



asongroup

# **Construction Traffic Impact Assessment**

Abbotts Road and Aldington Road Upgrade Project

Mamre Road Precinct

05/09/2023

P2264r01

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### APPENDICES

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#### Appendix A. Traffic Flows

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# Glossary

Acronym	Description
AVD	Average Vehicle Delay
AARU	Abbotts Road and Aldington Road corridor upgrades
Council	Penrith City Council
CTIA	Construction Traffic Impact Assessment
CTMP	Construction Traffic Management Plan
DA	Development Application
DCP	Development Control Plan
DoS	Degree of Saturation
DPE	Department of Planning and Environment
EIS	Environmental Impact Statement
GFA	Gross Floor Area
LOG-E	Land Owners Group East
LoS	Level of Service
MRP	Mamre Road Precinct
SSD	State Significant Development
TfNSW	Transport for New South Wales
REF	Review of Environmental Factors
VPA	Voluntary Planning Agreement
veh/hr	Vehicle movements per hour (1 vehicle in & out = 2 movements)

# 1 Introduction

## 1.1 Background

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Ason Group has been engaged by the Land Owners Group East (LOG-E) to prepare a Construction Traffic Impact Assessment (CTIA) in support of the Review of Environmental Factors (REF) required. The REF relates to the proposed upgrade of the Abbots Road and Aldington Road corridor (AARU).

The Mamre Road Precinct (MRP) was rezoned in June 2020 to provide for additional industrial land supporting the Western Sydney Employment Area and the planned new Western Sydney (Nancy-Bird Walton) International Airport.

The NSW Department of Planning and Environment (DPE) adopted a precinct-wide Development Control Plan on 19 November 2021 (herein referred to as the MRP DCP). The AARU is required to support development of the MRP and is consistent with the requirements of the MRP DCP.

The MRP Structure Plan map (June 2020) from the MRP DCP is displayed in **Figure 1**.

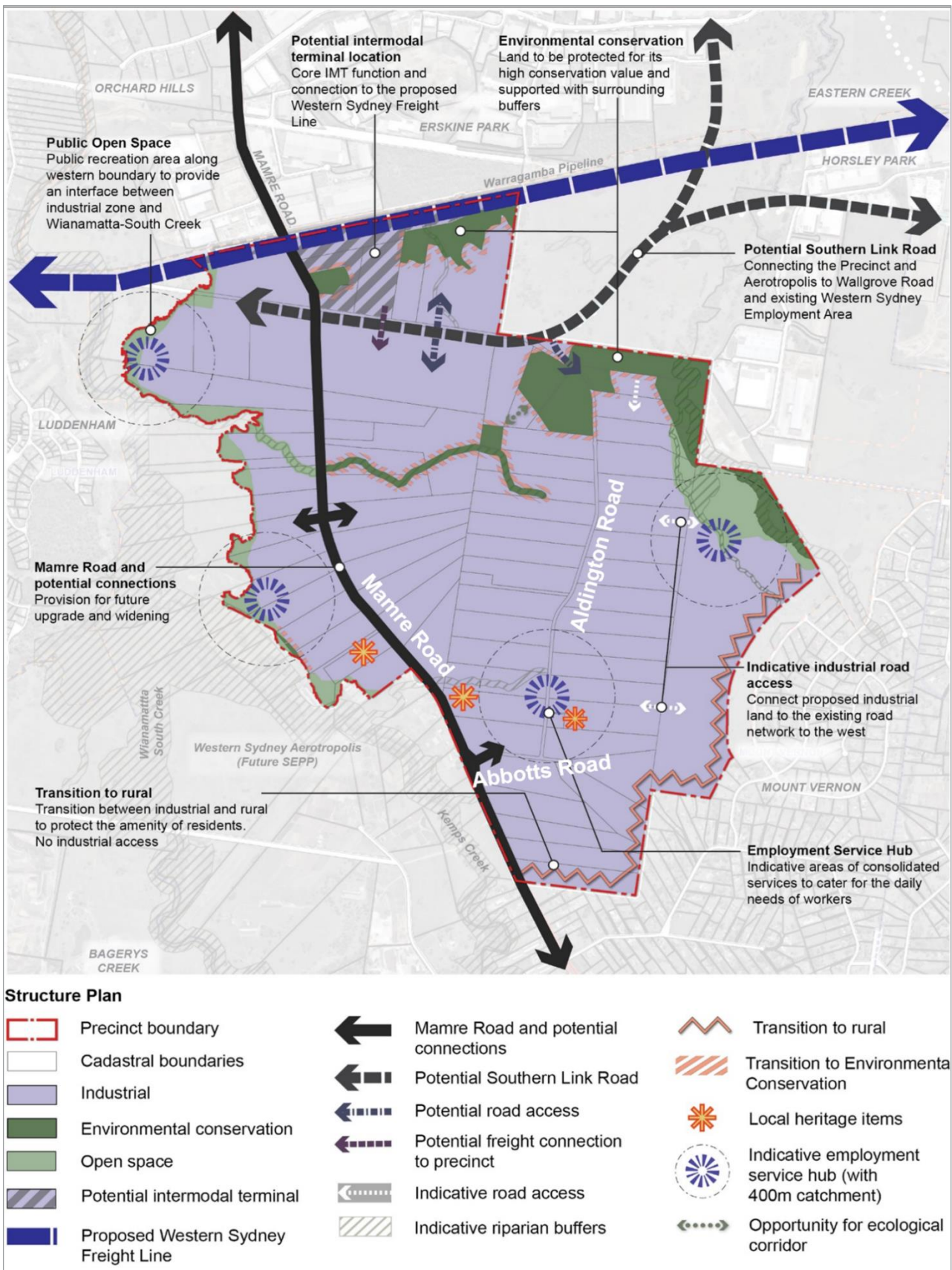


Figure 1: Mamre Road Precinct Structure Plan Map, June 2020<sup>1</sup>

<sup>1</sup> [NSW DPE MRP DCP website](http://www.nsw.gov.au/transport-and-infrastructure/transport-and-infrastructure-planning-and-design/mamre-road-precinct-structure-plan)

## 1.2 Project History

### 1.2.1 Background

LOG-E are represented by ESR Australia, Fife Kemps Creek, and Frasers Property Industrial, who are each developing parcels of land within the MRP, being the following:

- ESR Australia (ESR) – the Westlink Estate located at 290-308 Aldington Road, 59-62 and 63 Abbots Road;
- Fife Kemps Creek (FKC) – the 200 Aldington Road Industrial Estate and 90 Aldington Road Estate; and
- Frasers Property Industrial (Frasers) – two parcels of land, each located at:
  - 99-111 Aldington Road (Frasers North); and
  - 155-217 Aldington Road (Frasers South).

The relevant LOG-E sites within the MRP are shown below, in **Figure 2**.

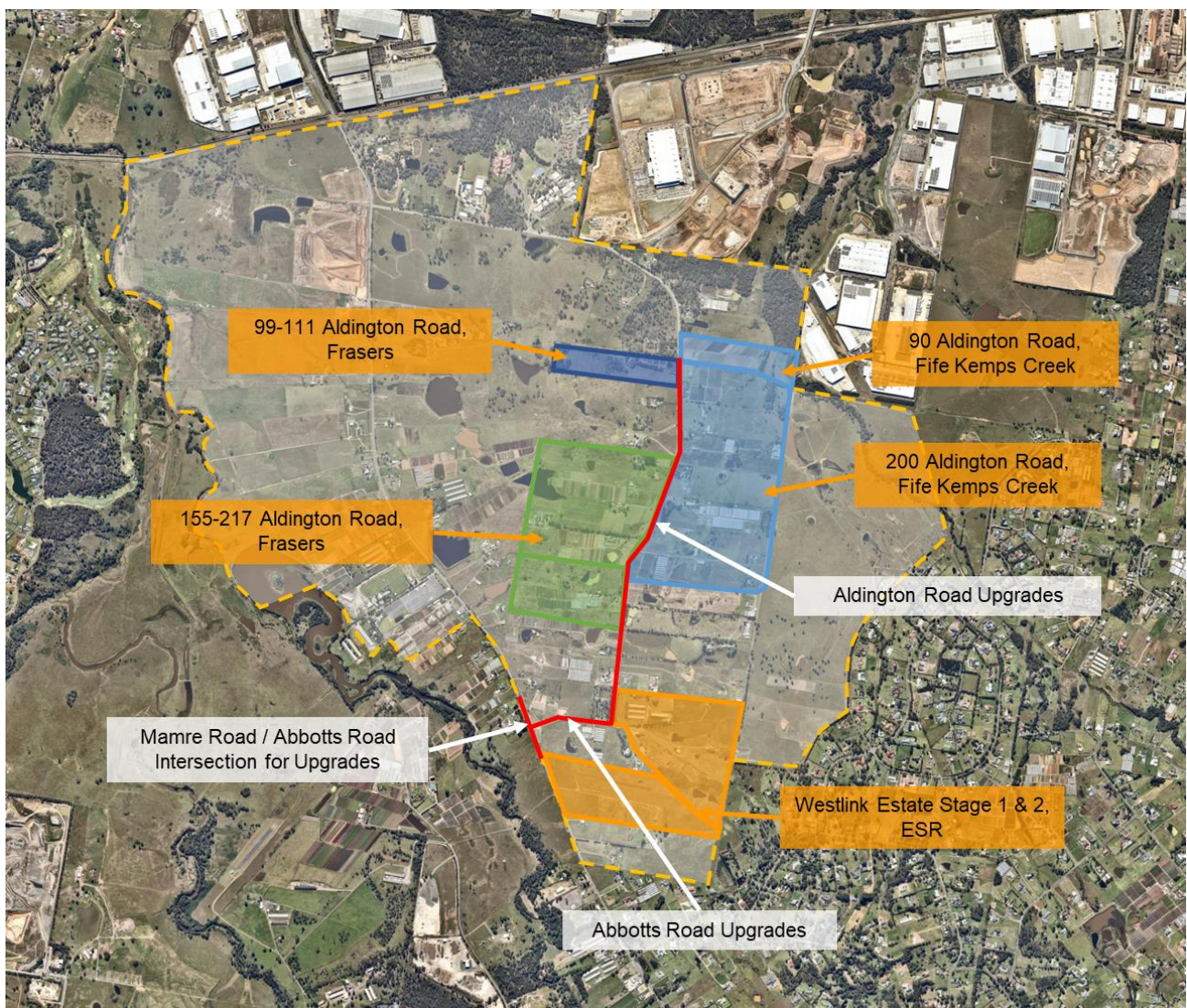


Figure 2: LOG-E Development Sites



While the MRP DCP identified the ultimate road network (by 2036), no staging strategy for delivery was identified. Therefore, as part of the development application process for each of the relevant sites, LOG-E are proposing upgrades to the Mamre Road / Abbotts Road intersection as well as the AARU.

Ason Group has worked on behalf of LOG-E to deliver the modelling assessment of the proposed road network which forms part of the relevant applications. The results of this operational modelling assessment have been documented within the following report:

- Ason Group, *P1815 – Mamre Road Precinct – LOG East – Revised Modelling*, P1815m02\_v4 MRP\_LOG East 2026 Revised Modelling, 19 September 2022 (LOG-E Modelling Memo).

Transport for New South Wales (TfNSW) endorsed this modelling assessment and, on 21 April 2023, Stage 1 of the Westlink Estate (SSD-9138102<sup>2</sup>) was approved by DPE.

The upgrades will be delivered through joint Voluntary Planning Agreements (VPA) associated with the approved Stage 1 of the Westlink Estates. The VPAs will be between LOG-E and Penrith City Council (Council) for the AARU; and DPE for the Mamre Road / Abbotts Road intersection upgrade.

## 1.2.2 LOG-E Development Works

**Table 1** provides the key information for each of the LOG-E developments, inclusive of Gross Floor Areas (GFA) in m<sup>2</sup>.

<b>TABLE 1: LOG-E ON-SITE DEVELOPMENT WORKS</b>		
LOG-E Site	Reference	Yield (GFA, m <sup>2</sup> )
ESR – Westlink Estate Stage 1	SSD-9138102	81,317
ESR – Westlink Estate Stage 2	SSD-46983729	39,651
FKC – 200 Aldington Road Industrial Estate	SSD-10479	50,930
FKC – 90 Aldington Road <sup>1</sup>	SD-220530	0
Frasers North	N/A (forthcoming application)	12,334
Frasers South	SSD-17552047	64,080

Note: 1) FKC 90 Aldington Road will be constructed as part of the 200 Aldington Road Industrial Estate and will not increase the programmed duration of construction traffic.

<sup>2</sup> <https://www.planningportal.nsw.gov.au/major-projects/projects/westlink-industrial-estate-stage-1>

# 1.3 Mamre Road Precinct Road Network Requirements

## 1.3.1 Strategic Road Network Requirements

The background traffic modelling which identified the road network layout required to support the MRP, was finalised in late 2021. The results of this modelling assessment have underpinned the road network layout detailed within the MRP DCP (as per **Figure 3**).

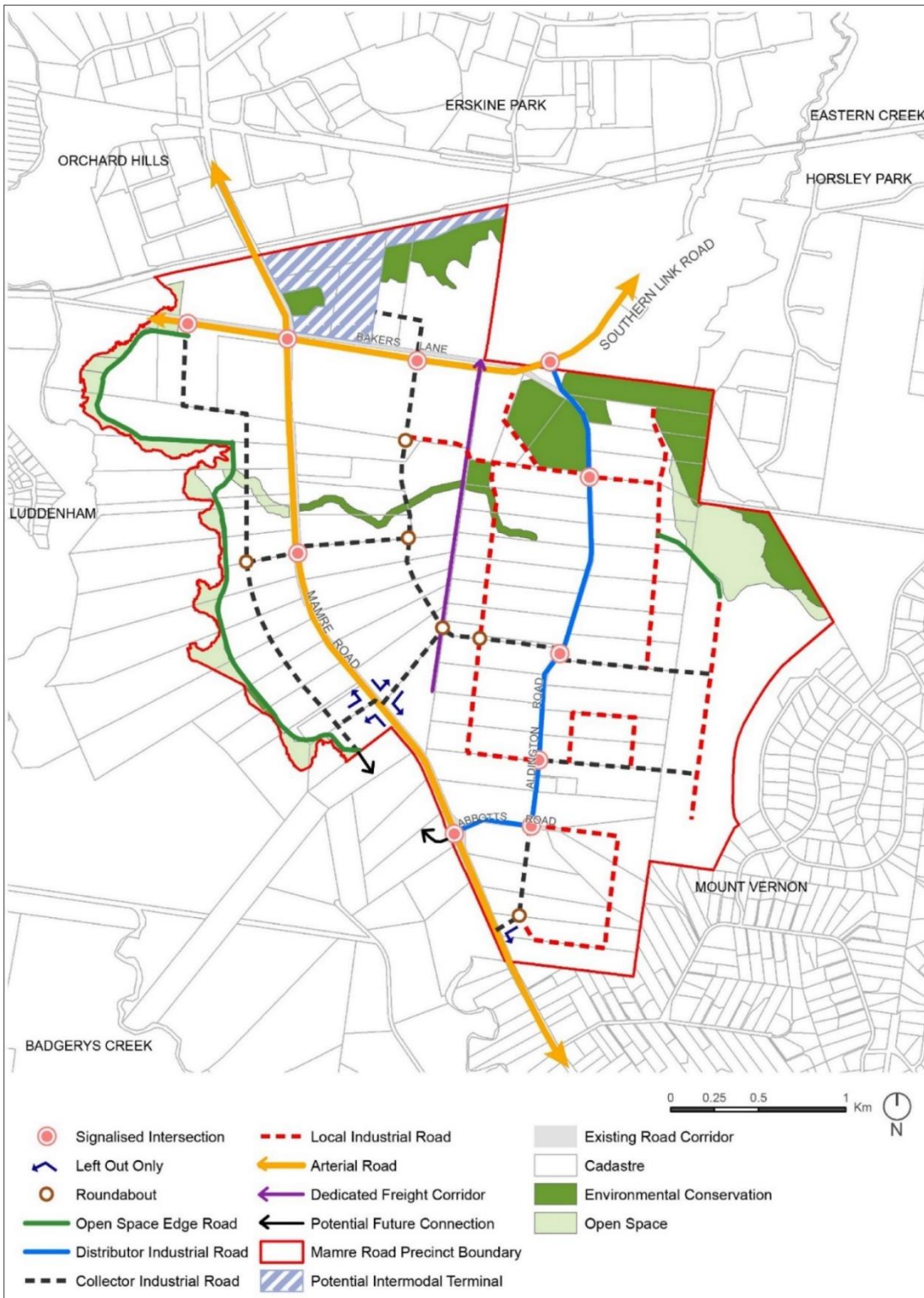


Figure 3: Mamre Road Planned Future Road Network Hierarchy

Ason Group worked with DPE and TfNSW to collectively deliver this modelling assessment.

