Transport Assessment

State Significant Development Application – Modification

657-769 Mamre Road, Kemps Creek (SSD-9522) Modification

Ref: 1840r01v02 TA_Kemps Creek SSD 9522 MOD

16/11/2021

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Revision History

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-	08/11/2021	Draft	O. Hashmi / A. Mohan	A. Rasouli
1	11/11/2021	Final	O. Hashmi / A. Mohan	A. Rasouli
2	16/11/2021	Final	O. Hashmi	A. Rasouli

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Glossary

Acronym	Description
CC	Construction Certificate
Council	Penrith City Council
DA	Development Application
DCP	Development Control Plan
DPIE	Department of Planning, Industry and Environment
GFA	Gross Floor Area
HRV	Heavy Rigid Vehicle (as defined by AS2890.2:2018)
LEP	Local Environmental Plan
LGA	Local Government Area
MOD	Section 4.55 Modification (also referred as a S4.55)
RMS Guide	Transport for NSW (formerly Roads and Traffic Authority), Guide to Traffic Generating Developments, 2002
TDT 2013/04a	TfNSW Technical Direction, Guide to Traffic Generating Developments – Updated traffic surveys, August 2013
TfNSW	Transport for New South Wales
TA	Transport Assessment
veh/hr	Vehicle movements per hour (1 vehicle in & out = 2 movements)

1 Introduction

1.1 Overview

Ason Group has been engaged by Frasers Property Australia and Altis Property Partners Joint Venture (the JV) to undertake a Transport Assessment (TA) in support of a Modification application (SSD-9522 MOD) in relation to State Significant Development (SSD-9522) of Kemps Creek Warehouse, Logistics and Industrial Facilities Hub (the Site).

The Site, also referred to as Mamre South Precinct (MSP) in this TA, and is located at 657-769 Mamre Road, Kemps Creek within the Penrith City Council (PCC) Local Government Area and is approximately 40 kilometres (km) west of the Sydney Central Business District. MSP comprises 118 hectares (ha) and is located within the Western Sydney Employment Area (WSEA) and the Western Sydney Aerotropolis (WSA).

The original SSD Approval for MSP (SSD-9522) was granted on 21 December 2020, which envisioned construction and operation of 8 warehouses comprising a total of 162,355 m^2 of Gross Floor Area (GFA). Following the approval of SSD-9522, the JV lodged a Modification (SSD-9522 MOD 1) with the support of a Transport Assessment prepared by Ason Group (*AG ref: P1565r02v3*). SSD-9522 MOD 1 proposed design configuration amendments for Lots 5 to 8 and the increase of the overall site GFA from 162,355 m^2 to 185,013 m^2. Furthermore, SSD-9522 MOD 1 has recently been approved by the NSW Department of Planning and Environment (DPIE) on 03 September 2021.

Moreover, a Modification 2 application (SSD-9522 MOD 2) proposing further adjustments to the overall Estate Plan has been prepared *(AG ref: P1780r01v7)* and is under consideration by DPIE at the time of preparing this TA.

The history of modifications the JV has sought with respect to the approved SSD-9522 including this modification (which is the subject of this TA) is outlined in **Section 1.2**.

Under this SSD-9522 MOD (subject for this TA), the JV proposes to make further adjustments and alterations to the previously approved SSD-9522 masterplan and recently approved MOD 1. The Proposal generally seeks to modify the Site layout to accommodate proposed changes to Lots 1, 2, 3 and 4, to the north of Bakers Lane alignment.

The Site location is shown overleaf in **Figure 1.**

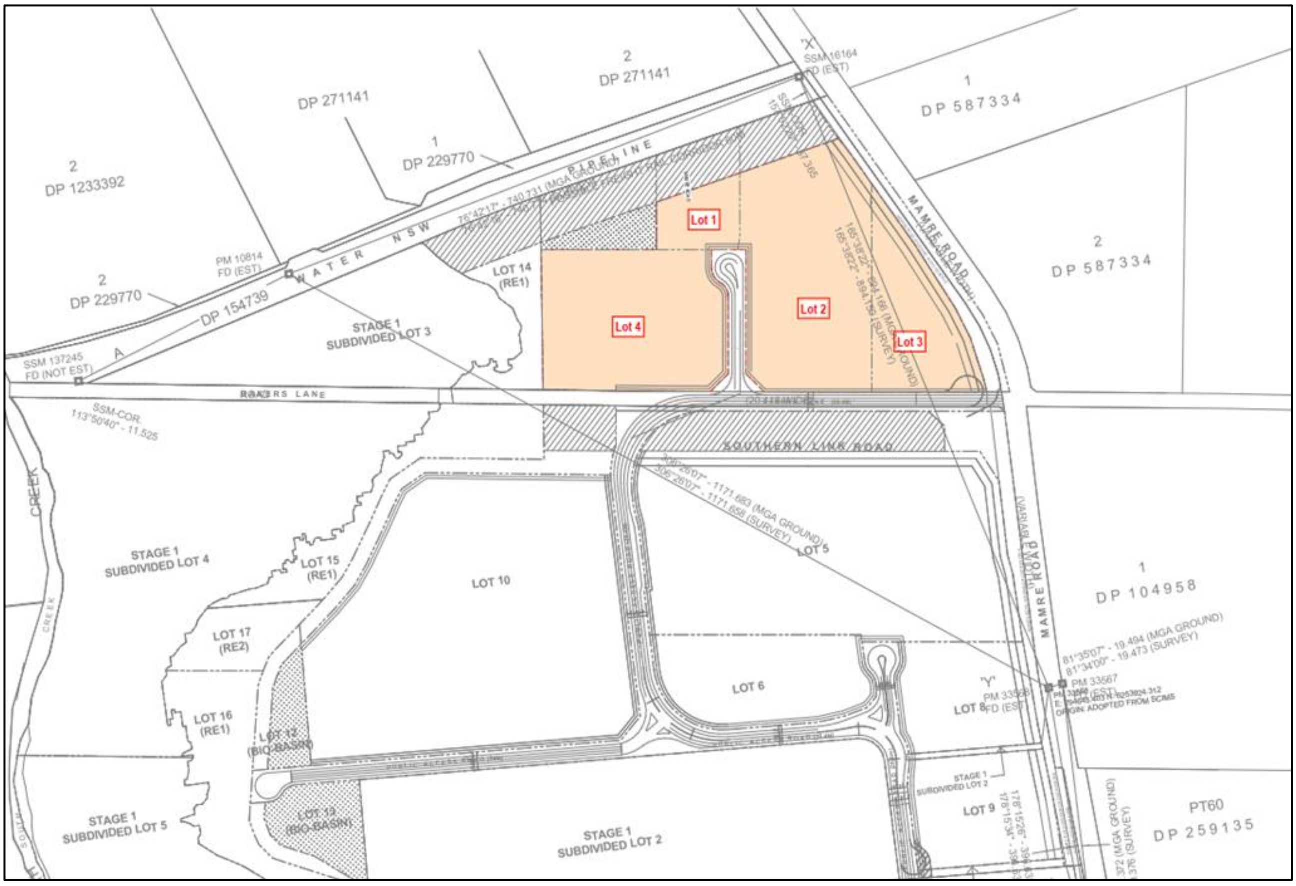

Figure 1: Site Location for Proposed Lots 1 to 4

With regards to the amendments, **Figure 2** showcases the existing approval for SSD-9522 MOD 1 Site plan related to Lots 1 to 4 whilst **Figure 3** showcases the proposed Site plan (for this MOD – subject to this TA).

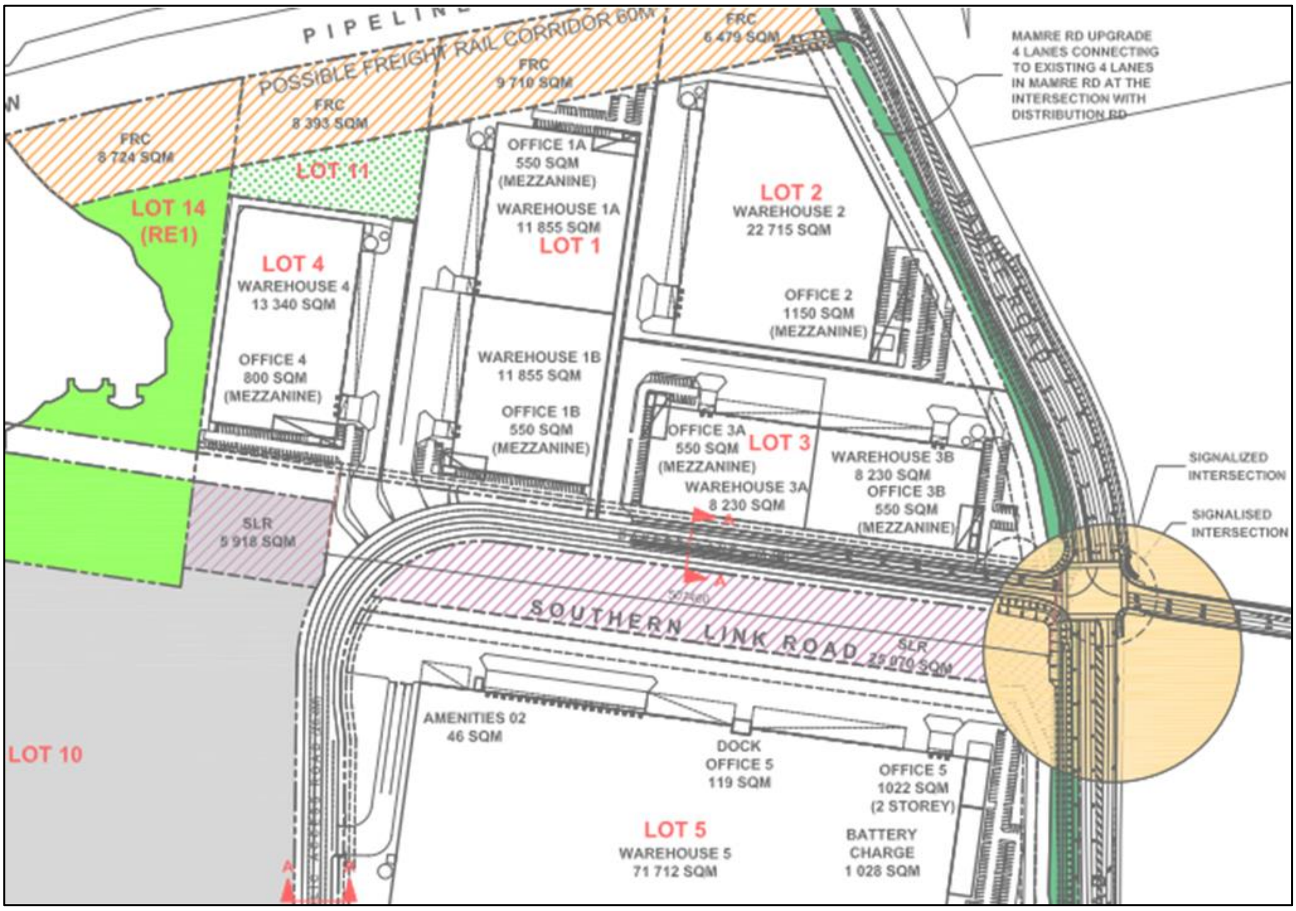

Figure 2: Approved Site Plan for Lots 1 to 4 (SSD-9522 MOD 1)

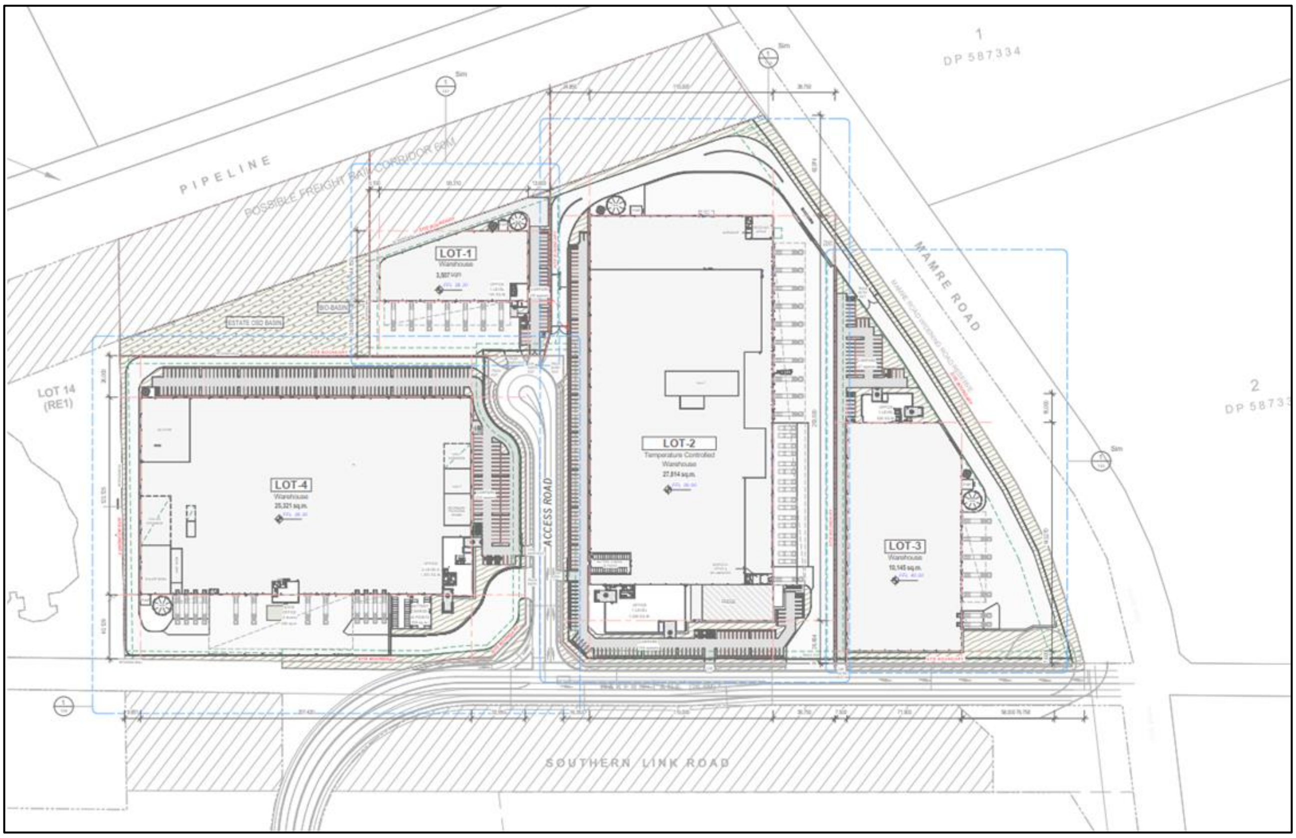

Figure 3: Proposed Site Plan for Lots 1 to 4

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It is noted that for Lots 1 to 4, a comparison between the proposed GFAs (under this MOD) and the GFAs under the MOD 1 approval is shown below in **Table 1**.

TABLE 1 CAR PARKING REQUIREMENT AND PROVISION – CURRENT APPROVAL VS. PROPOSED MOD FOR LOTS 1 TO 4

	Existing Approval (MOD 1)	Proposal (under this MOD)	Difference
Total Warehouse GFA (m^2)	76,225	66,787	-9,438
Total Office GFA (m^2)	4,150	3,362	-788
Total GFA (m^2)	80,375	70,149	-10,226

As noted in **Table 1**, this MOD results in a 10,226 m^2 GFA reduction. Therefore, the traffic generation based on the proposed MOD GFA based assessments would result in **reduced traffic impacts** on the internal estate roads and external roads (as compared to the previous MOD 1 approval). Detailed traffic impact assessment has been provided within the relevant sections of this report.

1.2 MSP (SSD-9522)

1.2.1 Original Approval

As discussed above, the original SSD Approval for MSP (SSD-9522) was granted on 21 December 2020 which was accompanied by series of Conditions of Consent (CoC), some of which relates to traffic and transport matters. It is important to emphasise that the original approved SSD included the design assessment and overall built form of Lots 1 to 4. Hence this Modification refers to the previous approved master plan to make comparison between what has been approved for these Lots and what is now proposed. It is again notable that as part of Response to Submissions (RtS), several liaisons processes have been undertaken with DPIE, TfNSW and Penrith City Council and as such, the proposed Site plan design under this MOD provides consideration to those consultation process.

According to the Schedule 1 of the Development Consent, the approved SSD-9522 characteristics are as follows:

- Demolition of existing structures, site-wide earthworks, landscaping, stormwater and other infrastructure and an internal road network,
- Construction and operation of eight warehouses comprising 162,355 m^2 of floor space,
- Intersection upgrade works in Mamre Road,
- 744 parking spaces; and
- 21-lot Torrens title subdivision over two stages, being Stage 1 residual lot subdivision (5 lots) and Stage 2 residual and development lot subdivision (17 lots).

With reference to relevant assessments for approved SSD-9522, MOD 1 it is understood that the entire MSP is likely to have an overall built form scheme of **421,820 m^2 (indicative Ultimate Master Plan)**. Furthermore, it is supported by the following upgrade strategies for the intersection of Mamre Road / Bakers Lane & Mamre Road / Southern Link Road (when delivered by TfNSW):

- **Approved Sequence 1A:** an interim access connection to accommodate the SSD traffic for up to the 2025 design year. Ason Group traffic modelling as part of MOD 1 and MOD 2 has confirmed that Sequence 1A can accommodate the traffic from the MSP Ultimate Master Plan (with 421,820 m^2) and the Southern Lots up to a design year of 2036. It is expected that the MOD 2 approval will remove Sequence 1B and that this Sequence will replace Sequence 1B in the longer-term future of MSP.

- **Approved Sequence 1B:** Following Sequence 1A, Sequence 1B is expected to accommodate the traffic from the MSP Ultimate Master Plan (with 421,820 m^2) and some potential developments to the south of MSP (the Southern Lots). According to SSD-9522 Condition B11, construction of the Sequence 1B must be completed by 31 December 2025. Again, MOD 2 seeks removal of Condition B11.
- **Approved Sequence 2 (expected to be delivered by TfNSW):** Sequence 2 will be delivered in the longer-term future (when Southern Link Road (SLR) is delivered by TfNSW and terminated as a cul-de-sac at the access to the MSP).
- **Approved Sequence 3 (expected to be delivered by TfNSW):** Designed to be aligned with the ultimate configuration of SLR in the future and when it is extended west through the MSP. Sequence 3 is to be delivered by TfNSW.

To support the original SSD for MSP, Ason Group has previously prepared a TA and several Response to Submission letters (SSD-9522 TA), which include detailed traffic generation assessments and SIDRA modelling for all above mentioned Sequences.

1.2.2 Approved MOD 1

Approved Modification 1 (MOD 1) of SSD-9522 has approved Sequence 1A, which allows for extra intersection capacity and also accommodates proposed changes to Lots 5-8. It is noteworthy that the MOD 1 has been approved by DPIE on 3 September 2021.

1.2.3 MOD 2

It is understood that the JV is now in the process of submitting a new modification to the SSD-9522 Plan (MOD 2), which generally seeks to:

- Revise the overall Estate Plan.
- Revise estate road reserve width from a current approval (SSD-9522) from 30.7 metres to 26.4 metres and removal of central medians on all estate roads to provide full vehicular access and movement.
- Remove Sequence 1B from the approval for roadworks by deleting condition B11 which states: *"The Applicant must complete the construction of Sequence 1B upgrade to the Mamre Road and Bakers Lane intersection by 31 December 2025 to the satisfaction of TfNSW."*

Detailed discussion regarding the operation of the approved Sequence 1A (at Mamre Road / Bakers Lane) is provided in **Section 4**. Ason Group has met with TfNSW to discuss the modelling outcome on 14 October 2021 and we believe that TfNSW is currently reviewing the SIDRA analysis completed for 2026, 2031 and 2036 scenarios for Sequence 1A.

1.3 Study Purpose

As discussed in **Section 1.2**, it is critical to state that, while the original SSD-9522 application does not cover the entire MSP, the SSD-9522 TA provided detailed traffic generation / impact assessments for the MSP Ultimate Master Plan, which form part of the SSD-9522 approval.

Therefore, the SSD-9522 approval is considered to set the 'benchmark' for the subsequent applications within the MSP. Providing that these conditions have inherently been considered and validated by the key consent authorities, including the DPIE and Transport for NSW (TfNSW), this TA therefore provides an assessment of the parking and traffic characteristics for the proposed development, which has been compared to the approved characteristics of the MSP to determine any departures from the current approval.

In summary, the main objective of this TA is to ascertain that traffic associated with proposed changes to Lots 1 to 4 can be captured through the approved Sequence 1A, Sequence 2 and Sequence 3 plans without having any adverse impact. Furthermore, this TA undertakes necessary traffic analysis for the Proposal to confirm that regardless of the outcome of MOD 2, the proposed development traffic will have no additional impacts on the approved Sequence 1A Plan.

1.4 Key References

In preparing this TA, Ason Group has referenced the following key planning documents. These include:

- Penrith City Council Development Control Plan (DCP 2014);
- Penrith City Council Local Environmental Plan (LEP 2010); and
- NSW Department of Planning, Industry and Environment (DPIE), Draft Mamre Road Development Control Plan, November 2020 (Mamre Road Draft DCP).

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

- Australian Standard 2890.1:2004 - Parking Facilities – Off Street Car Parking (AS 2890.1:2004);
- Australian Standard 2890.2:2018 - Parking Facilities – Off Street Commercial Vehicle Facilities (AS 2890.2:2018);
- Australian Standard 2890.3:2015 – Parking Facilities – Bicycle Parking (AS 2890.3:2015);
- Australian Standard 2890.6:2009 – Parking Facilities – Off Street Parking for People with Disabilities (AS2890.6:2009);
- Roads and Maritime Services (RMS), Guide to Traffic Generating Developments, 2002 (RMS Guide); and
- Roads and Maritime Services (RMS), Guide to Traffic Generating Developments Updated Surveys, 2013.

The following key documents have also been referenced:

- 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;
- Proposed Warehouse, Logistics and Industrial Facilities Hub - 657-769 Mamre Rd, Kemps Creek, Traffic Impact Assessment, prepared by Ason Group (ref: 0584r04v04) dated 03 August 2020 (SSD 9522 TA);
- Modification 1 – Warehouse, Logistics and Industrial Facilities Hub – 657 – 769 Mamre Road, Kemps Creek, Traffic Assessment, prepared by Ason Group (ref: 1565r02v3) dated 04 March 2021 (MOD 1);
- Modification 2 – Warehouse, Logistics and Industrial Facilities Hub – 657 – 703 Mamre Road, Kemps Creek, Technical Note, prepared by Ason Group (ref: 1780r01v7) dated 06 October 2021 (MOD 2); and
- Proposed Lot 10 – Kemps Creek Warehouse, Logistics and Industrial Facilities Hub, Transport Assessment, prepared by Ason Group (ref: 1732r01v05) dated 05 November 2021.

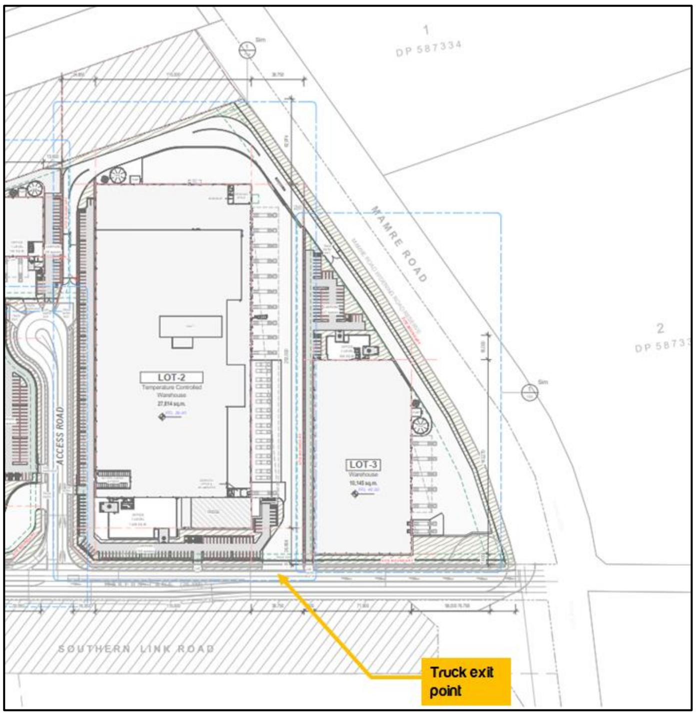
1.5 TfNSW Comments

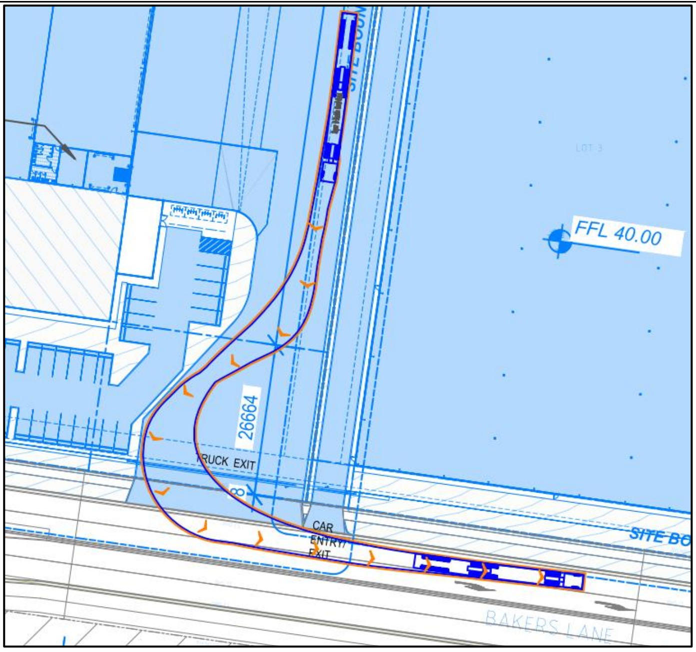
Notably, TfNSW has provided comments for the Proposal at 657-769 Mamre Road – Kemps Creek dated 3 November 2021. The relevant requirements as well as their brief responses are outlined in the table below. We acknowledge that there are several "other" design-related comments in TfNSW's email RFI on 3 November 2021 which are addressed by Costin Roe Consulting (the Project Civil Engineer).

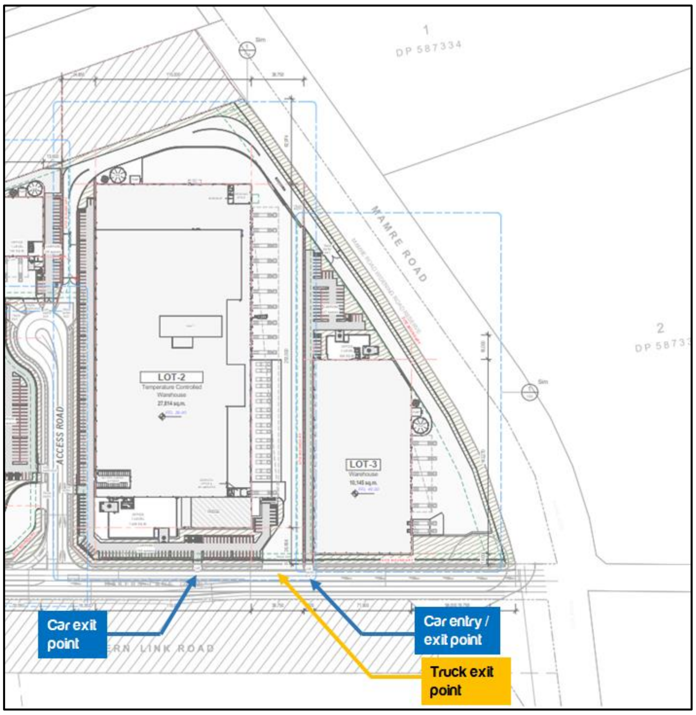
TABLE 2 RESPONSE TO TFNSW COMMENTS – EMAIL OF 3 NOVEMBER 2021

No.	Comment	Ason Response
SLR Layout (CO13362.01-SK30-A)		
1	A modelling memo needs to be provided with the signal design to understand what steered the design.	Notably, the SLR Layout has been amended and the modelling section within this report refers to the C013362.02-SK4-06-A layout plan prepared by Costin Roe Consulting. Refer to **Section 6.6** which details the 2036 signal modelling that has been undertaken for the SLR / Bakers Lane / N-S intersection. Notably, the revised design suggests that there is a 147 m separation from the proposed signal to the southern internal access point. The information provided within this section also details if the necessary queue lengths at Bakers Lane and SLR are sufficient to cater for the vehicles travelling at this intersection, without queueing on the respective roads. Furthermore, our modelling has been undertaken based on Costin Roe's latest design that allows for a Double Diamond phasing at this signal. In summary – based on our modelling, the intersection is expected to operate at a LoS B with average delays of 27 seconds (for the AM Peak) and a LoS C with average delays of 32 seconds (for the PM Peak). SIDRA modelling results suggests that the queue at the northern leg is 6 m for the AM Peak and 11 m for the PM Peak for the right-turn and left-turn lanes only and can be accommodated by the respective bays. Furthermore, this queuing occurs at the Bakers Lane / SLR / Acccess Road intersection (at 2036) which is well below the 147 m separation proposed by the JV. Based on the above, queuing at the northern leg will not have any material traffic impacts at this intersection. On top of that, the Lot 4 entry point onto the north-south access road is proposed to be open during operational hours of this warehouse and the control point for this warehouse is 80 m from the access point. Overall – the queueing storage for the northern approach is quite minimal which is deemed satisfactory. The modelled queueing estimation suggests that there would be no material impact to the proposed signalised intersection.
Proposed interim design – IF2-KC-FS-550-B		

2	Unclear of the distance from the signals to the access closest to Mamre Road – clarification required.	The distance from the signalised intersection to the Lot 3 light vehicle access point is ~180m.
		This distance exceeds the requirements of 50-100m separation from new signals at green field sites advised by TfNSW Furthermore, SIDRA analysis undertaken for Sequence 1A suggests that the queue back at the western leg of Mamre Road / Bakers Lane will NOT impact this access. In this regard, the queue back for the different modelling scenarios are as follows:
		• 2025 scenario
		  – AM Peak: Queue of 72m.
		  – PM Peak: Queue of 133m.

