

Traffic Impact Assessment

Proposed Warehouse Development
Lot 7 - First Estate, Mamre West Precinct

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Client: Altis Property Partners c/- Hansen Yuncken

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1 Introduction

1.1 Overview

Ason Group has been engaged by Hansen Yuncken, acting as Project Managers on behalf of the client Altis Property Partners (Altis), to prepare a Traffic Impact Assessment (TIA) in relation to Lot 7 of the First Estate Precinct at 585-649 Mamre Road, Orchard Hills.

The subject site is Lot 7 (the Site) of the Altis Precinct Master Plan site located at 585-649 Mamre Road, Orchard Hills (the Altis Precinct), now known as First Estate. This First Estate Precinct itself comprises the southern portion of a larger precinct referred to as the Mamre West Land Investigation Area (or the Mamre West Precinct). A Location Plan is presented in **Figure 1**, which provides an appreciation of the Mamre West Precinct, and its location within the new Western Sydney Priority Growth Area.

This TIA report addresses the relevant traffic, transport and parking implications of the development, including compliance with relevant State and Local Government controls and Australian Standards. This report also builds on the following Traffic Impact Assessments undertaken by Ason Group relating to the Precinct:

- *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 (the Planning Proposal 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 Altis Precinct, and
- *Proposed Training Academy and Emergency Services Facility – FRNSW; Lot 2, 585-649 Mamre Road, Orchard Hills* (the Lot 2 TIA), prepared by Ason Group (ref: 0287r01v2) and dated 22 September 2016. This report was submitted under Part 5 of the Environmental Planning and Assessment Act 1979.

The history of the site, including the access and future intersection operation is discussed in further detail in the following sections to provide context to this application.

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1.2 Summary of Proposed Development

1.2.1 Built Form

A detailed description of the Proposal is included within the Statement of Environmental Effects, prepared by Willowtree and the architectural plans prepared by Nettleton.

In summary, this application generally seeks approval for a purpose-built warehouse and distribution facilities for Snackbrands (Lot 7). A reduced copy of the Site Plan is presented in **Figure 2** and a summary of the proposed building floor areas and parking provision is as follows:

- Floor area: 30,255m² of GFA, including:
 - Low bay warehouse: 18,630m²
 - High bay warehouse: 11,025m²
 - Office: 500m²
 - Dock office: 100m²
- Parking provision: 114 spaces, including 2 accessible parking spaces

1.2.2 Site Access Arrangements

The Site is proposed to be accessed from the Estate Roads via two crossovers as follows:

- A full movement crossover for cars and other light vehicles (eastern access), and
- A full movement crossover for trucks and other heavy vehicles (western access).

Operationally, it is anticipated that commercial vehicles (trucks up to B-doubles) will enter Lot 7 via the western access driveway to access the hardstand. Sufficient hardstand is provided for these vehicles to make a U-turn on-site. Relevant swept path analysis has been undertaken and included in **Appendix A**.

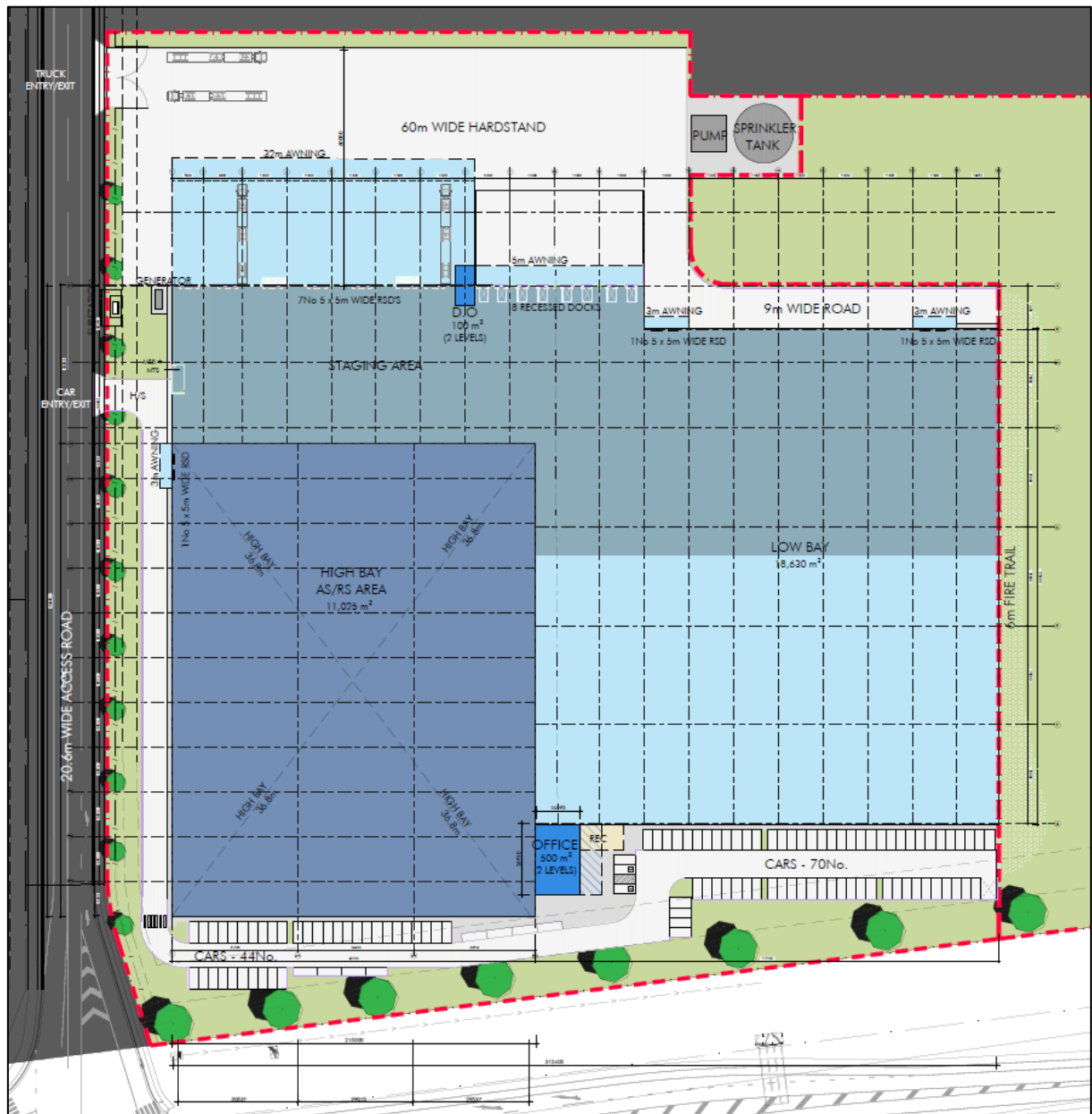


Figure 2: Site Plan

1.3 Report Structure

The remainder of this report is structured as follows:

- Section 2 provides the summary of the planning context associated with the Altis Precinct and the associated interim access arrangements.
- Section 3 describes the site, existing road network and accessibility to alternative transport modes
- Section 4 outlines the relevant parking requirements.
- Section 5 describes the traffic impacts of the proposed development including projected trip generation.
- Section 6 describes the access, internal configuration of the proposed car parking and loading aspects of the development
- Section 7 provides a summary of the key traffic and parking assessment findings.