It is notable that the LOG-E development sites were all considered in the MRP Modelling Assessment undertaken for the assessment years of 2031 and 2036.

### 1.3.2 2026 Road Network Requirements

As noted above, Ason Group delivered the modelling assessment on behalf of LOG-E for the 2026 assessment year. The road network which was adopted for the LOG-E modelling assessment (reported in the LOG-E Modelling Memo), forms part of the relevant State Significant Developments, as shown in **Figure 4**.

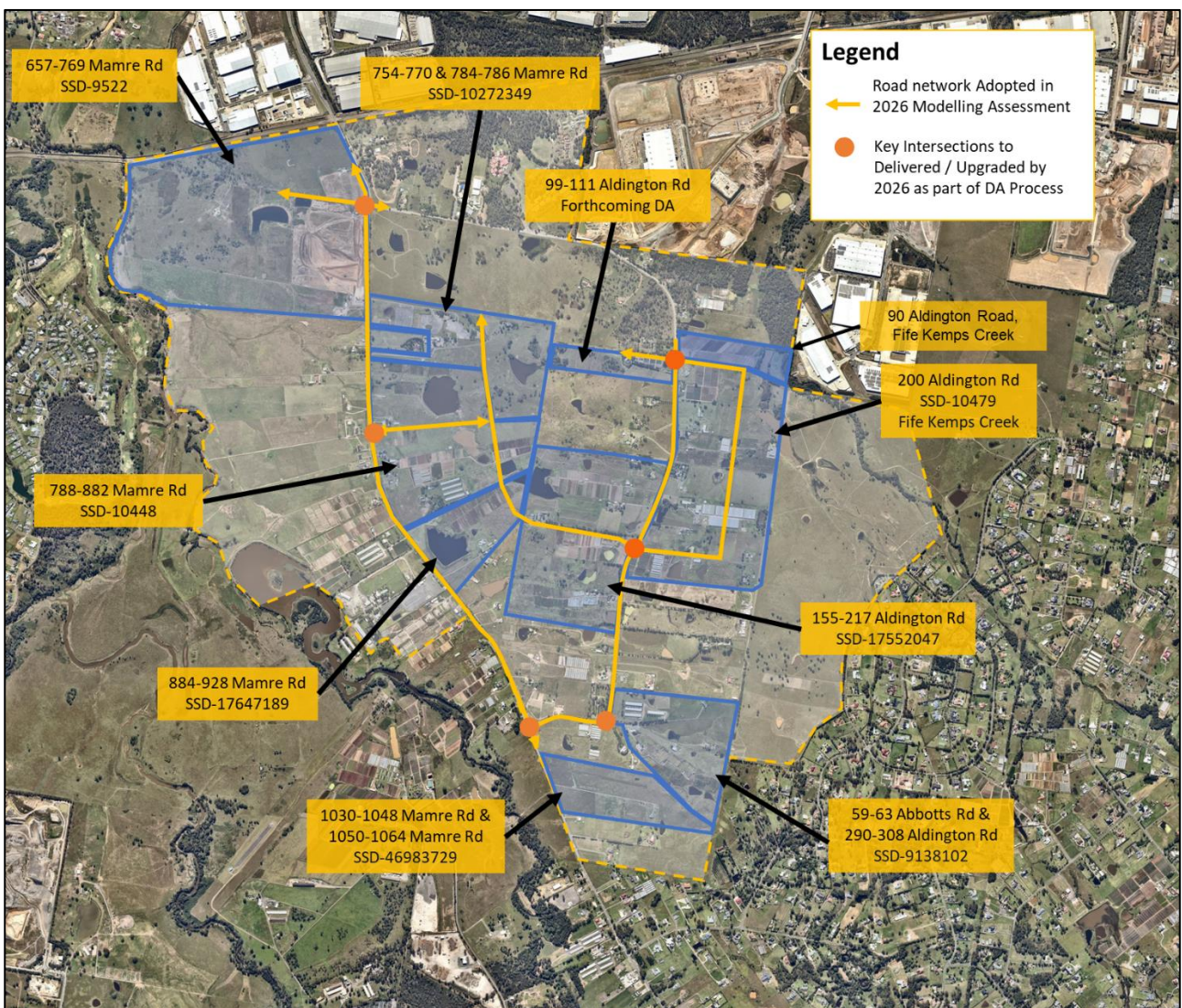


Figure 4: 2026 Modelling Assessment Road Network

With reference to the modelling assessment documented in the LOG-E Modelling Memo, two scenarios were established for the 2026 network.

The assessment adopted the following key modelling inputs:

- Modelling AM and PM time periods:
  - AM: 6:00am – 10:00am; and
  - PM: 3:00pm – 7:00pm.
- Trip generation:
  - AM peak hour: 0.23 trips/100m<sup>2</sup>;
  - PM peak hour: 0.24 trips/100m<sup>2</sup>; and
  - Daily trips: 2.91 trips/100m<sup>2</sup>.

Scenario 1 assessed 990,215m<sup>2</sup> of the total GFA within the MRP. The results of Scenario 1 are provided in **Table 2**. The proposed intersections along the Aldington Road corridor complied with the TfNSW threshold for both the delays and practical capacity.

**TABLE 2: SCENARIO 1 – SIDRA RESULTS**

ID	Intersection	Control	Approach	AM			TfNSW Guidelines Compliance	PM			TfNSW Guidelines Compliance
				DOS	LOS	Queue		DOS	LOS	Queue	
1	Aldington Road / Fife Kemps Creek (North)	Signal	S	0.06	C	10	✓	0.11	D	12	✓
			E	0.13	C	20	✓	0.16	C	31	✓
			N	0.26	B	33	✓	0.16	C	17	✓
			W	0.18	D	20	✓	0.12	C	5	✓
			<b>Overall</b>	<b>0.26</b>	<b>B</b>	<b>33</b>	✓	0.16	C	31	✓
2	Aldington Road / Fife Kemps Creek (South)	Signal	S	0.15	C	17	✓	0.28	C	47	✓
			E	0.14	C	29	✓	0.28	C	54	✓
			N	0.06	D	7	✓	0.10	C	14	✓
			W	0.14	C	24	✓	0.15	D	13	✓
			<b>Overall</b>	<b>0.15</b>	<b>C</b>	<b>29</b>	✓	<b>0.28</b>	<b>C</b>	<b>54</b>	✓
3	Aldington Road / Abbots Road	Signal	E	0.04	A	7	✓	0.07	A	13	✓
			N	0.03	D	3	✓	0.05	D	6	✓
			W	0.13	A	27	✓	0.27	B	56	✓
			<b>Overall</b>	<b>0.13</b>	<b>B</b>	<b>27</b>	✓	<b>0.27</b>	<b>B</b>	<b>56</b>	✓

Scenario 2 assessed 1,291,584m<sup>2</sup> of the total GFA within the MRP. The results of Scenario 2 are provided in **Table 3**. Under the increase in GFA yield, the proposed intersections along the Aldington Road corridor maintained their compliance with the TfNSW threshold for both the delays and practical capacity.

**TABLE 3: SCENARIO 2 – SIDRA RESULTS**

ID	Intersection	Control	Approach	AM			TfNSW Guidelines Compliance	PM			TfNSW Guidelines Compliance
				DOS	LOS	Queue		DOS	LOS	Queue	
1	Aldington Road / Fife Kemps Creek (North)	Signal	S	0.05	C	9	✓	0.20	C	33	✓
			E	0.20	D	29	✓	0.25	C	42	✓
			N	0.29	B	40	✓	0.13	B	22	✓
			W	0.10	D	11	✓	0.11	D	15	✓
			<b>Overall</b>	<b>0.29</b>	<b>B</b>	<b>40</b>	✓	<b>0.25</b>	<b>C</b>	<b>42</b>	✓
2	Aldington Road / Fife Kemps Creek (South)	Signal	S	0.21	D	35	✓	0.43	D	74	✓
			E	0.23	C	39	✓	0.41	C	76	✓
			N	0.03	C	5	✓	0.18	C	29	✓
			W	0.12	D	18	✓	0.24	D	36	✓
			<b>Overall</b>	<b>0.23</b>	<b>C</b>	<b>39</b>	✓	<b>0.42</b>	<b>C</b>	<b>76</b>	✓
3	Aldington Road / Abbots Road	Signal	E	0.21	B	24	✓	0.10	A	18	✓
			N	0.04	D	4	✓	0.19	D	23	✓
			W	0.21	B	48	✓	0.46	B	113	✓
			<b>Overall</b>	<b>0.21</b>	<b>B</b>	<b>48</b>	✓	<b>0.46</b>	<b>B</b>	<b>113</b>	✓

## 1.4 Report Purpose

Noting that the operational performance of the proposed intersections has already been assessed by the LOG-E Modelling Memo, the key purpose of this CTIA is to assess the cumulative impacts associated with the construction traffic relating to the AARU; as well as the upgrade to the Mamre Road / Abbots Road intersection and the on lot works for each of the LOG-E sites.

This report has been prepared to support the REF relating to the AARU.




## 2 Existing Conditions

### 2.1 Existing Road Network

#### 2.1.1 Key Roads

The existing road network providing access to the Intersection is detailed **Table 4** below.

**TABLE 4: KEY ROAD NETWORK**

Road	Description	Typical Road Characteristics
<b>Mamre Road</b>	<p>An arterial road which runs north-south between the Great Western Highway and M4, and Elizabeth Drive respectively.</p> <p>In the vicinity of the Mamre Road / Abbotts Road intersection, Mamre Road has a posted speed limit of 80km/h.</p>	
<b>Aldington Road</b>	<p>A local access that runs north-south (to the east of Mamre Road) and currently provides access for a number of rural residential properties. It connects with Bakers Lane to the north and Abbotts Road to the south.</p> <p>It provides 1 traffic lane in each direction and has a posted speed limit of 60km/h.</p>	
<b>Abbotts Road</b>	<p>A local access road that runs east-west connecting to Mamre Road (to the east of Mamre Road) and currently provides access for a number of rural residential properties. Abbotts Road provides 1 traffic lane in each direction and has a posted speed limit of 60km/h.</p>	

## 2.1.2 Key Intersection

Until such a time that Bakers Lane is upgraded, operational and construction traffic is to utilise the Mamre Road / Abbotts Road intersection to access Mamre road. As the only connection between the project site and the arterial road network, this therefore forms the key intersection for the purposes of this assessment.

The existing configuration for the Mamre Road / Abbotts Road intersection is shown in **Figure 5**. The existing intersection is currently subject to a restriction to the right-out movements from Abbotts Road for all vehicles during the AM and PM peak periods.



Figure 5: Existing Mamre Road / Abbotts Road intersection

While the Abbotts Road / Aldington Road intersection is being upgraded as part of the Project, it should be noted that the eastern leg currently acts as an access road to 2 residential properties as well as the ESR construction site. Therefore the volumes travelling to and from this leg are low and it is not necessary to conduct detailed assessment of the existing intersection.

## 2.1.3 Existing Traffic Flows

Ason Group conducted AM and PM peak period traffic surveys in Mamre Road south of James Erskine Drive. The flows found by the surveys are shown in **Table 5**.

TABLE 5: 2022 MAMRE ROAD TRAFFIC FLOWS		
Peak Period	Total Volumes	Directional Volumes
AM	1,619	NB: 801 vph
		SB: 818 vph
PM	1,721	NB: 794 vph
		SB: 927 vph

Light and heavy vehicle volumes per the survey is shown in **Figure 6** below.

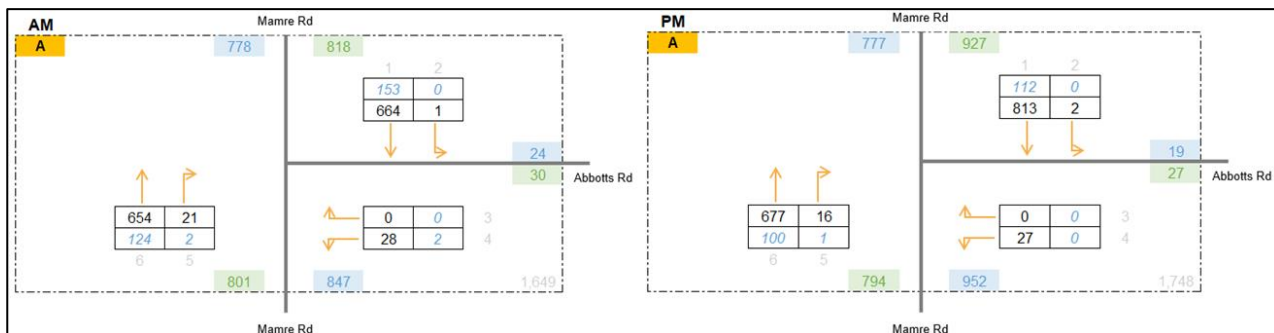


Figure 6: 2022 Surveyed Flow at Mamre Road / Abbotts Road Intersection

### 2.1.4 Baseline SIDRA Performance Testing

SIDRA intersection modelling has been undertaken to establish the baseline performance of the key intersection using SIDRA Intersection 9.0. In this regard, SIDRA modelling outputs a range of performance measures relevant to this assessment, including:

- Average Vehicle Delay (AVD): AVD (or average delay per vehicle in seconds) for intersections is used to determine an intersection’s Level of Service (see below). For signalised intersections, the AVD reported relates to the average of all vehicle movements through the intersection.
- Degree of Saturation (DoS): DoS is defined as the ratio of demand (arrival) flow to capacity.
- Level of Service (LoS): LoS is a comparative measure that provides an indication of the operating performance, based on AVD.

**Table 6** provides the SIDRA recommended criteria for the assessment of intersections with reference to the RMS Guide.

TABLE 6: SIDRA LEVEL OF SERVICE CRITERIA			
LoS	Average Delay per Vehicle (s)	Traffic Signals & Roundabout	Give Way & 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.



## 2.1.5 Existing Intersection Operation

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The existing performance of the key intersection has been determined based on the above methodology and validated through our on-site observations and knowledge of the operation of local roads and intersections. The results of the SIDRA analysis of existing operations are summarised in **Table 7**, detailed modelling outputs are provided in **Appendix B**.

**TABLE 7: 2022 BASELINE INTERSECTION OPERATIONS**

Intersection	Configuration	Period	AVD	DoS	LoS
Mamre Road / Abbotts Road	Priority	AM	19	0.41	B
		PM	22	0.40	B

With reference to **Table 7**:

- The Mamre Road / Abbotts Road intersection operates with satisfactory levels of performance under its existing configuration and background traffic during both AM and PM peak periods.
- It is observed that the northbound right turn movement is the critical movement in both peak periods, and vehicles queuing are wholly contained within the associated lane.