		• 2026 scenario – AM Peak: Queue of 73m. – PM Peak: Queue of 143m. • 2031 scenario – AM Peak: Queue of 73m. – PM Peak: Queue of 153m. • 2036 scenario – AM Peak: Queue of 74m. – PM Peak: Queue of 160m. Finally, the estimated traffic generation of this light vehicle access point is in the order of 18 trips in the AM Peak and 13 trips in the PM Peak which is considered to be relatively minimal and translates into 2-3 cars every 10 minutes for those peak periods.
3	Access closest to Mamre Road – in order for a 26m B-double to undertake the turn they would need to undertake the turn from the wrong side. Any access to should be able to accommodate for simultaneous entry/exit.	It is noted that the heavy vehicle access point shown in the following figure is the closest to Mamre Road.  It is important to note that this access point is a heavy vehicle exit point only for Lot 2 (which does NOT ACCOMMODATE ENTRY movements). Therefore, 26.0m B-double trucks will not undertake entry movements for Lot 2 (from this access crossover). Based on the swept path analysis included in **Appendix D**, this exit movement can occur in a lane correct manner. A reduced copy is also re-produced overleaf.



4	3 driveways shown in close proximity (closest to Mamre Road) – light access, heavy access and light access – concern with conflicting movements, swept paths missing.	The three closest access points to Mamre Road are shown in the figure below.  With regards to the western light vehicle access point and the heavy vehicle access point, they will be restricted to exit only. Therefore, light vehicles and heavy vehicles will not undertake turns from the wrong side of Bakers Lane to enter the respective Lots. Furthermore, both light vehicles and heavy vehicles will exit this access point in a lane correct manner which suggests that the access crossover design is suitable for the respective design vehicle. With regards to the light vehicle access point (within close proximity of Mamre Road for Lot 3), its distance from the Bakers Lane / Mamre Road intersection is ~180m and justification for this access point is already provided in item 2 above. The swept path assessment for light vehicles and heavy vehicles entering to / exiting from the access points is attached in **Appendix D**.

5	The heavy vehicle access to lot 4 is very close to the access to Bakers lane and may cause queueing onto Bakers Lane (this could cause possible issue with the ultimate alignment and impact to the efficiency of the signals also).	Refer to the Item 1 response.

2 Description of the Proposal

An overview of the proposed MOD is provided in this section. As mentioned before, all Lots within the Site forms part of the MSP being developed as a joint venture between Frasers and Altis under SSD-9522, which was approved in December 2020.

The proposed MOD will only impact the built-forms at Lots 1, 2, 3 and 4 to the north of Bakers Lane alignment.

2.1 Modification Plan

The ‘Revised SSD Plan’ accompanying this MOD has been developed having regard for the comments and feedback from the assessing authorities as part of the original approval, the Conditions of Consent document and the Draft Mamre Road DCP. A reduced scale copy of the SSD plans is provided in **Figure 4** for context.

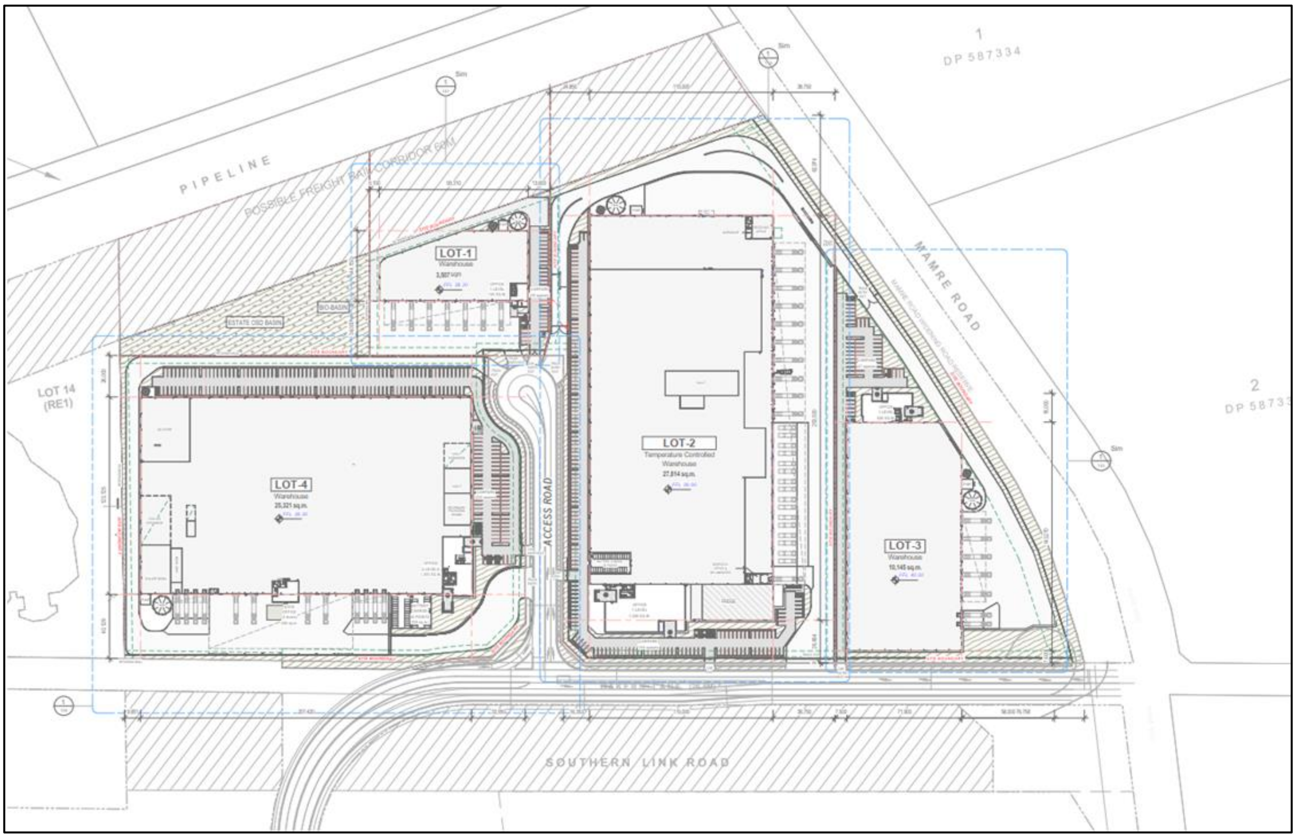


Figure 4: Proposed SSD Site Plan

The Proposal includes the following building components (shown overleaf).

TABLE 3 PROPOSAL YIELD

Component	Lot 1	Lot 2	Lot 3	Lot 4
Warehouse GFA (m^2)	3,507	27,814	10,145	25,321
Office GFA (m^2)	150	1,406	506	1,300
Total GFA (m^2)	3,657	29,220	10,651	26,621
Loading Dock Provision	7	18[1]	7[2]	12[3]
Car Parking Provision (Spaces)[4]	29	164	47	220

Note: 1) This provision includes 1 recessed dock and 17 Roller Shutter Doors (RSDs).

2) This provision includes 2 recessed docks and 5 RSDs.

3) This provision includes 8 recessed docks and 4 RSDs.

4) This provision includes accessible spaces and Electric Vehicle Charging Points.

2.2 Vehicular Access Strategy

2.2.1 External Access Arrangement Onto Bakers Lane

The proposed MOD reduces the direct vehicular access crossovers along Bakers Lane from what was originally approved under SSD-9522. A new north-south access road terminating into a cul-de-sac has been proposed on Bakers Lane (as part of this MOD). Notably, the cul-de-sac also has a one-way directional flow road, which provides added safety for vehicle access/egress.

Furthermore, this reduces the number of direct access crossovers on Bakers Lane from 7 (based on the previous SSD-9522 MOD 1 masterplan) to 3. It is indeed considered as an improvement from the previously approved design with several direct vehicular access points along Bakers Lane.

The previously approved external access arrangement (for SSD-9522 MOD 1) is shown overleaf in **Figure 5** while the proposed external access arrangement (for this MOD) is shown overleaf in **Figure 6**.

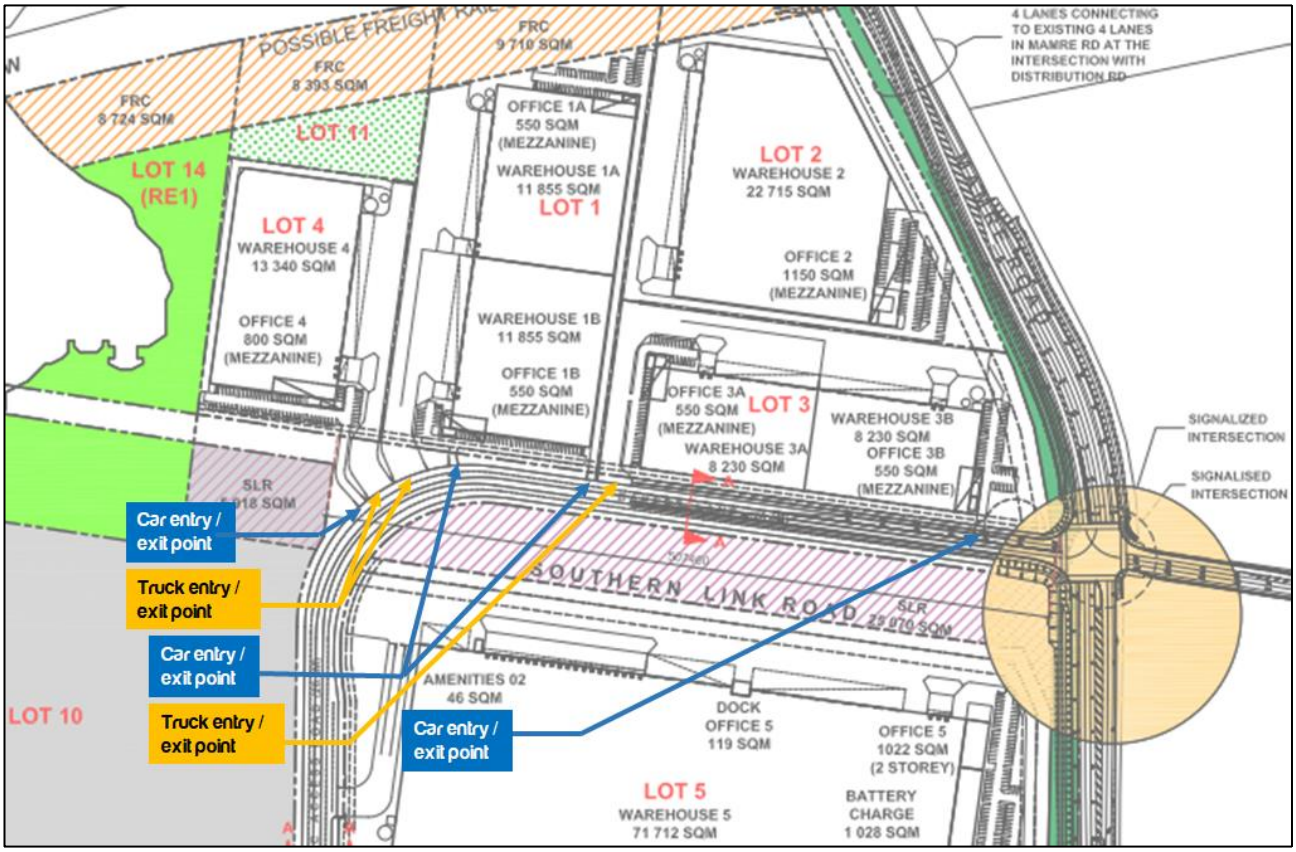


Figure 5: Proposed External Vehicular Access (for the SSD-9522 MOD 1 Masterplan)

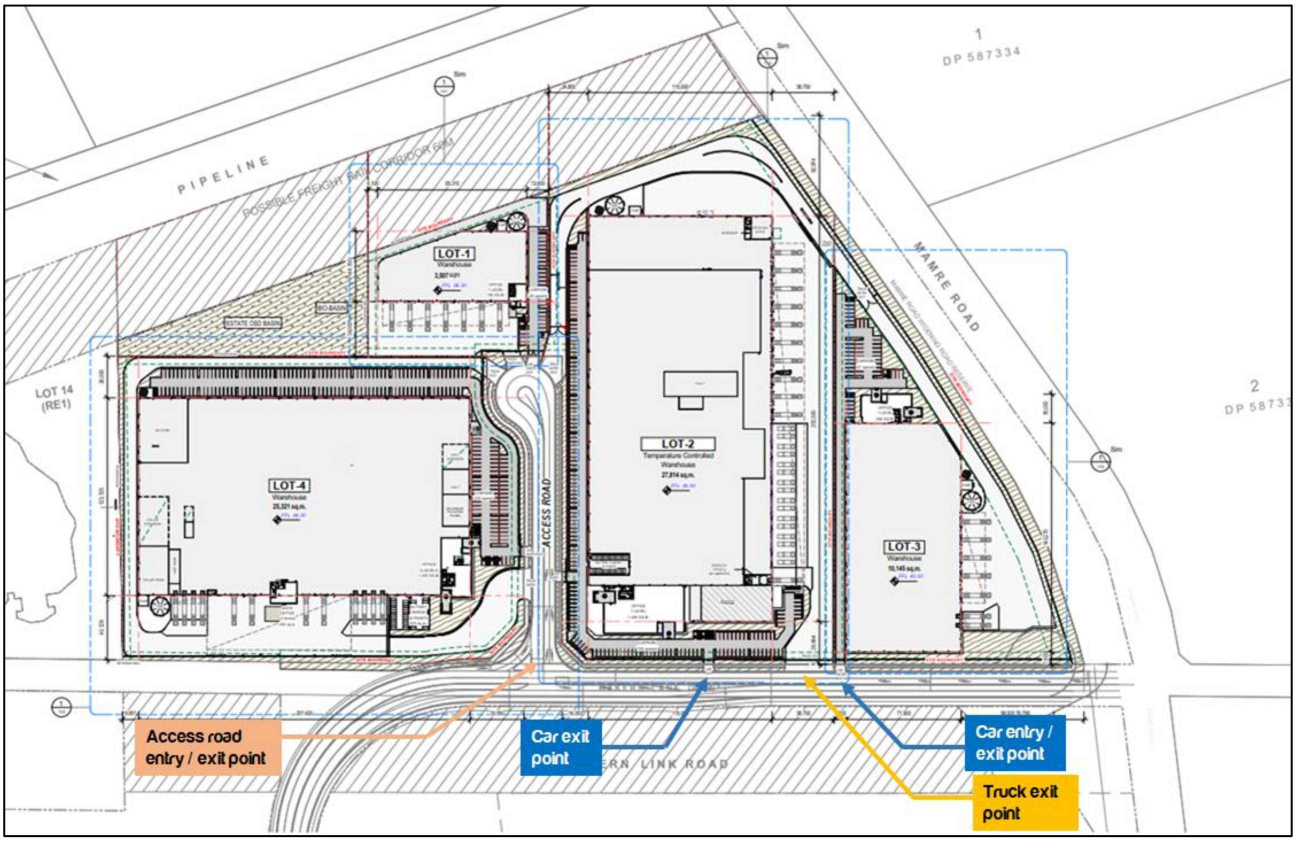


Figure 6: Proposed External Vehicular Access (for the Proposed Masterplan)

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2.2.2 Internal Access Arrangement Onto New North-South Access Road

The proposed internal road network and access strategy for this MOD is provided in **Figure 7.** The proposed internal access strategy is summarised as follows:

- Lots 1 and 4
  - All vehicular access to these two Lots will be provided via the proposed internal access road terminating into a cul-de-sac. Lots 1 and 4 have separate crossovers for both cars and trucks.
- Lot 2
  - Entry to this Lot will be provided via the proposed internal access road with a cul-de-sac and through separate crossovers for cars and trucks. It is important to note that the car entry point is located at the internal access road, but the exit point is located at Bakers Lane.
  - Cars and trucks will be able to exit from this Lot through separate crossovers onto Bakers Lane.
- Lot 3
  - The truck entry / exit to this Lot will be provided via the proposed internal access road (with the cul-de-sac).
  - Car entry / exit to this Lot will be provided through a separate crossover on Bakers Lane.

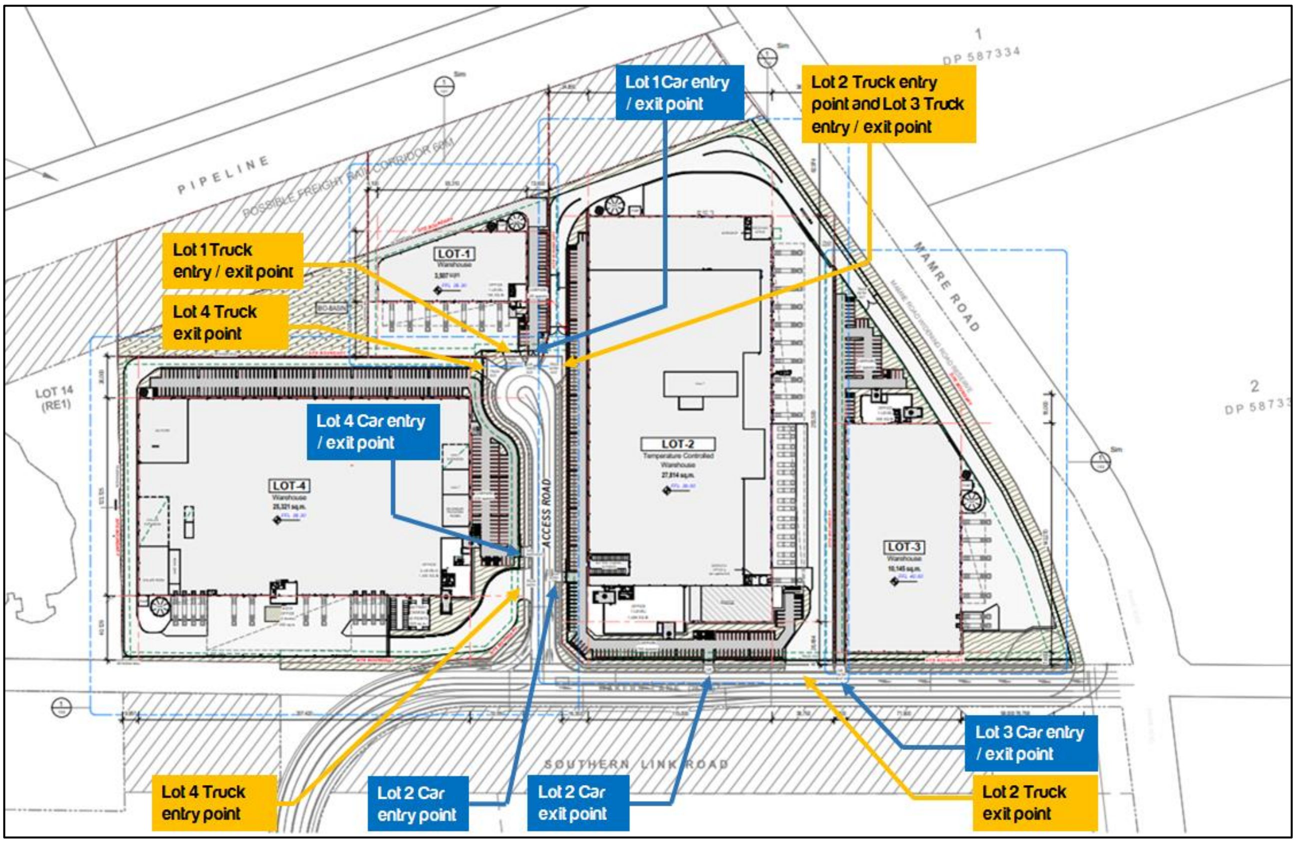


Figure 7: Proposed Vehicular Access Strategy

It is considered that the new design including a cul-de-sac provides for a better traffic and transport outcome on the following grounds:

- reduced traffic conflict between all cars and trucks movement; and
- clear priority for different access crossovers at the cul-de-sac.

3 Existing Conditions

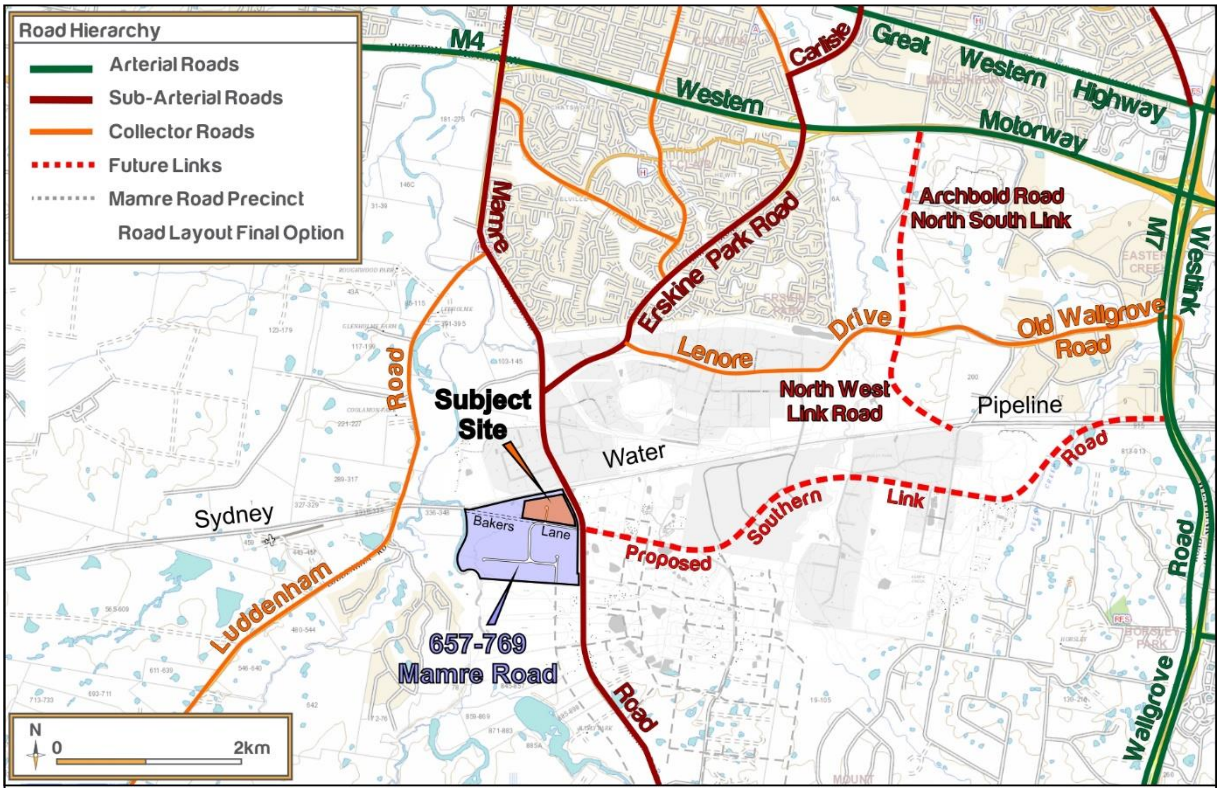
3.1 Existing Site Traffic Generation

The proposed 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.

3.2 Road Network

With reference to **Figure 8**, 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 80 km/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 70 km/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 60 km/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 (40 km/h) in operation during school peak periods. At present, Bakers Lane (East) forms a Signalised T intersection with Mamre Road.



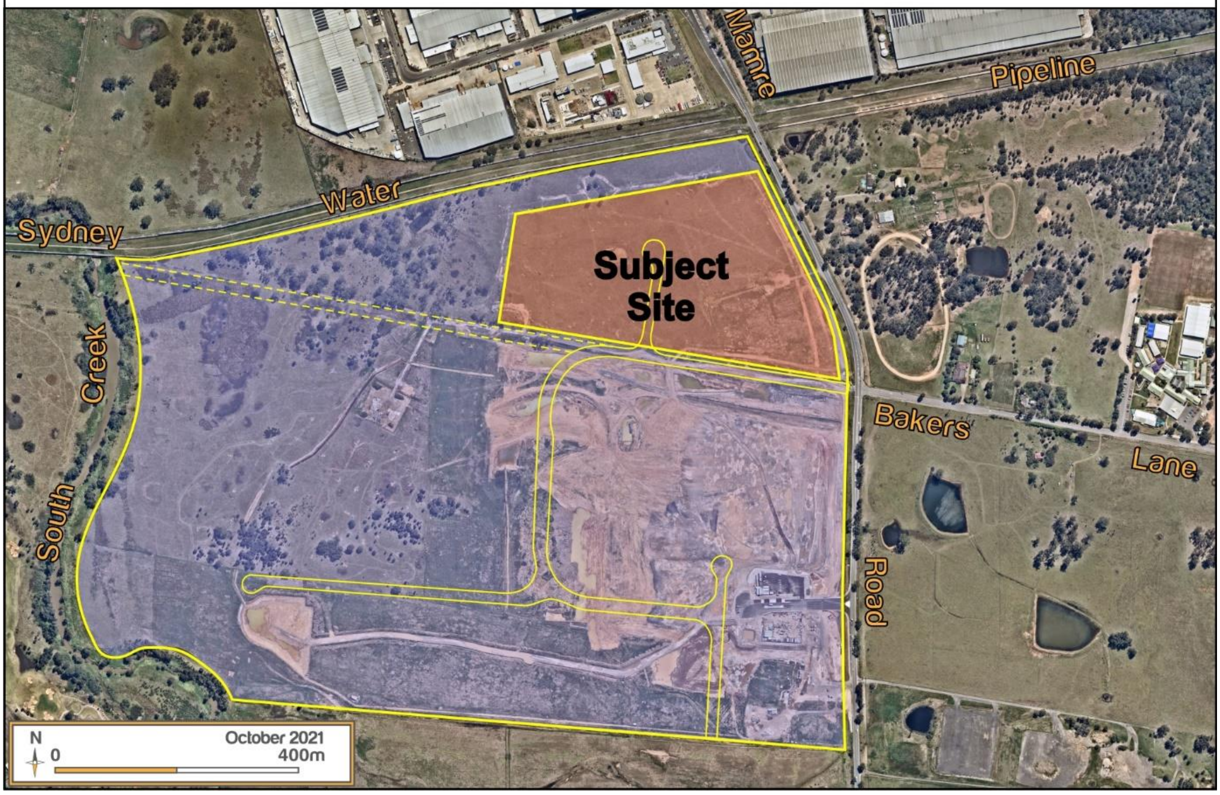


Figure 8: Existing Road Network

3.3 Key Intersections

The key intersections in the vicinity of the MSP are considered as follows:

- Mamre Road / Bakers Lane (Signal) as shown in **Figure 9**;
- Mamre Road / Erskine Park Road (Signal) as shown in **Figure 10**;
- Mamre Road / James Erskine Drive (Signal) as shown in **Figure 10**; and
- Mamre Road / Distribution Drive (Signal) as shown in **Figure 10**.

Figure 9: Existing Intersection of Mamre Road / Bakers Lane

Figure 10: Key Intersections in the Vicinity of the Site

Performance of these key intersections during a typical weekday AM and PM peak periods have been assessed and reviewed as part of the SSD-9522 application.