2 Planning Context

The application has been lodged having regard to the approved Mamre West development (SSDA 7173) and the subsequent MOD Applications considered by the Department of Planning and Environment (DP&E). These previous Concept Plan and subsequent Modification Application approvals set out the development principles including estate infrastructure, overall warehouse / industrial floor space, car parking provision rates and principles regarding future access to the regional road network.

2.1 STG1 Planning Proposal

The Mamre West Land Investigation Area has been the subject of investigations for rezoning. Having regard for the plan at **Figure 3**, the area consists largely of 3 components:

- Stage 1 flood-free area to the south (referred to as STG1 and consists primarily of the Altis Precinct).
- Stage 2 flood-free area to the north (referred to as STG2 and the *Potential Stage 2 Area*).
- The remaining area of the Precinct that is flood prone.

STG1 and STG2 are 47.8 hectares and 39.6 hectares in site area, respectively, and represent the 87.4 hectares of developable (flood-free) area within the investigation area. Based primarily on feedback from residents living within the STG2 area, NSW Department of Planning & Environment (DPE) reduced the Planning Proposal to the STG1 study area, with STG2 to be potentially the subject of a future Planning Proposal. Subsequently, the Planning Proposal was approved and the STG1 area has been rezoned for IN1 use.

It should be noted that the Planning Proposal to DPE was supported by a TIA report titled the *Mamre West Land Investigation Area, Planning Proposal Mamre Road, Western Sydney Priority Growth Area*, prepared by Ason Group in February 2016.



Figure 3: Mamre West Land Investigation Area Plan

2.2 Masterplan Access Strategy

In accordance with the Planning Agreement for the Planning Proposal, the following summarises the key components of the agreed Access Strategy for the STG1 area; it should be noted that the Access Strategy was developed having consideration for the upgrading of Mamre Road by NSW Roads & Maritime Services (RMS) to a Principal Arterial Road:

- Primary Access to be provided via a new western connection to the existing signalised T-intersection of Mamre Road with James Erskine Drive (the Primary Access intersection).
- Secondary Access to the Precinct to be provided via a left-in / left-out priority-controlled intersection with Mamre Road located approximately 500 metres south of the existing intersection with James Erskine Drive (the Secondary Access intersection).
- Internal industrial collector link roads connecting the Altis Precinct to northern STG1 areas and onwards to the Primary Access intersection.

Regarding interim access to the Altis Precinct in advance of the delivery of the Primary Access intersection (which requires the involvement of several third-party landowners) discussions with RMS have been ongoing. The outcome of the most recent discussions is the construction of a (now operational) temporary (interim) signalised intersection in the location of the future Secondary Access intersection. This Planning Agreement includes clauses that will ensure that the interim signalised intersection is removed once RMS upgrades Mamre Road to a principal arterial and the STG1 area is connected to the Primary Access intersection.

2.3 Future Road Network Considerations

It is worth noting that the Planning Proposal TIA provided a preliminary assessment of the Primary Access intersection – and the other study network intersection of Mamre Road with Erskine Park Road – under 2026 future year (with development) conditions. However, during the pre-lodgement consultation phase for the Planning Proposal, RMS advised that a Mamre Road Upgrade study was being undertaken in response to:

- Growth within the broader WSEA (such as the subject Planning Proposal), and
- Future traffic demands on Mamre Road arising directly and indirectly from the proposed Western Sydney Airport at Badgerys Creek.

The study is ongoing; however, RMS has advised:

- That Mamre Road is earmarked for classification as a Principal Arterial Road and that its main role would be to cater for 'through traffic' – as opposed to provide access to development – and would ideally achieve an 80 km/hr speed environment.
- Whilst upgrades to key Mamre Road intersections are yet to be committed, the Mamre Road upgrade would include (as a minimum) duplication of the existing 2-lane sections of Mamre Road, such as the section adjacent to the Site that has resulted in the proposed dedication of a 20-metre wide strip along the eastern boundary of the Altis Precinct to RMS. That dedication requirement has subsequently reduced to only 10 metres.

Accordingly, the Planning Proposal TIA provided an intersection layout for the Primary Access intersection and upgrades to the existing intersection of Mamre Road with Erskine Park Road that were 'indicative only', recognising that the eventual infrastructure works (in the first instance at least) would be determined by the Mamre Road Upgrade study. It is understood that RMS raises no objections to the approach of relying on the Mamre Road Upgrade study to identify future necessary upgrades.

2.4 First Estate Master Plan

The Precinct Masterplan is shown in **Figure 4** with the corresponding land use assumptions provided in **Table 1**. These yields have been adopted for all previous traffic assessments and form the basis of the interim and future site access and network operation in the vicinity.

