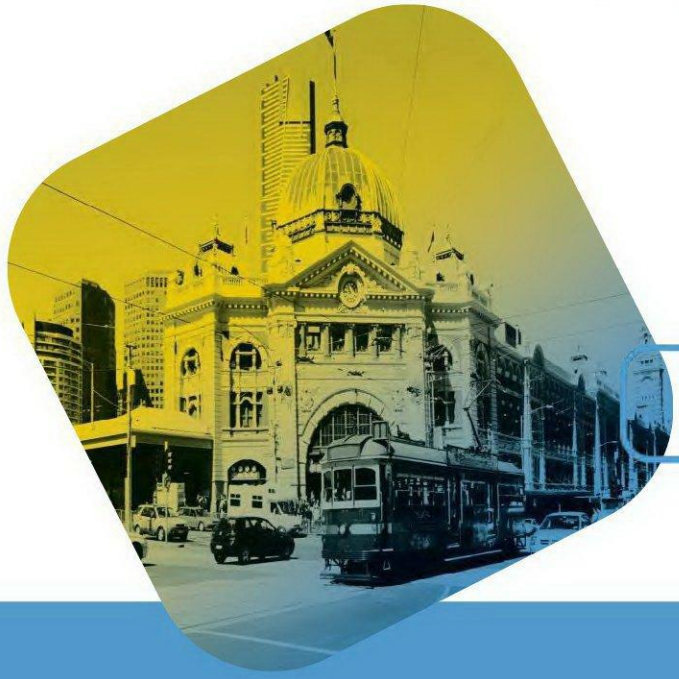
37°53'47.4"S
145°07'48.2"E

Multi-Storey Warehouse Development: 1-31 Gilby Road, Mount Waverley



Transport Impact Assessment

19 May 2023
Prepared for Dexus

IMP2205030TTA01F02.docx

Impact

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Document Information

Client	Dexus
Report Title	Multi-Storey Warehouse Development: 1-31 Gilby Road, Mount Waverley
Report Reference	IMP2205030TTA01F02.docx
Date of Issue	19 May 2023
Approved By	John-Paul Maina

Document Control

Version	Date	Author
UPDATED FINAL	19 May 2023	Jake Townley
FINAL	25 November 2022	Jake Townley

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Development Proposition

Location	37°53'47.4"S 145°07'48.2"E	1-31 Gilby Road, Mount Waverley
Use	Multi-Storey Warehouse Development	
Yield	18 Warehouse tenancies, and a cafe: 80,040 sqm Gross Floor Area	
Car Parking	687 Spaces	
Motorcycle	48 Spaces	
Bicycles	90 Spaces	
Access Arrangements	The proposed warehouse development will be located within the broader Axxess Corporate Park, and will benefit from direct frontage to Forster Road, as well as connection to the internal road network within Axxess Corporate Park Two access points are planned to Forster Road, located at the northern and southern boundaries of the review site. Specifically: **Access A1** Located at the northern end, catering for heavy / commercial vehicles only. **Access A2** Located at the southern end, catering for commuter vehicles only (staff & visitors) The design makes allowance for 2 access connections to the broader Axxess Corporate Park **Access A3** Located along the southern boundary will be delivered as part of this development **Access A4** Located along the eastern boundary of the site. Is to be realised in the future as part of the broader Axxess Corporate Park Masterplan. These access points, particuarly Access A3 enable access to / from Gilby Rd.	

Statutory Controls

Particular Provisions

Clause 52.06 - Car Parking

Requirement vs Provision	1,230 spaces required. 687 spaces provided.
Adequacy of Provision	Case Studies undertaken by RMS (NSW), and **IMPACT®** reveal that parking demand for this development typology is generated at a rate substantially lower than the statutory rate.

Both studies, show consistent outputs in all but the median rate, which is lower in the **IMPACT®** case studies - results shown overleaf.

This lower median rate is likely due to growing reliance on automation and robotics to improve supply chain efficiency, which in turn reduces labour requirements on site.

	RMS (NSW) Case Studies	**IMPACT®** case studies
Highest Rate	1.25 spaces per 100 sq.m	1.27 spaces per 100 sq.m
Average Rate	0.30 spaces per 100 sq.m	0.35 spaces per 100 sq.m
Lowest Rate	0.10 spaces per 100 sq.m	0.09 spaces per 100 sq.m
Median Rate	0.33 spaces per 100 sq.m	0.22 spaces per 100 sq.m

The proposal contemplates a total of 687 spaces, which equates to a provision rate of about **0.86 spaces per 100 sq.m**. This provision exceeds the anticipated demand to be generated by the site and is therefore deemed appropriate.

Note: This provision will be supplemented by 48 motorcycle spaces. This provision equates to a rate of 0.06 motorcycle spaces per 100 sq.m.

Considered as a whole motorised vehicle parking will be provided at a combined rate of **0.92 spaces per 100 sq.m**.

Design

The car park and accessways have been assessed against Clause 52.06-09 and satisfy the relevant design guidelines.

Clause 52.29 - - Land Adjacent to the Principal Road Network

Effect of the proposal on the operation of the road

An assessment of the capacity of Forster Road to absorb the proposed development traffic is possible having regard to the Practical Gap capacities revealed by studies summarised at Section 6.4.3.

The assessment confirms that the practical gap capacity that exists along Forster Road can comfortably absorbed the forecast volumes with ample spare capacity remaining

Effect of the proposal on public safety

- Geometrically, Forster Road has a vertical curve along the site's frontage. Assessments provided at Appendix A confirm that motorists on Foster Road and motorists emerging from the access points will have the benefit of at least 133 metre Safe Intersection Sight Distance.
- The proposed access arrangements are consistent with access arrangements along Forster Road. Drivers will have reasonable expectations at the access points, and so will cyclists that traverse the shared path along Forster Road.
- Access points are designed to accommodate safe movement of vehicles from all directions. Right turning traffic entering the site will be able to do so safely and without adversely obstructing through traffic.

- The design of the heavy vehicle access has been informed by the functional characteristics of the nominated design vehicle. We note that AS2890.2:2018 contemplates outcomes whereby Articulated Vehicles can turn into the driveway by using the second lane out from the kerb as permitted by Performance based Standards Scheme - The Standards and Vehicle assessment Rules.
- The design outcome has all articulated vehicle movements accommodated from the kerb side lane. This ensures the safety and efficiency of all movements along Fosters Road.

The proposal is expected to have no detrimental effects on public safety

Clause 52.34 - Bicycle Facilities

Requirement vs Provision

0 spaces required. 90 spaces provided.

Adequacy of Provision

This provision exceeds the statutory requirements and is satisfactory

Design

Assessed against Clause 52.34 and AS2890.3:2015 and deemed to satisfy the relevant design guidelines.

Clause 65.01 - Approval of an Application or Plan

Design Considerations (Loading Arrangements)

The proposed loading arrangements have been assessed and determined to have satisfied the relevant design guidelines / principles contained with Clause 65.01 and AS2890.1:2018

Traffic Considerations

Traffic Generation

The proposed development is expected to generate traffic at a rate of 0.3 trips per 100 sq.m. this equates to 240 trips during each of the peak hours.

However for the purpose of providing a robust assessment, a conservatively high forecast for traffic volumes has been adopted, equivalent to double the anticipated rate, i.e. a rate of 0.6 trips per 100 sq.m

On this high rate, the following traffic generation splits by vehicle class are used for analysis.

Period	Commuter Vehicles (Staff & Visitors)	Commercial Vehicles (Trucks)	Total
AM PEAK	419	45	**464**
PM PEAK	451	36	**487**

Traffic Impact

Volumes generated by the proposed development will be distributed predominately to:

Forster Road Commuter & Commercial Vehicles

Gilby Road Commuter Vehicles

- An assessment of the capacity of Forster Road to absorb this traffic confirms that the practical gap capacity that exists along Forster Road can

comfortably absorbed the forecast volumes with ample spare capacity remaining. This expectation is also confirmed by SIDRA analysis which reveals that the additional volumes will be comfortably accommodated at this intersection with manageable impacts on the traffic capacity

- The capacity of the intersection between Gilby Road / Lionel Road / Site Access has been assessed using SIDRA Intersection The assessment reveals that the additional volumes will be comfortably accommodated at this intersection with manageable impacts on the traffic capacity.

Future Considerations

The Suburban Rail Loop, a state infrastructure project proposed by the Victorian Government, will deliver a 90km rail line around Metropolitan Melbourne. This project contemplates a station at Monash with this station located in the locality of the site.

The delivery of this high quality, high capacity sustainable transport infrastructure will contribute positively to

- Higher density development outcomes;
- Uptake of sustainable transport by workers and visitors in the locality; and
- Potentially a redistribution of traffic volumes on the road network.

Whilst details of the likely development outcomes, impacts to the road network and modes of transport are yet to resolved, we have undertaken a sensitivity assessment.

The assessment of revised volumes reveals that additional volumes on the road network will not compromise the operation of the site access arrangements, with the network continuing to operate comfortably

Conclusion

- The proposed development satisfies relevant statutory requirements as they relate to technical design of accessways, car parking spaces, and loading areas.
- Where the statutory requirements are not explicitly met, specifically in relation to the provision of car parking spaces, the development satisfies decision guidelines that allow for a reduction of car parking, with case studies validating the reduction sought.
- We are satisfied that there are no traffic and transport grounds that should prohibit the issue of a permit.

2 Introduction

2.1 Engagement

IMPACT® have been engaged by Dexus to undertake a Transport Impact Assessment for the proposed multi-storey warehouse development at 1-31 Gilby Road, Mount Waverley.

2.2 Scope of Engagement

This Traffic and Transport Impact Assessment has been prepared to accompany a town planning submission.

In preparing this assessment we have referenced the following:

- Development plans prepared by Concept Y Architecture
- Monash Planning Scheme, specifically:
  - Clause 52.06 - Car Parking
  - Clause 52.29 - Land Adjacent to the Principal Road Network
  - Clause 52.34 - Bicycle Facilities
  - Clause 65.01 - Approval of an Application or Plan
- Australian Standards AS2890.1:2004, AS2890.2:2018, AS2890.3:2015 & AS2890.6:2009

3 Development Proposition

3.1 Use and Yield

It is planned to construct a multi storey warehouse development, with a total GFA of 80,040 sqm. The development will be delivered in stages, accommodating 18 warehouse tenancies, and a cafe.

Development summaries are presented at Table 1 and Table 2.

Table 1 Development Summary - Stage 1

Warehouse Tenancy	Gross Floor Area (GFA)
Ground Floor	**12,240 sqm**
Warehouse 1A	4,390 sqm
Warehouse 1B	3,620 sqm
Warehouse 1C	4,140 sqm
Cafe	90 sq.m
First Floor	**12,450 sqm**
Warehouse 1D	4,250 sqm
Warehouse 1E	4,200 sqm
Warehouse 1F	4,000 sqm
Second Floor	**12,550 sqm**
Warehouse 1G	4,250 sqm
Warehouse 1H	4,200 sqm
Warehouse 1I	4,100 sqm
Total	**37,240 sqm**

Table 2 Development Summary - Stage 2

Warehouse Tenancy	Gross Floor Area (GFA)
Ground Floor	**14,500 sqm**
Warehouse 2A	5,300 sqm
Warehouse 2B	3,670 sqm
Warehouse 2C	5,530 sqm
First Floor	**14,150 sqm**
Warehouse 2D	5,090 sqm
Warehouse 2E	4,110 sqm
Warehouse 2F	4,950 sqm
Second Floor	**14,150 sqm**
Warehouse 2G	5,090 sqm
Warehouse 2H	4,110 sqm
Warehouse 2I	4,950 sqm
Total	**42,800 sqm**

3.2 Parking

3.2.1 Car Parking

A total of 687 on-site car parking spaces, including 12 DDA compliant spaces, are contemplated.

These spaces will be provided within a multi deck car park that will span three levels. The multi deck car park will be located along the southern boundary of the subject site.

3.2.2 Bicycle Parking

A total of 90 bicycle spaces are proposed throughout the development.

Bicycle spaces are contemplated within the car parking deck for each stage, with 15 bicycle spaces proposed on each floor.

Bicycle spaces are propsoed in the form of Cora bicycle racks, to be provided in accordance with the manufacturers specifications attached in Appendix B.

3.3 Access Arrangements

The proposed warehouse development will be located within the broader Axxess Corporate Park, and will benefit from direct frontage to Forster Road, as well as connection to the internal road network within Axxess Corporate Park.

These access arrangements are described as follows:

3.3.1 Forsters Road

Two access points are planned to Forster Road, located at the northern and southern boundaries of the review site. Specifically:

Access A1 Located at the northern end, catering for heavy / commercial vehicles only. Right Out turn movements will be prohibited.

Access A2 Located at the southern end, catering for commuter vehicles only (staff & visitors). Fully Directional Access.

To accommodate these movements in a safe and convenient manner, whilst minimising performance impacts to Forster Road mitigation works are planned along Fosters Road to provide auxiliary right turn lanes.

These mitigation works are shown Figure 1, with details plans provided at Appendix A.

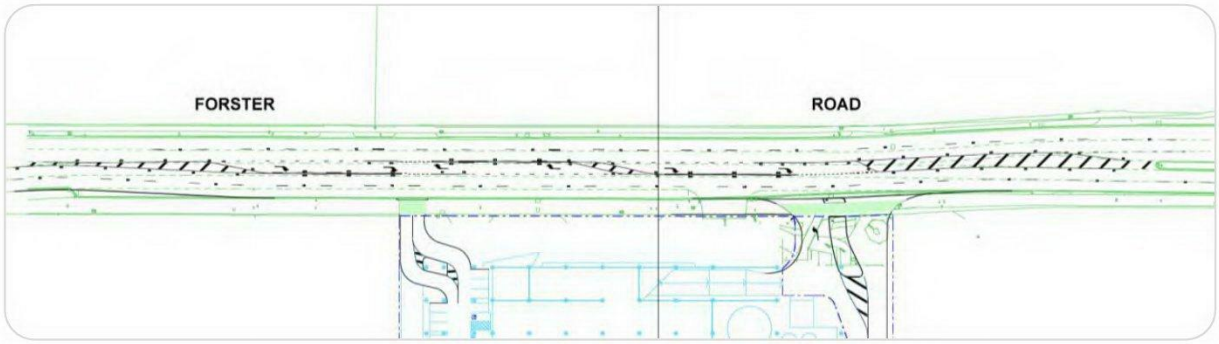


Figure 1 Forsters Road Mitigation Works

3.3.2 Internal Road Network - Axxess Corporate Park

The design makes allowance for 2 access connections to the broader Axxess Corporate Park

Access A3 Located along the southern boundary will be delivered as part of this development

Access A4 Located along the eastern boundary of the site, is to be realised as part of future development of the broader Axxess Corporate Park.

The access arrangements are illustrated at Figure 2.

Figure 2 Location of Access Arrangements

4 Existing Conditions

4.1 Location

The review site is located on the eastern side of Forster Road, in the section between Ricketts Road to the north and Ferntree Gully Road to the south. The location of the site is illustrated at Figure 3.

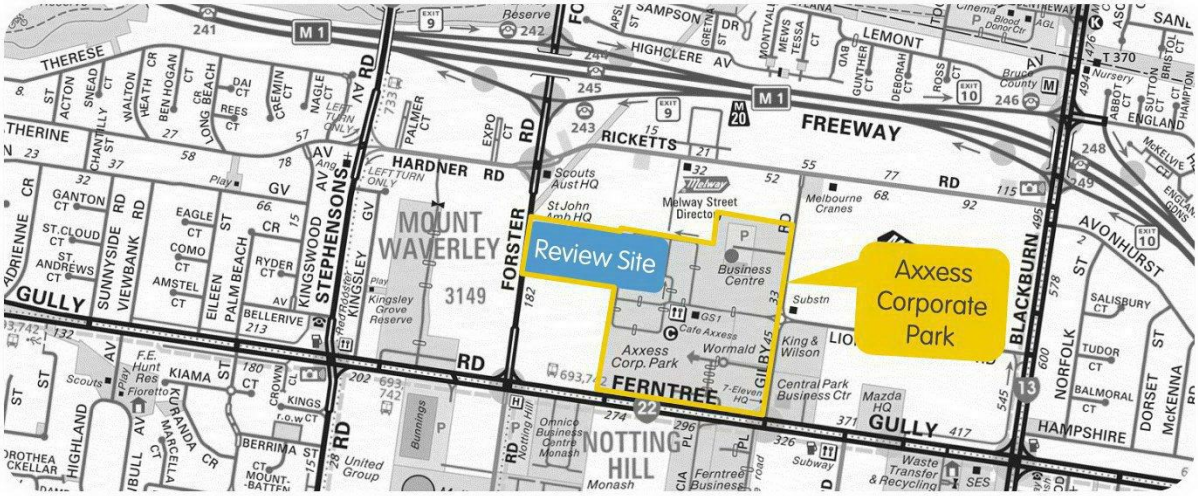


Figure 3 Location of Subject Site

The location of the review site in the context of the Axxess Corporate Park, estate plan is shown at Figure 4.

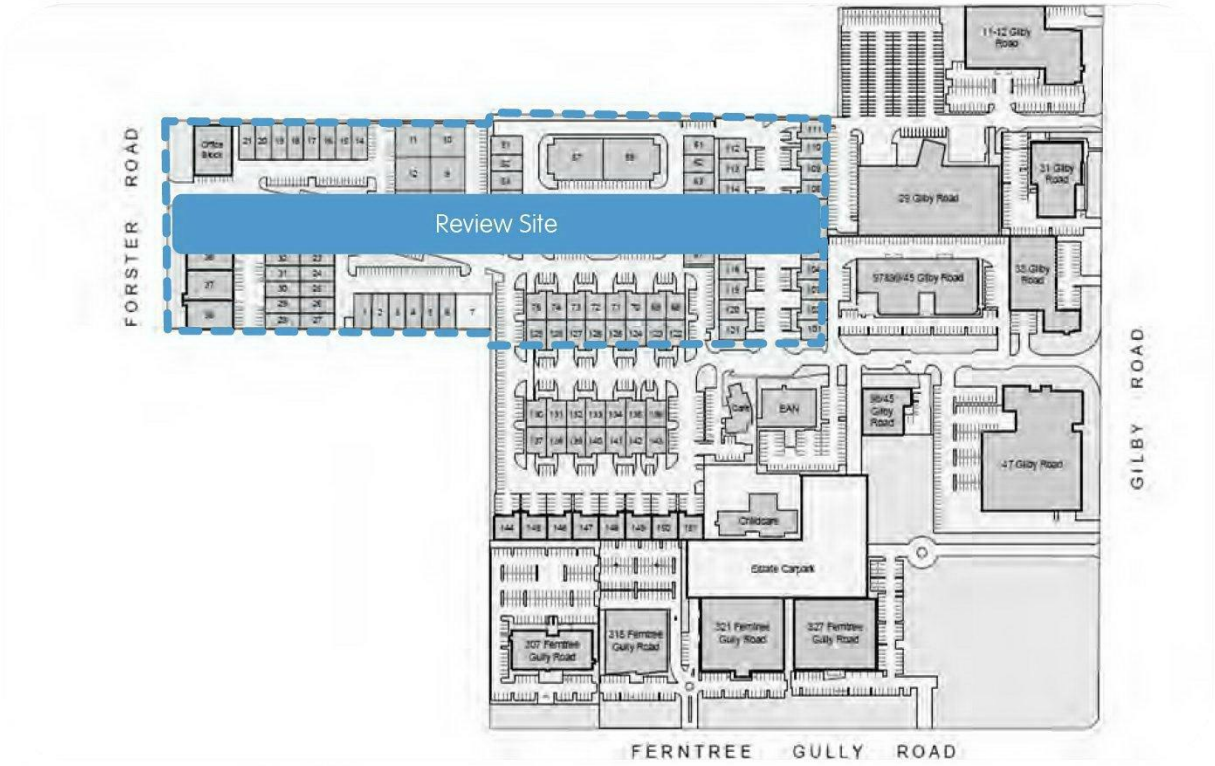


Figure 4 Location within Axxess Corporate Park

As shown at Figure 4, the review site is currently occupied by existing warehouse and office buildings, with a total net leasable area of 30,000 sq.m.

4.2 Planning Zone

The site is located within the Special Use Zone (SUZ6) as illustrated in Figure 5.

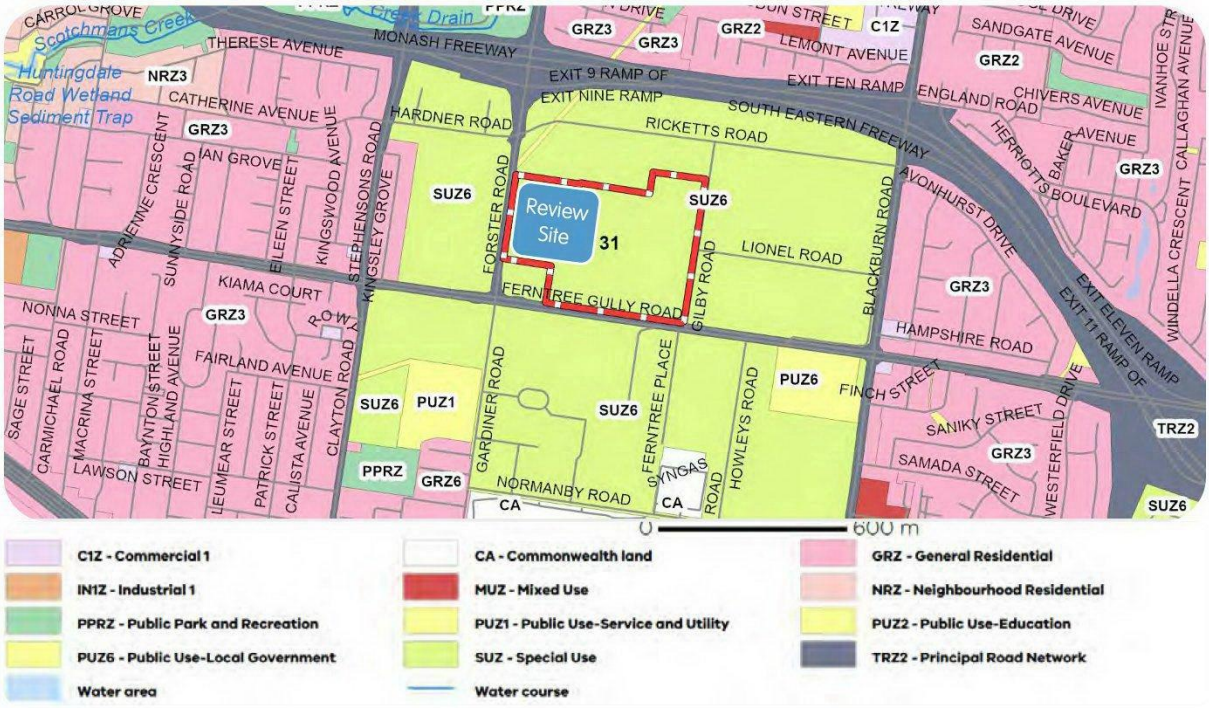


Figure 5 Land Use Planning Zone

The purpose of this zone is to:

- Encourage the integrated development of offices and manufacturing industries and associated commercial and industrial uses, and
- Facilitate the provision of short term accommodation and complementary business services.

4.3 Road Network

4.3.1 Forster Road

Classified as a primary state arterial road, Foster Road is aligned in a north to south direction between Waverley Road to the north and Ferntree Gully Road to the south where it continues as Gardiner Road.

Foster Road is described at Table 3.

Table 3 Road Network

Road	Responsible Authority	Road Reservation	Speed	Geometry	Parking Management
Forster Road	Department of Transport	24 metres	60km/h	Two traffic lanes in each direction, flanked by kerb side parking on the east side. shared path on eastern verge, footpath on western verge	Unrestricted parking along the eastern kerbside, unrestricted

4.4 Sustainable Transport

4.4.1 Public Transport

The site is accessible via bus services as shown at Figure 6.

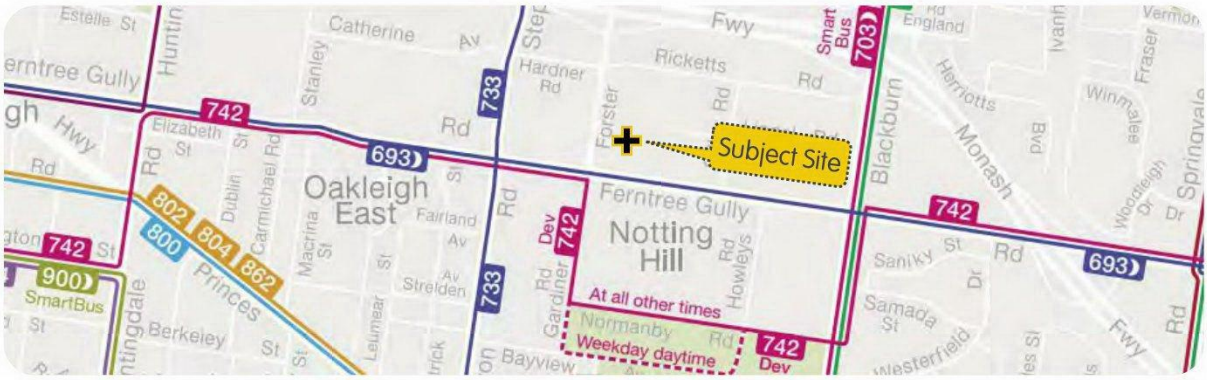


Figure 6 Public Transport Map

Summary of the bus services is provided at Table 4.

