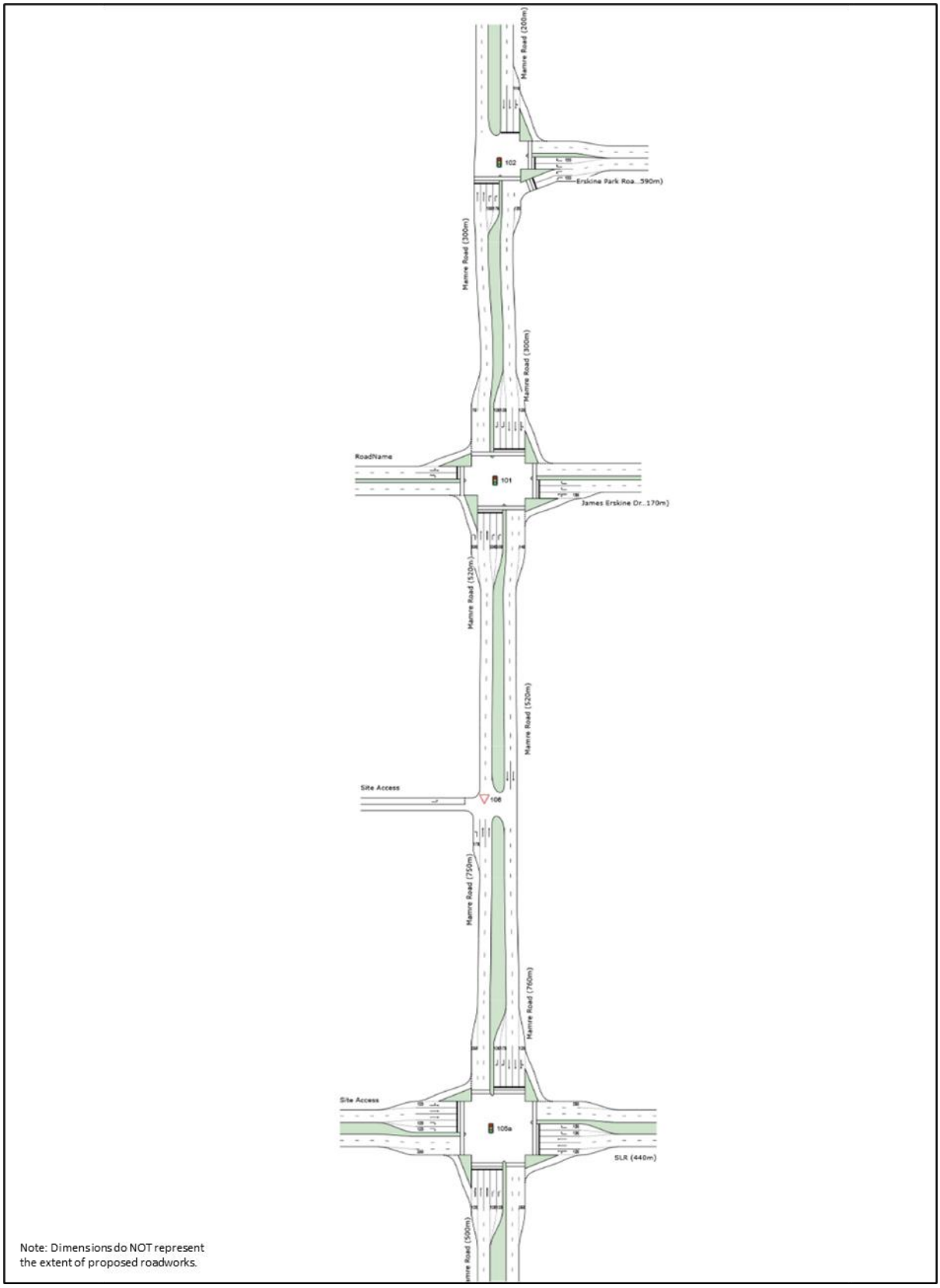


Figure 15: 2026 Future Network with Sequence 3 (SLR)

4.3 Background Growth

The following background growth rates have generally been adopted for the purpose of this TIA:

- 2% p.a. on Mamre Road, and
- 1% p.a. on Bakers Lane and SLR.

This is considered to be a reasonable assumption for future background growth in the area. Further to above, a copy of the future traffic volumes is attached in **Appendix D**.

4.4 Southern Lots Traffic Contribution

As part of the consultation process, it was established that Penrith City Council (PCC) and TfNSW require inclusion of likely traffic generation of the Southern Lots in the network analysis. Therefore, FPA has prepared a contribution plan (refer **Appendix E**) to demonstrate the anticipated potential GFA which could be anticipated within the Southern Lots. In consideration of this plan we have allowed for a sum 20,000 m^2 in the modelling to account for potential development to the south. Nevertheless, it is noted that any development to the south would be subject to a separate application — and hence assessment thereof — and is provided for the purposes of the sensitivity analysis requested only.

It is again to be emphasised that should the cumulative GFA of FPA, Altis and/or Southern Lots exceed Sequence 1A thresholds, then Sequence 1B should be implemented.

5 Operational Traffic Impacts

5.1 Traffic Generation Rates

Traffic generation rates adopted for this assessment reference Appendix E of the RMS Technical Direction TDT 2013/04a. Specifically, Ason Group has referenced the surveyed rates for ***vehicle trips during adjacent road AM and PM*** peak periods for the following three (3) industrial sites:

- Site 1: Erskine Park Industrial Estate, Erskine Park,
- Site 3: Wonderland Business Park, Eastern Creek, and
- Site 4: Riverwood Business Park, Riverwood.

These Sydney sites all exhibit similar attributes to those proposed for this TIA, including land-use and size of development. It is noted that the other Sydney and non-metropolitan sites reported in the RMS Technical Direction TDT 2013/04a are much smaller than the MSP and/or have a significantly higher office component that that proposed for the MSP.

The approved Mamre West Precinct – known as First Estate – TIA adopted the trip generation rates surveyed for Site 1 (Erskine Park Industrial Estate) which was entirely reasonable given that the First Estate lies directly opposite the Erskine Park Industrial Estate. The rates surveyed at the Erskine Park Industrial Estate (and applied to the MWP) are:

- AM Rate 0.134 trip per 100m^2 of GFA.
- PM Rate 0.139 trip per 100m^2 of GFA.

While it would be equally appropriate to apply these same rates to the MSP assessment, for the purposes of a worst-case assessment, this TIA has adopted rates which reflect the **average rate** of the 3 Sydney industrial sites (during adjacent road network AM and PM peak hours). These (significantly higher) MSP assessment trip rates are as follows:

- AM Rate 0.247 trip per 100m^2 of GFA.
- PM Rate 0.182 trip per 100m^2 of GFA.
- Daily Rate 2.64 trip per 100m^2 of GFA.

Accordingly, the results of the assessments presented in this TIA are more conservative than what was undertaken for First Estate. This conservative approach provides flexibility for latter development to reflect minor changes that may occur over the life of the MSP.

5.2 SSDA and Southern Lot Traffic Generation

Application of the traffic generation rates discussed in Section 5.1 above to the SSDA yield results in the following AM, PM and daily traffic volumes.

Table 4: Traffic Generation

Site	Development Yield (m^2)	AM Peak (veh/hr)	PM Peak (veh/hr)	Daily (veh/day)
MSP (this SSDA)	166,225	411	303	4,388
MSP (Indicative Ultimate MP)	421,820	1,042	768	11,136
Southern Lots	20,000	49	36	528

Accordingly, this SSD (subject to this traffic report) will generate 411 and 303 vehicular trips during road network AM and PM peak hours, respectively. The modelling undertaken for Sequence 1A has been based upon the SSD GFA and establishes a satisfactory operation of Sequence 1A for a total GFA of 166,225m^2. However, for conservatives, our traffic modelling for scenarios 1B, 2 and 3 has been based on Ultimate MP with the Southern Lots traffic to ensure that satisfactory intersection layouts are proposed.

The distribution of these trips on the surrounding road network is discussed below.

5.3 Traffic Distribution

The adopted trip distribution for the SSDA and Southern Lots are summarised as follows:

- 70% inbound / 30% outbound during AM peak hour, and
- 30% inbound / 70% outbound during PM peak hour.

Accordingly, the following ***TOTAL AM and PM*** peak hour inbound vs. outbound for the Ultimate MP and Southern Lots have been estimated:

- AM Peak: 764 veh/hr inbound / 327 veh/hr outbound, and
- PM Peak: 241 veh/hr inbound / 563 veh/hr outbound.

The resultant traffic distribution of the proposed Ultimate MP and Southern Lots were then assigned onto the road network having regard for the employment catchment of the area, anticipated traffic patterns in future; similar to that adopted for the approved Fist Estate traffic study.

Detailed traffic assignment are included in **Appendix F**.

5.4 Modelling Scenarios

A total of 5 traffic scenarios have been modelled which are outlined **Table 5** in addition to the 2018 existing base case.

Table 5: Summary of Modelling Scenarios

Scenario	Year		Access Strategy Phase				Includes Southern Lots
	2025	2026	Sequence 1A[4] (Bakers Ln)	Sequence 1B (Bakers Ln)	Sequence 2 SLR	Sequence 3 SLR (with extension)	
0[1]	☑		☑				
1[2]	☑			☑			
1[2]	☑			☑			☑
2[3]		☑			☑		
2[3]		☑			☑		☑
3[4]		☑				☑	
3[4]		☑				☑	☑

Note: 1) Undertaken as part of the original SSDA. Sensitivity testing for isolated SIDRA has been undertaken for 2025.

2) In line with the SIDRA network shown in Figure 13.

3) In line with the SIDRA network shown in Figure 14.

4) In line with the SIDRA network shown in Figure 15.

For clarity, under each modelling scenario we have tested the inclusion of traffic to/from the Southern Lots as a separate sub-option to better illustrate the impact of the Southern Lots on the road network and intersections.

5.5 Sequence 1A Modelling Results

Sequence 1A modelling has been undertaken as part of the original SSD submission – now on exhibition and available on DPIE website. However, as part of this RtS, we have undertaken sensitivity SIDRA analysis for Mamre Road / Bakers Lane (in isolation) to establish the design life of this intersection having regard for the following land-use and background growth inputs:

- 2% background traffic growth on Mamre Road,

- Full occupation of the development under this SSDA with a sum of 166,225 m^2 of GFA, and
- No Southern Lots.

It is noteworthy that Bakers Lane traffic is not anticipated to see any significant increase in traffic, particularly because the Oakdale West Estate (OWE) infrastructure is scheduled for completion by 2021, at which time vehicular access would be provided via the Western North South Link Road (WNSLR) until such time that Southern Link Road is constructed.

In this regard, the SIDRA results suggest as follows:

Table 6: Local Network Performance Comparison (Existing and 2025)

Intersection	Scenario	Period	Intersection Delay	Level of Service
Mamre Road / Bakers Lane (Signal Control)	Baseline (2018 surveyed volumes)	AM	18.2	B
		PM	47.2	D
	Baseline+166,225 m^2 (post development under this SSD)	AM	39.7	C
		PM	34.3	C
	2025 scenario (post development under this SSD)	AM	39.5	C
		PM	35.0	C

As outlined above, the modelling results support the proposed Sequence 1A at Mamre Road / Bakers Lane by 2025 and having regard for construction and occupation of 166,225 m^2 warehouse and industrial facility on the Site on the following grounds:

- Sequence 1A will operate at an satisfactory LoS (LoS C) during both AM and PM peak hour immediately post occupation of the development under this SSDA with a sum of 166,225 m^2 of GFA and will continue to work satisfactorily by the design life of 2025.
- It is noteworthy that this intersection is currently a signalised intersection with a stop sign control on the western leg and without pedestrian crossing facility. However, the proposal for sequence 1A includes significant upgrades to this intersection with addition of signalised pedestrian crossings.
- Furthermore, the existing configuration of this signal does not provide right and left turn bays into the Site to/from Mamre Road of which the proposed Sequence 1A upgrades intend to implement these additional bays.

Accordingly, the proposed upgrades at the Mamre Road / Bakers Lane signal as part of Sequence 1A can improve the vehicular and pedestrian movements at this signal when compared to the existing baseline.

In summary, the proposed Sequence 1A can accommodate the proposed development under this SSD with a sum of 166,225 m^2 of GFA up to 2025 with a better performance when compared to the existing signal operation.

5.6 Sequence 1B Modelling Results

For conservative assessment, traffic generation associated to the indicative Ultimate MP has been adopted for Sequence 1B modelling.

