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Data Centre Development: 51 Huntingwood Drive, Huntingwood



Traffic and Transport Assessment

9 September 2022
Prepared for EMKC³

IMP2203003TTA01F03

Impact

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Client EMKC³

Report Title Data Centre Development: 51
Huntingwood Drive,
Huntingwood

Report Reference IMP2203003TTA01F03

Date of Issue 9 September 2022

Approved By Sam Mulligan

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Document Control

Version	Date	Author
FINAL 03	9 September 2022	Jake Townley
FINAL 02	15 June 2022	Jake Townley
FINAL 01	1 June 2022	Jake Townley
DRAFT	23 May 2022	Jake Townley

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1 Introduction

1.1 Engagement

IMPACT[®] have been engaged by EMKC³ to undertake a Traffic and Transport Impact Assessment for the proposed data centre development at 51 Huntingwood Drive, Huntingwood.

1.2 Scope of Engagement

This Traffic and Transport Impact Assessment has been prepared to accompany a State Significant Development Application submission to the Western Regional Planning Panel.

In preparing this assessment we have referenced the following:

- Development plans prepared by Greenbox;
- State Environmental Planning Policy (Western Sydney Employment Area) Development Control Plan, 2009;
- Blacktown Development Control Plan, 2015
- Blacktown Local Environmental Plan, 2015
- Australian Standard AS2890.1:2004, AS2890.2:2018, AS2890.3:2015 & AS2890.6: 2009

1.3 SEARs

The development is considered a State Significant Development. As such, the Planning Secretary has provided the following Environmental Assessment Requirements (SEARs) for consideration as part of the Development Application, pertaining to traffic and transport:

Key Issue and Documentation 6: Traffic, Transport and Accessibility

- Provide a transport and accessibility impact assessment, which includes:
 - Details of all traffic types and volumes likely to be generated during construction and operation, including a description of key access and haul routes.
 - An assessment of the predicted impacts of this traffic on road safety and the capacity of the road network, including consideration of cumulative traffic impacts at key intersections (using industry standard modelling).
 - Plans demonstrating how all vehicles likely to be generated during construction and operation and awaiting loading, unloading or servicing can be accommodated on the site to avoid queuing in the street network.
 - Details and plans of any proposed internal road network, loading dock provision and servicing, on-site parking provisions, and sufficient pedestrian and cyclist facilities, in accordance with the relevant Australian Standards.
 - Swept path analysis for the largest vehicle requiring access to the development.
 - Details of road upgrades, infrastructure works, or new roads or access points required for the development if necessary.
- Provide a Construction Traffic Management Plan detailing predicted construction vehicle movements, routes, access and parking arrangements, coordination with other construction occurring in the area, and how impacts on existing traffic, pedestrian and bicycle networks would be managed and mitigated.

The above SEARs information is to be provided within the preparation of a Transport and Accessibility Impact Assessment, a Construction Traffic Management Plan, and a Green Travel Plan.

2 Response to SEARs

The SEARs requirements outlined within Section 1.3 are reproduced in Table 1 with a response to each provided.

Table 1 SEARs

Provide a transport and accessibility impact assessment, which includes:	Response
Details of all traffic types and volumes likely to be generated during construction and operation, including a description of key access and haul routes.	Details of traffic volumes generated during operation and key access routes are presented and assessed within Section 7 of this report. All details relating to traffic volumes generated during construction can be sought from the Construction Traffic Management Plan prepared for the Development Application (ref: IMP2203003CTMP01F03, dated 30 May 2022)
An assessment of the predicted impacts of this traffic on road safety and the capacity of the road network, including consideration of cumulative traffic impacts at key intersections (using industry standard modelling)	Details of traffic volumes generated during operation and key access routes are presented and assessed within Section 7 of this report.
Plans demonstrating how all vehicles likely to be generated during construction and operation and awaiting loading, unloading or servicing can be accommodated on the site to avoid queuing in the street network.	Plans demonstrating vehicle access associated with site operation including loading bay access, vehicle queuing at site access control points, and internal vehicle circulation are provided within Appendix A of this report. Plans detailing vehicle access associated with construction activities can be sought from the Construction Traffic Management Plan prepared for the Development Application (ref: IMP2203003CTMP01F03, dated 30 May 2022)
Details and plans of any proposed internal road network, loading dock provision and servicing, on-site parking provisions, and sufficient pedestrian and cyclist facilities, in accordance with the relevant Australian Standards.	Details of internal roads, loading docks, on-site carparking, pedestrian facilities and cyclist facilities are contained within architectural plans with these items reviewed by IMPACT® and advice provided where necessary. Swept path analysis provided as Appendix A details the assessment of internal roads and loading docks. Details relating to on-site car parking is contained within Section 4 Details relating to cyclist facilities is contained within Section 4.
Swept path analysis for the largest vehicle requiring access to the development.	Swept path analysis of design vehicles within the site and gaining access to the site are presented within Appendix A.
Details of road upgrades, infrastructure works, or new roads or access points required for the development if necessary.	IMPACT® has assessed and provided the project architect with advice on the required site access road requirements. This detail is contained within architectural plans for the Development Application, with their assessment on vehicle accessibility presented within Appendix A.

Provide a Construction Traffic Management Plan detailing:	Response
Predicted construction vehicle movements, routes, access and parking arrangements.	Details on construction traffic management can be sought from the Construction Traffic Management Plan prepared for the Development Application (ref: IMP2203003CTMP01F03, dated 30 May 2022)
Coordination with other construction occurring in the area, and how impacts on existing traffic, pedestrian and bicycle networks would be managed and mitigated.	Details on construction traffic management can be sought from the Construction Traffic Management Plan prepared for the Development Application (ref: IMP2203003CTMP01F03, dated 30 May 2022)

3 Existing Conditions

3.1 Location

The subject site is located on the southern side of Huntingwood Drive in addition to sharing a frontage (no pedestrian or vehicle access) to the Western Motorway corridor, as illustrated in Figure 1.



Figure 1 Location of Subject Site

The site is irregular in shape, with a frontage to Huntingwood Drive. Neighbouring land uses comprise:

- Commercial and industrial land uses to the north, east and west;
- The Western Motorway and Sydney Motorsport Park to the south.

The site currently accommodates a multi-level office building and at-grade car parking in various locations around the site.

3.2 Planning Zone

The subject site is located within the Light Industrial Zone (IN2), as illustrated in Figure 2.

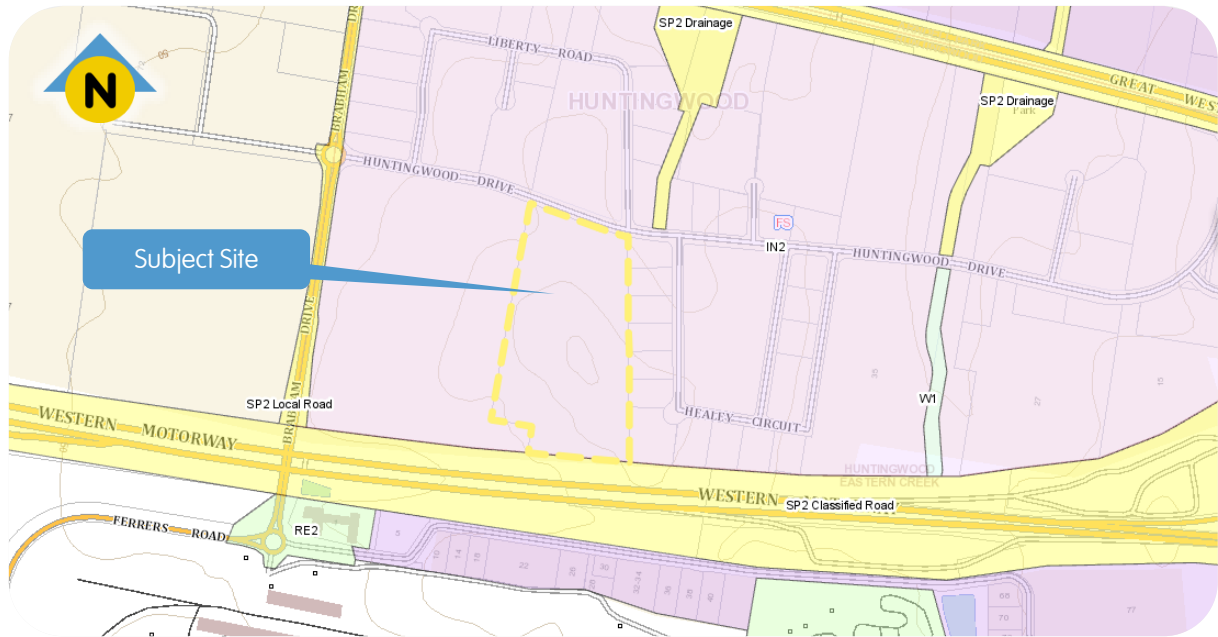


Figure 2 Land Use Planning Zone

The Blacktown Local Environmental Plan identifies this purpose of this zone to:

- Provide a wide range of light industrial, warehouse and related land uses.
- Encourage employment opportunities and to support the viability of centres.
- Minimise any adverse effect of industry on other land uses.
- Enable other land uses that provide facilities or services to meet the day to day needs of workers in the area.
- Support and protect industrial land for industrial uses.
- Minimise adverse impacts on the natural environment.

3.3 Road Network

The road network providing vehicular access to the site is shown in Figure 3 and includes:

- Western Motorway
- Great Western Highway
- Huntingwood Drive
- Brabham Drive
- Reservoir Road



Figure 3 Surrounding Road Network

3.4 Traffic Volumes

3.4.1 Intersection Volumes

IMPACT® commissioned Trans Traffic Surveys to undertake turning movement counts at the following intersections on Tuesday 5 April 2022 between 7:00am - 10:00am and 4:00pm - 7:00pm:

- Huntingwood Drive / Brabham Drive;
- Huntingwood Drive / Great Western Highway;
- Great Western Highway / Brabham Drive;
- Great Western Highway / Reservoir Road.

Figure 4 and Figure 5 illustrate the peak hour volumes for the AM and PM peak periods, respectively.

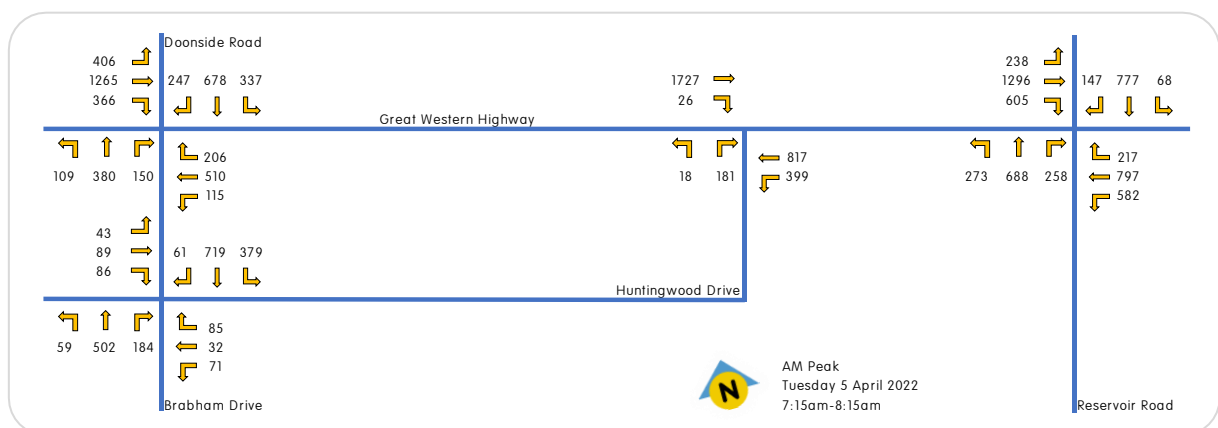


Figure 4 AM Turning Movement Counts

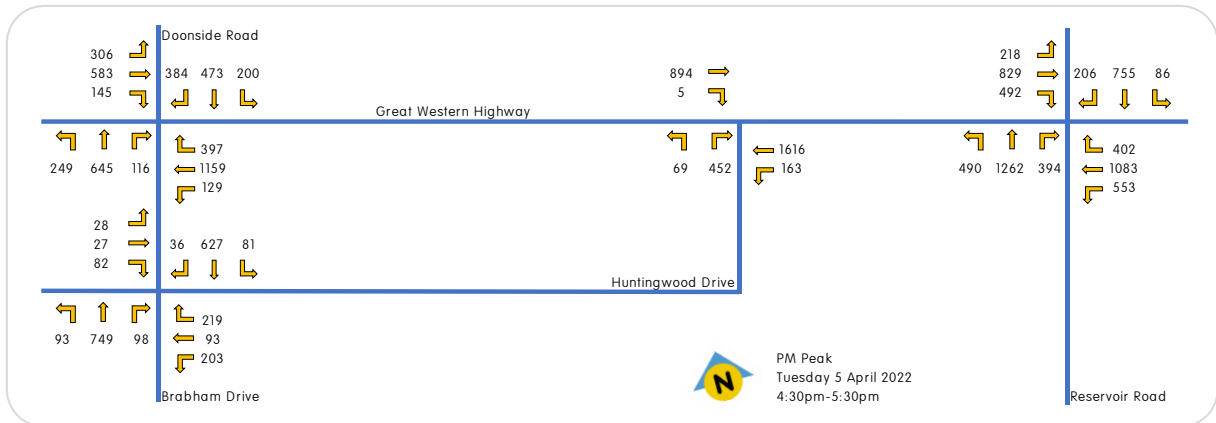


Figure 5 PM Turning Movement Counts

3.4.2 Intersection Analysis

The operation of the critical intersections have been analysed using SIDRA Intersection 9 for both AM and both PM peak periods. Critical outputs of this network analysis software are:

Degree of Saturation (D.O.S.) - Defined as the ratio of the volume of traffic observed making a movement compared to the maximum capacity for that movement. These are rated as follows:

D.O.S.	Rating
Up to 0.6	Excellent
0.6 to 0.7	Very Good
0.7 to 0.8	Good
0.8 to 0.9	Fair
0.9 to 1.0	Poor
Above 1.0	Very Poor

Some critical movements at an intersection can operate in the range of 0.9 to 1.0 during the high peak periods, reflecting actual conditions in a significant proportion of suburban signalised intersections. Target D.O.S of 0.9 for signalised intersections and 0.8 for unsignalised intersections is preferred, as queuing increases disproportionately beyond these limits.

95th Percentile (95thile) Queue - Defined as the maximum queue length, in metres, that can be expected in 95% of observed queue lengths in the peak hour; and

Average Delay - Defined as the delay time, in seconds, which can be expected over all vehicles making a movement in the peak hour.

The results of analysis are summarised in Table 2.

Table 2 Summary - SIDRA Intersection 9 Analysis

	Approach	Degree of Saturation	95 th ile Queue	Average Delay
Huntingwood Drive / Brabham Drive				
AM Peak	Brabham Drive (s)	0.32	14m	6 secs
	Huntingwood Drive (e)	0.31	12m	10 secs
	Brabham Drive (n)	0.57	34m	7 secs
	Huntingwood Drive (w)	0.31	10m	9 secs
PM Peak	Brabham Drive (s)	0.48	26m	6 secs
	Huntingwood Drive (e)	0.71	43m	13 secs
	Brabham Drive (n)	0.33	14m	5 secs
	Huntingwood Drive (w)	0.24	9m	11 secs
Great Western Highway / Brabham Drive				
AM Peak	Brabham Drive (s)	0.91	110m	54 secs
	Great Western Hwy (e)	0.49	80m	50 secs
	Doonside Road (n)	0.92	358m	73 secs
	Great Western Hwy (w)	0.91	281m	78 secs
PM Peak	Brabham Drive (s)	0.92	320m	73 secs
	Great Western Hwy (e)	0.90	251m	72 secs
	Doonside Road (n)	0.92	190m	65 secs
	Great Western Hwy (w)	0.53	115m	57 secs
Great Western Highway / Huntingwood Drive				
AM Peak	Huntingwood Drive (s)	0.58	45m	62 secs
	Great Western Hwy (e)	0.34	73m	7 secs
	Great Western Hwy (w)	0.62	157m	6 secs
PM Peak	Huntingwood Drive (s)	0.77	122m	62 secs
	Great Western Hwy (e)	0.77	279m	18 secs
	Great Western Hwy (w)	0.37	83m	8 secs
Great Western Highway / Reservoir Road				
AM Peak	Reservoir Road (s)	0.98	197m	38 secs
	Great Western Hwy (e)	0.70	206m	49 secs
	Reservoir Road (n)	1.01	352m	106 secs
	Great Western Hwy (w)	1.02	371m	109 secs
PM Peak	Reservoir Road (s)	1.07	1,293m	124 secs
	Great Western Hwy (e)	1.08	350m	115 secs
	Reservoir Road (n)	1.01	351m	101 secs
	Great Western Hwy (w)	1.07	230m	92 secs

Table 2 reveals that the immediate intersections which provide connectivity from Huntingwood Drive to the wider network (Huntingwood Drive / Brabham Drive - roundabout and Great Western Highway / Huntingwood Drive - signals) operate within acceptable parameters within their existing conditions during the recorded peak AM and PM periods, with motorists experiencing manageable delays and queues.

The intersection of Great Western Highway / Brabham Drive is currently operating close to its saturation point evidenced by decreases in level of service from queues and delays.

The intersection of Great Western Highway / Brabham Drive is currently operating beyond its saturation point with motorists experiencing poor levels of services on all approaches from large queues and delays.

3.5 Public Transport

The site has moderate connections to existing public transport facilities as shown in Figure 6 and summarised below:

- Route 723: Mount Druitt to Blacktown - operating along Huntingwood Drive with bus stops along the site frontage;
- Route 724: Blacktown to Arndell Park - operating along Reservoir Road and Brabham Drive with bus stops located approximately 500m walking distance at the intersection of Huntingwood Drive and Brabham Drive.

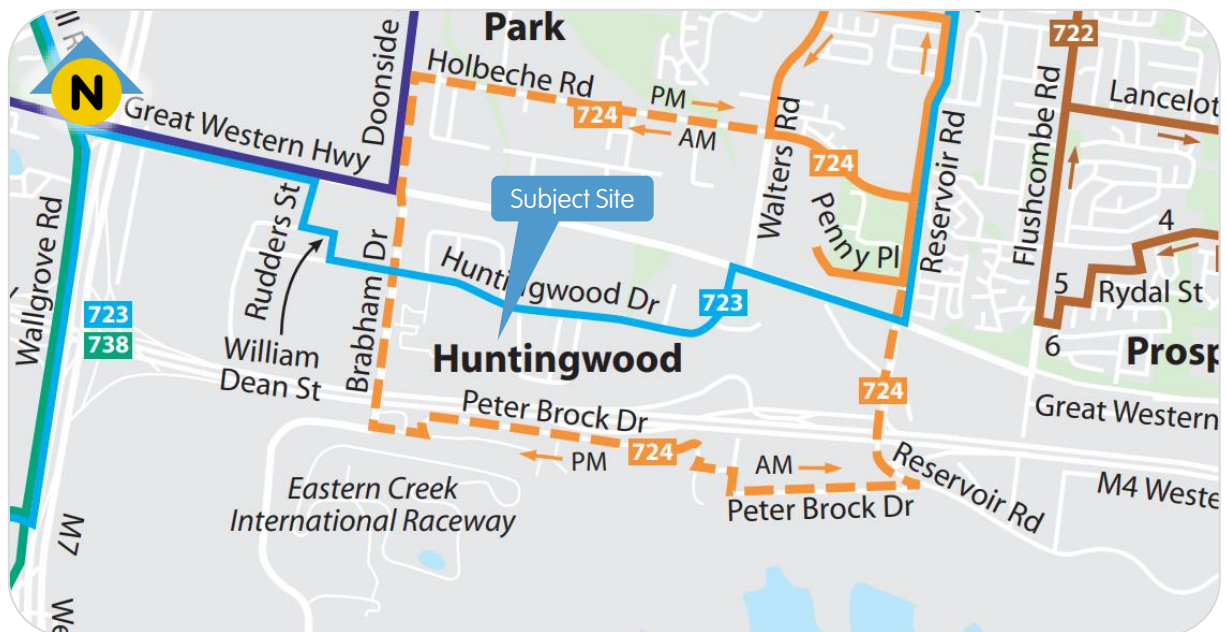


Figure 6 Public Transport Network

4 Development Proposition

4.1 Use and Yield

It is proposed to develop the subject site for the purpose of a data storage centre, in a staged arrangement as outlined within Table 3.