Table 4 Public Transport Options

Service	Route	Station / Stop	Distance
Bus	693 - Oakleigh to Belgrave	Forster Road / Ferntree Gully Road	~350m
	742 - Chadstone SC to Ringwood Station		
	733 - Box Hill to Oakleigh	Hardner Road / Stephensons Road	~550m

4.4.2 Cycling

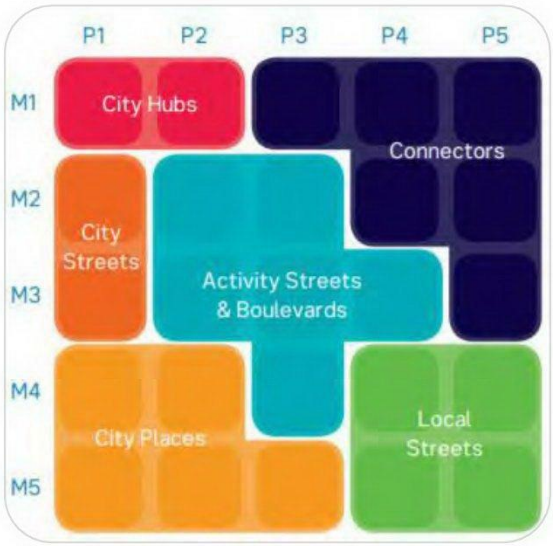
The site is easily accessible via Victoria's Strategic Cycling Corridors (SCC). These corridors are important transport routes for cycling and are a subset of the Principal Bicycle Network (PBN). They are intended to support the needs of commuter trips (to work or education) and other important trips, such as to stations, shops or schools.

As demonstrated at Figure 7 Forster Road is nominated as a Primary Cycling Route and connects to other Primary and Main Routes in the locality to provide broader connectivity to Metropolitan Melbourne.

Figure 7 Bicycle Network Plan

4.5 Movement and Place

Having regard to the Movement and Place Framework[1] reproduced below, Forster Road in the locality of the site can be classified as described at Table 5.



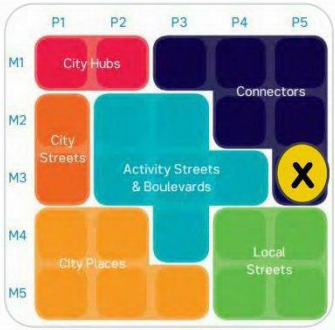
Place definitions

P1	Place of state or national significance.
P2	Place of regional significance.
P3	Place of municipal significance .
P4	Place of neighbourhood significance.
P5	Place of local significance.

Movement definitions

M1	Mass movement of people and/or goods on routes with a state or national-level movement function or provides primary access to state-level places.
M2	Significant movement of people and/or goods on routes connecting across multiple municipalities or provides primary access to regional-level places.
M3	Moderate movement of people and/or goods on routes connecting municipalities or provides primary access to municipal-level places.
M4	Movement of people and/or goods within a municipality.
M5	Local movement.

Table 5 Movement & Place Classification

Road	Movement	Place	Network Classification
Forster Road	**M3**: Moderate Movement of People and / or goods on routes connecting across multiple municipalities or provides primary access to municipal -level places	**P5**: Place of Local Significance	

The Network Classification for Forster Road is 'Connector'.

Successful Connectors should provide safe, reliable and efficient movement of people and goods between regions and strategic centres and mitigate the impact on adjacent communities.

[1] A decision-making framework that outlines the competing interests on the transport links and reports performance in terms of movement, place, environment and safety outcomes

4.6 Road Safety Statistics

Review of Department of Transport Crash Statistics Database in the period between 2021 - 2015 reveals that there have been no accidents recorded along Forster Road along the site frontage, or indeed in the section between Ricketts Road and Ferntree Gully Road.

We observe that there has only been one accident recorded along the immediate frontage of the broader Axxess Corporate Park site, with this incident occurring on Gilby Street at the roundabout intersection with Lionel Road.

The detail of this crash is summarised at Table 6. The accident involved a motorists and motor cyclist.

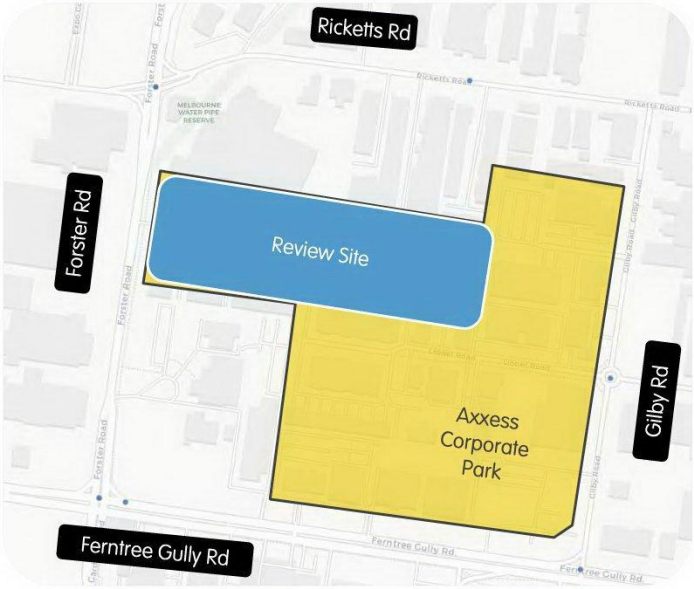


Table 6 Summary of Road Crash Statistics

No	Location	Date	Incident No	Severity	DCA Code	Description of Accident
Gilby Road / Lionel Road						
1	Intersection	07/12/2018	T20180022957	OI	110	Cross traffic (intersections only)
Legend	F = Fatal | SI = Serious Injury | OI = Other Injury					

5 Statutory Controls

The relevant traffic and transportation Statutory Controls are:

Particular Provisions

- Clause 52.06 - Car Parking
- Clause 52.29 - Land Adjacent to the Principal Road Network
- Clause 52.34 - Bicycle Facilities
- Clause 65.01 - Approval of an Application or Plan

5.1 Clause 52.06 - Car Parking

5.1.1 Purpose

The purpose of Clause 52.06 is:

- To ensure that car parking is provided in accordance with the Municipal Planning Strategy and Planning Policy Framework.
- To ensure the provision of an appropriate number of car parking spaces having regard to the demand likely to be generated, the activities on the land and the nature of the locality.
- To support sustainable transport alternatives to the motor car.
- To promote the efficient use of car parking spaces through the consolidation of car parking facilities.
- To ensure that car parking does not adversely affect the amenity of the locality.
- To ensure that the design and location of car parking is of a high standard, creates a safe environment for users and enables easy and efficient use.

5.1.2 Provision and Design Requirements

To satisfy the above purpose, Clause 52.06 of the Planning Scheme specifies requirements relating to the provision and design of car parking as follows:

5.1.3 Car Parking Provision Requirements - Clause 52.06-5

Table 1 to Clause 52.06-05 of the Planning Scheme provides rates for various land uses. The following rates apply to the use contemplated on the site:

- **Warehouse** — 2 spaces to each premises, plus 1.5 spaces to each 100 sqm of net floor area.
- **Cafe** — 4 spaces to each 100 sqm of net floor area.

Application of the above rates to each individual warehouse tenancy reveals a requirement for **1,231 spaces**.

5.1.4 Proposed Provision

The development is planned with **687 spaces** on site.

This provision is below the statutory requirement, and the proposal seeks approval to reduce the number of parking spaces required under Clause 52.06-5.

5.1.5 Application Requirements and Decision Guidelines to Reduce Car Parking Requirement

An application to reduce (including reduce to zero) the number of car parking spaces required under Clause 52.06-5 must be accompanied by a Car Parking Demand Assessment.

The Car Parking Demand Assessment must assess the car parking demand likely to be generated by the proposal and must also address the following matters, to the satisfaction of the responsible authority.

- The likelihood of multi-purpose trips within the locality which are likely to be combined with a trip to the land in connection with the proposed use.
- The variation of car parking demand likely to be generated by the proposed use over time.
- The short-stay and long-stay car parking demand likely to be generated by the proposed use.
- The availability of public transport in the locality of the land.
- The convenience of pedestrian and cyclist access to the land.
- The provision of bicycle parking and end of trip facilities for cyclists in the locality of the land.
- The anticipated car ownership rates of likely or proposed visitors to or occupants (residents or employees) of the land.
- Any empirical assessment or case study.

Before granting a permit to reduce the number of spaces, the responsible authority must consider the following, as appropriate:

- The Car Parking Demand Assessment.
- Any relevant local planning policy or incorporated plans.
- The availability of alternative car parking in the locality of the land, including:
  - Efficiencies gained from the consolidation of shared car parking spaces.
  - Public car parks intended to serve the land.
  - On-street parking in non-residential zones.
  - Streets in residential zones specifically managed for non-residential parking.
- On-street parking in residential zones in the locality of the land that is intended to be for residential use.
- The practicality of providing car parking on the site, particularly for lots of less than 300 square metres.
- Any adverse economic impact a shortfall of parking may have on the economic viability of any nearby activity centre.
- The future growth and development of any nearby activity centre
- Any car parking deficiency associated with the existing use of the land.
- Any credit that should be allowed for car parking spaces provided on common land or by a Special Charge Scheme or cash-in-lieu payment.
- Local traffic management in the locality of the land.
- The impact of fewer car parking spaces on local amenity, including pedestrian amenity and the amenity of nearby residential areas.
- The need to create safe, functional and attractive parking areas.
- Access to or provision of alternative transport modes to and from the land.
- The equity of reducing the car parking requirement having regard to any historic contributions by existing businesses.
- The character of the surrounding area and whether reducing the car parking provision would result in a quality/positive urban design outcome.
- Any other matter specified in a schedule to the Parking Overlay.
- Any other relevant consideration.

Considering the foregoing, the following car parking demand assessment outlines our expectations of likely parking demand.

5.1.6 Car Park Demand Assessment

Warehouse operations are evolving with a growing reliance on automation and robotics to improve supply chain efficiency. The growing reliance on automation and robotics is being driven in part by factors that include:

- Reduced labour requirements / lower labour costs
- Reduced workplace accident risks; and
- Maximum use of warehouse space

These operational trends in warehousing and manufacturing are informing customised design outcomes, which recognise the reduced demand for labour and with it a reduced demand for staff car parking.

RMS (NSW) Case Studies

The RMS NSW Guide to Traffic Generating Developments (2002) undertook studies at 10 Warehouses, recommends that parking for warehouses should be provided at a rate of

0.33 spaces per 100 sq.m	Identified as the median rate in the study
0.30 spaces per 100 sq.m	Identified as the average rate in the study

The results varied as follows:

1.25 spaces per 100 sq.m	identified as the highest rate
0.10 spaces per 100 sq.m	identified as the lowest rate

IMPACT® Case Studies

IMPACT® has commissioned studies at numerous warehouse developments of varying sizes in Metropolitan Melbourne. The findings of the studies align with the results of the RMS (NSW) studies in that parking demand is lower than the rate nominated at Cl 52.06, and also reveal that

- Parking demand for warehouse land uses vary depending on the size of tenancy, with smaller multi-unit warehouse tenancies (with tenancies that are on average 500 sq.m or less) generating parking demands at a higher rate as compared to larger single unit warehouses. This notion also holds firm with smaller single unit warehouse tenancies generating parking demands at a higher rate when compared to larger single unit warehouses.

The following table summarises the key information for each case study site.

Table 7 Parking Demand Summary - Warehouse

Address	Size (sqm)	Tenancies	Peak Demand	Rate / 100 sqm	Survey Date
24 Canterbury Road, Braeside	1,100	2	14 spaces	1.27	08/08/2019
36 Jayco Drive, Dandenong South	3,300	1	18 spaces	0.55	05/02/2019
30 Jayco Drive, Dandenong South	3,300	1	7 spaces	0.21	05/02/2019
10A William Barak Blvd, Broadmeadows	9,500	1	19 spaces	0.20	19 and 20 /10/2022
2A William Barak Blvd, Broadmeadows	12,500	1	27 spaces	0.22	
66-76 Dunmore Drive, Truganina - Warehouse 2	13,695	1	10 spaces	0.07	04/03/2016

655 Somerville Road, Sunshine West	14,095	1	62 spaces	0.44	25/11/2019
66-76 Dunmore Drive, Truganina - Warehouse 1	14,176	1	28 spaces	0.20	04/03/2016
1 Hudson Court, Keysborough	16,000	1	54 spaces	0.34	05/08/2021
448 Boundary Road, Derrimut	20,506	1	60 spaces	0.29	06-09/02/2018
13-19 William Angliss Drive, Laverton North	56,112	3	49 spaces	0.09	14-20/03/2018
Average				0.35 spaces / 100 sq.m	

As outlined by Table 7 and shown diagrammatically within Figure 8, there is clear evidence of a downward trend in relation to car parking provision rate as warehouse floor area increases.

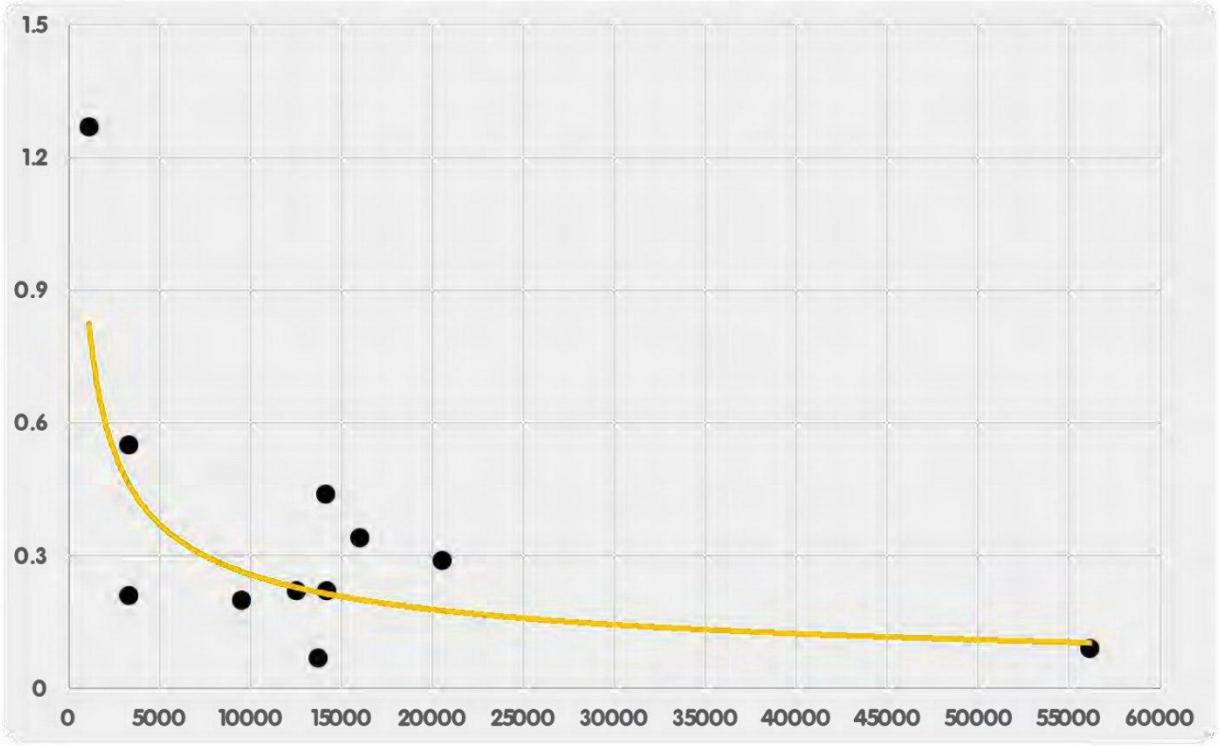


Figure 8 Warehouse Car Parking Provision Rates Comparison

Interestingly a comparison between the RMS (NSW) results and the results derived from the **IMPACT**® case studies reveal consistent rates in all but the median rate, which is lower in the **IMPACT**® case studies.

	RMS (NSW) Case Studies	**IMPACT**® case studies
Highest Rate	1.25 spaces per 100 sq.m	1.27 spaces per 100 sq.m
Average Rate	0.30 spaces per 100 sq.m	0.35 spaces per 100 sq.m
Lowest Rate	0.10 spaces per 100 sq.m	0.09 spaces per 100 sq.m
Median Rate	0.33 spaces per 100 sq.m	0.22 spaces per 100 sq.m

The **IMPACT**® case studies drawn from various locations in Metropolitan Melbourne, and as demonstrated in the comparison with the RMS (NSW) rates, there is consistency in the outputs which enhances the confidence in the results.

Notwithstanding these observations, **IMPACT**® have undertaken a further assessment to confirm that these studies provide a representative reference to inform decision making at the Mount Waverly locality. We have sourced Journey to Work Data - Statistical Area Level 2 (SA2). from the Australian Bureau of Statistics.

This data provides insights on transport modes for workers in the respective statistical area where the case studies were undertaken. A comparison of these statistics provides a basis by which a reasonable comparison can be made between various statistical areas.

The Journey to Work data reveals that workers at all the surveyed statistical areas rely heavily on car as a mode of transport to work, with an uptake of this mode of transport in the range of 82% - 91%.

Summary of persons commuting to the Dandenong SA2

Travel Mode	Counts	%
Public Transport	2,195	3.34
Vehicle	58,044	88.36
Active Transport	495	0.75
Other Mode	199	0.30
Worked at home*	4,129	6.29
Mode not stated	627	0.95
Total	**65,689**	

Summary of persons commuting to the Deer Park - Derrimut SA2

Travel Mode	Counts	%
Public Transport	315	2.44
Vehicle	11,308	87.43
Active Transport	107	0.83
Other Mode	63	0.49
Worked at home*	997	7.71
Mode not stated	140	1.08
Total	**12,934**	

Summary of persons commuting to the Sunshine West SA2

Travel Mode	Counts	%
Public Transport	298	2.97
Vehicle	8,856	88.16
Active Transport	101	1.01
Other Mode	32	0.32
Worked at home*	622	6.19
Mode not stated	134	1.33
Total	**10,045**	

Summary of persons commuting to the Braeside SA2

Travel Mode	Counts	%
Public Transport	256	2.10
Vehicle	11,080	91.07
Active Transport	84	0.69
Other Mode	33	0.27
Worked at home*	628	5.16
Mode not stated	86	0.71
Total	**12,166**	

Summary of persons commuting to the Broadmeadows SA2

Travel Mode	Counts	%
Public Transport	590	5.35
Vehicle	9,084	82.42
Active Transport	126	1.14
Other Mode	34	0.31
Worked at home*	1,059	9.61
Mode not stated	132	1.20
Total	**11,022**	

Summary of persons commuting to the Keysborough SA2

Travel Mode	Counts	%
Public Transport	388	3.79
Vehicle	8,600	84.02
Active Transport	116	1.13
Other Mode	46	0.45
Worked at home*	991	9.68
Mode not stated	90	0.88
Total	**10,236**	

Summary of persons commuting to the Mount Waverley - South SA2

Travel Mode	Counts	%
Public Transport	452	3.40
Vehicle	11,177	84.16
Active Transport	210	1.58
Other Mode	36	0.27
Worked at home*	1,307	9.84
Mode not stated	102	0.77
Total	**13,280**	

The Mount Waverley Statistical Area is recorded as having an uptake of car as a mode of transport to work, in the order of 84%. We are satisfied that the case studies provide basis by which comparisons can be made.

The case studies have revealed peak demand rate of about 0.6 spaces per 100 sq.m for warehouses in the 3,500 sqm - 5,500 sq.m range. Application of this rate to each tenancy results in a demand for **480 spaces**

5.1.7 Other Relevant Considerations

The Suburban Rail Loop, a state infrastructure project proposed by the Victorian Government, will deliver a 90km rail line around Metropolitan Melbourne. This project contemplates a station at Monash. This station will be located between Normanby Road and Ferntree Gully Road at a location generally shown at Figure 9.

Figure 9 Monash Station - Suburban Rail Loop

Trains are expected to be servicing this station by 2035. The delivery of this high quality, high capacity sustainable transport infrastructure will contribute positively to the uptake of sustainable transport by workers and visitors to and from Axxess Corporate Park, and result in less demand for car parking on site.

5.1.8 Adequacy of Proposed Provision

The proposal contemplates a provision 687 car parking spaces. This provision exceeds the forecast demand of 480 spaces.

5.1.9 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 purpose of Clause 52.06, specifically:

- To ensure the provision of an appropriate number of car parking spaces having regard to the demand likely to be generated, the activities on the land and the nature of the locality.

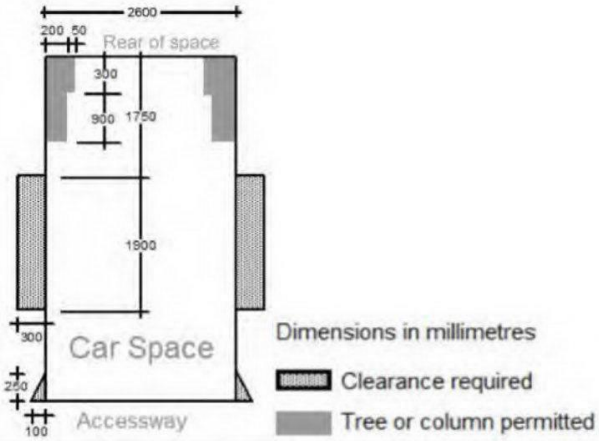
5.1.10 Design Standard for Car Parking - Clause 52.06 - 9

We have assessed the proposed car parking design and access arrangements against the requirements of Clause 52.06-9 of the Planning Scheme. Our findings are as follows:

5.1.10.1 Design Standard 1 - Accessways

Requirements		Design Response	Status
Accessways Must:			
1	Be at least 3 metres wide.	Accessways exceed 3m in width throughout	**Comply**
2	Have an internal radius of at least 4 metres at changes of direction or intersection or be at least 4.2 metres wide	Intersections are at least 4.2 metres wide at changes of direction.	**Comply**
3	Allow vehicles parked in the last space of a dead-end accessway in public car parks to exit in a forward direction with one manoeuvre.	No public car parks proposed.	**N/A**
4	Provide at least 2.1 metres headroom beneath overhead obstructions, calculated for a vehicle with a wheel base of 2.8 metres.	At least 2.1m headroom is provided above accessways and car spaces.	**Comply**
5	If the accessway serves four or more car spaces or connects to a road in a Transport Zone 2 or Transport Zone 3, the accessway must be designed so that cars can exit the site in a forward direction.	Cars can exit the site in a forward direction.	**Comply**
6	Provide a passing area at the entrance at least 6.1 metres wide and 7 metres long if the accessway serves ten or more car parking spaces and is either more than 50 metres long or connects to a road in a Transport Zone 2 or Transport Zone 3.	Accessways are greater than 6.1m wide throughout the site.	**Comply**
7	Have a corner splay or area at least 50 percent clear of visual obstructions extending at least 2 metres along the frontage road from the edge of an exit lane and 2.5 metres along the exit lane from the frontage, to provide a clear view of pedestrians on the footpath of the frontage road. The area clear of visual obstructions may include an adjacent entry or exit lane where more than one lane is provided, or adjacent landscaped areas, provided the landscaping in those areas is less than 900mm in height.	Corner splays to be provided adjacent the exit lanes at the site frontage.	**Comply**
8	If an accessway to four or more car parking spaces is from land in a Transport Zone 2 or Transport Zone 3, the access to the car spaces must be at least 6 metres from the road carriageway.	Car spaces are at least 6m from the road carriageway.	**Comply**

5.1.10.2 Design Standard 2 - Car Parking Spaces

<table>
<tr><th></th><th>Requirements</th><th>Design Response</th><th>Status</th></tr>
<tr><td>1</td><td>Car parking spaces and accessways must have the minimum dimensions in Table 2 of Clause 52.06-9.
<table>
<tr><th>Angle of car parking spaces to access way</th><th>Accessway width</th><th>Car space width</th><th>Car space length</th></tr>
<tr><td>Parallel</td><td>3.6 m</td><td>2.3 m</td><td>6.7 m</td></tr>
<tr><td>45°</td><td>3.5 m</td><td>2.6 m</td><td>4.9 m</td></tr>
<tr><td>60°</td><td>4.9 m</td><td>2.6 m</td><td>4.9 m</td></tr>
<tr><td>90°</td><td>6.4 m</td><td>2.6 m</td><td>4.9 m</td></tr>
<tr><td></td><td>5.8 m</td><td>2.8 m</td><td>4.9 m</td></tr>
<tr><td></td><td>5.2 m</td><td>3.0 m</td><td>4.9 m</td></tr>
<tr><td></td><td>4.8 m</td><td>3.2 m</td><td>4.9 m</td></tr>
</table></td><td>Car spaces are designed in accordance with the dimensions in Table 2, specifically:
— 2.6m wide,
— 4.9m long,
— Accessed from an aisle 6.4m wide.</td><td>Comply</td></tr>
<tr><td>2</td><td>A wall, fence, column, tree, tree guard or any other structure that abuts a car space must not encroach into the area marked 'clearance required' on Diagram 1 other than:
A column, tree or tree guard, which may project into a space if it is within the area marked 'tree or column permitted' on Diagram 1 of the design standard
A structure, which may project into the space if it is at least 2.1 metres above the space.
 