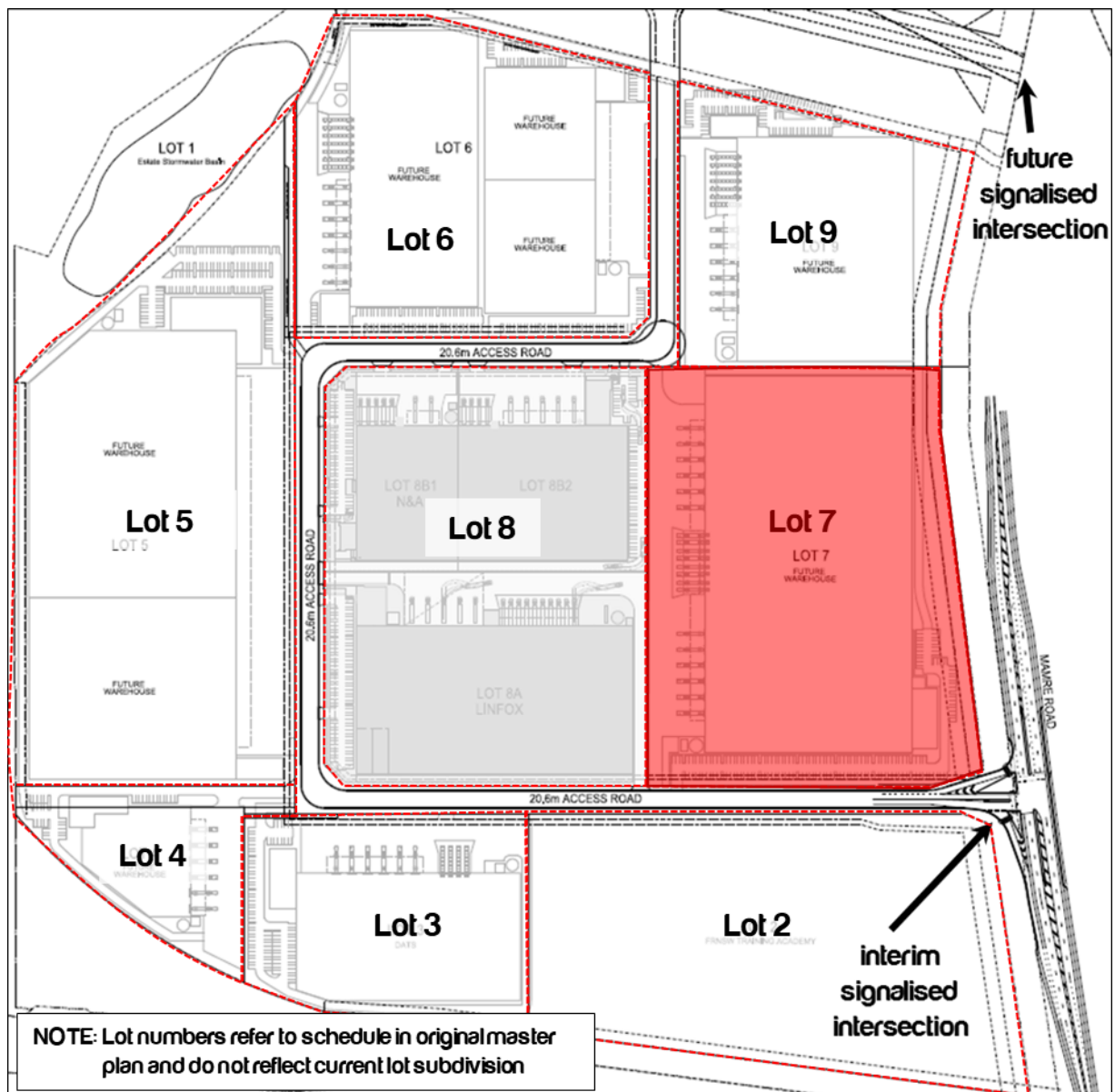


Figure 4: Altis Precinct Master Plan

The RMS *Technical Direction 2013/04a – Guide to Traffic Generating Developments; Updated traffic surveys* (RMS Technical Direction) provides surveys of industrial precincts across Sydney, including specific data for development within the Erskine Park Industrial Area and therefore provides the most appropriate rates for assessment. The RMS Technical Direction provides the following rates in relation to the Erskine Park Industrial Area:

- 0.134 trips per 100m² GFA (total building, warehouse and office) during the morning peak hour
- 0.139 trips per 100m² GFA during the evening peak hour

This TIA report adopts trip rate assumptions from the RMS Technical Direction as stipulated above, with application of these rates to the adopted Precinct development yields summarised in Table 1.

Table 1: Master Plan Forecast Traffic Generation

Lot	Warehouse Ref:	Total Built Area (m ²)	AM Trips	PM Trips
Lot 1	Bio retention basis	n/a	-	-
Lot 2	FRNSW	-	91	91
Lot 3	Warehouse3	16,000	21	22
Lot 4	Warehouse 4	4,250	6	6
Lot 5	Warehouse 5a	22,200	30	31
	Warehouse 5b	28,600	38	40
	Warehouse 6A	6,900	9	10
Lot 6	Warehouse 6B	8,200	11	11
	Warehouse 6C	20,200	27	28
Lot 7	Warehouse 7	41,500	56	58
	Warehouse 8A	11,400	15	16
Lot 8	Warehouse 8B	9,400	13	13
	Warehouse 8C	22,160	30	31
Lot 9	Warehouse 9	21,200	28	29
Total			375	386

It is noted that, under this Precinct wide assessment, Lot 7 was assumed to have a potential development floor area of some 41,500m² GFA. Accordingly, the approved Precinct-wide modelling adopts a traffic generation of 56 and 58 vehicles per hour during morning and evening peak periods, respectively, for Lot 7.

Notwithstanding, it is noted that the current Lot 7 comprises what was previously Lot 7 and Lot 9 of the original master plan. The site area of the current Lot 7 comprises some 48.3% of that overall Lot 7 / Lot 9 area. Together, Lots 7 & 9 were assumed to generate the following peak hourly traffic movements:

- AM peak 84 veh/hr (41 veh/hr @ 48.3%)
- PM peak 87 veh/hr (42 veh/hr @ 48.3%)

2.5 Interim Access

As mentioned, an interim signal intersection between Mamre Road and the proposed industrial access road – designed and constructed in accordance with Austroads and RMS requirements – has been approved (as part of a separate application) to provide access to the Altis Precinct until completion of, and connection to, the Primary Access intersection. Based on preliminary SIDRA modelling, the following summarises key characteristics of the intersection design.

- Southbound on Mamre Road:
 - o An auxiliary southbound lane of about 240 metres length, comprising a 100-metre approach lane and a 120-metre departure lane, plus approximately 20 metres through the intersection.
 - o A dedicated right-turn bay on the northern approach of 130 metres length.
- Northbound on Mamre Road – An auxiliary northbound lane of about 340 metres length, comprising a 200-metre approach lane and a 120-metre departure lane.
- Site Access Road – 2 approach lanes, a full right-turn lane and a 70 metre left-turn short lane.

This intersection is currently operational.

2.6 Interim Access Intersection Performance

The following analysis assesses the performance of the approved interim signalised intersection using SIDRA modelling. In this regard, SIDRA modelling outputs a range of performance measures, in particular:

- Degree of Saturation (DOS) – The DOS is used to measure the performance of intersections where a value of 1.0 represents an intersection at theoretical capacity. As the performance of an intersection approaches DOS of 1.0, queue lengths and delays increase rapidly. It is usual to attempt to keep DOS to less than 0.9, with satisfactory intersection operation generally achieved with a DOS below 0.8.
- 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.