Table 3 Development Proposal

	Support Space	Office	Data Hall
Phase 1	34,971 sqm	2,530 sqm	32,134 sqm
Phase 2	41,010 sqm	-	35,043 sqm
Phase 3	44,803 sqm	-	53,210 sqm
Total	120,784 sqm	2,530 sqm	120,387 sqm

The data centre is proposed to operate on a 24 hour per day / 7 day per week basis, with up to 250 staff even split between three (3) shifts over a 24-hour period as follows:

- 8:00am - 4:00pm
- 4:00pm - 12:00am
- 12:00am - 8:00am.

On this basis, up to 80-85 staff will be onsite at any one time.

4.2 Parking and Access

A total of 137 car parking spaces are proposed inclusive of three (3) DDA compliant spaces. Of the 137 spaces, 134 spaces are provided within secure areas at the northern and eastern sides of the site, with three (3) spaces provided at the entry control point of the site.

A total of 10 bicycle spaces in the form of five (5) double sided bicycle racks are proposed adjacent to the main office entry point.

Site access is proposed via separate entry and exit crossovers to Huntingwood Drive, in addition to a combined entry / exit emergency access crossover at the north-western corner of the site. The main entry provides access to the security control point allowing either access into the secure area of the site, or to the rejection lane which links to the exit crossover.

Once within the secure area of the site, internal loop roads provide access to car parking areas, loading docks, and maintenance areas for plant. All site access and internal loop roads are designed to accommodate up to 19m articulated vehicles.

We are advised the frequency of 19m articulated vehicles will be very limited to less than 1 movement per week associated with replacement / maintenance of plant equipment only, during site operation. The site will accommodate up to 12 heavy rigid vehicles (12.5m) per day.

Details on vehicle access requirements during the construction stage can be obtained from the Construction Traffic Management Plan prepared for the Development Application (ref: IMP2203003CTMP01F03, dated 30 May 2022).

The access arrangements are shown within Figure 7.

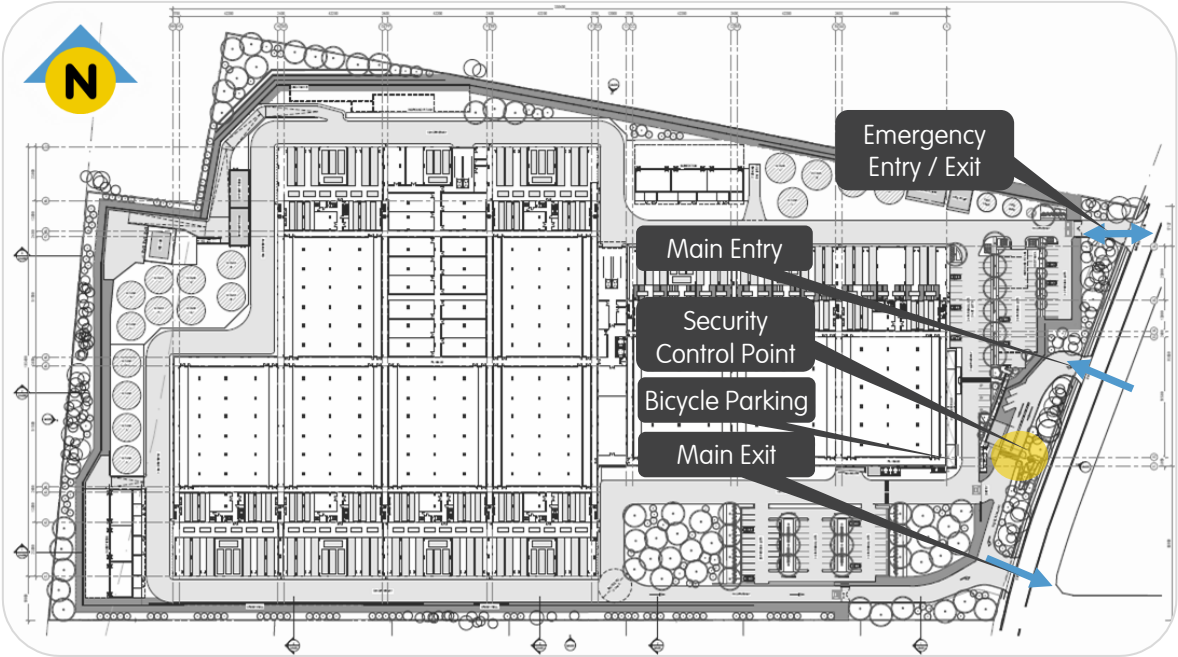


Figure 7 **Site Access Arrangements**

5 Parking Considerations

5.1 Car Parking

The relevant controls relating to the provision of car parking are outlined within the Blacktown Development Control Plan, 2015 (BDCP) as follows:

5.1.1 Objectives

The objective of Section 6 of Part A of the BDCP is to provide a comprehensive guide for the provision of parking for new development in order to:

- Ensure adequate traffic safety and management.
- Ensure an adequate environmental quality of parking areas (both safety and amenity).
- Provide parking areas that are convenient and sufficient for the use of employees and visitors generated by new developments.

5.1.2 Provision Requirements

Car parking is to be provided for specific types of development in accordance with the standards shown in Table 6.1. Parking is to be provided off-street and is to be readily identifiable and accessible from public roads. The following rate applies to the proposed use:

Office: 1 space per 40 sqm GFA.

Application of the above rate reveals a requirement for **63 spaces**. It is planned to provide **137 spaces** on site.

Table 6.1 however does not provide a car parking rate for a 'data centre' use. For activities not specifically mentioned, car parking requirements will be determined on the merits of the application.

5.1.3 Car Parking Demand Assessment

To determine the car parking requirements associated with the entire use, reference is drawn to the ABS Census 2016 Method of Travel to Work data for the local government area of Blacktown to provide guidance on the baseline number of staff / customers to the site which are expected to utilise private vehicle mode share, and thus generate parking demands at the site.

Table 4 Journey to Work Data (Commuting to Blacktown) - 2016 Census Data

Mode of Travel for 'journey to work' trips to Blacktown	Mode Split %
Car (as driver)	73.3%
Car (as passenger)	5.6%
Train	3.7%
Bus	1.9%
Motorcycle / Scooter	0.4%
Walking	1.5%
Cycling	0.2%
Work from Home / Did not go to Work	11.4%
Other	2.0%

On the basis of the maximum number of staff on site at any one time (80-85 staff) and the current proportion of private vehicle trips / mode share for workers within the Blacktown local government area (73%), up to 62 spaces are estimated to be required to accommodate peak staffing numbers at the site.

Notwithstanding the above, the area of Huntingwood is considered to exhibit a reduced connection to public and alternative transport services in comparison to Blacktown, with a greater proportion of staff expected to drive to the site. For the purposes of the assessment and consistent with the prepared Green Travel Plan for the site, the following mode split has been assumed as outlined in Table 5.

Table 5 Journey to Work Data (Commuting to Huntingwood) - Site Specific

Mode of Travel for 'journey to work' trips to Huntingwood	Rationale	Mode Split %
Car (as driver)	Driver trips replace N/A modes beyond ABS rate	80.6%
Car (as passenger)	Share trips encouraged - ABS rate maintained	5.6%
Train	No train services in close proximity - ABS rate reduced	0%
Bus	Limited bus services - ABS rate maintained	1.9%
Motorcycle / Scooter	No motorcycle parking proposed - ABS rate maintained	0.4%
Walking	Limited path network - ABS rate maintained	1.5%
Cycling	10 spaces provided	10.0%
Work from Home / Did not go to Work	Not applicable to site	0%
Other	Not applicable to site	0%

Application of the above 'driver' mode of travel rate to the 85 staff results in a car parking demand for 65-69 spaces per shift. Allowance is also required however for arriving staff prior to their shift, when staff of the current shift are still at the site. On this basis, for a short period around shift changeover time, a demand for 65-69 spaces for staff on the current shift plus a further 65-69 spaces for staff arriving for the next shift results in a total demand for 130-138 spaces.

The provision of 137 spaces will satisfy the peak car parking demands generated by the site.

5.1.4 DDA Car Parking

As defined by Section 4.8 of Part E of the BDCP, the provision of DDA compliant parking shall be provided as follows which are clearly marked and signposted for this purpose, and located as close as possible to the building's entrance:

All Developments of 50 or more spaces: 2% (or part thereof).

Application of the above rate reveals a requirement for **3 spaces**.

The provision of three (3) DDA compliant spaces located close to the building entrance satisfies this requirement.

5.1.5 Conclusion - Car Parking Provision

We can conclude that an adequate number of spaces are provided to cater for the projected demand.

Accordingly, the development proposition satisfies the objective of Section 6 of Part A of the BDCP to:

- Ensure adequate traffic safety and management.
- Ensure an adequate environmental quality of parking areas (both safety and amenity).
- Provide parking areas that are convenient and sufficient for the use of employees and visitors generated by new developments.

5.2 Bicycle Parking

The BDCP does not specifically prescribe provision rates for bicycle parking requirements associated with a data centre. As outlined by Section 4.8 of Part E of the BDCP:

- Applicants are encouraged to incorporate, in the design of their buildings, safe storage/parking areas for bicycles, with adequate shower and change facilities provided for staff.

To satisfy the above requirements, the provision of 10 bicycle parking spaces are proposed adjacent the mains pedestrian entry area to the building.

6 Design Considerations

6.1 Car Parking and Access

The requirements guiding the design of car parking and access are outlined in the following sections of the BDCP:

- Part A - Section 6.4
- Part E - Section 4.7.

6.1.1 Part A - Section 6.4

We have assessed the proposed car parking design and access arrangements against the requirements of Part A - Section 6.4 of the BDCP. Our findings are as follows:

Requirements		Design Response	Status
Access			
1	Car parking areas should be designed so that vehicles can enter and leave the site in a forward direction.	All vehicles can enter and exit the site in a forward direction.	Comply
2	Ingress and egress to or from the site should be located where they will cause the least interference with vehicular and pedestrian movement on public roads. Direct access should not be gained off existing or proposed high volume roads where an alternative access can be provided.	Site access locations are proposed with adequate offsets to roads and neighbouring site access locations on a straight alignment of Huntingwood Drive.	Comply
3	Road access to parking areas will not be permitted in close proximity to traffic signals, intersections or where sight distance is considered inadequate by Council in accordance with Austroads Guide to Traffic Management.	Site access locations are proposed with adequate offsets to roads and intersections on a straight alignment of Huntingwood Drive where adequate sight distance can be achieved.	Comply
4	The number of access points to be provided from any site to any one street frontage should be limited to one ingress and one egress.	The site proposes one ingress and one egress connection to Huntingwood Drive, in addition to an emergency access to provide convenient access past security control points in the event of an emergency only.	Comply
5	Parking areas should have a separate entrance and exit where more than 50 spaces are provided or where the development generates a high turnover of traffic, such as a supermarket or a drive-in service facility.	Separate entry and exit connections proposed.	Comply
6	The potential for on-street queuing should be eliminated by the provision of sufficient standing area for vehicles entering the carpark and loading areas.	Queuing area is proposed indented to the site to reduce / eliminate vehicle queuing back to Huntingwood Drive.	Comply

Requirement	Design Response	Status
Manoeuvring		
1 All parking bays should be readily accessible. The provision of adequate space for the manoeuvring of vehicles, particularly rigid and articulated heavy vehicles, may be necessary depending upon the type of development. The NSW Roads and Maritime Services' standards for car, truck and semi-trailer design turning paths should be used to determine the layout of parking areas.	Swept path analysis contained within Appendix A shows adequate ability for manoeuvring of vehicles within the site.	Comply
2 Dead-end parking aisles will generally not be permitted. Consideration will be given to their provision in small parking areas or when reserved for a specific low turnover use (such as for employees) which is signposted in that way.	Car parking areas with dead end aisles will be for allocated staff use only.	Comply
Bay and Aisle Dimensions		
1 Minimum bay and aisle dimensions are outlined in the Australian Standards and have been incorporated into Table 6.2.	Car parking spaces are provided in accordance with AS2890.1:2004 with car spaces measuring 2.6m wide by 5.4m long accessed from a 6.0m wide aisle.	Comply
2 Bays should be greater than the minimum dimensions when located adjacent to an obstruction wall, fence or the like.	Car parking bays not located directly adjacent obstructions.	Comply
Service Vehicle Areas		
1 Service vehicle areas should be provided off-street with convenient access. In larger developments, service areas should operate independently of other parking areas.	Services are provided off-street and separate from parking areas.	Comply
Pedestrians		
1 Parking areas should be designed to minimise the potential for vehicular / pedestrian conflict. Pedestrian pathway connections between car parking areas and buildings are desirable.	Pedestrian paths are provided between car parking areas and the building entrance.	Comply
Parking for Persons with a Disability		
1 In all parking areas, Council wishes to encourage the provision of parking spaces for the disabled, located to allow convenient and safe access within sites. All parking areas must provide for disabled drivers in accordance with the provisions of the Building Code of Australia. Such spaces shall be clearly marked and signposted for this purpose.	The provision of three (3) DDA compliant spaces located close to the building entrance satisfies this requirement.	Comply

6.1.2 Part E - Section 4.7

We have assessed the proposed car parking design and access arrangements against the requirements of Part E - Section 4.7 of the BDCP. Our findings are as follows:

Requirements	Design Response	Status
Vehicular Access and Circulation		
1 Adequate vehicular entrance to and exit from the development is to be provided and designed in order to provide safety for pedestrians and vehicles using the site and adjacent roadways. It is preferable that separate ingress and egress be provided to minimise vehicular conflict within development sites. Vehicular ingress and egress to the site must be in a forward direction at all times.	All vehicles can enter and exit the site in a forward direction via separate ingress and egress points.	Comply
2 All developments must be designed and operated so that a standard single unit truck as defined by Austroads Design Vehicles and Turning Path Templates (Austroads 2013) may complete a 3-point or semi-circular turn on the site without interfering with parked vehicles, buildings, landscaping or outdoor storage and work areas. Largescale developments shall be designed to accommodate semi-trailers. In general, turning circles will be required to be provided to accommodate the largest type of truck which could reasonably be expected to service the site.	Swept path analysis contained within Appendix A shows adequate ability for manoeuvring of vehicles within the site, including semi-trailer vehicles.	Comply
3 All internal two-way roadways are to have a minimum width of 7m. Lesser widths may be considered for one-way aisles. All internal roadways, circulation and parking areas are to be sealed with a hard-standing, all-weather material. Direction arrows are to be shown on all internal roadways in order to facilitate the satisfactory movement of vehicles.	Internal two-ways are a minimum of 7m.	Comply
4 Adequate space is to be provided within the site for the loading, unloading and fuelling (if applicable) of vehicles.	Swept path analysis contained within Appendix A shows adequate ability for manoeuvring of vehicles within the site, including semi-trailer vehicles.	Comply
5 Developments are to comply with the requirements of Austroads Guide to Traffic Management - Part 12: Traffic Impacts on Development in relation to the number, location and design of vehicular entry and exit points.	Access points comply with the requirements of Part A - Section 6.4 of the BDCP	Comply
6 Direct vehicular access is denied between individual sites and any road zoned SP2 Infrastructure - Classified Road or SP2 Infrastructure - Local Road in Blacktown LEP 2015 except in special circumstances as outlined in Clause 7.9 of Blacktown LEP 2015 (Development with frontage to a road zoned SP2 Infrastructure - Local Road or SP2 Infrastructure - Classified Road).	The site does not have a road frontage to any other road. The site is currently operational thus no safety, efficiency or ongoing operational issues to Huntingwood Drive could be expected from redevelopment of the site.	Comply

Requirement	Design Response	Status
Car Parking		
1 Car parking areas, if possible, should be located immediately behind the minimum setback area and in front of any activity on the site. This arrangement encourages the use of off-street car parking, making the development more attractive to visitors and employees. In addition, car parking areas should be accessible to all parts of the industrial development which they serve.	Car parking is provided at the front of the site.	Comply
2 Parking facilities for commercial vehicles should be designed to accommodate the largest type of truck which could reasonably be expected to park on the site.	Swept path analysis contained within Appendix A shows adequate ability for manoeuvring of vehicles within the site, including semi-trailer vehicles.	Comply
3 Sufficient spaces should be provided for parking for persons with a disability. All developments providing 50 parking spaces or more must provide at least 2% or part thereof of those spaces for disabled drivers, clearly marked and signposted for this purpose and located as close as possible to the building's entrance	The provision of three (3) DDA compliant spaces located close to the building entrance satisfies this requirement.	Comply
4 Whilst not negating the need for a landscaped buffer at the primary street frontage of properties, car parking areas should be visible from the road providing access to the site. This encourages the use of off-street car parking by both visitors and employees. In addition, car parking areas should be accessible to all parts of the development which they serve.	Car parking is visible from the road.	Comply

Note: Vehicle grades have not been assessed as part of this design review.

6.2 Bicycle Parking and Access

The BDCP does not provide any guidance on bicycle parking design requirements. Guidance for bicycle parking design is therefore taken from AS2890.3:2015 - Bicycle Facilities.

6.2.1.1 Design

The development plans outline the provision of five (5) double sided ground mounted bicycle racks each within a 1.0m by 1.7m envelope accessible from a minimum 1.5m access aisle.

6.2.1.2 Conclusion - Bicycle Parking

We can conclude that bicycle parking provided as part of this development satisfies the requirements of AS2890.3:2015.

7 Traffic Considerations

7.1 Traffic Generation & Directional Splits

7.1.1 Staff Movements

The site is proposed to operate as a data centre, with the primary vehicle movements to and from the site generated by staff arrivals and departures.

Having regard for the number of staff per shift, the travel mode split of staff (i.e. 80.6% driver) and the shift commencement / completion times, the following movements can be attributed to the proposal:

- **Shift 1: 8:00am - 4:00pm:**
 - 69 arrival movements between 7:00am - 8:00am
 - 69 departure movements between 4:00pm - 5:00pm
- **Shift 2: 4:00pm - 12:00am:**
 - 69 arrival movements between 3:00pm - 4:00pm
 - 69 departure movements between 12:00am - 1:00am
- **Shift 3: 12:00am - 8:00am:**
 - 69 arrival movements between 11:00pm - 12:00am
 - 69 departure movements between 8:00am - 9:00am

Outlined within Section 3.4.1, the recorded AM and PM road network peak periods are identified as:

- AM: 7:15am-8:15am
- PM: 4:30pm-5:30pm

Conservatively assuming all 69 arrivals movements associated with Shift 1 and all departure movements associated with Shift 3 occur within the peak period, **69 inbound and 69 outbound movements** will occur within the AM peak.

In the PM peak, arrival movements associated with Shift 2 will occur prior to the commencement of the PM road network peak, and thus the site will generate **69 outbound movements** associated with Shift 1 only within the PM peak.

7.1.2 Delivery Movements

We are advised up to 12 heavy rigid vehicles attend the site per day, thus generating 12 inbound and 12 outbound movements across the day. It is generally accepted peak hour movements equate to 10% of daily movements equating to 1 inbound and 1 outbound movement in each peak period. For the purpose of this assessment, **2 inbound and 2 outbound movements** are anticipated in each peak period.

The following directional split of traffic is anticipated:

- West via Great Western Highway: 40%
- East via Great Western Highway: 20%
- East via Western Motorway: 20%
- North via Doonside Road: 5%
- North via Reservoir Road: 15%

On the basis of the above, Figure 8 and Figure 9 show the site generated traffic of the proposal, for the AM and PM peak periods, respectively.