</td><td>Clearances are provided to car spaces in accordance with Diagram 1.</td><td>Comply</td></tr>
<tr><td>3</td><td>Car spaces in garages or carports must be at least 6 metres long and 3.5 metres wide for a single space and 5.5 metres wide for a double space measured inside the garage or carport.</td><td>No garages or carports proposed.</td><td>N/A</td></tr>
<tr><td>4</td><td>Where parking spaces are provided in tandem (one space behind another) an additional 500mm in length must be provided between each space.</td><td>No tandem spaces proposed.</td><td>N/A</td></tr>
<tr><td>5</td><td>Where two or more car parking spaces are provided for a dwelling, at least one space must be under cover.</td><td>No dwellings proposed.</td><td>N/A</td></tr>
<tr><td>6</td><td>Disabled car parking spaces must be designed in accordance with AS 2890.6-2009 (disabled) and the Building Code of Australia. Disabled car parking spaces may encroach into an accessway width specified in Table 2 by 500mm.</td><td>Disabled car parking spaces have been designed in accordance with AS2890.6-2009.</td><td>Comply</td></tr>
</table>

5.1.10.3 Design Standard 3 - Gradients

	Requirements	Design Response	Status
1	Accessway grades must not be steeper than 1:10 (10 per cent) within 5 metres of the frontage to ensure safety for pedestrians and vehicles. The design must have regard to the wheelbase of the vehicle being designed for; pedestrian and vehicular traffic volumes; the nature of the car park; and the slope and configuration of the vehicle crossover at the site frontage. This does not apply to accessways serving three dwellings or less.	No grading proposed within 5 metres of the site frontage.	**Comply**
2	Ramps (except within 5 metres of the frontage) must have the maximum grades as outlined in Table 3 and be designed for vehicles travelling in a forward direction.	Ramp grades do not exceed 1:5.	**Comply**
3	Where the difference in grade between two sections of ramp or floor is greater than 1:8 (12.5 per cent) for a summit grade change, or greater than 1:6.7 (15 per cent) for a sag grade change, the ramp must include a transition section of at least 2 metres to prevent vehicles scraping or bottoming.	Appropriate transition sections have been provided.	**Comply**
4	Plans must include an assessment of grade changes of greater than 1:5.6 (18 per cent) or less than 3 metres apart for clearances, to the satisfaction of the responsible authority.	N/A	**N/A**

Type of car park	Length of ramp	Maximum grade
Public car parks	20 metres or less	1:5 (20%)
	longer than 20 metres	1:6 (16.7%)
Private or residential car parks	20 metres or less	1:4 (25%)
	longer than 20 metres	1:5 (20%)

5.1.11 Conclusion - Car Park Design

The proposed car park and accessways have been assessed and determined to have satisfied the relevant design guidelines.

Accordingly, the proposal satisfies the purpose of Clause 52.06, specifically:

- To ensure that the design and location of car parking is of a high standard, creates a safe environment for users and enables easy and efficient use.

5.2 Clause 52.29 - Land Adjacent to the Principal Road Network

5.2.1 Purpose

The purpose of Clause 52.29 is:

- To ensure appropriate access to the Principal Road Network or land planned to form part of the Principal Road Network.
- To ensure appropriate subdivision of land adjacent to Principal Road Network or land planned to form part of the Principal Road Network.

5.2.2 Permit Requirement

A permit is required to:

- Create or alter access to:
  - A road in a Transport Zone 2

Forster Road is classified as a road in a Transport Zone 2, and the proposal seeks to alter access. Specifically, the proposal modifies the existing access and also creates a new access for commuter vehicles (staff & visitors). Accordingly, a permit is required.

5.2.3 Decision Guidelines

Before deciding on an application, the Responsible Authority must consider amongst other items the effect of the proposal on the operation of the road and on public safety.

5.2.3.1 Effect of the proposal on the operation of the road and on public safety

Assessment Against Clause 52.06 Requirement

The development is designed such that all design criteria set out in Clause 52.06-9 associated with accessways to and from a road in a Road Zone have been satisfied, specifically:

Requirement:	If the accessway serves four or more car spaces or connects to a road in a Transport Zone 2 or Transport Zone 3, the accessway must be designed so that cars can exit the site in a forward direction.
Design Response	
The accessway is designed such that cars can exit the site in a forward direction.	
Requirement:	Provide a passing area at the entrance at least 6.1 metres wide and 7 metres long if the accessway serves ten or more car parking spaces and is either more than 50 metres long or connects to a road in a Transport Zone 2 or Transport Zone 3
Design Response	
The accessways are designed in a manner that provides a passing area at the entrance at least 6.1 metres wide and 7 metres long.	
Requirement:	If an accessway to four or more car parking spaces is from land in a Transport Zone 2 or Transport Zone 3, the access to the car spaces must be at least 6 metres from the road carriageway.
Design Response	
Access to the car spaces is setback more than 6 metres from the road carriageway.	

Assessment Against Australian Standard AS2890.1:2004

AS2890.1:2004 provides guidance on the design and location of access facilities to off street parking areas and queuing areas. This guidance is contained at Section 3 of AS2890.1:2004.

Access Design Principles

AS 2890.1:2004 provides the following access design principles:

> All accesses to off-street car parks from frontage roads shall be formed in such a way as to be clearly recognized by road users as either an access driveway or as an intersection. (our emphasis)
>
> If intended as an intersection, the entry and exit shall be designed as if for a public roadway, with all necessary traffic control devices and intersection geometric design

Categories of Access Facilities

To determine the access facility type and for access driveways, widths and restrictions on their location along frontage roads, the Australian Standard categorises accesses according to the following

- Class of parking facility
- the frontage road type, either arterial (including sub-arterial) or local (including collector); and
- the number of parking spaces served by the access facility.

These categories are set out in Table 3.1 in AS2890.1:2004. This table is reproduced below.

TABLE 3.1

SELECTION OF ACCESS FACILITY CATEGORY

Class of parking facility (see Table 1.1)	Frontage road type	Access facility category — Number of parking spaces (Note 1)				
		<25	25 to 100	101 to 300	301 to 600	>600
1,1A	Arterial	1	2	3	4	5
	Local	1	1	2	3	4
2	Arterial	2	2	3	4	5
	Local	1	2	3	4	4
3,3A	Arterial	2	3	4	4	5
	Local	1	2	3	4	4

NOTES:

1 When a car park has multiple access points, each access should be designed for the number of parking spaces effectively served by that access.

2 This Table does not imply that certain types of development are necessarily suitable for location on any particular frontage road type. In particular, access to arterial roads should be limited as far as practicable, and in some circumstances it may be preferable to allow left-turn-only movements into and out of the access driveway.

Figure 10 **Extract from AS2890.1:2004 - Table 3.1: Selection of Access Facilities**

Having regard to the categorisation criteria, the proposed access is classified as an Access Category 4, noting that:

Categorisation Criteria	Development Outcome
Class of parking facility	Class 1,1A parking facility, i.e. short term high turnover parking facility.
The frontage road type, either arterial (including sub-arterial) or local (including collector)	Forster Road is an Arterial Road
Number of parking spaces served by the access facility.	687 spaces planned. The traffic distribution forecasts suggests that 40% -45% of these spaces will be accessed from Forster Road

Driveways in categories 3 and 4 shall not be located:

a. on arterial roads unless entrances and exits are designed and constructed as intersection treatments catering adequately for all projected traffic flows;

b. closer to intersections than permitted for Category 1 and 2 driveways (see Item (a));

    a. At signalised intersections, the minimum distance from the intersection, measured from the property boundary along both legs, shall be increased as necessary to locate access driveways beyond the influence of normal queue lengths at the intersections. If this is not practicable, it may be necessary to provide:

        i. an arrangement which confines traffic to turning left when either entering or leaving the car park;

        ii. a signalized driveway with signals coordinated with the intersection signals; or

        iii. other traffic management means of providing for safe and efficient operation of the driveway.

c. opposite other developments generating a large amount of traffic, unless all projected traffic flows are provided for in a properly designed and constructed intersection treatment, including the installation of signals if necessary;

d. where there is a heavy and constant pedestrian movement along the footpath, unless this can be adequately catered for by some form of positive control, e.g. traffic signals;

e. where right turning traffic entering the facility would obstruct through traffic; or

f. where traffic using the driveways will interfere or block the operations of bus stops, taxi ranks, loading zones or pedestrian crossings.

Noting the requirement to design and construct the access as an intersection treatment, I have sought guidance from:

a. Austroads Guide to Road Design Part 4: Intersections and Crossings - General; and

b. Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management.

Austroads Guide to Road Design

Austroads Guide to Road Design Part 4: Intersections and Crossings - General contains design guidance that are common to the geometric design of all at-grade intersections.

At Section 7.1 (Property Access & Median Opening) the Austroads Guide notes that the principles of intersection design defined in this guide also apply to property access, and further notes that sight distance, design vehicle turning paths and interference to through traffic by decelerating and accelerating vehicles should be considered at all sites.

Design Principles for Intersection Design

Section 3 of Austroads Guide to Road Design Part 4 sets out factors that influence design of intersections. These include, but not limited to consideration of:

a. Road Users

b. Provision for Large Vehicles

c. Topography and Land Availability

d. Pavement Marking & Signage

Road Users

The Austroads Guide requires designers to have primary consideration of:

a. The road users that travel through the intersection (heavy vehicles, cyclists, pedestrians etc).

b. The characteristics of the various road users and their vehicles.

Successful consideration of road users should result in a design that satisfies the principles that road users are not amongst other items:

a. Surprised by the location of the intersection or the layout

b. Severely disadvantaged for making errors nor rewarded for deliberately committing unsafe acts.

A design outcome that satisfies the first principle, requires actions such as:

a. Provision of adequate approach sight distance on all approaches

b. Need for advance signposting

c. Consistency of treatment along routes so that drivers can have reasonable expectations about intersection treatments.

In respect to satisfying the second principle, designers are required to:

a. Imagine the actions of those drivers who have made an error at the intersection and ensure that recovery action is not hazardous.

b. Design to discourage unsafe acts.

c. Road designers should also consider the needs of road users in particular situations, such as hospitals, schools, etc. where there may be a need to consider a wide range of capabilities

Provision for Large Vehicles

The design needs to be informed on the functional characteristics of the nominated design vehicle.

The design should aim to provide an economical level of design that caters safely and comfortably for most vehicles operating in accordance with normal traffic regulations.

Topography and Land Availability

The topography at an intersection is an important consideration because it can influence amongst other items:

a. Safety and efficiency of the approaches to the intersection

Pavement Marking & Signage

The design solution should provide markings and signs to warn, regulate and guide traffic. The extent of the devices used varies depending on the importance of the intersection in the road network and the site characteristics.

Sight Distance Requirements

Austroads Guide to Traffic Management Part 4A: Unsignalised and Signalised Intersections notes that desirably, sight distances at accesses should comply with the sight distance requirements for intersections, i.e. that approach sight distance (ASD), safe intersection sight distance (SISD), and minimum gap sight distance (MGSD).

ASD is:

> the minimum level of sight distance which must be available on the minor road approaches to all intersections to ensure that drivers are aware of the presence of an intersection.

Note: Obtaining ASD at domestic accesses is preferable but may not always be necessary due to the familiarity with their location of the users. At other than domestic accesses, ASD will need to be provided only if adequate perception of the access is not provided through other means.

SISD is:

> the minimum sight distance which should be provided on the major road at any intersection

The Guide however acknowledges that the criteria above often cannot be obtained at accesses on roadways with tighter horizontal and vertical alignments, or vegetation. Where such geometry constraints exist, minimum sight distances at accesses should comply with the following:

a. Minimum gap sight distance

b. Safe intersection sight distance using values given under the extended design domain (EDD) criteria for sight distance at intersections.

Designing for these parameters ensures that drivers are able to undertake reasonable actions to ensure safe progress through the intersection.

Minimum Gap Sight Distance

Forster Road operates as a 60km/h road and provides for two way traffic (two lanes in each direction).

A minimum gap acceptance time of 5 seconds is required. For this environment, the Australian Standard AS28790.1:2004 provides guidance that minimum gap sight distance of 83 metres would be required.

Safe Intersection Sight Distance

Forster Road operates as a 60km/h road and provides for two way traffic (two lanes in each direction).

At this speed, the SISD requirements are for motorists traveling along Forster Road to be able to sight the intersection from 123 meters.

Assessment of the proposed design outcome against the forgoing principals follows:

Principal 1	Drivers are not surprised by the location of the intersection or the layout

Design Response
We observe that geometrically, Forster Road has a vertical curve along the site's frontage. Assessments provided at Appendix A confirm that motorists on Foster Road and motorists emerging from the access points will have the benefit of at least 133 metre Safe Intersection Sight Distance. The proposed access arrangements are consistent with access arrangements along Forster Road. Drivers will have reasonable expectations at the access points, and so will cyclists that traverse the shared path along Forster Road. Mitigation works are planned along Fosters Road to provide auxiliary right turn lanes. These mitigation works will further enhance the presence of the access points.

Principal 2	Motorists are not severely disadvantaged for making errors nor rewarded for deliberately committing unsafe acts.

Design Response
Access points are designed to accommodate safe movement of vehicles from all directions. Right turning traffic entering the site will be able to do so safely and without adversely obstructing through traffic. The heavy vehicle access will have right turn out movements prohibited. The design of the heavy vehicle access has been informed by the functional characteristics of the nominated design vehicle. We note that AS2890.2:2018 contemplates outcomes whereby Articulated Vehicles can turn into the driveway by using the second lane out from the kerb as permitted by Performance based Standards Scheme - The Standards and Vehicle assessment Rules. The design outcome has all articulated vehicle movements accommodated from the kerb side lane. This ensures the safety and efficiency of all movements along Fosters Road.

Assessment Against Australian Standard AS2890.2:2018

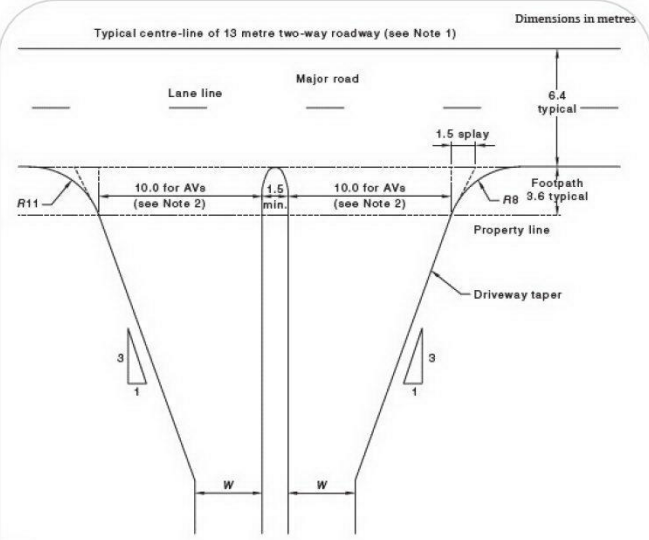
Australian Standard AS2890.2:2018 provides guidance on the design of Commercial vehicle access points to Major Roads.

Geometric Design

This guidance is provided at Figure 3.2 - Reproduced as an extract to the right, and seeks a design outcome that provides a physical separation between inbound and outbound commercial vehicle movements.

We also observe that the standard contemplates at Note 1 that:

HRV can turn left into the driveway entirely from the left lane and can turn out without encroaching over the public roadway centre-line. AVs up to 17 m in length, likewise, can turn in from the left lane and can turn out without encroaching over the centre-line. Articulated Vehicles 20.0m long can turn into the driveway by using the second lane out from the kerb as permitted by Performance based Standards Scheme - The Standards and Vehicle assessment Rules.



Key
W = width of circulation roadway (see Table 3.1)

NOTE 1 Figure 3.2 shows the HRV can turn left into the driveway entirely from the left lane and can turn out without encroaching over the public roadway centre-line. AVs up to 17 m in length, likewise, can turn in from the left lane and can turn out without encroaching over the centre-line. The design (20.0 m long) AV specified in this Standard can turn into the driveway by using the second lane out from the kerb as permitted by *Performance based Standards Scheme — The Standards and Vehicle Assessment Rules* (see Bibliography).

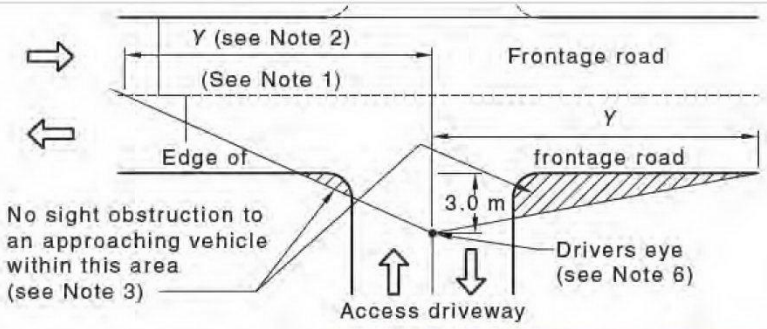
NOTE 2 The corresponding dimensions for the MRV and SRV are 7 m and 5 m respectively. Larger vehicles may be able to use these narrower driveways depending on the width of public road available for manoeuvring in or out.

NOTE 3 The access driveway median should be either fully- or semi-mountable kerb.

Figure 3.2 — Minimum design for a major access driveway catering for HRVs and AVs

Sight Distance

Sight distance to oncoming traffic to enable a commercial vehicle to find a safe gap in oncoming traffic when leaving an access driveway are nominated as 83 metres for cars and 133 metres for commercial vehicles.



Frontage road speed (see Note 4) km/h	Distance (Y) along frontage road (see Note 5) m	
	5 s gap	8 s gap
40	55	89
50	69	111
60	83	133

Note 5: These distances are equivalent to minimum gap sight distance (MGSD) for an exiting vehicle. The minimum requirement is a 5 s gap. A right turn exit into a six lane road may require up to an 8 s gap, unless the median is wide enough to shelter a vehicle leaving the driveway.

Note 6: When checking sight distance the height of the object (approaching vehicle) is to be taken as 1.15 m above the road surface. The driver's eye height is to be taken as any height in the range 1.15 m to 2.5 m, to cater for both car and commercial vehicle drivers

Assessment of the proposed design outcome against the forgoing requirements

Geometric Design
Design Response
The design of the commercial vehicle access provides a physical separation between inbound and outbound commercial vehicle movements. While the Standard contemplates that Articulated Vehicles (20.0m long) can turn into the driveway by using the second lane out from the kerb as permitted by Performance based Standards Scheme - The Standards and Vehicle assessment Rules, the design outcome has all articulated vehicle movements accommodated from the kerb side lane. This ensures the safety and efficiency of all movements along Fosters Road.
Sight Distance
Design Response
Assessments provided at Appendix A confirm that motorists on Foster Road and motorists emerging from the commercial access points will have the benefit of at least 133 metre Safe Intersection Sight Distance. This sight distance is measured from a driver's eye height of 1.15 m. a higher driver eye height, corresponding to the eye height of a truck driver would provide greater sight distance.

5.2.4 Conclusion - Access to Principal Road Network

The proposed car park accessway and commercial vehicle accessways have been assessed and determined to have satisfied the relevant design standards. The proposal is not expected to have any adverse effects on the operation of Forster Road or on public safety.

Accordingly, the proposal satisfies the purpose of Clause 52.29, specifically:

- To ensure appropriate access to the Principal Road Network or land planned to form part of the Principal Road Network.

5.3 Clause 52.34 - Bicycle Facilities

5.3.1 Purpose

The purpose of Clause 52.34 is to encourage cycling as a mode of transport, and provide secure, accessible and convenient bicycle parking spaces and associated shower and change facilities.

5.3.2 Provision Requirements

To satisfy the above purpose, Clause 52.34-3 of the Planning Scheme specifies the bicycle parking provision requirements for a variety of different uses within Table 1. There are no applicable rates for warehouse use.

Therefore, the development does not trigger a statutory requirement.

5.3.3 Proposed Provision

Notwithstanding the above, it is proposed to provide 90 bicycle spaces throughout the development to encourage cycling as an alternative mode of transport. This outcome is satisfactory.

5.3.3.1 End of Trip Facilities: Shower / Change Rooms

If five (5) or more employee bicycle spaces are required, one (1) shower should be provided for the first five (5) employee bicycle spaces, plus one (1) to each ten (10) employee bicycle spaces thereafter.

While no bicycle spaces are required, 90 bicycle spaces are planned. To this end, it is recommended that the development provides at least **10 shower / change rooms** for cyclists.

5.3.4 Design Requirements

Clause 52.34-6 of the Planning Scheme states bicycle spaces should:

- Provide a space for a bicycle of minimum dimensions of 1.7 metres in length, 1.2 metres in height and 0.7 metres in width at the handlebars.
- Be located to allow a bicycle to be ridden to within 30 metres of the bicycle parking space.
- Be located to provide convenient access from surrounding bicycle routes and main building entrances.
- Not interfere with reasonable access to doorways, loading areas, access covers, furniture, services and infrastructure.
- Not cause a hazard.
- Be adequately lit during periods of use.

5.3.4.1 Proposed Bicycle Design

The bicycle spaces are planned to be provided in the form of Cora bicycle racks. The design has been assessed against the requirements of Clause 52.34 of the Monash Planning Scheme, the Australian Standard for Bicycle parking facilities (AS 2890.3:2015) and the manufacturer's specifications.

5.3.5 Conclusion - Bicycle Parking

We can conclude that bicycle parking provided as part of this development satisfies the purpose of Clause 52.34, specifically:

- To encourage cycling as a mode of transport, and provide secure, accessible and convenient bicycle parking spaces.

5.4 Clause 65.01 - Approval of An Application or Plan

5.4.1 Requirements and Objectives

To address the adequacy of loading for new developments, Clause 65.01 of the Monash Planning Scheme specifies that the responsible authority must consider:

- The adequacy of loading and unloading facilities and any associated amenity, traffic flow and road safety impacts.

5.4.2 Loading Arrangements

Loading Areas

Each warehouse tenancy will be provided access to a hard stand area.

The ground floor hardstand area has been designed to accommodate circulation of articulated vehicles up to AustRoads 26m B-double design vehicle.

The first and second floor tenancies are accessible by 19m semi-trailer vehicles. Swept paths provided at Appendix A demonstrate access to loading areas.

Access & Circulation

Heavy vehicles shall enter and exit the site via Forster Road. A 10m wide private accessway is planned along the northern site boundary and shall provide access to the warehouse hardstand areas.

Ground floor hardstand areas shall be accessed directly from the private road, with designated entry and exit points. Circulation through the ground floor hardstand areas shall be anti-clockwise. The first and second floor hardstand areas shall be accessed via ramps from the ground floor. Circulation through the upper levels shall be one-way clockwise.

Swept paths provided at Appendix A demonstrate circulation within the site.

Table 3.2 — Maximum roadway and ramp grades

Design vehicle	Roadway/ramp grade[a] (max)
SRV	1:6.5 (15.4 %)
MRV, HRV	1:6.5 (15.4 %)
AV	1:6.5 (15.4 %)
BD	1:8.3 (12 %)
A-double	1:10 (10 %)
A-triple	1:20 (5 %)

[a] The grade on a curve is measured along the inside of the curve. If reverse manoeuvres are permitted on a ramp, the maximum grade shall be 1:8 (12.5 %).

The ramps providing access to from first and second level has been assessed against AS2890.2:2018. This Standard requires the following maximum ramp grades and rates of change of grades:

Table 3.3 — Maximum rates of change of grades for roadways and ramps

Design vehicle	Rate of change of grade (max)
SRV	1:12 (8.3 %) in 4.0 m of travel
MRV, HRV	1:16 (6.25 %) in 7.0 m of travel
AV	1:16 (6.25 %) in 10 m of travel
BD	1:16 (6.25 %) in 10 m of travel
A-double	1:16 (6.25 %) in 10 m of travel
A-triple	1:16 (6.25 %) in 10 m of travel

Ramps to / from Level 1 & 2 have been designed with a maximum grade of 1:6.5, with 10 m transitions at the top and bottom designed at a grade of 1:16.

5.4.3 Conclusion - Loading Arrangements

The proposed loading arrangements have been assessed and determined to have satisfied the relevant design guidelines / principles contained within Clause 65.01 and AS2890.2:2018.

Accordingly, it is considered that the proposal:

- Provides adequate vehicle loading and unloading facilities, which will not result in associated amenity, traffic flow and road safety impacts.

6 Traffic Considerations

6.1 Assessment Framework

VicRoads Guidelines for Transport Impact Assessment Reports (TIAR) - For Major Land Use and Development Proposals (2006) at Section 5.1 (Performance Objectives of a TIAR), sets out the Performance Objectives as follows:

For existing road infrastructure:

- Any potential adverse effects from land use development proposals on road safety and operational efficiency are identified and, where necessary, developers provide mitigating road improvement works as part of the development costs to minimise these effects and retain, within practical limitations, the level of safety and operational efficiency that would have existed without the development.

In section 5.3 (Proposed Vehicle Access Arrangements), The VicRoads Guideline states that:

- A principal objective is to ensure that any disruption to through traffic is minimised and that safety is not compromised. Therefore, design of the permitted access should take into account the volume and type of traffic generated by the proposed development, as well as the speed environment for through traffic on the abutting road'.

In Section 5.7 (Post Development Analysis), the guideline requires that:

a. The extent of the road network to be analysed should not necessarily be confined to that in the immediate vicinity of the proposed development site. It should generally include all intersections and all mid-block locations where any traffic movement is increased by an amount of 10% or greater as a result of traffic generated by the proposed development/land use and/or resultant changes in travel patterns brought about by the proposal, and/or at any other location identified as necessary by the relevant road authority

b. A comparison of the traffic performance (level of service) of the road network between the Base Case and Post Development scenarios should be carried out to identify the land use/development impacts and the required mitigating works (and any appropriate staging of the works).

c. Each of the identified affected elements of the road network, including proposed intersections providing site access, should be analysed for safety and traffic capacity using an appropriate and agreed methodology. Capacity analysis of signalised intersections should be carried out using a recognised or agreed analysis tool (e.g. SIDRA).

d. The assessment should identify required improvements to intersections in order to retain, within practical limitations, the degree of saturation, safety and operational efficiency at levels that would have existed without the proposed land use/development (i.e Base Case).

e. Where the degree of saturation for part of the road network is estimated to be in excess of 0.9 (approximately) it may be necessary in the analysis to distribute traffic across the network to recognise the diversion of traffic to alternative routes or to recognise the spreading of any peak periods. This may depend on the environment (urban or rural) and relative congestion on the remainder of the surrounding road network.

f. The TIAR should also demonstrate that the proposed site access arrangements (as compared to any mitigating works to existing road network) will operate satisfactorily for an appropriate future time period after full development (i.e. at least 10 years).

6.2 Traffic Generation

6.2.1 RMS Case Studies

The RMS (NSW) undertook Trip Generation Surveys at Business Parks and Industrial Estates in 2012.