3.4 Public Transport

3.4.1 Existing Bus Services

The existing bus services in the vicinity of the MSP are shown in **Figure 11.**

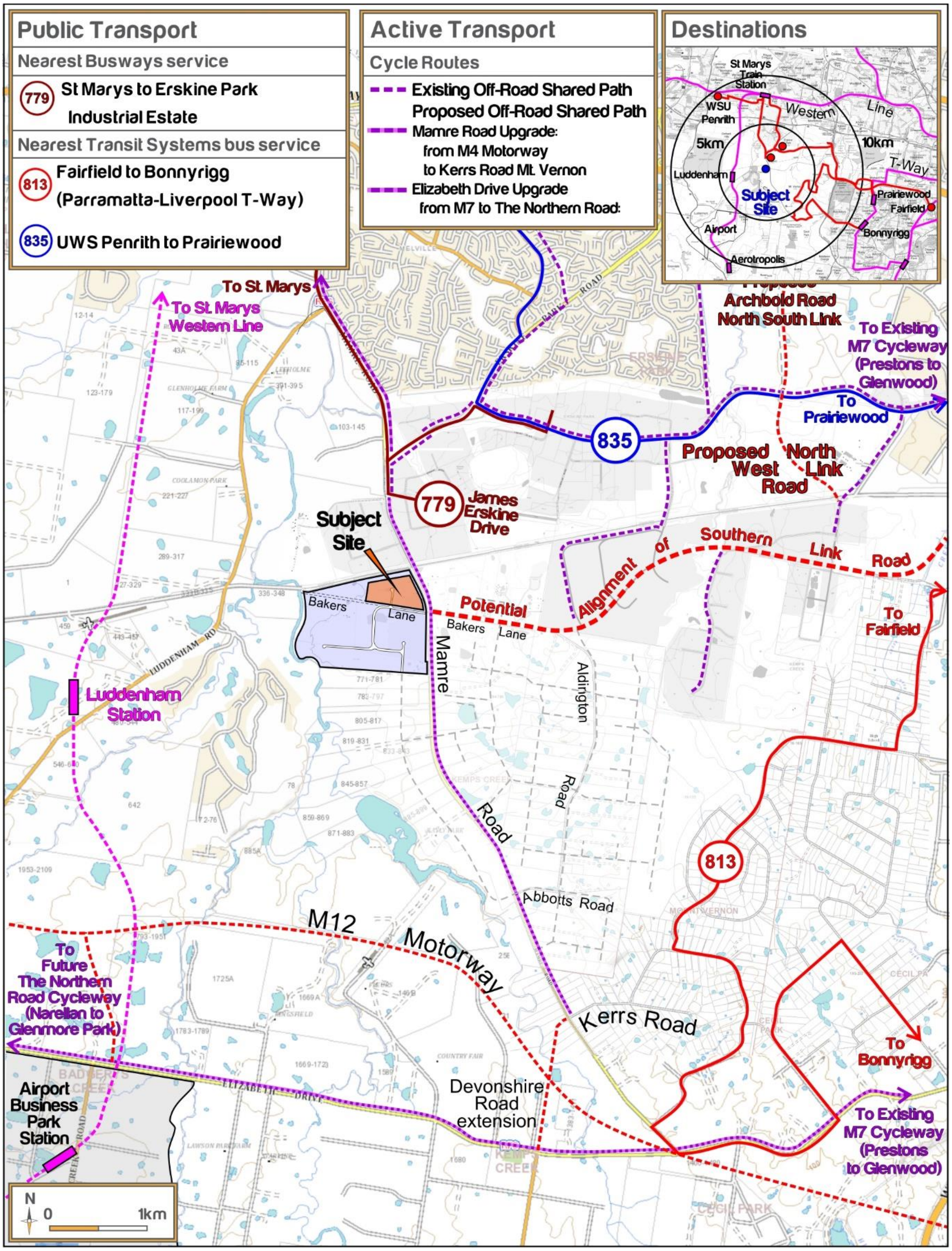


Figure 11: Public Transport Services & Cycling Routes

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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.

3.4.2 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 Marys 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; and
- 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; and
- in the long term, connect to areas such as Leppington in the South West Growth Centre, Prairiewood and the Liverpool to Parramatta T-Way.

3.5 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.

Furthermore, the latest approval for the Sequence 1A concept plan prepared by MU Group shows cycle lane and pedestrian connectivity at the Mamre Road / Bakers Lane signalised intersection (indicated in **Figure 12** below). Noting that this plan has recently been approved, by itself, confirm that the proposed MSP including the Site will have a much better active transport connectivity to Mamre Road.

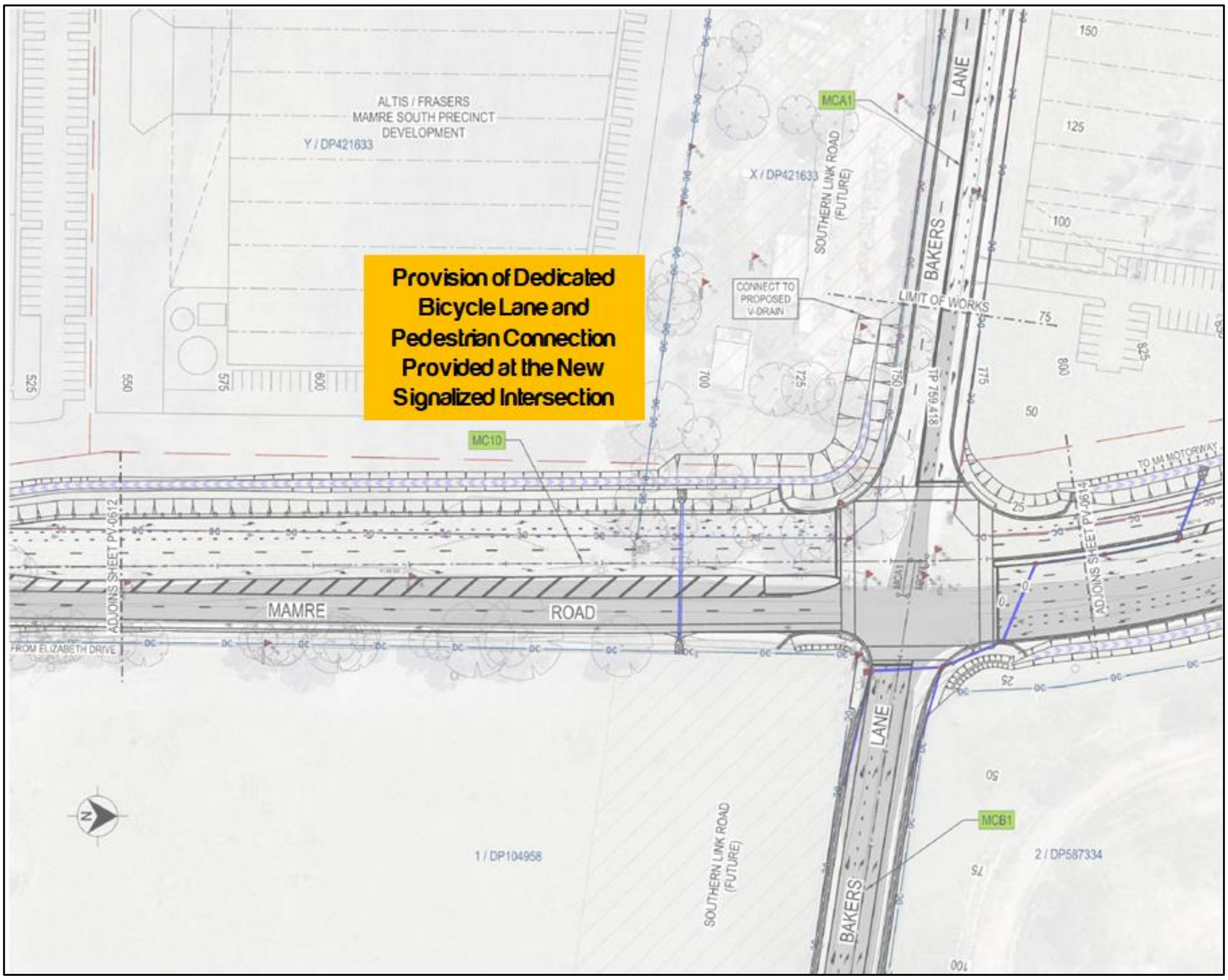


Figure 12: Sequence 1A Signal Layout (Mamre Road / Bakers Lane)

4 Future Context

4.1 Upgrades at the Mamre Road / Bakers Lane Intersection

4.1.1 Approved Sequence Plans (SSD-9522 Plan and Approved MOD 1)

SSD-9522 and approved MOD 1 includes 3 access Sequence strategies at the intersection of Mamre Road and Bakers Lane, which are briefly discussed as follows:

Approved Sequence 1A:

Approved Sequence 1A is expected to accommodate the potential estate-wide traffic associated with MSP Ultimate Master Plan (with 421,820 m^2) and the assumed GFA for the Southern Lots. The approval for the approved Sequence 1A has been granted under MOD 1.

It is expected that MOD 2 would then remove Sequence 1B in light of this approved Sequence 1A.

For context, a reduced copy of the approved Sequence 1A layout is provided in **Figure 13**.

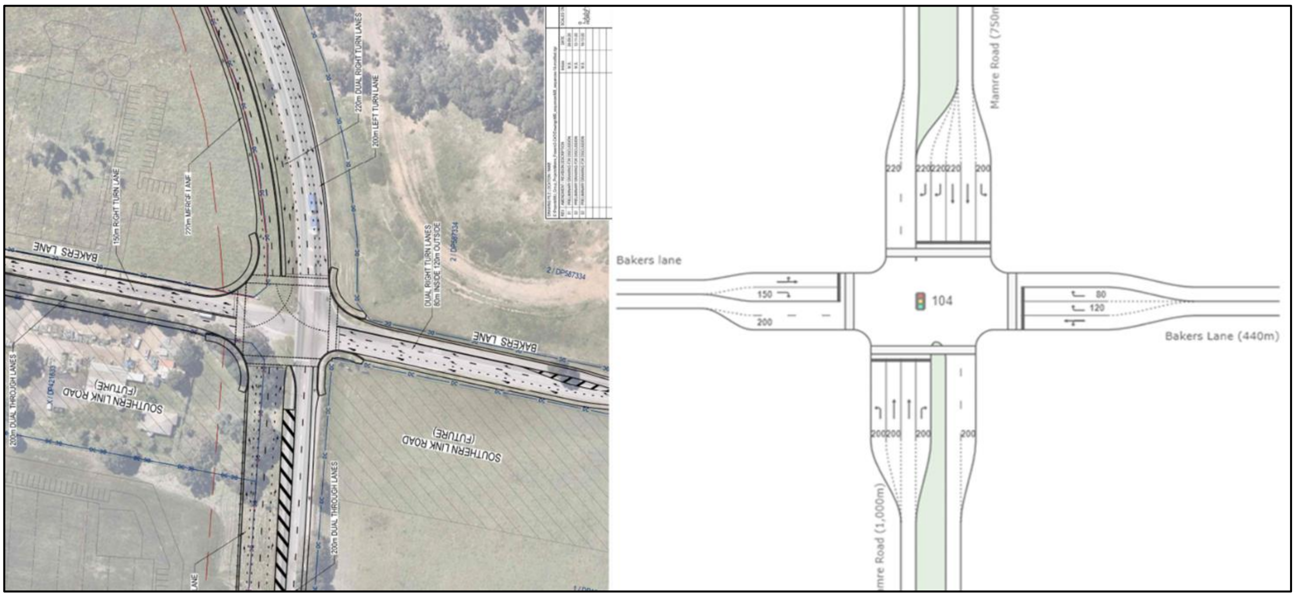


Figure 13: Approved Sequence 1A - Mamre Road / Bakers Lane Signal Layout

Accordingly, the network SIDRA modelling analysis have been updated for the approved Sequence 1A of the Mamre Road / Bakers Lane intersection with 3 other intersections which include:

- Mamre Road / Erskine Park Road;
- Mamre Road / James Erskine Drive; and
- Mamre Road / Distribution Drive.

SIDRA modelling results (for 2025) are summarised in **Table 4**.

TABLE 4 SIDRA MODELLING RESULTS – YEAR 2025 (APPROVED UNDER MOD 1)

Intersection	Peak Period	Average Delay (Seconds)	Level of Service (LoS)
Year 2025 – Already Approved as part of MOD 1			
Mamre Road / Erskine Park Road	AM	24.9	B
	PM	25.9	B
Mamre Road / James Erskine Drive	AM	13.5	A
	PM	11.6	A
Mamre Road / Distribution Drive	AM	9.7	A
	PM	13.6	A
Mamre Road / Bakers Lane	AM	41.3	C
	PM	47.0	D

It is indicated that all key intersections are expected to operate at an acceptable LoS (LoS D or better) during both AM and PM peak periods and the approved Sequence 1A can readily accommodate the potential estate-wide traffic associated with MSP Ultimate Master Plan (with 421,820 m^2) as well as the Southern Lots' traffic.

In any event, it is noted that the traffic from this MOD is not relying on the MOD 2 approval and can be approved through the existing approval under SSD-9522 and approved MOD 1. Furthermore, the traffic modelling for this sequence plan has been extended up to the year of 2036 to review the performance of this intersection in light of regional background growth in case that SLR would not be delivered by 2036.

It is again emphasised that the original approval (SSD-9522) assumes delivery of SLR by 2026 by TfNSW, and as such the additional traffic assessments undertaken for 2026, 2031 and 2036 are considered as option testing to show the performance of this intersection should the SLR not be delivered by 2036.

4.2 Additional Option Testing Modelling (for 2026, 2031 and 2036)

Additional SIDRA modelling for the Mamre Road / Bakers Lane intersection layout (under the approved Sequence 1A) has been completed for the years 2026, 2031 and 2036. This additional option testing is therefore assumed to inform the performance of the 1A intersection in case the SLR wouldn't be delivered by TfNSW in longer term future and with no Sequence 1B roadworks on Mamre Road.

With regards to the input traffic volumes for the respective years (2026, 2031 and 2036), a breakdown is showcased in the figures below. Notably, the traffic generation for the scenarios is based on the potential estate-wide traffic associated with the MSP Ultimate Masters Plan (with 421,820 m^2) and the assumed GFAs for the Southern Lots.

To begin, the traffic volume distribution for the year 2026 is shown overleaf in **Figure 14**.

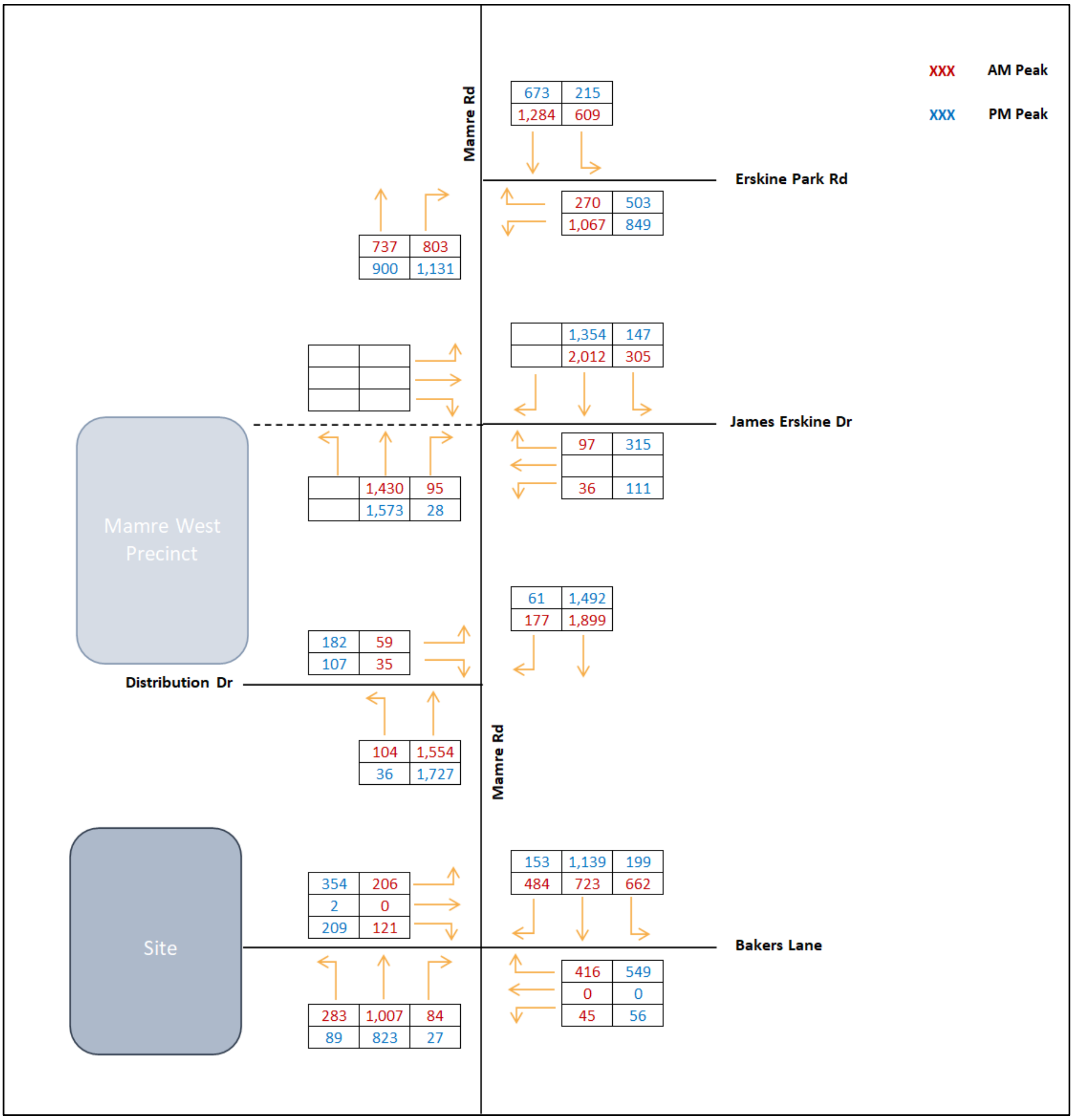


Figure 14: Peak Hour Traffic Profile for the MSP Ultimate Plan and Southern Lots GFA for 2026

The traffic volume distribution for the year 2031 is shown overleaf in **Figure 15**.

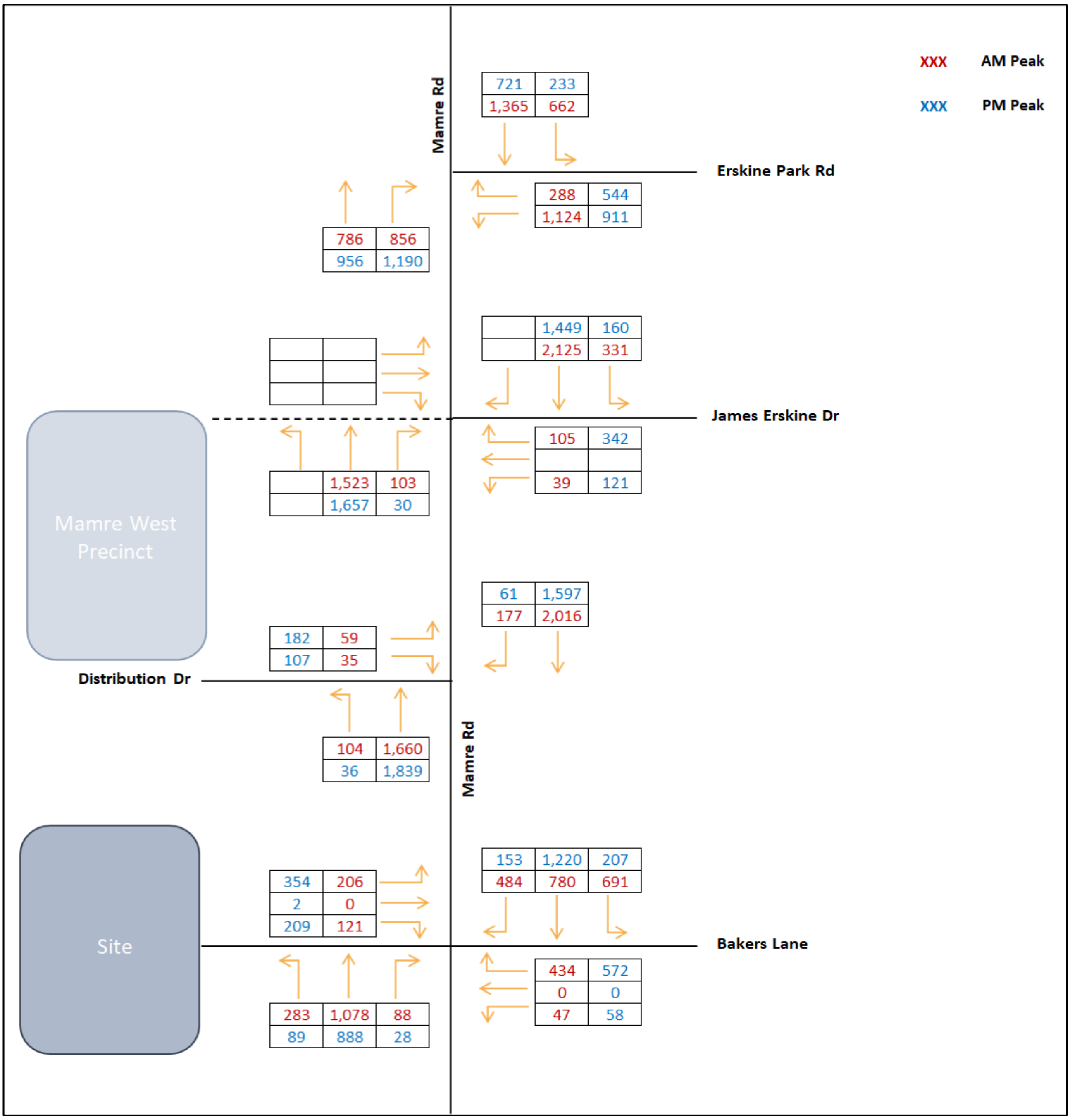


Figure 15: Peak Hour Traffic Profile for the MSP Ultimate Plan and Southern Lots GFA for 2031

The traffic volume distribution for the year 2036 is shown overleaf in **Figure 16**.

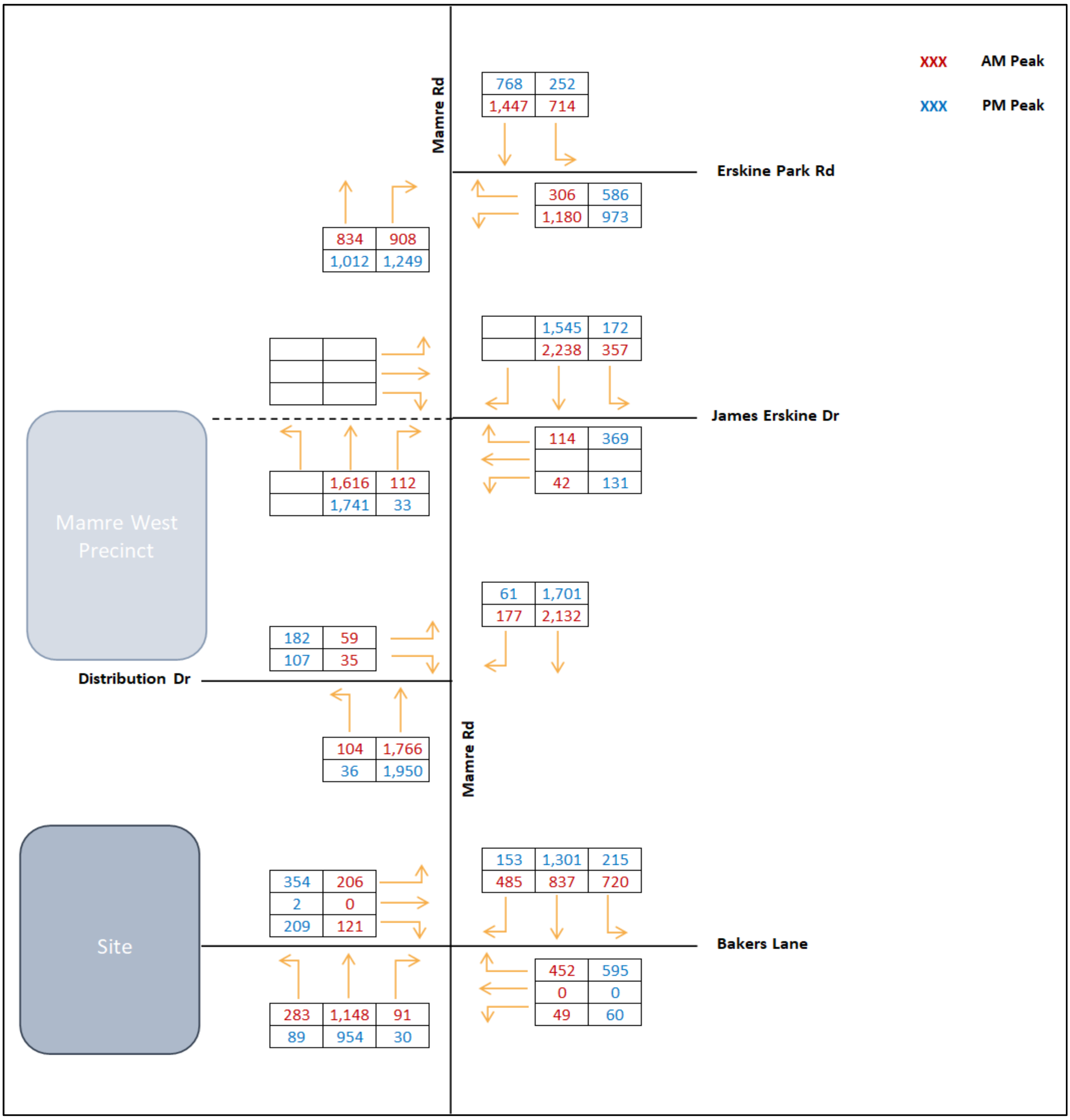


Figure 16: Peak Hour Traffic Profile for the MSP Ultimate Plan and Southern Lots GFA for 2036

Accordingly, the network SIDRA modelling analysis (for the three years mentioned above) have been updated for the approved Sequence 1A of the Mamre Road / Bakers Lane intersection with 3 other intersections which include:

- Mamre Road / Erskine Park Road;
- Mamre Road / James Erskine Drive; and
- Mamre Road / Distribution Drive.

The SIDRA network layout for the Site is indicated overleaf in **Figure 17**.

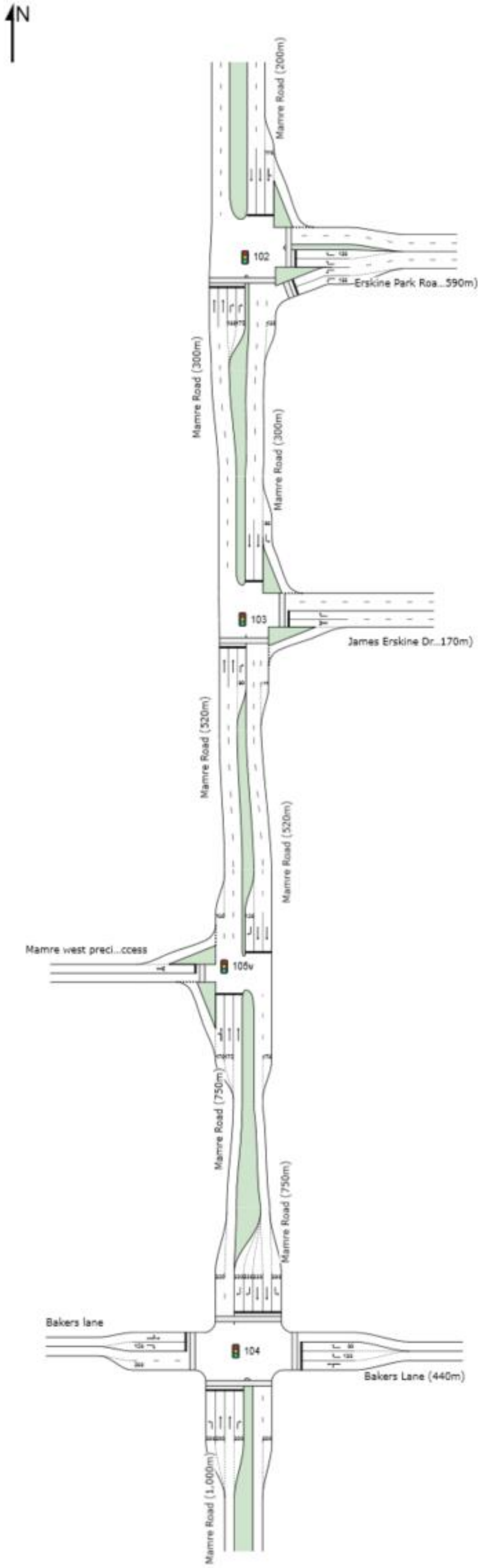


Figure 17: SIDRA Network Layout for Approved Sequence 1A (2025, 2026, 2031 and 2036)

The following SIDRA modelling results were found, utilising the SIDRA Intersection 8.0 modelling package. SIDRA modelling results for the year 2026, 2031 and 2036 are summarised in the following table.

TABLE 5 SIDRA MODELLING RESULTS – YEAR 2026, 2031 AND 2036

Intersection	Peak Period	Average Delay (Seconds)	Level of Service (LoS)
Year 2026 – Under review by TfNSW as part of MOD 2			
Mamre Road / Erskine Park Road	AM	41.8	C
	PM	28.2	B
Mamre Road / James Erskine Drive	AM	16.9	B
	PM	11.6	A
Mamre Road / Distribution Drive	AM	10.1	A
	PM	13.8	A
Mamre Road / Bakers Lane	AM	41.1	C
	PM	48.1	D
Year 2031– Under review by TfNSW as part of MOD 2			
Mamre Road / Erskine Park Road	AM	51.1	D
	PM	33.0	C
Mamre Road / James Erskine Drive	AM	12.5	A
	PM	13.1	A
Mamre Road / Distribution Drive	AM	9.5	A
	PM	14.3	A
Mamre Road / Bakers Lane	AM	40.6	C
	PM	51.1	D
Year 2036 – Under review by TfNSW as part of MOD 2			
Mamre Road / Erskine Park Road	AM	72.6	F
	PM	36.3	C
Mamre Road / James Erskine Drive	AM	16.0	B
	PM	19.8	B
Mamre Road / Distribution Drive	AM	9.1	A
	PM	20.5	B
Mamre Road / Bakers Lane	AM	40.2	C
	PM	53.1	D

It is indicated that all key intersections are expected to operate at an acceptable LoS (LoS D or better) during both AM and PM peak periods and the approved Sequence 1A (for 2026 and 2031) can readily accommodate the potential estate-wide traffic associated with MSP Ultimate Master Plan (with 421,820 m^2) and the Southern Lots.