An electronic copy of the SIDRA files has already been provided for distribution to TfNSW and PCC for consideration. However, a detailed results summary table is provided in **Appendix H** which shows an appreciation of the Network performance changes from the existing 2018 base and 2025 with Sequence 1B.

In summary the key findings of the SIDRA Network assessments for this Sequence are as follows:

- For the 2025 scenario (with Sequence 1B access), all intersections including the upgraded intersection of Mamre Road / Bakers Lane would be able to cater for the estimated traffic generation of the entire MSP site (Ultimate MP).
- The upgraded intersection of Bakers Lane / Mamre Road (refer **Figure 13**) will continue performing at a satisfactory LoS C with / without the additional traffic estimated from the Southern Lots during both AM and PM peak hour .

It is noted that the upgrades to the Mamre Road / Bakers Lane intersection will only be temporary and is provided only to facilitate the development traffic. Bakers Lane is proposed to be disconnected from Mamre Road and be realigned with the proposed Southern Link Road in the longer term.

5.7 Sequence 2 and Sequence 3 Modelling Results

Due to uncertainty surrounding the future of the SLR, analysis has been undertaken for 2026 aligning with both Sequence 2 and Sequence 3, described as follows:

- Sequence 2 aligns with current RMS proposal for the Mamre Road Upgrade and current plans for the SLR, with a turning head provided within the Site.
- Sequence 3 aligns with current RMS proposal for the Mamre Road Upgrade, with a consolidated western approach succeeding the turning head.

It should be again emphasised that, for conservative assessment, traffic generation associated to the indicative Ultimate MP has been adopted for Sequence 2 and Sequence 3 modelling.

Detailed SIDRA network results for the 2026 Sequence 2 and Sequence 3 modelling options are presented in **Appendix I** and **Appendix J**. Furthermore, the SIDRA Network results are summarised as follows:

- Having regard for RMS Mamre Road Upgrades, all intersections would work satisfactorily under the MSP indicative Ultimate MP and the indicative Ultimate MP + Southern Lots options in 2026.
- More importantly, the Mamre Road / SLR signalised intersection will generally operate at an overall LoS C under Sequence 2 and Sequence 3 when considering the estimated traffic generation of the Ultimate MSP site.

6 SSDA Parking Analysis

6.1 Car Parking Rates

There is evidence that Council's warehouse parking requirement (1 space per 100m^2 GFA) is more than actual parking demands for warehouse developments, specifically as a factor of lower warehouse employee numbers. Amongst other factors, significant technological advances have also resulted in lower employee densities within warehouse developments, with the 2012 Employment Typology Study for the WSEA indicating employment densities of less than 20 employees per hectare across much of western Sydney. Consequently, many warehouse sites now provide car parking significantly in excess of the actual parking requirements of end users.

This position is further supported by the warehouse rates adopted by other controls, all of which return parking requirements significantly less than the numbers required based on the application of Council's DCP rates.

In response to the above, the minimum parking rates sought for the proposal, based on the RMS Guide rates for warehouse car parking, are:

- 1 space per 300 m^2 of warehouse GFA
- 1 space per 40 m^2 of ancillary office GFA

It is noteworthy that the above car parking rates have also been referenced in Mamre West Land Investigation Area, Development Control Plan (August 2016). That DCP applies to the approved and constructed developments within the First Estate area which have similar functions to the developments proposed for this Site.

These proposed (minimum) rates would enable the required flexibility in the design of future developments whilst still ensuring sufficient parking to accommodate both the current and future parking requirements of tenants.

6.2 Car Parking Requirements

Having regard for the RMS parking rates suggested above, the required parking spaces for the SSD and the supply of parking for this development is assessed in the following table.

Table 7: Car Parking Requirement

Lot Number	GFA (sqm)			Car Parking Requirement (spaces)	Car Parking Provision (spaces)
	Warehouse	Office	Total		
Lot 1A	11,855	550	12,405	53	54
Lot 1B	11,855	550	12,405	53	54[1]
Lot 2	22,715	1,150	23,865	104	105
Lot 3A	8,230	550	8,780	41	42[2]
Lot 3B	8,230	550	8,780	41	42
Lot 4	13,340	800	14,140	64	65
Lot 5	17,355	890	18,245	80	81
Lot 6	14,700	800	15,500	69	69
Lot 7	23,105	1,100	24,205	105	105
Lot 8	26,350	1,550	27,900	127	127
Total	**157,735**	**8,490**	**166,225**	**738**	**744**

Notes: 1) Includes 7 provisional spaces

2) Includes 1 provisional space

According to the above table, the total car parking requirement for the Site (under this SSD) is 738 spaces. In response, the Site includes a total car parking provision of 744 spaces (including 8 provisional spaces), with sufficient car parking provision for each individual lot.

It is noteworthy that the additional 6 car parking spaces provided for the entire estate is not expected to have any material traffic impact onto the surrounding road network.

6.3 Accessible Parking Rates

Council's DCP at Part C10 – Transport, Access and Parking, Table C10.2 – requires accessible parking to be provided in accordance with the *Disability (Access to Premises – Buildings) Standards 2010* from the Building Code of Australia. This standard requires accessible parking for industrial developments to be provided at a rate of:

- 1 space for every 100 car parking spaces or part thereof (rounded up).

The provision of accessible parking in accordance with these Standards would be adopted for the SSDA.

As discussed above, each individual Lot is to provide accessible car parking at a rate of 1% of the total parking provision (rounded up). Applicable accessible parking requirements are summarised in the following tables.

Table 8: Accessible Car Parking Requirement for the SSDA

Lot Number	Car Parking Provision (spaces)	Accessible Car Parking Requirement (spaces)
Lot 1A	54	1
Lot 1B	54	1
Lot 2	105	2
Lot 3A	42	1
Lot 3B	42	1
Lot 4	65	1
Lot 5	81	1
Lot 6	69	1
Lot 7	105	2
Lot 8	127	2
Total	**744**	**13**

Accessible spaces should ideally be located within close proximity to building entrances, where possible, and designed in accordance with AS2890.6.

6.4 Commercial (Service) Vehicle Bay Provisions

6.4.1 Service Bay Rates

Separate hardstand areas are proposed for each warehouse development which is expected to accommodate their proposed site-specific demand. However, in the absence of known operational requirements, the RMS Guide suggests the following service bay requirements for industrial land-uses:

- 1 space per 800m^2 for development with a GFA <8,000m^2, and
- 10 spaces +1 space per 1,000m^2 over 8,000m^2.

It is noted that (based on experience on similar projects) the strict application of RMS Guides service bay rates leads to significant on-site service bay requirements which in most cases is higher than the actual tenant demands for such facilities.

In this regard, a review of the similar site-specific plans for developments within the First Estate has been undertaken to review current practice with regard to provision of service bays for such developments.

Details of this analysis are outlined in below table.

Table 9: Service Bay Rates – Subdivision Lots at First Estate

Lot	Warehouse GFA (m^2)	Number of service bays provided	Service Bay Rate
Lot 6A	5,000	6	1 space per 833m^2
Lot 6B	4,575	4	1 space per 1,144m^2
Lot 6C	13,950	6	1 space per 2,325m^2
Lot 8A	21,000	25	1 space per 840m^2
Lot 8B1	7,000	9	1 space per 778m^2
Lot 8B2	11,734	13	1 space per 903m^2

From the above, the actual service bay provision is expected to fall within the range of 1 space per 778–2,325 m^2 of warehouse GFA.

6.4.2 SSDA Loading Dock Requirements

Having regard to the above, the minimum and maximum service bay rates have been applied to each individual warehouse development. The resultant service bay requirements are outlined in the following table.

Table 10: Service Bay Requirements

Lot Number	Warehouse GFA (m^2)	Service Bay Requirement (Lower Rate)	Service Bay Requirement (Upper Rate)	Service Bay Provision
Lot 1A	11,855	5	15	10
Lot 1B	11,855	5	15	10
Lot 2	22,715	10	29	20
Lot 3A	8,230	4	11	8
Lot 3B	8,230	4	11	9
Lot 4	13,340	6	17	12
Lot 5	17,355	7	22	11
Lot 6	14,700	6	19	13
Lot 7	23,105	10	30	16
Lot 8	26,350	11	34	19
Total	**157,735**	**68**	**203**	**128**

According to the above table, appropriate number of service bays are provided for each individual lot to accommodate the potential loading bay demand of tenants.

7 Preliminary Construction Traffic Management Plan

A detailed Construction Traffic Management Plan (**CTMP**) will be provided as part of detailed construction planning. For the purposes of this TIA report, the following general principles for managing construction traffic have been assumed and provide an understanding of the likely traffic impacts during the construction period.

7.1 Potential Haulage Routes

The primary potential haulage route to and from the Site would be via Mamre Road, with trucks accessing the Site from the M4 Western Motorway either via the Erskine Park Road interchange from the northeast or the Mamre Road interchange in the north. Another potential route would be via Mamre Road and the Elizabeth Drive interchange with the M7 Motorway from the south. RMS currently identifies both routes as heavy vehicle routes. Construction of the Proposal would generate additional truck movements along these routes. Given that these routes currently carry high volumes of heavy vehicles, construction of the development would not have a significant impact on the performance of Mamre Road, Erskine Park Road, Elizabeth Road, the M4 Motorway or the M7 Motorway.

7.2 Proposed Working Hours

The construction work would vary depending on the phase of construction and associated activities and includes both construction and design personnel. The size of the on-site workforce has not been finalised and as a result, the peak working population on-site at any given time during the construction period may vary. Construction works would be undertaken during standard construction-working hours, which are likely to be as follows:

- Monday to Friday: 7.00AM to 6.00PM
- Saturday: 7.00AM 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 or for oversize deliveries under special permit.

7.3 Construction Traffic Generation

Light vehicle traffic generation would be generally associated with contractor movements to and from the Site. Contractors would be comprised of project managers, various trades and general construction personnel. Over the full construction period, the peak workforce represents the worst-case scenario for vehicle movements during the morning or evening road network peak hour. The workforce arrival and departure periods (6.30-7.00AM and 5.00-5.30PM) represent the peak construction traffic generation periods.

Light vehicle construction trips are expected to arrive in the morning and depart in the evening and the number of trips would be based on the workforce numbers. Parking for this construction related-vehicles would be provided on-site.

Heavy vehicle traffic would mainly be generated by activities associated with the delivery of construction equipment and delivery of material for construction works. As the construction programme has yet to be finalised, a worst-case scenario for heavy vehicle movements per day required for the delivery of construction materials to the Site cannot be accurately determined. However, these deliveries are likely to occur outside of the peak network traffic periods and would have limited (if any) impact to traffic on Mamre Road, Erskine Park Road, Elizabeth Road, the M4 Motorway or the M7 Motorway, which currently have high proportions of heavy vehicles.

Importantly, the construction traffic volumes are expected to be lower than the volumes anticipated for the SSDA once it becomes operational. Therefore, recognising that the key intersection is anticipated to perform satisfactorily once the Proposal is completed, it can be assumed that the intersection would satisfactorily accommodate the lower volumes of construction traffic.

7.4 Construction Mitigation Measures

While the traffic impacts of construction of the development are likely to be less than the operational phases, the following measures will be undertaken to minimise the impacts of the construction activities of the development:

- Traffic control would be required to manage and regulate traffic movements into and out of the site during construction.
- Disruption to road users would be kept to a minimum by scheduling intensive delivery activities outside of peak network hours.

Construction and delivery vehicles would be restricted to using Mamre Road, Erskine Park Road, Elizabeth Road, the M4 Motorway or the M7 Motorway. At no stage are construction vehicles associated with the site to use Bakers Lane, east of Mamre Road.

8 Design Commentary

8.1 Relevant Design Standards

The site access, car park and loading should be designed to comply with the following relevant Australian Standards:

- AS2890.1 for car parking areas,
- AS2890.2 for commercial vehicle loading areas, and
- AS2890.6 for accessible (disabled) parking.

It is expected that any detailed construction drawings in relation to any modified areas of the car park or site access would comply with these Standards. Furthermore, compliance with the above Standards would be expected to form a standard condition of consent to any development approval.

8.2 Design Vehicle

Proposed internal estate roads and warehouse hardstand areas should be designed to accommodate movements of 26.0 metres B-Double. In this regard, consideration should be given to the swept path analysis undertaken as part of a separate submission accompanying the SSD submission.