The study comprised assessment of 11 sites in NSW, Five (5) urban and six (6) regional sites. Analysis of the data revealed a good logarithmic relationship for business/industrial parks where office/commercial establishments do not exceed 10% of all floor area. These mathematical relationships are reproduced below.

Table 8 Traffic Generation Formulae - All Vehicle Classes

Trip Generation Relationships for Estates with up to 10% of Office/Commercial Areas	
Period	Relationship[2]
AM PEAK	Y = 183.44 Ln (x) - 1607
PM PEAK	Y = 185.42 Ln (x) - 1606

Based on these mathematical relationships, the planned 80,040 sq.m industrial estate, with about 6,500 sq.m of office has the potential to generate the following volumes.

Table 9 Traffic Generation Forecast - All Vehicle Classes

Period	Relationship	Building Area	Forecast	Rate / 100 sq.m (Building Area)
AM PEAK	Y = 183.44 Ln (x) - 1607	80,040 sq.m	464	**0.58**
PM PEAK	Y = 185.42 Ln (x) - 1606		487	**0.61**

The surveys also revealed a very high correlation between the number of commercial vehicle trips and the overall gross floor area. The mathematic relationship was determined as follows:

Table 10 Traffic Generation Formulae - Commercial Vehicles

Period	Relationship[3]
AM PEAK	Y = 0.0004x + 13.168
PM PEAK	Y = 0.0004x + 3.8521

Based on these mathematical relationships, the planned 80,040 sq.m industrial estate has the potential to generate the following commercial vehicle volumes.

Table 11 Traffic Generation Forecast - Commercial Vehicles

Period	Relationship	Building Area	Forecast	Rate / 100 sq.m (Building Area)
AM PEAK	Y = 0.0004x + 13.168	80,040 sq.m	45	0.06
PM PEAK	Y = 0.0004x + 3.8521		36	0.04

[2] Y = Number of trips and x = Total Gross Floor Area, sq.m

[3] Y = Number of trips and x = Total Gross Floor Area, sq.m

Considered as a whole, the proposed development is expected to generate the following traffic generation splits by vehicle class as summarised at Table 12.

Table 12 Traffic Generation Forecast Commuter & Commercial Vehicles

Period	Commuter Vehicles (Staff & Visitors)	Commercial Vehicles (Trucks)	Total	Rate / 100 sq.m (Building Area)
AM PEAK	419	45	**464**	**0.58**
PM PEAK	451	36	**487**	**0.61**

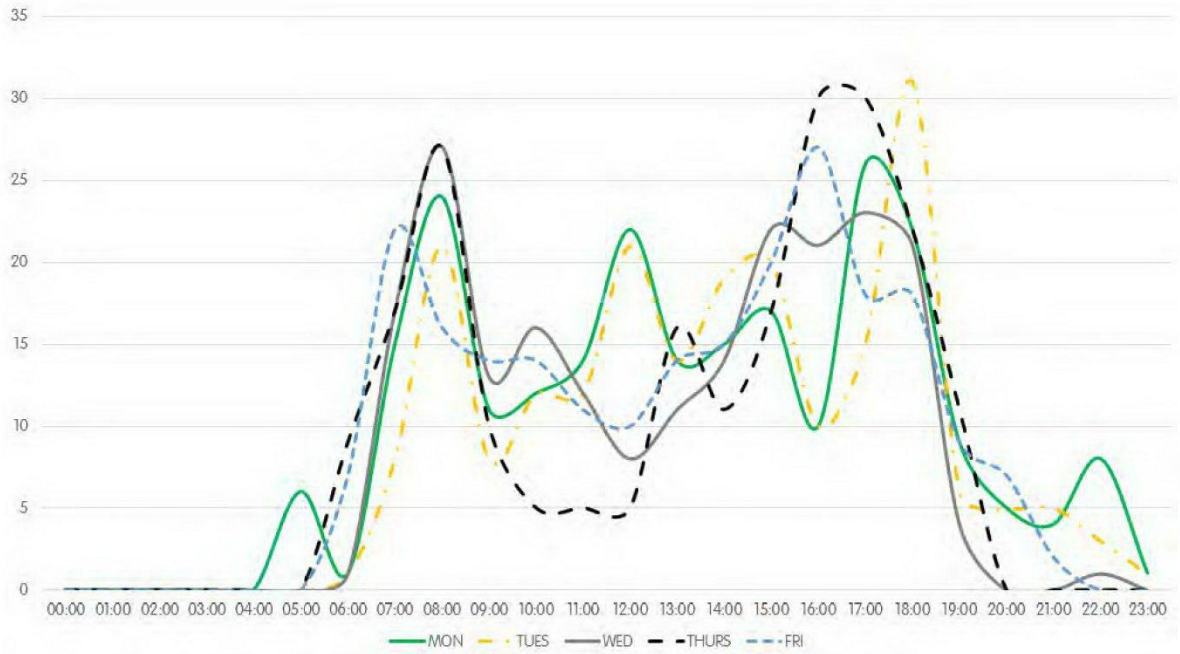
6.2.2 IMPACT® Case Studies

IMPACT® has commissioned studies at numerous warehouse developments of varying sizes in Metropolitan Melbourne.

The studies indicate that warehouse developments in Metropolitan Melbourne generate their peak hour volumes at rates that are substantially lower than the calculated rates adopted by RMS (NSW).

These case studies are reproduced as follows.

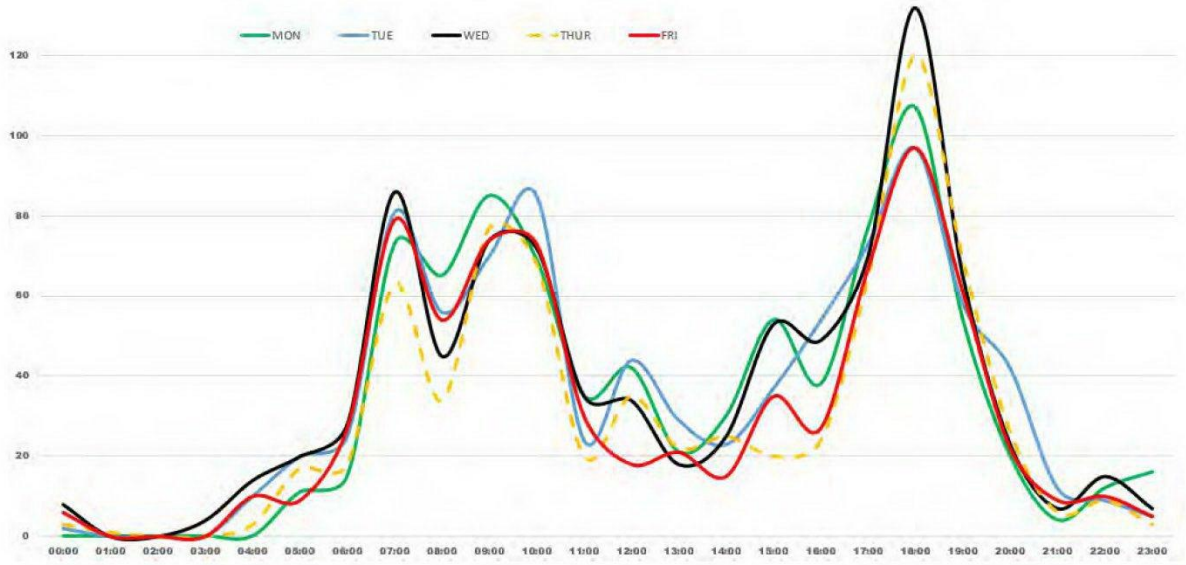
1 Hudson Court, Keysborough	
	
Floor Area	16,000 sq.m
Study	Pneumatic tube counters (5 Days)
Peak Traffic Volumes	31 trips



Peak Hour Rate	0.19 trips / 100 sq.m

64 Pound Rd W, Dandenong South

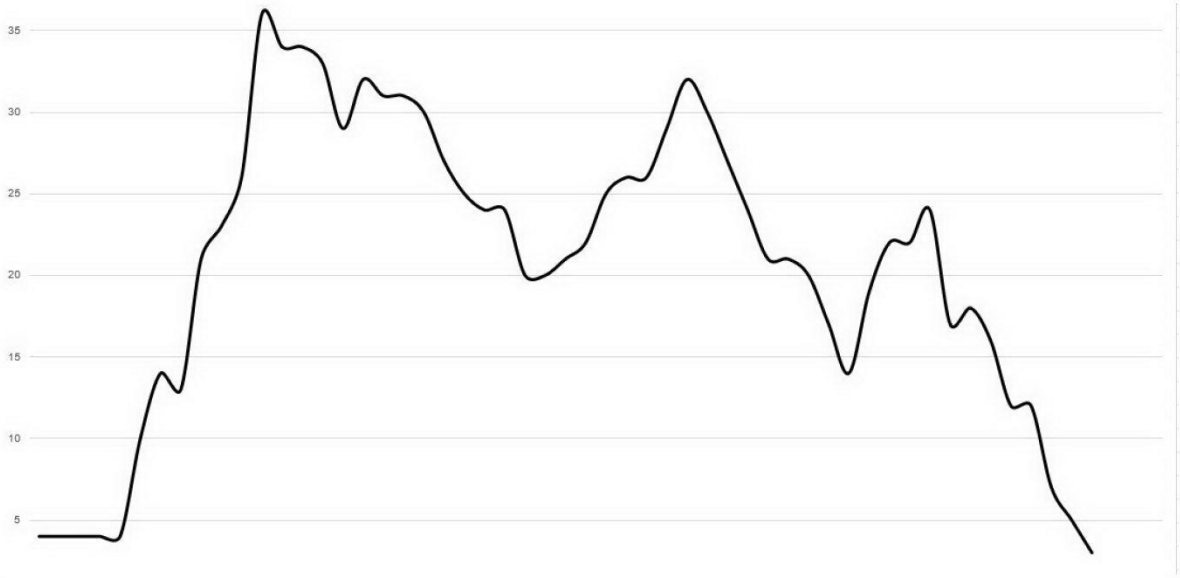
Floor Area	10,200 sq.m
Study	Pneumatic tube counters (5 Days)
Peak Traffic Volumes	AM Commuter Peak: 50 trips (8:00am - 9:00am) PM Commuter Peak: 38 trips (4:00pm - 5:00pm) Peak Hour: 110 trips (6:00pm - 7:00pm)



Rate	AM Commuter Peak: 0.50 trips (8:00am - 9:00am) PM Commuter Peak: 0.37 trips (4:00pm - 5:00pm) Site Peak: 1.08 trips (6:00pm - 7:00pm)

655 Somerville Road, Sunshine West

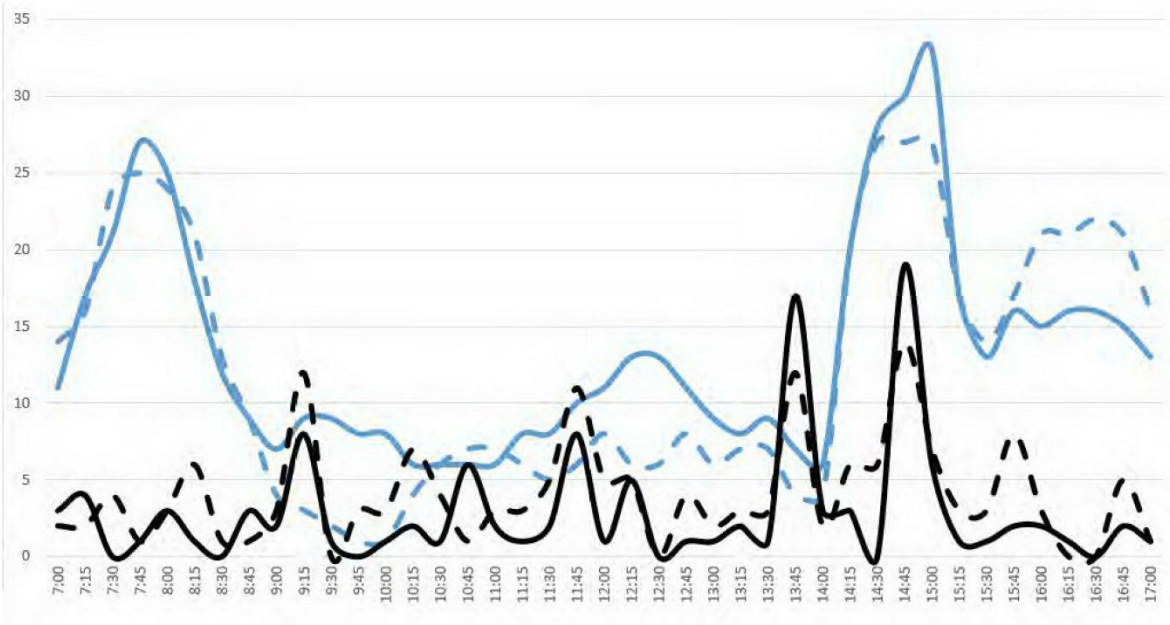
Floor Area	14,000 sq.m
Study	Cameras (1 Day)
Peak Traffic Volumes	AM Commuter Peak: 34 trips (8:00am - 9:00am) PM Commuter Peak: 24 trips (4:00pm - 5:00pm)



Rate	AM Commuter Peak: 0.24 trips (8:00am - 9:00am) PM Commuter Peak: 0.17 trips (4:00pm - 5:00pm)

68 Atlantic Drive, Keysborough & 7-9 Naxos Way, Keysborough

Floor Area	Site 1: 11,9367 Sq.m Site 2: 7,357 Sq.m
Study	Camera (2 Days)
Peak Traffic Volumes	Site 1: 33 trips Site 2: 19 trips



Rate	Site 1: 0.28 trips / 100 sq.m Site 2: 0.26 trips / 100 sq.m

Palm Springs Road, Ravenhall	
	
Floor Area	Site 1: 40,250 sq.m Site 2: 35,900 sq.m Site 3: 43,200 sq.m
Study	Camera (2 Days)
Peak Traffic Volumes	Site 1: 117 trips (5pm -6pm) Site 2: 20 trips (7:15am - 8:15am) Site 3: 125 trips(5pm -6pm)

SITE	AREA	WEDNESDAY	
		AM (7:15AM - 8:15AM)	PM (5:00PM - 6:00PM)
SITE 1	40250	69	116
		0.17	0.29
		AM (7:15AM - 8:15AM)	PM (5:00PM - 6:00PM)
SITE 2	35900	20	6
		0.06	0.02
		AM (7:15AM - 8:15AM)	PM (5:00PM - 6:00PM)
SITE 3	43200	52	16
		0.12	0.04
COMBINED	119350	141	138
		0.12	0.12

Peak Rates

SITE	AREA	THUR	
		AM (7:15AM - 8:15AM)	PM (5:00PM - 6:00PM)
SITE 1	40250	79	117
		0.20	0.29
		AM (7:15AM - 8:15AM)	PM (5:00PM - 6:00PM)
SITE 2	35900	20	12
		0.06	0.03
		AM (7:15AM - 8:15AM)	PM (5:00PM - 6:00PM)
SITE 3	43200	60	125
		0.14	0.29
COMBINED	119350	159	254
		0.13	0.21

It is evident that the recorded peak traffic generation rates are lower than the RMS calculated rates of between 0.58 sq.m - 0.61 trips per 100 sq.m.

The case studies suggest that a peak hour rate in the order of 0.3 trips per 100 sq.m would be a more appropriate rate for assessment.

Adopting this rate to the proposed development translates to 240 peak hour trips.

6.2.3 Adopted Rates

In order to provide a robust assessment of the post development conditions, the conservatively high RMS (NSW) rates will be adopted.

These rates as shown in the table below result in a forecast that is double the anticipated peak hour volume.

Period	ADOPTED RMS (NSW) RATES		ANTICIPATED IMPACT CASE STUDY RATES	
	Total	Rate / 100 sq.m	Total	Rate / 100 sq.m)
AM PEAK	464	0.58	240	0.30
PM PEAK	487	0.61	240	0.30

6.3 Traffic Distribution

The RMS (NSW) study revealed directional trip distribution splits as presented at Table 13.

Table 13 Directional Trip Distribution Splits

Period	Arrivals	Departures
AM PEAK	69%	31%
PM PEAK	34%	66%

For the purpose of this assessment, we have adopted a 70% / 30% split for both the AM and PM peak periods.

This translates to the volumes shown at Table 14.

Table 14 Directional Trip Distribution - Commuter & Commercial Vehicles

Period	Commuter Vehicles (Staff & Visitors)		Commercial Vehicles (Trucks)		Total	
AM PEAK	419		45		**464**	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
	293	126	32	14	**325**	**139**
PM PEAK	451		36		**487**	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
	135	316	11	25	**146**	**341**

6.4 Traffic Impact

6.4.1 Preamble

Volumes generated by the proposed development will be distributed predominately to:

Forster Road Commuter & Commercial Vehicles

Gilby Road Commuter Vehicles

The access routes to / from the review site to the broader road network are shown at Figure 11 overleaf.

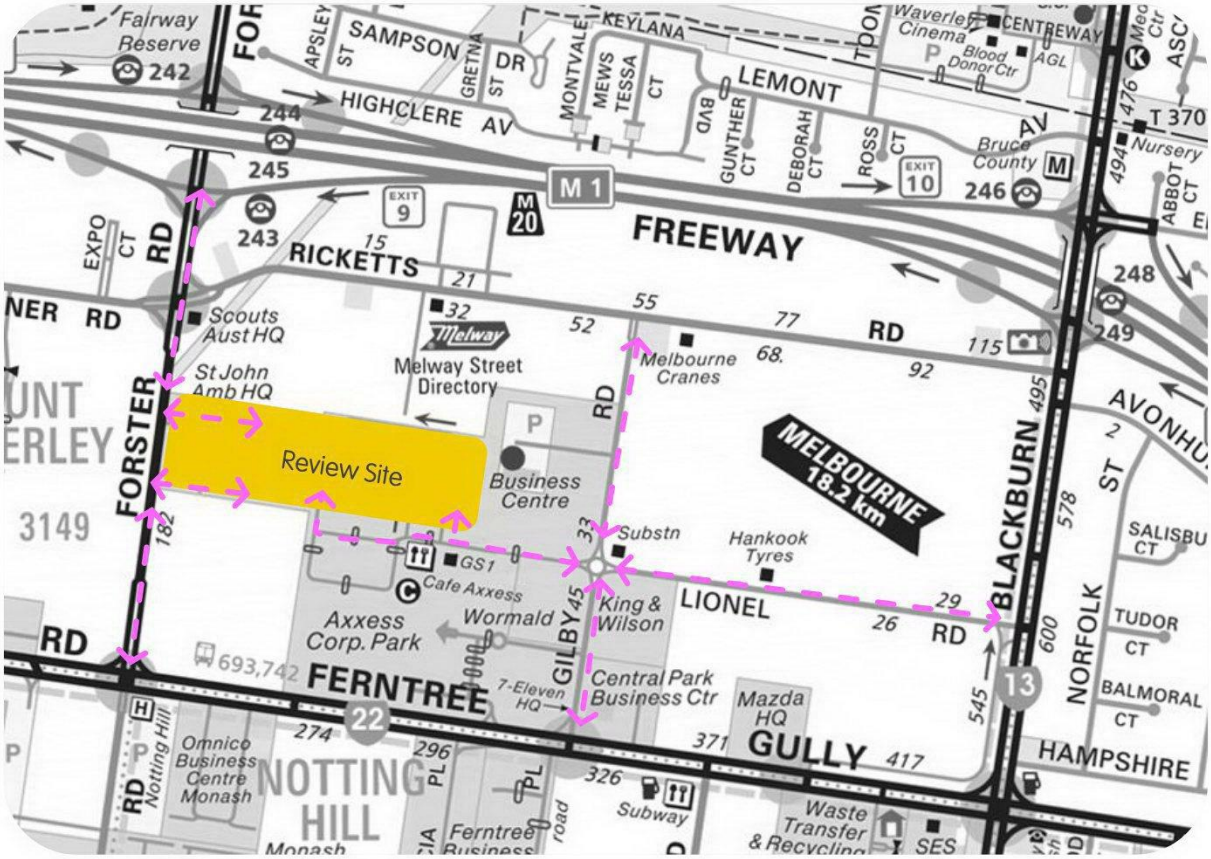


Figure 11 **Access Routes To / From Review Site**

6.4.2 Existing Volumes

To quantify the traffic impacts of the proposed development, **IMPACT**® commissioned Trans Traffic Surveys Pty Ltd to undertaken traffic studies at

- Forster Road Site Access
- Gilby Road / Lionel Road.

The studies comprised:

Survey Type	Location	Dates	
Pneumatic Tube Counters	Forster Road Site Access	Monday 29th August 2022 - Friday 2nd September 2022	
Traffic Movement	Gilby Road / Lionel Road	Wednesday 31st August 2022 & Thursday 1st September	6:00am - 9:00am 3:00am - 6:00pm
Gap Acceptance	Forster Road Site Access		8:00am - 9:00am 5:00pm - 6:00pm

The study revealed that volumes generated to / from the site have a bias toward the Gilby Road / Lionel Road access point, with 55% - 60% bias observed on average across a typical AM and PM Peak period.

This bias is illustrated at Figure 12.

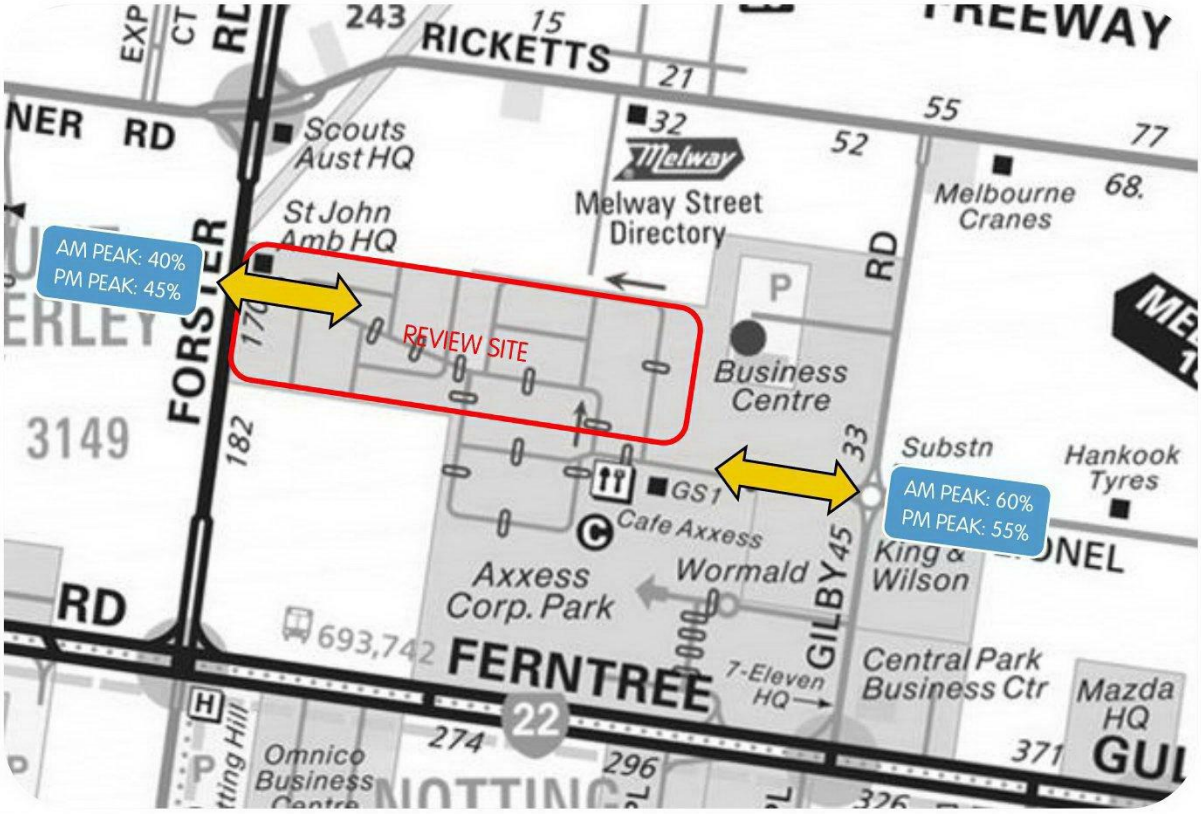


Figure 12 **Average AM & PM Peak Distribution Pattern - Road Network**

The respective peak hour volume splits at each intersection are Table 15 and Table 16.