For 2036, it is indicated that all key intersections (excluding the Mamre Road / Erskine Park Road during the AM peak hour) are expected to operate at an acceptable LoS (LoS D or better) during both the AM and PM peak hours by 2036. However, the Mamre Road / Erskine Park Road intersection operates at a LoS F only for the AM peak hour. To investigate the impact of the MSP to this failure, Ason Group have run another scenario without considering the traffic associated with the Southern Lots (Southern Lots refers to land south of this Estate) for the AM peak hour at this intersection with minor changes to the phase timing. The revised AM peak hour modelling results are provided in the following table.

TABLE 6 SIDRA MODELLING RESULTS (SEQUENCE 1A - 2036 WITHOUT TRAFFIC VOLUMES FROM THE SOUTHERN LOTS)

Intersection	Peak Period	Average Delay (Seconds)	Level of Service (LoS)
Mamre Road / Erskine Park Road	AM	51.6	D

As shown above, the MSP ultimate traffic (associated with the 421,820m^2 GFA) can be accommodated through this signalised intersection with a LoS D during the AM peak hour. This, in turn, suggests that the MOD 2 traffic without considering the Southern Lots would result in an acceptable outcome. It is important to understand that the MSP is an approved SSD but the Southern Lots have no current approval (at the time of preparation of this technical note and as far as we are aware). It is worth noting that the Southern Lots would be subject for their own planning pathways and additional traffic modelling reviews, when necessary.

Regardless, the SIDRA results confirm that even with the inclusion of Southern Lots, the Sequence 1A intersection would operate satisfactorily in the PM peak hour and further delays only occur at the AM peak hour by 2036.

In summary, and as it relates to this MOD, the approved **Sequence 1A plan can accommodate** the ultimate built form of the entire MSP as well as the Southern Lots traffic (for years 2026, 2031 and 2036) satisfactorily. Accordingly, Sequence 1B can be removed without consequences on the network (as it was added without the need to support the traffic proposed by SSD-9522).

Finally, it is emphasised that the MOD traffic DOES NOT rely on approval of MOD 2 noting that the GFAs now proposed for Lots 1 to 4 have been reduced from the original approved SSD-9522 and MOD 1 approval.

Approved Sequence 2:

As approved under SSD-9522, Sequence 2 will be delivered in the longer-term future when the Southern Link Road (SLR) will be delivered by TfNSW. Bakers Lane will be terminated as a cul-de-sac at the access to the MSP as shown in **Figure 18**.

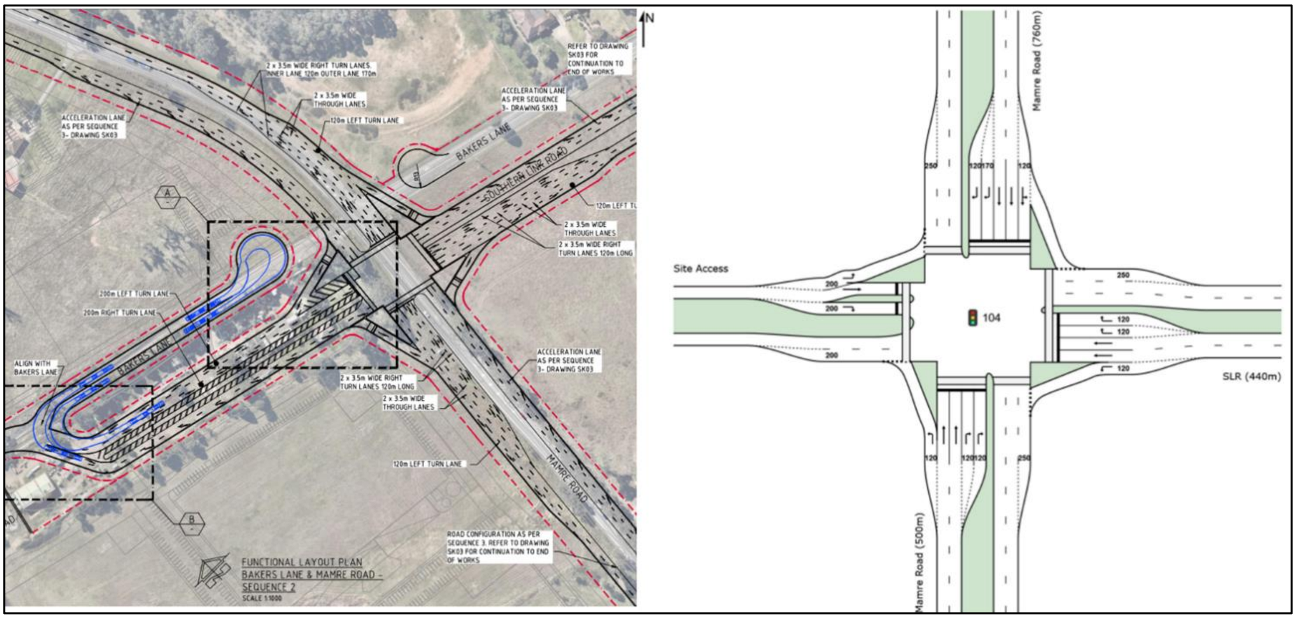


Figure 18: Approved Sequence 2 Mamre Road / Bakers Lane Signal Layout

Approved Sequence 3:

As approved under SSD-9522, Sequence 3 shows the ultimate configuration of the SLR in the future and when it is extended west through the MSP, as shown in **Figure 19**.

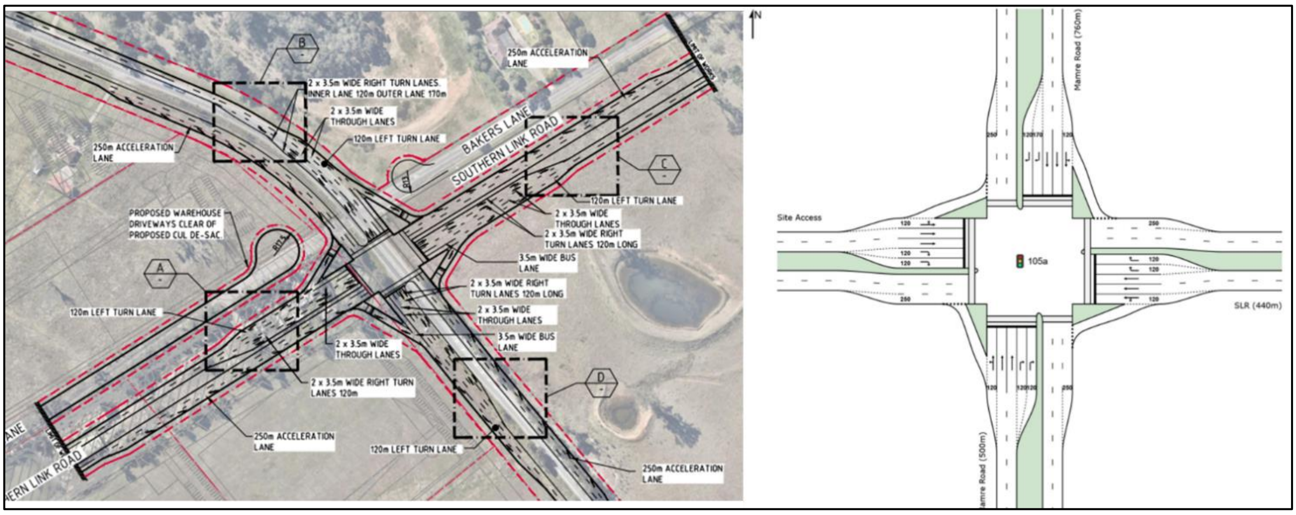


Figure 19: Approved Sequence 3 Mamre Road / Bakers Lane Signal layout

To conclude, traffic from this MOD also does not worsen the SIDRA modelling results for Sequences 2 and 3, noting that the GFAs now proposed for Lots 1 to 4 have been reduced from the original approved SSD-9522 and MOD 1 approval.

5 Parking Provisions

5.1 Car Parking

Parking rates for developments within the Kemps Creek Warehouse, Logistics and Industrial Facilities Hub have been provided in Condition A8 of the SSD-9522 approval as shown below in **Table 7**. It is noted that the Mamre Road Precinct Draft DCP also suggests similar parking rates for warehouse and office components.

TABLE 7 APPROVED CAR PARKING RATES SET OUT IN SSD-9522

Land Use	Parking Rate
Warehouse	1 space per 300 m^2 GFA
Office	1 space per 40 m^2 GFA
Accessible Parking	1 space for accessible parking for every 100 car parking spaces
Electric Vehicle Charging Stations	1 percent of car parking spaces provided with conduit provision for Electric Vehicle Charging Stations

5.2 Parking Assessment

5.2.1 Previous Parking Assessment

Having regard for Condition A8, the car parking requirement and provision for the approved SSD-9522 and MOD 1 (with regards to Lots 1 to 4) along with the Proposal are shown in the following table for comparison purposes.

TABLE 8 CAR PARKING REQUIREMENT AND PROVISION – CURRENT APPROVAL VS. PROPOSED MOD

	Existing Approval (MOD 1)	Proposal (under this MOD)	Difference
Total Warehouse GFA (m^2)	76,225	66,787	-9,438
Total Office GFA (m^2)	4,150	3,362	-788
Car Parking Required	362	299	-63
Car Parking Proposed	364[1]	460	+96

Note: 1) This includes 8 provisional spaces.

Accordingly, the proposed MOD reduces the overall GFA for Lots 1 to 4 (incl.) but increases the overall parking supply by +96 spaces.

Notwithstanding, the additional car parking spaces that have been proposed will not have negative traffic impacts as there is a reduction in the total GFA, which results in fewer trips for the Proposal (refer to **Section 6**).

5.2.2 Parking Assessment

Application of the **Table 7** rates to the proposed GFAs results in the following parking requirements (as shown in **Table 9**).

TABLE 9 CAR PARKING REQUIREMENT AND PROVISION FOR THE PROPOSED SITE

Lot	Land Use	GFA (m^2)	Car Parking Required	Car Parking Required per Lot	Car Parking Provided	Provisional Parking
1	Warehouse	3,507	12	16	29	0
	Office	150	4			
2	Warehouse	27,814	93	128	164	0
	Office	1,406	35			
3	Warehouse	10,145	34	47	47	0
	Office	506	13			
4	Warehouse	25,321	84	117	220	0
	Office	1,300	33			
Total	**-**	**70,149**	**-**	**308**	**460**	**0**

It is evident that the proposed car parking provision of Lots 1, 2 and 4 complies with and exceeds the SSD-9522, Condition A8 requirement. The proposed car parking provision for Lot 3 complies with the SSD-9522, Condition A8 requirement. In summary, the proposed car parking provision is supportable.

5.3 Accessible Parking

Condition A8(c) of the SSD-9522 CoC specifies the following requirements for accessible parking spaces:

- 1 space for people with disabilities for every 100 car parking spaces.

Table 10 outlines the accessible parking spaces required for the Proposal.

TABLE 10 ACCESSIBLE PARKING REQUIREMENT AND PROVISION

Lot	On-site Parking Supply	Accessible Parking Requirement	Accessible Parking Provision
1	29	1	1
2	164	2	2
3	47	1	1
4	220	3	3
Total	**460**	**7**	**7**

With reference to **Table 10**, the overall accessible car parking provision indicated on the Site plan (7 accessible parking spaces) satisfies the minimum accessible parking requirement with regard for the CoC.

5.4 Electric Vehicle Charging Stations

Condition A8(d) of SSD-9522 specifies the following requirements for electric vehicle charging stations:

- 1 percent of car parking spaces provided with conduit provision for Electric Vehicle Charging Stations.

Table 11 outlines the electric vehicle charging stations required for the Proposal.

TABLE 11 ELECTRIC VEHICLE CHARGING STATION REQUIREMENT AND PROVISION

Lot	On-site Parking Supply	EV Charging Station Requirement	EV Charging Station Provision
1	29	1	1
2	164	2	2
3	47	1	1
4	220	3	3
Total	**460**	**7**	**7**

With reference to the above table, the overall electric vehicle charging spaces indicated on the Site Plan (7 spaces) satisfy the minimum electric vehicle charging stations with regards to the CoC.

5.5 Bicycle Parking

Condition A9 of SSD-9522 refers to the Planning Guidelines for Walking and Cycling, which requires bicycle parking to be provided at a rate of 3-5% of staff numbers (for long-term use) and 5-10% of staff numbers (for short-term use).

It is noted that detailed staff numbers for the proposed Lots are not available at the time of preparation of this TA. However, the following bicycle parking has been provided for each warehouse which is expected to readily satisfy the actual demand for these Lots.

TABLE 12 BICYCLE PARKING REQUIREMENTS AND PROVISION

Lot	Bicycle Parking Provision
1	3
2	15
3	5
4	16
Total	**39**

With reference to the above table, the overall bicycle parking provision shown on the Site plan is expected to satisfy the minimum requirements of the Planning Guidelines for Walking and Cycling. However, additional bicycle parking can be provided on-site if deemed necessary when the population forecast is provided for each warehouse.

Additionally, the Planning Guidelines for Walking and Cycling also provides the following minimum requirements (shown in **Table 13**) for End of Trip (EoT) facilities on-site.

TABLE 13 EOT FACILITIES REQUIREMENTS

Warehouse	EOT Facility	Requirement	Provision
1[1]	Lockers	1	1
	Showers	2 (1 male and 1 female)	2
	Change rooms	2 (1 male and 1 female)	2
2[2]	Lockers	5	5
	Showers	6 (3 male and 3 female)	6
	Change rooms	2 (1 male and 1 female)	2
3[1]	Lockers	2	2
	Showers	6 (3 male and 3 female)	6
	Change rooms	2 (1 male and 1 female)	2
4[2]	Lockers	6	6
	Showers	6 (3 male and 3 female)	6
	Change rooms	2 (1 male and 1 female)	2

Note: 1) 13-49 staff category as per the Planning Guidelines for Walking and Cycling

2) 150-299 staff category as per the Planning Guidelines for Walking and Cycling

With reference to the above table, it is evident that the End of Trip Facilities provision satisfies the minimum requirements of the Planning Guidelines for Walking and Cycling.

6 Traffic Assessment

6.1 Approved Trip Generation Rates

Based on the approved SSD-9522 TA, trip generation rates have been referred to the following three (3) industrial sites for vehicles trips during the adjacent road AM and PM peak periods.

- Site 1: Erskine Park Industrial Estate, Erskine Park,
- Site 2: Wonderland Business Park, Eastern Creek, and
- Site 3: Riverwood Business Park, Riverwood

As such the approved rates (during adjacent road network AM and PM peak hours) are as follows:

- AM Rate: 0.247 trips per 100 m^2 GFA
- PM Rate: 0.182 trips per 100 m^2 GFA
- Daily Rate: 2.640 trips per 100 m^2 GFA

6.2 Traffic Assessment (Based on Approved Rates)

Application of the approved traffic generation rates to the proposed Site's yield (excluding the amenities) results in the following AM, PM and daily traffic volumes (shown in **Table 14**).

TABLE 14 TRAFFIC GENERATION (BASED ON THE APPROVED SSD-9522 RATES)

Development Yield (m^2)	AM Peak (veh/hr)	PM Peak (veh/hr)	Daily (veh/day)
70,149	173	128	1,852

Table 14 demonstrates indicative total hourly traffic generation of 173 trips during the AM Peak and 128 trips during the PM Peak periods (inbound + outbound movements), and 1,852 total vehicles trips throughout the day (inbound + outbound movements) for the proposed Site (Lots 1, 2, 3 and 4).

Table 15 provides a comparison between the indicative traffic generation of approved SSD-9522, MOD 1 and the Proposal based on the SSD approved rates.

TABLE 15 TRAFFIC GENERATION COMPARISON (BASED ON THE SSD-9522 RATES)

	Development Yield for Lots 1 to 4 (m^2)	AM Peak (veh/hr)	PM Peak (veh/hr)	Daily (veh/day)
Approved SSD-9522	80,375	199	147	2,122
Approved SSD-9522 MOD 1	80,375	199	147	2,122
Proposed SSD-9522 MOD	70,149	173	128	1,852
Difference	**-11,055**	**-26**	**-19**	**-270**

With reference to **Table 15,** the indicative traffic generation predicts fewer trips than what was previously approved as part of the SSD-9522 and MOD 1 approval (which included detailed traffic modelling for the entire MSP in approved sequences 1A, 2 and 3). Therefore, the proposed Site will not have any additional traffic impact beyond what has been approved as part of the previous approvals.

6.3 First Principles Assessment

The immediate tenant for Lot 2 (within the proposed Site) has provided a traffic generation forecast in accordance with their operational needs. **Table 16** provides a summary of the forecast vehicular trip generation (during the weekday) for the proposed development based on the operational requirements.

TABLE 16 FIRST PRINCIPLES TRAFFIC GENERATION ESTIMATION FOR LOT 2 – OPERATIONAL

Vehicle Types	Peak Hour Trip Generation (trips/hr)[1]		Daily Trip Generation[1] (veh/day)
	AM Peak (veh/hr)	PM Peak (veh/hr)	
Light Vehicles	35	35	200
Heavy Vehicles	25	4	157
Total	**60**	**39**	**357**

Note: 1) Including both inbound and outbound movements.

Having regard for the future operational assessment, Lot 2 will generate 60 trips and 39 trips during the AM and PM peak periods (inbound + outbound movements) respectively and 357 total vehicle trips throughout the day (inbound + outbound movements).

Furthermore, with regards to the above, providing the theoretical trip generation for Lots 1, 3 and 4 along with Lot 2's operational data leads to the following vehicular trip generation for the proposed Site.

TABLE 17 TRAFFIC GENERATION FOR THE PROPOSED SITE (BASED ON OPERATIONAL DATA AND THE SSD-9522 RATES)

Lot	Development Yield (m^2)	AM Peak (veh/hr)	PM Peak (veh/hr)	Daily (veh/day)
1[1]	3,657	9	7	97
2[2]	29,220	60	39	357
3[1]	10,651	26	19	281
4[1]	26,621	66	48	703
Total	**70,149**	**161**	**113**	**1,438**

Note: 1) Based on SSD-9522 rates.

2) Based on operational data.

It is indicated that the anticipated vehicular trip generation associated with the proposed development is likely to be **EVEN LOWER** than the theoretical estimation at both the daily and peak period levels.

6.4 Traffic Impact Summary

The following table provides a comparison between the indicative traffic based on the SSD rates and the indicative traffic based on both the SSD rates and the operational traffic data.

TABLE 18 TRIP GENERATION COMPARISON

Period	Adopting Approved Traffic Generation Rates (SSD-9522)	Adopting Approved Traffic Generation Rates and Indicative Operation	Comparison of Trips
AM Peak	173	161	-12
PM Peak	128	113	-15
Daily	1,852	1,438	-414

The operational traffic generation assessment predicts fewer trips than what was previously approved as part of the SSD-9522 and MOD 1 approval (which included detailed traffic modelling for the entire Kemps Creek in sequences 1A, 2 and 3). Therefore, the proposed Site will not have any additional traffic impact beyond what has been approved as part of the previous approvals.

6.5 Operational Traffic (Vehicle Types)

The immediate tenant for Lot 2 has also provided the operational heavy vehicle types that will enter and exit the Lot. The operational heavy vehicle types are described as follows:

- Vans
  - 10 daily incoming trips and 60 daily outgoing trips
  - 5 incoming trips in the AM Peak
  - 2 outgoing trips in PM Peak
- 12.5m Heavy Rigid Vehicles (HRVs)
  - 20 daily incoming trips and 44 daily outgoing trips
  - 11 incoming trips in the AM Peak
  - 2 outgoing trips in the PM Peak
- 20.0m Articulated Vehicles (AVs)
  - 12 daily incoming trips and 5 daily outgoing trips
  - 6 incoming trips in the AM Peak
  - 0 outgoing trips in the PM Peak
- 26.0m B-double trucks
  - 5 daily incoming trips and 1 daily outgoing trip
  - 3 incoming trips in the AM Peak
  - 0 outgoing trips in the PM Peak

As stated before, Lots 1, 3 and 4 are still speculative with no available operational information.

However, applying a similar percentage to the heavy vehicle breakup to the theoretical traffic generation for other Lots would result in the following heavy vehicle movements for Lots 1, 3 and 4:

TABLE 19 INDICATIVE DAILY HEAVY VEHICLE BREAKUP FOR LOTS 1, 3 AND 4 (BASED ON LOT 2 OPERATIONAL DATA)

	Lot 1	Lot 3	Lot 4
Vans	13	38	94
12.5m HRVs	12	34	86
20.0m AVs	3	9	23
26.0m B-double trucks	1	3	8
Total	**29**	**84**	**211**

6.6 Internal Access Road Intersection Assessment

6.6.1 Interim Sequence Design

SIDRA modelling has been undertaken for the interim Bakers Lane / Access Road intersection for an assumed year 2026. The Bakers Lane / Access Road assumed as a priority-controlled intersection and the intersection layout for this scenario is shown overleaf in **Figure 20**.

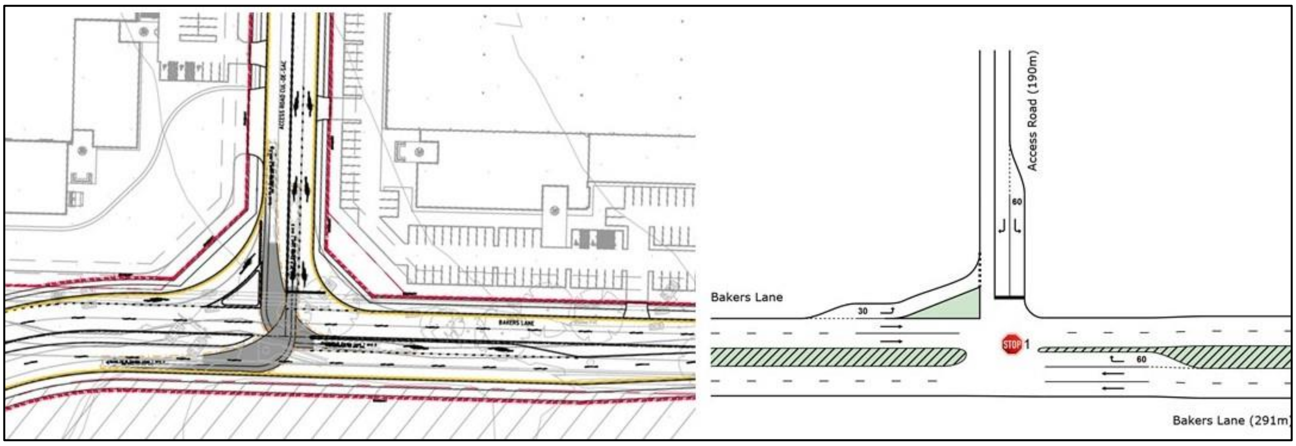


Figure 20: Potential Intersection Layout (Signalised Intersection) for SLR / Bakers Lane (in 2026)

Based on the warehouse GFAs (for Lots 1 to 4) and the Kemps Creek Logistics Hub's SSD-9522 traffic generation rates within **Section 6.1**, the inbound and outbound trips for each Lot is summarised in **Table 20**.

TABLE 20 SUMMARY OF DEVELOPMENT PEAK HOUR TRAFFIC GENERATION

Land Use Type	AM		PM	
	In	Out	In	Out
Lot 1	7	2	1	5
Lot 2	58	14	11	42
Lot 3	21	5	4	16
Lot 4	53	13	10	39
Total	**139**	**34**	**26**	**102**

Note: This table includes the total trip generation for Lots 1 to 4.

In addition to the above, additional assumptions were adopted and are outlined below which are similar to the approved Kemps Creek SSD:

- Through traffic volumes along Bakers Lane has been sourced from the approved Kemps Creek SSD original TA for 2026;
- It is assumed all ingress/egress to the MOD is via the future Bakers Lane East and through Sequence 1A signal; and
- The MOD traffic will be distributed to Mamre Road, prior to the delivery of the signal, which implies only right in and left out development trips at this intersection, with minimum right turn out movement.

The traffic profile for the interim sequence design is shown within the following figure, shown below. It is noted that for this traffic profile, trips for the three access driveways leading to Bakers Lane have been excluded from the traffic profile and the modelling (as they do not enter nor exit from the cul-de-sac).

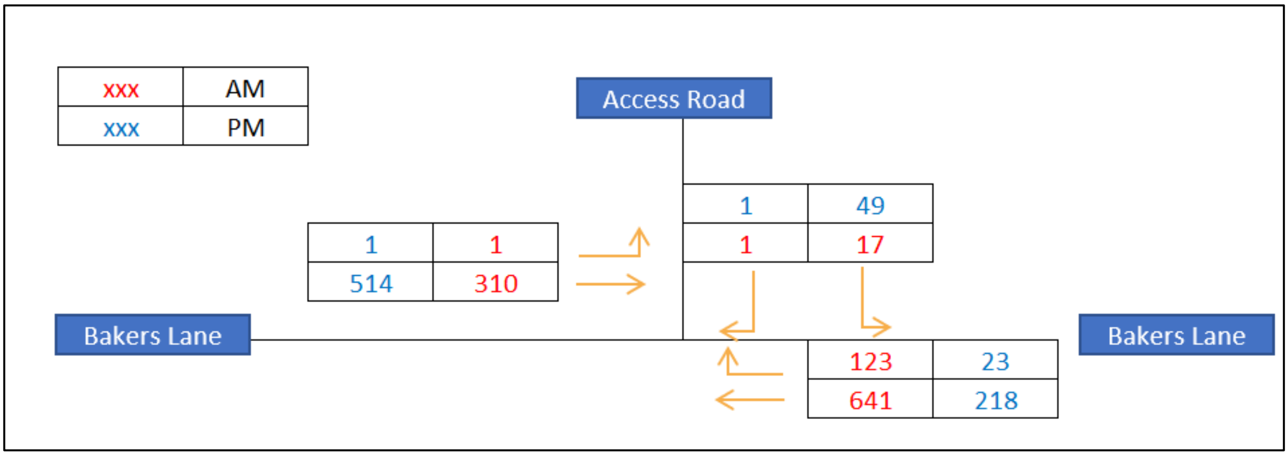


Figure 21: Traffic Profile (Signalised Intersection) for SLR / Bakers Lane (in 2026)

Table 21 summarises the 2026 SIDRA results for the interim design. The SIDRA modelling results suggest that the intersection layout will perform at a good LoS, LoS A, in both the AM and PM Peak hours.

TABLE 21 SIDRA RESULTS – 2026 INTERIM DESIGN

Intersection	Approach	AM Peak			PM Peak		
		DoS	Delay (Seconds)	LoS	DoS	Delay (Seconds)	LoS
Bakers Lane	East	0.16	8	A	0.04	10	A
Access Road	North	0.02	10	A	0.07	11	A
Bakers Lane	West	0.11	0	A	0.18	0	A

Accordingly, this functional layout is deemed acceptable from traffic modelling grounds.

6.6.2 Ultimate Signal Design

Additionally, SIDRA modelling has been undertaken for the potential future SLR / Bakers Lane / North-South 01 Access Road intersection for an assumed year 2036. This assessment has been undertaken noting that the SLR / Bakers Lane / North-South Road 01 intersection is likely to operate as a signalised intersection when a Sequence 3 upgrade plan is delivered by TfNSW.

The intersection layout for this scenario is shown overleaf in **Figure 22** which is based on the Costin Roe functional layout. It is noted that the traffic estimation at this intersection has been obtained through review of EMME Data as well as the traffic volumes estimated for the entire Master Plan and the Southern Lots.

Figure 22: Intersection Layout (Signalised Intersection) for SLR / Bakers Lane (in 2036)

The traffic profile for the ultimate sequence design is shown in the following figure.

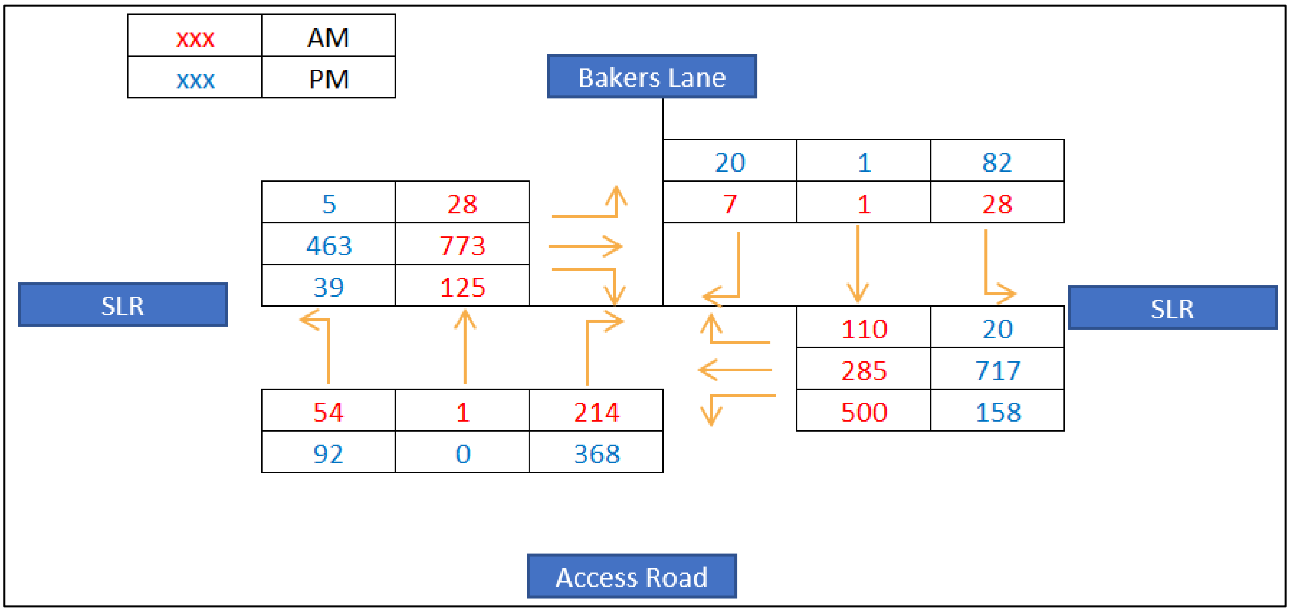


Figure 23: Traffic Profile (Signalised Intersection) for SLR / Bakers Lane (in 2036)

The SIDRA modelling results (attached in **Appendix C**) indicated that the signalised intersection with 140 seconds cycle time (as generally requested by TfNSW for new signals) operates at a LoS “D’’ or better in both the AM and PM Peak hours. Furthermore, it is noted that the southbound movement has a shared through / right-turn lane as well.