8.3 Internal Road Widths

Final resolution of the road reserve widths for the Site and the broader warehouse and industrial sites in this vicinity will be subject to the overarching precinct-wide traffic modelling currently being undertaken by Ason Group. However, in the interim and in response to DPIE and Council's request the Proposal intends to provide a 30.7 metres wide north-south (NS) spine road from Bakers Lane cul-de-sac to the southern east-west public road. The design standard of the proposed NS spine road will include a solid central median to separate the north and southbound traffic movements.

In our separate design review submission accompanying this SSD, we have completed a detailed swept path analysis for these roads with 20.6 metres width, confirming efficient and safe movements for 26 metres B Double vehicles.

Final resolution of the road reserve widths for the Site and the broader warehouse and industrial sites in this vicinity will be subject to the overarching precinct-wide traffic modelling currently being undertaken by Ason Group. Currently DPIE and TfNSW have proposed 30.7m, which will be reviewed and confirmed via detailed traffic modelling.

9 Conclusions

9.1 General Notes

- Ason Group has been commissioned by Altis Property Partners (Altis) and Frasers Property Australia (FPA) to undertake a revised Traffic Impact Assessment (TIA) for the development of warehouse logistics and industrial facilities hub at 657 - 753 Mamre Road in Kemps Creek (known as Mamre South Precinct – MSP) within the Penrith City Council Local Government.
- The proposal generally seeks construction of warehouse/industrial developments with ancillary office uses as part of a State Significant Development Application (SSDA) for part of the MSP, while the remaining part of the MSP will be subject to separate Development Applications (DA).
- This revised TIA has been prepared in response to the relevant authority comments to the original exhibition process. Revised modelling included in this TIA has been based on the following changes to the original SSDA submission:
  - Revised SSD Plan with a total GFA of 166,225 m^2,
  - No left in / left out access crossover on Mamre Road — all access being via a single signalised access to either Bakers Lane (or Southern Link Road in the future),
  - Inclusion of a new connection to land to the south (the Southern Lots) and traffic generation thereof,
  - 4 different access options (referred to as “sequences”) for access to/from the Site,
  - Altis and FPA intention is to upgrade Mamre Road in this vicinity to 2-lanes in each direction (4-lanes in total) from the southern boundary of the Site to the signalised intersection of Mamre Road / Distribution Drive.
- An indicative ultimate Master Plan for the entire MSP site with a total GFA of 421,820 m^2 is provided to Ason Group for the purpose of traffic modelling / assessment of Sequence 2 and Sequence 3.
- Altis and FPA intend to adopt the previously demonstrated upgrades at Mamre Road / Bakers Lane (refer Figure 10 of the original submission) until year 2025 to accommodate construction and occupation of the proposed development under this SSDA with a sum of 166,225 m^2 of warehouse and industrial facility on the Site.

9.2 Existing & Future Conditions

- The SIDRA analysis undertaken for the key intersections in the vicinity of the Mamre South Precinct for the Baseline (May 2018) confirm the intersection of Mamre Road / Bakers Lane currently operates at its capacity (LoS D with 47.2 second average delay) during PM peak.

- Mamre Road in this vicinity is envisaged to be upgraded to 2 lanes in each direction as part of the RMS Mamre Road Upgrade project. The Applicant will offer upgrading Mamre Road to a total of 4-lanes from the southern boundary of the Site to the existing intersection of Mamre Road / Distribution Drive to bring forward these planned works.

9.3 SSDA Assessment

- The following traffic generation has been estimated for the SSDA and the Southern Lots:

Site	Development Yield (m^2)	AM Peak (veh/hr)	PM Peak (veh/hr)	Daily (veh/day)
MSP (this SSDA)	166,225	411	303	4,388
MSP (Indicative Ultimate MP)	421,820	1,042	768	11,136
Southern Lots	20,000	49	36	528

Note: 1) Southern Lots subject to separate assessment and indicative detail provided for sensitivity purposes only.

- Access to the Site is intended to follow a Sequence order as below:
  - Sequence 1A – All access via an interim upgrade to Mamre Road / Bakers Lane signalised intersectionSequence 1A is designed to cater the proposed development under this SSDA with a total GFA of 166,225m^2.
  - Sequence 1B – All access from the upgraded Mamre Road / Bakers Lane signalised intersection, with Mamre Road upgrades to 4 lanes (2 in each direction) along the length of the site.
  - Sequence 2 – Via a future Southern Link Road (SLR) / Mamre Road signalised intersection assuming that the SLR connection will terminate as a turning head at the Site, and
  - Sequence 3 – Via future SLR with extension to the western leg within the Site.
- It is noteworthy that the existing Mamre Road / Bakers Lane signal currently operates at its capacity (LoS D with 47.2 second average delay) during PM peak. It should be considered that the implementation of Sequence 1A upgrade works improves the intersection performance during the PM peak, with sensitivity testing through 2025 demonstrating that the results are still an improvement to the existing scenario. Furthermore, significant improvements will be provided to this intersection including addition of pedestrian crossing and separate left and right turn bays to/from the Site.

- In consideration of upgrades associated with Sequence 1B, the network performance in 2025 general improves, specifically the Mamre Road / Bakers Lane intersection performing at a satisfactory LoS C with and without the Southern Lots traffic during both AM and PM peak hours.
- Having regard for RMS Mamre Road Upgrades at 2026, represented by the Sequences 2 and 3 upgrades, all intersections would work satisfactorily under the MSP indicative Ultimate MP and the indicative Ultimate MP + Southern Lots options in 2026.
- A review of the parking requirements for the SSDA shows the proposed car parking provision sufficiently satisfy the RMS parking requirements.
- The total car parking requirement for the Site is 738 spaces. In response, the Site includes a total car parking provision of 744 spaces, with sufficient car parking provision for each individual lot. It is noteworthy that the additional 6 car parking spaces provided for the entire estate is not expected to have any material traffic impact onto the surrounding road network.
- The number of loading bays for the proposed SSD has been assessed as part of this TIA and it has been confirmed that the proposed SSD provide sufficient loading bays for each warehouse.
- It is expected that any detailed construction drawings in relation to any modified areas of the car park or site access would comply with these Standards. Furthermore, compliance with the above Standards would be expected to form a standard condition of consent to any development approval.

9.4 Conclusion

In summary, it is concluded that the proposed SSDA is supportable and would not have any unacceptable traffic or parking impacts. Upgrades to the road network have been identified to satisfactorily mitigate any impacts of the increased development traffic.

Appendix A

SEARs

NSW GOVERNMENT | Planning & Environment

Planning Services
Industry Assessments
Contact: Bianca Thornton
Phone: 02 8217 2040
Email: bianca.thornton@planning.nsw.gov.au

Our Ref: SSD 9522

Mr Andrew Cowan
Director, Willowtree Planning
Suite 4, Level 7, 100 Walker Street
NORTH SYDNEY NSW 2060

Email: acowan@willowtp.com.au

Dear Mr Cowan

State Significant Development – Planning Secretary's Environmental Assessment Requirements
Kemps Creek Warehouse and Logistics Hub (SSD 9522)

Please find attached the Planning Secretary's Environmental Assessment Requirements (SEARs) for the preparation of an Environmental Impact Statement (EIS) for the above-mentioned development. **Attachment 1** provides guidelines which may assist in the preparation of the EIS.

The attached SEARs have been prepared in consultation with the relevant government agencies and Penrith City Council (see **Attachment 2**). The SEARs are based on the scoping report prepared by Willowtree Planning, dated 15 August 2018.

Please note the Planning Secretary may alter the SEARs at any time. You must consult further with the Department if you do not lodge a development application (DA) and EIS for the development within two years of the date of issue of these SEARs.

I wish to emphasise the importance of effective and genuine community consultation and the need for the proposal to proactively respond to the community's concerns. A comprehensive, detailed and genuine community consultation and engagement process must be undertaken during the preparation of the EIS. This process must ensure the community is informed of the development and engaged with issues of concern to it. Sufficient information must be provided to the community to enable a good understanding of the development and any potential impacts.

If the proposal is likely to have a significant impact on matters of National Environmental Significance, it may require an approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). If an EPBC Act approval is required, please advise accordingly, as the Commonwealth approval process may be integrated into the NSW approval process, and supplementary SEARs may need to be issued.

Please contact the Department at least **two weeks** before you lodge the EIS and any associated documentation for the development. This will enable the Department to confirm:

- the applicable fee (see Division 1AA, Part 15 of the *Environmental Planning and Assessment Regulation 2000*)
- consultation and public exhibition arrangements.

If you have any enquiries, please contact Bianca Thornton on the details above.

Yours sincerely

C. Ritchie

Chris Ritchie 14/9/18
Director
Industry Assessments
as the delegate of the Planning Secretary

Planning Secretary's Environmental Assessment Requirements

Section 4.12(8) of the *Environmental Planning and Assessment Act 1979* Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*

Application Number	SSD 9522
Project Name	Kemps Creek Warehouse and Logistics Hub
Development	Establishment of a warehouse and logistics hub, comprising: • site-wide earthworks, infrastructure and internal road network • construction and operation of 11 warehouses comprising 165,186 square metres (m^2) of floor space (152,485 m^2 warehouse and 7,700 m^2 office) • 816 parking spaces • subdivision.
Location	657-769 Mamre Road, Kemps Creek in the Penrith Local Government Area (Lot 34 DP1118173, Lot X DP421633, Lot 1 DP1018318, Lot Y DP421633 and Lot 22 DP258414)
Applicant	Frasers Property Industrial Construction Pty Ltd and Altis Property Partners Pty Ltd
Date of Issue	14 September 2018
General Requirements	The environmental impact statement (EIS) must be prepared in accordance with, and meet the minimum requirements of, clauses 6 and 7 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* (the Regulation). In addition, the EIS must include: • a detailed description of the development, including: – the need for the proposed development – justification for the proposed development – likely staging of the development – likely interactions between the development and existing, approved and proposed operations in the vicinity of the site – plans of any proposed building works • consideration of all relevant environmental planning instruments, including identification and justification of any inconsistencies with these instruments • a risk assessment of the potential environmental impacts of the development, identifying the key issues for further assessment • a detailed assessment of the key issues specified below, and any other significant issues identified in this risk assessment, which includes: – a description of the existing environment, using sufficient baseline data – an assessment of the potential impacts of all stages of the development, including any cumulative impacts, taking into consideration relevant guidelines, policies, plans and statutes – a description of the measures that would be implemented to avoid, minimise, mitigate and if necessary, offset the potential impacts of the development, including proposals for adaptive management and/ or contingency plans to manage significant risks to the environment • a consolidated summary of all the proposed environmental management and monitoring measures, highlighting commitments included in the EIS. The EIS must also be accompanied by a report from a qualified quantity surveyor providing: • a detailed calculation of the capital investment value (CIV) (as defined in clause 3 of the Regulation) of the proposal, including details of all assumptions and

	prepared on company letterhead and indicate applicable GST component of the CIV • an estimate of jobs that will be created during the construction and operational phases of the proposed development • certification that the information provided is accurate at the date of preparation.
Key issues	The EIS must address the following specific matters: • **Statutory and Strategic Context** – including: – detailed justification that the proposed land use is permissible, taking into consideration the State Environmental Planning Policy (Western Sydney Employment Area) 2009 – details of any proposed consolidation or subdivision of land – demonstration that the proposal is consistent with all relevant planning strategies, environmental planning instruments, adopted precinct plans, draft district plan(s) and adopted management plans and justification for any inconsistencies. The following must be addressed: o State Environmental Planning Policy (Western Sydney Employment Area) 2009 o A Metropolis of Three Cities o Western City District Plan o Western Sydney Aerotropolis – Land Use and Infrastructure Implementation Plan – Stage 1: Initial Precincts o Western Sydney Freight Line corridor. • **Planning Agreement/Development Contributions** – demonstration that satisfactory arrangements have been or would be made to provide, or contribute to the provision of, necessary local and regional infrastructure required to support the development. • **Suitability of the Site** – including: – an analysis of site constraints, such as flooding impacts and future road and road corridors – a detailed justification that the site is suitable for the scale of the proposal and any constraints identified, having regard to the site's surrounds and the potential visual impact of the development. • **Community and Stakeholder Engagement** – including: – a detailed community and stakeholder participation strategy which identifies who in the community has been consulted and a justification for their selection, other stakeholders consulted and the form(s) of consultation, including a justification for this approach – a report on the results of the implementation of the strategy including issues raised by the community and surrounding land owners and occupiers that may be impacted by the proposal – details of how issues raised during community and stakeholder consultation have been addressed and whether they have resulted in changes to the proposal – details of the proposed approach to future community and stakeholder engagement based on the results of consultation. • **Urban Design and Visual** – including: – a visual impact assessment (including photomontages and perspectives) of the development layout and design (buildings and storage areas), including height, colour, scale, building materials and finishes, signage and lighting, having regard to surrounding residential receivers and clause 23 of the State Environmental Planning Policy (Western Sydney Employment Area) 2009, particularly in terms of potential impacts on: o nearby public and private receivers o significant vantage points in the broader public domain including Mamre Road – consideration of the layout and design of the development having regard to the surrounding vehicular, pedestrian and cycling networks