# 3 Proposed Works

## 3.1 Project upgrades

The proposed AARU is shown in **Figure 7**, which shows the extent of the AARU, with the subsequent figures demonstrating the intersections in more detail. The upgrades are proposed to represent the ultimate road corridors, per TfNSW’s directive for the ultimate road network to be delivered and are per Council requirements.

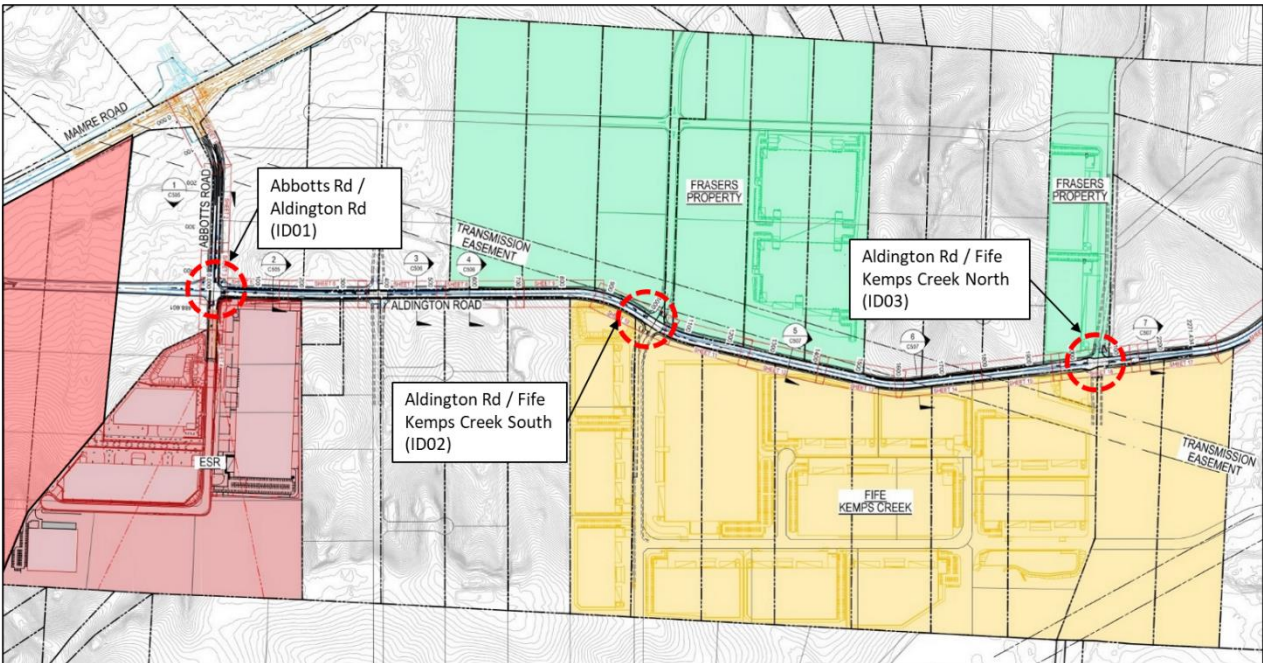


Figure 7: AARU – General Arrangement (Prepared by AT&L)

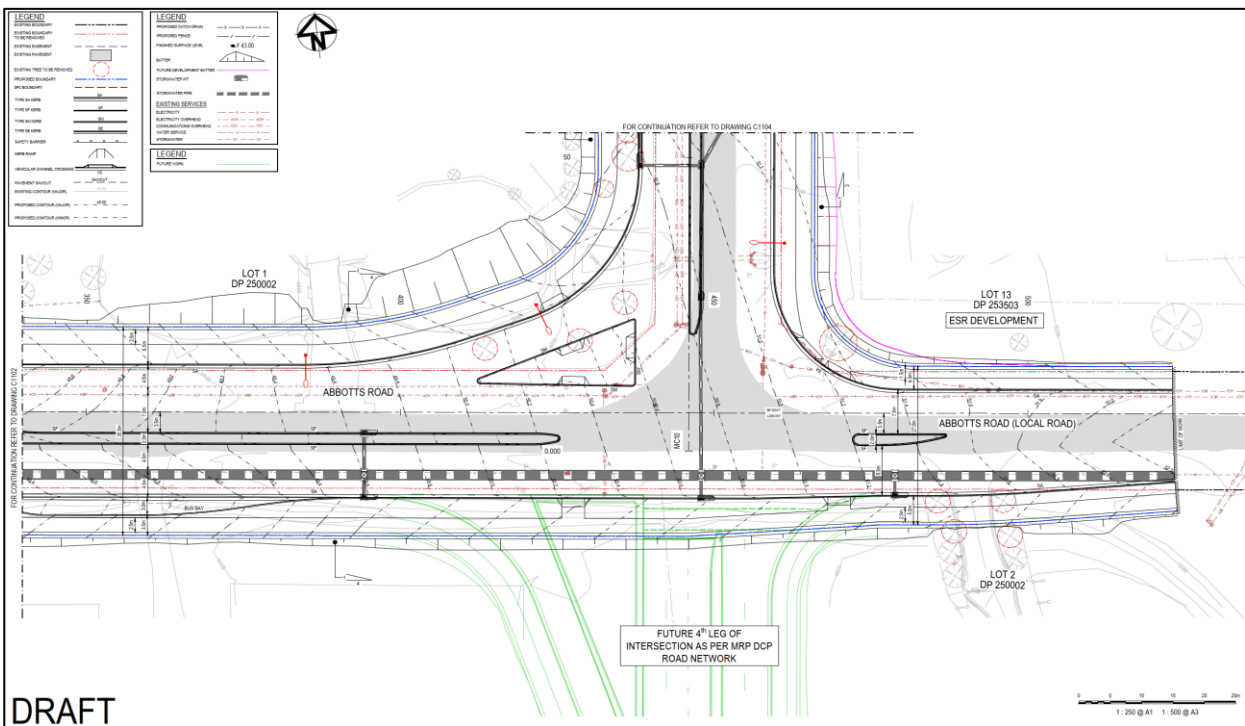


Figure 8: AARU 50% Design Drawing - Abbots Road / Aldington Road Intersection

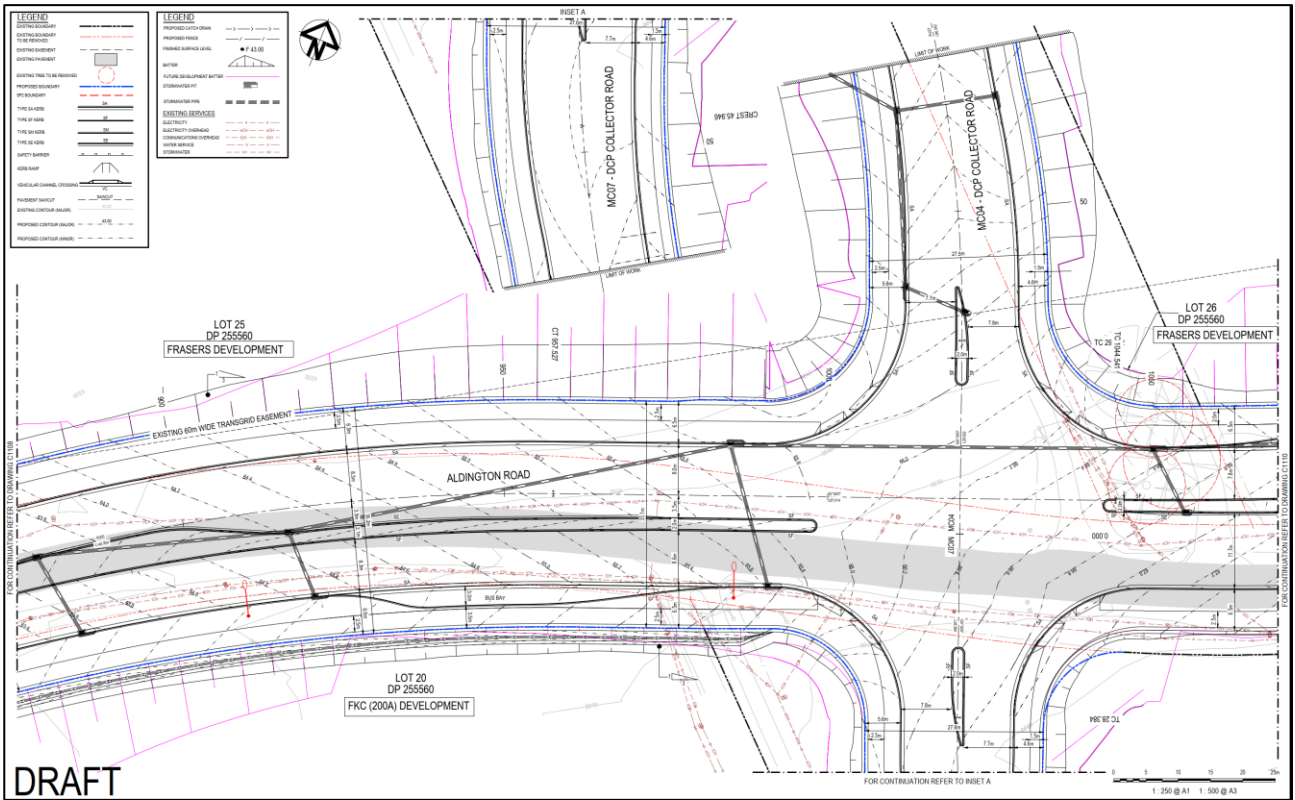


Figure 9: AARU 50% Design Drawing - Aldington Road / MC07 DCP Collector Road (Fraser's South)

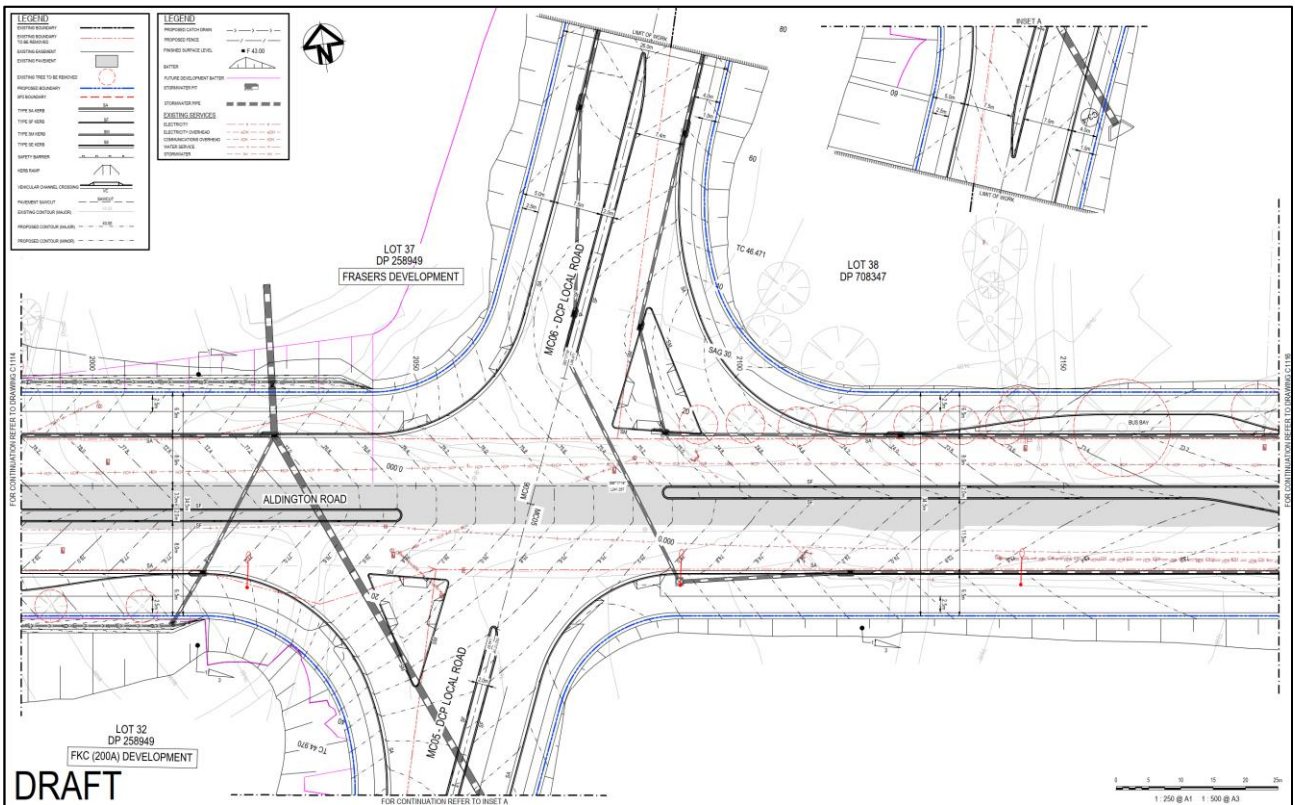


Figure 10: AARU 50% Design Drawing - Aldington Road / MC06 DCP Local Road (Fraser's North)

## 3.2 Other Works

Further to the proposed AARU, LOG-E are also proposing the Mamre Road / Abbotts Road intersection upgrade.

The proposed upgrades to the Mamre Road / Abbotts Road intersection for the 2026 road network are shown in **Figure 11**. The upgrades are proposed to represent the final configuration of the Abbotts Road leg, as per TfNSW's directive for the ultimate road network to be delivered.

Acquisition of Lot 1 DP250002 (adjacent to the Mamre Road / Abbotts Road intersection) to support the additional intersection widening is currently being facilitated by ESR for the 2026 intersection and road upgrade.

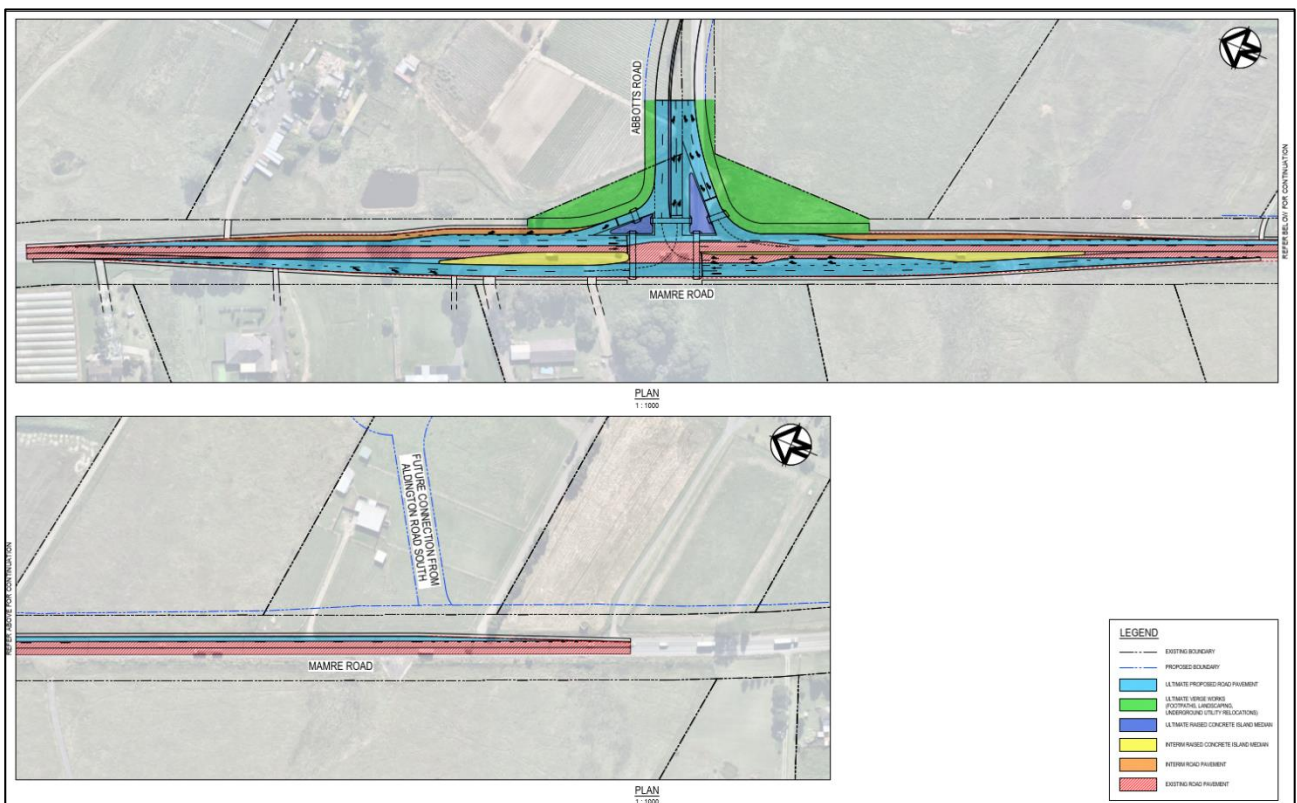


Figure 11: Mamre Road / Abbotts Road Intersection - Currently Proposed 2026 Geometry

Finally, it is noted that LOG-E on-lot works will also be occurring for each of the respective sites. However, it is critical to recognise that at this stage, the construction programme for each site is currently unknown as it is subject to the relevant Development Application (DA) and approval processes.