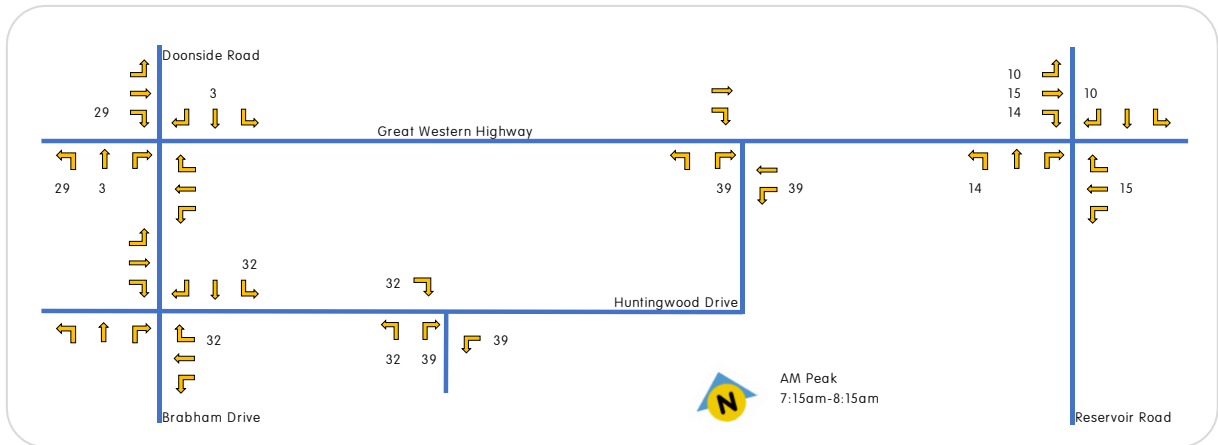


Figure 8 AM Site Generated Traffic Volumes

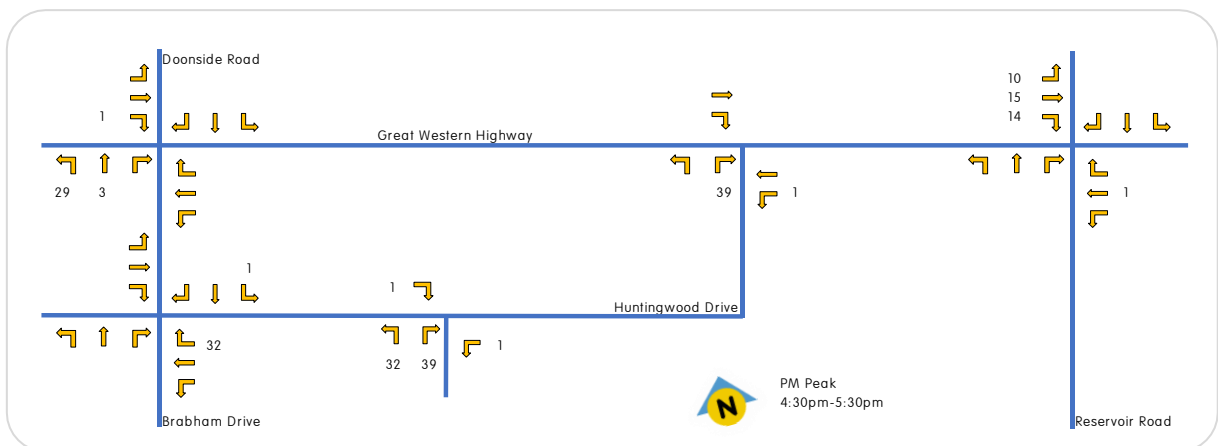


Figure 9 PM Site Generated Traffic Volumes

7.2 Traffic Impact

7.2.1 Immediate Post Development Traffic Volumes (2024)

To allow for traffic generation from future development of surrounding land parcels in addition to having consideration for organic growth of traffic volumes, a 1% compounding growth factor has been applied to the existing traffic volumes collected by **IMPACT**® as outlined within Section 3.4.1. The growth has applied to the design year 2024 to correlate with expected commissioning of the site, in addition to a future 10-year post development design year – 2034.

In both design year scenarios, an assessment 'without development' is compared to a 'with development' assessment to determine the impact of the site generated traffic on the road network.

Figure 10 and Figure 11 outline the 2024 design year 'without development' traffic volumes.

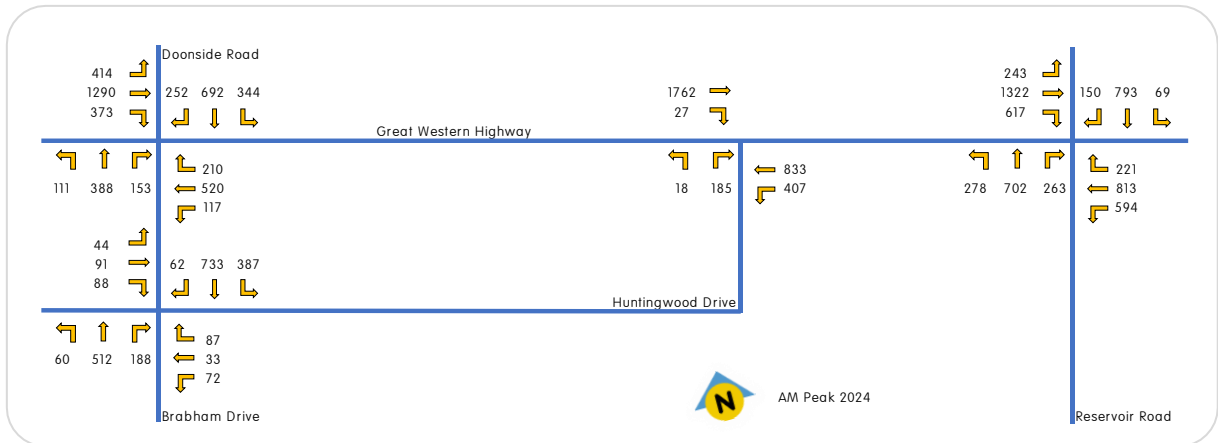


Figure 10 AM 2024 Without Development Volumes

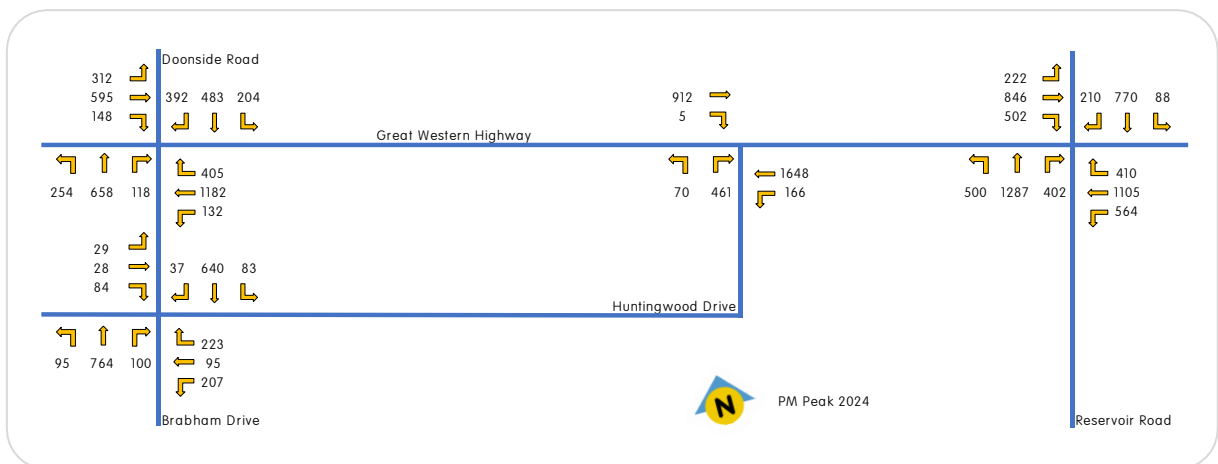


Figure 11 PM 2024 Without Development Volumes

The 'with development' volumes have been ascertained by adding the site generated traffic to the 2024 background traffic ('without development' traffic volumes).

The 'with development' volumes are shown within Figure 12 and Figure 13, for the AM and PM peak periods, respectively.

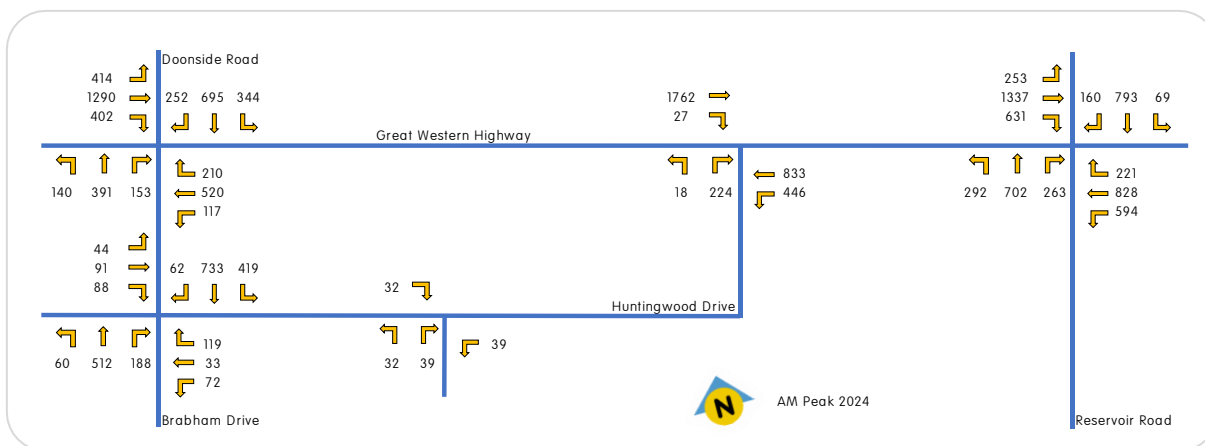


Figure 12 AM 2024 With Development Volumes

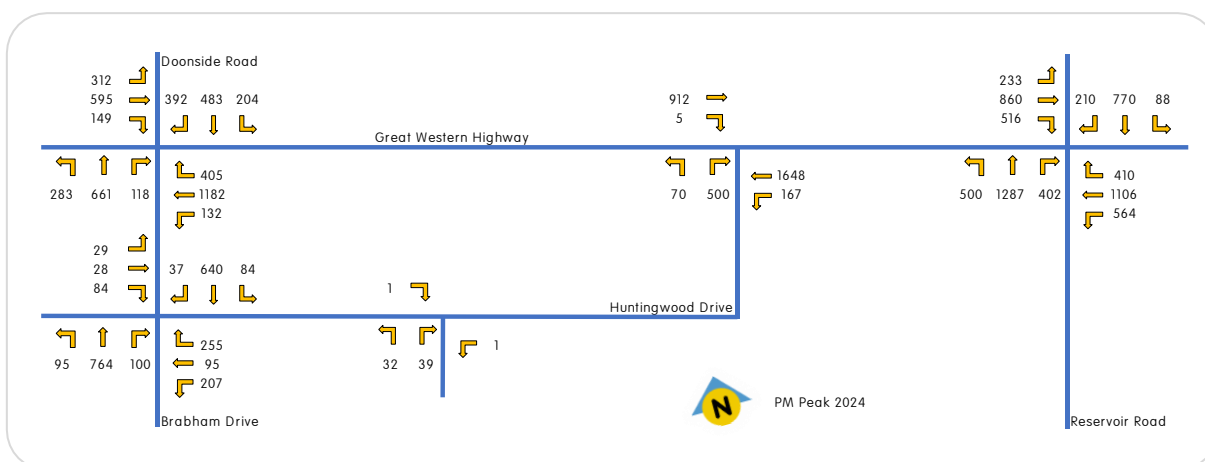


Figure 13 PM 2024 With Development Volumes

The operation of the critical intersections identified within Section 3.4.2 has been undertaken using SIDRA Intersection 9.

For the purposes of the assessment, the analysis does not calibrate the intersections, rather it is utilised as comparison tool to compare the 'without development' and 'with development' conditions by adopting the same parameters and allowing SIDRA to assign the most efficient signal phase timing.

Signalised intersections have been assumed to operate with leading right turn / diamond phasing commensurate with existing phasing arrangements.

This comparison is shown within Table 6.

Table 6 Summary - SIDRA Intersection 9 Analysis: 2024 Without vs With Development

Approach		Degree of Saturation		95 th ile Queue		Average Delay	
		<i>Without</i>	<i>With</i>	<i>Without</i>	<i>With</i>	<i>Without</i>	<i>With</i>
Huntingwood Drive / Brabham Drive							
AM Peak	Brabham Drive (s)	0.33	0.34	15m	15m	6 secs	6 secs
	Huntingwood Drive (e)	0.32	0.37	12m	15m	10 secs	11 secs
	Brabham Drive (n)	0.59	0.61	37m	39m	7 secs	7 secs
	Huntingwood Drive (w)	0.32	0.32	11m	11m	9 secs	9 secs
PM Peak	Brabham Drive (s)	0.50	0.52	27m	30m	7 secs	7 secs
	Huntingwood Drive (e)	0.74	0.78	47m	55m	14 secs	15 secs
	Brabham Drive (n)	0.34	0.34	15m	15m	5 secs	5 secs
	Huntingwood Drive (w)	0.26	0.26	9m	10m	11 secs	12 secs
Great Western Highway / Brabham Drive							
AM Peak	Brabham Drive (s)	0.93	0.93	114m	129m	55 secs	54 secs
	Great Western Hwy (e)	0.50	0.48	82m	83m	50 secs	51 secs
	Doonside Road (n)	0.94	0.94	383m	387m	78 secs	78 secs
	Great Western Hwy (w)	0.93	0.96	297m	313m	82 secs	90 secs
PM Peak	Brabham Drive (s)	0.94	0.95	340m	361m	78 secs	82 secs
	Great Western Hwy (e)	0.94	0.94	280m	279m	82 secs	82 secs
	Doonside Road (n)	0.91	0.95	195m	194m	64 secs	68 secs
	Great Western Hwy (w)	0.55	0.55	119m	119m	58 secs	58 secs
Great Western Highway / Huntingwood Drive							
AM Peak	Huntingwood Drive (s)	0.60	0.61	46m	55m	62 secs	61 secs
	Great Western Hwy (e)	0.34	0.35	75m	80m	7 secs	8 secs
	Great Western Hwy (w)	0.63	0.65	164m	177m	6 secs	7 secs
PM Peak	Huntingwood Drive (s)	0.78	0.78	126m	133m	63 secs	62 secs
	Great Western Hwy (e)	0.79	0.81	289m	302m	18 secs	20 secs
	Great Western Hwy (w)	0.38	0.38	85m	90m	8 secs	9 secs
Great Western Highway / Reservoir Road							
AM Peak	Reservoir Road (s)	1.04	1.04	233m	233m	45 secs	44 secs
	Great Western Hwy (e)	0.72	0.72	218m	218m	49 secs	49 secs
	Reservoir Road (n)	1.02	1.02	376m	378m	115 secs	116 secs
	Great Western Hwy (w)	1.03	1.04	397m	414m	113 secs	121 secs
PM Peak	Reservoir Road (s)	1.10	1.09	1,394m	1,454m	141 secs	150 secs
	Great Western Hwy (e)	1.10	1.10	375m	376m	127 secs	127 secs
	Reservoir Road (n)	1.02	1.05	376m	396m	110 secs	122 secs
	Great Western Hwy (w)	1.09	1.12	247m	271m	98 secs	106 secs

As shown within Table 6, the 'with development' scenario results in very little difference in intersection performance as a result of development traffic.

On the basis of the assessment presented, the proposal is not expected to unduly impact the intersection and road network with site generated traffic expected to have a negligible impact on the current operation of intersections in the vicinity of the site.

7.2.2 Future Post Development Traffic Volumes (2034)

As previously outlined, a 1% compounding growth factor has been applied to the existing traffic volumes collected by **IMPACT**® for a future 10-year post development design year – 2034.

An assessment 'without development' is compared to a 'with development' assessment to determine the impact of the site generated traffic on the road network.

Figure 14 and Figure 15 outline the 2034 design year 'without development' traffic volumes.

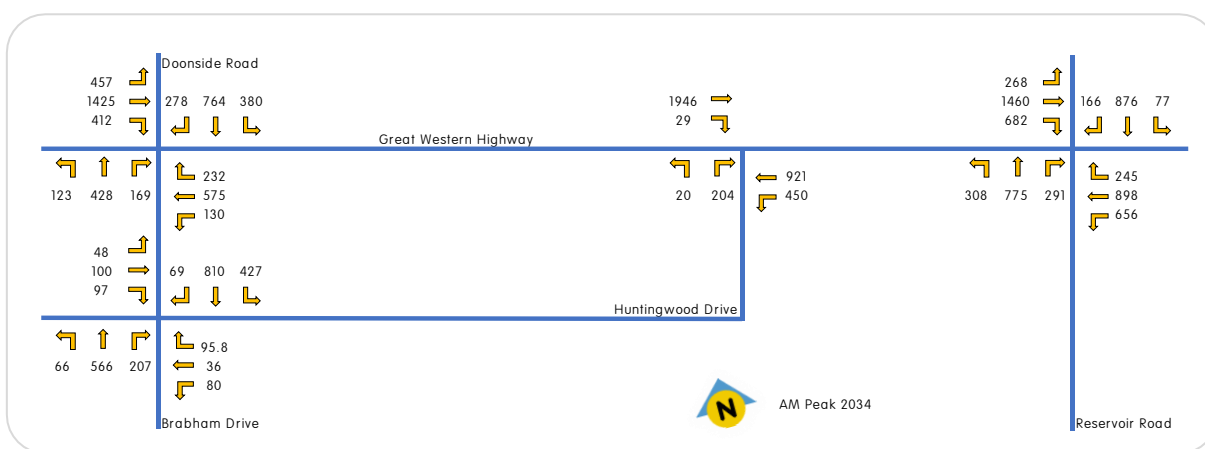


Figure 14 AM 2034 Without Development Volumes

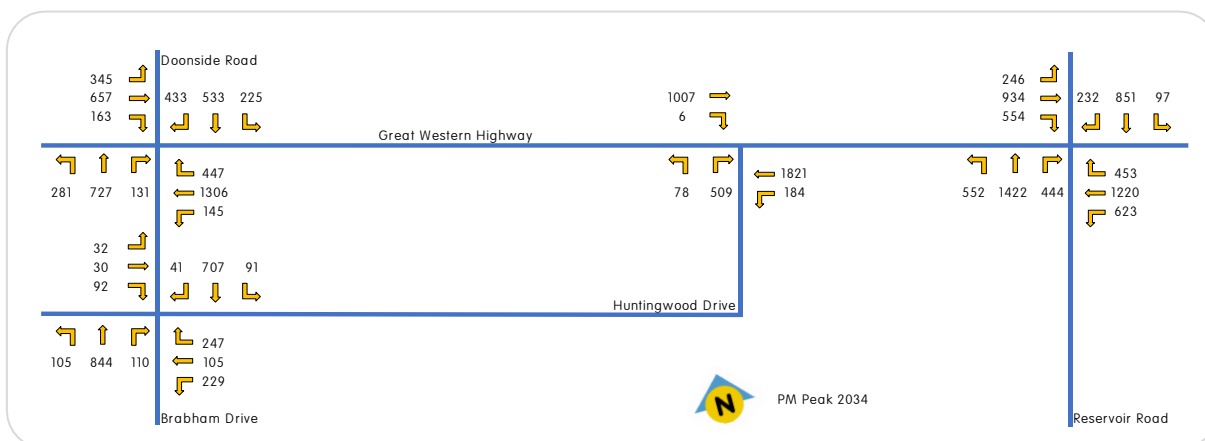


Figure 15 PM 2034 Without Development Volumes

The 'with development' volumes have been ascertained by adding the site generated traffic to the 2034 background traffic ('without development' traffic volumes).