- detailed plans showing suitable landscaping which incorporates endemic species
- a design report that establishes design guidelines and development parameters, and includes diagrams, illustrations and drawings to clarify the design intent of the proposal and which clearly demonstrates how design quality will be achieved in accordance with Clause 31 Design Principles of the State Environmental Planning Policy (Western Sydney Employment Area) 2009

- **Traffic and Transport** – including:
  - a quantitative Traffic Impact Assessment prepared in accordance with relevant Penrith City Council, Austroads and Roads and Maritime Services guidelines
  - details of all daily and peak traffic and transport movements likely to be generated by the development (vehicle type, public transport) during construction and indicative operation
  - impacts on the safety and capacity of the surrounding road network and access points, using SIDRA or similar modelling, to assess impacts from current traffic counts and cumulative traffic from existing and proposed development
  - demonstrate that sufficient loading/unloading, car parking and pedestrian and cyclist facilities have been provided for the development
  - details and a justification of access to, from and within the site (vehicular and pedestrian)
  - details of road upgrades, new roads or access points required for the development, if necessary
  - consideration of the western connection of the Southern Link Road and road widening requirements for Mamre Road, in consultation with RMS
  - consideration of the proposed Western Sydney Freight Line, including the width of the corridor and how this will be considered in the layout of the proposal, in consultation with TfNSW
  - details of how the proposal would allow connection to future land uses to the south of the site.
- **Flooding** – a detailed hydrological and hydraulic assessment which includes the following:
  - a comprehensive assessment of the impact of flooding on the development for the full range of flood events up to the probable maximum flood. This assessment should address any relevant provisions of the NSW Floodplain Development Manual (2005) including the potential effects of climate change, sea level rise and an increase in rainfall intensity
  - consideration of current flooding behaviour and impacts, including on flood detention areas, how flood behaviour and impacts will change due to the proposal and how these changes will be mitigated
  - assessment of the impact of the development on flood behaviour (i.e., levels, velocities and duration of flooding) and on adjacent, downstream and upstream areas
  - detail proposed floor levels for all proposed habitable structures on the site having considered the full range of flood events up to the probable maximum flood
  - detail an emergency response plan for the site, which includes consideration of a flood-free access to or from the development site in extreme flood events.
- **Soils and Water** – including:
  - a description of how the proposal takes into consideration the South Creek corridor strategy and the land use vision for the South Creek Precinct, in consultation with Infrastructure NSW and the Greater Sydney Commission
  - measures to protect the Warragamba Pipelines corridor from any works or activities associated with the development

	– details of how access to the Warragamba Piplines corridor would be maintained, in consultation with WaterNSW – a description of the water demands and a breakdown of water supplies, including a detailed site water balance – identification of any water licensing requirements under the *Water Act 1912* or *Water Management Act 2000* – details of proposed erosion and sediment controls during construction – a description of the surface and stormwater management system designed in accordance with Penrith City Council's Water Sensitive Urban Design Policy, including drainage design, on site detention, and measures to treat or re-use water – characterisation of the nature and extent of any contamination on the site and surrounding area – an assessment of potential impacts on surface and groundwater resources, drainage patterns, soil (stability, salinity and acid sulfate soils), related infrastructure, watercourses and riparian land and proposed mitigation, management and monitoring measures. • **Biodiversity** – including: – an assessment of the proposal's biodiversity impacts in accordance with the *Biodiversity Conservation Act 2016*, including the preparation of a Biodiversity Development Assessment Report (BDAR) where required under the Act, except where a waiver for preparation of a BDAR has been granted – describe how impacts upon critical vegetation and endangered species on site will be avoided and minimised. • **Infrastructure Requirements** – including: – a detailed written and/or geographical description of infrastructure required on the site – identification of any infrastructure upgrades required off-site to facilitate the development, and describe any arrangements to ensure that the upgrades will be implemented in a timely manner and maintained – an infrastructure delivery and staging plan, including a description of how infrastructure on and off-site will be co-ordinated and funded to ensure it is in place prior to the commencement of construction – an assessment of the impacts of the development (construction and operation) on existing infrastructure surrounding the site. • **Heritage** – including: – an Aboriginal Cultural Heritage Assessment Report prepared in consultation with Aboriginal people and in accordance with Office of Environment and Heritage guidelines – an assessment of European Heritage including potential impacts on the surrounding site and surrounding area, including any built landscape items, conservation areas, views and settings. • **Noise and Vibration**– including: – a quantitative noise and vibration impact assessment undertaken by a suitably qualified person in accordance with the relevant Environment Protection Authority guidelines and including an assessment of nearby sensitive receivers – cumulative impacts of other developments – details of proposed mitigation, management and monitoring measures. • **Hazards and Risk** – including: – a preliminary risk screening completed in accordance with *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* and *Applying SEPP 33* (DoP, 2011), with a clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development. Should preliminary screening indicate that the project is "potentially hazardous" a preliminary hazard analysis (PHA) must be prepared in accordance with Hazardous Industry Planning Advisory

	Paper No. 6 – Guidelines for Hazard Analysis (DoP, 2011) and Multi-Level Risk Assessment (DoP, 2011). • **Bushfire** – including: – details of the storage of any flammable materials – an assessment against the requirements of *Planning for Bushfire Protection 2006*, particularly access and provision of water supply for firefighting purposes – a description of measures to ensure the proposal will not increase the bushfire risk to adjoining lands. • **Waste** – including: – details of the quantities and classification of all waste streams to be generated on site during construction and operation – details of waste storage, handling and disposal during construction and operation – details of the measures that would be implemented to ensure that the development is consistent with the aims, objectives and guidance in the NSW Waste Avoidance and Resource Recovery Strategy 2014-2021. • **Air Quality** – including: – an assessment of the air quality impacts (including dust) during construction and operation of the development, in accordance with the relevant Environment Protection Authority guidelines – details of proposed mitigation, management and monitoring measures. • **Social** – including the preparation of a social impact assessment, which: – identifies and analyses the potential social impacts of the development, from the points of view of the affected community/ies and other relevant stakeholders, i.e. how they expect to experience the project – considers how potential environmental changes in the locality may affect people's: way of life; community; access to and use of infrastructure, services, and facilities; culture; health and wellbeing; surroundings; personal and property rights; decision-making systems; and fears and aspirations, as relevant and considering how different groups may be disproportionately affected – assesses the significance of positive, negative, and cumulative social impacts considering likelihood, extent, duration, severity/scale, sensitivity/importance, and level of concern/interest – includes mitigation measures for likely negative social impacts, and any proposed enhancement measures – details how social impacts will be adaptively monitored and managed over time.
Plans and Documents	The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the Regulation. You should provide these as part of the EIS rather than as separate documents.
Consultation	During the preparation of the EIS, you must consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups and affected landowners. In particular you must consult with: • Penrith City Council • Greater Sydney Commission • Roads and Maritime Services • Transport for NSW • Office of Environment and Heritage • Environment Protection Authority • Fire and Rescue NSW • Rural Fire Service • Department of Industry – Crown Lands and Water • Sydney Water

	• WaterNSW • surrounding local residents and stakeholders • any other public transport or community service providers. The EIS must describe the consultation process and the issues raised, and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, a short explanation should be provided.
Further consultation after 2 years	If you do not lodge a Development Application and EIS for the development within 2 years of the issue date of these SEARs, you must consult further with the Secretary in relation to the preparation of the EIS.
References	The assessment of the key issues listed above must take into account relevant guidelines, policies, and plans as identified. While not exhaustive, the following attachment contains a list of some of the guidelines, policies, and plans that may be relevant to the environmental assessment of this proposal.

Appendix B

Response to Submission Table

Ref: P0584l02

31 July 2020

info@asongroup.com.au
+61 2 9083 6601
Suite 5.02, Level 5, 1 Castlereagh Street
Sydney, NSW 2000
www.asongroup.com.au

Altis Property Partners
Level 14, 60 Castleregh Street
Sydney NSW 2000

Attn: Stephen O'Connor; Project Director

RE: 657-769 Mamre Road, Kemps Creek Logistic Hub – Response to Submission

Dear Stephen,

I refer to the site at the above-mentioned address and the Request for RTS forwarded by the Department of Planning, Industry & Environment dated 19th July 2019. We have reviewed the material provided and a preliminary response to relevant items is provided in **Attachment A**.

We trust the above is of assistance and please contact either the undersigned or Tim Lewis should you have any queries or require further information in relation to the above.

Yours sincerely,

Ali Rasouli
Senior Traffic Engineer – Ason Group
Email: ali.rasouli@asongroup.com.au

Attachment A

Table 1: Authority Comments & Ason Group Response

No.	Authority	Authority Comments / Actions	Ason Group Response
1	**DPIE Comments**	The Traffic Impact Assessment (TIA) assumes the expansion of Mamre Road to two lanes each way will be completed prior to operation of Stages 2 and 3 of the development. RMS have advised that funding has not been allocated for the Mamre Road expansion along the site frontage. The TIA must assess the traffic impacts of the entire development (stages 1, 2 and 3) for the scenario where no expansion to Mamre Road has been completed.	It has been established that Altis / FPA are proposing to bring forward the localised widening of sections on Mamre Road, providing for two lanes in each direction from the southern boundary of the Site to the existing signalized intersection of Mamre Road / Distribution Drive. It is noteworthy that, the revised Master Plan submission has been assessed and confirmed adequate capacity for the key intersections. For context, this is provided in Sections 4 and 5 of the revised TIA.
2		The left in / left out connections to Mamre Road is not supported.	It is noted and the revised Master Plan has removed this left in left out connection on Mamre Road. Reference shall be made to the Section 1.1 of the revised TIA and the revised Master Plan shown in Figure 1.
3		A connection between the internal access roads and future development sites to the south should be provided.	It is noted and the revised Master Plan has allowed for the connection to the southern Lots. Reference shall be made to the Section 1.1 of the revised TIA and the revised Master Plan shown in Figure 1.
4		The development assumes an alignment for the western extension of the Southern Link Road (SLR). The western extension of the SLR does not form part of the Transport and Arterial Road Infrastructure Map in the SEPP WSEA and it is premature to design a subdivision until an alignment is finalised. Additionally, due to the flood affectation of the site, consideration should be given to the infrastructure required for a crossing over South Creek.	In the revised submission dated 30/08/2019, the RMS has since removed their comment in relation to the SLR extending West of Mamre Road. We understand this was based upon further consultation, where the RMS acknowledges the Master Plan provides the flexibility for the SLR beyond the development extents.