Table 15 **Forster Road / Site Access: AM & PM Peak Volumes**

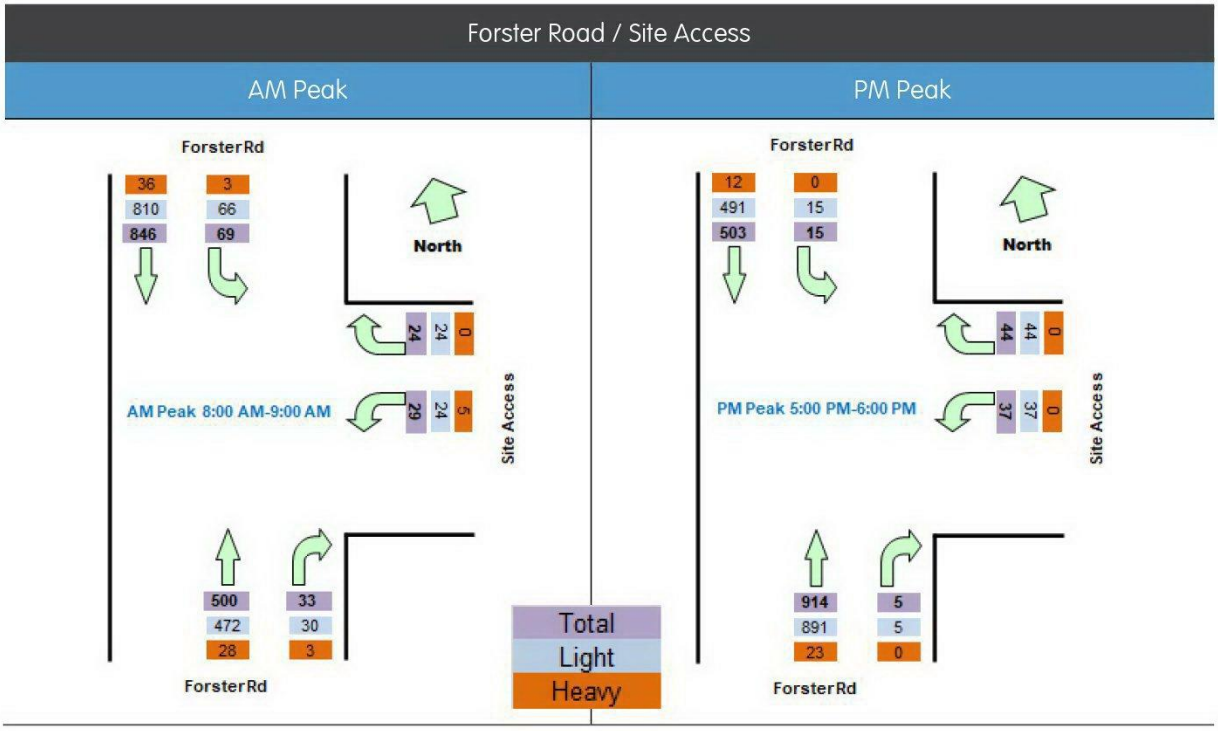
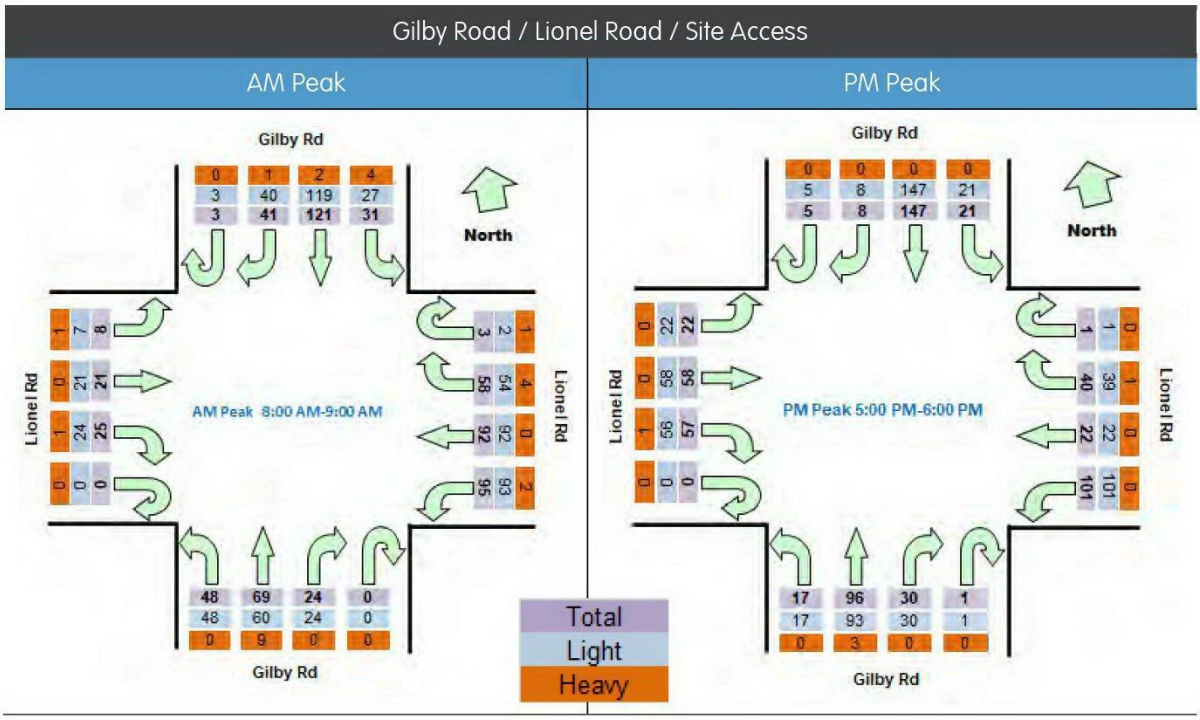


Table 16 Gilby Road / Lionel Road / Site Access: AM & PM Peak Volumes



6.4.3 Gap Acceptance Analysis

A gap acceptance study was also undertaken using critical gap and follow up headways identified in AustRoads Guide to Road Design Part 4A and reproduced below at Table 17.

Table 17 Critical Gap and Follow Up Headway Parameters

Movement	Critical Gap	Follow Up Headway
Left Out	5	3
Right Out [4]	8	5
Right In	5	3

Based on the above parameters, the gap analysis studies undertaken at the Forster Road / Site Access revealed the following gap capacities.

Table 18 Recorded Gap Capacity (Theoretical Absorption Capacity) - Wed 31st August 2022

Approach	Movement	AM Peak		PM Peak	
		Cars	Trucks	Cars	Trucks
Site Access	Left Out	570		795	
	Right Out	221	N/A	237	N/A
Forster Road (South)	Right In	570		795	

[4] Right out movements for trucks will be prohibited.

Table 19 Recorded Gap Capacity (Theoretical Absorption Capacity) - Thur 1st Sept 2022

Approach	Movement	AM Peak		PM Peak	
		Cars	Trucks	Cars	Trucks
Site Access	Left Out	563		841	
	Right Out	200	N/A	198	N/A
Forster Road (South)	Right In	563		841	

AustRoads Guide suggests that the absorption capacity is a theoretical upper limit which may not be achieved in practice.

To provide a conservative estimate, AustRoads Guide recommends a 15% discount to make allowance for the number of gaps that can practically be taken by motorists arriving / departing the intersection.

Application of the above discount yields the following practical gaps.

Table 20 Practical Vehicle Gap Capacity - Wed 31st August 2022

Approach	Movement	AM Peak		PM Peak	
		Cars	Trucks	Cars	Trucks
Site Access	Left Out	485		676	
	Right Out	188	N/A	201	N/A
Forster Road (South)	Right In	485		676	

Table 21 Practical Vehicle Gap Capacity - Thur 1st Sept 2022

Approach	Movement	AM Peak		PM Peak	
		Cars	Trucks	Cars	Trucks
Site Access	Left Out	479		715	
	Right Out	170	N/A	168	N/A
Forster Road (South)	Right In	479		715	

6.4.4 Traffic Distribution

For the purpose of this assessment, the prevailing traffic distribution patterns observed at the Forster Road access and Gilby Road access will be maintained. A graphical representation of the forecast development peak hour vehicle movements to / from the subject site are presented at Figure 13 and Figure 14.

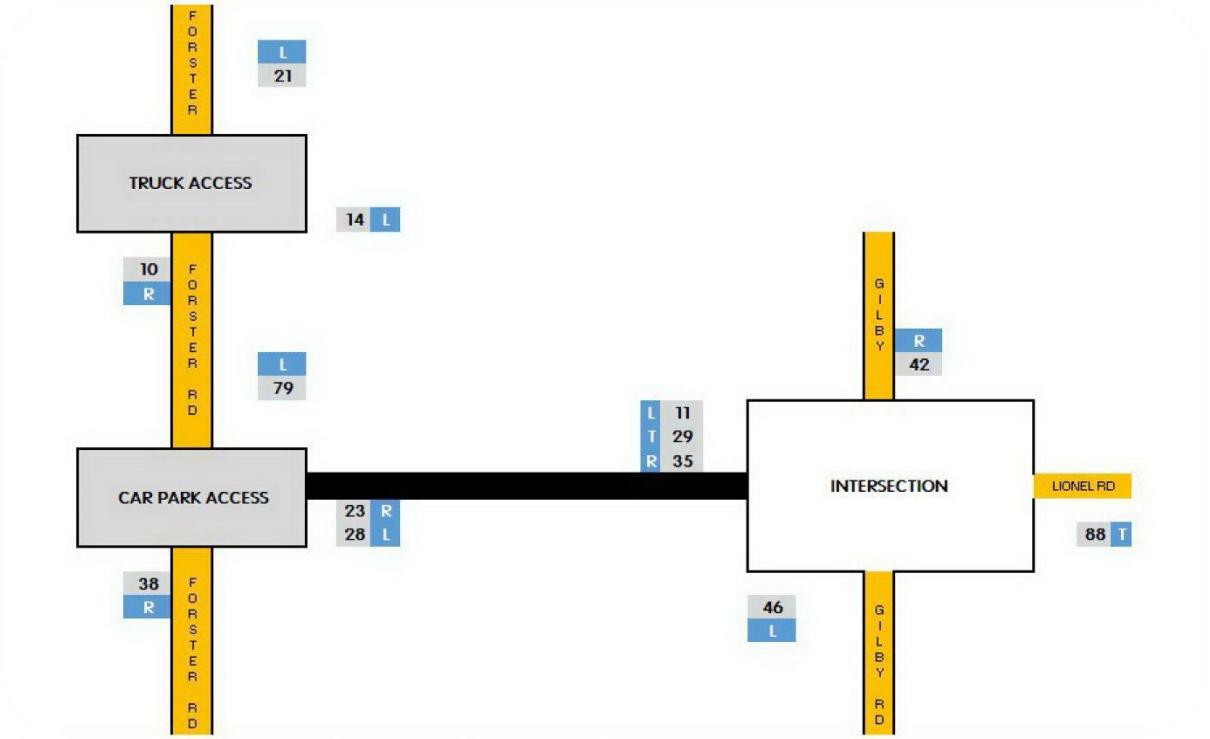


Figure 13 **Peak Hour Development Volumes - AM PEAK**

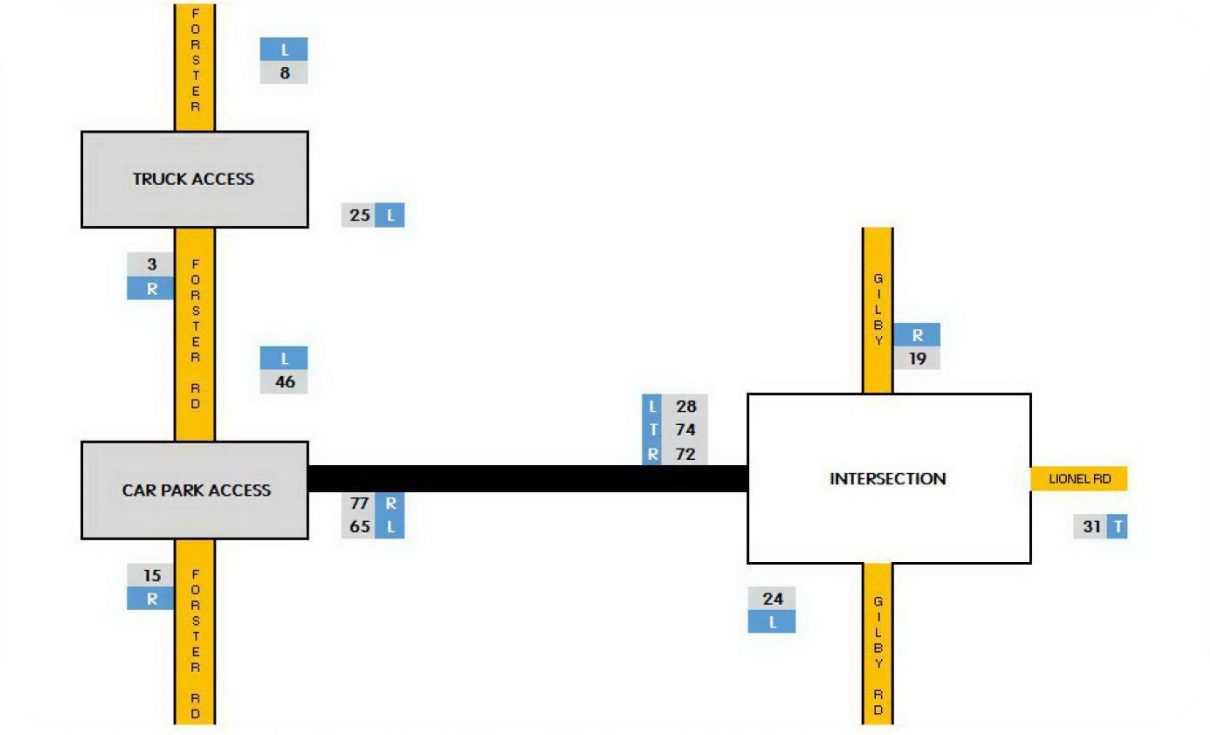


Figure 14 **Peak Hour Development Volumes - PM PEAK**

6.4.5 Capacity Analysis

Forster Road

6.4.5.1 First Principals

An assessment of the capacity of Forster Road to absorb this traffic is possible having regard to the Practical Gap capacities revealed by studies summarised at Section 6.4.3 and reproduced at Table 22 and Table 23.

Table 22 Existing Movement Capacity vs Development Volumes - AM PEAK

Approach	Movement	Existing Capacity		Development Volumes	
		Cars	Trucks	Cars	Trucks
Site Access	Left Out	479 - 485		28	14
	Right Out	170 - 188	N/A	23	N/A
Forster Road (South)	Right In	479 - 485		38	10

Table 23 Existing Movement Capacity vs Development Volumes - PM PEAK

Approach	Movement	Existing Capacity		Development Volumes	
		Cars	Trucks	Cars	Trucks
Site Access	Left Out	676 - 715		65	25
	Right Out	168 - 201	N/A	77	N/A
Forster Road (South)	Right In	676 - 715		15	3

The assessment confirms that the practical gap capacity that exists along Forster Road can comfortably absorb the forecast volumes with ample spare capacity remaining.

6.4.5.2 SIDRA Analysis

Allowing for the proposed mitigation measures along Forster Road, a SIDRA analysis has been undertaken off the two access point. Critical outputs of the SIDRA Model 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

In evaluating intersection performance during capacity analysis and design the target maximum degree of saturation of the critical (maximum) movement is:

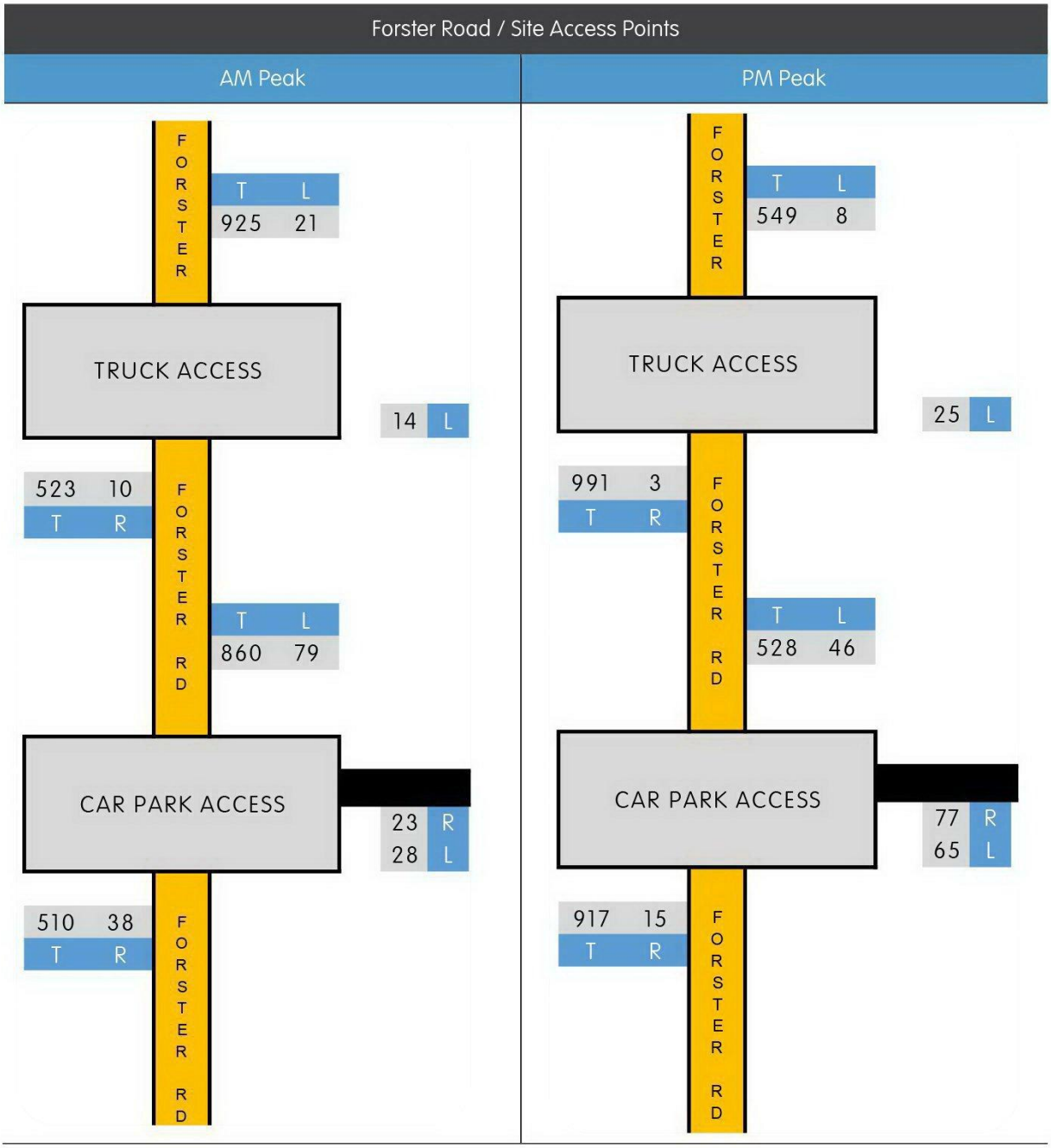
Unsignalised intersection: 0.8 (desirable) and 0.85 (maximum)

95th Percentile (95%ile) 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 post development AM and PM Peak volumes are presented at Table 24.

Table 24 Forster Road / Site Access: Post Development AM & PM Peak Volumes



The assessment reveals that the additional volumes will be comfortably accommodated at this intersection with manageable impacts on the traffic capacity as summarised in the SIDRA results presented at Table 25 and Table 26.

Table 25 SIDRA Outputs - Car Park Access: Post Development AM Peak & PM Peak

Intersection	Approach	AM Peak			PM Peak		
		DOS	Queue (m)	Delay (sec)	DOS	Queue (m)	Delay (sec)
Forster Road / Car Park Access	South	0.16	2	1	0.27	0	1
	East	0.22	6	20	0.70	32	44
	North	0.26	2	1	0.16	2	2
	Intersection	0.26	6	2	0.70	32	4

SIDRA results are provided at Appendix C.

Table 26 SIDRA Outputs - Heavy Vehicle Access: Post Development AM Peak & PM Peak

Intersection	Approach	AM Peak			PM Peak		
		DOS	Queue (m)	Delay (sec)	DOS	Queue (m)	Delay (sec)
Forster Road / Heavy Vehicle Access	South	0.15	2	0	0.28	0	0
	East	0.04	2	13	0.05	3	10
	North	0.27	0	0	0.16	0	0
	West	0.11	3	16	0.24	6	27
	Intersection	0.27	3	1	0.28	6	1

SIDRA results are provided at Appendix C.

The results confirm that the impacts of the proposed development on road network operational efficiency have been adequately ameliorated by the suite of mitigation works.

Specifically, the results reveal that as required under the VicRoads Guidelines, that the proposed mitigating road improvement works as part of the development retain, within practical limitations, the level of safety and operational efficiency that would have existed without the development.

Gilby Road

The capacity of the intersection between Gilby Road / Lionel Road / Site Access has been assessed using SIDRA Intersection.

The post development AM and PM Peak volumes are presented at Figure 15 and Figure 16.

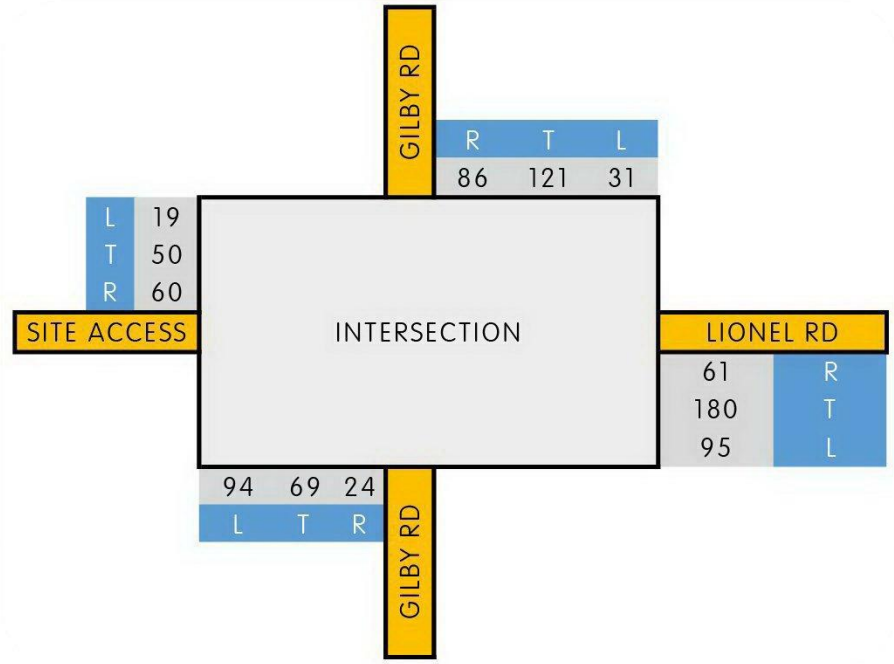


Figure 15 Gilby Road Access Post Development AM Peak Volumes

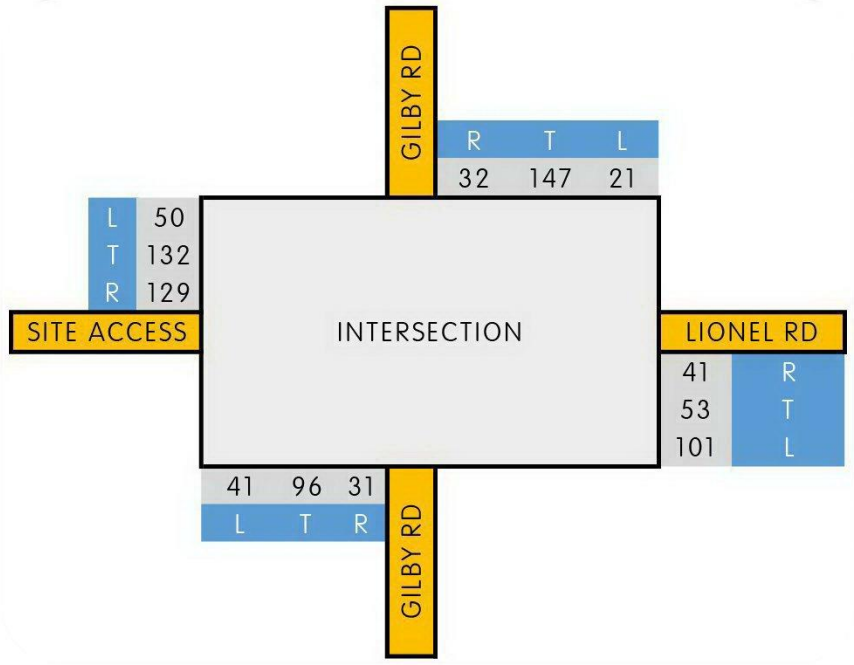


Figure 16 Gilby Road Access Post Development PM Peak Volumes

The assessment reveals that the additional volumes will be comfortably accommodated at this intersection with manageable impacts on the traffic capacity as summarised in the SIDRA results presented at Table 27.

Table 27 SIDRA Outputs - Post Development AM Peak & PM Peak

Intersection	Approach	AM Peak			PM Peak		
		DOS	Queue (m)	Delay (sec)	DOS	Queue (m)	Delay (sec)
Gilby Road / Lionel Road / Site Access	South	0.20	8	7	0.15	6	6
	East	0.33	15	7	0.20	8	7
	North	0.20	9	7	0.20	9	7
	West	0.12	5	7	0.27	12	7
	Intersection	0.33	15	7	0.27	12	7

SIDRA results are provided at Appendix C.

6.5 Future Considerations

6.5.1 10 Year Assessment - Site Access Arrangements

The VicRoads Guidelines require that:

- The TIAR should also demonstrate that the proposed site access arrangements (as compared to any mitigating works to existing road network) will operate satisfactorily for an appropriate future time period after full development (i.e. at least 10 years).

Review of data published by DTP indicates that volumes along Forster Road are reducing by an annual rate of 0.3%. The foregoing assessment allows for no traffic reduction, and is based on inflated development volume forecasts that are double the anticipated volumes.

Accordingly, the assessment demonstrates that the proposed site access arrangements will operate satisfactorily after full development.

6.5.2 Suburban Rail Loop

The Suburban Rail Loop, a state infrastructure project proposed by the Victorian Government, will deliver a 90km rail line around Metropolitan Melbourne. This project contemplates a station at Monash with this station located in the locality of the site.

The delivery of this high quality, high capacity sustainable transport infrastructure will contribute positively to

- Higher density development outcomes;
- Uptake of sustainable transport by workers and visitors in the locality; and
- Potentially a redistribution of traffic volumes on the road network.

Whilst details of the likely development outcomes, impacts to the road network and modes of transport are yet to resolved, we have undertaken a sensitivity assessment based on the following presumptions.

Development Volumes	The uptake of sustainable transport by workers and visitors in the locality will be expected to reduce traffic generation to / from the site. Currently, the assessment is based on an inflated forecast (0.6 trips / 100sq.m) that is double the anticipated rate (0.3 trips / 100 sq.m).

For this future scenario assessment, development volumes will be adjusted to reflect the anticipated rate of 0.3 trips / 100 sq.m.