TABLE 22 SIDRA RESULTS – 2036 ULTIMATE SIGNAL DESIGN WITH DOUBLE DIAMOND PHASING

Intersection	Approach	AM Peak			PM Peak		
		DoS	Delay (Seconds)	LoS	DoS	Delay (Seconds)	LoS
Access Road	South	0.51	55	D	0.52	45	D
SLR	East	0.44	23	B	0.51	24	B
Bakers Lane	North	0.05	26	B	0.10	23	B
SLR	West	0.49	27	B	0.37	33	C
Overall		**0.51**	**27**	**B**	**0.52**	**32**	**C**

The SIDRA modelling results show that all the approaches in AM and PM perform at an acceptable level of service. Furthermore, the results suggest that all movements have enough capacity, and the modelled queue length is less than the storage capacity lengths in all directions. The overall DoS and 95th percentile of queues indicate that the intersection operates at an acceptable level in both the AM and PM Peak scenarios with significant spare capacity.

Accordingly, this functional layout is deemed acceptable from traffic modelling grounds.

6.6.3 Separation to Lot 4 Access

Finally, TfNSW has previously advised that the separation from new signalised intersections in a green field site should be in the order of 50-100 metres. With reference to the TfNSW requirements, the following dot points suggest that the access point for Lot ot 4 is supportable:

- Separation from the signalised intersection to the NS access road is ~147 m;
- Distance from the Lot 4 access to the proposed internal Bakers Lane intersection is ~45 m; and
- The Lot 4 control point including the boom gate location are proposed to be situated ~80 m within the warehouse.

Accordingly, there is a total of ~192 m separation from Lot 4 access point to this signal, readily satisfying TfNSW's required separation from signals at green field sites. However, the Lot 4 control point would be ~272 m from the signal which provide more queueing capacity for Lot 4.

In summary, the SIDRA analysis as well as the accesss location assessment undertaken for Lot 4 is supportive and can accommodate the overall MSP and Southern Lots traffic (inclusive of the proposed Site's traffic) by 2036 with no material traffic impact onto the SLR and Estate Roads.

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 TA 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, and in line with the overarching CTMP prepared previously by Ason Group.

Furthermore, the existing construction access along Mamre Road will act as an interim measure for construction vehicles until the signalised Sequence 1A is operational.

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: 7.00 AM to 6.00 PM
- Saturday: 7.00 AM to 1.00 PM
- Sunday and Public holidays: No planned work.

It may (on occasion) be necessary to undertake night works to minimise disruption to traffic or for oversize deliveries under a special permit.

7.3 Anticipated Construction Program 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 AM or PM road network peak hour. The workforce arrival and departure periods (6:30 – 7:00 AM and 5:00 – 5:30 PM) 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.

Ason Group has been advised that the construction traffic vehicle movements per day for the Site is expected to be around 70% of the operational traffic numbers (from the First Principles assessment) shown in **Table 17**. The expected construction vehicle movements (inbound and outbound) are therefore provided as follows:

- Total light and heavy vehicle trips: 1,007 trips (subject to further review when the construction program is better defined).

Furthermore, the likely breakdown for the peak construction traffic volumes is shown below, noting that the AM and PM Peaks are based on 70% of the theoretical operational traffic volumes for the proposed Site.

- AM Peak: 113 trips; and
- PM Peak: 79 trips

Notwithstanding, majority of the deliveries are likely to occur outside of the peak road network traffic periods and would have limited (if any) impact onto surrounding road network. Again, it is emphasised that a detailed CTMP will be provided in response to a suitable CoC for the Proposal.

Importantly, the construction traffic volumes are lower than the volumes anticipated for SSD-9522 (and this SSD) once it becomes operational. Therefore, recognising that the key intersection is anticipated to perform satisfactorily once the Site is completed, it can be assumed that the intersection would satisfactorily accommodate the lower volumes of construction traffic.

8 Design Commentary

The relevant design commentary is explained in the following sections.

8.1 Relevant Design Standards

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

- AS2890.1:2004 for car parking areas;
- AS2890.2:2018 for commercial vehicle loading areas; and
- AS2890.6:2009 for accessible spaces.

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 prior to any development approval. Furthermore, the proposed MOD will not change the design of Lots other than 1, 2, 3 and 4 from the original SSD-9522 and MOD 1 approval.

Accordingly, this section reviews the design of the revised layouts for Lots 1, 2, 3 and 4.

8.2 Design Vehicle

Proposed internal estate roads and warehouse hardstand areas have been designed to accommodate movements of a 26.0m B-double trucks. In this regard, **Appendix D** provides a swept path analysis for 30 Super B-Double trucks for conservativeness. Based on operational information, the largest size truck required for the operation of this Site is 26.0m B-Double trucks. As such, the assessment undertaken for 30.0m Super B-Double trucks are deemed conservative.

8.3 Warehouse Hardstand Area

Reference should be made to **Appendix D** for a swept path analysis of the proposed Site. The swept path analysis confirm that the revised layouts are generally designed to accommodate movements of 30.0m Super B-Double trucks.

8.4 Internal Road Network

As discussed in **Section 2.2.1**, internal access to all the Lots will be provided by a new access road (cul-de-sac with a one-way traffic flow) located at Bakers Lane. As a result of this change, there will be fewer access crossovers on Bakers Lane when compared to the previous SSD-9522 and MOD 1 approvals. Furthermore, this change provides a better traffic outcome as fewer vehicles will be entering the proposed Lots from Bakers Lane.

Reference should also be made to the swept path analysis attached in **Appendix D** showcasing heavy vehicles entering from the access road into the proposed Site.

8.5 Car Parking Design

Staff and visitor parking – situated in proximity to tenancies – is demonstrated to generally comply with AS2890.1:2004 in line with User Class 1/1A required for staff parking. Accessible spaces generally comply with AS2890.6:2009.

8.6 Fire Service Appliance Circulation

In line with the Fire and Rescue NSW (FRNSW) Guidelines, circulation around the Site and through the fire path perimeter has been tested for a 12.5 m HRV, demonstrating sufficient access for 'General and 'Specialist' fire appliances, as demonstrated in **Appendix D**.

8.7 Internal Circulation

A one-way clockwise circulation route is proposed for all heavy vehicles attending Lot 1, as shown in **Figure 24.**

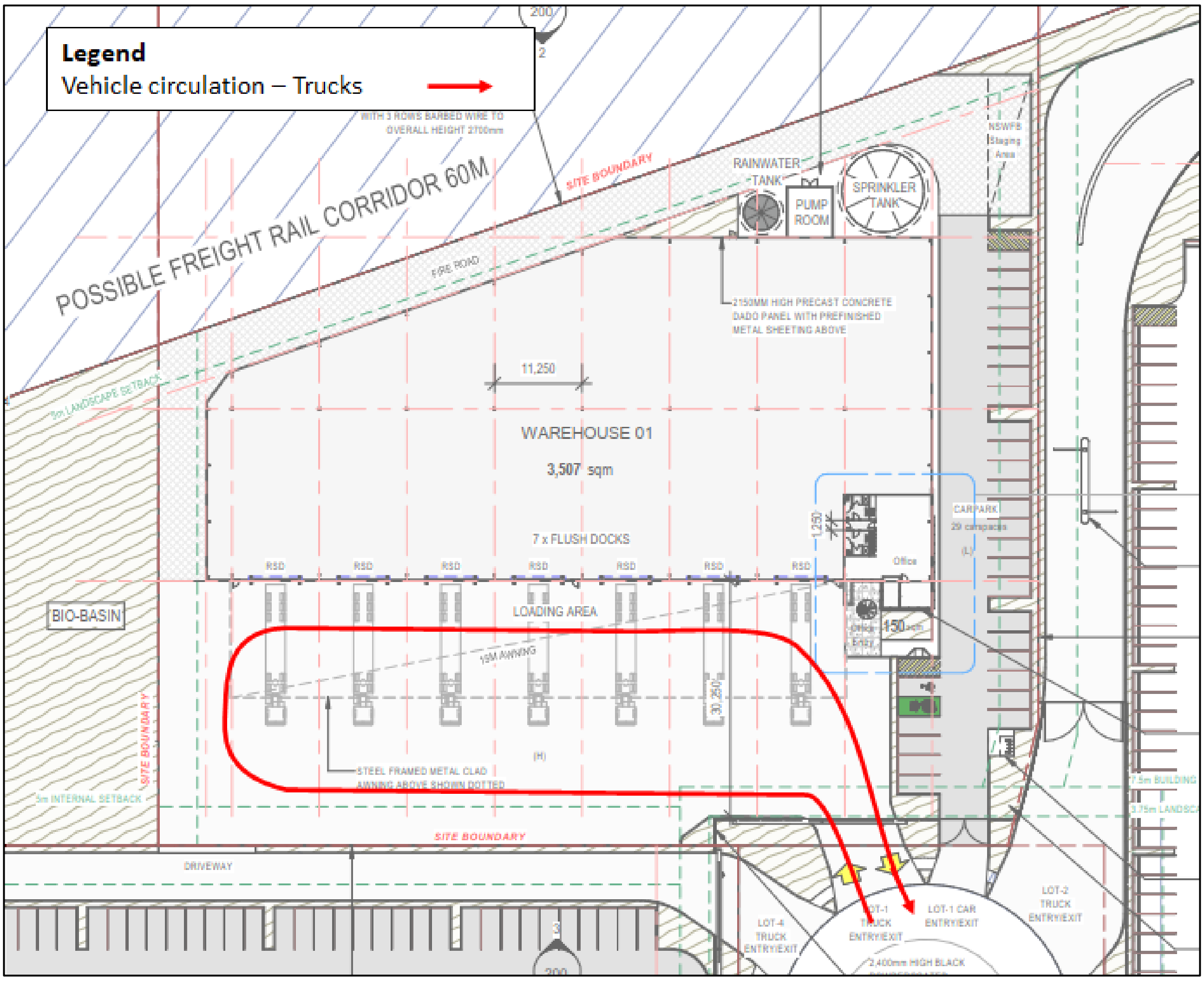


Figure 24: Heavy Vehicle Circulation within Lot 1

asongroup

A one-way clockwise circulation route is proposed for all heavy vehicles attending Lot 2, as shown in **Figure 25.**

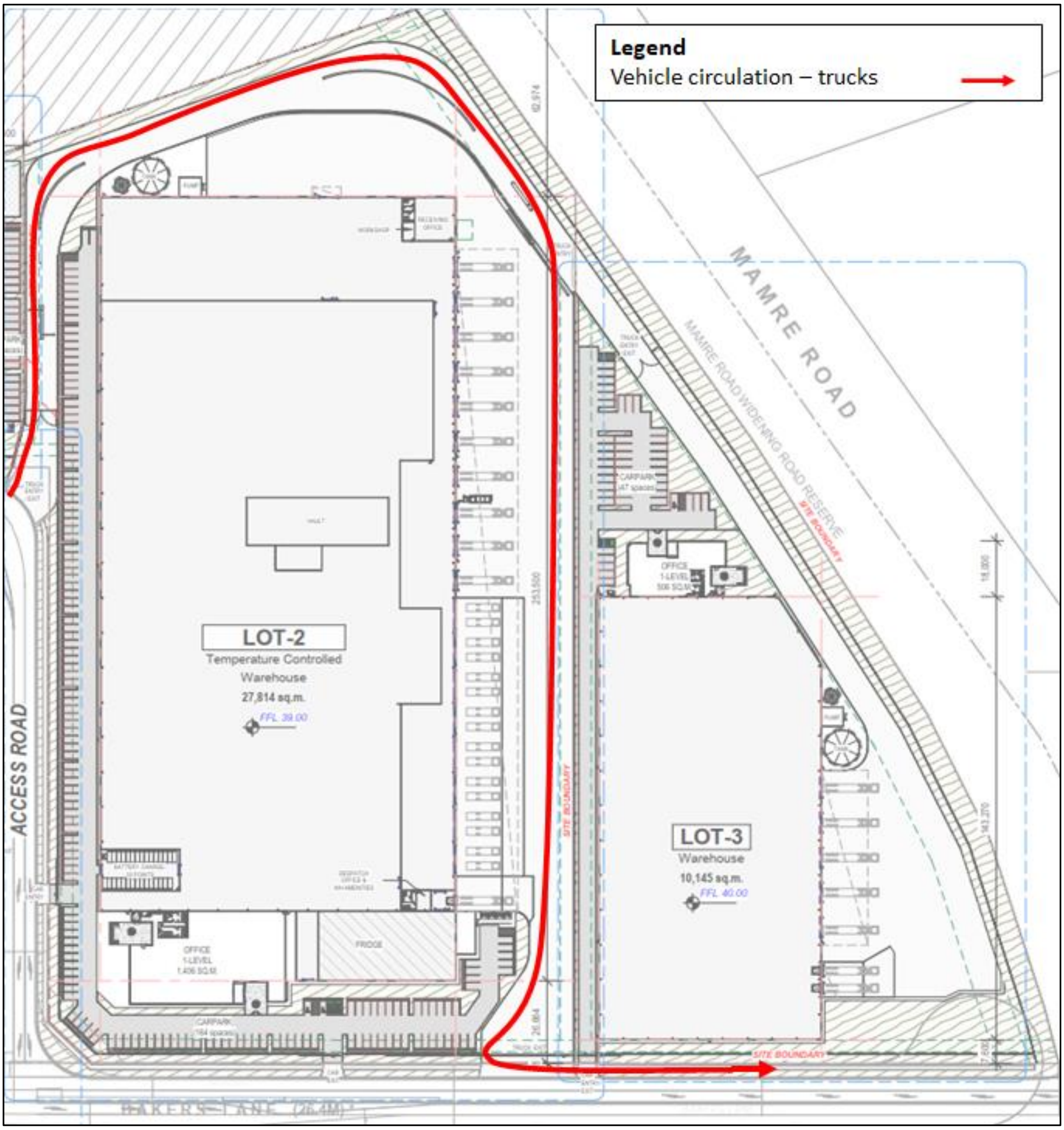


Figure 25: Heavy Vehicle Circulation within Lot 2

A two-way clockwise circulation route is proposed for all heavy vehicles attending Lot 3, as shown in **Figure 26**.

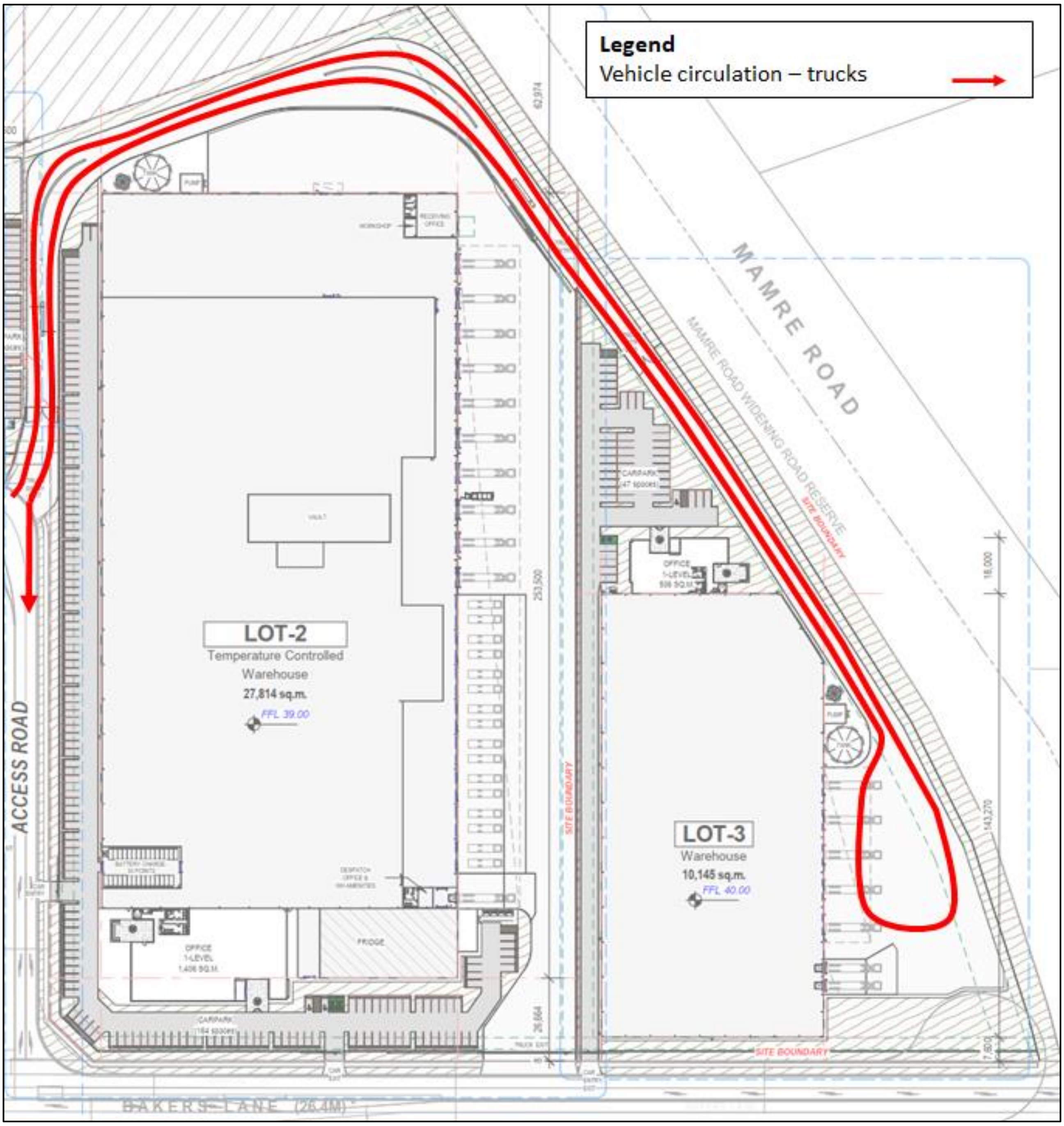


Figure 26: Heavy Vehicle Circulation within Lot 3

A one-way clockwise circulation route is proposed for all heavy vehicles attending Lot 4, as shown below in **Figure 27**.

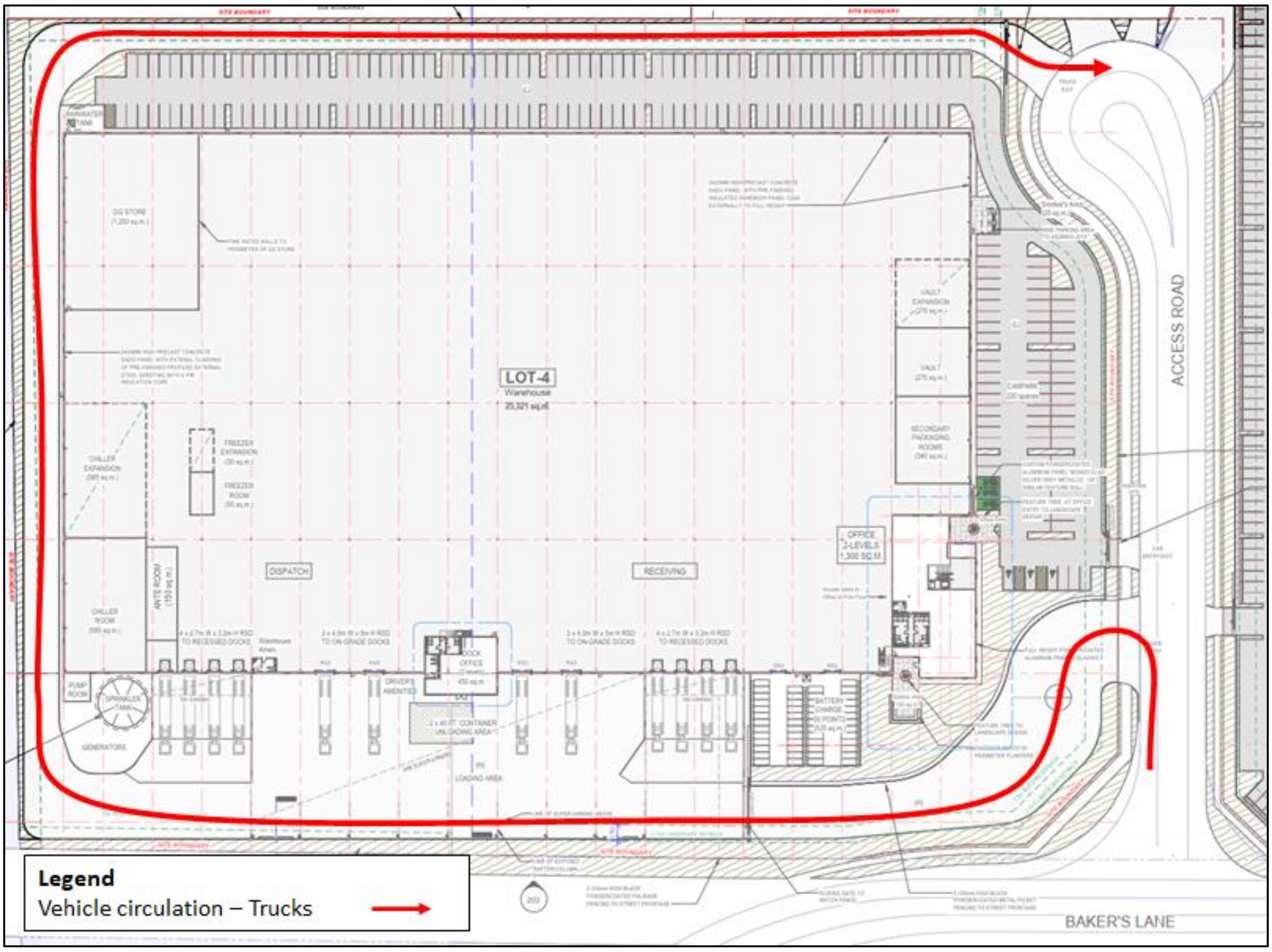


Figure 27: Heavy Vehicle Circulation within Lot 4

9 Summary and Conclusions

Ason Group has been engaged by Altis Property Partners (Altis) and Frasers Property Australia (FPA) Joint Venture (JV) to prepare a TA to assess the traffic and parking implications associated with the proposed Modification of Lots 1, 2, 3 and 4 within the Kemps Creek Warehouse, Logistics and Industrial Facilities Hub.

9.1 Key Findings

The key findings of this TA are:

- The estimated proposed SSD traffic generation having regard for the approved traffic generation rates as part of the SSD-9522 TA are shown in **Table 23** as follows:

TABLE 23 TRAFFIC GENERATION (BASED ON THE SSD-9522 RATES)

Development Yield (m^2)	AM Peak (veh/hr)	PM Peak (veh/hr)	Daily (veh/day)
70,149	173	128	1,852

- Traffic associated with the Proposal has already been assessed as part of SSD-9522 and approved MOD 1 (part of the approved Sequences 1A, 2 and 3). The indicative traffic generation predicts fewer trips than what was previously approved as part of the SSD-9522 and MOD 1 approval (which included detailed traffic modelling for the entire MSP in sequences 1A, 2 and 3) as shown in **Table 24** below. Therefore, the proposed Site will not have any additional traffic impact beyond what has been approved as part of the previous approvals.

TABLE 24 TRAFFIC GENERATION COMPARISON (BASED ON THE SSD-9522 RATES)

	Development Yield (m^2)	AM Peak (veh/hr)	PM Peak (veh/hr)	Daily (veh/day)
Approved SSD-9522	**80,375**	199	147	2,122
Approved SSD-9522 MOD 1	**80,375**	199	147	2,122
Proposed SSD-9522 MOD	**70,149**	173	128	1,852
Difference	**-11,055**	-26	-19	-270

- Moreover, based on operational data provided by the immediate tenant of Lot 2 and the approved rates to Lots 1, 3 and 4, the Proposal will generate the following vehicular traffic generation onto the surrounding road network (actual anticipated traffic generation of the Site) shown in **Table 25** as follows:

TABLE 25 TRAFFIC GENERATION FOR THE PROPOSED SITE (BASED ON OPERATIONAL DATA AND THE SSD-9522 RATES)

Lot	Development Yield (m^2)	AM Peak (veh/hr)	PM Peak (veh/hr)	Daily (veh/day)
1[1]	3,657	9	7	97
2[2]	29,220	60	39	357
3[1]	10,651	26	19	281
4[1]	26,621	66	48	703
Total	**70,149**	**161**	**113**	**1,438**

Note: 1) Based on SSD-9522 rates.
2) Based on operational data.

- As noted above, the operational traffic generation assessment predicts fewer trips than what was previously approved as part of the SSD-9522 and MOD 1 approval (which included detailed traffic modelling for the entire Kemps Creek in sequences 1A, 2 and 3). Therefore, the proposed Site will not have any additional traffic impact beyond what has been approved as part of the previous approvals.
- Furthermore, it is understood that a MOD 2 has been lodged with DPIE which seeks the removal of Sequence 1B. Accordingly, traffic associated with the proposed MOD has also been captured by the updated SIDRA modelling for the approved Sequence 1A. The SIDRA modelling undertaken as part of MOD 1 for the approved Sequence 1A indicates that the traffic associated with the proposed Site will not result in any material impacts in the surrounding road network operation.
- It is noted that the key intersections within the broader locality have also been assessed for the years 2026, 2031 and 2036 with a brief summary shown overleaf*:*

TABLE 26 SIDRA MODELLING RESULTS (APPROVED SEQUENCE 1A – 2026, 2031 AND 2036)

Intersection	Peak Period	Average Delay (Seconds)	Level of Service (LoS)
Year 2026 – Under review by TfNSW as part of MOD 2			
Mamre Road / Erskine Park Road	AM	41.8	C
	PM	28.2	B
Mamre Road / James Erskine Drive	AM	16.9	B
	PM	11.6	A
Mamre Road / Distribution Drive	AM	10.1	A
	PM	13.8	A
Mamre Road / Bakers Lane	AM	41.1	C
	PM	48.1	D
Year 2031 – Under review by TfNSW as part of MOD 2			
Mamre Road / Erskine Park Road	AM	51.1	D
	PM	33.0	C
Mamre Road / James Erskine Drive	AM	12.5	A
	PM	13.1	A
Mamre Road / Distribution Drive	AM	9.5	A
	PM	14.3	A
Mamre Road / Bakers Lane	AM	40.6	C
	PM	51.1	D
Year 2036 – Under review by TfNSW as part of MOD 2			
Mamre Road / Erskine Park Road	AM	72.6	F
	PM	36.3	C
Mamre Road / James Erskine Drive	AM	16.0	B
	PM	19.8	B
Mamre Road / Distribution Drive	AM	9.1	A
	PM	20.5	B
Mamre Road / Bakers Lane	AM	40.2	C
	PM	53.1	D

- Notably, it is indicated that the key intersections (excluding the Mamre Road / Erskine Park Road intersection during the AM peak for 2036) are expected to operate at an acceptable LoS (LoS D or better) during both AM and PM peak periods. However, the Mamre Road / Erskine Park Road intersection (for 2036) operates at a LoS F. It is noted that the LoS F for this AM peak period assessment is related to the background traffic growth of the area in the next 15 years and it is not directly relevant to the proposed MOD traffic, which is negligible in the scheme of the background Mamre Road traffic growth.
- In summary, the projected traffic associated with this SSD will not result in requirements for any additional upgrades onto the surrounding road network ultimate from what has already been approved.
- On-site car parking provisions for the proposed MOD in this SSD meet the requirements under Condition A8 of SSD 9522. Therefore, the proposed SSD will not result in any adverse parking impact onto the surrounding road network.
- Detailed design of each individual building is deferred to their respective DA assessment. However, the Site access, car park and loading areas for all buildings are expected to comply with the following relevant Australian Standards:
  - AS 2890.1:2004 for car parking areas;
  - AS 2890.2:2018 for commercial vehicle loading areas; and
  - AS 2890.6:2009 for accessible (disabled) parking.
- It is expected that any detailed construction drawings in relation to 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 prior to any development approval.

9.2 Conclusions

In summary, the proposed MOD development is deemed supportable on traffic and transport planning grounds and will not result in any adverse impacts on the surrounding road network.