The 'with development' volumes are shown within Figure 16 and Figure 17, for the AM and PM peak periods, respectively.

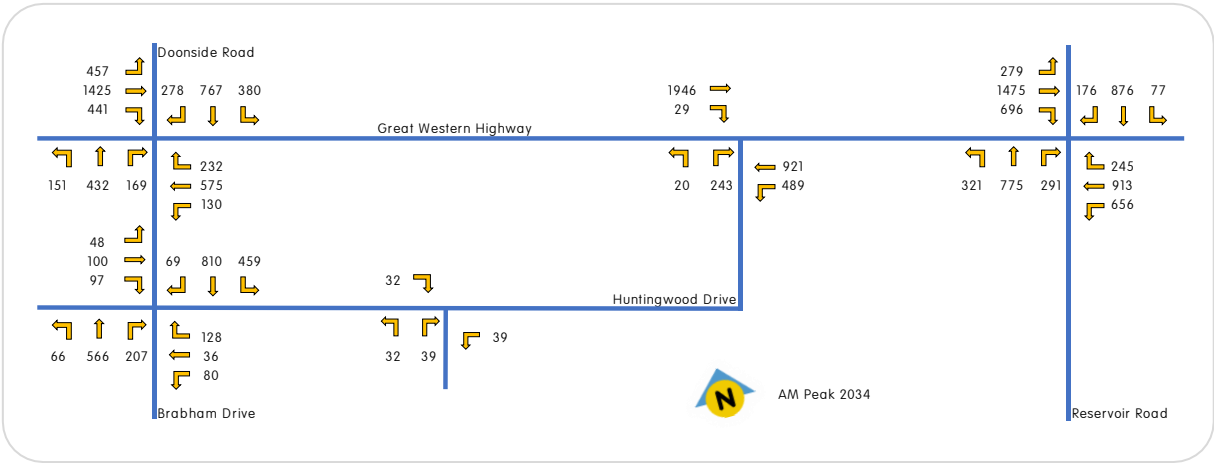


Figure 16 AM 2034 With Development Volumes

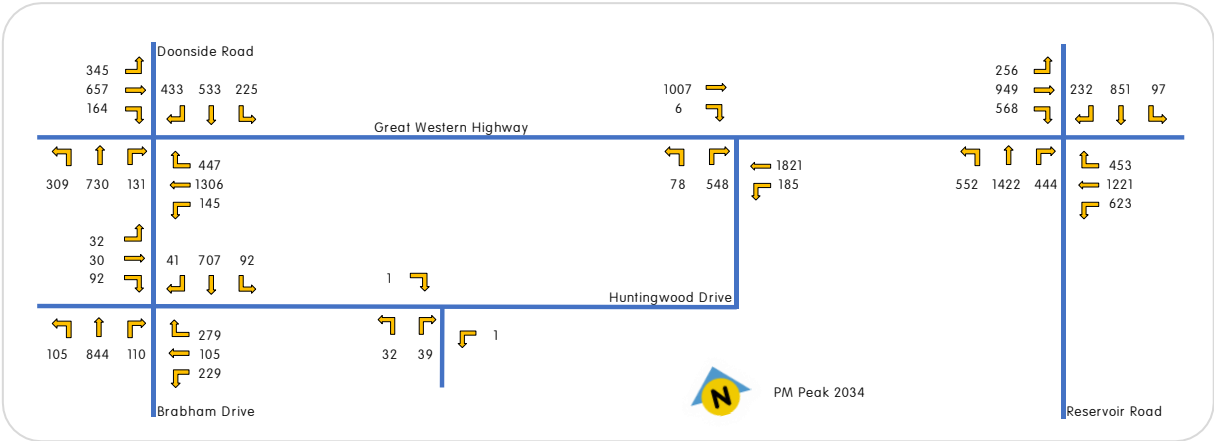


Figure 17 PM 2034 With Development Volumes

The operation of the previously identified intersections has been undertaken using SIDRA Intersection 9 as shown within Table 7.

Table 7 Summary - SIDRA Intersection 9 Analysis: 2034 Without vs With Development

Approach		Degree of Saturation		95 th ile Queue		Average Delay	
		<i>Without</i>	With	<i>Without</i>	With	<i>Without</i>	With
Huntingwood Drive / Brabham Drive							
AM Peak	Brabham Drive (s)	0.37	0.38	17m	18m	6 secs	6 secs
	Huntingwood Drive (e)	0.38	0.45	16m	20m	11 secs	12 secs
	Brabham Drive (n)	0.67	0.69	52m	55m	9 secs	9 secs
	Huntingwood Drive (w)	0.36	0.37	13m	14m	10 secs	10 secs
PM Peak	Brabham Drive (s)	0.58	0.60	38m	42m	8 secs	8 secs
	Huntingwood Drive (e)	0.86	0.91	73m	93m	19 secs	23 secs
	Brabham Drive (n)	0.38	0.38	17m	17m	5 secs	5 secs
	Huntingwood Drive (w)	0.31	0.32	12m	12m	12 secs	12 secs
Great Western Highway / Brabham Drive							
AM Peak	Brabham Drive (s)	1.03	1.03	142m	151m	64 secs	64 secs
	Great Western Hwy (e)	0.56	0.56	92m	92m	52 secs	52 secs
	Doonside Road (n)	1.04	1.04	548m	552m	122 secs	123 secs
	Great Western Hwy (w)	1.03	1.06	419m	419m	126 secs	134 secs
PM Peak	Brabham Drive (s)	1.04	1.05	483m	509m	125 secs	130 secs
	Great Western Hwy (e)	1.03	1.03	380m	380m	118 secs	118 secs
	Doonside Road (n)	1.02	1.04	244m	240m	85 secs	88 secs
	Great Western Hwy (w)	0.60	0.60	132m	132m	58 secs	58 secs
Great Western Highway / Huntingwood Drive							
AM Peak	Huntingwood Drive (s)	0.66	0.67	52m	61m	64 secs	63 secs
	Great Western Hwy (e)	0.38	0.39	86m	91m	7 secs	8 secs
	Great Western Hwy (w)	0.70	0.71	203m	220m	7 secs	8 secs
PM Peak	Huntingwood Drive (s)	0.88	0.89	178m	223m	79 secs	86 secs
	Great Western Hwy (e)	0.88	0.90	428m	490m	26 secs	31 secs
	Great Western Hwy (w)	0.41	0.42	105m	119m	9 secs	11 secs
Great Western Highway / Reservoir Road							
AM Peak	Reservoir Road (s)	1.11	1.15	298m	328m	54 secs	61 secs
	Great Western Hwy (e)	0.79	0.80	261m	265m	50 secs	51 secs
	Reservoir Road (n)	1.13	1.13	531m	532m	180 secs	180 secs
	Great Western Hwy (w)	1.15	1.15	557m	577m	189 secs	191 secs
PM Peak	Reservoir Road (s)	1.23	1.23	1,923m	1,923m	232 secs	232 secs
	Great Western Hwy (e)	1.21	1.21	514m	516m	189 secs	190 secs
	Reservoir Road (n)	1.10	1.10	505m	505m	155 secs	155 secs
	Great Western Hwy (w)	1.20	1.23	340m	367m	134 secs	144 secs

As shown within Table 7, the 'with development' scenario results in very little difference in intersection performance as a result of development traffic.

On the basis of the assessment presented, the proposal is not expected to unduly impact the intersection and road network with site generated traffic expected to have a negligible impact on the current operation of intersections in the vicinity of the site.

APPENDIX A

Swept Path Analysis

Design Vehicles

- 8.8m Medium Rigid Vehicle
- 12.5m Heavy Rigid Vehicle
- 19m Articulated Vehicle

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- GENERAL NOTES:
1. ALL DIMENSIONS ARE TO FACE OF KERB AND CHANNEL UNLESS NOTED OTHERWISE.
 2. LOCAL ROADS
 - HUNTINGWOOD DRIVE (SPEED ZONE 60KM/H).
 - HEALY CIRCUIT (SPEED ZONE 50KM/H)DECLARED ROADS
 - WESTERN HIGHWAY(SPEED ZONE 100KM/H).
 3. BASE INFORMATION FROM NEARMAP AERIAL PHOTOGRAPHY DATED 17.02.2022 AND EMKC3 A-SD-DU-0040[]_TRAFFIC STRATEGY_.dwg DATED 04.07.202

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Client
EMKC3

Project
**COMMERCIAL DEVELOPMENT
51 HUNTINGWOOD DRIVE, HUNTINGWOOD
CITY OF BLACKTOWN**

Title
**TRAFFIC & TRANSPORT IMPACT ASSESSMENT
SITE LAYOUT PLAN**

Status
PRELIMINARY

Revision Description
ISSUED FOR SSDA SUBMISSION

Date
2022-07-11
Drawn / Approved
JT / SM

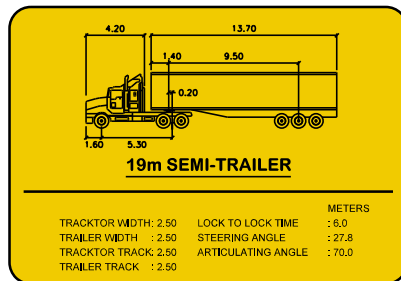
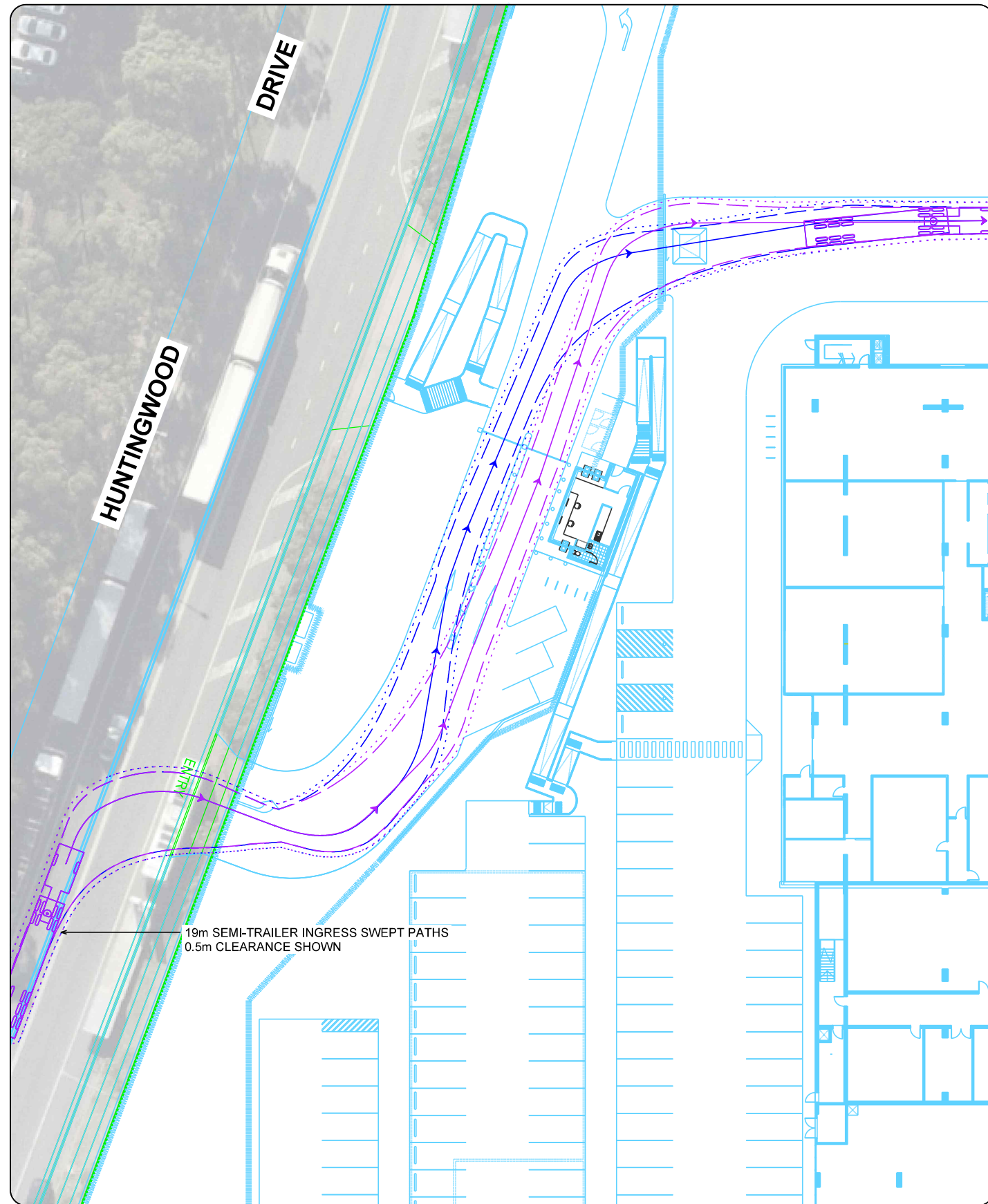
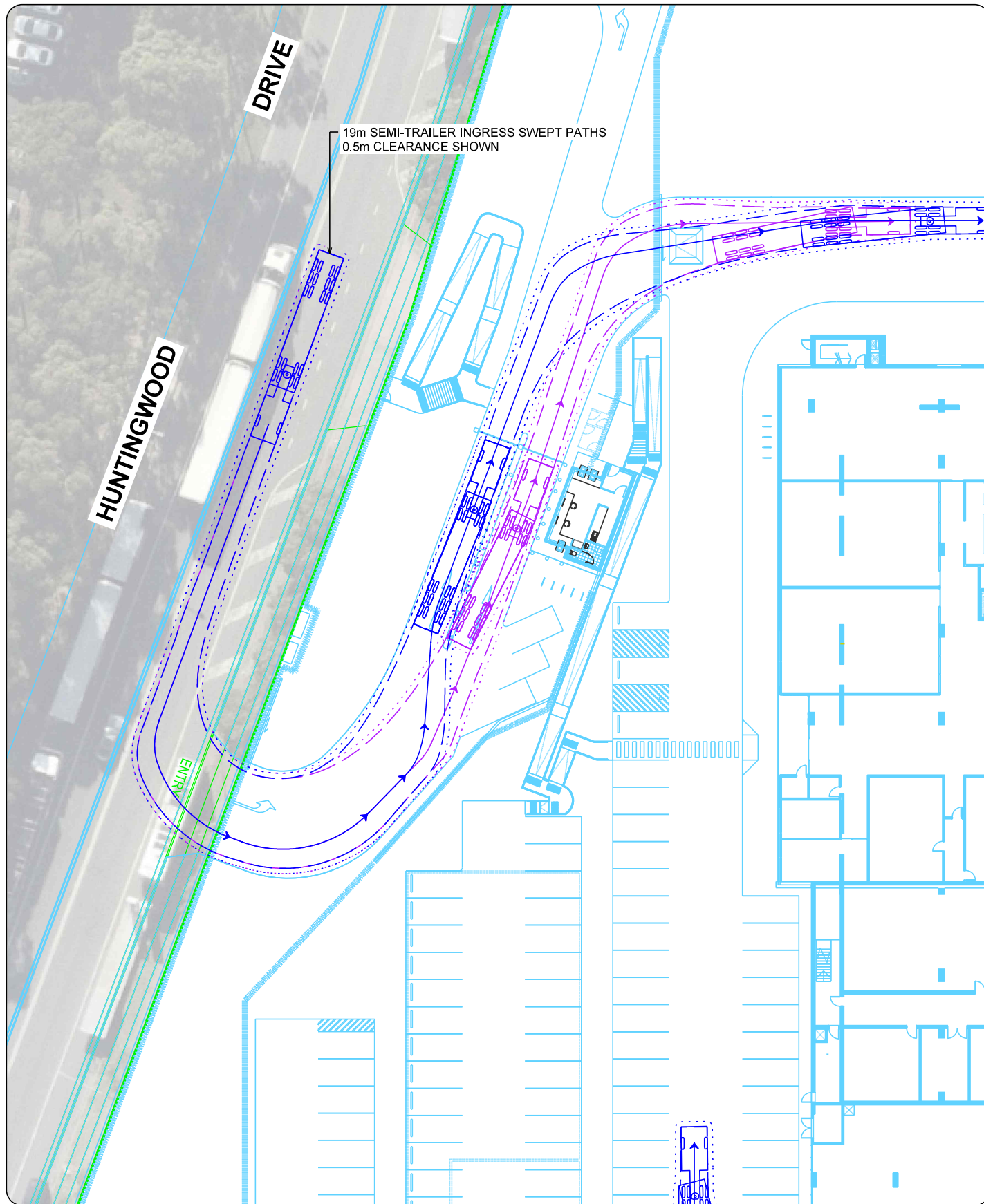
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Revision