## 3.3 Construction Methodology

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### 3.3.1 Construction Staging – Works Phases

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The works periods identified below are for construction of the AARU and represent a consolidation of the construction activities identified in the construction programme provided by the LOG-E. It is anticipated that construction of the AARU would be conducted over the following construction works periods, as listed below:

- Aldington Road:
  - Early works – 6-week road closure to allow deep cutting and construction of temporary pavement. Local Traffic will need to access from North from Bakers Lane or south from Abbots Road
  - Stage 1 – Installation of services and construction of outside lane on both carriageways. Two-way traffic to remain on the existing pavement behind concrete barriers.
  - Stage 2 - Construction of median and median lanes on both carriageways. Two-way traffic to go on outside lanes of new pavement.
- Abbots Road:
  - Stage 1 – Construction of outside lane on eastbound carriage way. Two-way traffic to remain on the existing pavement.
  - Stage 2 – Construction of median lane on eastbound carriageway. Eastbound traffic to travel on new pavement, westbound traffic to remain on existing pavement.
  - Stage 3 – Construction of westbound carriageway, median and services. Two-way traffic to travel on eastbound carriageway.

Note access will be maintained to private and developer lots on Aldington and Abbots Road, access will be restricted to left in left out.

### 3.3.2 Construction Staging – Intersection Layouts

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Noting that the Mamre Road / Abbots Road intersection will also be subject to upgrades, the following figures demonstrate the intersection configuration each construction stage of the Mamre Road / Abbots Road upgrade.

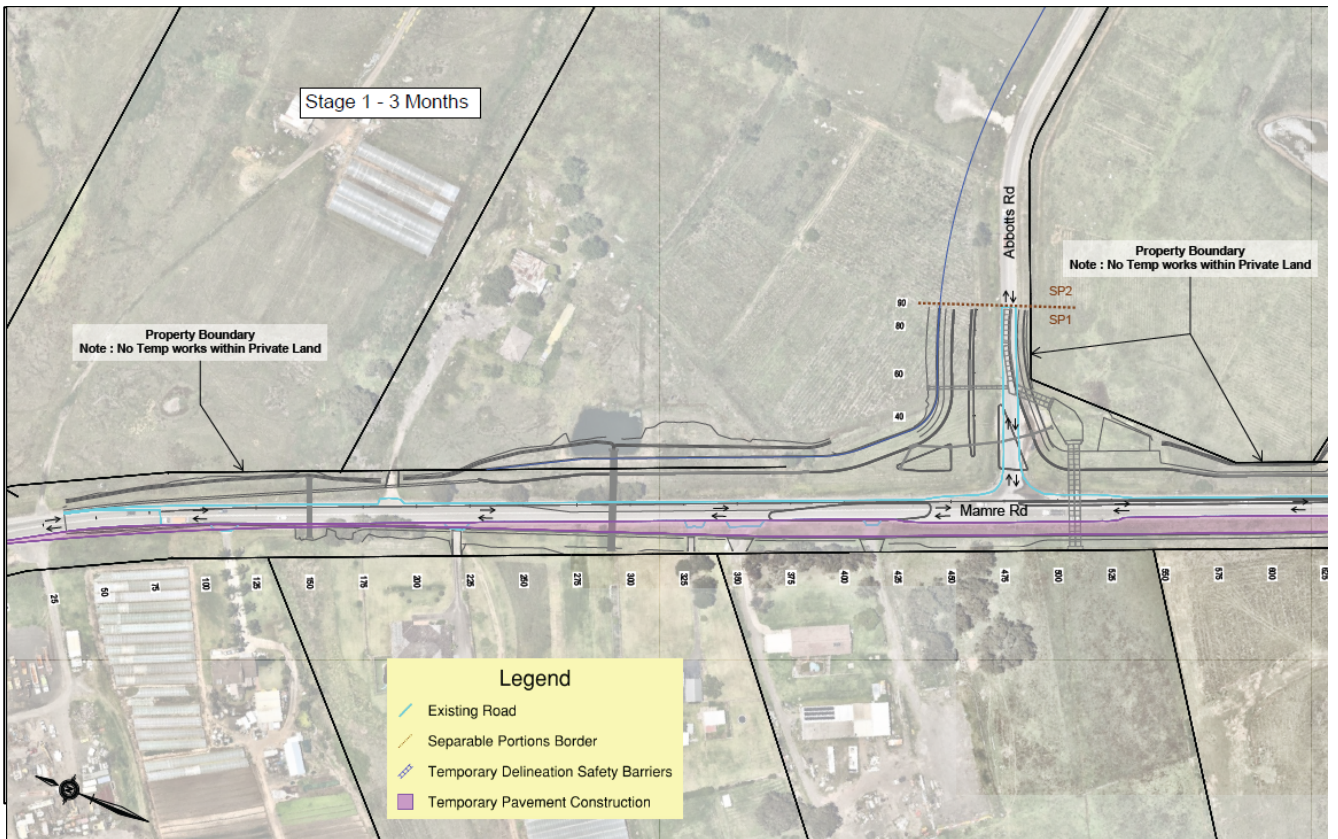


Figure 12: Mamre Road / Abbots Road Upgrade - Construction Stage 1

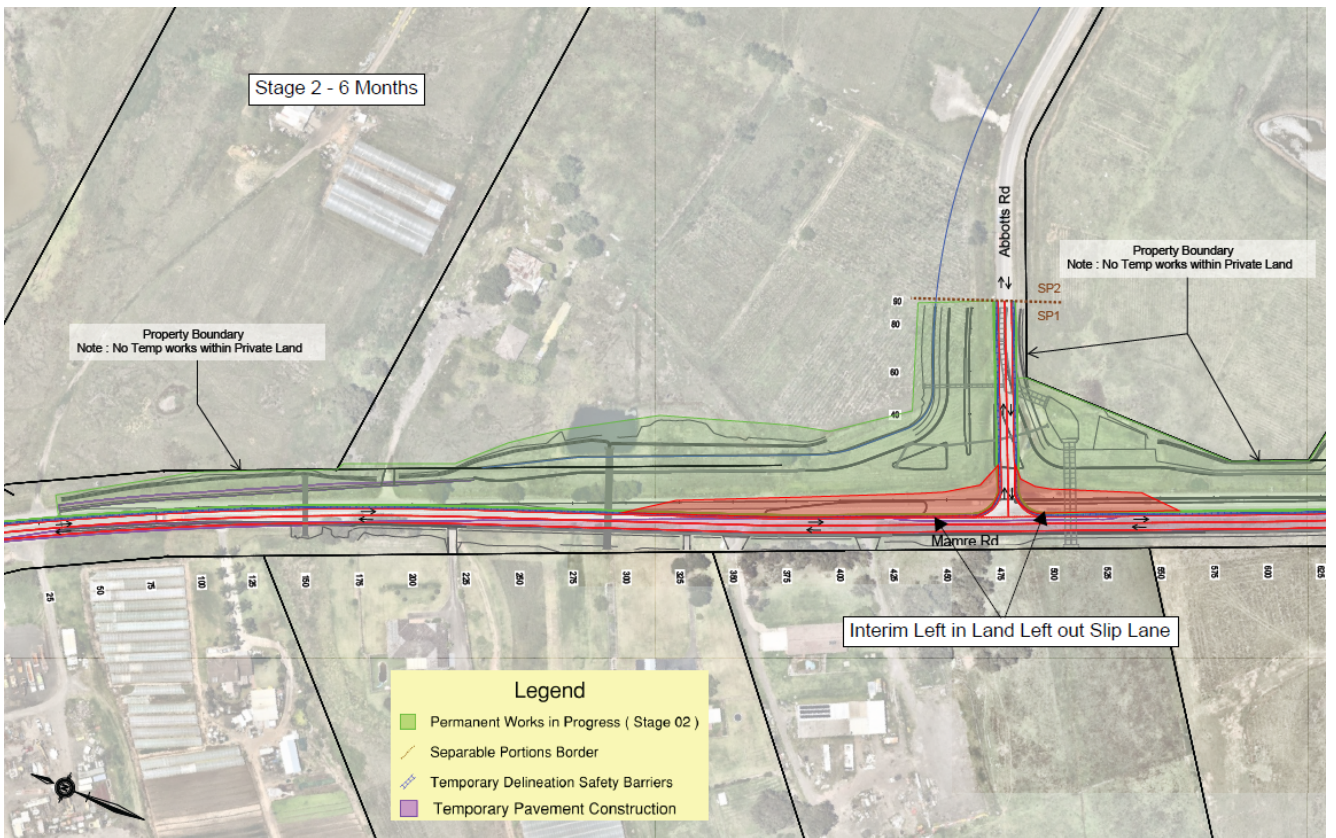


Figure 13: Mamre Road / Abbots Road Upgrade - Construction Stage 2

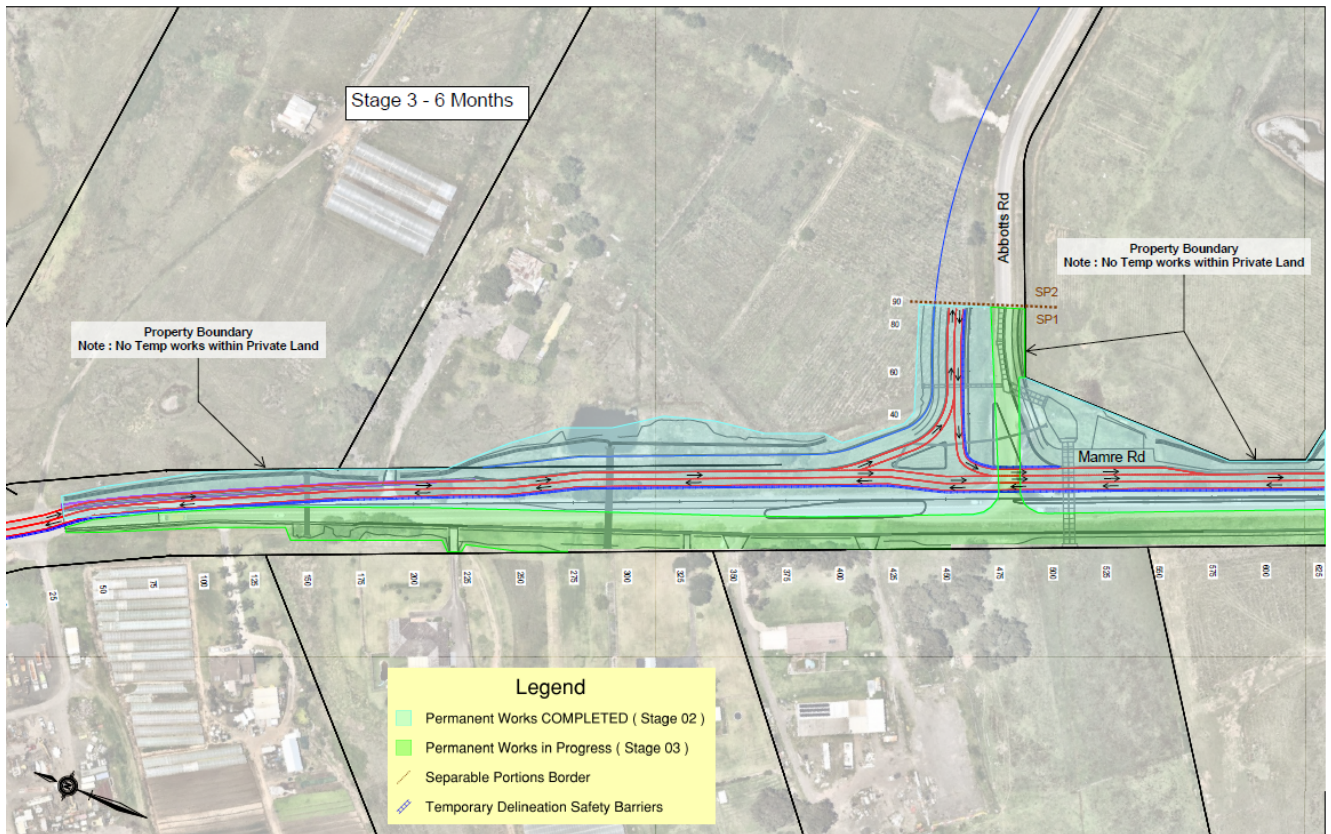


Figure 14: Mamre Road / Abbotts Road Upgrade - Construction Stage 3

### 3.3.3 Construction Programme and Activities – AARU

Construction of the AARU is planned to commence in October 2023, with the total period of construction works anticipated to be approximately 19 months.

The indicative construction programme (subject to relevant approvals) for the AARU is indicated in **Table 8** below.

TABLE 8: PROJECT CONSTRUCTION PROGRAMME				
Corridor Upgrade	Stage	Estimated Commencement	Estimated Completion	Duration
Abbotts Road	1	June 2024	August 2024	2 months
	2	August 2024	November 2024	3 months
	3	November 2024	July 2025	8 months
Aldington Road	Early Works	June 2024	November 2024	5 months
	1	November 2024	November 2025	12 months
	2	November 2025	June 2026	7 months

The overall construction timeframe of the AARU, alongside the upgrades of Mamre Road / Abbotts Road intersection and the LOG-E development sites, are to occur across approximately 23 months. Detailed construction works and the cumulative construction programme are provided in **Section 3.3.4** below.

### 3.3.4 Construction Programme and Activities – LOG-E Works & Mamre Road / Abbots Road Intersection Upgrade

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Further to the above works, it is also noted that each of the LOG-E sites may be subject to construction works relating to the on-lot developments, as well as works commencing on the Mamre Road / Abbots Road intersection upgrade. The current construction timeframes for the intersection upgrade and LOG-E sites are provided below in **Table 9**. Note that this is subject to change relating to the relevant approvals processes.