Appendix A. SSD-9522 and Approved MOD 1 Sequences - SIDRA Result Summary Tables

Intersection	Configuration	Period	Scenario 1				
			2025 Modified Sequence 1A				
			Overall Intersection Delay - LoS	Approach	Queue	Avg. Delay	Degree of Saturation - DoS
Erskine Park Rd / Mamre Rd	Signallised (3-way)	AM	24.9 - B	N	123	24.5	0.85
				E	97	34.5	0.85
				S	73	17.1	0.84
		PM	25.9 - B	N	55	27.1	0.69
				E	61	33.0	0.91
				S	100	20.4	0.77
James Erskine Dr / Mamre Rd	Signallised (3-way)	AM	13.5 - A	N	169	18.6	0.86
				E	16	29.8	0.50
				S	24.1	4.9	0.82
		PM	11.6 - A	N	96	13.0	0.68
				E	39	33.8	0.73
				S	60	4.7	0.63
Distribution Dr / Mamre Rd	Signallised (3-way)	AM	9.9 - A	N	98	8.5	0.70
				S	70	11.7	0.59
				W	7	9.9	0.17
		PM	13.6 - A	N	86	10.3	0.68
				S	97	16.0	0.68
				W	45	15.7	0.50
Bakers Ln / Mamre Rd (*Isolated)	Signallised (4-way)	AM	41.3 - C	N	114	40.4	0.91
				E	72	80.4	0.89
				S	87	23.7	0.56
				W	72	62.1	0.65
		PM	47.0 - D	N	163	44.6	0.81
				E	86	69.3	0.81
				S	94	33.1	0.60
				W	133	52.2	0.79

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	31.6 - C	N	164	27.6	0.84	31.9 - C	N	166	28.0	0.84
				E	111	41.9	0.87		E	113	42.0	0.87
				S	111	27.9	0.83		S	112	28.2	0.84
		PM	26.7 - B	N	66	31.9	0.73	26.7 - B	N	66	31.8	0.73
				E	70	34.5	0.90		E	70	34.5	0.90
				S	106	18.9	0.78		S	108	19.1	0.79
James Erskine Dr / Mamre Rd	Signallised (4-way)	AM	21.5 - B	N	114	17.8	0.68	21.5 - B	N	117	17.7	0.68
				E	19	54.3	0.70		E	19	54.3	0.70
				S	129	22.4	0.70		S	131	22.5	0.71
				W	22	43.3	0.80		W	21.9	43.3	0.80
		PM	27.9 - B	N	84	20.2	0.59	28.3 - B	N	85	20.2	0.59
				E	40	42.0	0.67		E	40	42.0	0.67
				S	154	27.3	0.82		S	160	28.4	0.83
				W	65	44.1	0.90		W	65	44.4	0.90
Distribution Dr / Mamre Rd	Give-way Controlled (3-way)	AM	13.6 - A	N	0	0.2	0.51	13.7 - A	N	0	0.2	0.52
				S	0	0.6	0.42		S	0	0.6	0.43
				W	1	13.6	0.08		W	1	13.7	0.08
		PM	16.7 - B	N	0	0.1	0.46	17.1 - B	N	0	0.1	0.46
				S	0	0.3	0.45		S	0	0.3	0.46
				W	4	16.7	0.28		W	4	17.1	0.28
SLR Sequence 2	Signallised (4-way)	AM	29.8 - C	N	67	22.6	0.71	30.2 - C	N	67	22.9	0.71
				E	54	55.6	0.70		E	54	55.6	0.70
				S	123	29.5	0.71		S	125	30.1	0.72
				W	27	34.7	0.52		W	29	35.1	0.55
		PM	32.7 - C	N	98	30.9	0.59	32.1 - C	N	95	29.5	0.57
				E	64	46.7	0.60		E	66	48.5	0.64
				S	92	27.8	0.57		S	89	26.2	0.55
				W	42	30.4	0.48		W	46	31.1	0.56

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	31.6 - C	N	164	27.6	0.84	31.9 - C	N	166	28.0	0.84
				E	111	41.9	0.87		E	113	42.0	0.87
				S	111	27.9	0.83		S	112	28.2	0.84
		PM	26.7 - B	N	66	31.9	0.73	26.7 - B	N	66	31.8	0.73
				E	70	34.5	0.90		E	70	34.5	0.90
				S	106	18.9	0.78		S	108	19.1	0.79
James Erskine Dr / Mamre Rd	Signallised (4-way)	AM	21.5 - B	N	114	17.8	0.68	21.5 - B	N	117	17.7	0.68
				E	19	54.3	0.70		E	19	54.3	0.70
				S	129	22.4	0.70		S	131	22.5	0.71
				W	22	43.3	0.80		W	130.7	21.5	0.80
		PM	27.9 - B	N	84	20.2	0.59	28.3 - B	N	85	20.2	0.59
				E	40	42.0	0.67		E	30	42.0	0.67
				S	154	27.3	0.82		S	160	28.4	0.83
				W	65	44.1	0.90		W	65	44.4	0.90
Distribution Dr / Mamre Rd	Give-way Controlled (3-way)	AM	13.6 - A	N	0	0.2	0.51	13.8 - A	N	0	0.2	0.52
				S	0	0.6	0.42		S	0	0.6	0.43
				W	1	13.6	0.08		W	1	13.8	0.08
		PM	16.8 - B	N	0	0.1	0.46	17.2 - B	N	0	0.1	0.46
				S	0	0.3	0.45		S	0	0.3	0.46
				W	4	16.8	0.28		W	4	17.2	0.28
SLR Sequence 3	Signallised (4-way)	AM	31.1 - C	N	70	22.4	0.61	31.2 - C	N	69	22.5	0.62
				E	51	51.7	0.61		E	52	52.7	0.64
				S	97	35.6	0.63		S	99	35.5	0.64
				W	28	29.9	0.25		W	22	29.6	0.20
		PM	32.8 - C	N	98	30.6	0.59	33.0 - C	N	98	30.7	0.59
				E	64	46.4	0.60		E	64	46.5	0.60
				S	62	30.2	0.43		S	63	30.8	0.44
				W	37	26.8	0.35		W	40	27.0	0.37

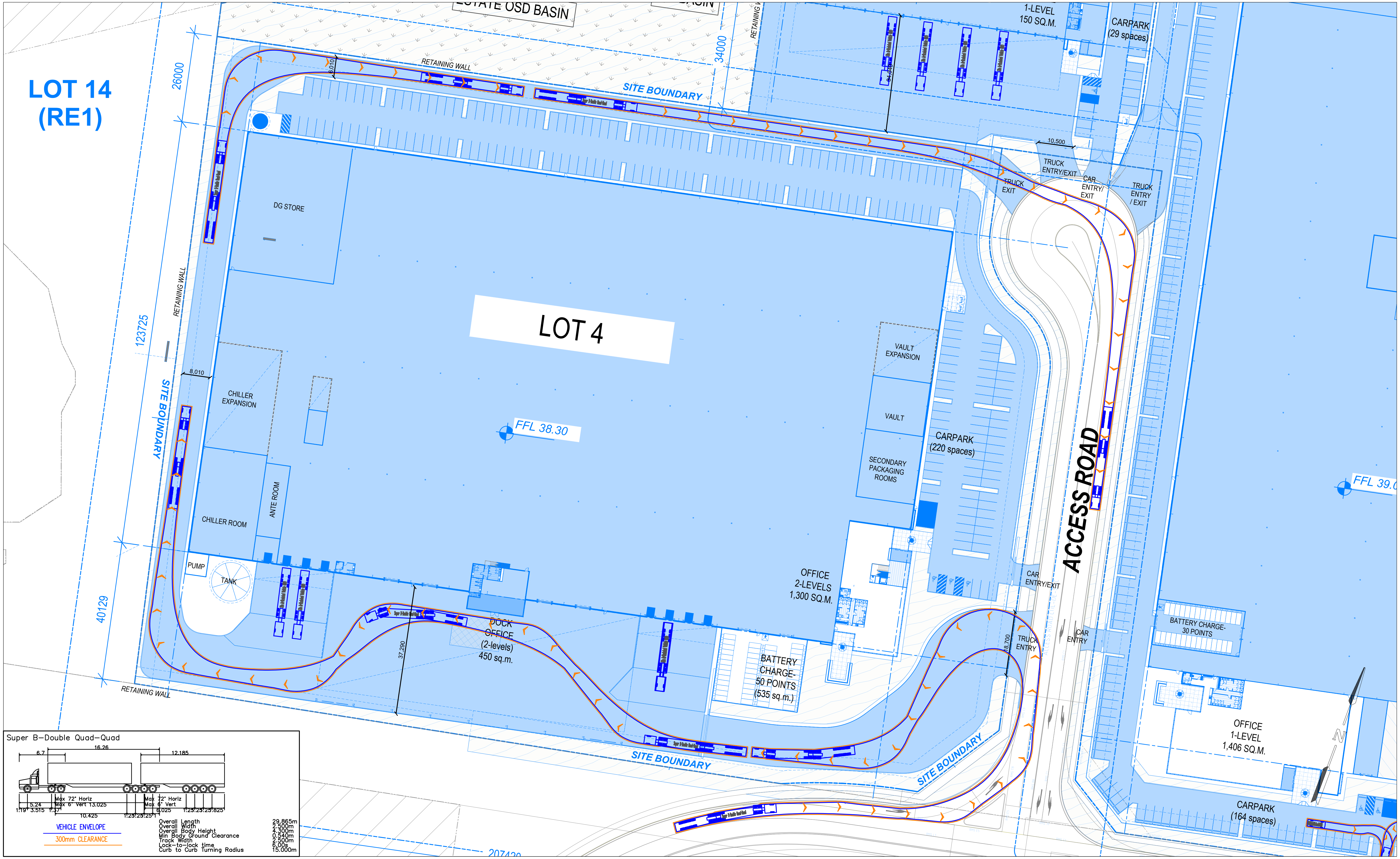
Appendix B. SIDRA Result Summary Table for Sequence 1A (for 2026, 2031 and 2036)

Intersection	Configuration	Period	Scenario 1																			
			2025 Modified Sequence 1A					2026 Modified Sequence 1A					2031 Modified Sequence 1A					2036 Modified Sequence 1A				
			Overall Intersection Delay - LoS	Approach	Queue	Avg. Delay	Degree of Saturation - DoS	Overall Intersection Delay - LoS	Approach	Queue	Avg. Delay	Degree of Saturation - DoS	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	24.9 - B	N	123	24.5	0.85	41.8 - C	N	169	34.2	0.93	51.1 - D	N	202	42.9	0.96	72.6 - F	N	282	68.8	1.03
				E	97	34.5	0.85		E	141	75.1	1.16		E	127	86.0	1.24		E	149	104.0	1.31
				S	73	17.1	0.84		S	93	22.0	0.93		S	122	31.1	0.99		S	167	50.6	1.05
		PM	25.9 - B	N	55	27.1	0.69	28.2 - B	N	60	29.6	0.75	33.0 - C	N	67	31.5	0.80	36.3 - C	N	60	27.7	0.81
				E	61	33.0	0.91		E	66	33.2	0.91		E	86	42.0	0.99		E	114	59.3	1.09
				S	100	20.4	0.77		S	128	24.1	0.85		S	151	27.5	0.90		S	142	24.1	0.93
James Erskine Dr / Mamre Rd	Signallised (3-way)	AM	13.5 - A	N	169	18.6	0.86	16.9 - B	N	206	24.5	0.90	12.5 - A	N	151	16.1	0.84	16.0 - B	N	173	20.8	0.87
				E	16	29.8	0.50		E	20	31.1	0.58		E	21	30.9	0.64		E	22	30.8	0.62
				S	24.1	4.9	0.82		S	39	5.1	0.83		S	53	6.5	0.91		S	89	9.1	0.83
		PM	11.6 - A	N	96	13.0	0.68	11.6 - A	N	97	12.1	0.69	13.1 - A	N	114	14.0	0.77	19.8 - B	N	182	28.1	0.89
				E	39	33.8	0.73		E	40	36.0	0.74		E	44	38.1	0.76		E	48	37.5	0.77
				S	60	4.7	0.63		S	58	4.4	0.65		S	70	5.2	0.69		S	91	6.7	0.75
Distribution Dr / Mamre Rd	Signallised (3-way)	AM	9.9 - A	N	98	8.5	0.70	10.1 - A	N	115	9.0	0.73	9.5 - A	N	92	7.8	0.71	9.1 - A	N	81	7.0	0.69
				S	70	11.7	0.59		S	76	11.4	0.62		S	82	11.2	0.64		S	87	11.1	0.67
				W	7	9.9	0.17		W	7	10.7	0.18		W	8	11.1	0.19		W	8	11.6	0.20
		PM	13.6 - A	N	86	10.3	0.68	13.8 - A	N	100	10.5	0.73	14.3 - A	N	114	10.8	0.78	20.5 - B	N	177	18.6	0.87
				S	97	16.0	0.68		S	102	16.2	0.70		S	112	17.0	0.74		S	135	22.5	0.84
				W	45	15.7	0.50		W	46	16.3	0.50		W	48	17.6	0.51		W	43	17.9	0.50
Bakers Ln / Mamre Rd (*Isolated)	Signallised (4-way)	AM	41.3 - C	N	114	40.4	0.91	41.1 - C	N	109	40.4	0.92	40.6 - C	N	110	39.2	0.90	40.2 - C	N	106	38.2	0.89
				E	72	80.4	0.89		E	73	81.4	0.90		E	75	79.5	0.89		E	77	77.9	0.88
				S	87	23.7	0.56		S	101	23.9	0.61		S	117	25.1	0.66		S	130	25.7	0.70
				W	72	62.1	0.65		W	73	62.4	0.65		W	73	61.8	0.62		W	74	62.0	0.64
		PM	47.0 - D	N	163	44.6	0.81	48.1 - D	N	190	45.8	0.84	51.1 - D	N	213	47.4	0.87	53.1 - D	N	248	54.1	0.91
				E	86	69.3	0.81		E	90	73.2	0.85		E	98	75.9	0.89		E	101	75.8	0.89
				S	94	33.1	0.60		S	96	31.0	0.60		S	103	30.5	0.62		S	118	31.8	0.68
				W	133	52.2	0.79		W	143	57.0	0.84		W	153	71.2	0.88		W	160	65.3	0.90

Appendix C. SIDRA Result Summary Table for Interim and Ultimate Internal Bakers Lane Intersection

Intersection	Configuration	Period	Interim Scenario (2026)				
			Overall Intersection Delay - LoS	Approach	Queue	Avg. Delay	Degree of Saturation - DoS
Southern Link Road / Bakers Lane	Unsignalised priority control (3-way)	AM	1.2 - A	N	1	12.4	0.02
				E	5	1.4	0.23
				W	0	0.1	0.11
		PM	1.0 - A	N	2	11.3	0.07
				E	1	1.0	0.08
				W	0	0.1	0.18
Intersection	**Configuration**	**Period**	**Ultimate Scenario (2036)**				
			Overall Intersection Delay - LoS	**Approach**	**Queue**	**Avg. Delay**	**Degree of Saturation - DoS**
Southern Link Road / Bakers Lane	Signallised (4-way)	AM	27.1 - B	N	5	26.4	0.05
				E	58	22.5	0.44
				S	64	55.3	0.51
				W	154	23.4	0.49
		PM	31.5 - C	N	11	22.7	0.10
				E	157	24.4	0.51
				S	100	45.2	0.52
				W	100	32.9	0.37

Appendix D. Swept Path Analysis and Design Commentary



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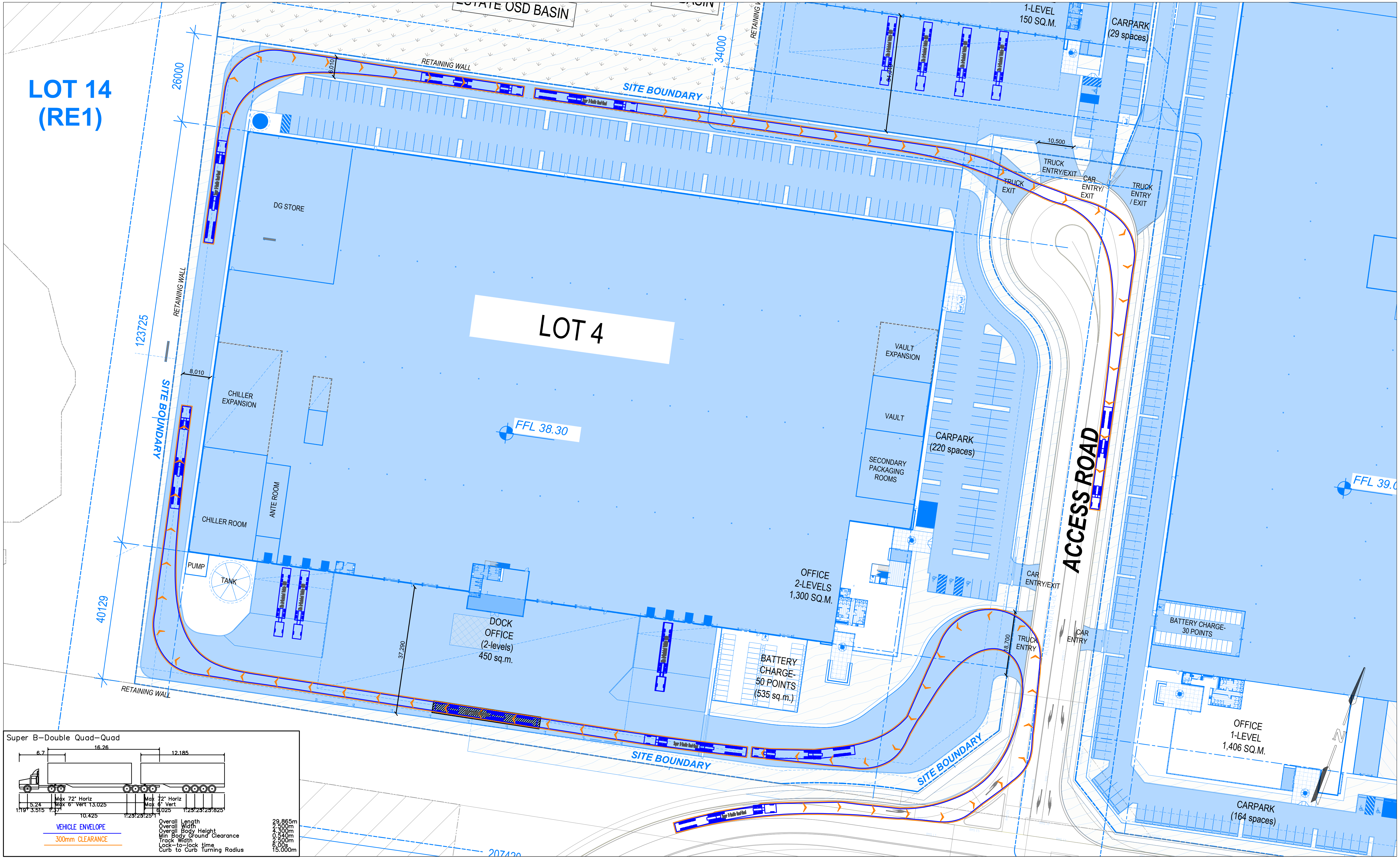

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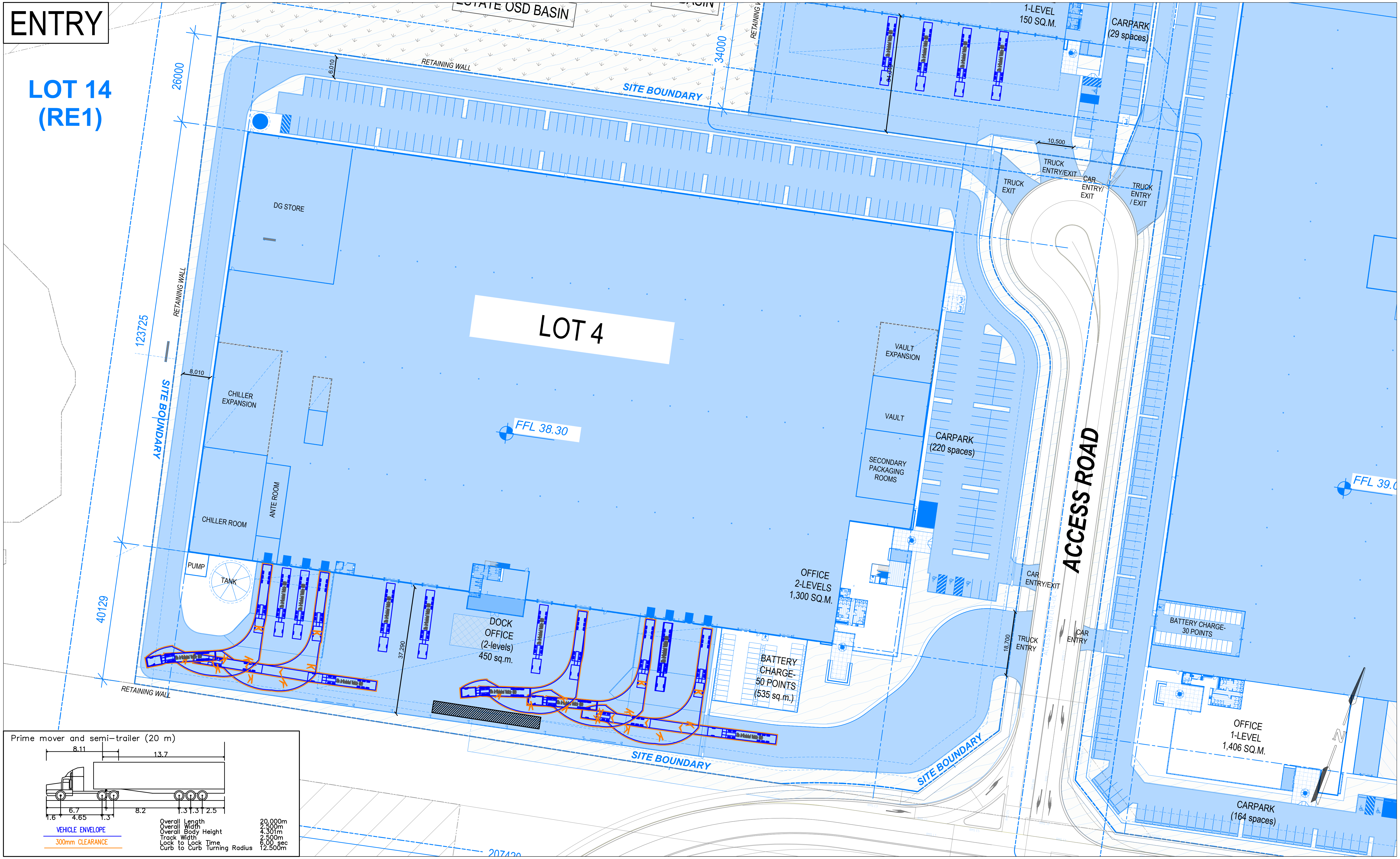

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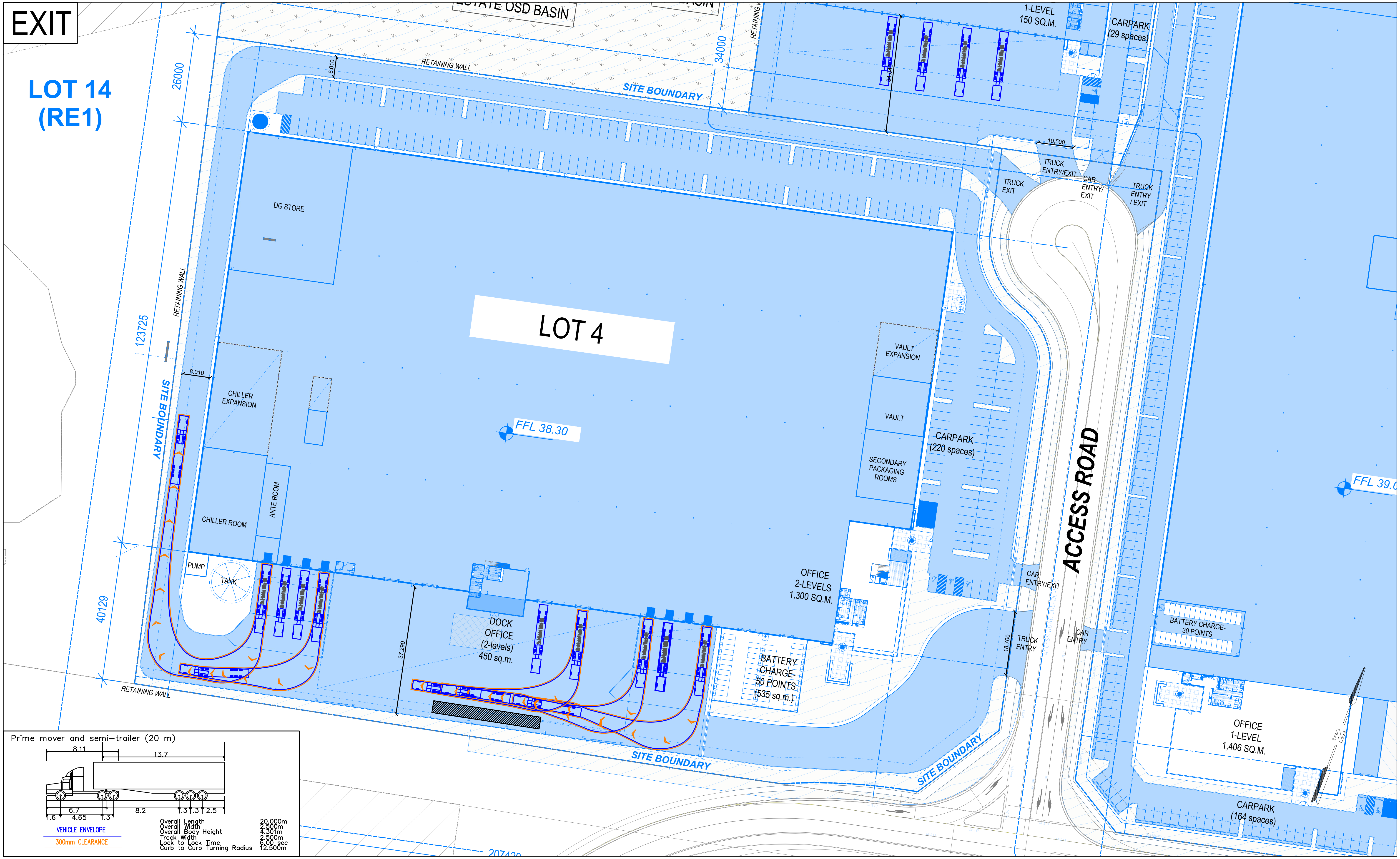

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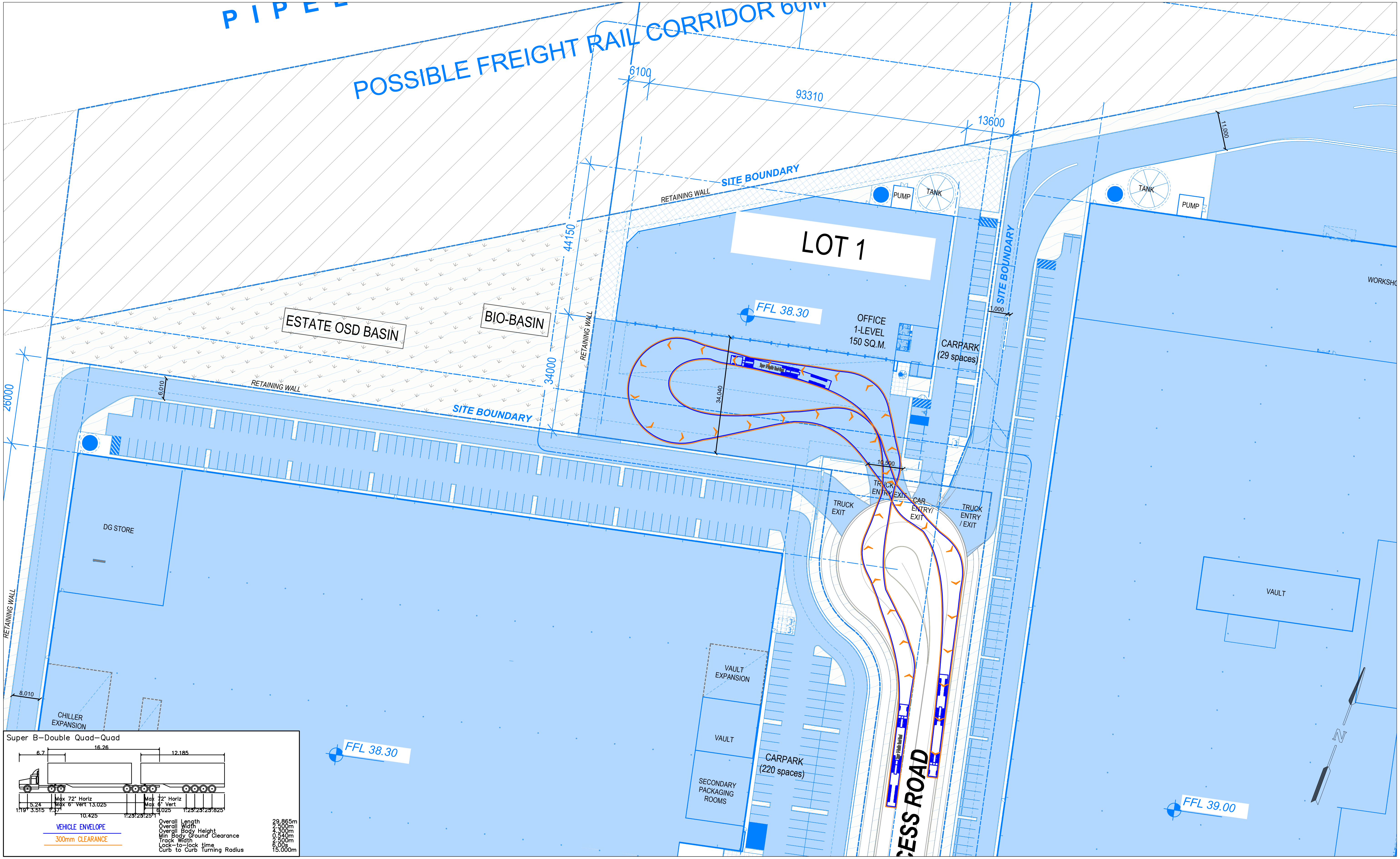