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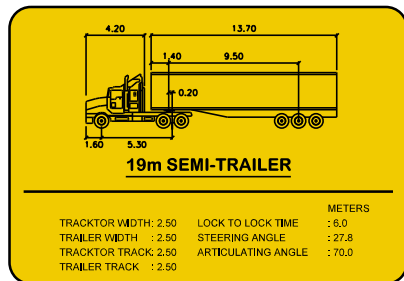
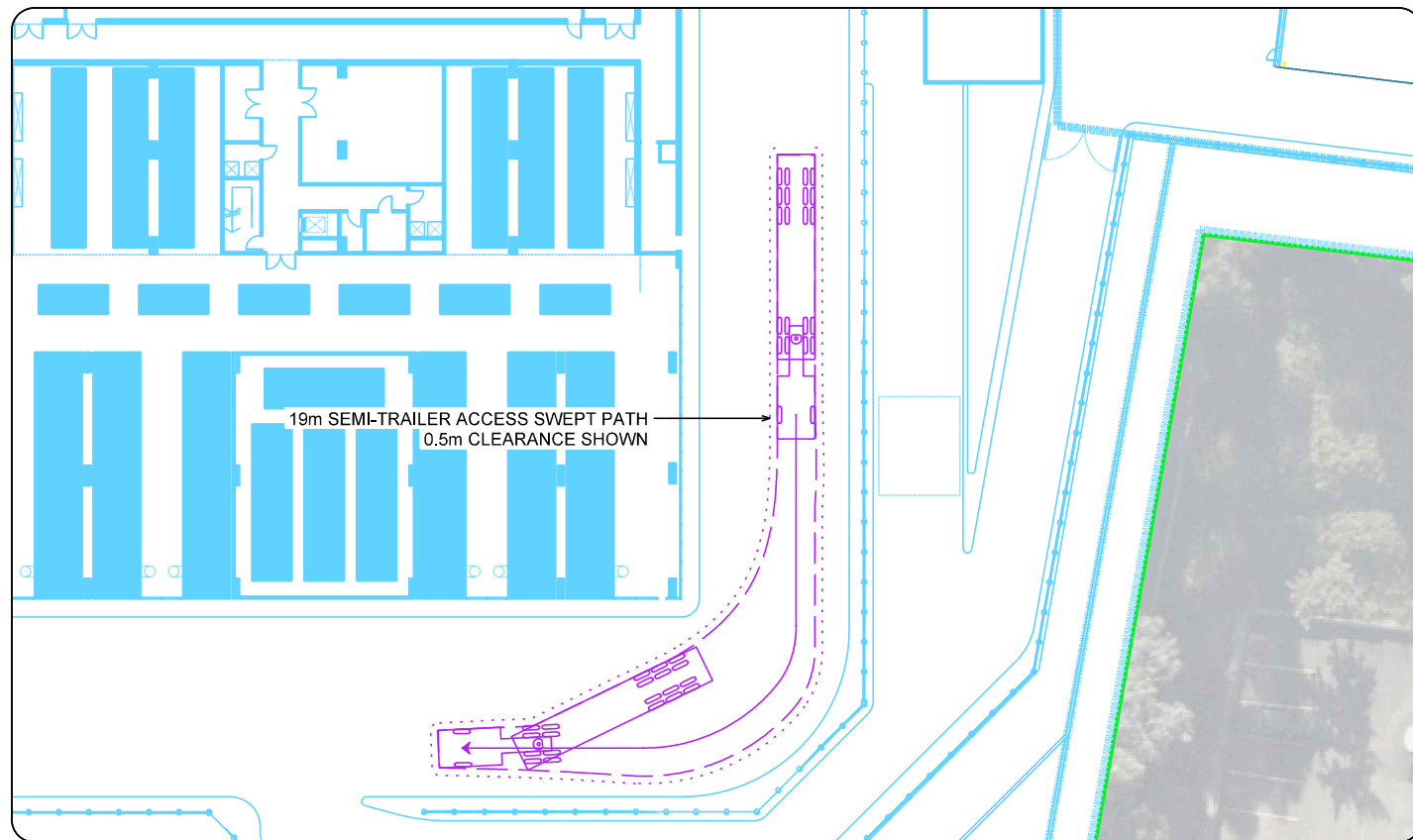
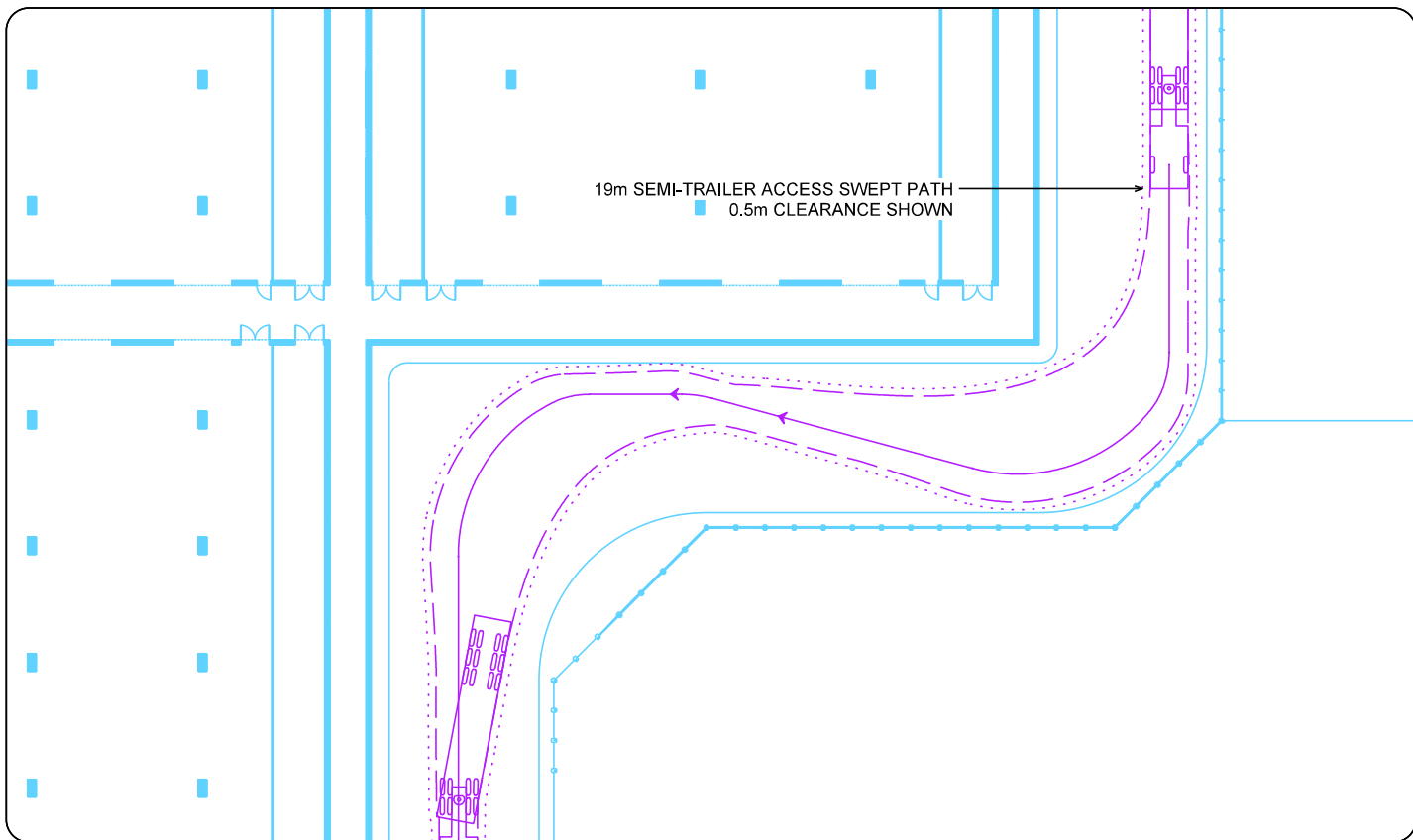
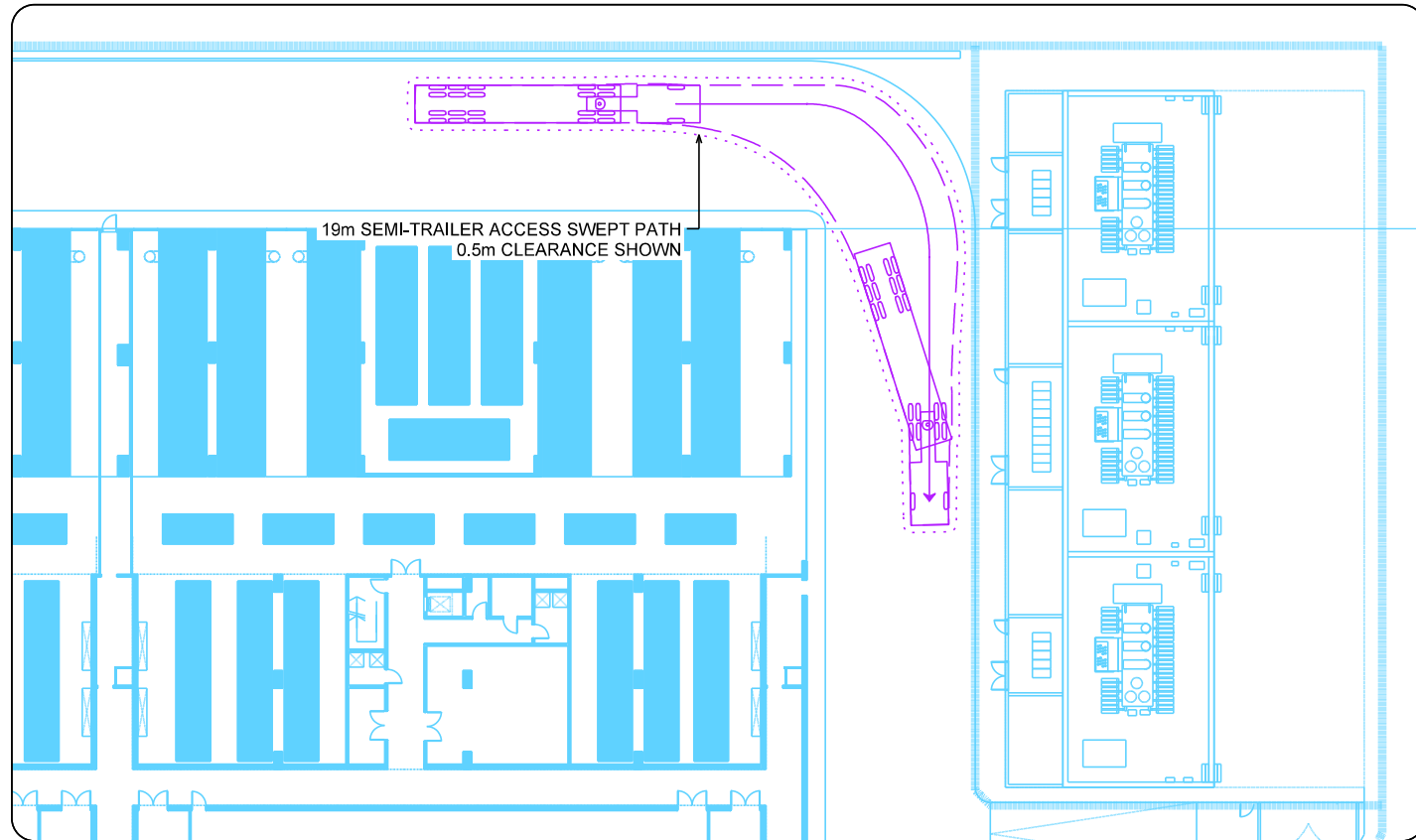
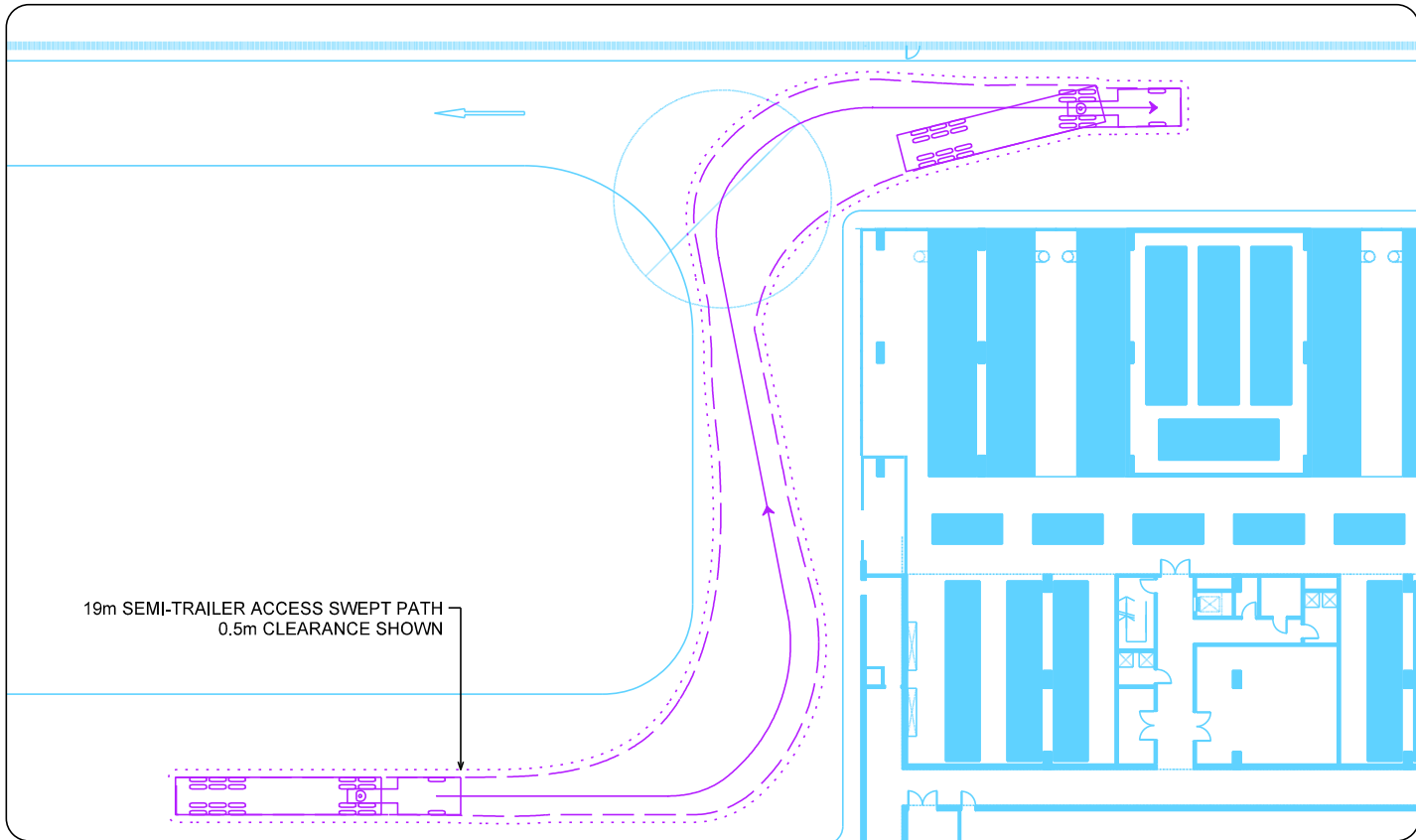
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Client EMKC3		Status PRELIMINARY	
Project COMMERCIAL DEVELOPMENT 51 HUNTINGWOOD DRIVE, HUNTINGWOOD CITY OF BLACKTOWN		Revision Description ISSUED FOR SSDA SUBMISSION	
Title TRAFFIC & TRANSPORT ASSESSMENT SWEEP PATH ANALYSIS 19m SEMI-TRAILER DESIGN VEHICLE		Date 2022-07-11 Drawn / Approved JT / SM	Revision
Drawing Number IMP2203003 - DRG-01-02		H	