**TABLE 9: OTHER WORKS CONSTRUCTION PROGRAMMES**

Site	Estimated Commencement	Estimated Completion	Duration
Mamre Road / Abbots Road Upgrade	March 2024	February 2025	12 months
Frasers North	April 2024	June 2025	15 months
Frasers South	July 2024	August 2025	14 months
ESR	October 2023	July 2025	21 months
FKC	October 2023	November 2024	14 months



## 3.4 Site Access

---

It is noted that construction traffic management is to be subject to the relevant Construction Traffic Management Plans (CTMP) implemented at the time construction commences. However, it has been well established that construction traffic is not to utilise Bakers Lane. Therefore, all construction traffic will access each of the sites via the Mamre Road / Abbotts Road intersection.

The following access routes are to be applied for construction of the AARU as well as the Mamre Road / Abbotts Road intersection and LOG-E development sites.

- Stage 1:
  - All construction vehicle, including light and heavy vehicles, access to and from the Project site is expected to occur via left-in left-out movements only at the Mamre Road / Abbotts Road intersection during Stage 1 of the construction. No right-in movements from Mamre Road are allowed for construction vehicles.
  - Local traffic access from Mamre Road to Abbotts Road via right-in will be retained and the existing traffic rules, as abovementioned in **Section 2.1.2**, apply. This is subject to TfNSW approval via the WAD. TfNSW may deem left in left out only for local traffic, which local traffic may turn right at Bakers Lane.
- Stage 2 and 3
  - During construction Stage 2 and 3, all construction vehicles will be limited to left-in left-out movements only at the Mamre Road / Abbotts Road intersection.
  - Right-in movement from Mamre Road is allowed for local traffic subject to TfNSW approval as stated in Stage 1.

The heavy vehicle access routes are shown in the figure below.

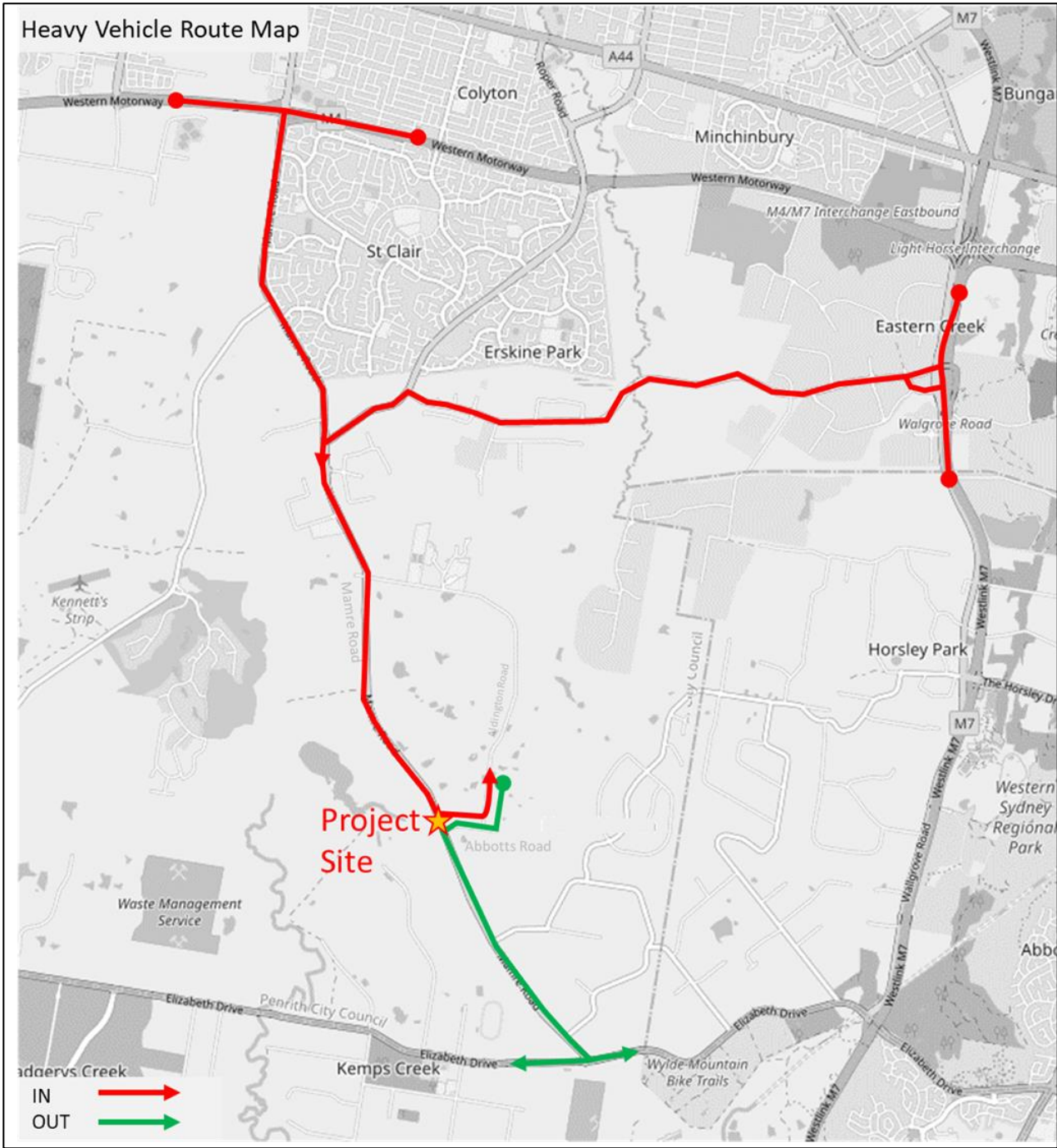


Figure 15: Stage 2 and 3 Heavy Vehicle Site Access Route

# 4 Traffic Generation Assessment

## 4.1 Construction Traffic Generation

Construction traffic demand for each of the associated LOG-E developments, as well as the infrastructure construction traffic, have been provided by respective developers / contractors to inform this assessment. Construction vehicle type, its associated volumes and daily profile has been provided for each construction stage of each project (as per **Section 3.3**).

The construction traffic forecasts for each site provided have been overlaid to establish the peak cumulative *construction* period, with peak flows (movement/hour or movement/day) for each of the construction phases are demonstrated in the tables below.

The peak construction period for Stage 1 is expected to occur during June 2024.

**TABLE 10: PEAK CUMULATIVE TRAFFIC MOVEMENTS – Stage 1**

Site	AM	PM	Daily
Mamre Road Upgrade	30	18	284
Abbotts Road Upgrade	40	20	332
Aldington Road Upgrade	40	22	358
Frasers North	15	15	76
Frasers South	0	0	0
ESR Stage 1	46	18	248
ESR Stage 2	56	26	424
FKC	14	14	100
<b>Total</b>	<b>241</b>	<b>133</b>	<b>1,822</b>

The peak construction period for Stage 2 is expected to occur during November 2024.

**TABLE 11: PEAK CUMULATIVE TRAFFIC MOVEMENTS – Stage 2**

Site	AM	PM	Daily
Mamre Road Upgrade	30	18	284
Abbotts Road Upgrade	0	0	0
Aldington Road Upgrade	40	22	358
Frasers North	47	30	288
Frasers South	25	35	158
ESR Stage 1	46	18	248
ESR Stage 2	56	26	424
FKC	0	0	0
<b>Total</b>	<b>244</b>	<b>149</b>	<b>1,760</b>

The peak construction period for Stage 3 is expected to occur during January 2025.

**TABLE 12: PEAK CUMULATIVE TRAFFIC MOVEMENTS – Stage 3**

Site	AM	PM	Daily
Mamre Road Upgrade	30	18	284
Abbotts Road Upgrade	0	0	0
Aldington Road Upgrade	40	22	358
Frasers North	32	15	212
Frasers South	57	50	370
ESR Stage 1	0	0	0
ESR Stage 2	46	18	298
FKC	0	0	0
<b>Total</b>	<b>205</b>	<b>123</b>	<b>1,522</b>

## 4.2 Trip Distribution

The vehicular classification, based on the information provided, is shown in **Table 13**.

**TABLE 13: VEHICLE TYPE SPLIT FOR CONSTRUCTION VEHICLE TRIPS**

Stage	Period	Light Vehicle	Heavy Rigid	Heavy Articulated
Stage 1	AM	209	16	16
	PM	61	38	34
Stage 2	AM	210	18	16
	PM	83	30	36
Stage 3	AM	185	12	8
	PM	69	22	32

The distribution of traffic from the Site has been based on the surveyed traffic volumes. The subsequent trip distribution profiles for each of the assessment scenarios (see **Section 5.2.2**) are presented in **Appendix A**.

# 5 Construction Traffic Impact Assessment

## 5.1 Introduction

To assess the impacts of the construction traffic generation outlined in **Section 3.4**, a SIDRA modelling assessment has been undertaken. The following sections outline the inputs and assumptions which have been adopted for the modelling assessment, as well as summarising the results of the traffic modelling assessment.

The key works associated with this CTIA relate to the modelling of the temporary intersection arrangements during the key construction stages.

## 5.2 Modelling Inputs

### 5.2.1 SIDRA Intersection Layout

With reference to Section 3.3.2, the following intersection geometry have been adopted for SIDRA modelling and are shown in **Figure 16** and **Figure 17**.

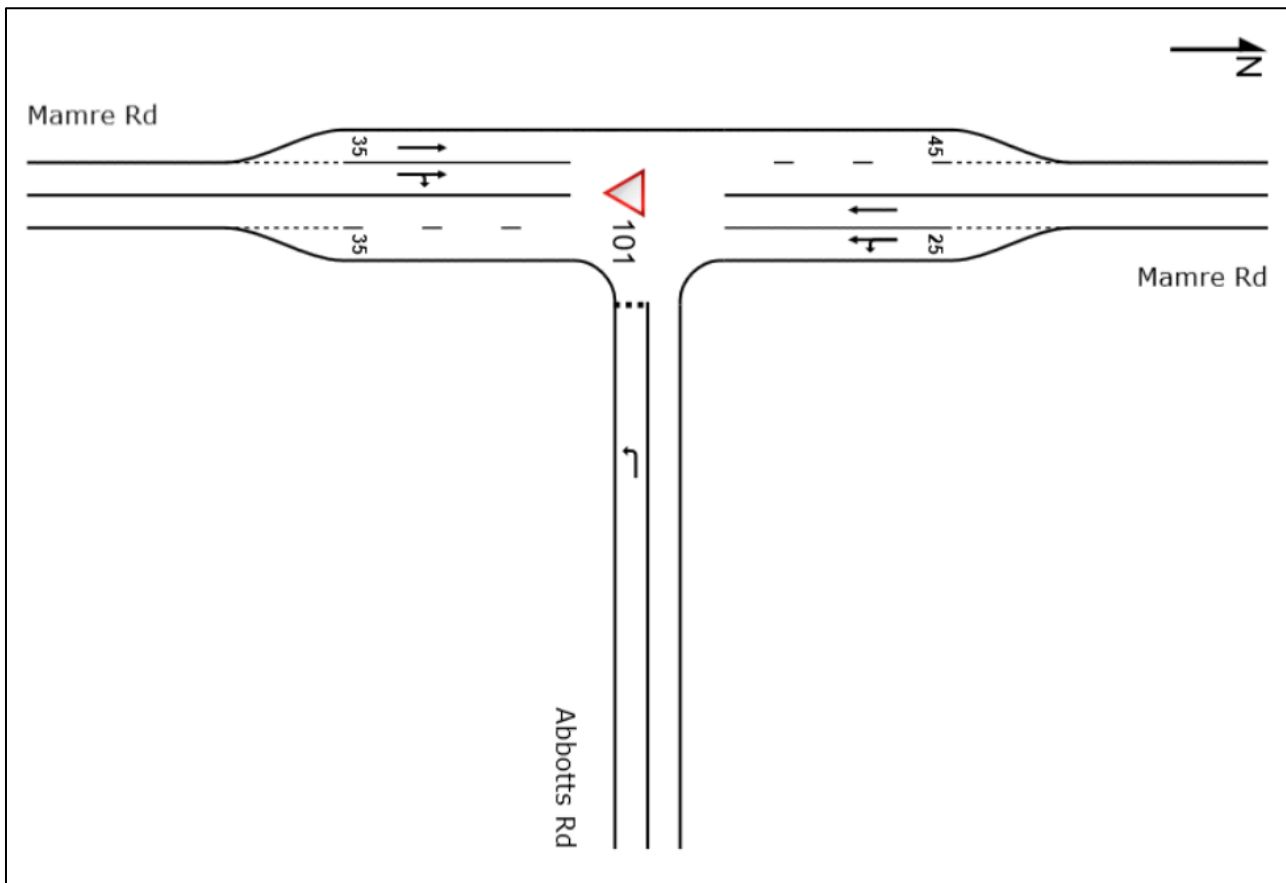


Figure 16: Mamre Road / Abbots Road Upgrade Layout - Construction Stage 1<sup>1</sup>

Note: 1) Right-in movement from Mamre Road allowed for local traffic only

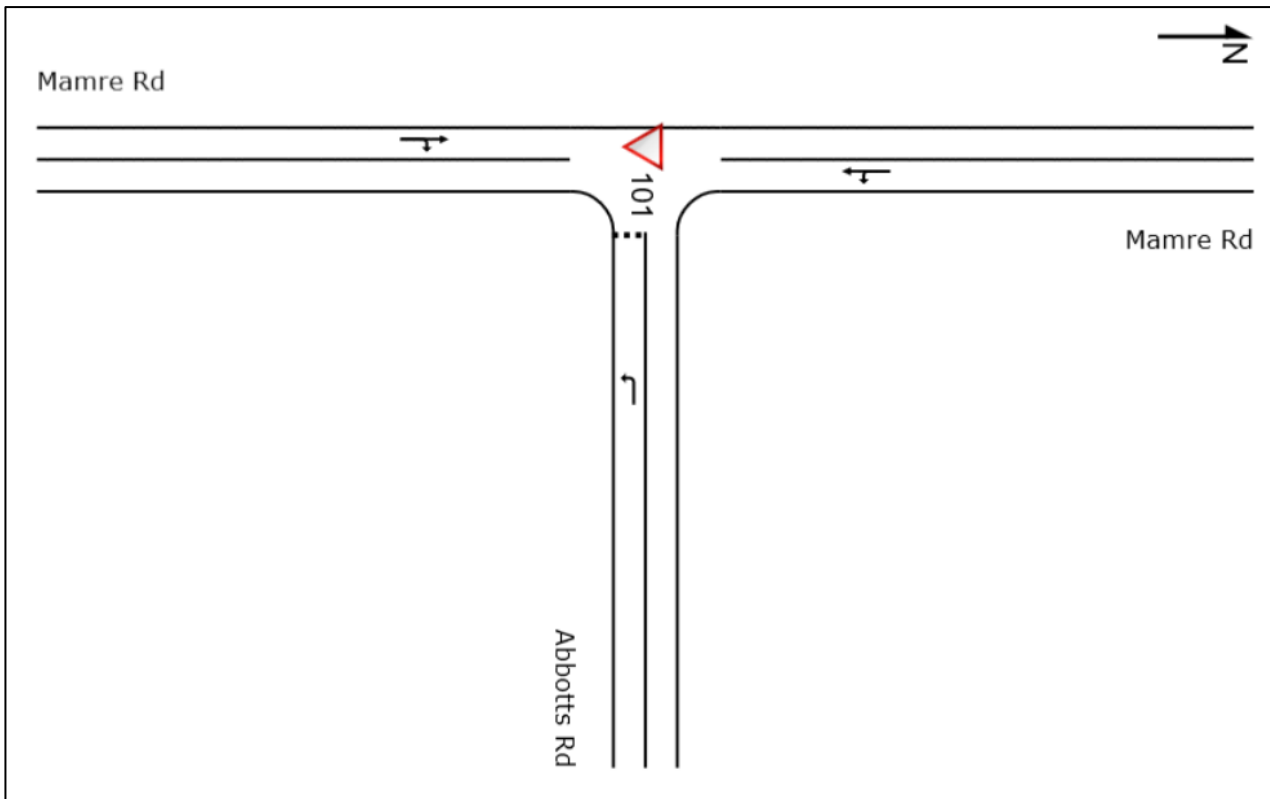


Figure 17: Mamre Road / Abbotts Road Upgrade Layout - Construction Stage 2 & 3<sup>1</sup>

Note: 1) Right-in movement from Mamre Road allowed for local traffic only

### 5.2.2 Assessment Scenarios

Construction traffic flow and infrastructure scenarios for the forecasted construction phasings, have been developed for this assessment.