No.	Authority	Authority Comments / Actions	Ason Group Response
5	**PCC Comments**	It is not considered that the current proposal has established that the Southern Link Road has been provided with adequate traffic signals to cater for future traffic movement, associated for instance with the identified 4 way traffic movement.	Ason Group Traffic Impact Assessment (TIA), which has been submitted and revised in response to authority comments, has reviewed the performance of the Mamre Road / Southern Link Road signalised intersection. The revised assessments based on the updated SSDA plan includes detailed traffic impact assessments for Mamre Road / SLR signal under two different sequence scenarios, demonstrating that satisfactory LoS can be achieved. Reference should be made to section 5 of the revised TIA.
6		The proposal is not considered to have appropriately clarified the treatment and further extension of Bakers lane to the east of Mamre Road within the subject site, including its alignment with the Southern Link Road and possible closure or treatment in the future. It is considered that the potential does exist for the alignment of Bakers Lane to be changed in the future which at present has not been finalised by the Roads and Maritime Services.	Refer to the 'sequence' drawings included in the drawing package supporting the revised submission. Reference can also be made to section 2 of the revised TIA. In this regard, the proposed access strategy for the SSDA is envisaged to be delivered in three sequences as briefly explained in below: **Sequence 1a,** via an interim upgrade at Mamre Road / Bakers Lane intersection which is proposed to accommodate traffic associated with the proposed development under this SSDA with a total GFA of 166,225m^2 and will continue accessing the Site till 2025. **Sequence 1b**, from Bakers Lane signalised intersection with Mamre Road including 4-lanes on Mamre Road at this stage. Essentially, the western leg of the Bakers Lane will be upgraded to form the vehicular access point for the entire MSP. This upgrade is expected to be fully delivered by 2025. **Sequence 2** is for the future scenario when Southern Link Road (SLR) will be delivered and terminated into a cul-de-sac at the access to the Site. **Sequence 3** shows the ultimate configuration of the SLR in future and when it is extended west through the Site. Furthermore, section 5 of the TIA reviews performance of the surrounding road network under each access sequence options.
7		In Table 11 of the report, SIDRA analysis confirms that the intersection of Mamre Road / Bakers Lane would still operate at a LoS F during the PM peak hour and with the Stage 1 development. This clearly demonstrates that the intersection would require some form of an upgrade to accommodate future traffic demands. The applicant should identify the upgrade and this also requires TfNSW approval.	This intersection currently operates at its capacity (LoS D with 47.2 second average delay during PM peak) and without any pedestrian crossing facility. It is important to note that with the additional improvements envisaged at this intersection as part of the sequence 1a upgrade, the operation of the signal post completion of SSD will actually be improved when compared to the existing during PM peak. Additionally, the implementation of pedestrian crossings through the intersection will significantly improve overall pedestrian amenity of the intersection. The SIDRA analysis confirms that the signalised intersection of Mamre Road / Bakers Lane with additional upgrades proposed as part of sequence 1a will have an improved performance until 2025 when compared to the existing situation. By upgrading Mamre Road to 4 lanes from southern boundary of the Site to Distribution Drive signal as well as appropriate short turn bays proposed as part of sequence 1b will ensure satisfactory operation of this intersection from existing situation with an overall intersection **'LoS' C** during the morning and afternoon peak hours with and without Southern Lots.

No.	Authority	Authority Comments / Actions	Ason Group Response
8		Furthermore, as the timing of the delivery of the SLR is unknown, the applicant needs to assess the interim scenario access, with full master plan development. Also, it is necessary to identify the future infrastructure upgrades to cater for the full master plan development.	Revised analysis has been undertaken based on assuming all access to/from Mamre Road / Bakers Lane (as per sequence 1b) and, as a result, the Proposal now includes additional upgrades to Mamre Road (widening to 4-lanes adjacent the site) to cater for full development of the master plan now proposed. Furthermore, additional upgrades have been envisaged for the signalised intersection of Mamre Road / Bakers Lane to fully accommodate the future traffic of the full Master Plan as well as the Southern Lots. Section 5 of the TIA discussed the SIDRA results for this scenario.
9		The proposal has a left in/left out access arrangement to Mamre Road which is contrary to RMS advice on 11 September 2018 which stated that "Proposed development should have all its access from the Southern Link Road connection".	The revised submission has removed secondary access to Mamre Road, with all access via Bakers Lane and future connections to SLR should it proceed to the west in the future.
10		RMS has given close attention to future intersection locations, to provide safe access to and from properties along the Mamre Road corridor upgrade, between M4 and Kerrs Road. To be in line with RMS' principles, it is imperative that early planning considers alternate access arrangements to and from properties along the Mamre Road corridor. In considering this, the proposed internal road "NSR2" should be extended to the southern boundary of the property. The internal road "NSR2" needs to be designed as a high order industrial road standard and to be functioning as a future collector road.	Noted. An allowance for future connection to the south has been incorporated into the revised master plan. Furthermore, interim upgrades proposed have also been assessed with regard for (reasonable) development of the lands to the south.
11	**RMS Comments**	The proposed left in / left out on Mamre Road is not supported and all access must be from the signalised intersection with Bakers Lane.	Noted. The revised SSD plan has removed this access crossover.
12		A connection from the local road to the south must be provided to give access to future development	Noted. The revised SSD provides this connection, with traffic modelling including traffic associated with future development of lands to the south.
13		The proposal assumed that Southern Link Road would be extended and the intersection of Bakers Lane/Mamre Road would be closed. However, the current strategic development of Southern Link Road only extends to Mamre Road.	Noted. In our revised TIA, we have allowed for different connections between Mamre Road / SLR and the site access.
14		The duplication of Mamre Road is not funded along the frontage of this site or at the intersection with Bakers Lane. Funding is only available for the construction of the Mamre Road upgrade to Erskine Park form the M4 only.	Noted. Altis and FPA has offered to upgrade Mamre Road to 2-lanes in each direction (total 4-lanes) from the southern boundary of the Site to the existing signalized intersection of Mamre Road / Distribution Drive.
15		Modelling (SIDRA) files for the proposed intersection of Mamre Road and Bakers Lane should be provided. The TIA report that accompanied the development application does not provide enough detail on the performance of the intersection, including queue lengths, degree of saturation, etc.	Noted. The SIDRA files of the revised modelling have been provided to Altis and FPA to submit to RMS for review and assessments.
16		The modelling in the traffic report has included the Mamre Road upgrades which may not be funded and constructed when this development has been completed. The applicant should assess the impact of this proposal based on Mamre Road not being upgraded.	It has been established that Altis / FPA are proposing to bring forward the localised widening of sections on Mamre Road, providing for two lanes in each direction. This is planned to occur between the southern boundary of the Site to the existing signalised intersection of Mamre Road / Distribution Drive. Thus, the modelling conducted accounts for planned upgrades to Mamre Road in conjunction with existing and future provision.

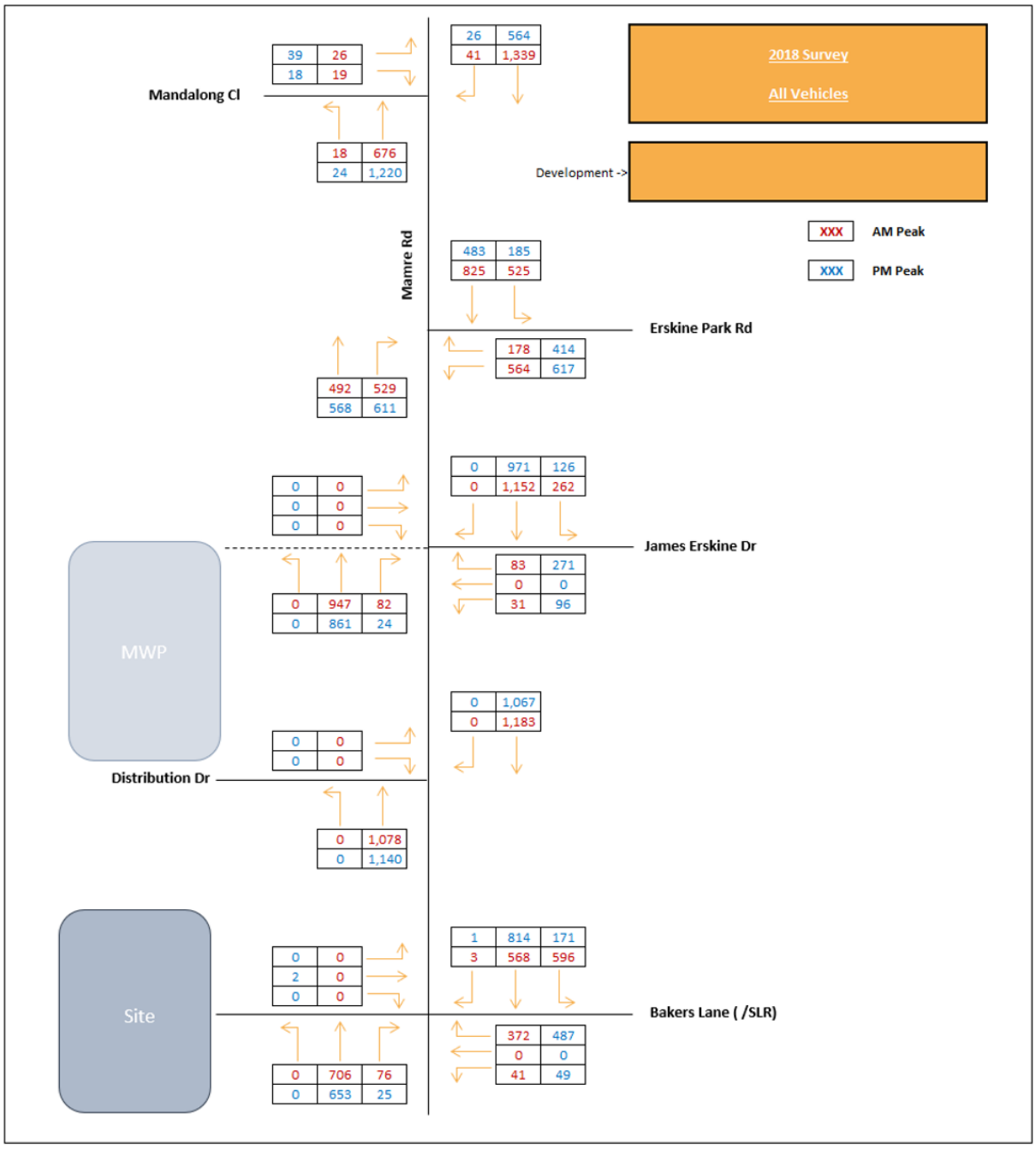
No.	Authority	Authority Comments / Actions	Ason Group Response
17		Further modelling has been undertaken for a third lane on Mamre Road which is unlikely to be constructed by 2036.	It is understood that any further upgrade plans or commitments on Mamre Road await resolution of further traffic studies being undertaken for the broader area. However, the modelling undertaken for the future 2036 base scenario identifies that there is a need for upgrades to Mamre Road to accommodate background traffic growth even without considering the Master Plan traffic. Therefore, some level of upgrade is required, irrespective of the Proposal. The adopted upgrades have sought to be consistent with the future plans — which envisage widening to 3 lanes in each direction in the longer term, even if those upgrades are not fully funded.
18	**Anglican School Comments**	Section 1.2 of the Traffic Impact Assessment specifies that a Construction Traffic Management Plan (CTMP) for the Proposal is not part of the scope of the assessment, rather stating that it is expected that a CTMP will be prepared prior to the issue of a Construction Certificate. It is generally considered that a development of this scale would necessitate at the very minimum, a preliminary CTMP to be prepared prior to determination. The preliminary CTMP should provide appropriate construction management initiatives which aim to minimise / eliminate potential impacts of construction activities on the safety and efficiency of the nearby educational precinct.	A preliminary CTMP has been prepared and provided in Section 7 of the revised TIA.
19		Section 3.4 of the Traffic Impact Assessment specifies that on-site observations confirm a significant school traffic demand through the intersection of Mamre Road and Bakers Lane, particularly during the PM peak hour. Section 3.5 refers to traffic surveys of the intersection of Mamre Road and Bakers Lane during weekday AM and PM peak periods, which were utilised as the basis for existing and future intersection performance. The specific extent of these surveys are however not specified. Whilst it is expected that the AM peak surveys captured the school start period, it is not clear that the PM peak surveys adequately captured the school finish period (typically 2:30pm – 4:00pm).	Afternoon surveys at the intersection of Mamre Road / Bakers Lane were conducted on Thursday 3 – May – 2018 (outside school holidays) during the following road network peak period: ▪ 3:00PM – 6:00PM Accordingly, the afternoon peak surveys adequately captured and considered school traffic.
21		Similarly, Section 4.2 of the Traffic Impact Assessment refers to future base case scenario 2036 AM and PM peak hour traffic demands obtained from Roads & Maritime Services. The exact hourly periods modelled should be outlined to ensure they adequately capture the school finish period.	The 2036 base traffic profile has been obtained from RMS strategic traffic model and as such it is expected to readily include the traffic associated with the school. Nevertheless, the updated SSD modelling — considering 2026 — applies percentage growth rates to the existing traffic on the surrounding road network, therefore the school traffic has readily been increased. Furthermore, the future modelling scenario adequately includes the peak operating hours of the school. The existing road network peak hours are: AM Peak: 7:45am – 8:45am PM Peak: 15:00pm – 16:00pm