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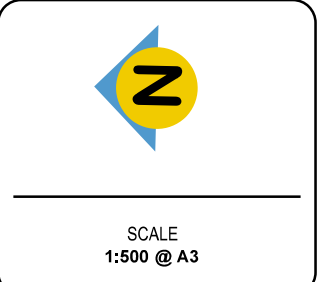
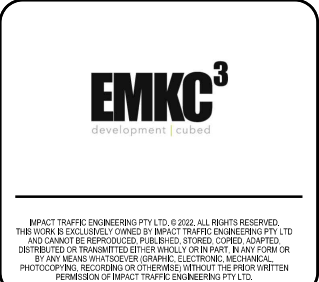
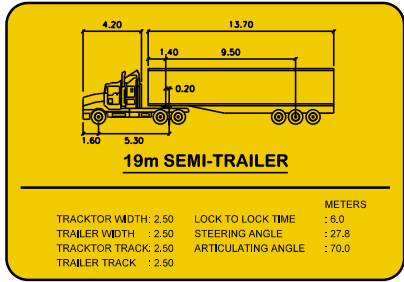
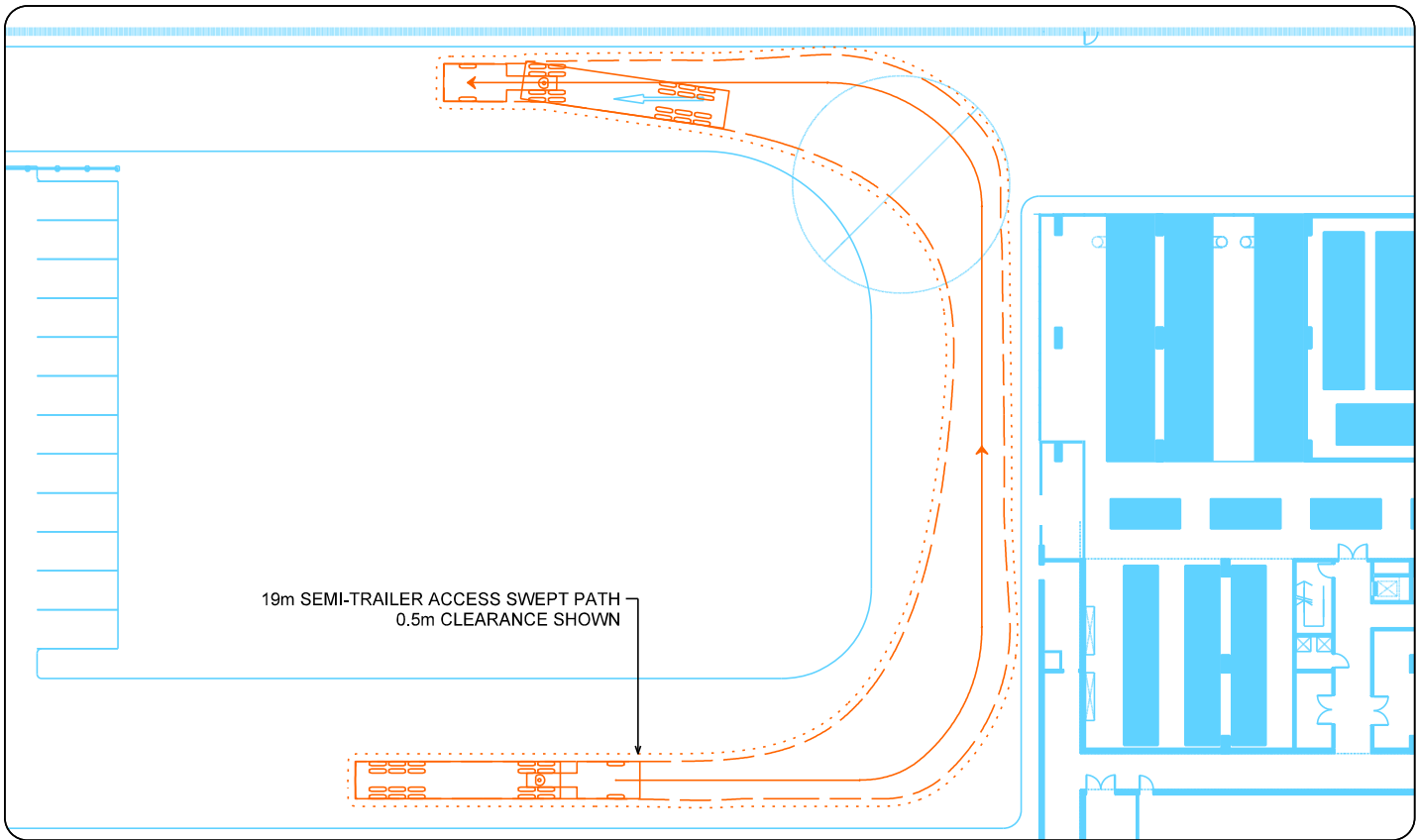
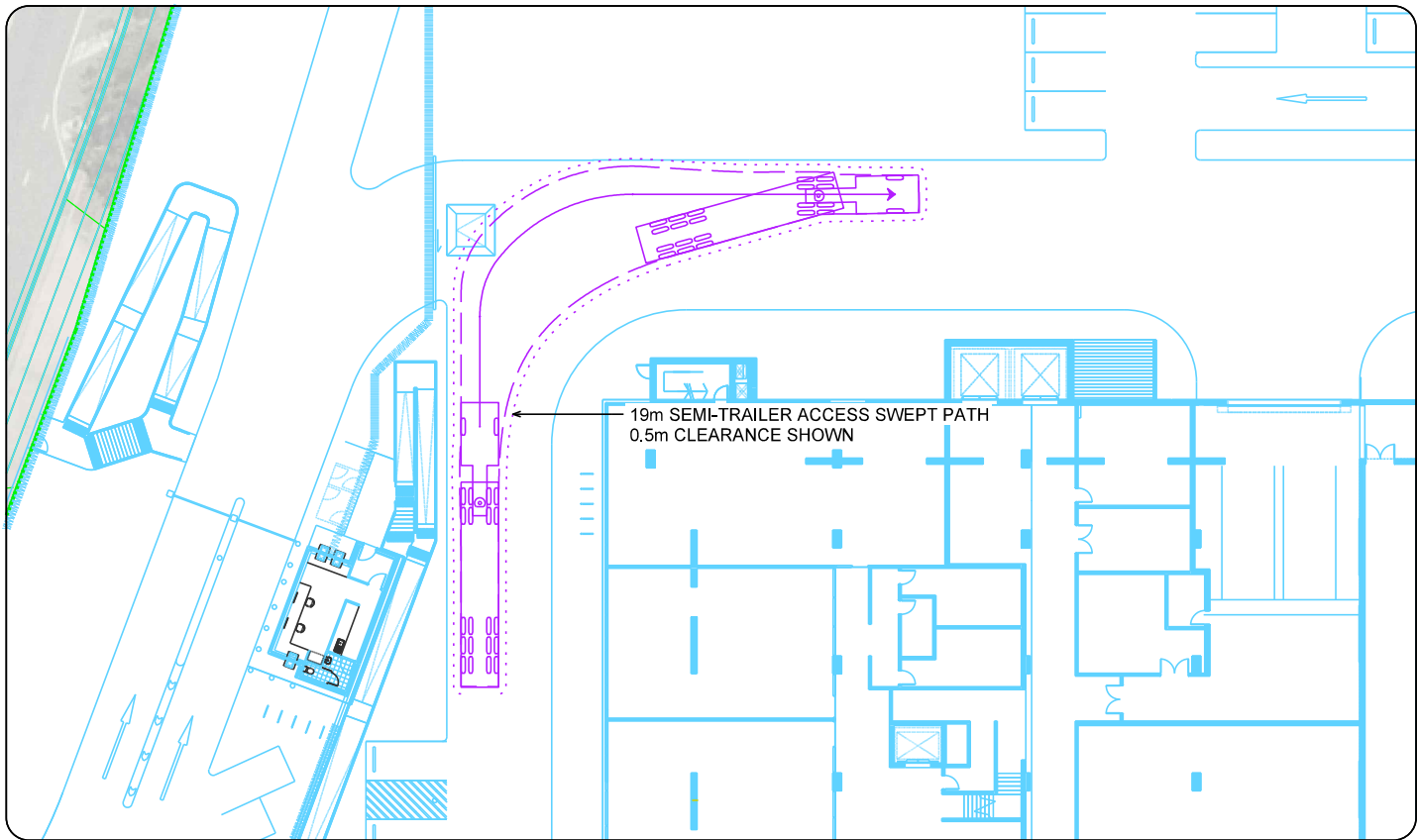
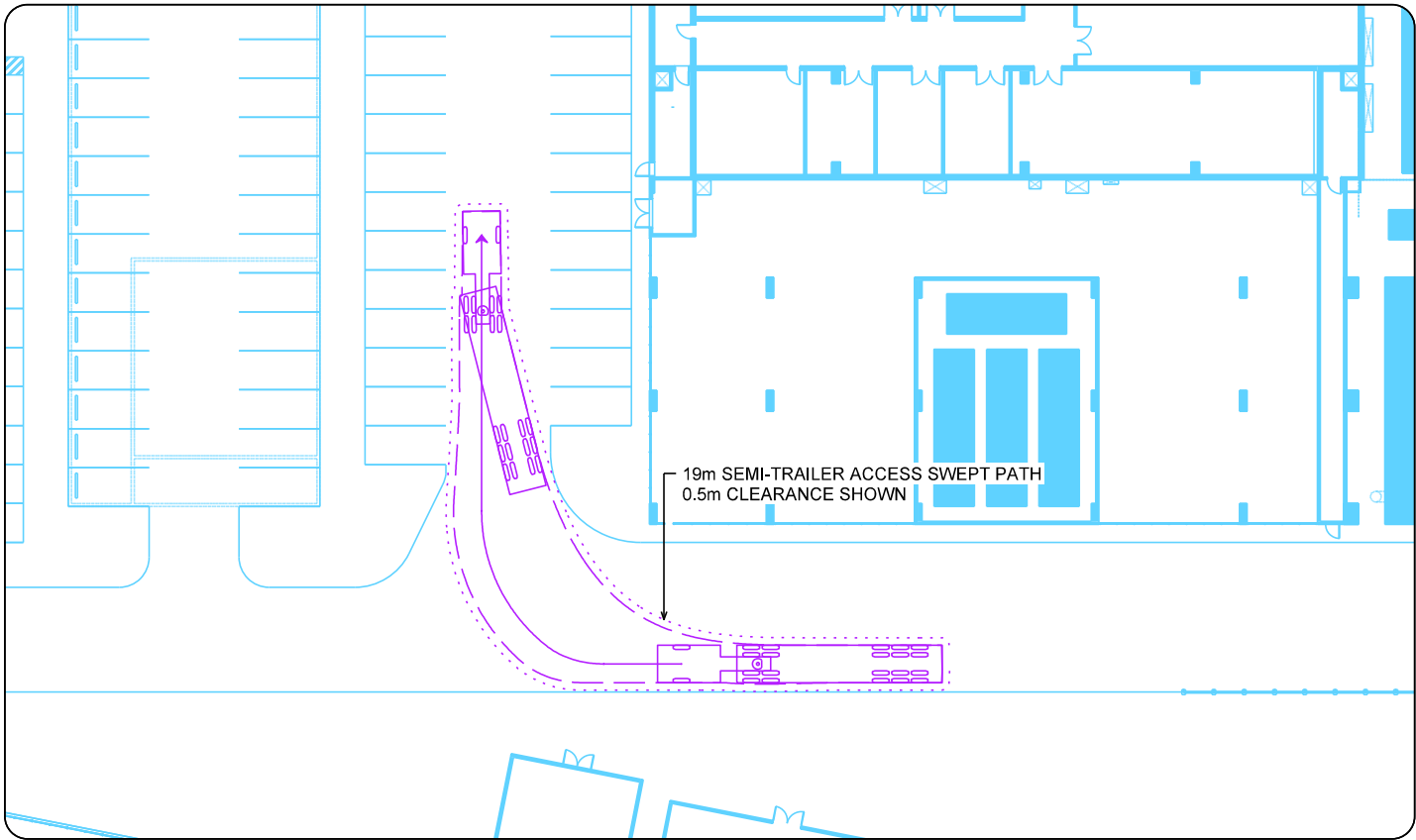
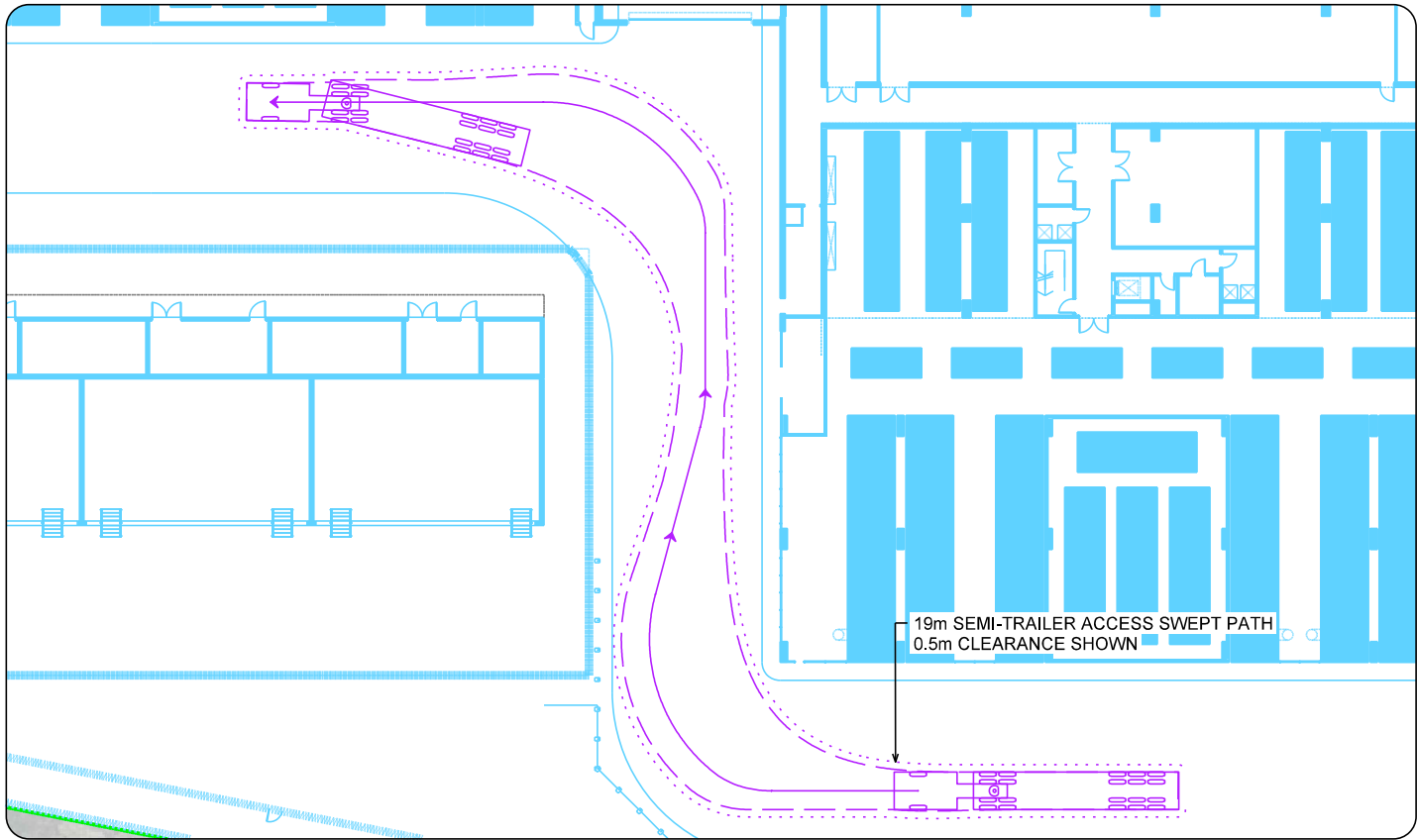
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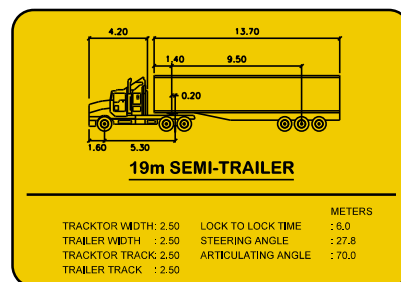
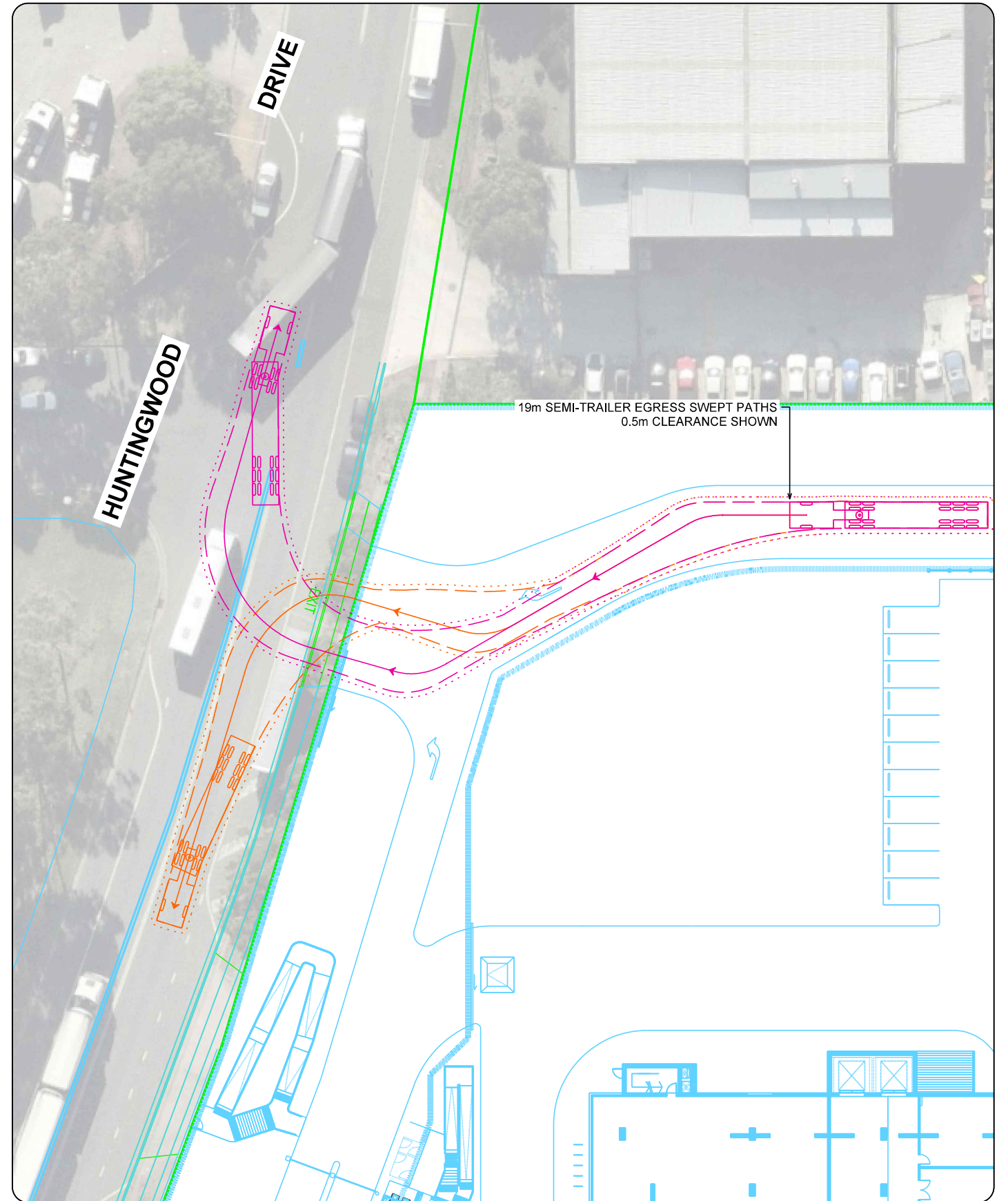
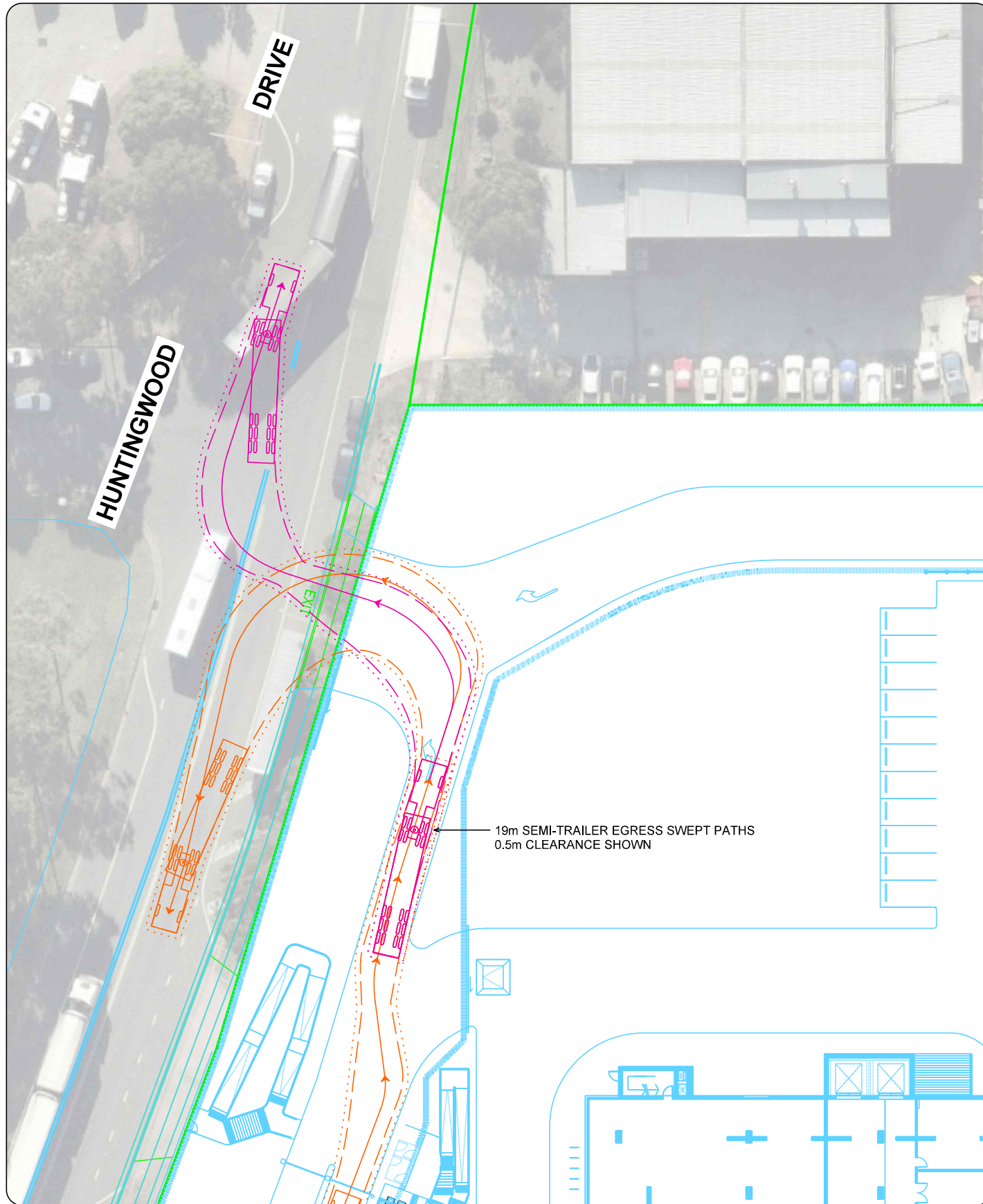
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Project COMMERCIAL DEVELOPMENT 51 HUNTINGWOOD DRIVE, HUNTINGWOOD CITY OF BLACKTOWN		Revision Description ISSUED FOR SSDA SUBMISSION	
Title TRAFFIC & TRANSPORT ASSESSMENT SWEEP PATH ANALYSIS 19m SEMI-TRAILER DESIGN VEHICLE		Date 2022-07-11 Drawn / Approved JT / SM	Revision
		Drawing Number IMP2203003 - DRG-01-03	H



Client EMKC3		Status PRELIMINARY	
Project COMMERCIAL DEVELOPMENT 51 HUNTINGWOOD DRIVE, HUNTINGWOOD CITY OF BLACKTOWN		Revision Description ISSUED FOR SSDA SUBMISSION	
Title TRAFFIC & TRANSPORT ASSESSMENT SWEEP PATH ANALYSIS 19m SEMI-TRAILER DESIGN VEHICLE		Date 2022-07-11 Drawn / Approved JT / SM	Revision
Drawing Number IMP2203003 - DRG-01-04		H	