The following scenarios have been assessed to consider for all three peak cumulative traffic flows for the Mamre Road / Abbotts Road upgrade:

- Scenario 1: Base 2024 + Construction Stage 1 – Base 2024 traffic flows (i.e., with background traffic growth to 2024 without construction traffic) plus peak cumulative construction traffic flows (associated LOG-E developments and surrounding infrastructure upgrades) during Stage 1 Mamre Road / Abbotts Road Upgrade.
- Scenario 2: Base 2024 + Construction Stage 2 – Base 2024 traffic flows plus peak cumulative construction traffic flows during Stage 2 Mamre Road / Abbotts Road Upgrade.
- Scenario 3: Base 2024 + Construction Stage 3 – Base 2024 traffic flows plus peak cumulative construction traffic flows during Stage 3 Mamre Road / Abbotts Road Upgrade.

With reference to Figure 16 and Figure 17, it is noted that the intersection geometry of Stage 3, as it relates to SIDRA modelling input, is identical to that of Stage 2. Further, the Stage 3 peak cumulative construction flow presents a reduced traffic volume compared to Stage 2.

Therefore, assessment of Phases 1 and 2 has been undertaken. Assessment of Stage 3 is not considered necessary, noting that volumes would be less than under Stage 2.

### 5.2.3 Background Traffic Growth

To establish the relevant 2024 baseline traffic flows, linear growth rate of 3% has been adopted. The baseline flows, along with the development flows, are presented in **Appendix A**.

## 5.3 Intersection Operations

### 5.3.1 Scenario 1 - Base 2024 + Construction Stage 1

This scenario captures the future 2024 baseline volume and the addition of peak cumulative construction volume during Stage 1 of the AARU. The SIDRA intersection outputs for Scenario 1 for Mamre Road / Abbotts Road intersection for both AM and PM peak periods are summarised in **Table 14**, detailed SIDRA modelling outputs are provided in Appendix B.

TABLE 14: SCENARIO 1 – SIDRA RESULTS					
Intersection	Configuration	Period	Delay (s)	DoS	LoS
Mamre Road / Abbotts Road	Priority-controlled	AM Construction Stage 1	41	0.58	C
		PM Construction Stage 1	29	0.45	C
		AM Existing	19	0.41	B
		PM Existing	22	0.40	B

With reference to the above, the SIDRA intersection modelling indicates that the intersection is able to satisfactorily accommodate the forecasted background volumes as well as the forecasted cumulative construction traffic.

A comparison of the intersection performance between the existing operation and the anticipated Stage 1 construction, indicates that the addition of the traffic generated by the construction activities within vicinity of the site has minor changes in the AVD and DoS on the operation of the study network during construction of Stage 1 of the AARU.

It is noted that the LoS at Mamre Road / Abbotts Road intersection is anticipated to deteriorate from LOS B to C during the AM peak. However, performance is still within acceptable levels; and, noting that this would be for a temporary period during construction of the upgraded intersection, is deemed to be acceptable.

### 5.3.2 Scenario 2 – Base 2024 + Construction Stage 2

This scenario includes the construction traffic associated with the peak cumulative construction traffic during Stage 2 of the AARU. The SIDRA intersection outputs for Scenario 2 for Mamre Road / Abbotts Road intersection are summarised in **Table 15** below, detailed SIDRA modelling outputs are provided in Appendix B.

TABLE 15: SCENARIO 2 – SIDRA RESULTS					
Intersection	Configuration	Period	Delay (s)	DoS	LoS
Mamre Road / Abbotts Road	Priority-controlled	AM Construction Stage 2	51	0.72	D
		PM Construction Stage 2	31	0.57	C
		AM Construction Stage 1	41	0.58	C
		PM Construction Stage 1	29	0.45	C
		AM Existing	19	0.41	B
		PM Existing	22	0.40	B

With reference to the above, a deterioration in the intersection performance is anticipated during Stage 2 construction as a result of the change in intersection geometry of the Mamre Road / Abbotts Road intersection upgrade. The new configuration includes one lane for both right-turn and through movement, and no longer supports the bypass of through movements.

The cumulative construction traffic during Stage 2 will have minor impacts on the PM peak intersection performance, where LoS C is maintained and an increase of 2 seconds in overall delay is anticipated when compared against Stage 1 construction.

During Stage 2 AM peak, a higher DoS of 0.72 and LoS of D are anticipated due to the increase in delay of the south approach movement. The significant increase in the left-turn in movements, from 64 during the PM peak to 231 during the AM peak, would result in the increased delay of the south approach right-turn in movement, and subsequently the through movement. It is important to note that the volume of right-turn in movements during the Stage 2 AM peak is of a low volume of 22 movements, and the Stage 2 construction is expected to have a duration of 4 months.

Nevertheless, the intersection is able to satisfactorily accommodate the anticipated cumulative construction traffic volume during Stage 2 construction for both AM and PM peaks with additional capacity.

It is anticipated that the Mamre Road / Abbotts Road intersection will operate with similar LoS or better during Stage 3 of the construction due to reduced traffic volume.

### 5.3.3 Summary

It is concluded that the Mamre Road / Abbotts Road intersection will be able to satisfactorily accommodate the cumulative construction traffic associated with the infrastructure upgrade and LOG-E development within vicinity of the AARU, during all phases of construction.



Further to the above intersection performance, it is noted that each of the projects documented would be subject to construction traffic management measures (i.e. Traffic Controllers). These measures are to be detailed in the relevant CTMPs to be implemented at the time of construction. As such, it is evident that the proposed construction activities can occur without having an impact on network performance and road safety.

## 6 Conclusions

Ason Group has been engaged by LOG-E (represented by ESR, FKC, and Frasers) to prepare a Construction Traffic Impact Assessment in relation to the proposed Abbotts Road and Aldington Road corridor upgrades project (the AARU).

Further to the detailed assessment of the relevant construction traffic impacts, the following are the summary and conclusions:

- LOG-E are proposing to deliver an upgrade to the Abbotts Road and Aldington Road corridors (the subject of this report), as well as the Mamre Road / Abbotts Road intersection, to support development of the Mamre Road Precinct (MRP).
- The AARU will be delivered through a joint Voluntary Planning Agreement between LOG-E and Council. The Mamre Road / Abbotts Road intersection upgrade will also be delivered via a VPA between LOG-E and DPE.
- The operational performance of the proposed road network has been assessed separately as part of the relevant State Significant Developments for each of the LOG-E sites. The assessment found satisfactory performance in the assessment year of 2026 for each of the intersections to be delivered / upgraded (including the Mamre Road / Abbotts Road intersection as well as those along Aldington Road).

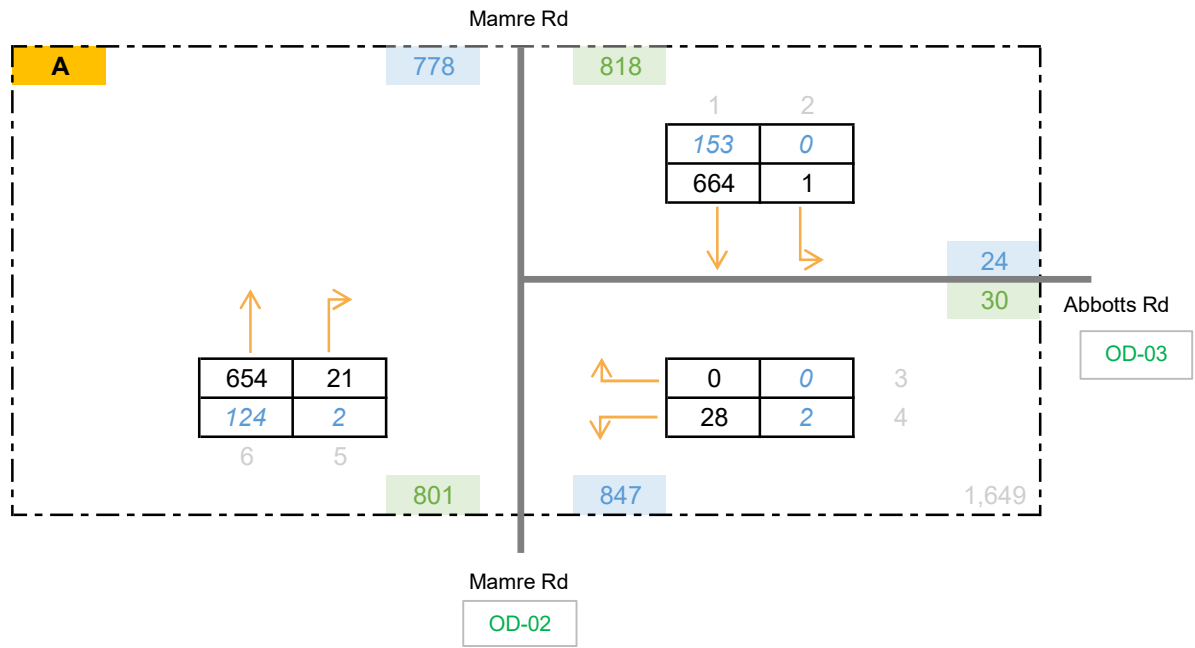
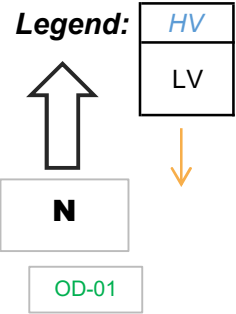
Therefore, the key purpose of this report was to assess the traffic impacts associated with the cumulative construction traffic of the AARU.

- The peak cumulative construction is expected to be during June 2024, when works are expected to be occurring on the AARU, the Mamre Road / Abbotts Road intersection, as well as the LOG-E sites.
- SIDRA intersection analysis found that the Mamre Road / Abbotts Road intersection would be able to satisfactorily accommodate the forecasted background traffic volumes, as well as the cumulative construction traffic, for both the AM and PM peak periods.
- Overall, during all phases of construction, the Mamre Road / Abbotts Road intersection is able to satisfactorily accommodate the cumulative construction traffic associated with the infrastructure and corridor upgrades and LOG-E developments within the MRP.

# Appendix A. Traffic Flows

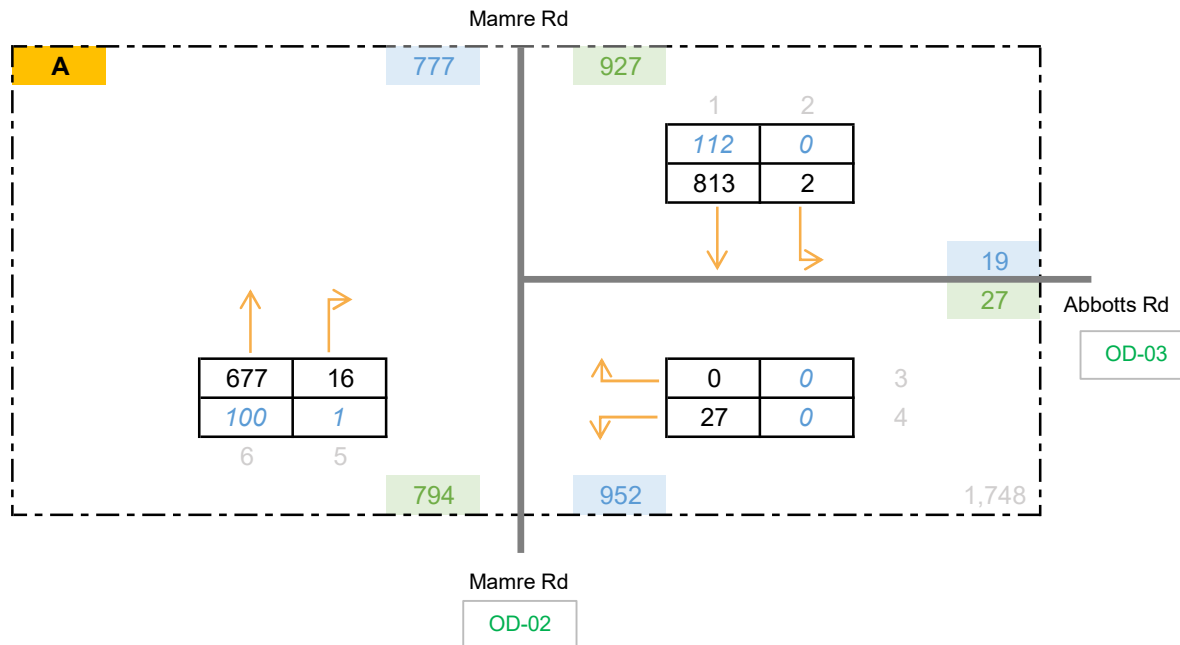
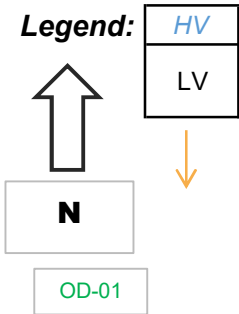
Peak Period: AM

Scenario: Existing



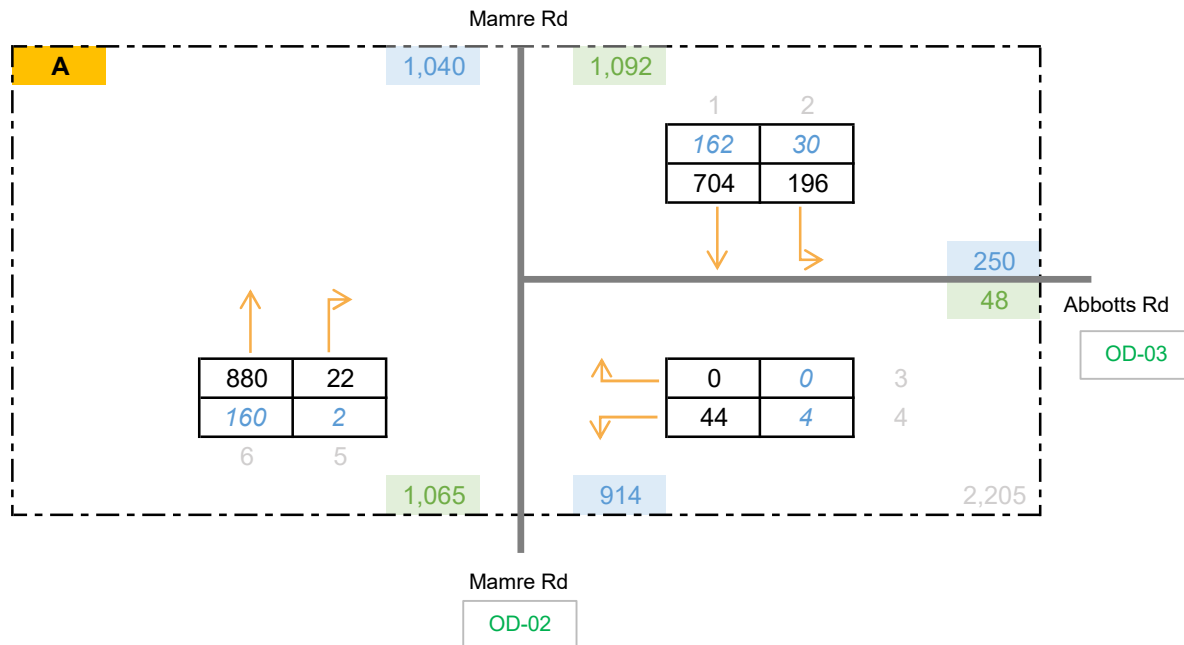
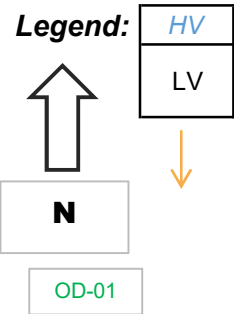
Peak Period: PM