This adjustment continues to provide a conservatively high estimate of development volumes because the reduction anticipated from the Suburban Rail Loop project should technically be applied to this anticipated rate of 0.3 trips / 100 sq.m

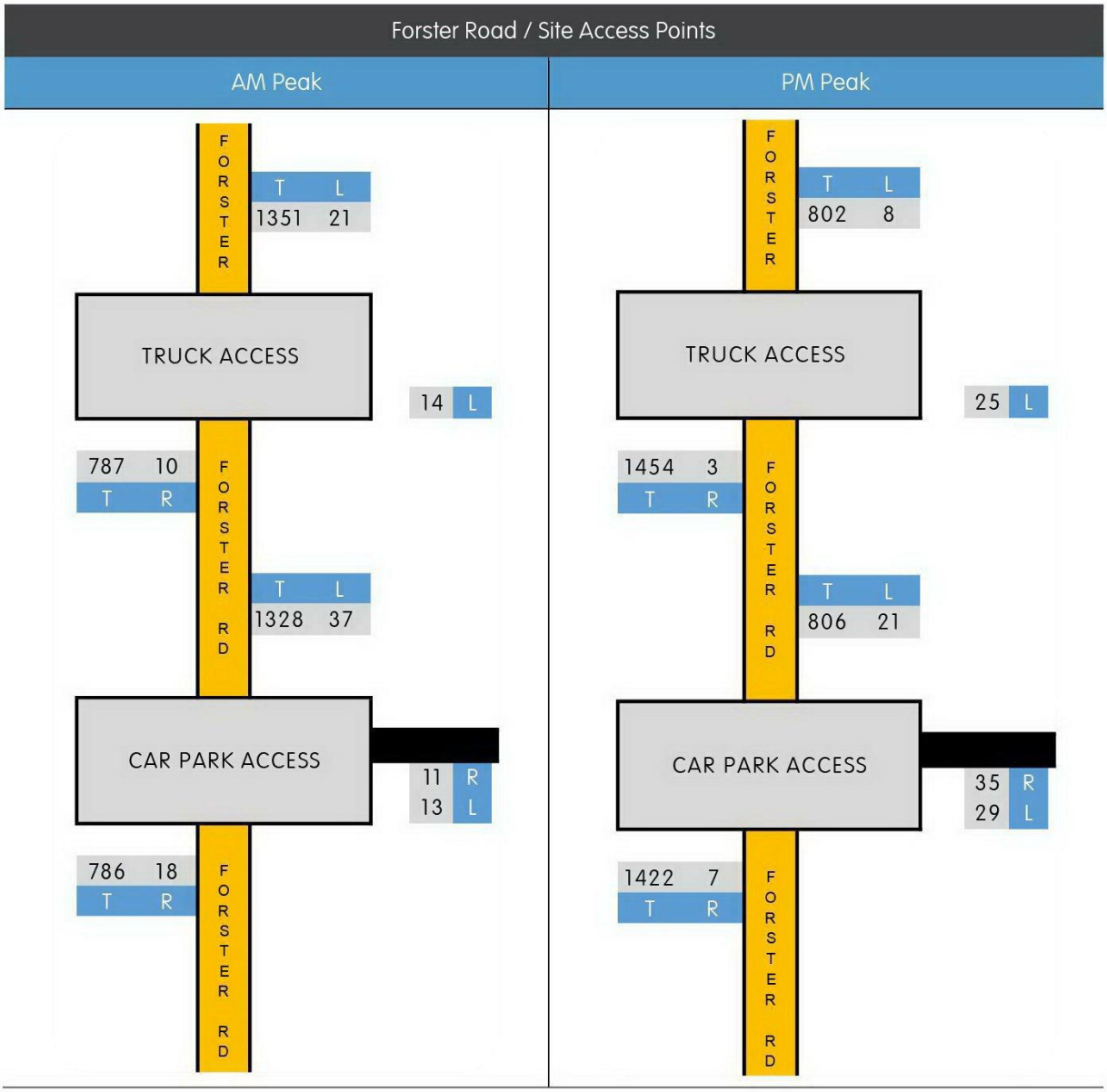
Road Network Growth

For assessment purposes, it is typical that traffic volume growth in established road corridors is adopted at a compounding rate of between 2.5% - 3.0% per annum over 10 years.

In this instance, a more aggressive compounding rate of 4.5% per annum over 10 years has been adopted.

The revised post development AM and PM Peak volumes are presented at Table 28.

Table 28 Forster Road / Site Access: Post Suburban Rail Loop AM & PM Peak Volumes



Assessment of these revised volumes reveals that the additional volumes on the road network will not compromise the operation of the site access arrangements, with the network continuing to operate comfortably as summarised in the SIDRA results presented at Table 29 and Table 30.

Table 29 SIDRA Outputs - Car Park Access: Post Suburban Rail Loop AM Peak & PM Peak

Intersection	Approach	AM Peak			PM Peak		
		DOS	Queue (m)	Delay (sec)	DOS	Queue (m)	Delay (sec)
Forster Road / Car Park Access	South	0.24	1	1	0.41	0	0
	East	0.23	5	41	0.82	30	132
	North	0.38	2	0	0.23	3	1
	Intersection	0.38	5	1	0.82	30	4

SIDRA results are provided at Appendix D.

Table 30 SIDRA Outputs - Heavy Vehicle Access: Post Suburban Rail Loop AM Peak & PM Peak

Intersection	Approach	AM Peak			PM Peak		
		DOS	Queue (m)	Delay (sec)	DOS	Queue (m)	Delay (sec)
Forster Road / Heavy Vehicle Access	South	0.22	3	0	0.41	0	0
	East	0.05	2	17	0.06	3	12
	North	0.39	0	0	0.23	0	0
	West	0.24	5	32	0.62	16	95
	Intersection	0.39	5	1	0.62	16	2

SIDRA results are provided at Appendix D.

6.6 Conclusion - Traffic Impacts

The foregoing assessment confirms that the proposed development will have minimal impacts to the adjacent road network.

Importantly:

- At the location of the proposed site access, there is ample capacity to comfortably accommodate the number of movements generated by the proposed development with ample spare capacity.
- The results confirm that the impacts of the proposed development on road network operational efficiency have been adequately ameliorated.
- Specifically, the results reveal that as required under the VicRoads Guidelines, that the proposed road improvement works as part of the development retain, within practical limitations, the level of safety and operational efficiency that would have existed without the development.

APPENDIX A
Functional Layout Plans & Swept Path Analysis

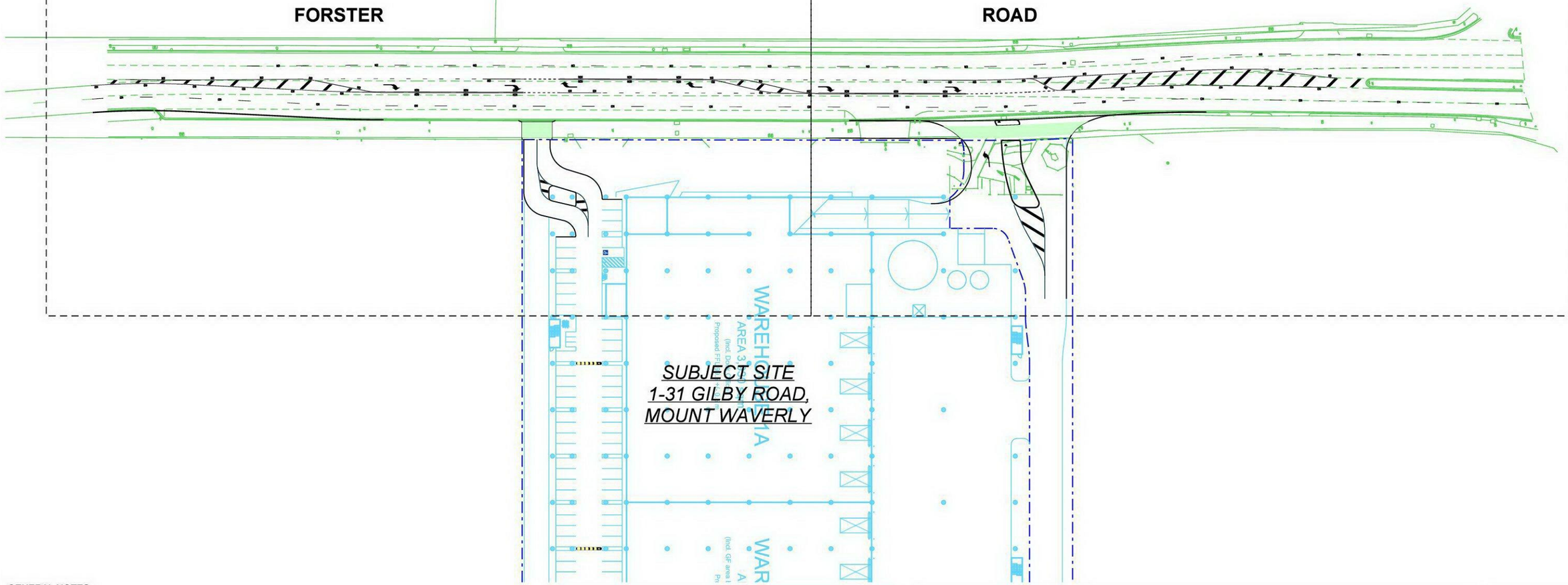
Design Vehicles

- 12.5m Heavy Rigid Vehicle
- 19m Semi-Trailer
- 26m B-Double

D23-138149

FOR DETAILS REFER TO IMP2205030-FLP-02-01

FOR DETAILS REFER TO IMP2205030-FLP-02-02



GENERAL NOTES:

1. ALL DIMENSIONS ARE TO FACE OF KERB AND CHANNEL UNLESS NOTED OTHERWISE.
2. DECLARED ROADS - FORSTER ROAD (SPEED ZONE 60KM/H).
3. BASE INFORMATION FROM NEARMAP AERIAL PHOTOGRAPHY DATED 14.09.2022 AND CONCEPT Y 2209-122-DA-010-011-012-013-014(A).dwg DATED 14.11.2022 SURVEY BY VERIS 304525-AF 2022-09-15.dwg DATED 19.09.2022
4. INSTALL ALL SIGNS AND LINE MARK IN ACCORDANCE WITH AUSTROADS GUIDE TO TRAFFIC MANAGEMENT VOLUME 10, AS1742 AND RELEVANT VICROADS SUPPLEMENTS AND REMOVE ANY REDUNDANT SIGNS.

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ABN 78 611 424 107
LEVEL 17, 31 QUEEN STREET, MELBOURNE VIC 3000
create@impactaustralia.com.au
impactaustralia.com.au

MELWAY ONLINE REF: MAP 70 6E

SCALE
1:1000 @ A3

Client
DEXUS

Date **2023-05-15**
Drawn / Approved **SGM / JPM**

Project
MULTI STORY WAREHOUSE DEVELOPMENT
1-31 GILBY ROAD, MOUNT WAVERLEY
CITY OF MONASH

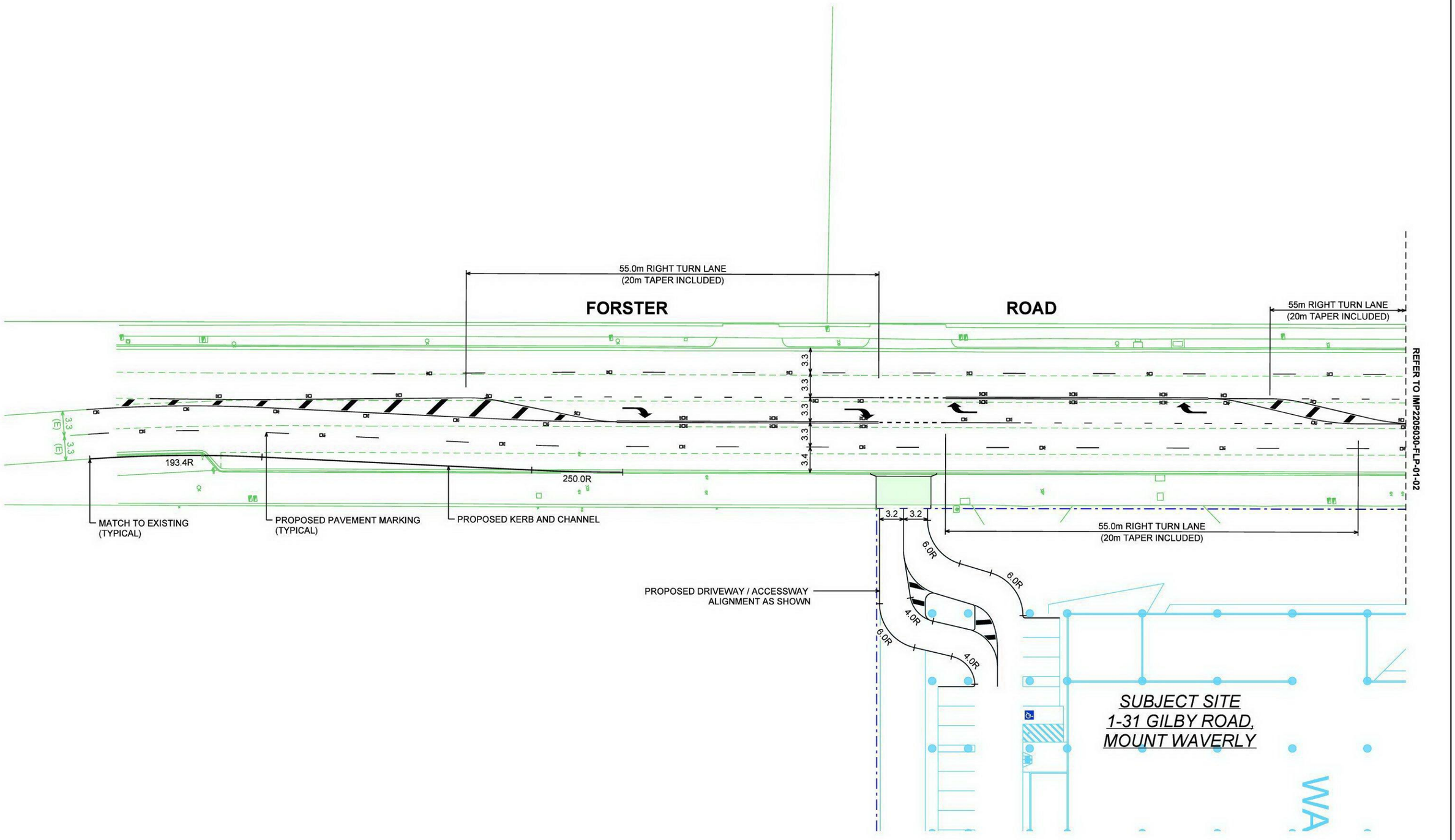
Title
PROPOSED ACCESS ON FORSTER ROAD
RIGHT TURN LANES
OVERALL SITE LAYOUT PLAN

Status
PRELIMINARY

Drawing Number
IMP2205030 - FLP-02-00

Revision
A

D23-138149



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SCALE
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Client
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Date **2023-05-17**
Drawn / Approved **JT / JPM**

Project
MULTI STORY WAREHOUSE DEVELOPMENT
1-31 GILBY ROAD, MOUNT WAVERLEY
CITY OF MONASH

Title
PROPOSED ACCESS ON FORSTER ROAD
RIGHT TURN LANES
FUNCTIONAL LAYOUT PLAN

Status
PRELIMINARY

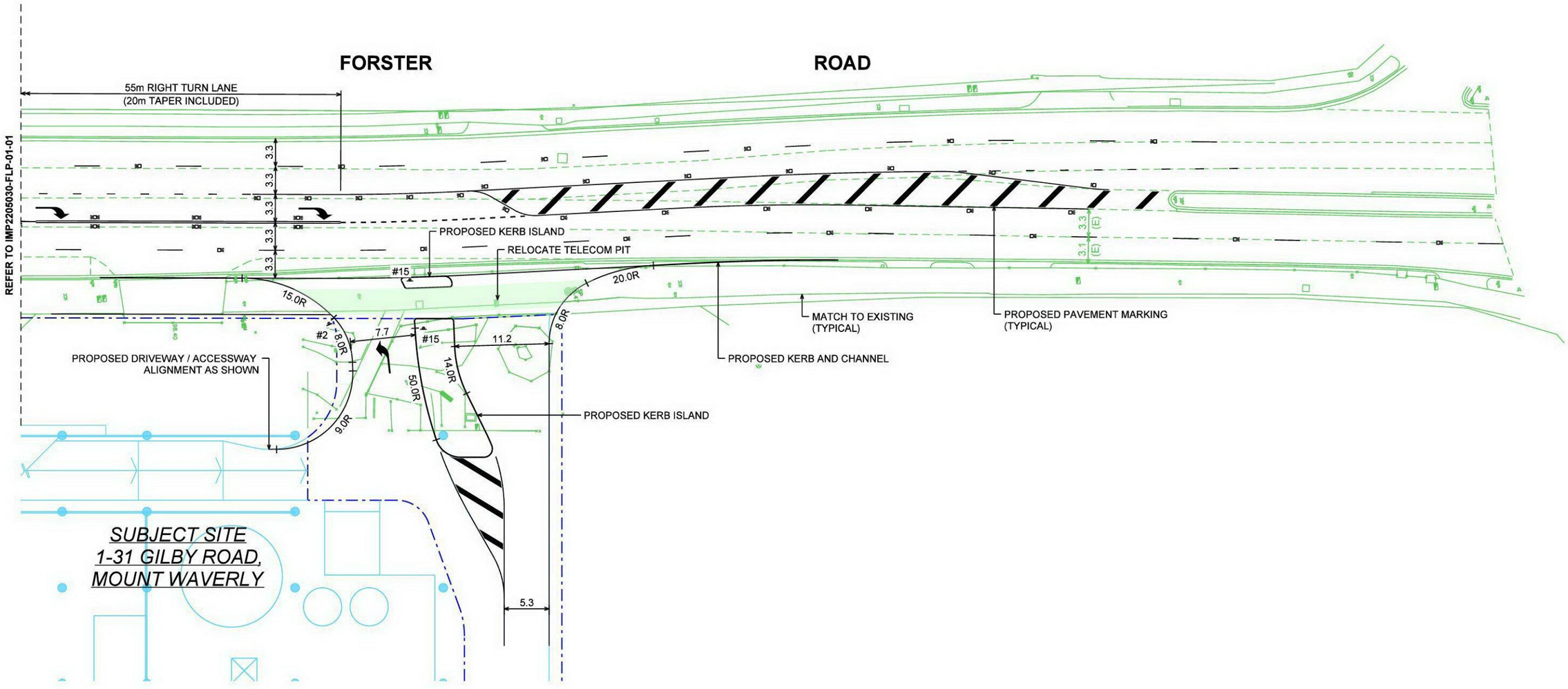
Drawing Number
IMP2205030 - FLP-02-01

Revision
B

D23-138149

SIGN SCHEDULE

#2	GIVE WAY	R1-2
#15	ONLY	R2-14(L)



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SCALE
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Client
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Date **2023-05-17**
Drawn / Approved **JT / JPM**

Project
MULTI STORY WAREHOUSE DEVELOPMENT
1-31 GILBY ROAD, MOUNT WAVERLEY
CITY OF MONASH

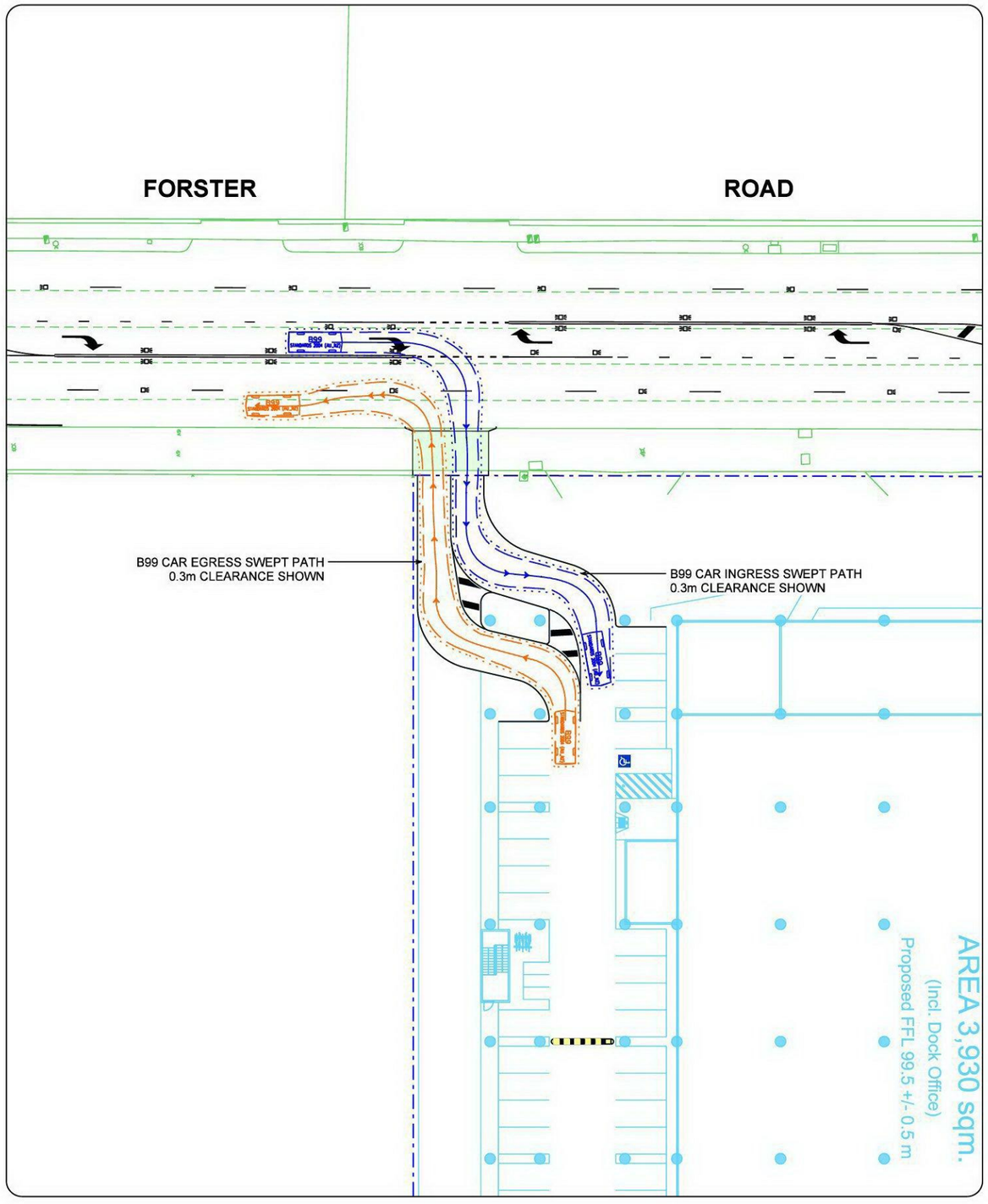
Title
PROPOSED ACCESS ON FORSTER ROAD
RIGHT TURN LANES
FUNCTIONAL LAYOUT PLAN

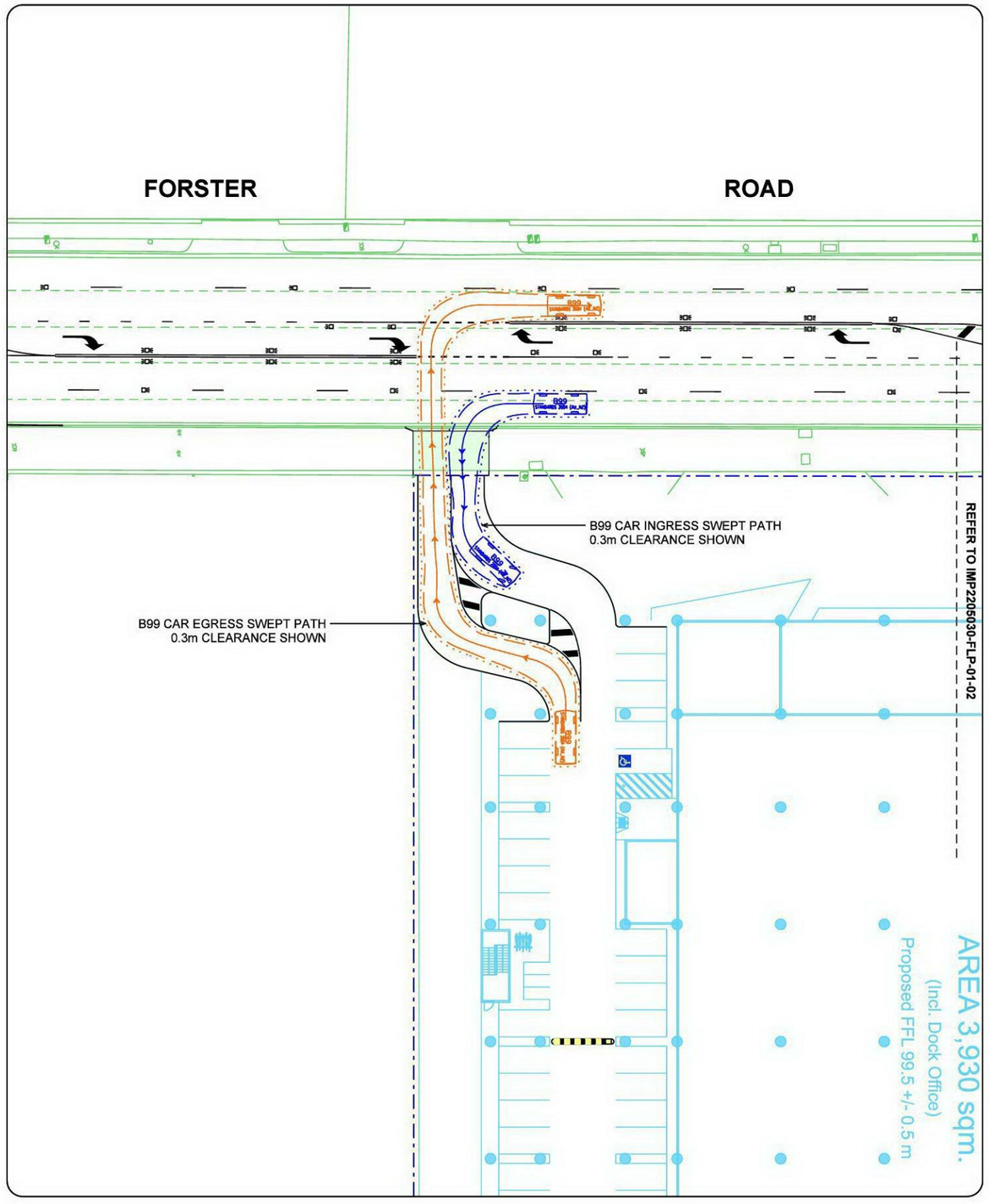
Status
PRELIMINARY

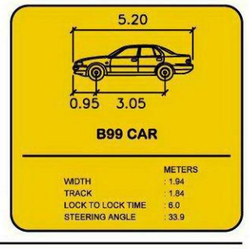
Drawing Number
IMP2205030 - FLP-02-02

Revision
B

D23-138149







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Date **2023-05-17**
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Project
MULTI STORY WAREHOUSE DEVELOPMENT
1-31 GILBY ROAD, MOUNT WAVERLEY
CITY OF MONASH