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SCALE
1:500 @ A3

Client
EMKC3

Project
**COMMERCIAL DEVELOPMENT
51 HUNTINGWOOD DRIVE, HUNTINGWOOD
CITY OF BLACKTOWN**

Title
**TRAFFIC & TRANSPORT ASSESSMENT
SWEPT PATH ANALYSIS
19m SEMI-TRAILER DESIGN VEHICLE**

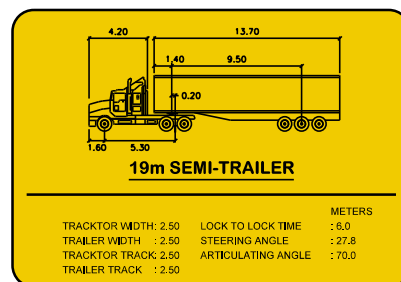
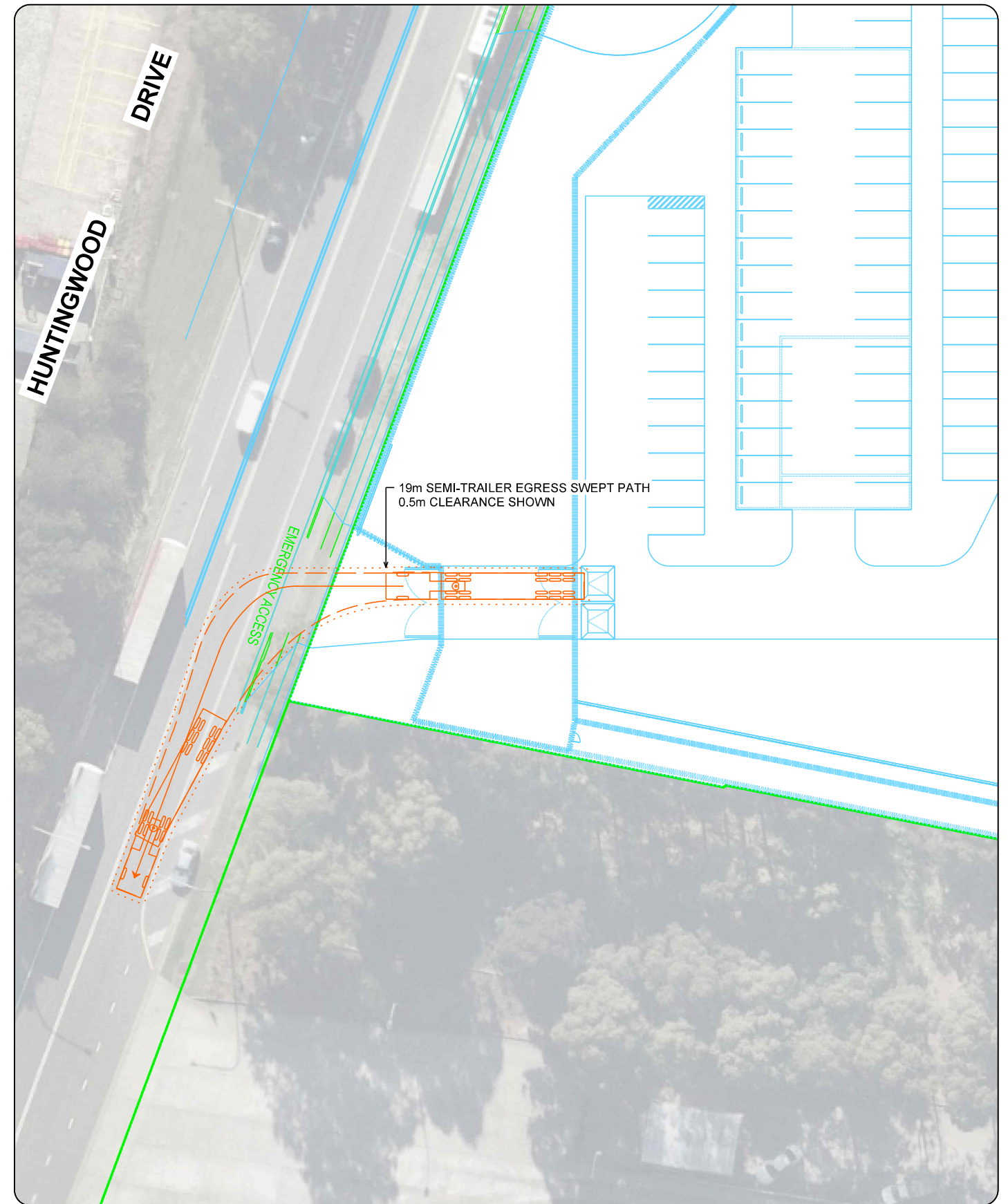
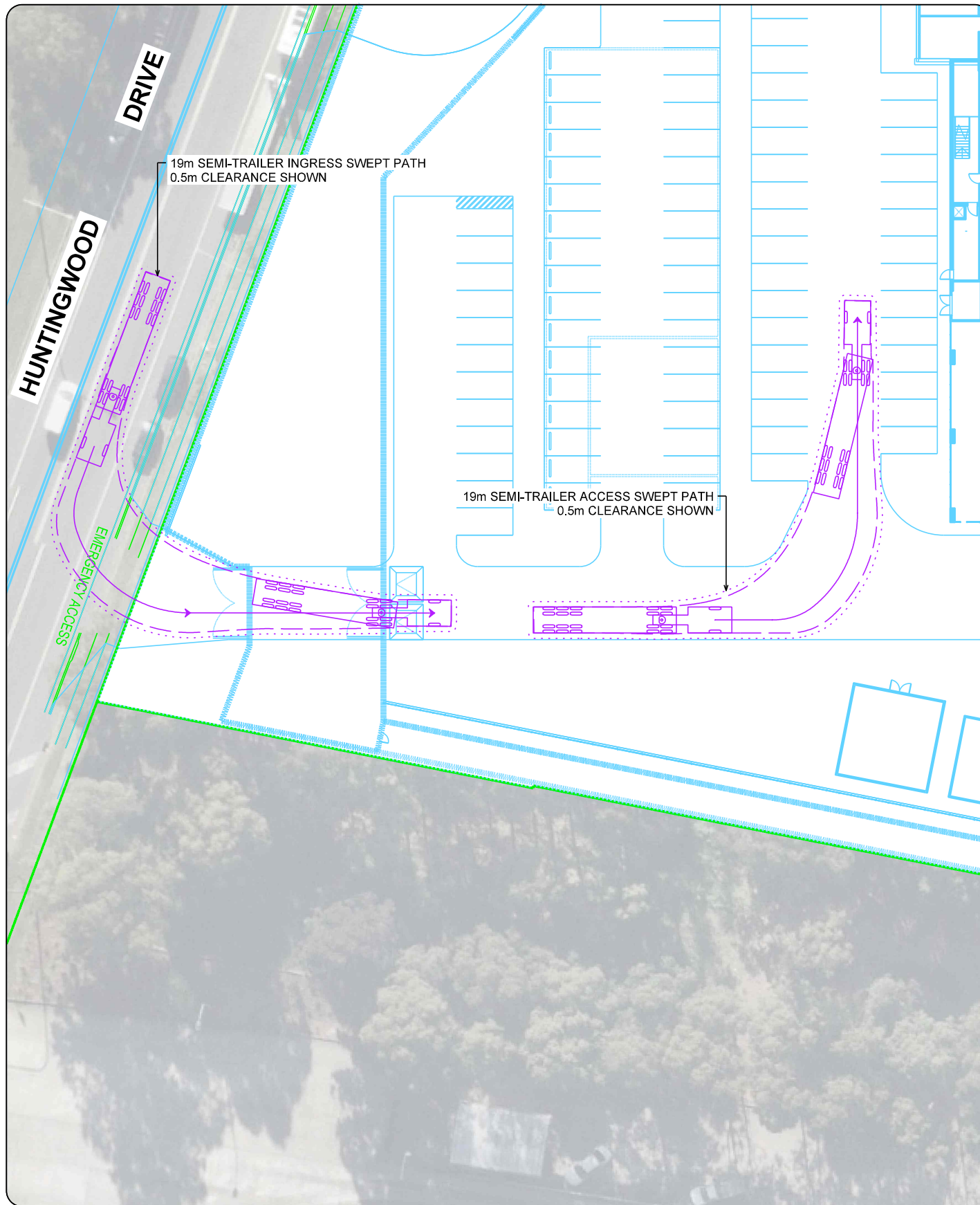
Status
PRELIMINARY

Revision Description
ISSUED FOR SSDA SUBMISSION

Date
2022-07-11
Drawn / Approved
JT / SM

Drawing Number
IMP2203003 - DRG-01-05

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H



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Client
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Project
**COMMERCIAL DEVELOPMENT
51 HUNTINGWOOD DRIVE, HUNTINGWOOD
CITY OF BLACKTOWN**

Title
**TRAFFIC & TRANSPORT ASSESSMENT
SWEEP PATH ANALYSIS
19m SEMI-TRAILER DESIGN VEHICLE**

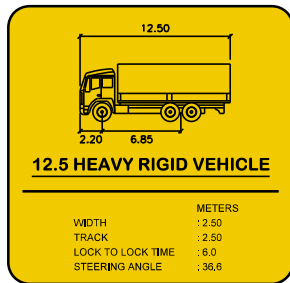
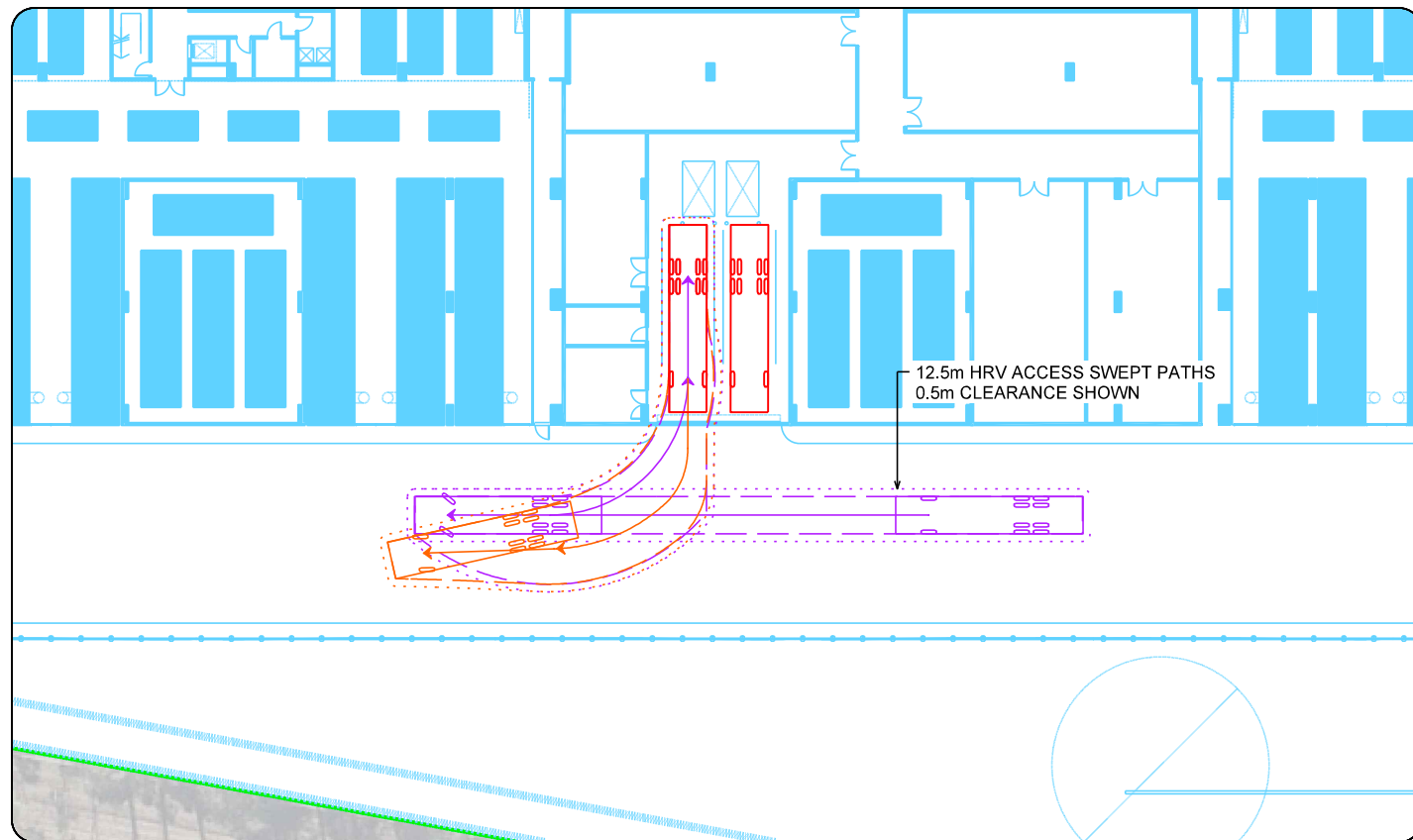
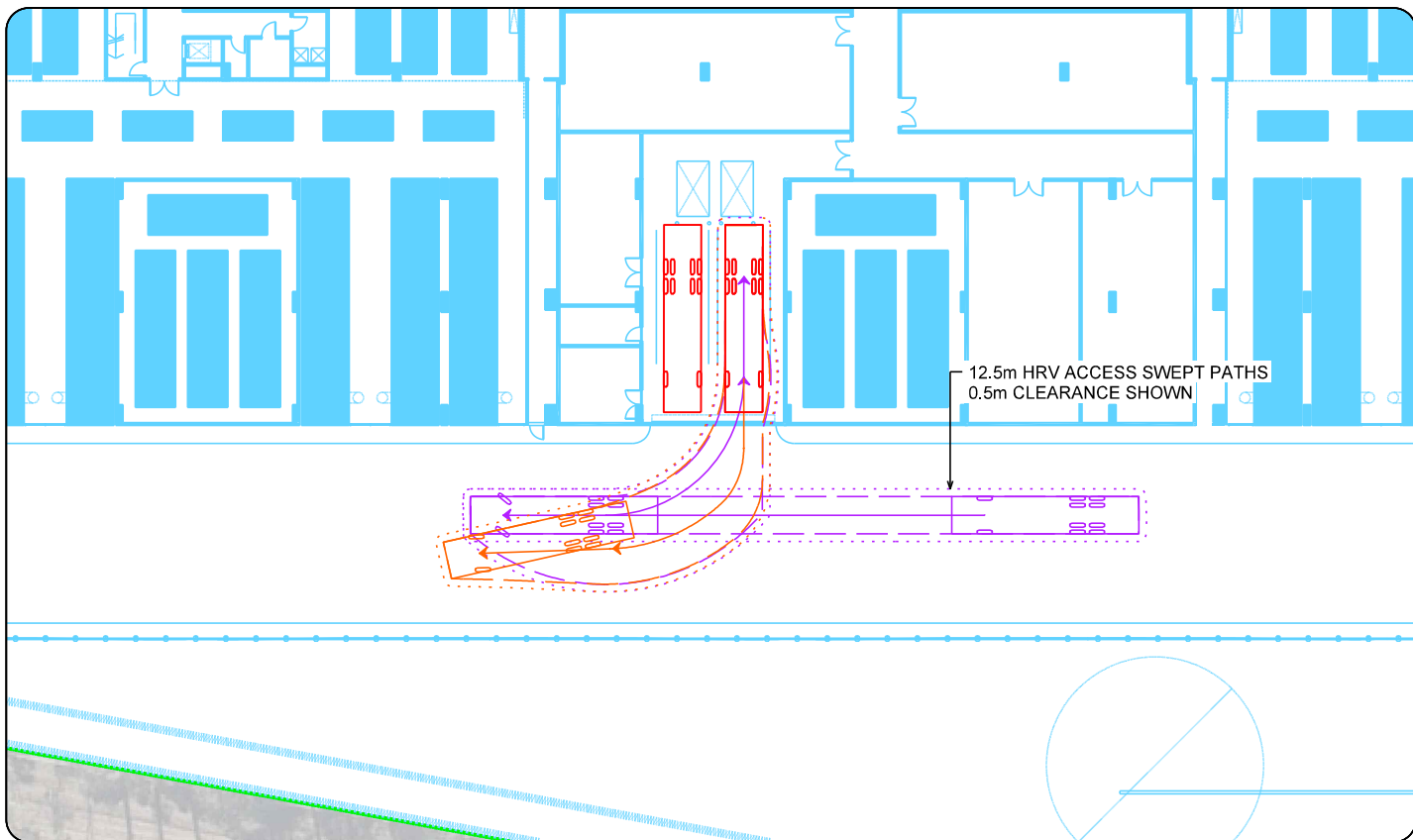
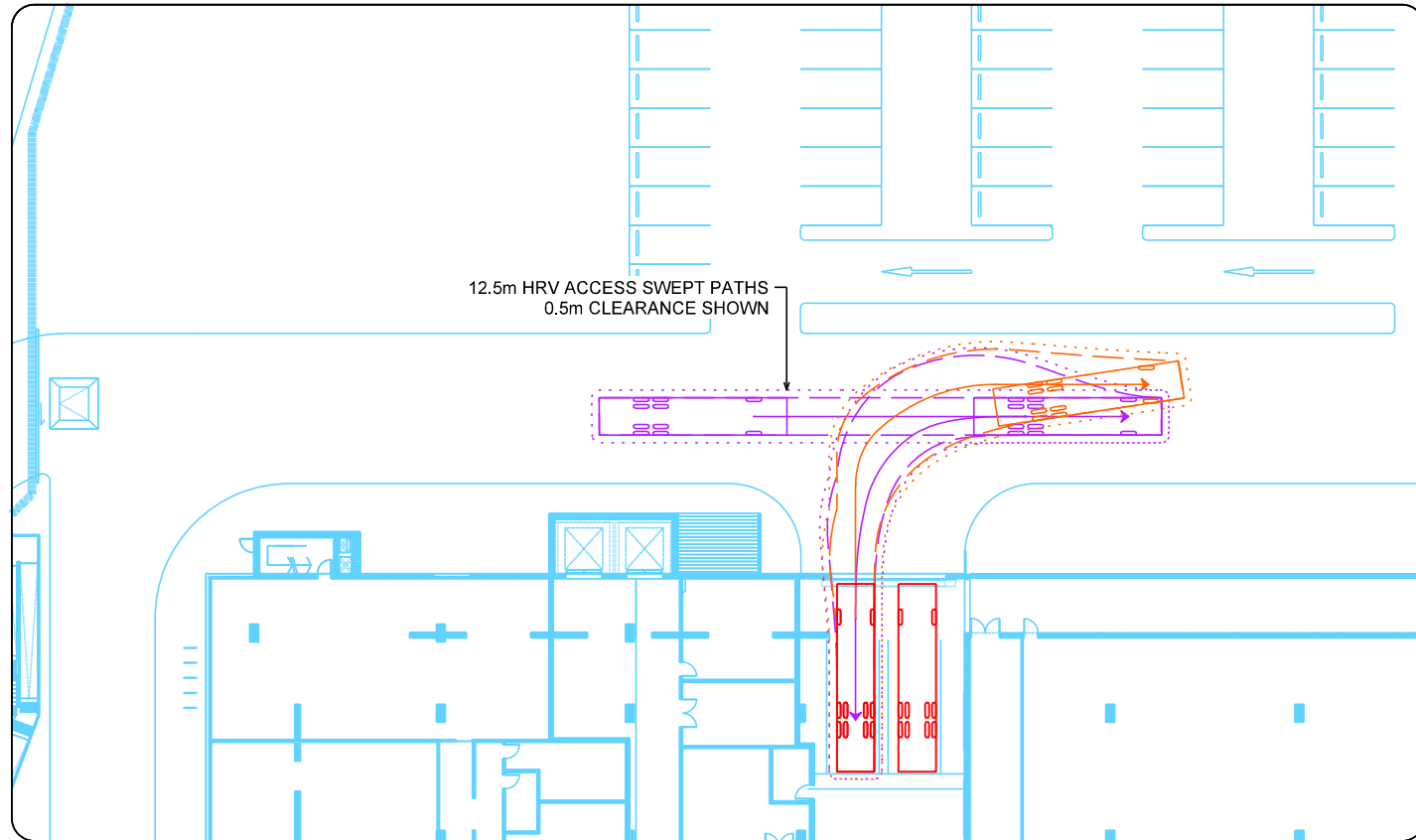
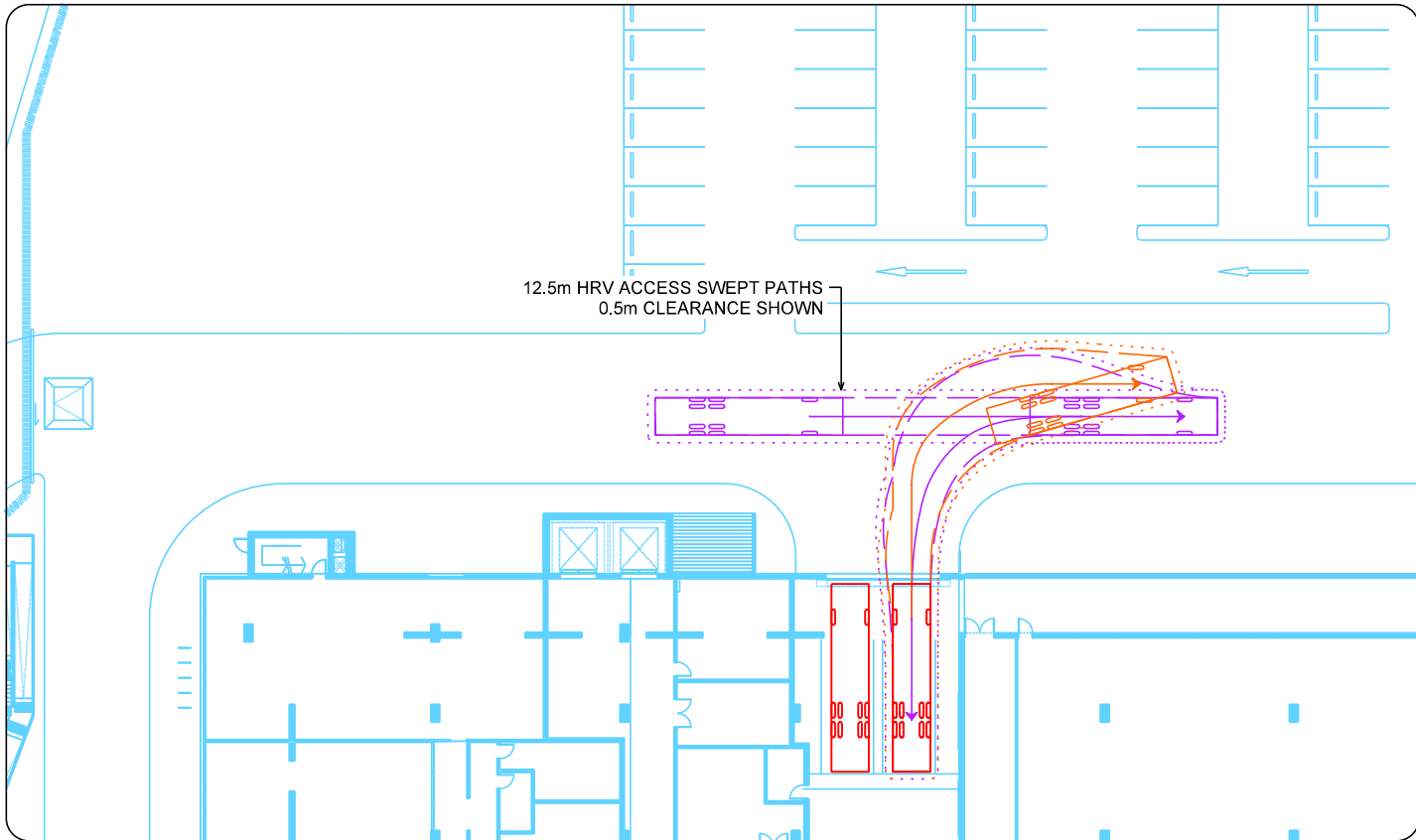
Status
PRELIMINARY