A recommended baseline for assessment as per the RMS Guide is provided in **Table 2**.

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.

Results of the SIDRA analysis of the interim intersection under the full development of the Altis Precinct are presented in **Table 3**.

Table 3: Intersection Operation Performance

Scenario	Period	Degree of Saturation (DOS)	Average Vehicle Delay (AVD)	Level of Service (LOS)
2026 Baseline with Altis Precinct Master Plan	AM	0.949	20.9	B
	PM	0.741	14.7	B

The SIDRA results demonstrate that the proposed interim signal intersection is expected to operate with a Level of Service B based on the Altis Precinct development yield outlined in Table 3. These Level of Service indicate acceptable delays and spare capacity.

3 Existing Conditions

3.1 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 Precinct, 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/hr.
- Erskine Park Road – a sub-arterial road servicing traffic between the Great Western Highway and M4 to the north, and 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/hr.
- James Erskine Drive – a local industrial access road, providing access for the Erskine Park Industrial Precinct, which lies to the east of Mamre Road adjacent to 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.

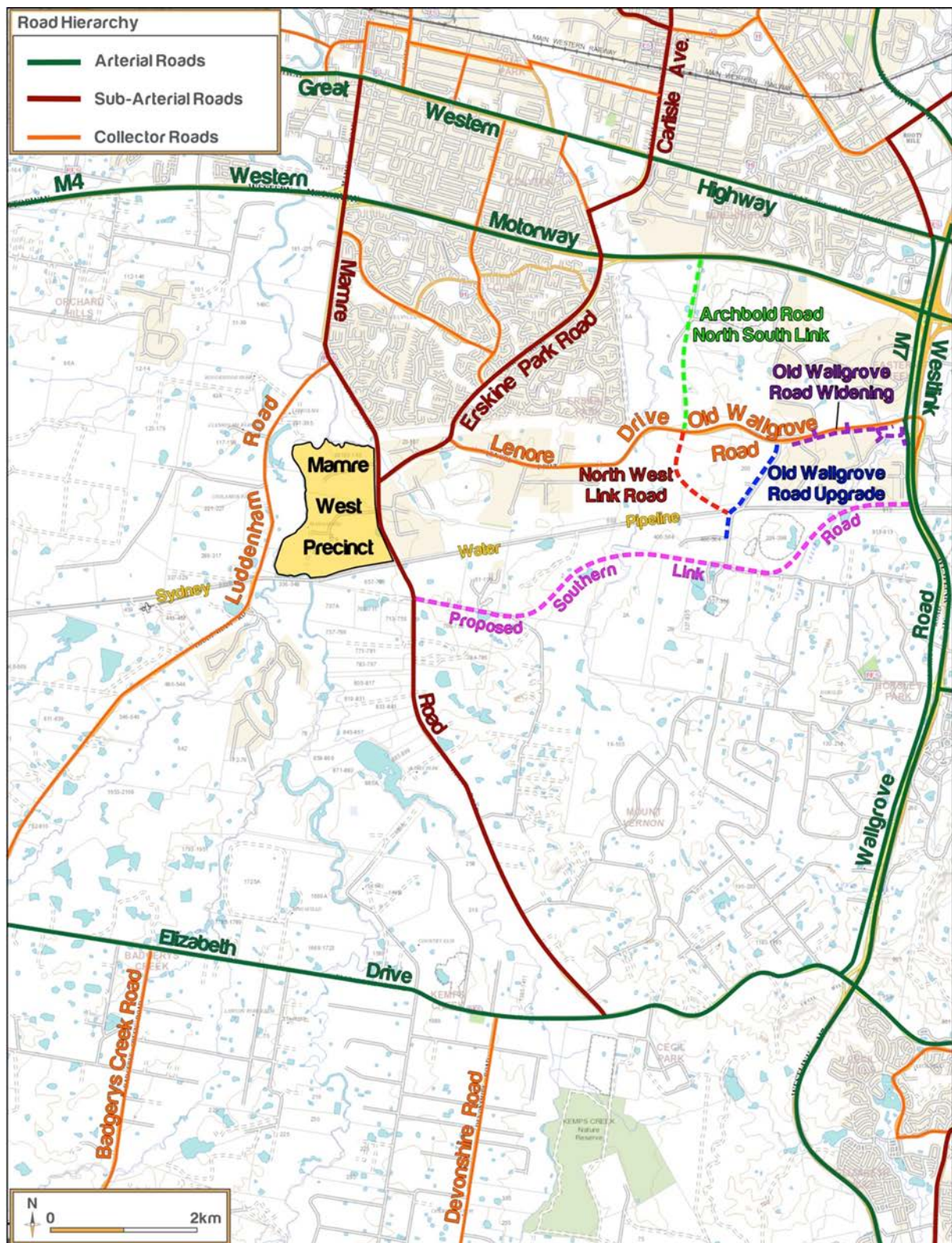


Figure 5: Location Plan & Road Hierarchy

3.2 Public Transport

3.2.1 Bus Services

The existing bus services within the vicinity of the Site are shown **Figure 6**. It is evident that the Site is not directly serviced by frequent public transport operations at this time. Notwithstanding, the opportunities for future connections have been identified and are discussed further below.

3.2.2 Future Bus Service Opportunities

While it is apparent that the Site will be well served by a future road network, it is nonetheless important that people have the opportunity to use public transport, which requires significant 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 Site. The mentioned route provides a key connection to the St Mary's railway station and to the broader transport network.