Title
PROPOSED ACCESS ON FORSTER ROAD
SWEPT PATH ANALYSIS
B99 CAR

Status
PRELIMINARY

Drawing Number
IMP2205030 - FLP-02-03

Revision
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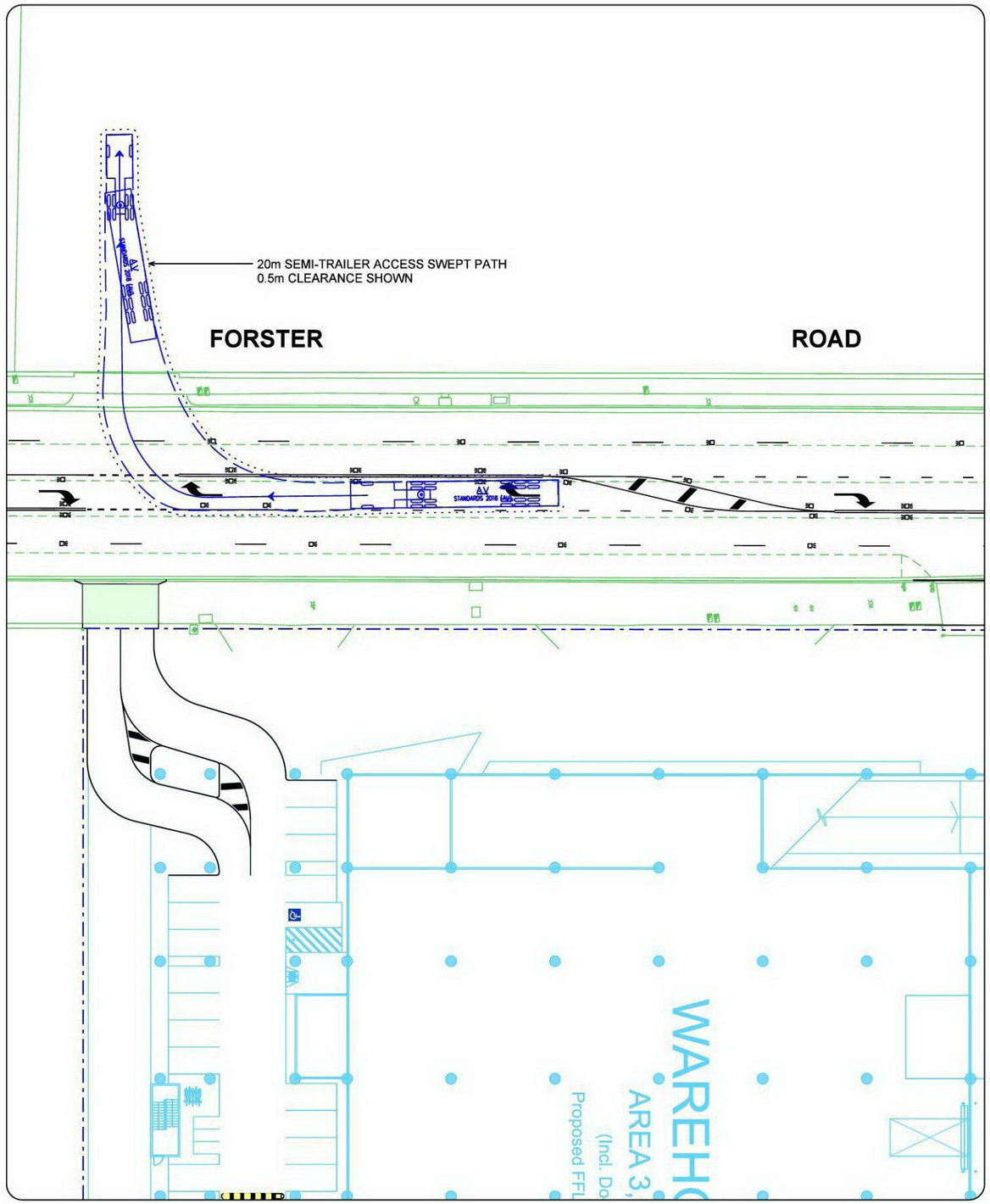

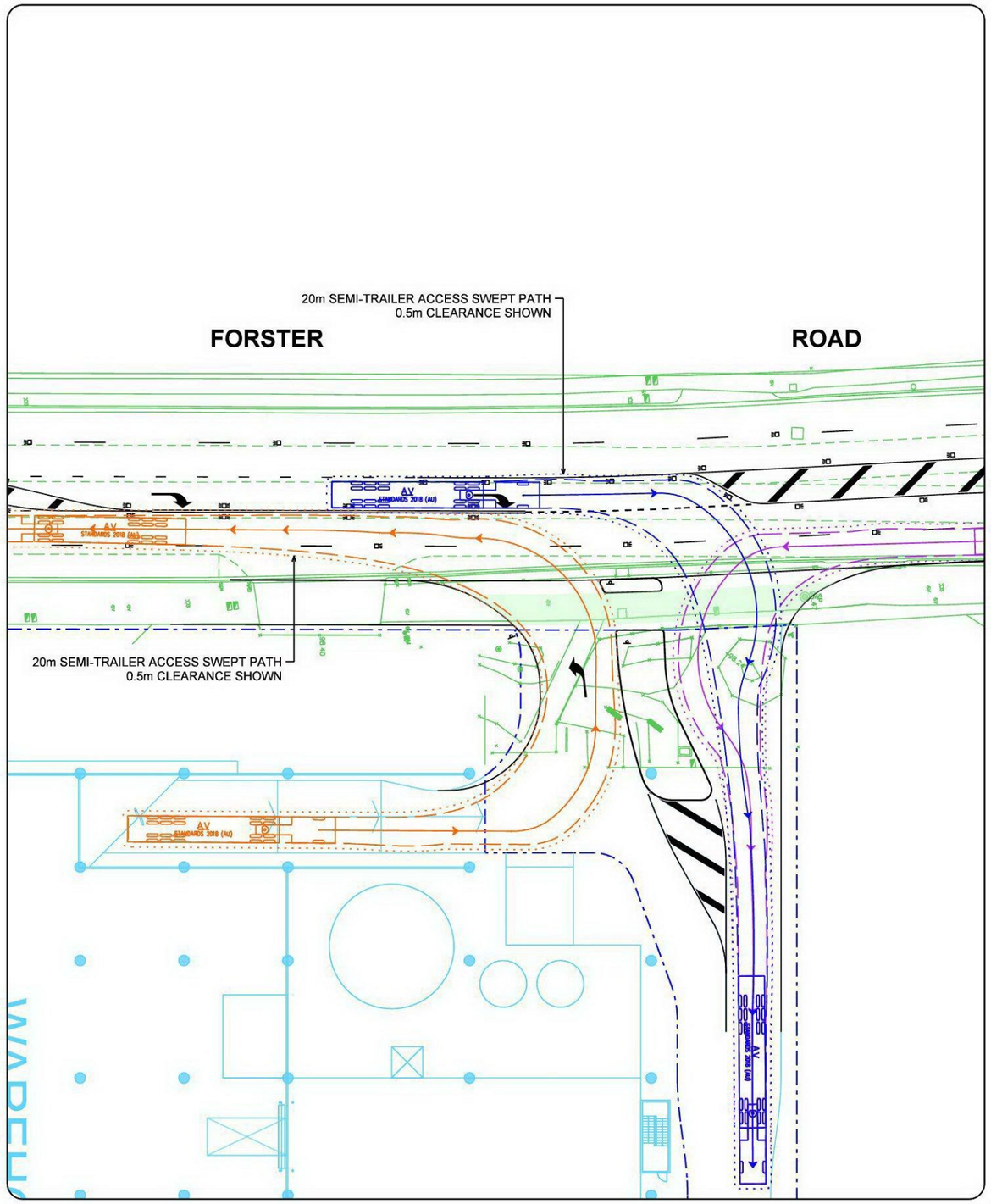

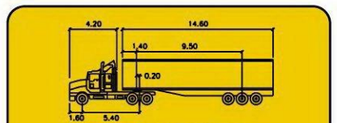

20m SEMI-TRAILER

METERS			
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TRAILER WIDTH	: 2.50	STEERING ANGLE	: 28.3
TRACTOR TRACK	: 2.50	ARTICULATING ANGLE	: 72.0
TRAILER TRACK	: 2.50		

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MELWAY ONLINE REF: MAP 70 6E

SCALE
1:500 @ A3

Client
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Date **2023-05-17**
Drawn / Approved **JT / JPM**

Project
MULTI STORY WAREHOUSE DEVELOPMENT
1-31 GILBY ROAD, MOUNT WAVERLEY
CITY OF MONASH

Title
PROPOSED ACCESS ON FORSTER ROAD
SWEPT PATH ANALYSIS
20m SEMI-TRAILER

Status
PRELIMINARY

Drawing Number
IMP2205030 - FLP-02-04

Revision
B

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D23-138149

FORSTER

ROAD

26m B-DOUBLE INGRESS SWEPT PATH
0.5m CLEARANCE SHOWN

26m B-DOUBLE EGRESS SWEPT PATH
0.5m CLEARANCE SHOWN

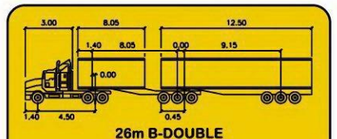
26m B-DOUBLE INGRESS SWEPT PATH
0.5m CLEARANCE SHOWN

B-DOUBLE 26M
AUSTROADS 2013 (4a)

B-DOUBLE 26M
AUSTROADS 2013 (4a)

B-DOUBLE 26M
AUSTROADS 2013 (4a)

WAREHOUSE
AREA 3,930 sq
(Incl. Dock Office)
Proposed FFL 99.5 +/- C



26m B-DOUBLE

	METERS		METERS
TRACKTOR WIDTH	2.50	LOCK TO LOCK TIME	6.0
TRAILER WIDTH	2.50	STEERING ANGLE	23.4
TRACKTOR TRACK	2.50	ARTICULATING ANGLE	70.0
TRAILER TRACK	2.50		

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MELWAY ONLINE REF: MAP 70 6E

SCALE
1:500 @ A3

Client
DEXUS

Date **2023-05-17**
Drawn / Approved **JT / JPM**

Project
MULTI STORY WAREHOUSE DEVELOPMENT
1-31 GILBY ROAD, MOUNT WAVERLEY
CITY OF MONASH

Title
PROPOSED ACCESS ON FORSTER ROAD
SWEPT PATH ANALYSIS
26m B-DOUBLE

Status
PRELIMINARY

Drawing Number
IMP2205030 - FLP-02-05

Revision
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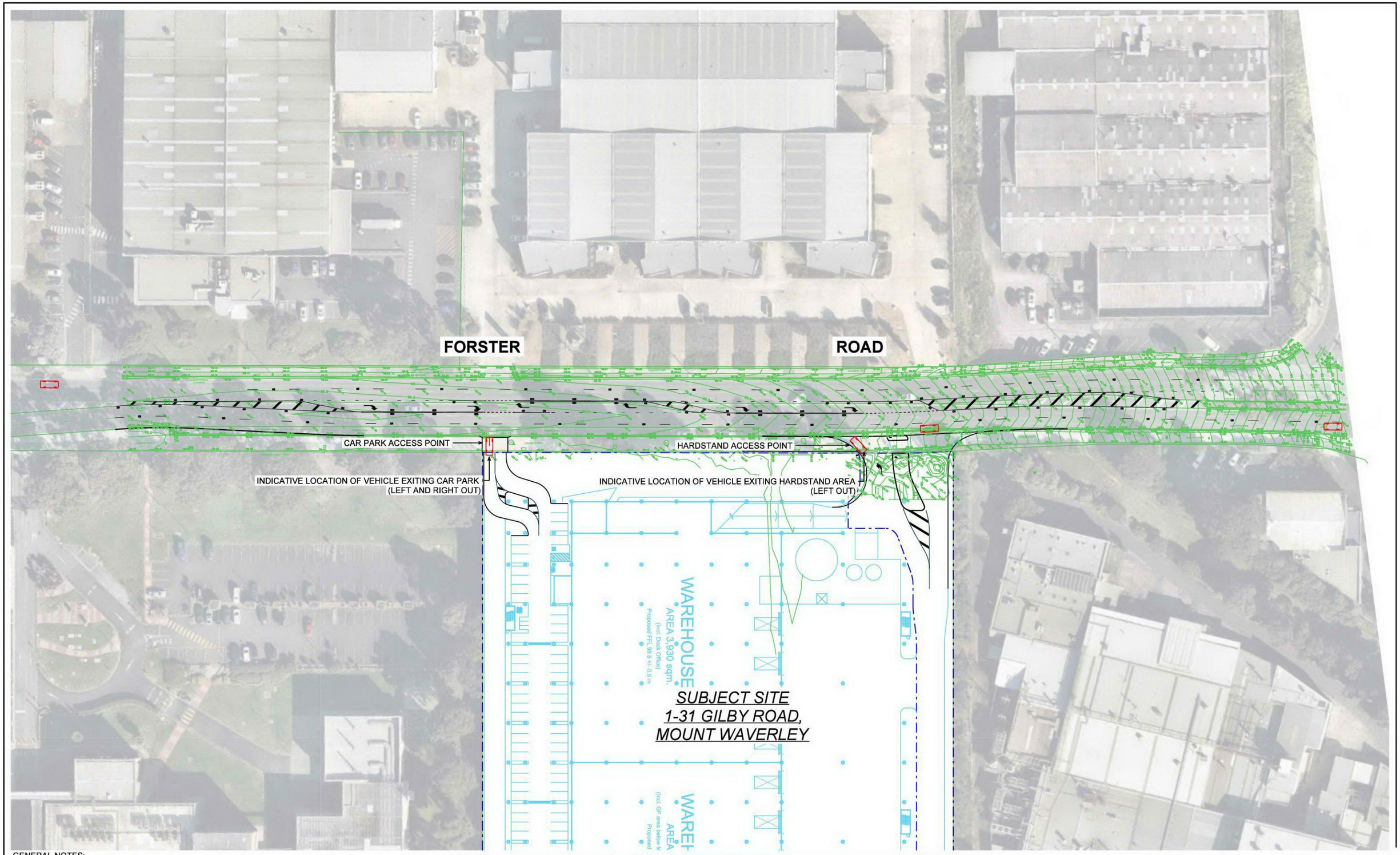

GENERAL NOTES:
1. ALL DIMENSIONS ARE TO FACE OF KERB AND CHANNEL UNLESS NOTED OTHERWISE.
2. LOCAL ROADS - GILBY ROAD (SPEED ZONE 50KM/H).
   DECLARED ROADS - FORSTER ROAD (SPEED ZONE 60KM/H).
3. BASE INFORMATION FROM NEARMAP AERIAL PHOTOGRAPHY DATED 14.09.2022 AND CONCEPT Y 2209-122-SK-010-011-012-013-014(G) DATED 18.05.2023

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MELWAY ONLINE REF: MAP 70 G7

SCALE
1:1000 @ A3

Client
DEXUS

Status
PRELIMINARY

Project
MULTI-STOREY WAREHOUSE DEVELOPMENT
1-31 GILBY ROAD, MOUNT WAVERLEY
CITY OF MONASH

Date
2023-05-18

Drawn / Approved
JT / JPM

Revision Description
ISSUED FOR INFORMATION

Title
SAFE INTERSECTION SIGHT DISTANCE ASSESSMENT
SITE LAYOUT PLAN

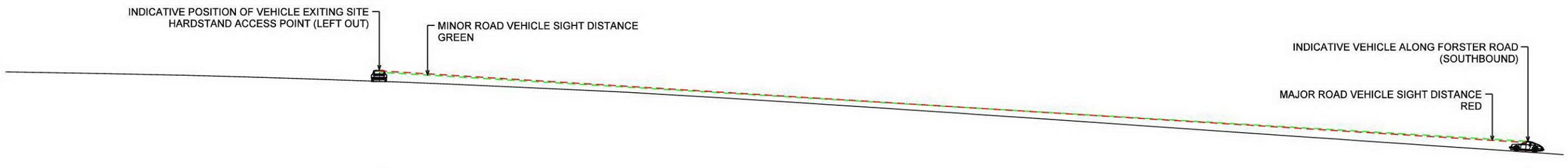
Drawing Number
IMP2205030 - DRG-02-01

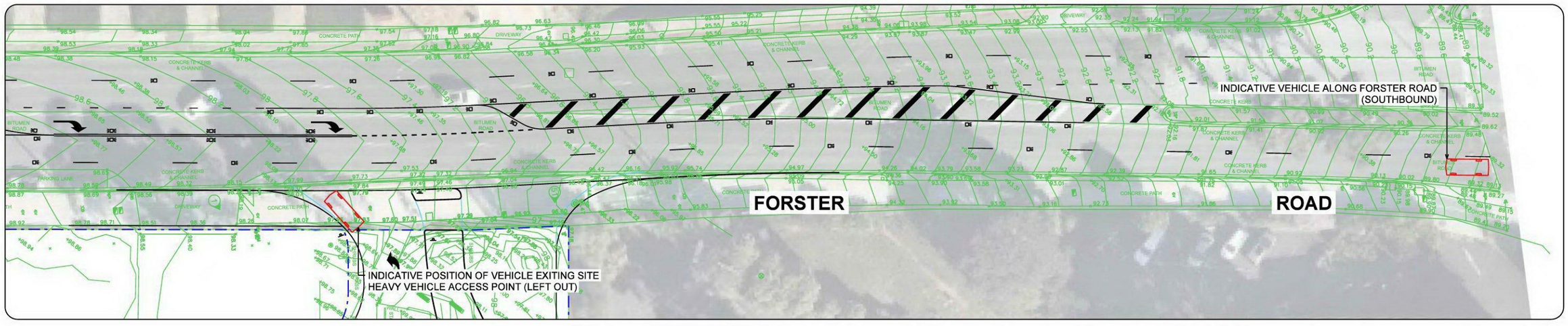
Revision
C

D23-138149

SIGHT DISTANCE ASSESSMENT
FORSTER ROAD
SOUTHBOUND LANE

HARDSTAND ACCESS POINT





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Client
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Status
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Project
MULTI-STOREY WAREHOUSE DEVELOPMENT
1-31 GILBY ROAD, MOUNT WAVERLEY
CITY OF MONASH

Date
2023-05-18

Drawn / Approved
JT / JPM

Revision Description
ISSUED FOR INFORMATION

Title
FORSTER ROAD LONGITUDINAL SECTION
SOUTHBOUND LANE
HARDSTAND ACCESS POINT - LEFT OUT

Drawing Number
IMP2205030 - DRG-02-02

Revision
C

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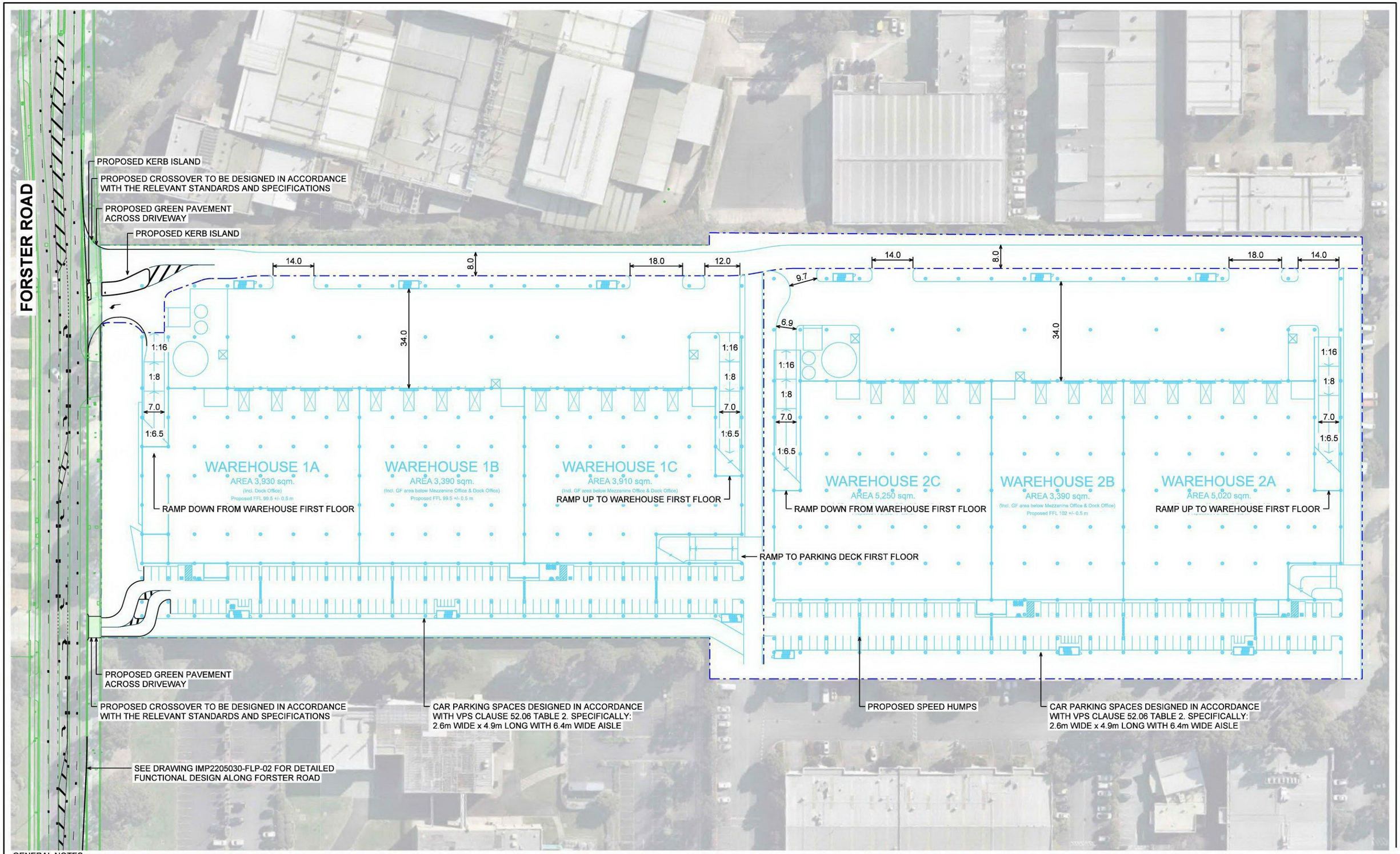
D23-138149



GENERAL NOTES:
1. ALL DIMENSIONS ARE TO FACE OF KERB AND CHANNEL UNLESS NOTED OTHERWISE.
2. LOCAL ROADS - GILBY ROAD (SPEED ZONE 50KM/H).
   DECLARED ROADS - FORSTER ROAD (SPEED ZONE 60KM/H).
3. BASE INFORMATION FROM NEARMAP AERIAL PHOTOGRAPHY DATED 14.09.2022 AND CONCEPT Y 2209-122-DA-010-011-012-013-014(H).dwg DATED 17.05.2023

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MELWAY ONLINE REF: MAP 70 G7