Scenario: Existing



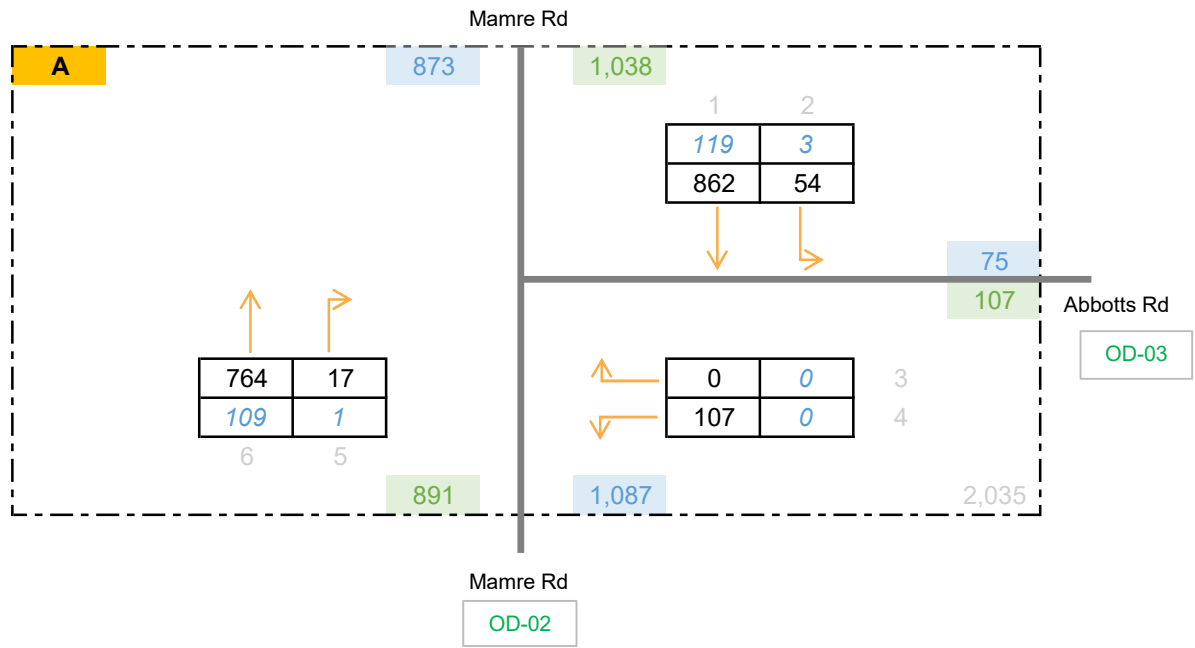
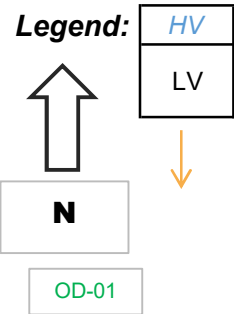
Peak Period: AM

Scenario: Project Case - Stage 1



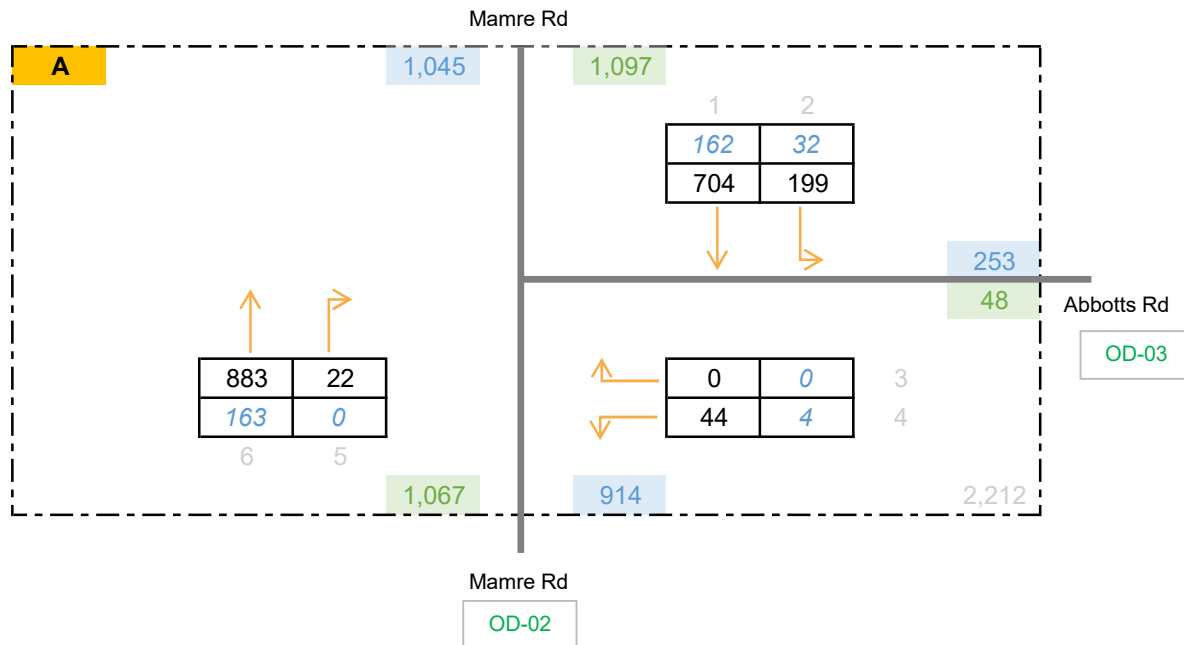
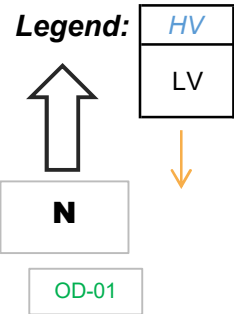
Peak Period: PM

Scenario: Project Case - Stage 1



Peak Period: AM

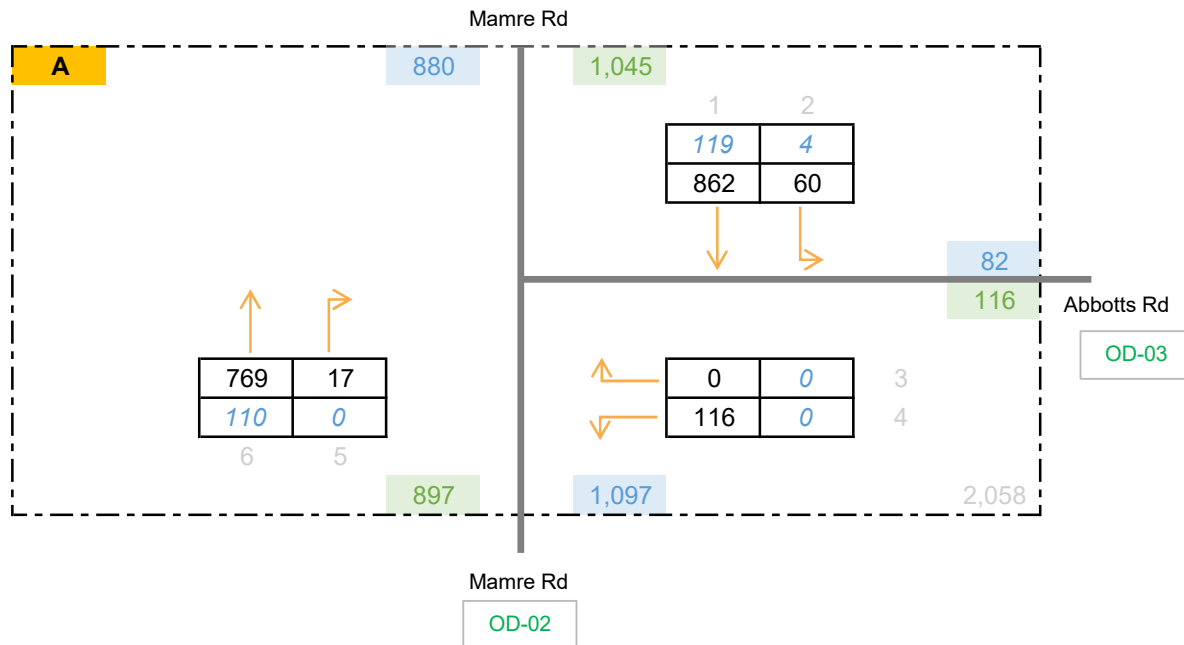
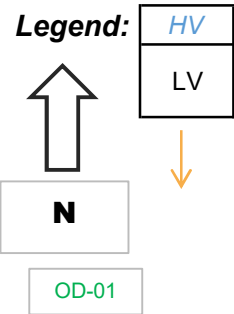
Scenario: Project Case - Stage 2





Peak Period: **PM**

Scenario: **Project Case - Stage 2**



# Appendix B. SIDRA Results

# SITE LAYOUT

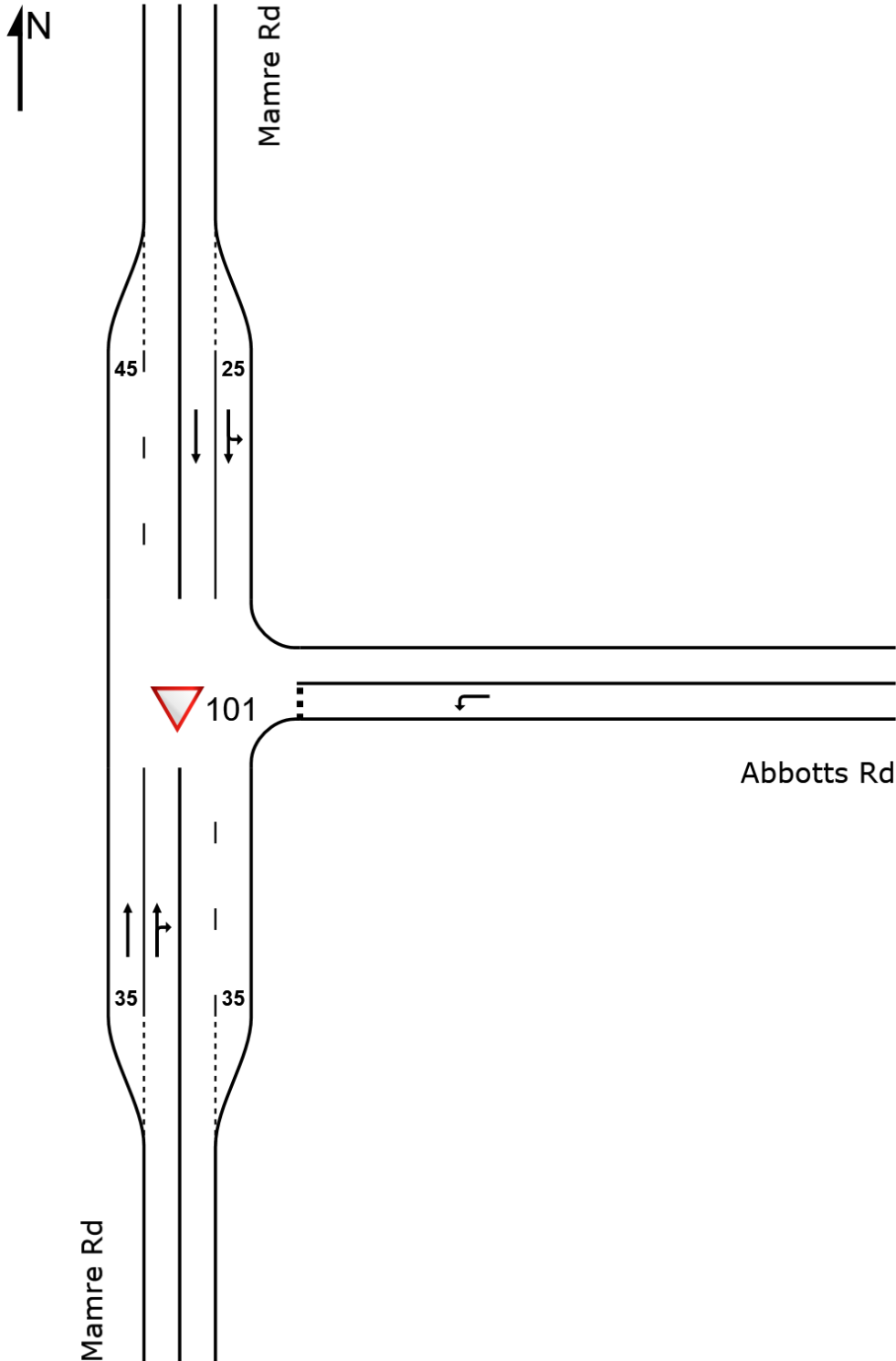
▽ Site: 101 [Baseline - AM (Site Folder: Base)]

Mamre Rd/Abbotts Rd

Site Category: (None)

Give-Way (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



# MOVEMENT SUMMARY

Site: 101 [Baseline - AM (Site Folder: Base)]

Mamre Rd/Abbotts Rd

Site Category: (None)

Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[ Total veh/h ]	[ HV ] veh/h	[ Total veh/h ]	[ HV ] %				[ Veh. veh ]	[ Dist ] m				
South: Mamre Rd														
2	T1	778	124	819	15.9	0.409	1.7	LOS A	1.4	11.1	0.12	0.02	0.17	58.3
3	R2	23	2	24	8.7	0.409	19.4	LOS B	1.4	11.1	0.16	0.03	0.23	55.3
Approach		801	126	843	15.7	0.409	2.2	NA	1.4	11.1	0.12	0.02	0.17	58.2
East: Abbotts Rd														
4	L2	30	2	32	6.7	0.029	8.4	LOS A	0.1	0.7	0.25	0.56	0.25	52.2
Approach		30	2	32	6.7	0.029	8.4	LOS A	0.1	0.7	0.25	0.56	0.25	52.2
North: Mamre Rd														
7	L2	1	0	1	0.0	0.097	5.6	LOS A	0.0	0.0	0.00	0.00	0.00	58.2
8	T1	817	153	860	18.7	0.398	0.5	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
Approach		818	153	861	18.7	0.398	0.5	NA	0.0	0.0	0.00	0.00	0.00	59.7
All Vehicles		1649	281	1736	17.0	0.409	1.5	NA	1.4	11.1	0.06	0.02	0.09	58.8

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

Queue Model: SIDRA Standard.