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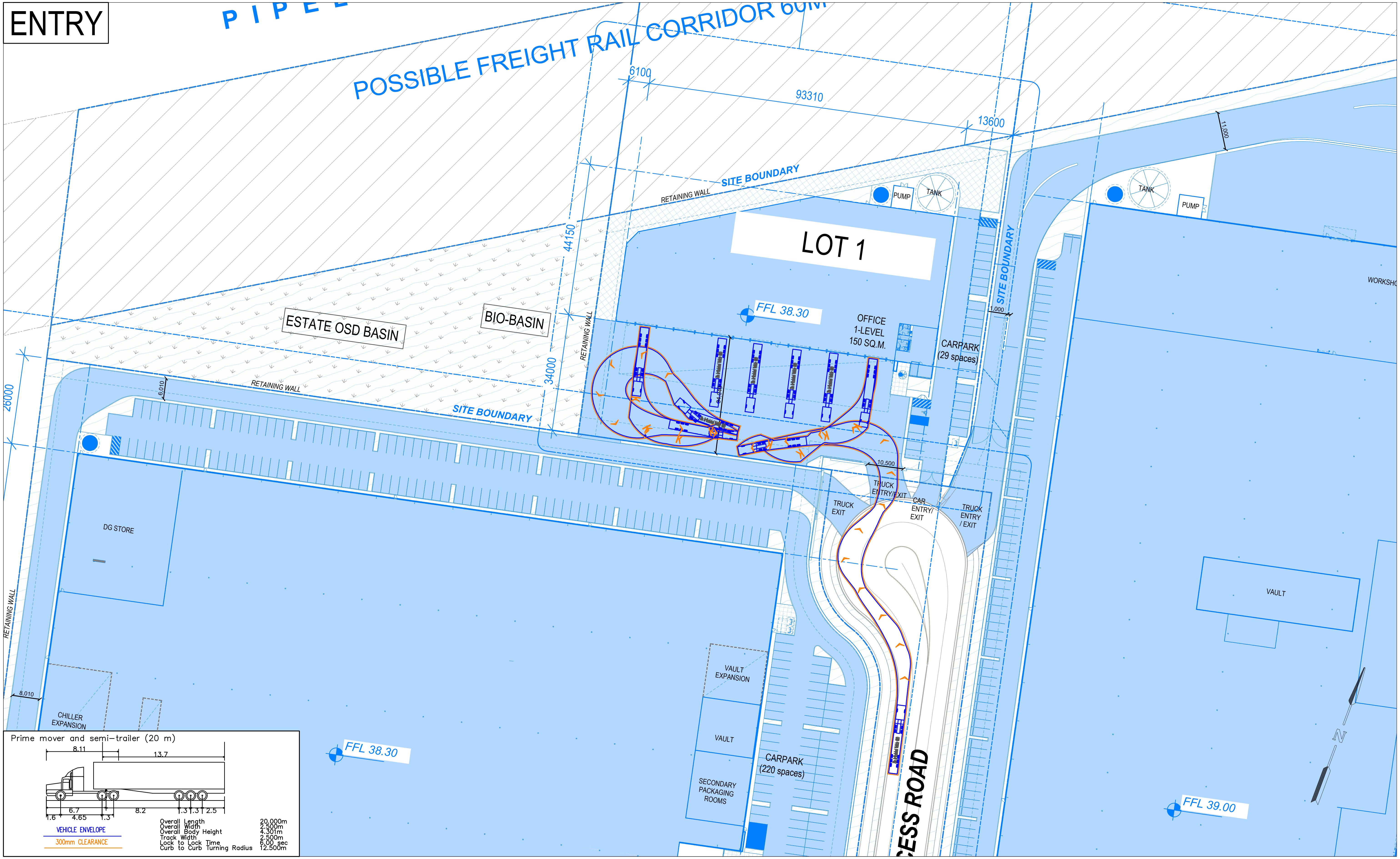

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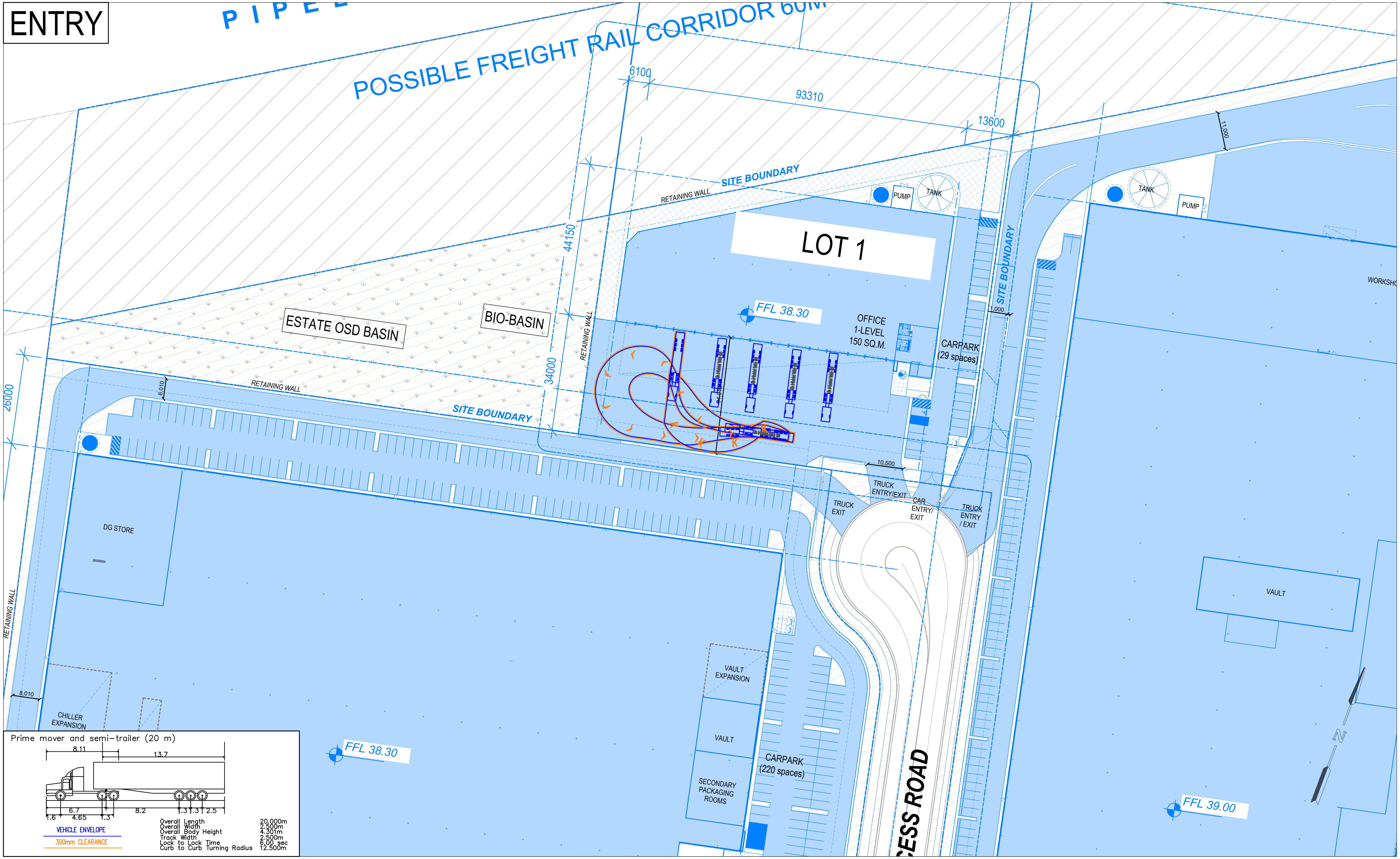

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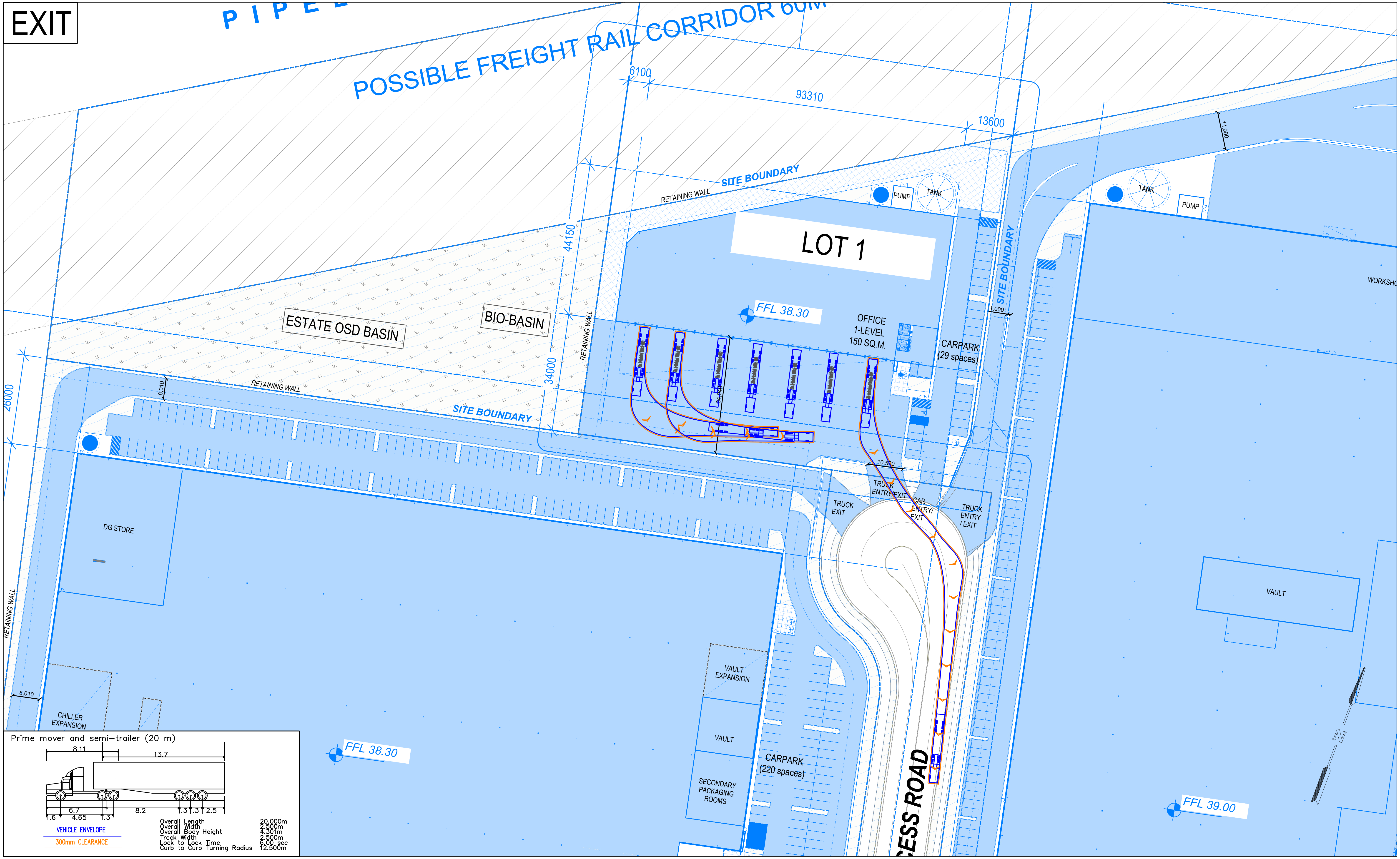

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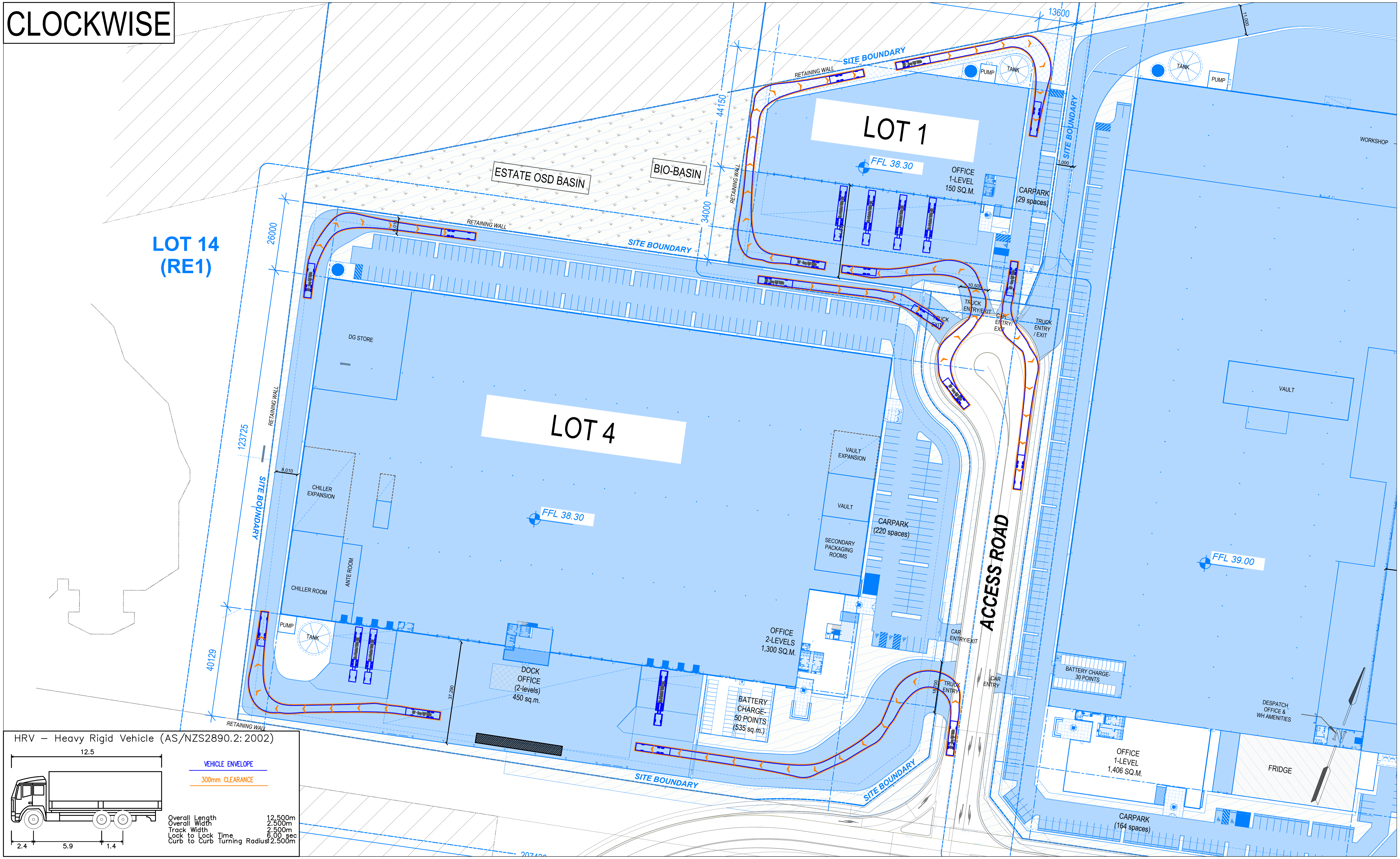

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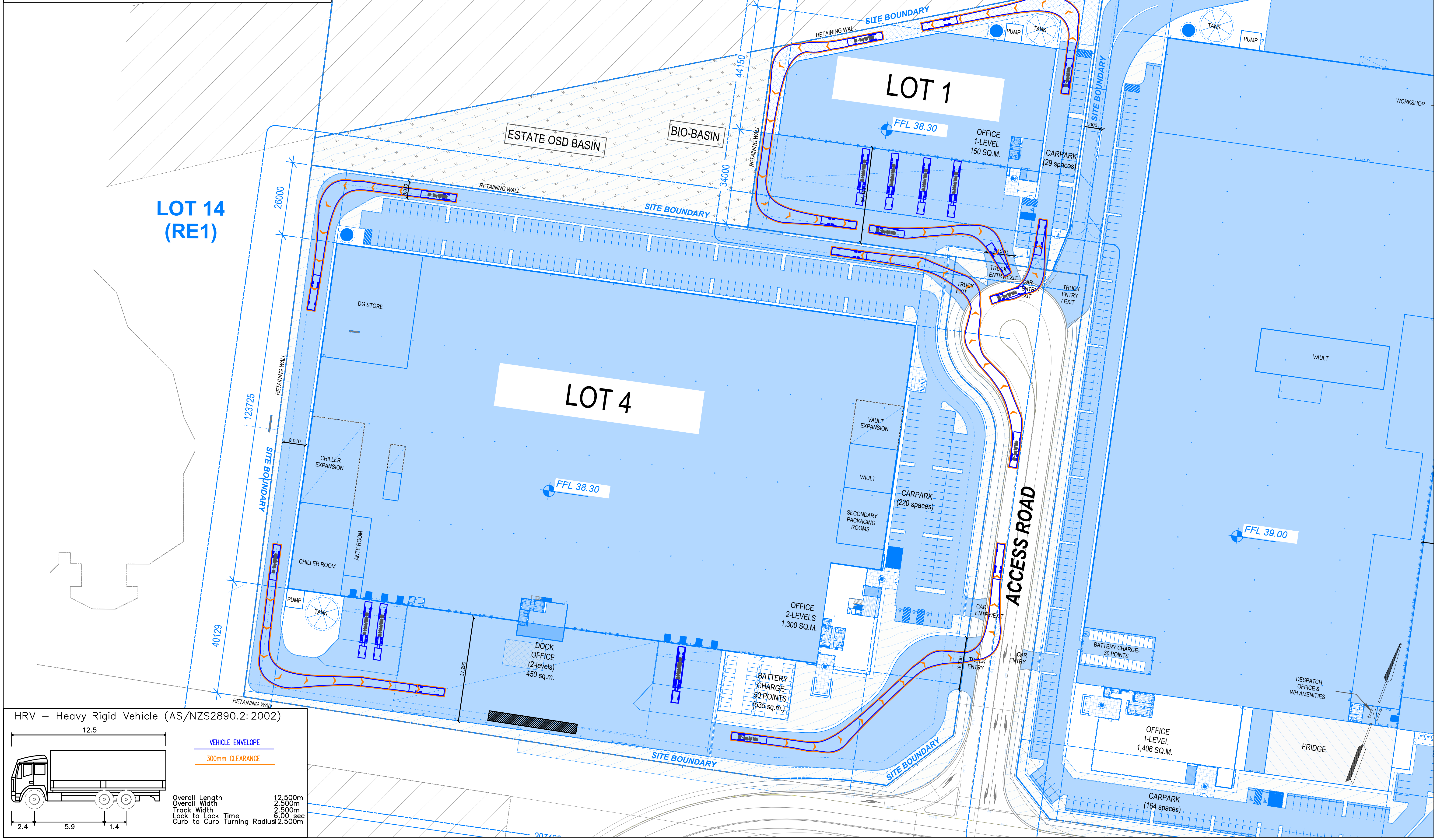
COUNTER CLOCKWISE



HRV – Heavy Rigid Vehicle (AS/NZS2890.2:2002)

VEHICLE ENVELOPE

300mm CLEARANCE

Overall Length	12.500m
Overall Width	2.500m
Track Width	2.500m
Lock to Lock Time	6.00 sec
Curb to Curb Turning Radius	12.500m

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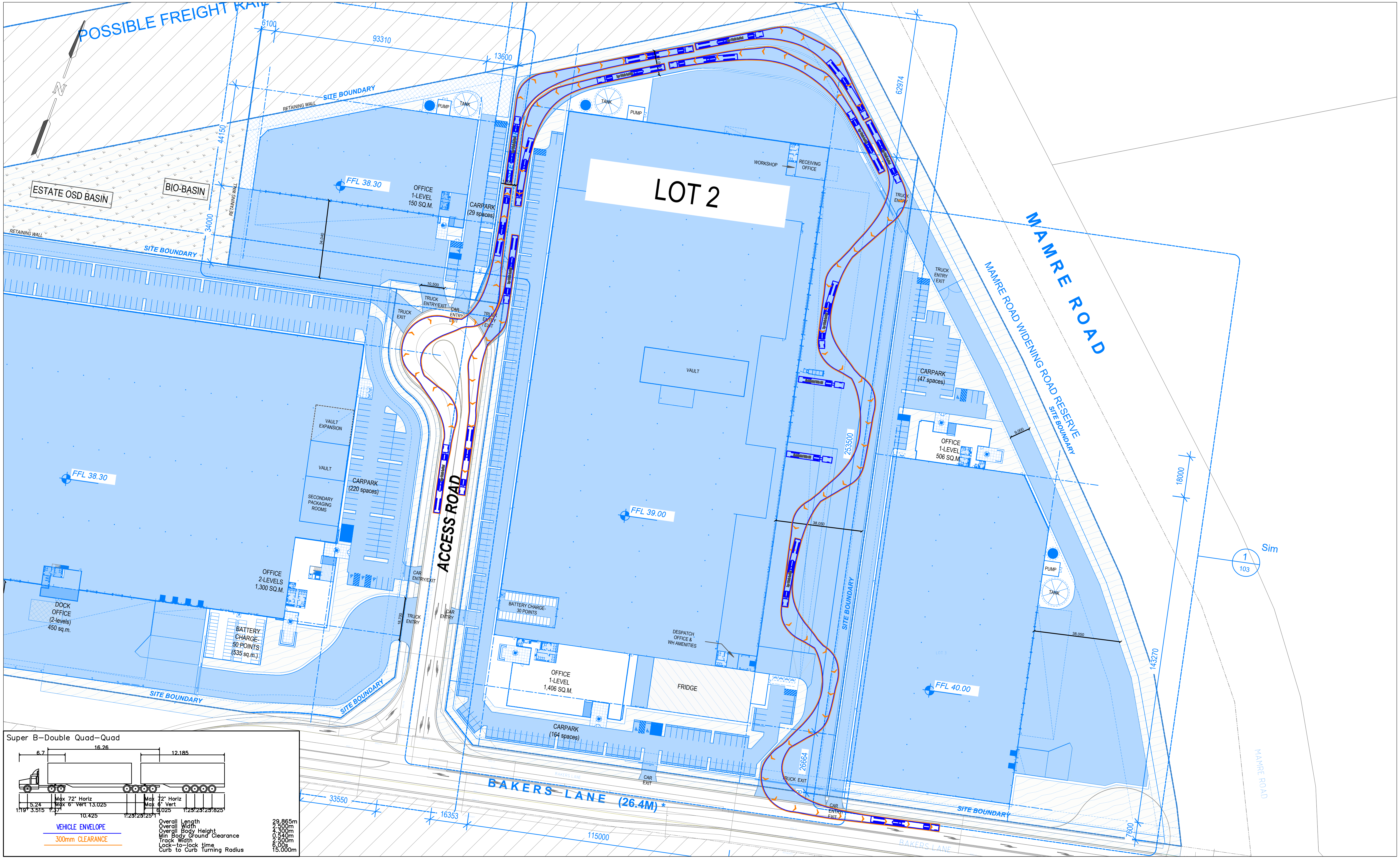

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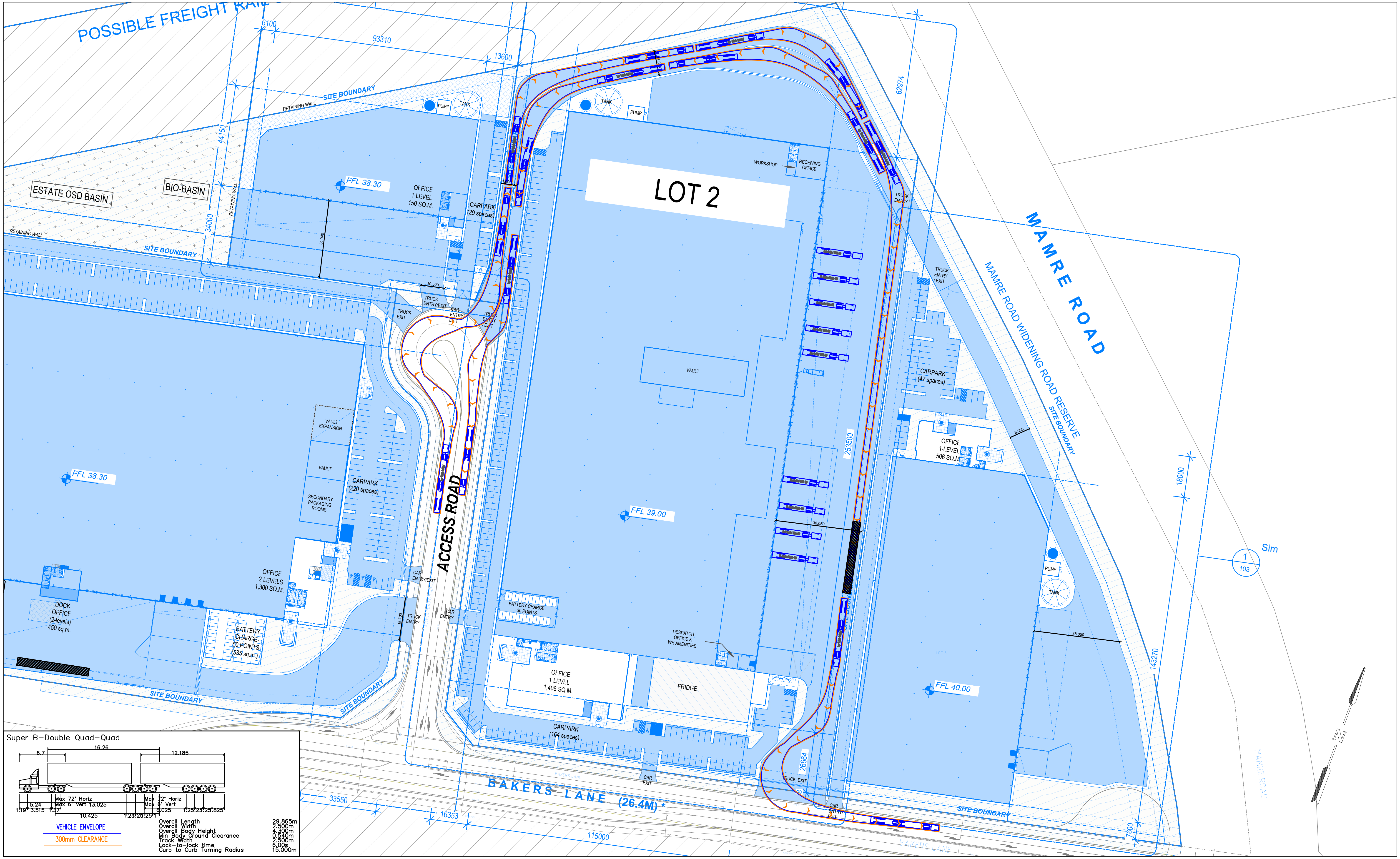

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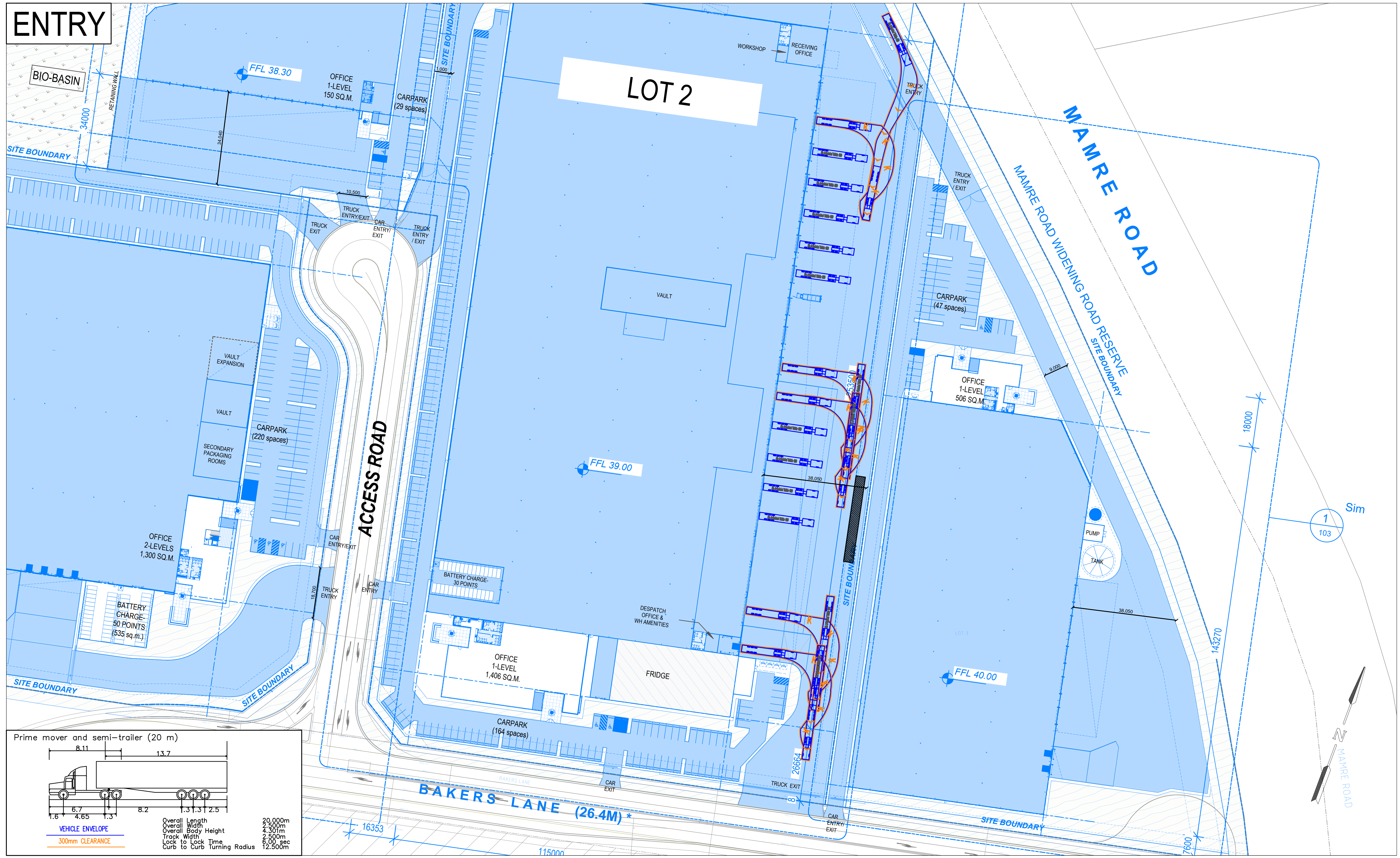