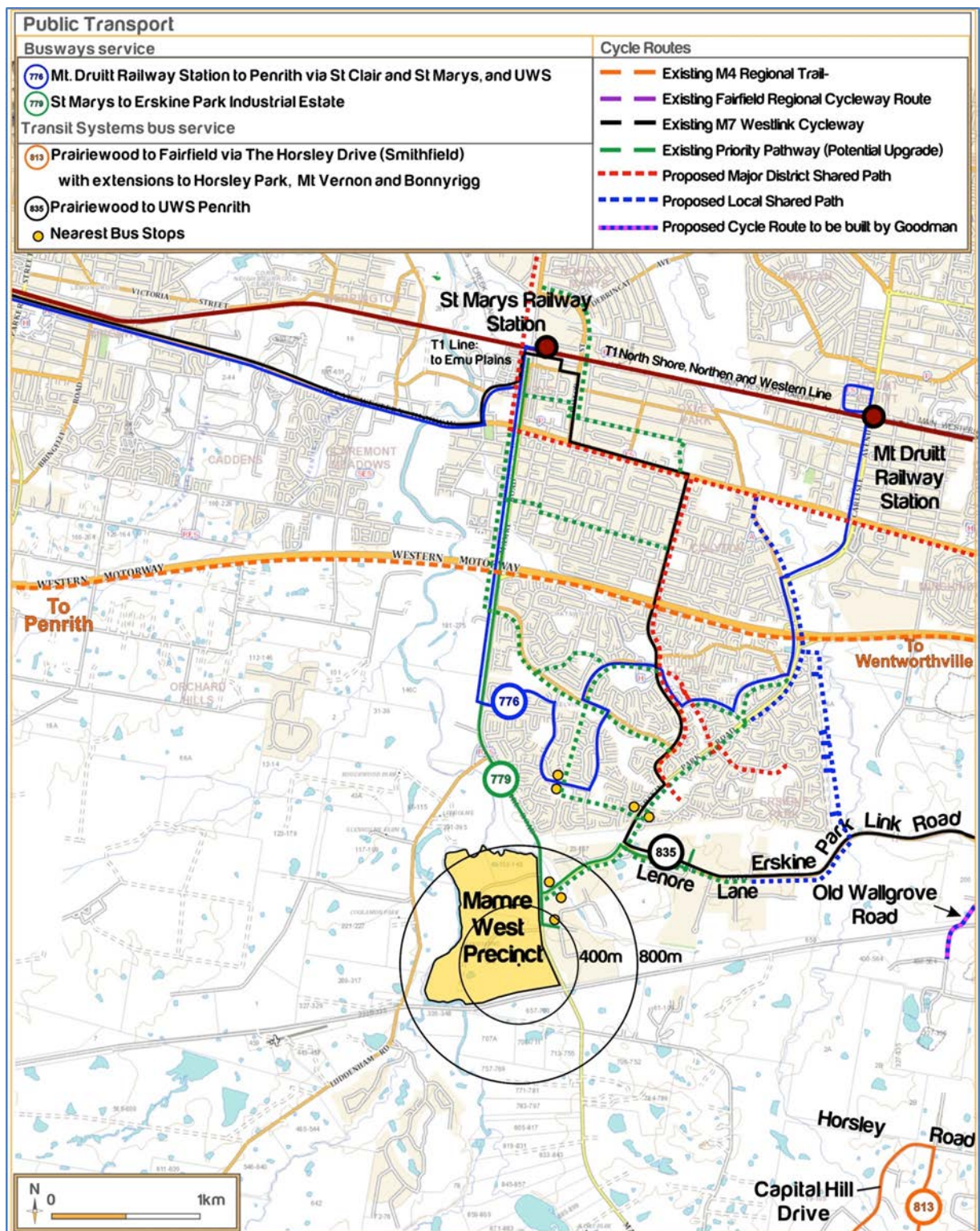


Figure 6: Public Transport Services & Cycling Routes

The planning of bus services in Sydney is governed by the NSW Service Planning Guidelines, which aim 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.

3.3 Cycling

There are existing opportunities and infrastructure for cyclists to access the Site via Mamre Road. 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 Site that could be connected to paths along Erskine Park Road.

4 Parking Requirements

4.1 Car Parking

4.1.1 Car Parking Requirement

The *Mamre West Land Investigation Area Development Control Plan* (the Precinct DCP), and the Master Plans conditions of consent requires car parking for warehouse developments to be provided at the following rates:

- 1 space per 300 m² of warehouse GFA
- 1 space per 40 m² of ancillary office GFA

Application of these rates to the floor areas proposed is summarised in Table 4.

Table 4: Car Parking Provision and Requirements

Site	Floor Area (m ² GFA)	DCP Parking Rate	Parking Required ¹	Parking Provided
Warehouse	29,655	1 space / 300 m ² GFA	99	
Office	600	1 space / 40 m ² GFA	15	
TOTAL Lot 7	30,255		114	114

Notes: 1) No. of spaces rounded to nearest whole number

The development includes provision of a total of 114 car spaces, which complies with the requirements of the Precinct DCP rates and outlined within the conditions.

4.1.2 Accessible Parking

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 office (Class 5) and warehouse (Class 7) developments to be provided at a rate of:

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

Application of this control to the proposal results in a minimum of 2 accessible parking space being required per tenancy. Accordingly, the development provides sufficient accessible parking.

4.2 Bicycle Parking

The expected staff numbers for the proposed warehouses at any one time is 87 people, including:

- Warehouse: 50 people
- Office / Amenities: 20 people
- Security: 2 people
- Drivers: 15 people

Council's DCP requires bicycle parking to be provided in accordance with *Planning Guidelines for Walking and Cycling* (NSW Government 2004) which stipulated the following bicycle provision rates:

- 3% - 5% of staff (for staff).
- 5% - 10% of staff (for visitors).

Application of these rates will result in a requirement for between 7-13 bicycle spaces. However, these are optimistic targets for an industrial locality, such as the subject site, with a mode share of closer to 2% of staff considered more realistic, particularly in the short-medium term, resulting in a nominal requirement for 2 bicycle spaces. It is considered to be suitable in the short-term, with provision of additional spaces in the longer term should a demand for bicycle facilities arise.

Bicycle parking is not shown on the plan. However, there is ample space near each building for bicycle spaces to be provided and this can be conditioned, if necessary.

5 Traffic Assessment

5.1 Traffic Generation

As discussed in Section 1.2, the RMS Technical Direction 04a – as adopted by the TIA supporting the approved Master Plan - identifies the following traffic generation for the Erskine Park Industrial Area which are considered representative of the proposed development:

- 0.134 trips per 100m² GFA (total building, warehouse and office) during the morning peak hour
- 0.139 trips per 100m² GFA during the evening peak hour
- 1.892 trips per 100m² GFA per day

The application of the above rates to the proposed development yield will result in:

- 41 veh/hr during AM peak hour
- 42 veh/hr during PM peak hour
- 572 trips per day

These figures include both staff vehicles (cars) and commercial vehicles (trucks).

It is evident that the proposed development is expected to generate in the order of 41 and 42 veh/hr during morning and evening peak periods. As mentioned in Section 2.4, under the First Estate Master Plan assessment, this is consistent with that adopted for the subject site, when considering the reduced area of Lot 7.