<table>
<tr><th>No.</th><th>Authority</th><th>Authority Comments / Actions</th><th>Ason Group Response</th></tr>
<tr><td>22</td><td></td><td>Section 3.7 of the Traffic Impact Assessment presents that the junction of Mamre Road and Bakers Lane currently operates with a poor level of service during the PM peak. Whilst an upgrade to the intersection is proposed as part of the Application, Section 5.5 indicates that post development modelling of the junction maintains an unacceptable level of service of 'F' during the PM peak hour.</td><td>The revised TIA proposes additional upgrades at Mamre Road / Bakers Lane which can satisfactorily accommodate the additional traffic from the Site (sequence 1b) as well as the Southern Lots. In this instance reference shall be made to section 5 of the revised TIA.</td></tr>
<tr><td>23</td><td></td><td>Post Potential Master Plan 2036 modelling of the intersection of Mamre Road and Southern Link Road contained within Section 7.4 of the Traffic Impact Assessment indicates operation near capacity during both the AM and PM peak hours.</td><td>Revised assessments adopt 2026 as the relevant future modelling year and suitable upgrades to achieve satisfactory performance have been addressed. Accordingly, the revised TIA shows that:
- Considering sequences 2 & 3 with SLR connection the intersection of Mamre Road / SLR will generally operate at an overall 'LoS C' with and without the Southern Lots during the AM and PM peak periods with the exception for sequence 2 AM peak hour which operates at an acceptable LoS 'D' when considering the Southern Lots traffic.
Accordingly, this intersection will be able to accommodate the additional traffic to/from the Site as well as the Southern Lots. Detailed SIDRA results for these scenarios can be found in relevant appendices of the revised TIA.</td></tr>
<tr><td>24</td><td></td><td>Further to the above analysis, some concern is held with respect to traffic signal cycle times adopted for some intersections under certain scenarios (presented within Appendix 5 of the Traffic Impact Assessment).
Traffic signals governing intersections on State Roads which carry considerable traffic demands such as Mamre Road typically operate with cycle times in excess of 100 seconds.
There are however numerous examples where signalised intersections along Mamre Road have been modelled with cycle times less than 100 seconds, which are unlikely to be adopted in reality.
The adoption of reduced cycle times can result in the presentation of a more efficient operational performance than that which would prevail in the likely event that longer cycle times are implemented.
The following provides a summary of the examples where a traffic signal time of less than 100 seconds have been adopted:
▪ The junction of Mamre Road and James Erskine Drive has been modelled under existing conditions with a cycle time of 60 and 80 seconds during the AM and PM peak hours, respectively.
▪ The junctions of Mamre Road and Southern Link Road has been modelled under 2036 Base conditions with a cycle time of 75 seconds during the PM peak hour.
▪ The junction of Mamre Road and Southern Link Road have been modelled under future 2036 conditions incorporating the Application with a cycle time of 85 seconds during the PM peak hour.</td><td>The phasing and timing information for the existing signalised intersection has been determined through number of site inspections during peak periods as well as detailed review of the video footage at the time of the surveys. More importantly, we have cross-checked our site observations against the RMS signal phasing and timing and applied RMS data for our modellings. It is therefore, a reasonable assumption to adopt a similar signal data for future traffic modelling scenarios as it also provides an opportunity for a like for like comparison between each scenarios. For additional clarity the following cycle timing has been adopted as part of the revised TIA for different modelling scenarios:
<table><tr><th>Modelling scenario</th><th>Intersection</th><th>AM Cycle Time</th><th>PM Cycle Time</th></tr><tr><td rowspan="3">Existing Baseline</td><td>Mamre Rd / Erskine Park Rd (T-Intersection)</td><td>80s</td><td>100s</td></tr><tr><td>Mamre Rd / James Erskine Dr (T-Intersection)</td><td>60s</td><td>80s</td></tr><tr><td>Mamre Rd / Bakers Lane</td><td>81s</td><td>107s</td></tr><tr><td>2025 – Sequence 1A</td><td>Mamre Rd / Bakers Lane</td><td>100s</td><td>100s</td></tr><tr><td rowspan="4">2025 – Sequence 1B</td><td>Mamre Rd / Erskine Park Rd (T-Intersection)</td><td>80s *</td><td>90s *</td></tr><tr><td>Mamre Rd / James Erskine Dr (T-Intersection)</td><td>80s *</td><td>90s *</td></tr><tr><td>Mamre Rd / Distribution Drive (T-Intersection)</td><td>80s *</td><td>90s *</td></tr><tr><td>Mamre Rd / Bakers Lane</td><td>80s</td><td>85s</td></tr><tr><td rowspan="3">2026 – Sequence 2</td><td>Mamre Rd / Erskine Park Rd</td><td>115s *</td><td>100s *</td></tr><tr><td>Mamre Rd / James Erskine Dr</td><td>115s *</td><td>100s *</td></tr><tr><td>Mamre Rd / SLR</td><td>120s</td><td>120s</td></tr></table></td></tr>
</table>

<table>
<tr><th>No.</th><th>Authority</th><th>Authority Comments / Actions</th><th>Ason Group Response</th></tr>
<tr><td></td><td></td><td>▪ The junction of Mamre Road and Mamre West Precinct has been modelled under future conditions incorporating the Application with a cycle time of 50 seconds during both AM and PM peak hours.</td><td>
<table>
<tr><td rowspan="3">2026 – Sequence 3</td><td>Mamre Rd / Erskine Park Rd</td><td>115s *</td><td>100s *</td></tr>
<tr><td>Mamre Rd / James Erskine Dr</td><td>115s *</td><td>100s *</td></tr>
<tr><td>Mamre Rd / SLR</td><td>120s</td><td>120s</td></tr>
</table>
Note: * The network has been assessed using a network cycle time.
</td></tr>
<tr><td>25</td><td></td><td>The above cycle times, and thus the reported intersection performances, should be confirmed by Roads & Maritime Services as being appropriate.</td><td>The SIDRA files for our revised assessments have already been provided Altis and FPA to present to RMS for review and consideration.</td></tr>
</table>

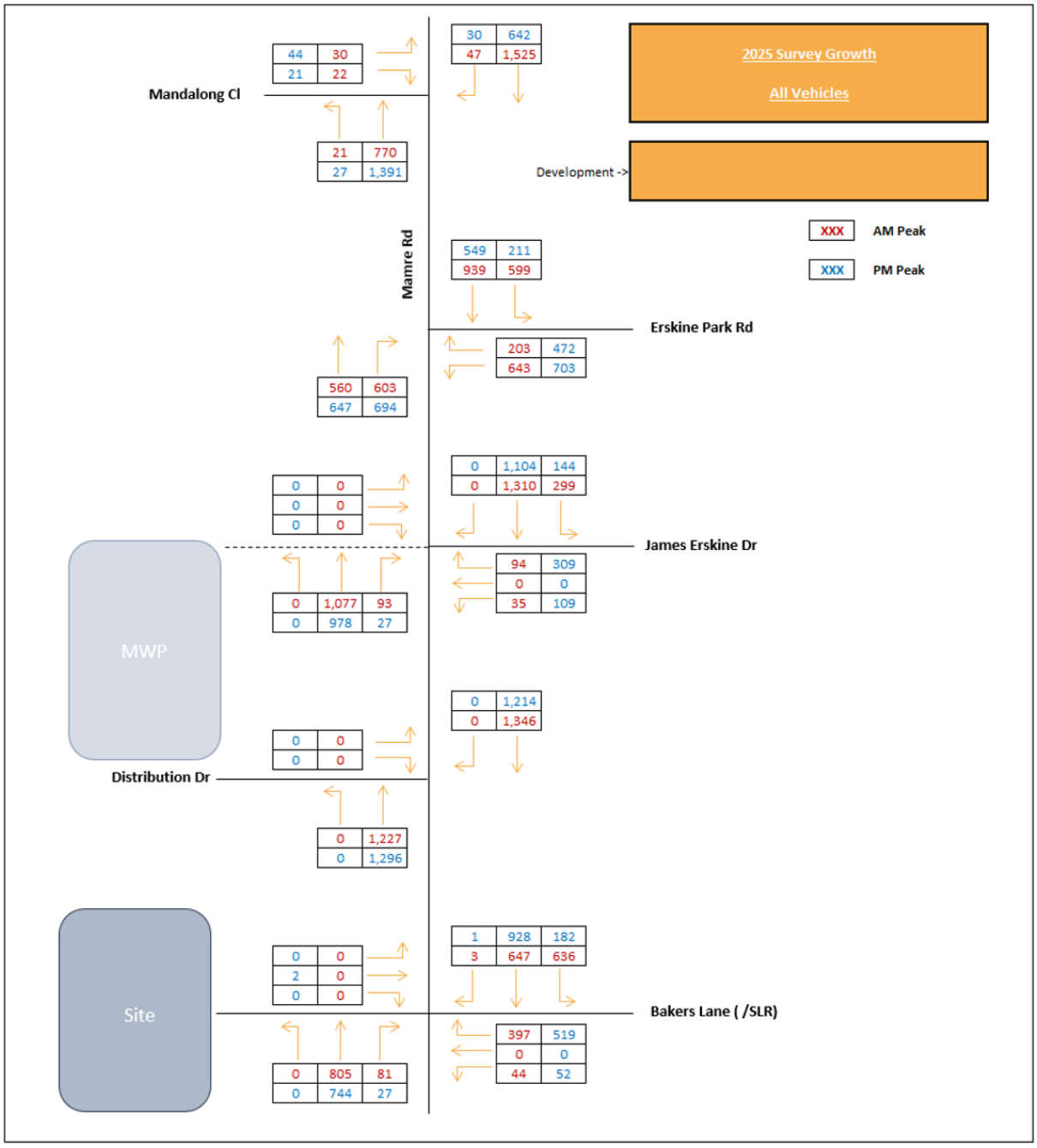
Appendix C

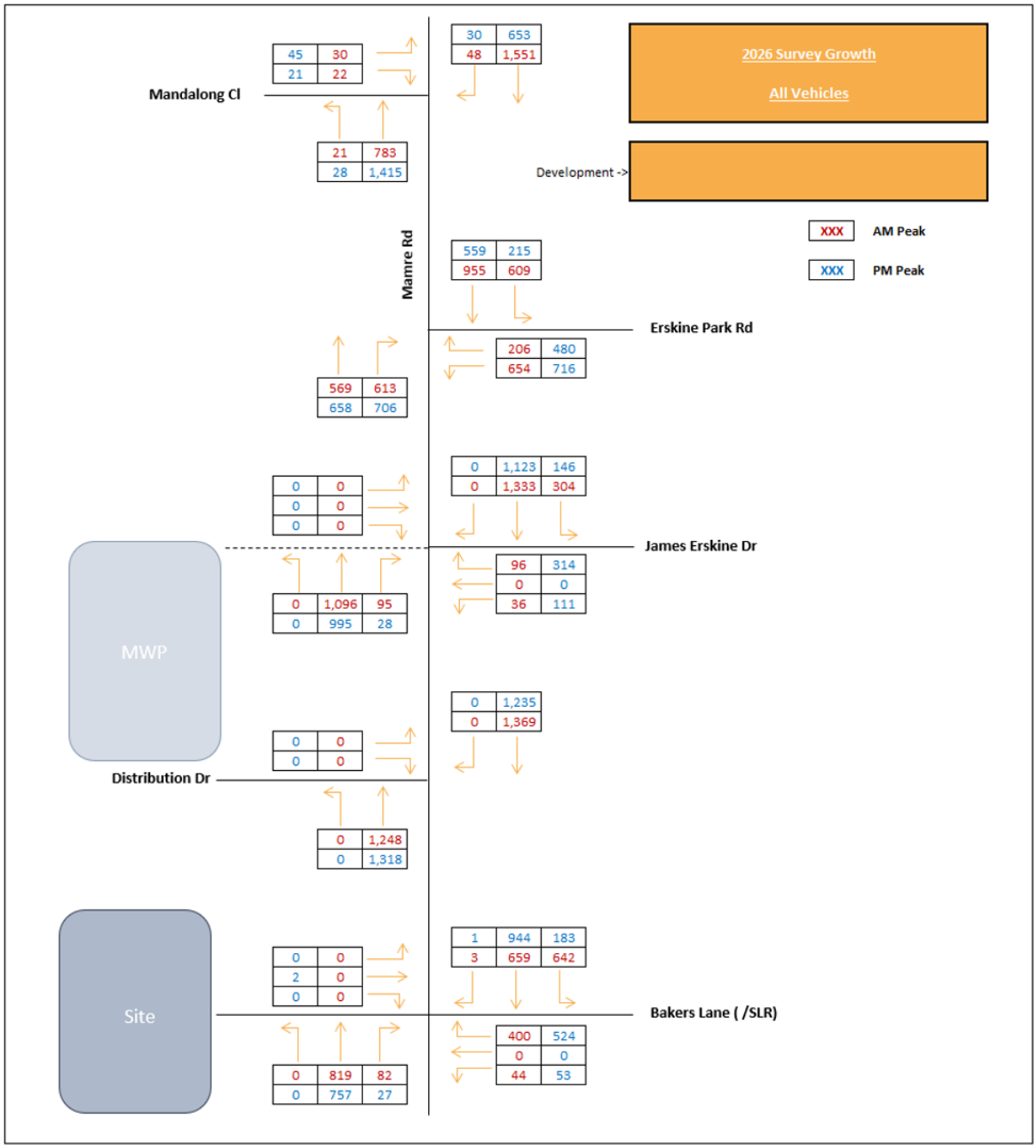
Baseline Traffic Volumes (May 2018)