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

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

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# MOVEMENT SUMMARY

Site: 101 [Baseline - PM (Site Folder: Base)]

Mamre Rd/Abbotts Rd

Site Category: (None)

Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[ Total veh/h ]	[ HV veh/h ]	[ Total veh/h ]	[ HV % ]				[ Veh. veh ]	[ Dist m ]				
South: Mamre Rd														
2	T1	777	100	818	12.9	0.395	1.6	LOS A	1.2	9.7	0.11	0.01	0.15	58.4
3	R2	17	1	18	5.9	0.395	21.8	LOS B	1.2	9.7	0.14	0.02	0.19	55.6
Approach		794	101	836	12.7	0.395	2.1	NA	1.2	9.7	0.11	0.01	0.15	58.3
East: Abbotts Rd														
4	L2	28	0	29	0.0	0.027	8.9	LOS A	0.1	0.6	0.25	0.57	0.25	52.4
Approach		28	0	29	0.0	0.027	8.9	LOS A	0.1	0.6	0.25	0.57	0.25	52.4
North: Mamre Rd														
7	L2	2	0	2	0.0	0.106	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	58.2
8	T1	925	112	974	12.1	0.434	0.6	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
Approach		927	112	976	12.1	0.434	0.7	NA	0.0	0.0	0.00	0.00	0.00	59.7
All Vehicles		1749	213	1841	12.2	0.434	1.4	NA	1.2	9.7	0.05	0.02	0.07	58.9

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

Queue Model: SIDRA Standard.

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

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

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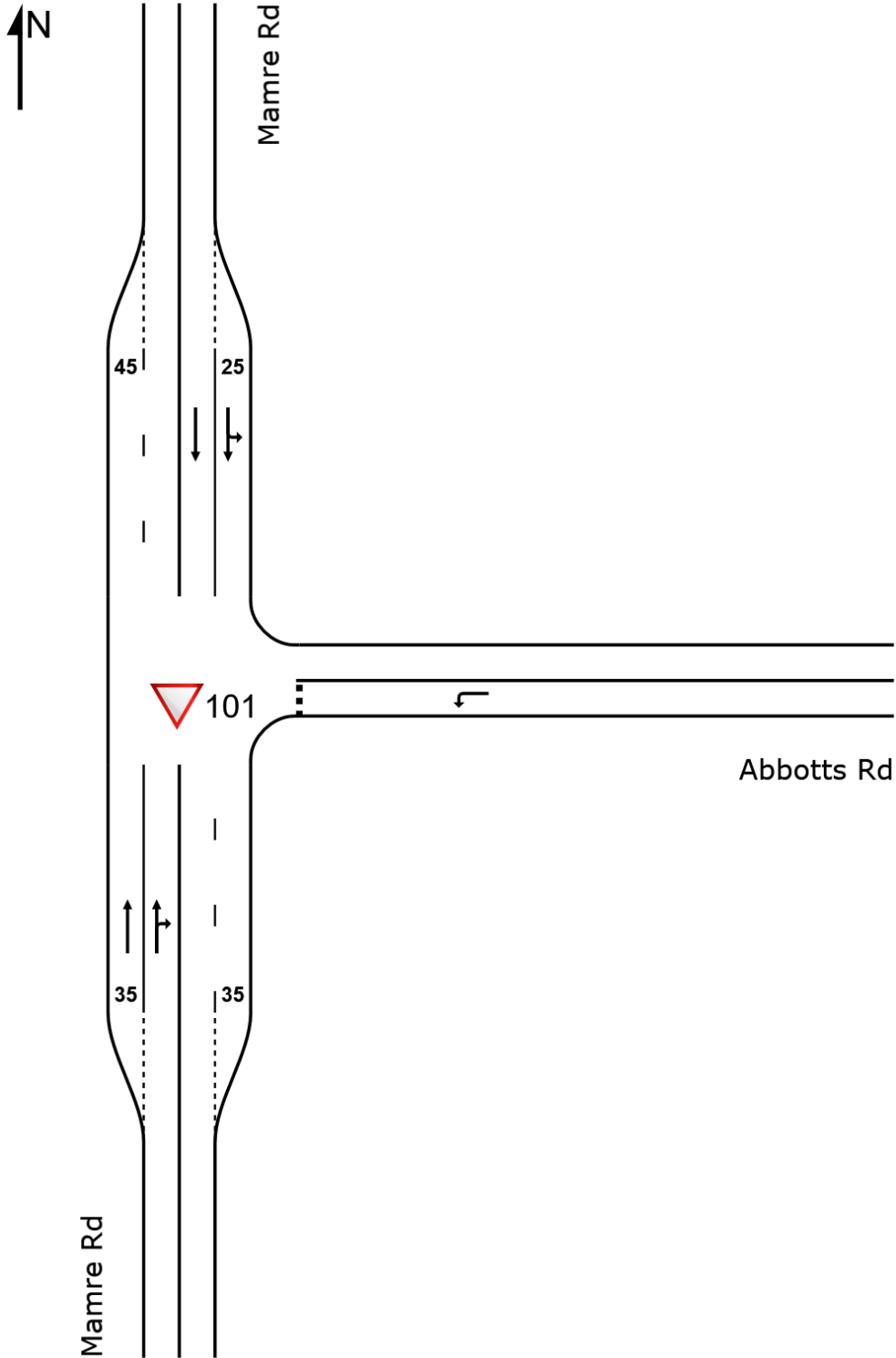
Project: C:\Users\AngelaJi\Ason Group\Ason Group Team Site - 2264\Projects\Modelling\p2264m01v1\_Mamre\_Abbotts\_2026.sip9

# SITE LAYOUT

▽ Site: 101 [Scenario 1 - AM (Site Folder: Construction - Stage 1)]

Mamre Rd/Abbotts Rd  
Site Category: (None)  
Give-Way (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.





# MOVEMENT SUMMARY

Site: 101 [Scenario 1 - AM (Site Folder: Construction - Stage 1)]

Mamre Rd/Abbotts Rd  
 Site Category: (None)  
 Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[ Total veh/h	HV ] veh/h	[ Total veh/h	HV ] %				[ Veh. veh	Dist ] m				
South: Mamre Rd														
2	T1	1040	160	1095	15.4	0.575	4.9	LOS A	14.0	110.7	0.74	0.03	0.86	55.5
3	R2	24	2	25	8.3	0.575	41.2	LOS C	14.0	110.7	1.00	0.03	1.16	51.7
Approach		1064	162	1120	15.2	0.575	5.7	NA	14.0	110.7	0.74	0.03	0.87	55.4
East: Abbotts Rd														
4	L2	48	4	51	8.3	0.039	8.7	LOS A	0.0	0.0	0.00	0.57	0.00	52.9
Approach		48	4	51	8.3	0.039	8.7	LOS A	0.0	0.0	0.00	0.57	0.00	52.9
North: Mamre Rd														
7	L2	226	30	238	13.3	0.140	5.7	LOS A	0.0	0.0	0.00	0.57	0.00	52.6
8	T1	866	162	912	18.7	0.524	0.3	LOS A	0.0	0.0	0.00	0.00	0.00	59.5
Approach		1092	192	1149	17.6	0.524	1.4	NA	0.0	0.0	0.00	0.12	0.00	58.0
All Vehicles		2204	358	2320	16.2	0.575	3.6	NA	14.0	110.7	0.36	0.08	0.42	56.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

Queue Model: SIDRA Standard.

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

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



# MOVEMENT SUMMARY

Site: 101 [Scenario 1 - PM (Site Folder: Construction - Stage 1)]

Mamre Rd/Abbotts Rd  
 Site Category: (None)  
 Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[ Total veh/h ]	[ HV ] veh/h	[ Total veh/h ]	[ HV ] %				[ Veh. veh ]	[ Dist ] m				
South: Mamre Rd														
2	T1	873	109	919	12.5	0.453	2.5	LOS A	2.0	15.7	0.13	0.01	0.19	57.6
3	R2	18	1	19	5.6	0.453	28.8	LOS C	2.0	15.7	0.17	0.02	0.25	54.5
Approach		891	110	938	12.3	0.453	3.1	NA	2.0	15.7	0.13	0.01	0.19	57.5
East: Abbotts Rd														
4	L2	107	0	113	0.0	0.098	9.8	LOS A	0.3	2.4	0.24	0.57	0.24	52.5
Approach		107	0	113	0.0	0.098	9.8	LOS A	0.3	2.4	0.24	0.57	0.24	52.5
North: Mamre Rd														
7	L2	57	3	60	5.3	0.118	5.6	LOS A	0.0	0.0	0.00	0.17	0.00	56.4
8	T1	981	119	1033	12.1	0.486	0.7	LOS A	0.0	0.0	0.00	0.02	0.00	59.4
Approach		1038	122	1093	11.8	0.486	1.0	NA	0.0	0.0	0.00	0.03	0.00	59.2
All Vehicles		2036	232	2143	11.4	0.486	2.3	NA	2.0	15.7	0.07	0.05	0.10	58.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

Queue Model: SIDRA Standard.

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

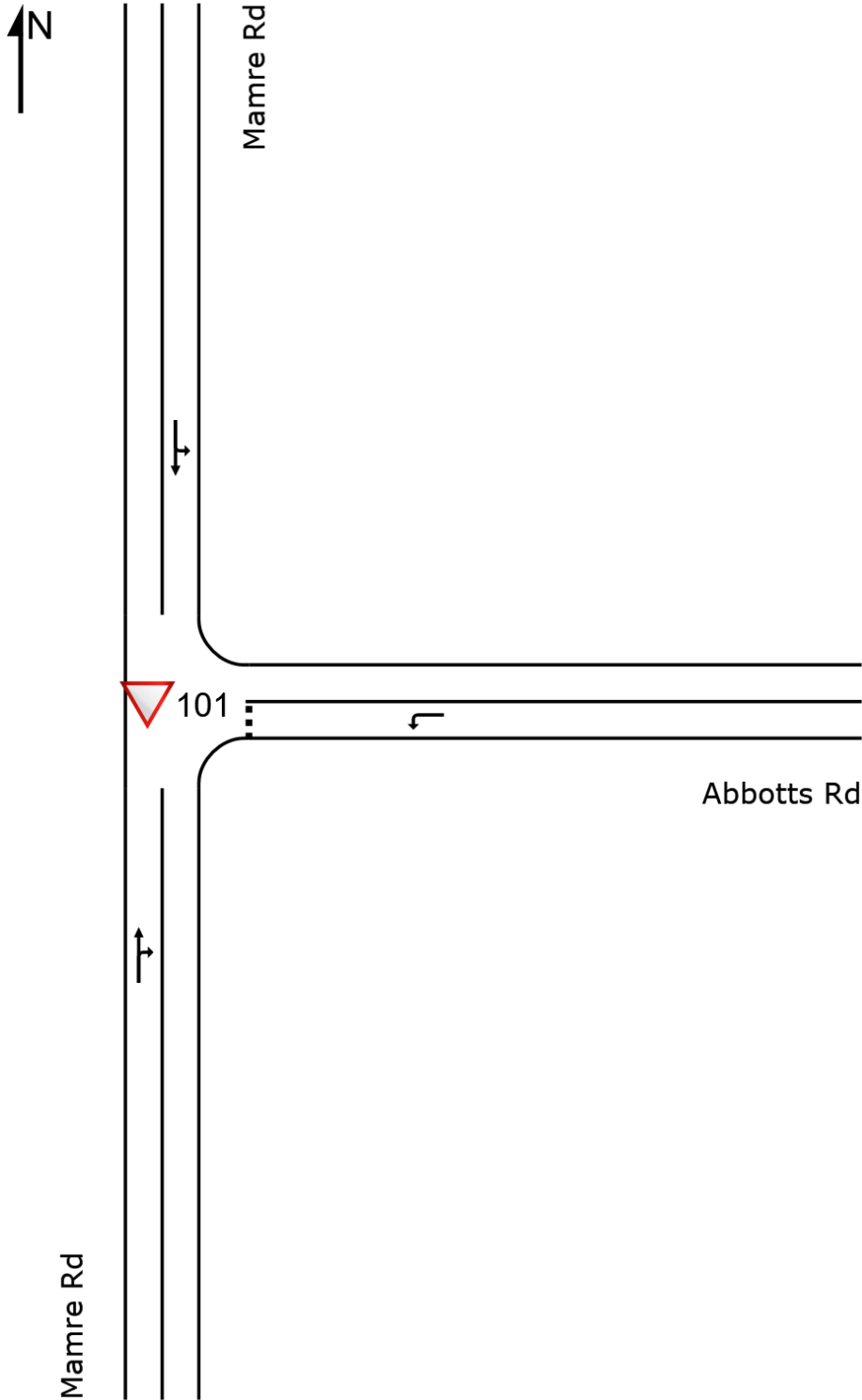
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# SITE LAYOUT

▼ Site: 101 [Scenario 2 - AM (Site Folder: Construction - Stage 2)]

Mamre Rd/Abbotts Rd  
Site Category: (None)  
Give-Way (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.





# MOVEMENT SUMMARY

Site: 101 [Scenario 2 - AM (Site Folder: Construction - Stage 2)]

Mamre Rd/Abbotts Rd  
 Site Category: (None)  
 Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[ Total veh/h ]	[ HV ] veh/h	[ Total veh/h ]	[ HV ] %				[ Veh. veh ]	[ Dist ] m				
South: Mamre Rd														
2	T1	1046	163	1101	15.6	0.717	4.5	LOS A	15.1	119.8	1.00	0.03	1.18	55.1
3	R2	22	0	23	0.0	0.717	50.8	LOS D	15.1	119.8	1.00	0.03	1.18	52.8
Approach		1068	163	1124	15.3	0.717	5.4	NA	15.1	119.8	1.00	0.03	1.18	55.0
East: Abbotts Rd														
4	L2	48	4	51	8.3	0.125	13.7	LOS A	0.4	2.8	0.77	0.90	0.77	47.0
Approach		48	4	51	8.3	0.125	13.7	LOS A	0.4	2.8	0.77	0.90	0.77	47.0
North: Mamre Rd														
7	L2	231	32	243	13.9	0.668	6.1	LOS A	0.0	0.0	0.00	0.12	0.00	55.7
8	T1	866	162	912	18.7	0.668	0.5	LOS A	0.0	0.0	0.00	0.12	0.00	58.0
Approach		1097	194	1155	17.7	0.668	1.7	NA	0.0	0.0	0.00	0.12	0.00	57.5
All Vehicles		2213	361	2329	16.3	0.717	3.7	NA	15.1	119.8	0.50	0.09	0.59	56.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Vehicle movement LOS values are based on average delay per movement.  
 Minor Road Approach LOS values are based on average delay for all vehicle movements.  
 NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.  
 Delay Model: SIDRA Standard (Geometric Delay is included).  
 Queue Model: SIDRA Standard.  
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).  
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

Site: 101 [Scenario 2 - PM (Site Folder: Construction - Stage 2)]

Mamre Rd/Abbotts Rd  
 Site Category: (None)  
 Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[ Total veh/h ]	[ HV ] veh/h	[ Total veh/h ]	[ HV ] %				[ Veh. veh ]	[ Dist ] m				
South: Mamre Rd														
2	T1	879	110	925	12.5	0.569	1.9	LOS A	1.9	14.8	0.15	0.01	0.23	57.6
3	R2	17	0	18	0.0	0.569	31.2	LOS C	1.9	14.8	0.15	0.01	0.23	55.3
Approach		896	110	943	12.3	0.569	2.5	NA	1.9	14.8	0.15	0.01	0.23	57.6
East: Abbotts Rd														
4	L2	116	0	122	0.0	0.340	16.9	LOS B	1.2	8.1	0.84	0.98	1.01	45.3
Approach		116	0	122	0.0	0.340	16.9	LOS B	1.2	8.1	0.84	0.98	1.01	45.3
North: Mamre Rd														
7	L2	64	4	67	6.3	0.609	5.9	LOS A	0.0	0.0	0.00	0.04	0.00	57.0
8	T1	981	119	1033	12.1	0.609	0.3	LOS A	0.0	0.0	0.00	0.04	0.00	59.0
Approach		1045	123	1100	11.8	0.609	0.7	NA	0.0	0.0	0.00	0.04	0.00	58.9
All Vehicles		2057	233	2165	11.3	0.609	2.4	NA	1.9	14.8	0.11	0.08	0.16	57.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

Queue Model: SIDRA Standard.

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

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