On the basis of the above, it is anticipated that the road and intersection upgrades would be more than adequate to cater for the traffic generated by the Proposal. Accordingly, it is considered that no further road upgrades are required to support the proposed development.

5.2 Future Network Performance

The development traffic generation outlined in Section 5.1 above is less than that adopted for Lot 7 as part of the Precinct analysis discussion in Section 2.4. As such, the proposal is generally consistent with the Precinct planning undertaken previously.

Previous modelling as part of the planning for the Altis Precinct concluded that the interim access arrangements to Mamre Road will operate with a Level of Service B during both peak periods. Accordingly, there is sufficient spare capacity within the planned intersection design to accommodate the traffic volumes generated by the proposal.

6 Design Commentary

6.1 Relevant Design Standards

The site access, car park and loading areas (and access thereto) shall be designed to comply with the following relevant Australian Standards:

- AS2890.1 for car parking areas;
- AS2890.2 for commercial vehicle loading areas;
- AS2890.3 for bicycle parking; 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.

6.2 Site Access & Internal Design Commentary

The proposed development has generally been designed having regard for the above Standards. Reference should also be made to the swept paths and design commentary included in **Appendix A** for detailed commentary with regard to the design.

7 Conclusions

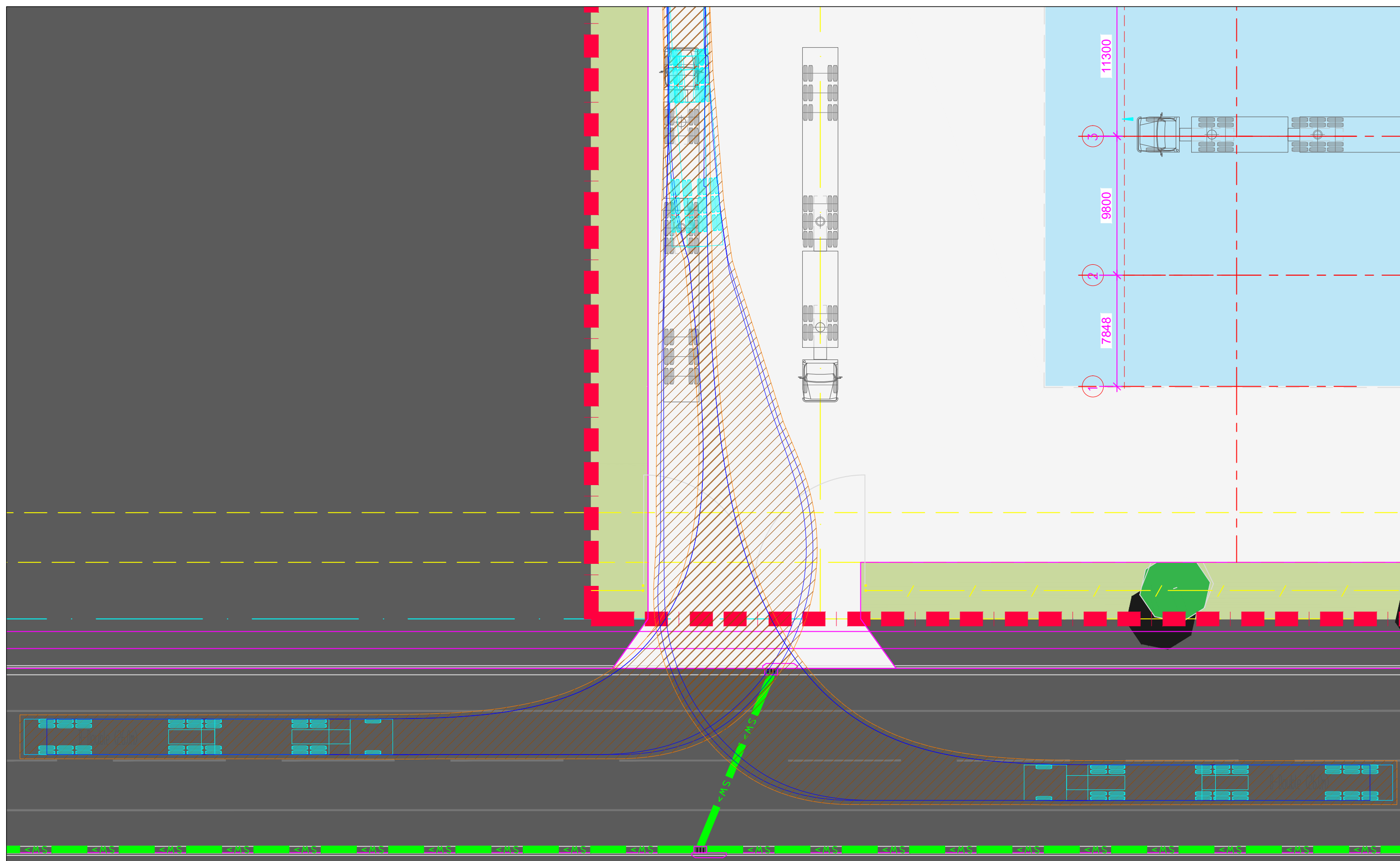
The key findings of this Traffic Impact Assessment are:

- Ason Group has been engaged by Hansen Yuncken, acting as Project Managers on behalf of Altis Property Partners, to prepare a TIA report relating to a relation to the development of Lots 7 of First Estate, Mamre West. The Site is located within the recently rezoned Altis Precinct area.
- Primary access the Altis Precinct is to be provided via a new western connection to the existing signalised T-intersection of Mamre Road with James Erskine Drive and secondary access is to be provided via a left-in / left-out priority-controlled intersection with Mamre Road located approximately 500 metres south of the James Erskine Drive intersection.
- In advance of the delivery of the Primary Access intersection at James Erskine Drive, a temporary (interim) signalised intersection is provided in the location of the future Secondary Access intersection to service the Altis Precinct.
- Previous SIDRA modelling demonstrates that the proposed interim signalised intersection is expected to operate with a Level of Service B during both the morning and evening peak periods. Therefore, the interim signalised intersection to Mamre Road will adequately accommodate the forecast traffic generated by the full Altis Precinct Master Plan area, including that associated with the subject site (Lot 7).
- The proposed development is generally consistent with that assessed under the Master Plan. In this regard, Lot 7 will generate less than that adopted (and approved) previously in relation to the Master Plan. Collectively, the future peak hourly traffic volumes associated with Lot 7 will be:
 - AM Peak 41 vehicles per hour
 - PM peak 42 vehicles per hour
 - Daily 572 vehicles per day
- A total of 114 car parking spaces are proposed for Lot 7, which complies with the requirements of the Precinct DCP rates and outlined within the conditions. The internal configuration of the Site – including light and heavy vehicular access, car parking and servicing areas – have generally been designed in accordance with Council's DCP and the relevant Australian Standards of AS2890.1, AS2890.2, AS2890.3 and AS2890.6.