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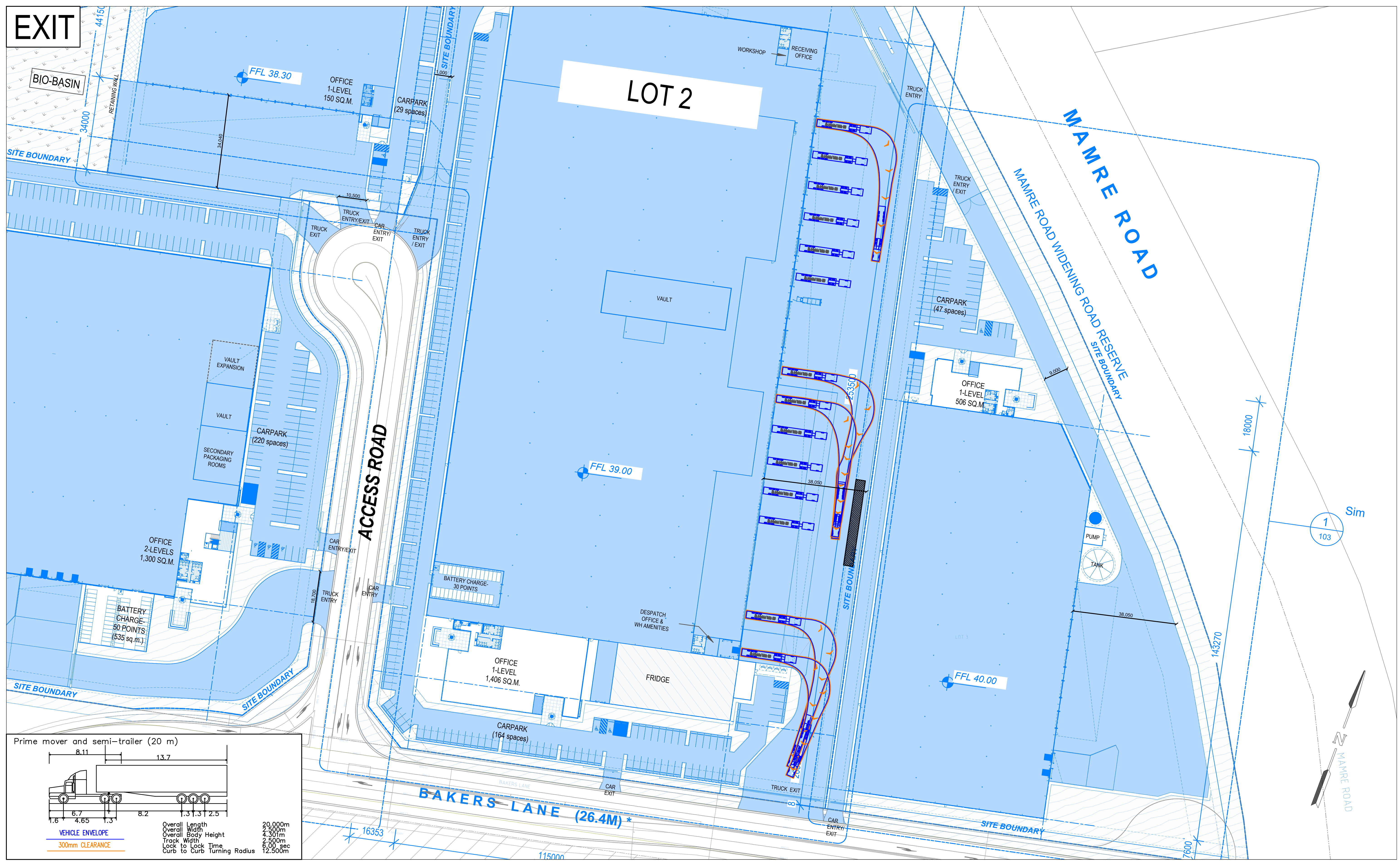

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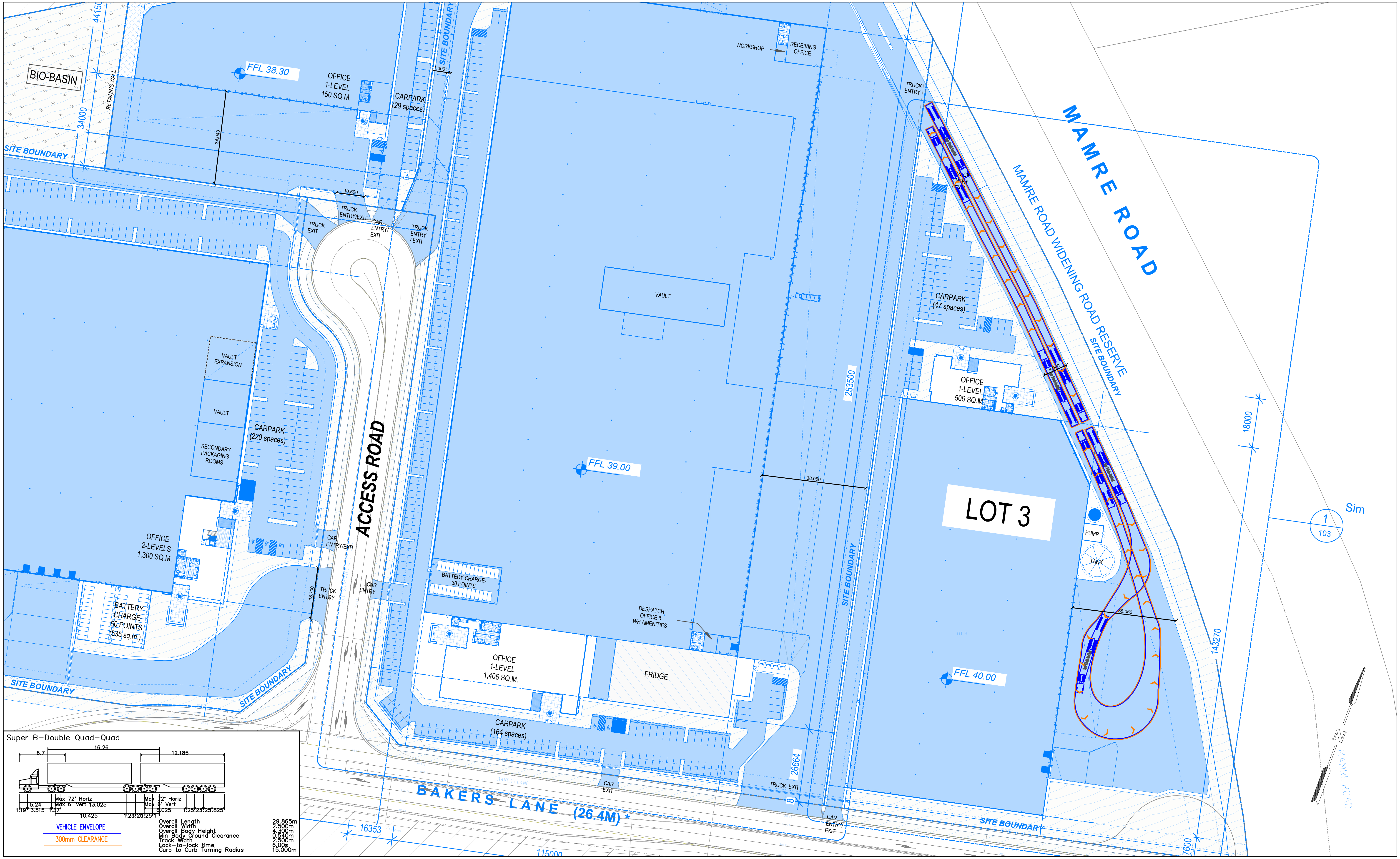

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FILE NAME	AG1840-02-v05.dwg
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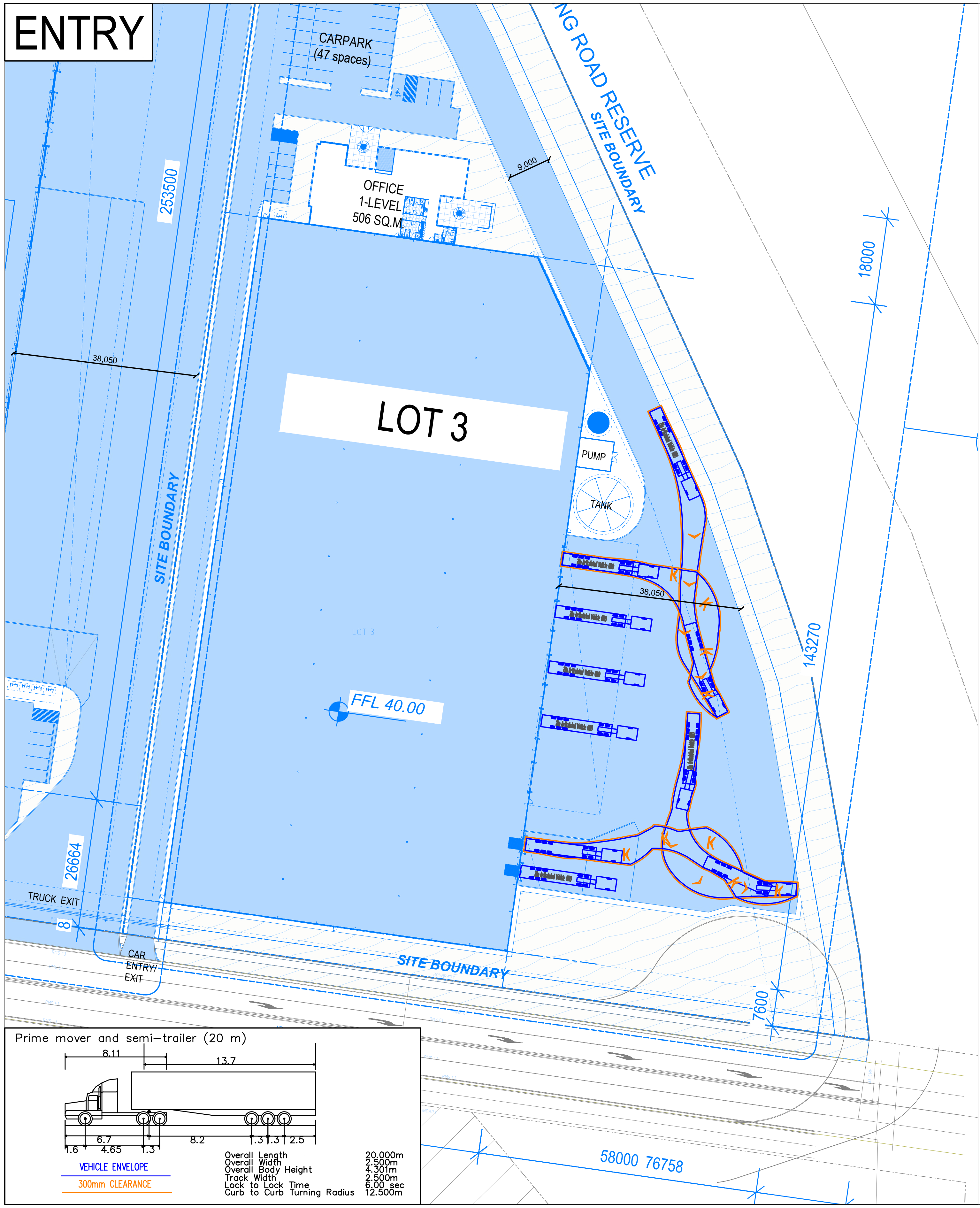

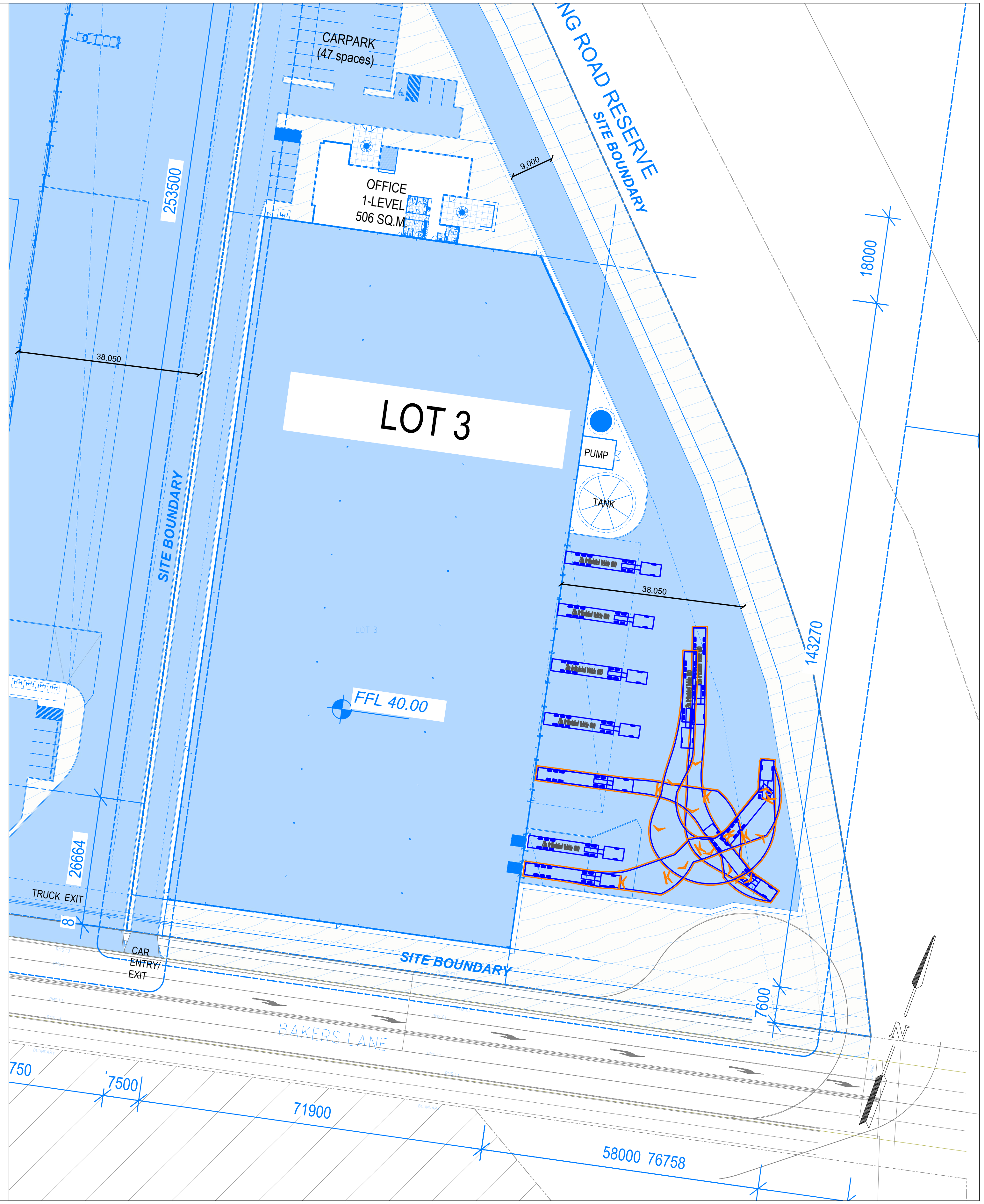

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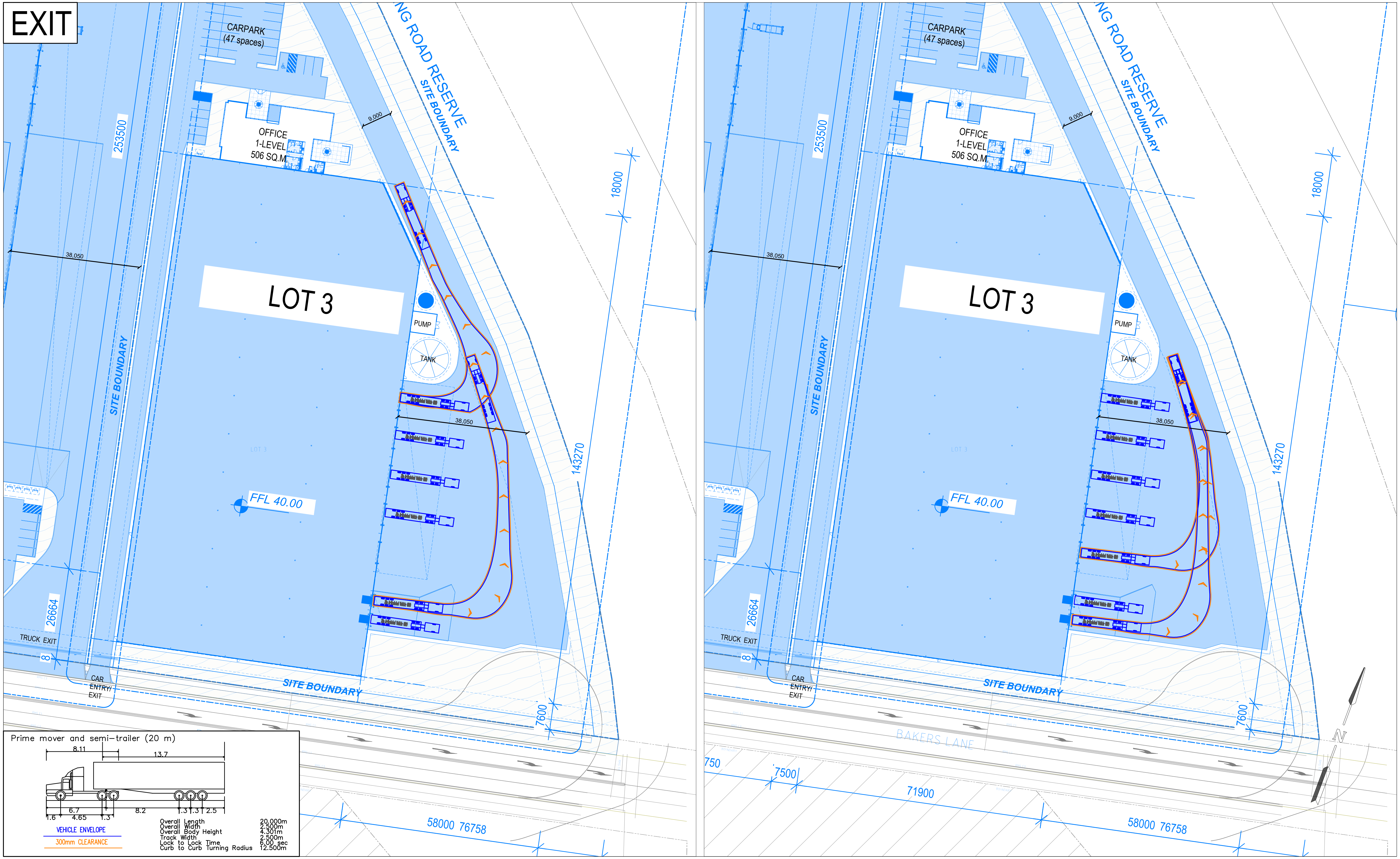

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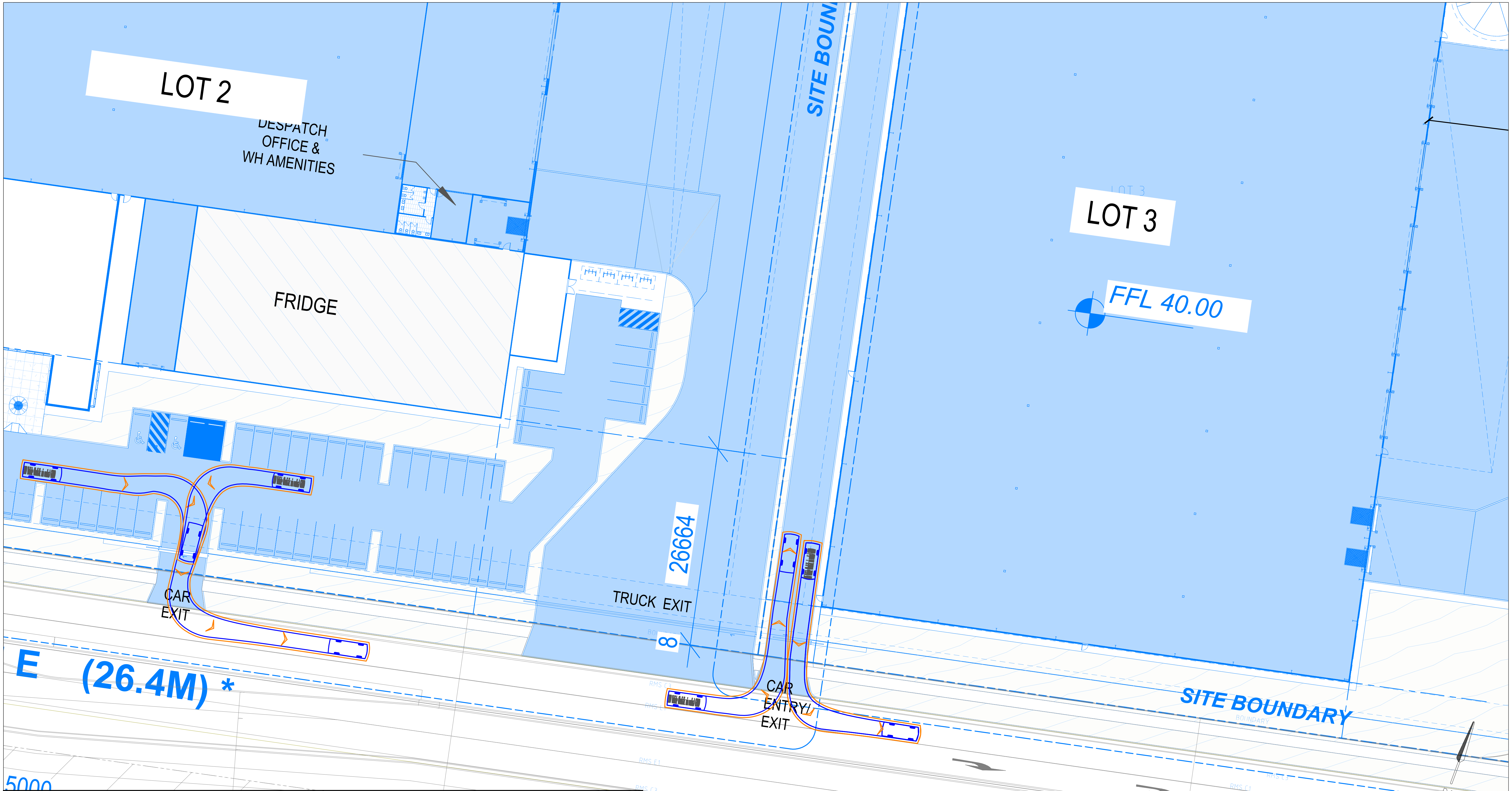

B99 Vehicle (AS/NZS2890.1:2004)

5.2
0.95 3.05
VEHICLE ENVELOPE
300mm CLEARANCE

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

B85 Vehicle (AS/NZS2890.1:2004)

4.91
0.92 2.8
VEHICLE ENVELOPE
300mm CLEARANCE

Overall Length	4.910m
Overall Width	1.870m
Overall Body Height	1.421m
Min Body Ground Clearance	0.159m
Track Width	1.770m
Lock to Lock Time	4.00 sec
Curb to Curb Turning Radius	5.80m

GENERAL NOTES

This drawing is provided for information purposes only and should not be used for construction.
Base Plan prepared by the Altis and Frasers JV, received 09.11.2021.
Swept path assessments completed at 10 km/h and 300mm clearance.

DESIGNED	Osama Hashmi
PAPER SIZE	A3
APPROVED BY	A. RASOULI
DATE	05.10.2021
SCALE	1:1500
	NTS
CLIENT	Altis and Frasers JV
PROJECT	1840
	Mamre South Precinct - Mamre Road, Kemps Creek
DOCUMENT INFORMATION	DESIGN ASSESSMENT
	SWEPT PATH ASSESSMENT
FILE NAME	AG1840-02-v05.dwg
SHEET	AG18

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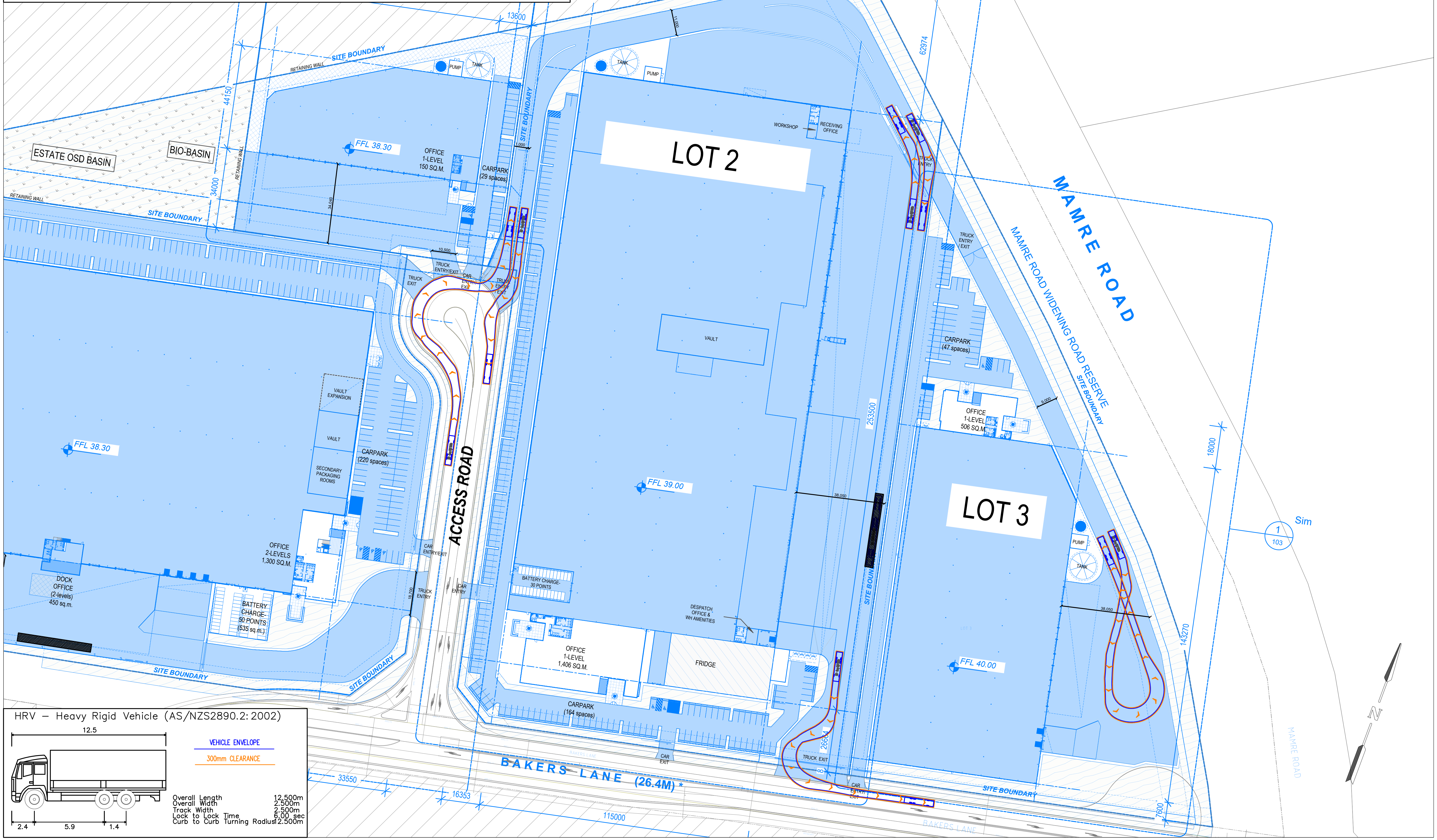
CLOCKWISE AND COUNTER CLOCKWISE



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DESIGNED: Osama Hashmi	PAPER SIZE: A3	CLIENT: Altis and Frasers JV	DOCUMENT INFORMATION: DESIGN ASSESSMENT
APPROVED BY: A. RASOULI	DATE: 05.10.2021	PROJECT: 1840	SWEPT PATH ASSESSMENT
SCALE: 1:1500	NTS	Mamre South Precinct - Mamre Road, Kemps Creek	FILE NAME: AG1840-02-v05.dwg — SHEET: AG19

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