2018 Survey
All Vehicles
Development ->
XXX AM Peak
XXX PM Peak
Mandalong Cl
Mamre Rd
Erskine Park Rd
James Erskine Dr
Distribution Dr
Bakers Lane (/SLR)
MWP
Site
39 26
18 19
18 676
24 1,220
26 564
41 1,339
483 185
825 525
178 414
564 617
492 529
568 611
0 0
0 0
0 0
0 947 82
0 861 24
0 971 126
0 1,152 262
83 271
0 0
31 96
0 0
0 0
0 1,078
0 1,140
0 1,067
0 1,183
0 0
2 0
0 0
0 706 76
0 653 25
1 814 171
3 568 596
372 487
0 0
41 49

Appendix D

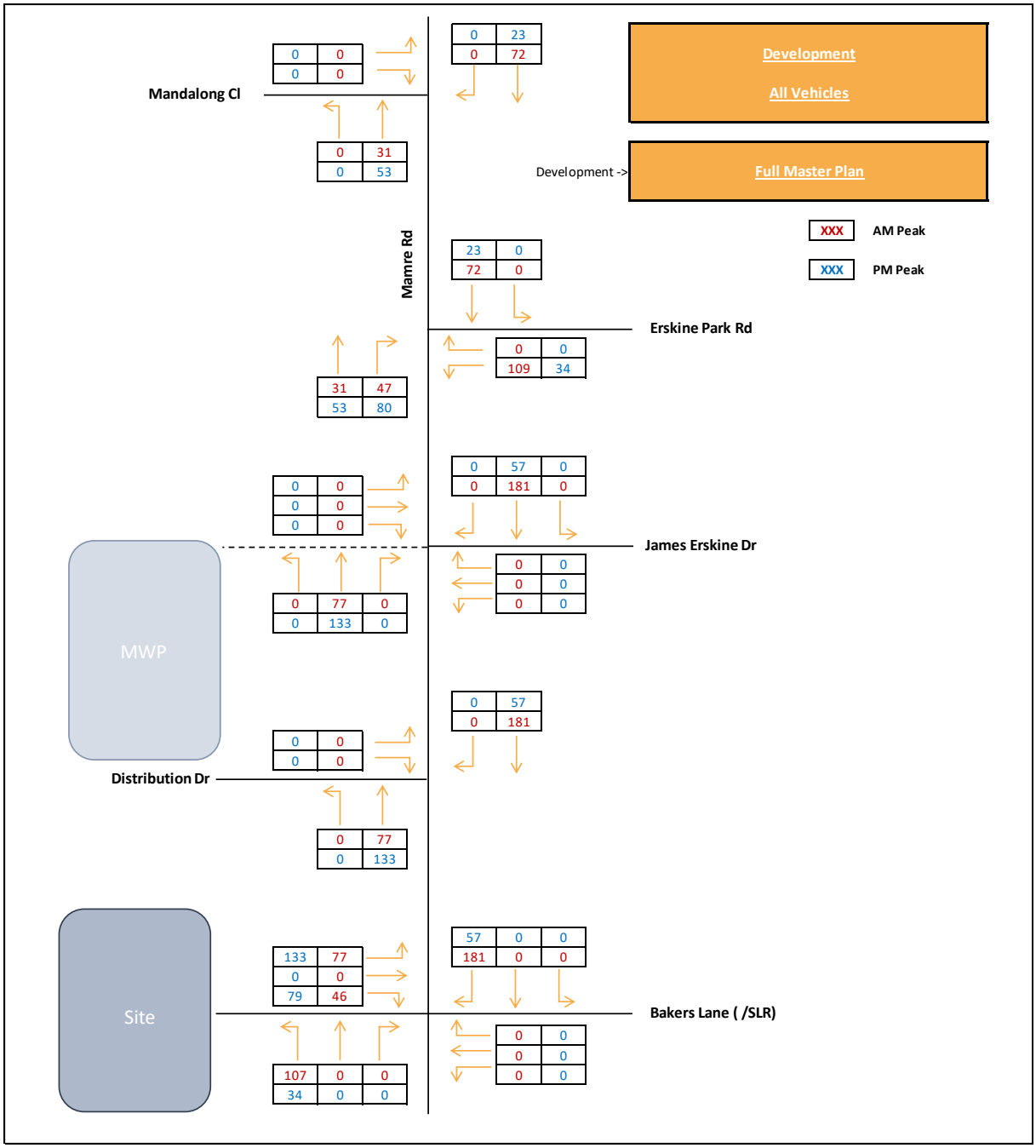
Future Base Traffic Volumes (2025 and 2026)


2025 Survey Growth
All Vehicles
Development ->
XXX AM Peak
XXX PM Peak
Mandalong Cl
Mamre Rd
Erskine Park Rd
James Erskine Dr
Distribution Dr
Bakers Lane (/SLR)
MWP
Site
44 30
21 22
30 642
47 1,525
21 770
27 1,391
549 211
939 599
203 472
643 703
560 603
647 694
0 0
0 0
0 0
0 1,104 144
0 1,310 299
94 309
0 0
35 109
0 1,077 93
0 978 27
0 1,214
0 1,346
0 0
0 0
0 1,227
0 1,296
0 0
2 0
0 0
1 928 182
3 647 636
397 519
0 0
44 52
0 805 81
0 744 27


2026 Survey Growth
All Vehicles
Development ->
XXX AM Peak
XXX PM Peak
Mandalong Cl
Mamre Rd
Erskine Park Rd
James Erskine Dr
Distribution Dr
Bakers Lane (/SLR)
MWP
Site
45 30
21 22
21 783
28 1,415
30 653
48 1,551
559 215
955 609
206 480
654 716
569 613
658 706
0 0
0 0
0 0
0 1,123 146
0 1,333 304
96 314
0 0
36 111
0 1,096 95
0 995 28
0 1,235
0 1,369
0 0
0 0
0 1,248
0 1,318
0 0
2 0
0 0
1 944 183
3 659 642
400 524
0 0
44 53
0 819 82
0 757 27

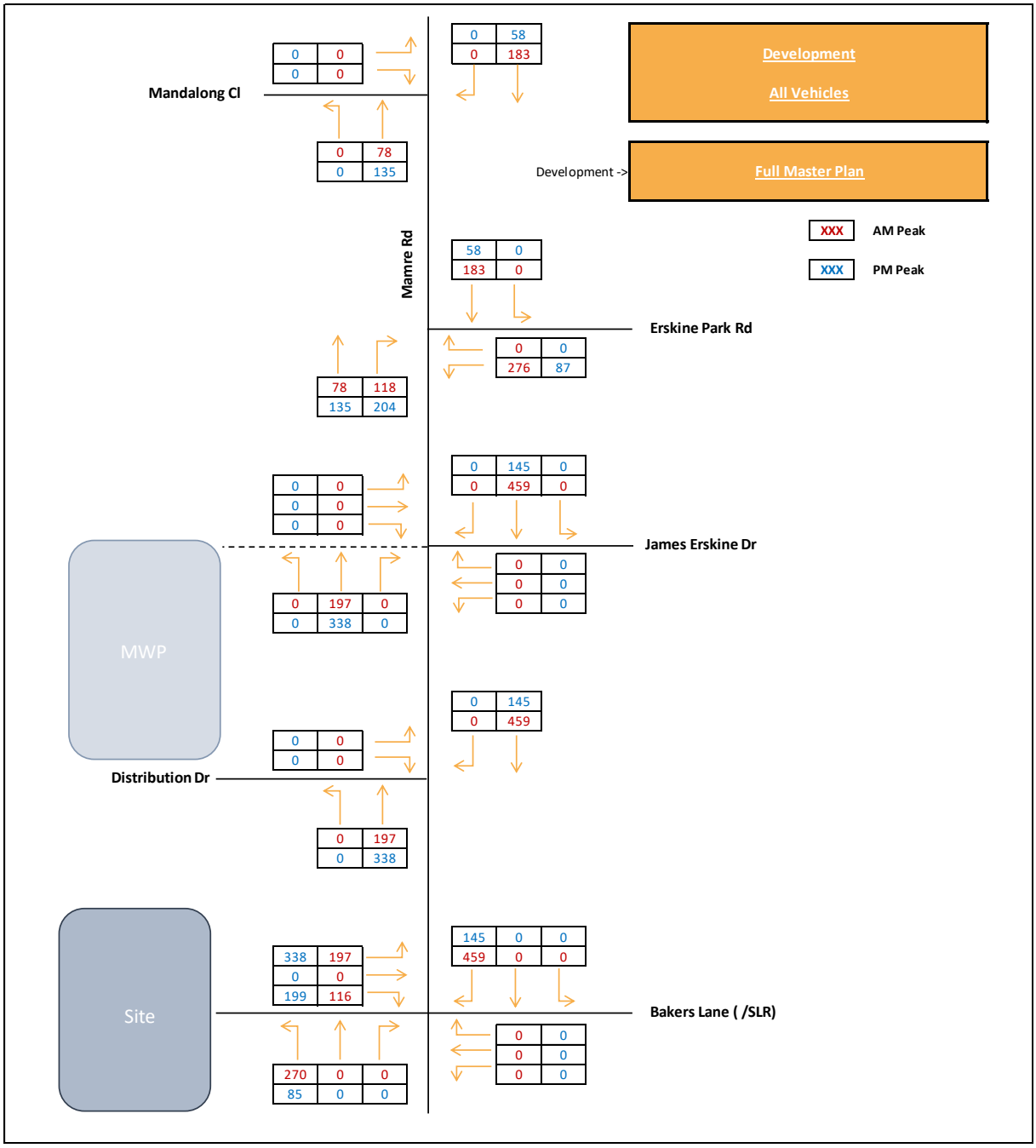
Appendix E-1

SSDA Traffic Volumes


Development
All Vehicles
Development ->
Full Master Plan
XXX AM Peak
XXX PM Peak
Mandalong Cl
Mamre Rd
Erskine Park Rd
James Erskine Dr
Distribution Dr
Bakers Lane (/SLR)
MWP
Site