Revision Description
ISSUED FOR SSDA SUBMISSION

Date
2022-07-11
Drawn / Approved
JT / SM

Drawing Number
IMP2203003 - DRG-01-06

Revision
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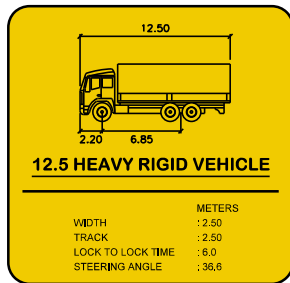
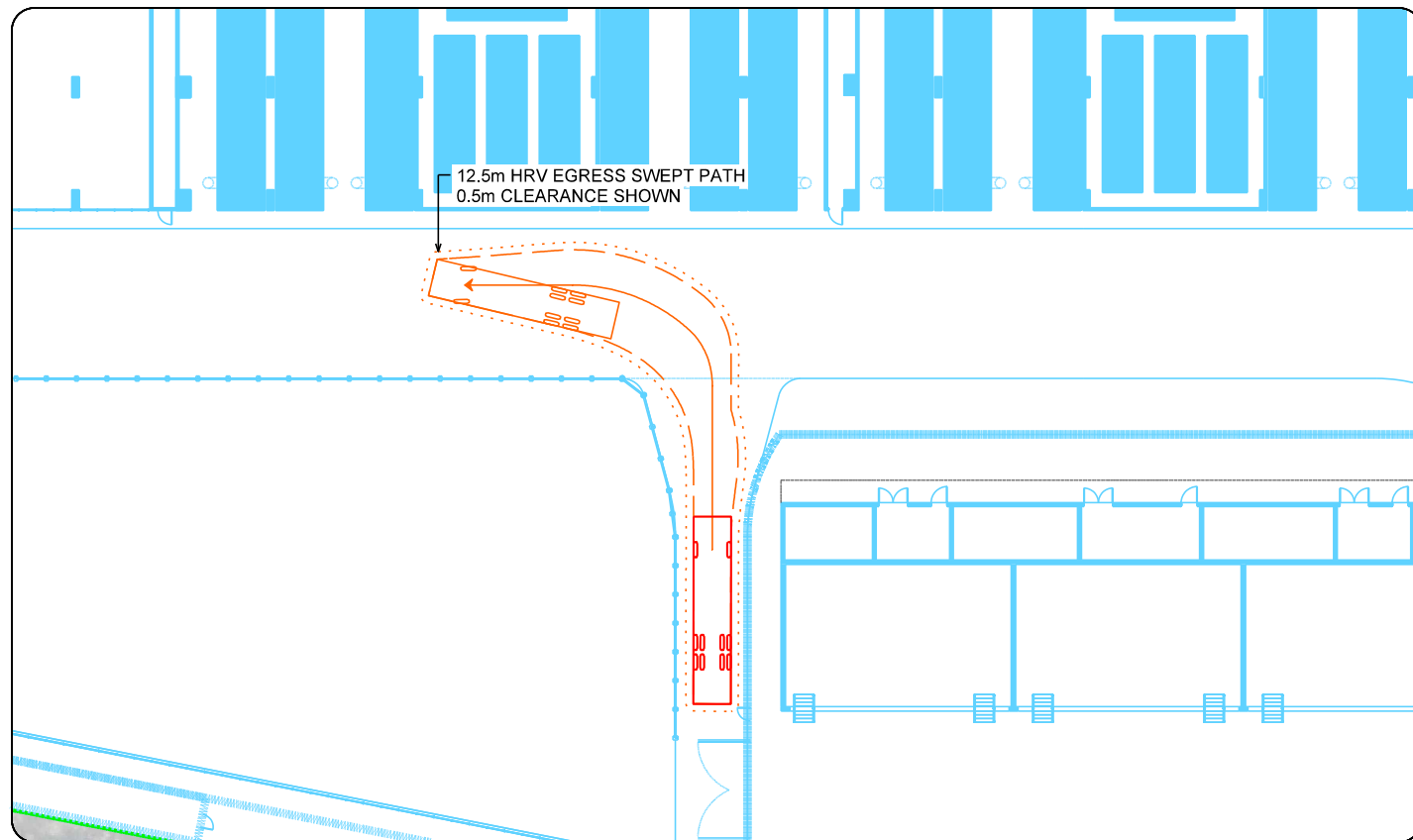
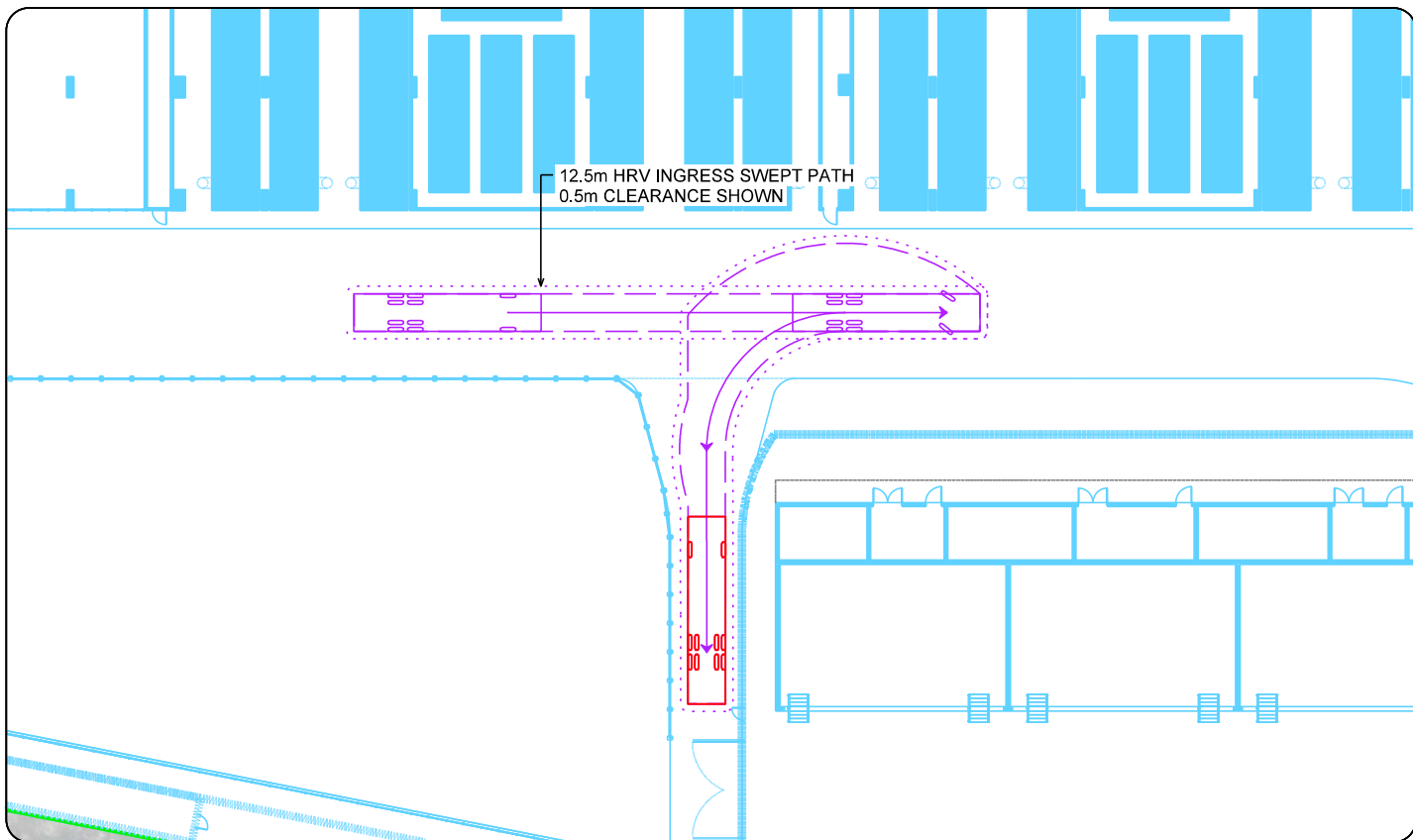
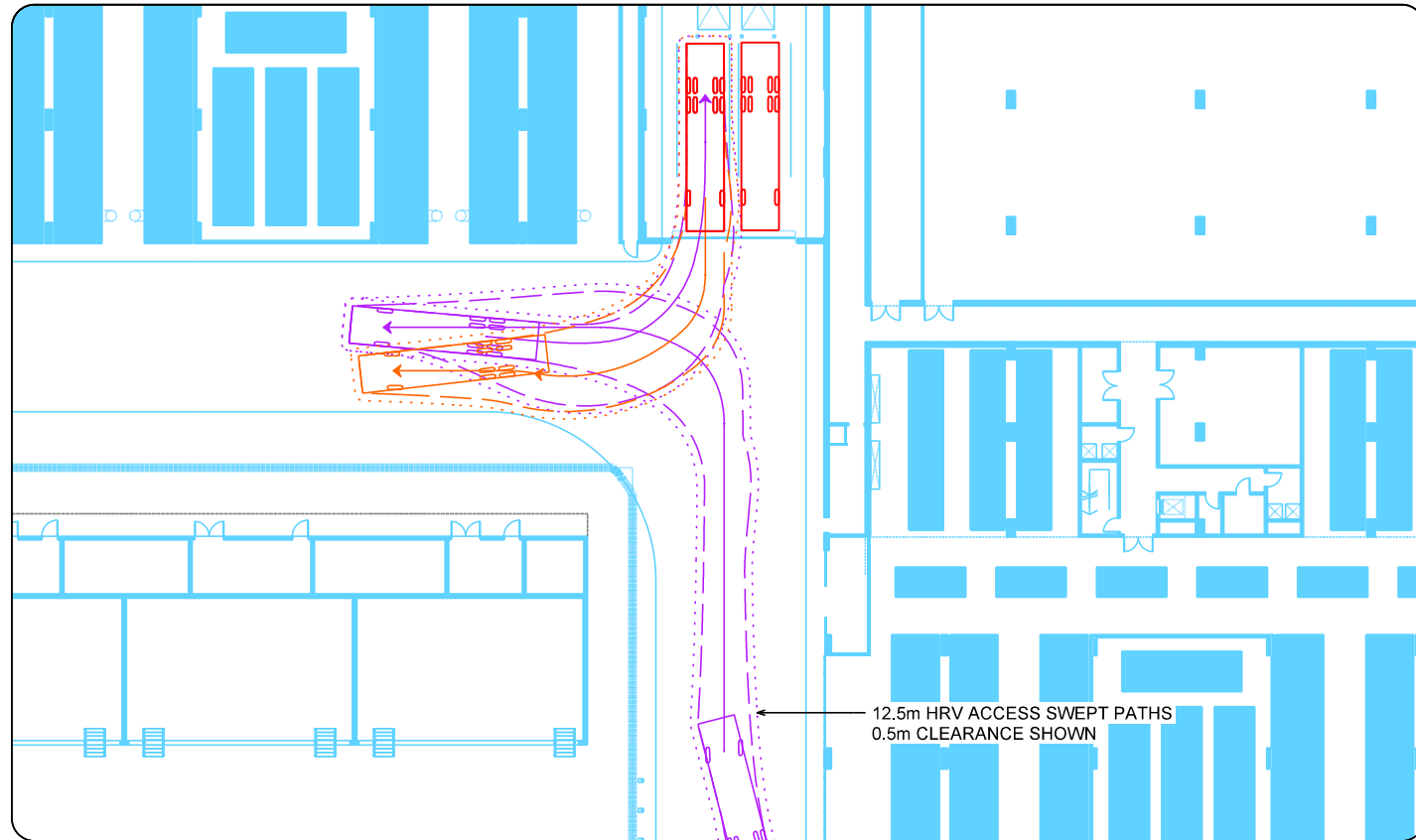
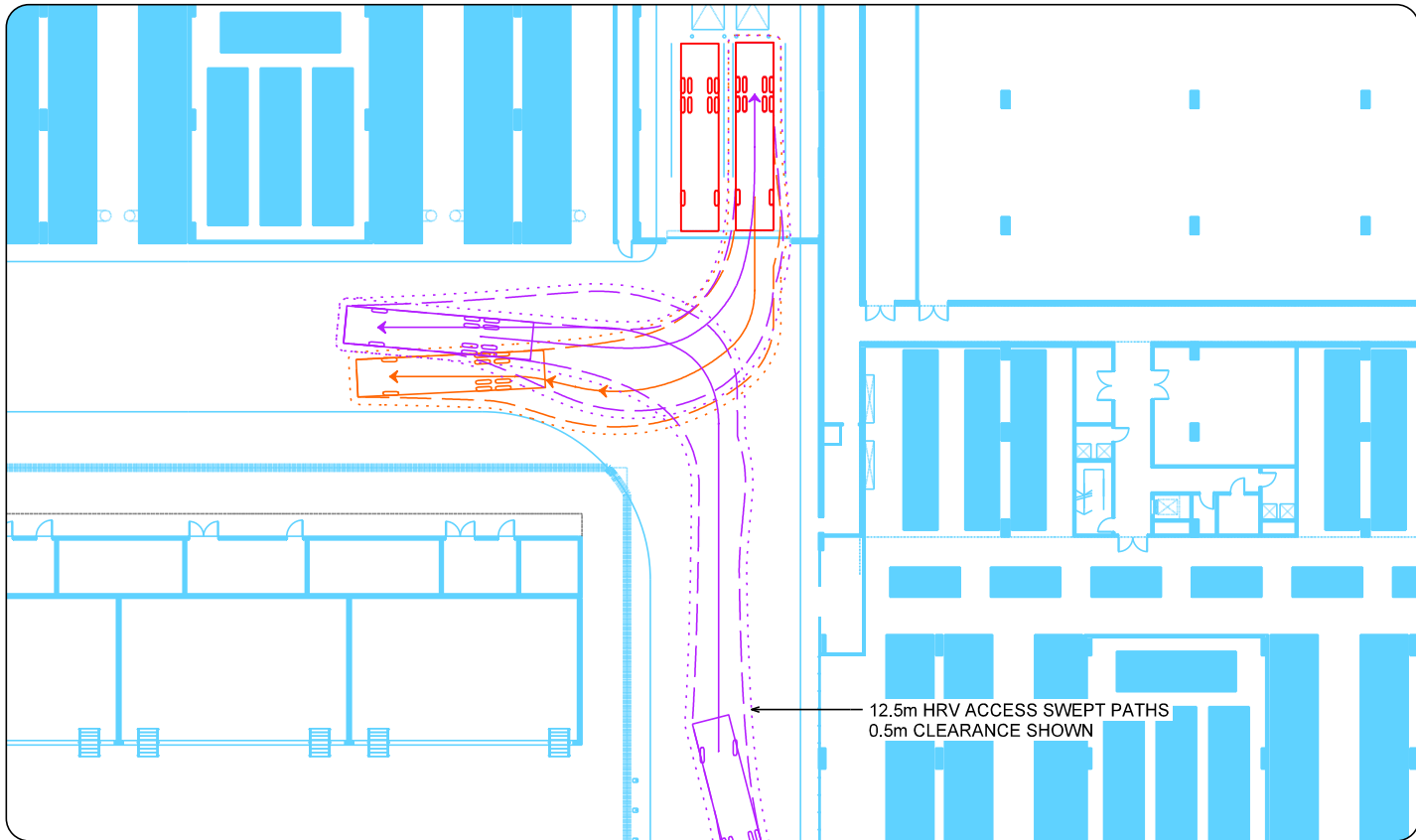
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Client EMKC3	Status PRELIMINARY
Project COMMERCIAL DEVELOPMENT 51 HUNTINGWOOD DRIVE, HUNTINGWOOD CITY OF BLACKTOWN	Revision Description ISSUED FOR SSDA SUBMISSION
Date 2022-07-11 Drawn / Approved JT / SM	Revision H
Title TRAFFIC & TRANSPORT ASSESSMENT SWEEP PATH ANALYSIS 12.5m HRV DESIGN VEHICLE	Drawing Number IMP2203003 - DRG-01-07

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Client EMKC3		Status PRELIMINARY	
Project COMMERCIAL DEVELOPMENT 51 HUNTINGWOOD DRIVE, HUNTINGWOOD CITY OF BLACKTOWN		Revision Description ISSUED FOR SSDA SUBMISSION	
Title TRAFFIC & TRANSPORT ASSESSMENT SWEEP PATH ANALYSIS 12.5m HRV DESIGN VEHICLE		Date 2022-07-11 Drawn / Approved JT / SM	
Drawing Number IMP2203003 - DRG-01-08		Revision H	

11/07/2022 3:05:50 PM



5.20
0.95 3.05

B99 CAR

	METERS
WIDTH	: 1.94
TRACK	: 1.84
LOOK TO LOOK TIME	: 6.0
STEERING ANGLE	: 33.9

EMKC³
development | cubed

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Client EMKC3	Status PRELIMINARY
Project COMMERCIAL DEVELOPMENT 51 HUNTINGWOOD DRIVE, HUNTINGWOOD CITY OF BLACKTOWN	Date 2022-07-11 Drawn / Approved JT / SM
Title TRAFFIC & TRANSPORT ASSESSMENT SWEEP PATH ANALYSIS B99 CAR DESIGN VEHICLE	Revision Description ISSUED FOR SSDA SUBMISSION
Drawing Number IMP2203003 - DRG-01-09	Revision H

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5.20
0.95 3.05

B99 CAR

	METERS
WIDTH	: 1.94
TRACK	: 1.84
LOOK TO LOOK TIME	: 6.0
STEERING ANGLE	: 33.9

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Client EMKC3		Status PRELIMINARY	
Project COMMERCIAL DEVELOPMENT 51 HUNTINGWOOD DRIVE, HUNTINGWOOD CITY OF BLACKTOWN		Date 2022-07-11 Drawn / Approved JT / SM	Revision Description ISSUED FOR SSDA SUBMISSION
Title TRAFFIC & TRANSPORT ASSESSMENT SWEEP PATH ANALYSIS B99 CAR DESIGN VEHICLE		Drawing Number IMP2203003 - DRG-01-10	Revision H



Simplexity