In summary, the Proposal is supportable on traffic planning grounds and will not result in any adverse impacts on the surrounding road network or the availability of on-street parking.

Appendix A

Swept Paths



Notes:

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Document Info:

Drawn by: Shihui Hu
File name: AG0707d02_Snackbrands_Swept Paths.dwg

Client:

Hansen Yuncken

Project:

0707
Lot 7 - First Estate, Mamre West Precinct

	Drawing Title:
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26m B-double
Ingress

Date:

1-Aug-18

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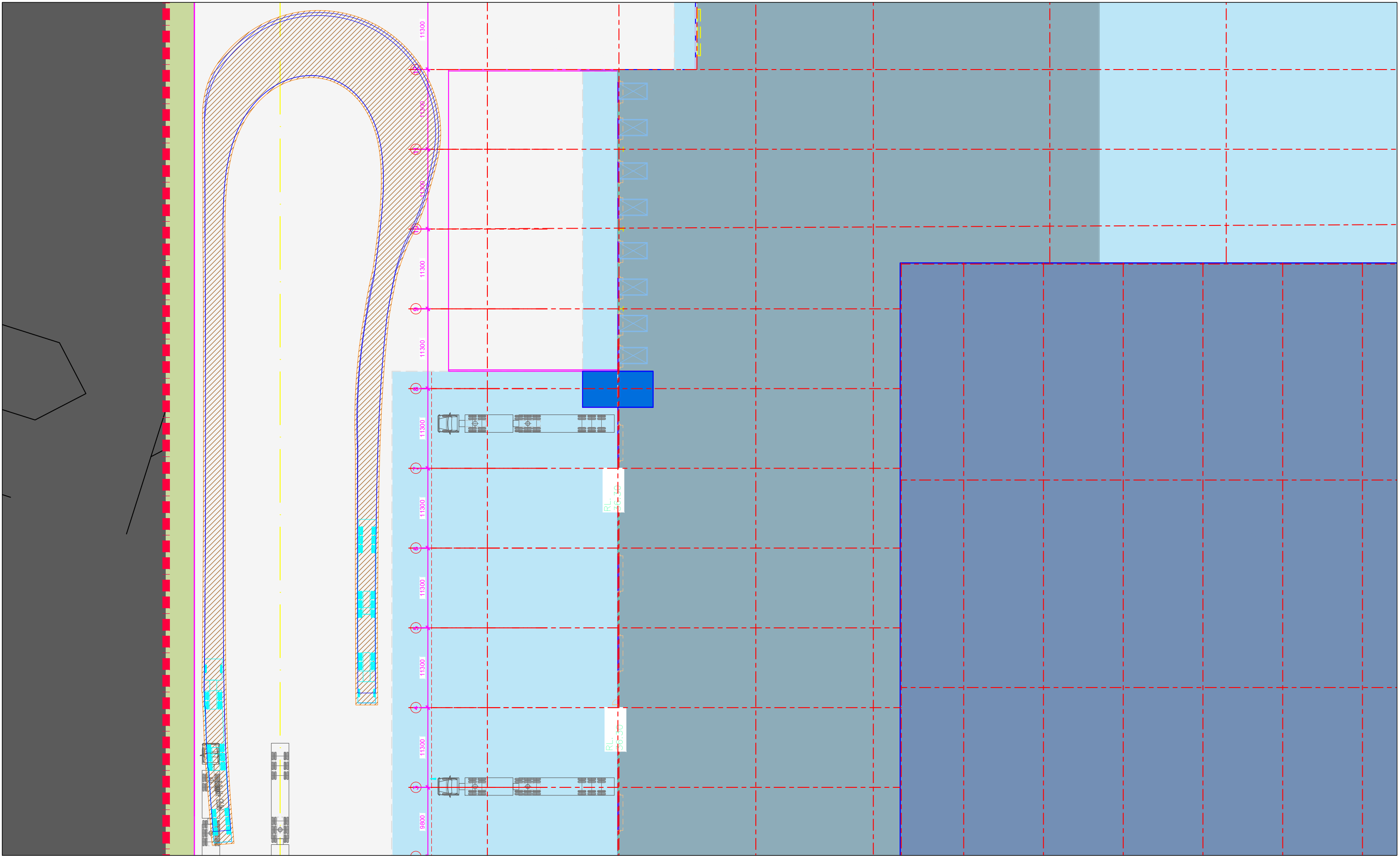
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26m B-double