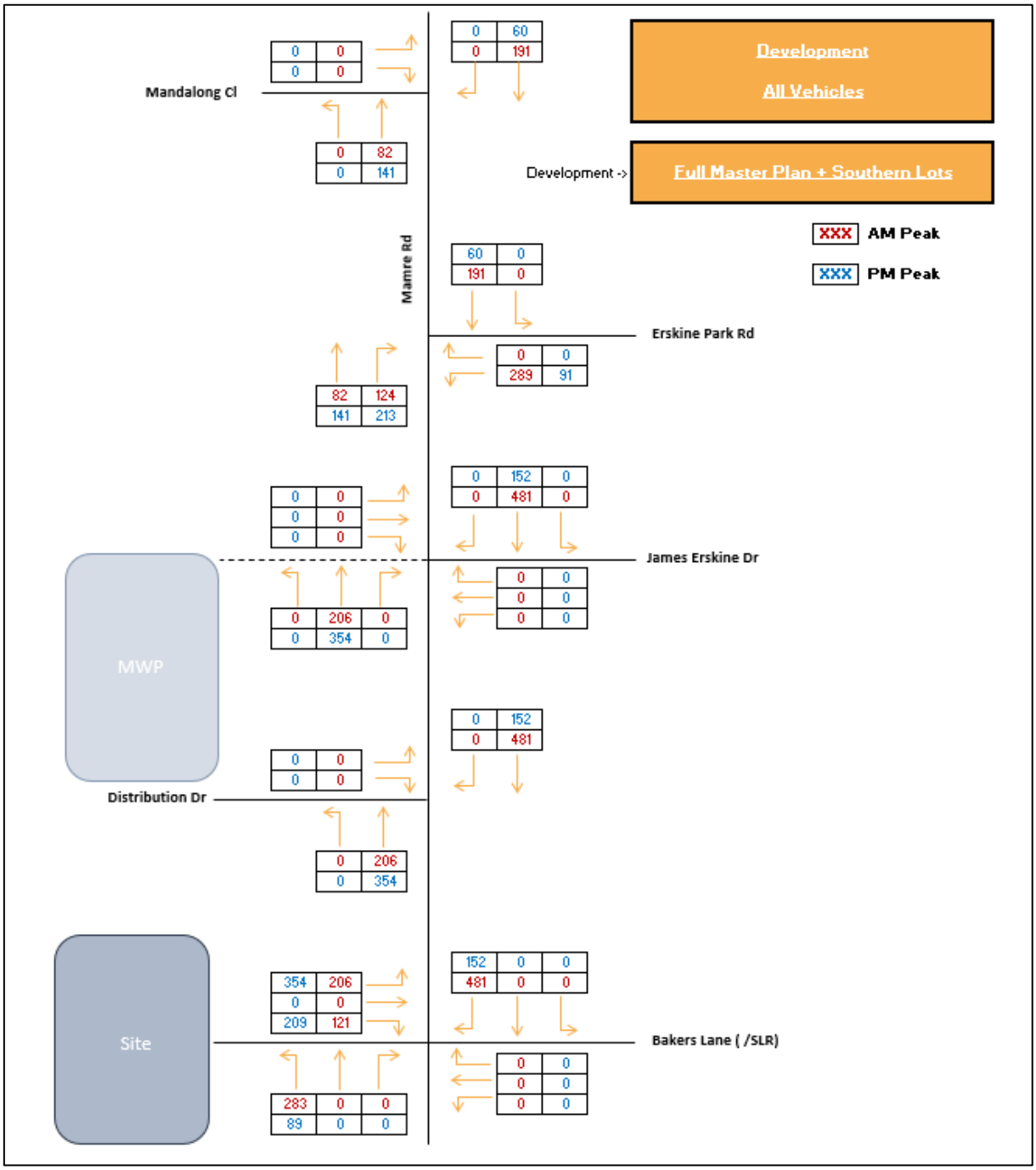
Appendix E-2

Indicative Ultimate MSP Traffic Volumes


Development
All Vehicles
Development ->
Full Master Plan
XXX AM Peak
XXX PM Peak
Mandalong Cl
Mamre Rd
Erskine Park Rd
James Erskine Dr
Distribution Dr
Bakers Lane (/SLR)
MWP
Site

Appendix F

Indicative Ultimate MSP + Southern Lots Traffic Volumes


Development
All Vehicles
Development ->
Full Master Plan + Southern Lots
XXX AM Peak
XXX PM Peak
Mandalong Cl
Mamre Rd
Erskine Park Rd
James Erskine Dr
Distribution Dr
Bakers Lane (/SLR)
MWP
Site

Appendix G

SIDRA Results – 2018 Baseline and 2025 Sequence 1A

Intersection	Configuration	Period	Scenario 0									
			2018 Existing					2025 Sequence 1A + 166,225sqm built-form				
			Overall Intersection Delay - LoS	Approach	Queue	Avg. Delay	Degree of Saturation - DoS	Overall Intersection Delay - LoS	Approach	Queue	Avg. Delay	Degree of Saturation - DoS
Erskine Park Rd / Mamre Rd	Signallised (3-way)	AM	23.9 - B	N	85	15.1	0.72	Not included with isolated assessment.				
				E	112	38.6	0.83					
				S	54	24.9	0.77					
		PM	29.1 - C	N	60	25.4	0.53					
				E	101	28.0	0.75					
				S	89	32.1	0.75					
James Erskine Dr / Mamre Rd	Signallised (3-way)	AM	12.3 - A	N	88	14.6	0.79	Not included with isolated assessment.				
				E	11	22.7	0.35					
				S	51	7.9	0.57					
				-	-	-	-					
		PM	15.1 - B	N	86	16.0	0.69					
				E	40	25.5	0.60					
				S	67	9.7	0.56					
				-	-	-	-					
Distribution Dr / Mamre Rd	Signallised (3-way)	AM	Intersection traffic not settled for 2018.					Not included with isolated assessment.				
		PM										
Bakers Ln / Mamre Rd (*Isolated)	Signallised (4-way)	AM	18.2 - B	N	157	13.8	0.73	39.5 - C	N	168	45.0	0.90
				E	106	37.1	0.80		E	134	44.6	0.85
				S	148	14.8	0.70		S	132	29.7	0.71
				W	1	12.1	0.01		W	30	36.5	0.25
		PM	47.2 - D	N	477	54.2	0.98	35.0 - C	N	196	38.5	0.85
				E	256	75.4	0.99		E	137	31.0	0.72
				S	166	14.8	0.61		S	120	31.1	0.68
				W	1	21.9	0.02		W	61	41.0	0.64

Appendix H

SIDRA Results – 2025 Sequence 1B

Intersection	Configuration	Period	Scenario 1B									
			2025 Sequence 1B (no SL)					2025 Sequence 1B (with SL)				
			Overall Intersection Delay - LoS	Approach	Queue	Avg. Delay	Degree of Saturation - DoS	Overall Intersection Delay - LoS	Approach	Queue	Avg. Delay	Degree of Saturation - DoS
Erskine Park Rd / Mamre Rd	Signallised (3-way)	AM	25.5 - B	N	129	25.4	0.86	24.9 - B	N	123	24.5	0.85
				E	103	35.3	0.85		E	97	34.5	0.85
				S	72	17.2	0.84		S	73	17.1	0.84
		PM	25.7 - B	N	54	26.7	0.67	26.1 - B	N	55	27.3	0.69
				E	61	33.0	0.91		E	61	33.0	0.91
				S	99	20.1	0.77		S	103	20.7	0.77
James Erskine Dr / Mamre Rd	Signallised (3-way)	AM	15.2 - B	N	188	21.5	0.88	13.5 - A	N	169	18.6	0.86
				E	17	29.9	0.49		E	16	29.3	0.50
				S	23	4.8	0.82		S	24	4.9	0.82
				-	-	-	-		-	-	-	-
		PM	11.7 - A	N	96	12.5	0.68	11.7 - A	N	96	12.5	0.68
				E	39	33.8	0.73		E	39	33.8	0.73
				S	58	4.9	0.63		S	60	5.0	0.63
				-	-	-	-		-	-	-	-
Distribution Dr / Mamre Rd	Signallised (3-way)	AM	10.0 - A	N	97	8.8	0.67	9.7 - A	N	90	8.1	0.66
				S	69	11.6	0.58		S	70	11.7	0.59
				W	7	9.9	0.17		W	7	9.9	0.17
		PM	13.4 - A	N	75	10.1	0.63	13.5 - A	N	76	10.2	0.6
				S	95	15.9	0.67		S	97	16.0	0.7
				W	44	15.2	0.50		W	45	15.7	0.5
Bakers Ln / Mamre Rd	Signallised (4-way)	AM	33.9 - C	N	91	32.4	0.90	34.7 - C	N	90	34.1	0.93
				E	45	54.9	0.92		E	45	54.9	0.92
				S	88	28.3	0.82		S	88	28.2	0.82
				W	36	35.6	0.63		W	38	36.0	0.67
		PM	39.7- C	N	128	39.0	0.89	39.0 - C	N	128	29.0	0.89
				E	63	57.1	0.92		E	63	57.0	0.92
				S	64	24.4	0.66		S	64	24.2	0.66
				W	99	48.3	0.90		W	96	44.2	0.86

Appendix I

SIDRA Results – 2026 Sequence 2

Intersection	Configuration	Period	Scenario 2									
			2026 Sequence 2 (no SL)					2026 Sequence 2 (with SL)				
			Overall Intersection Delay - LoS	Approach	Queue	Avg. Delay	Degree of Saturation - DoS	Overall Intersection Delay - LoS	Approach	Queue	Avg. Delay	Degree of Saturation - DoS
Erskine Park Rd / Mamre Rd	Signallised (3-way)	AM	35.7 - C	N	194	31.6	0.87	37.1 - C	N	199	32.4	0.88
				E	140	47.5	0.91		E	152	51.0	0.91
				S	126	30.3	0.86		S	127	30.7	0.86
		PM	27.4 - B	N	68	32.6	0.75	27.7 - B	N	70	33.1	0.75
				E	70	34.2	0.90		E	70	34.2	0.90
				S	123	20.4	0.83		S	126	20.9	0.84
James Erskine Dr / Mamre Rd	Signallised (4-way)	AM	21.4 - B	N	128	17.7	0.71	21.3 - B	N	133	17.5	0.71
				E	20	55.9	0.73		E	20	56.0	0.73
				S	139	22.2	0.71		S	141	22.3	0.72
				W	23	45.8	0.84		W	23.2	46.0	0.84
		PM	31.5 - C	N	88	20.4	0.61	32.4 - C	N	89	20.4	0.62
				E	40	42.1	0.67		E	40	42.1	0.67
				S	198	36.1	0.89		S	206	38.2	0.90
				W	65	45.8	0.90		W	65	46.1	0.90
Distribution Dr / Mamre Rd	Give-way Controlled (3-way)	AM	14.3 - A	N	0	0.2	0.55	14.4 - A	N	0	0.2	0.56
				S	0	7.5	0.44		S	0	7.5	0.44
				W	1	14.3	0.08		W	1	14.4	0.08
		PM	18.9 - B	N	0	0.1	0.47	19.3 - B	N	0	0.1	0.47
				S	0	7.5	0.48		S	0	7.5	0.49
				W	4	18.9	0.31		W	4	19.3	0.32
Bakers Ln / Mamre Rd	Signallised (4-way)	AM	32.3 - C	N	79	25.1	0.79	35.8 - C	N	84	31.5	0.80
				E	55	57.1	0.74		E	54	55.9	0.70
				S	135	32.4	0.78		S	147	34.4	0.82
				W	42	38.7	0.80		W	43	38.5	0.78
		PM	34.5 - C	N	102	34.2	0.62	34.5 - C	N	102	34.4	0.63
				E	62	43.6	0.54		E	62	43.6	0.54
				S	99	31.1	0.63		S	99	30.9	0.63
				W	61	31.4	0.61		W	64	31.6	0.63

Appendix J

SIDRA Results – 2026 Sequence 3

Intersection	Configuration	Period	Scenario 3									
			2026 Sequence 3 (no SL)					2026 Sequence 3 (with SL)				
			Overall Intersection Delay - LoS	Approach	Queue	Avg. Delay	Degree of Saturation - DoS	Overall Intersection Delay - LoS	Approach	Queue	Avg. Delay	Degree of Saturation - DoS
Erskine Park Rd / Mamre Rd	Signallised (3-way)	AM	35.7 - C	N	194	31.6	0.87	37.1 - C	N	199	32.4	0.88
				E	140	47.5	0.91		E	152	51.0	0.91
				S	126	30.3	0.86		S	127	30.7	0.86
		PM	27.4 - B	N	68	32.6	0.75	27.7 - B	N	70	33.1	0.75
				E	70	34.2	0.90		E	70	34.2	0.90
				S	123	20.4	0.83		S	126	20.9	0.84
James Erskine Dr / Mamre Rd	Signallised (4-way)	AM	21.4 - B	N	128	17.7	0.71	21.3 - B	N	133	17.5	0.71
				E	20	55.9	0.73		E	20	56.0	0.73
				S	139	22.2	0.71		S	141	22.3	0.72
				W	23	45.8	0.84		W	23.2	46.0	0.84
		PM	31.5 - C	N	88	20.4	0.61	32.4 - C	N	89	20.4	0.62
				E	40	42.1	0.67		E	40	42.1	0.67
				S	198	36.1	0.89		S	206	38.2	0.90
				W	65	45.8	0.90		W	65	46.1	0.90
Distribution Dr / Mamre Rd	Give-way Controlled (3-way)	AM	14.4 - A	N	0	0.2	0.55	14.5 - A	N	0	0.2	0.53
				S	0	7.5	0.44		S	0	7.5	0.44
				W	1	14.4	0.08		W	1	14.5	0.08
		PM	19.4 - B	N	0	0.1	0.47	19.8 - B	N	0	0.1	0.47
				S	0	7.5	0.48		S	0	7.5	0.49
				W	4	19.4	0.32		W	5	19.8	0.33
Bakers Ln / Mamre Rd	Signallised (4-way)	AM	32.4 - C	N	74	23.7	0.70	32.7 - C	N	77	24.0	0.71
				E	54	55.4	0.70		E	54	55.4	0.70
				S	107	37.5	0.69		S	109	38.4	0.71
				W	21	27.3	0.24		W	23	27.4	0.25
		PM	32.8 - C	N	98	31.3	0.59	32.8 - C	N	98	31.5	0.59
				E	64	46.2	0.60		E	64	46.2	0.60
				S	67	32.7	0.47		S	68	32.7	0.47
				W	33	22.7	0.42		W	36	22.7	0.44