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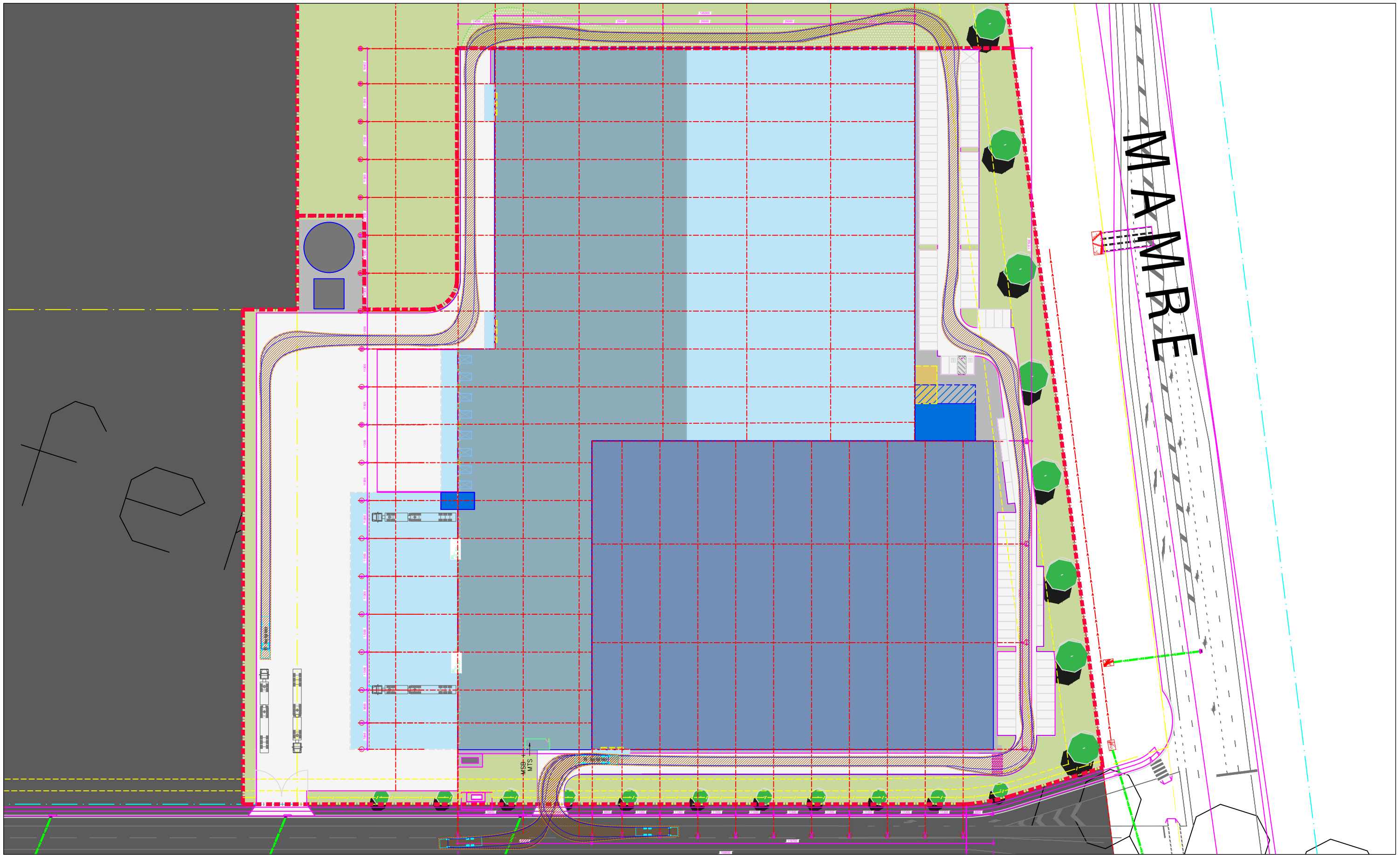
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Fire Truck (HRV)

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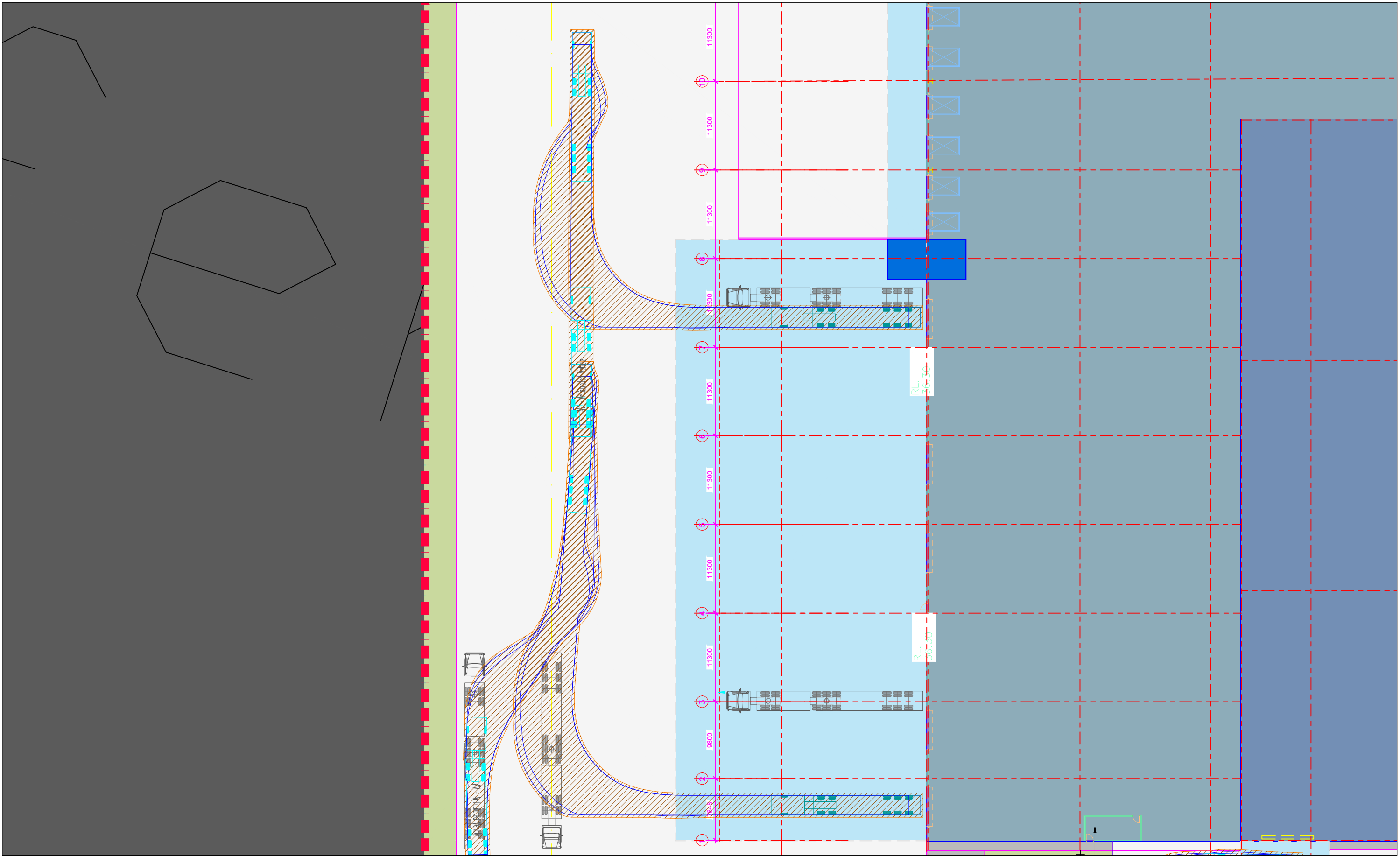
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Notes:

This drawing is provided for information purposes only and should not be used for construction.

Document Info:

Drawn by: Shihui Hu

File name: AG0707d02_Snackbrands_Swept Paths.dwg

Client:

Hansen Yuncken

Project:

0707

Lot 7 - First Estate, Mamre West Precinct

Drawing Title:

19m Articulated Vehicle

Access RSDs

Date:

1-Aug-18

Scale @ A3:

[scale]

Drawing Number:

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