SCALE
1:1200 @ A3

Client
DEXUS

Status
PRELIMINARY

Project
MULTI-STOREY WAREHOUSE DEVELOPMENT
1-31 GILBY ROAD, MOUNT WAVERLEY
CITY OF MONASH

Date
2023-05-17

Drawn / Approved
JT / JPM

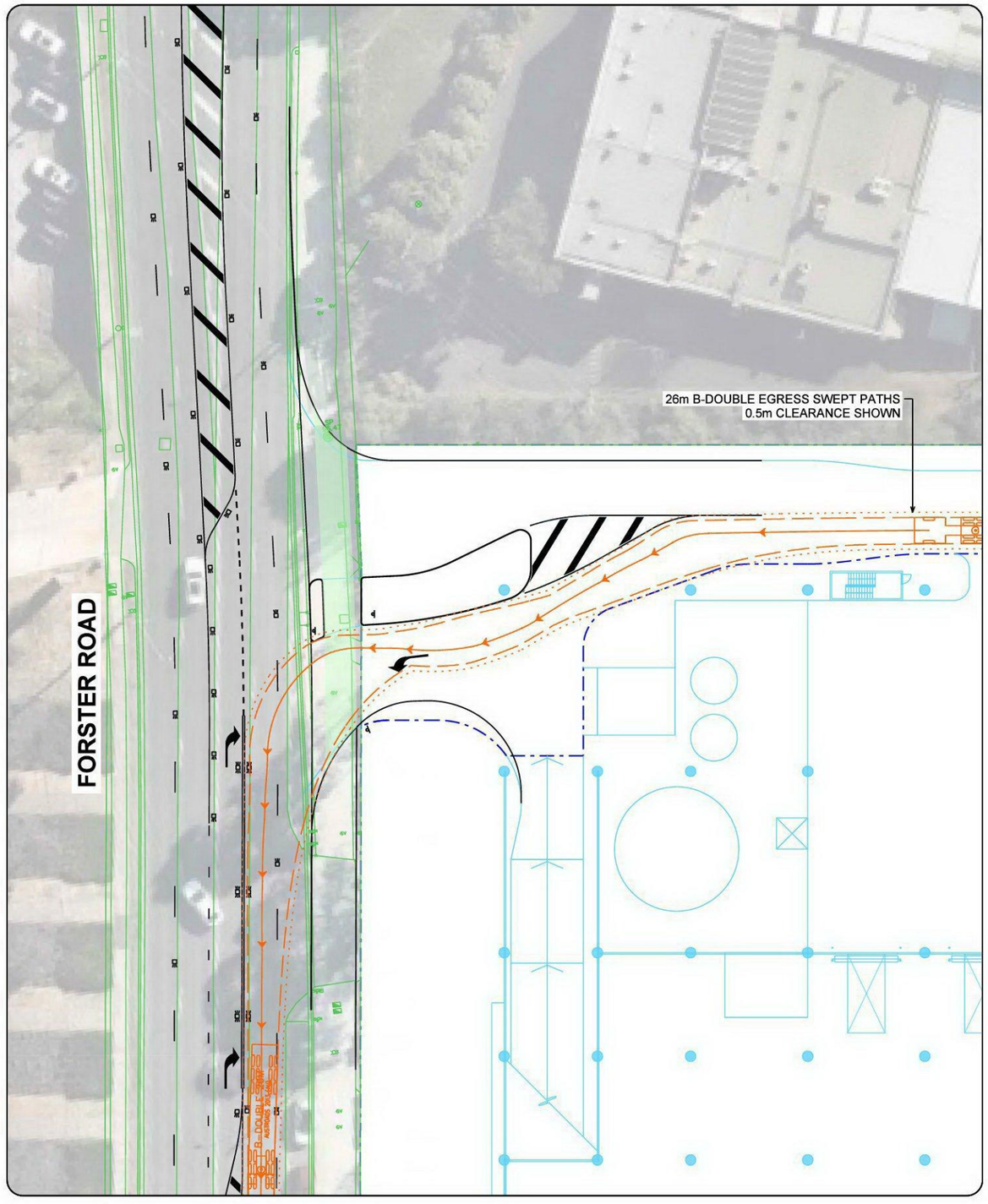
Revision Description
ISSUED FOR INFORMATION

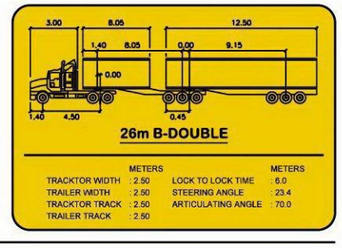
Title
TRAFFIC & TRANSPORT ASSESSMENT
GROUND FLOOR - SITE LAYOUT PLAN

Drawing Number
IMP2205030 - DRG-01-01

Revision
G

D23-138149





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MELWAY ONLINE REF: MAP 70 G7

SCALE
1:500 @ A3

Client
DEXUS

Status
PRELIMINARY

Project
MULTI-STOREY WAREHOUSE DEVELOPMENT
1-31 GILBY ROAD, MOUNT WAVERLEY
CITY OF MONASH

Date
2023-05-17

Drawn / Approved
JT / JPM

Revision Description
ISSUED FOR INFORMATION

Title
TRAFFIC & TRANSPORT ASSESSMENT
GROUND FLOOR - SWEPT PATH ANALYSIS
26m B-DOUBLE DESIGN VEHICLE

Drawing Number
IMP2205030 - DRG-01-02

Revision
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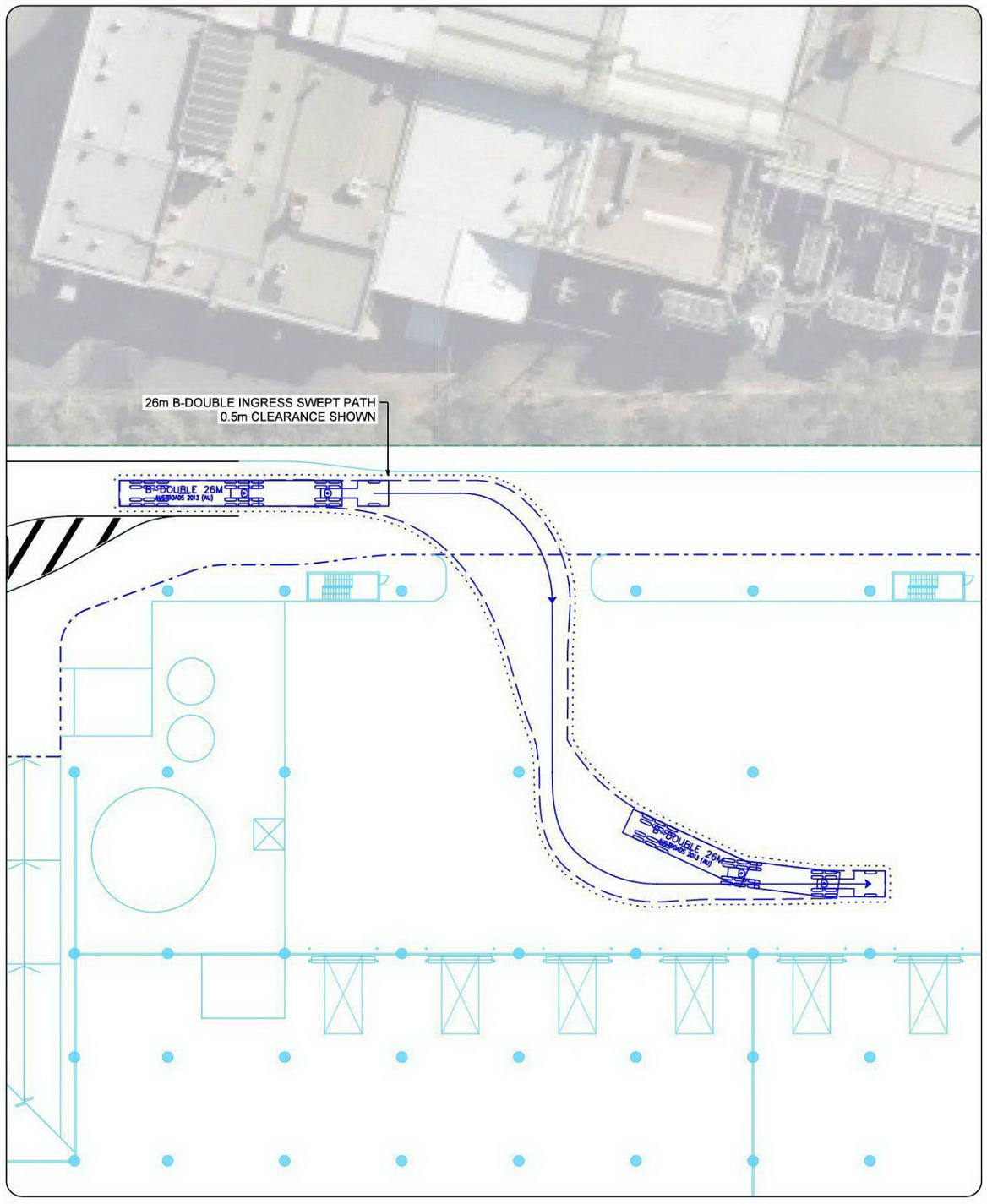
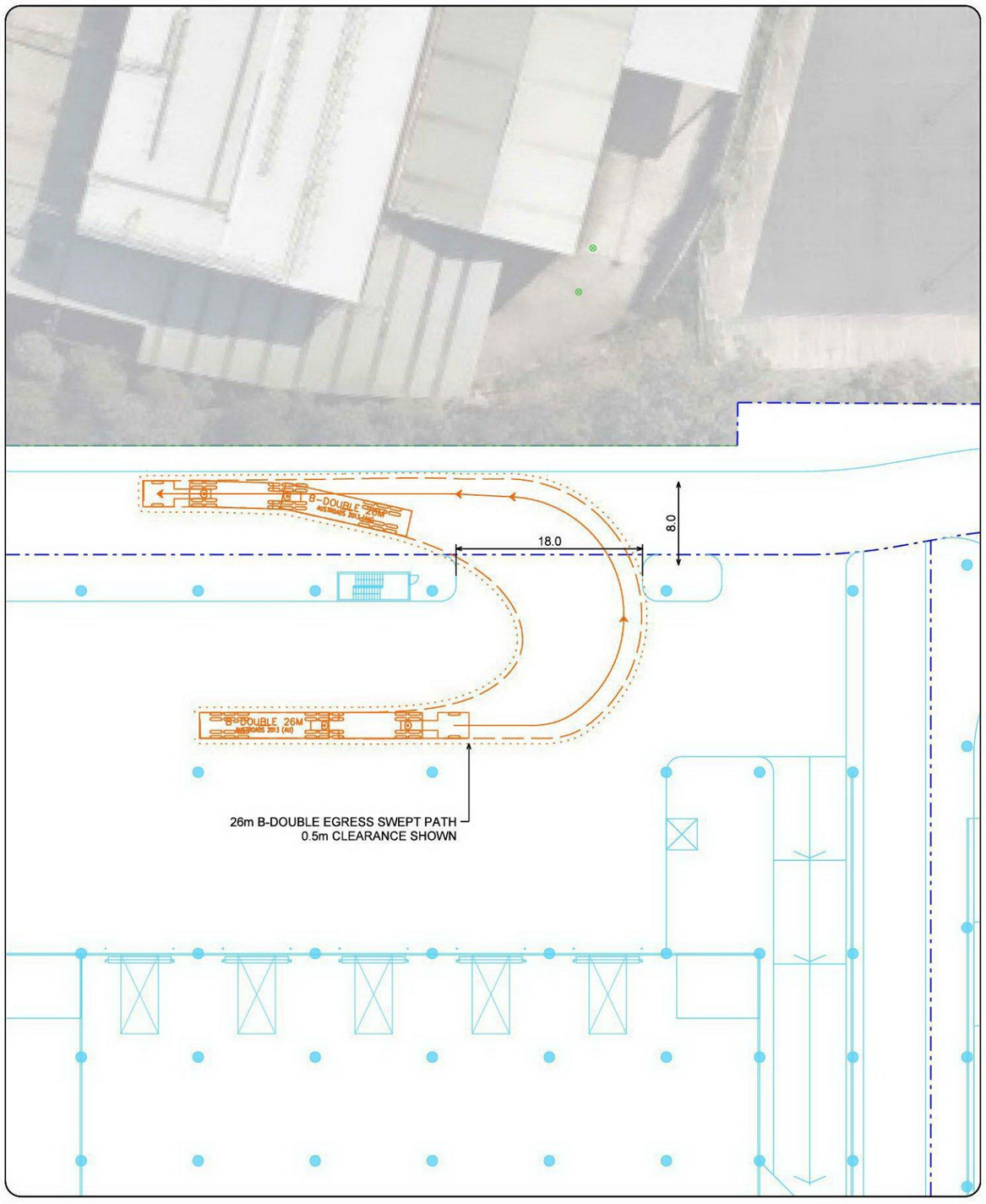
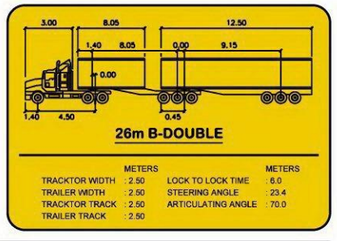
D23-138149







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TRAILER WIDTH	2.50	STEERING ANGLE	23.4
TRACKTOR TRACK	2.50	ARTICULATING ANGLE	70.0
TRAILER TRACK	2.50		

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impactaustralia.com.au

N

MELWAY ONLINE REF: MAP 70 G7

SCALE
1:500 @ A3

Client
DEXUS

Status
PRELIMINARY

Project
MULTI-STOREY WAREHOUSE DEVELOPMENT
1-31 GILBY ROAD, MOUNT WAVERLEY
CITY OF MONASH

Date
2023-05-17

Drawn / Approved
JT / JPM

Revision Description
ISSUED FOR INFORMATION

Title
TRAFFIC & TRANSPORT ASSESSMENT
GROUND FLOOR - SWEPT PATH ANALYSIS
26m B-DOUBLE DESIGN VEHICLE

Drawing Number
IMP2205030 - DRG-01-03

Revision
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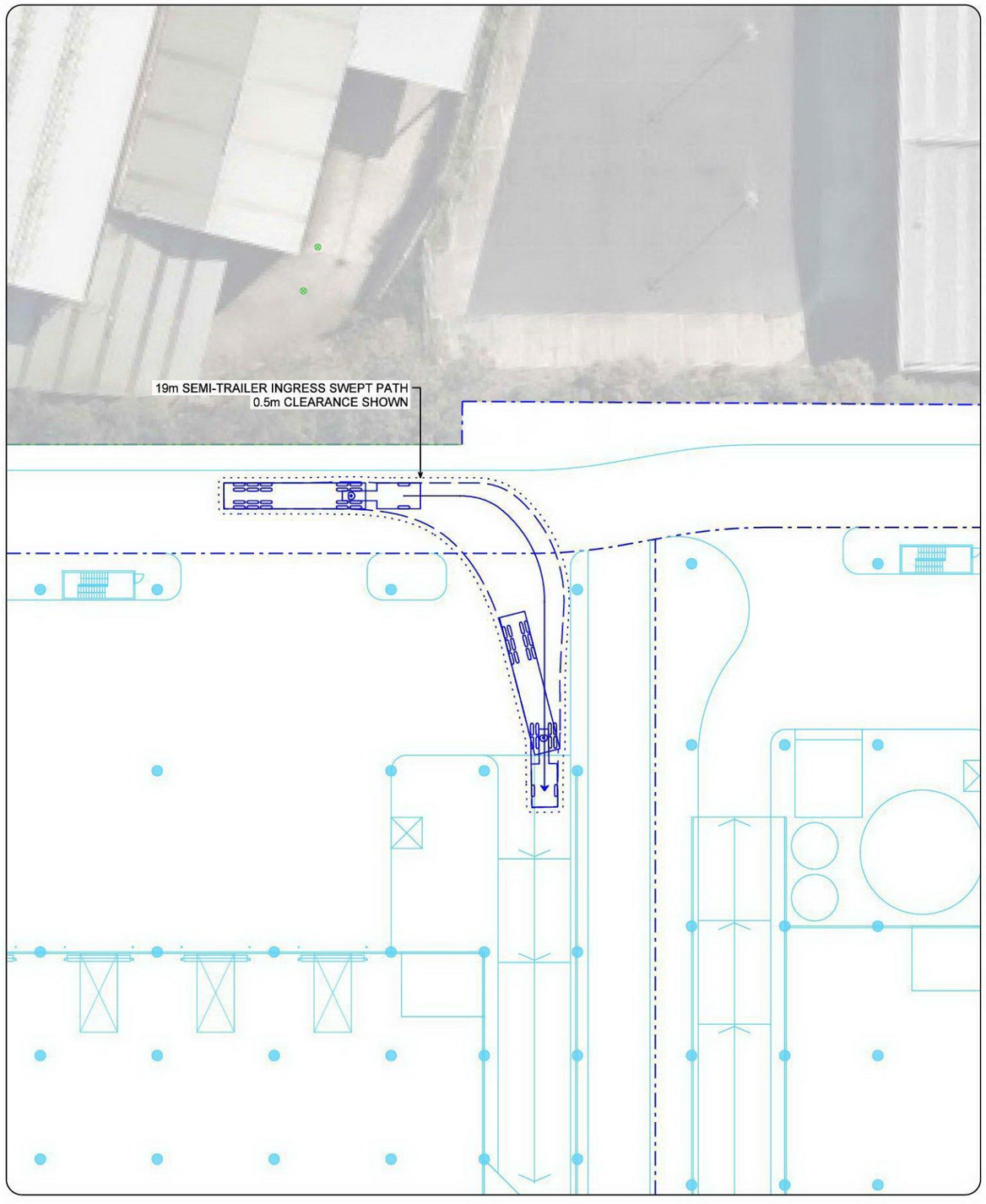
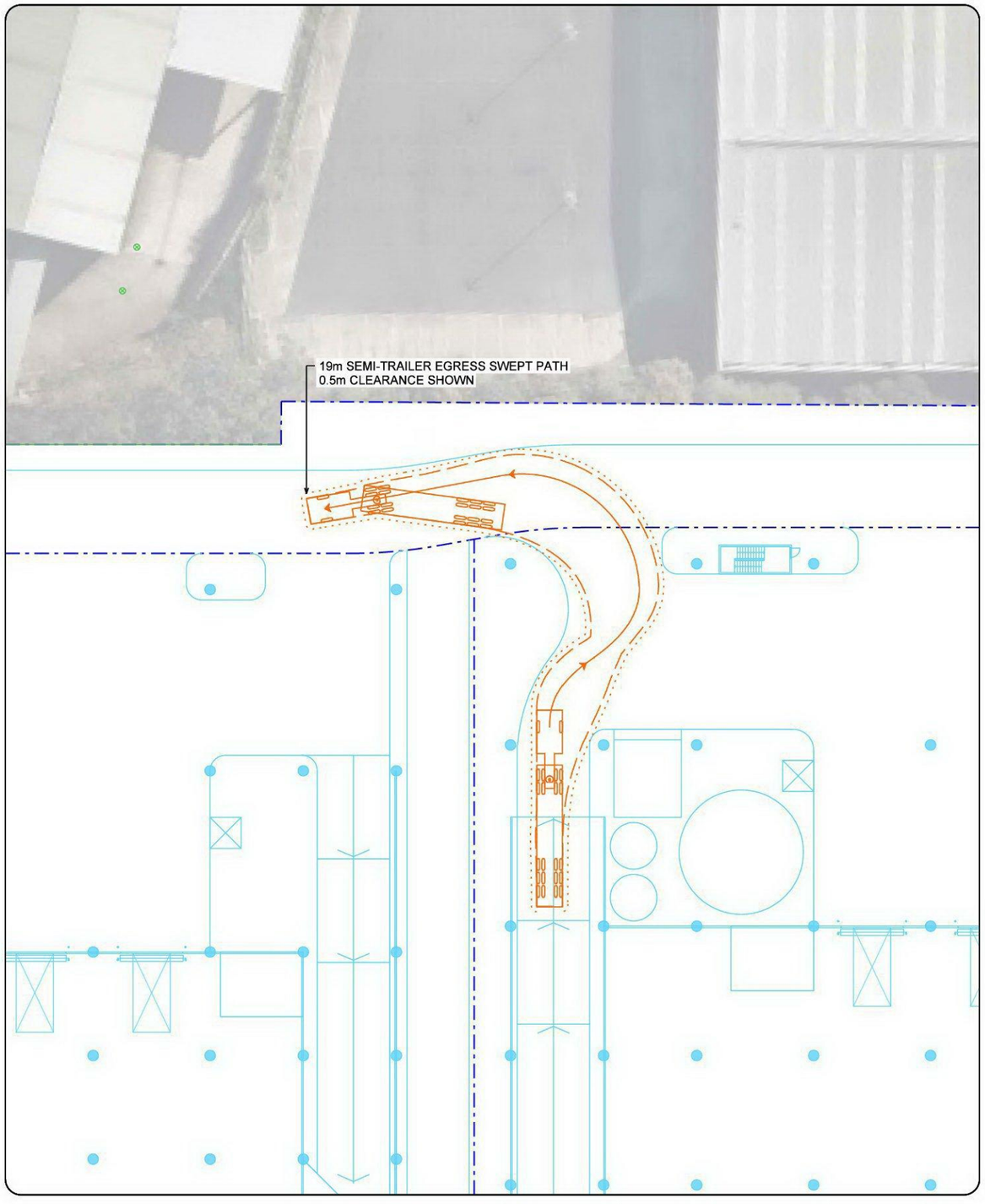
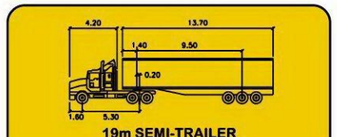
D23-138149







19m SEMI-TRAILER

			METERS
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TRAILER WIDTH	: 2.50	STEERING ANGLE	: 27.8
TRACKTOR TRACK	: 2.50	ARTICULATING ANGLE	: 70.0
TRAILER TRACK	: 2.50		

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N

MELWAY ONLINE REF: MAP 70 G7

SCALE
1:500 @ A3

Client
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Status
PRELIMINARY

Project
MULTI-STOREY WAREHOUSE DEVELOPMENT
1-31 GILBY ROAD, MOUNT WAVERLEY
CITY OF MONASH

Date
2023-05-17

Drawn / Approved
JT / JPM

Revision Description
ISSUED FOR INFORMATION

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

Drawing Number
IMP2205030 - DRG-01-04

Revision
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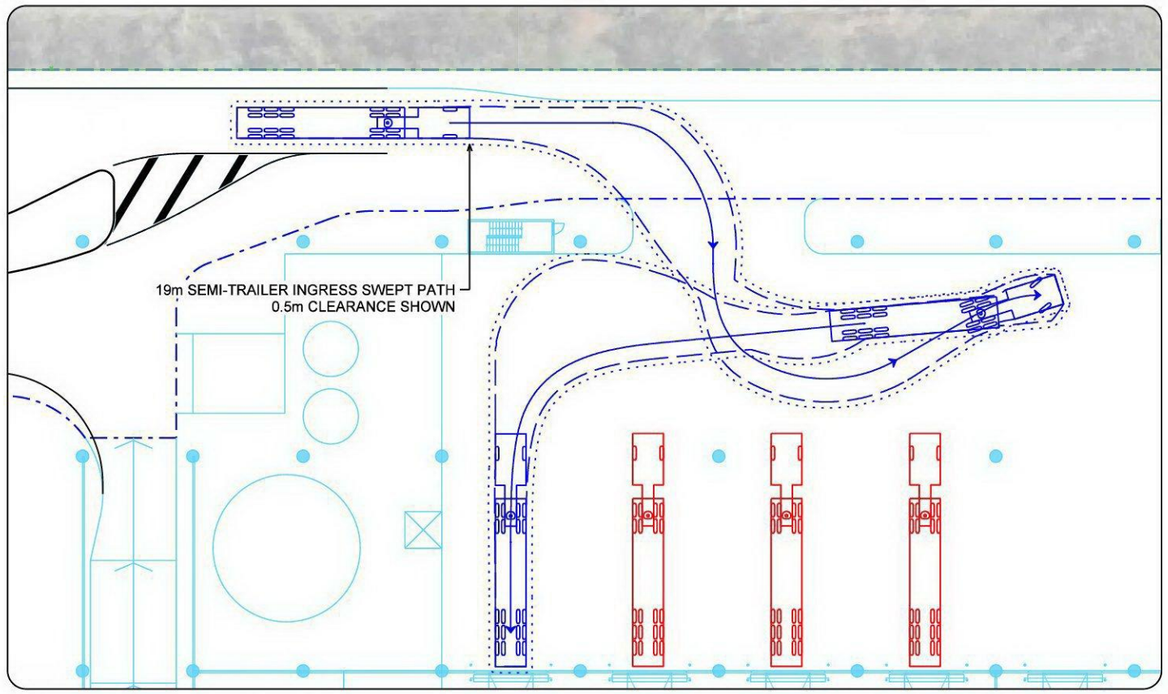
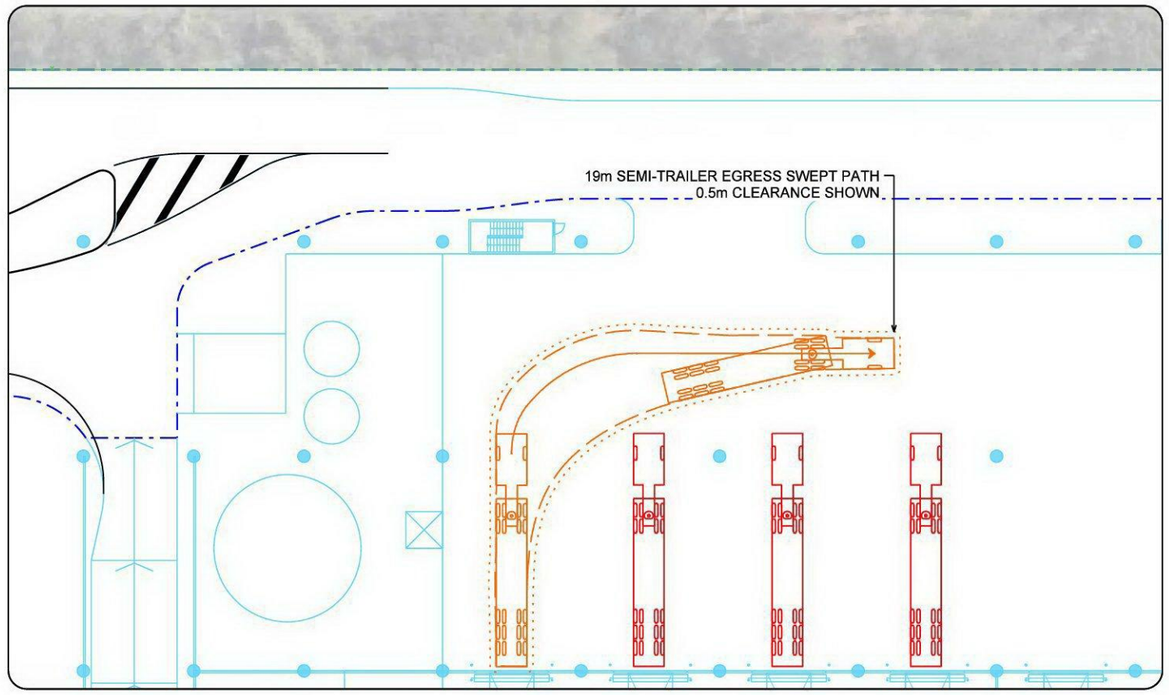
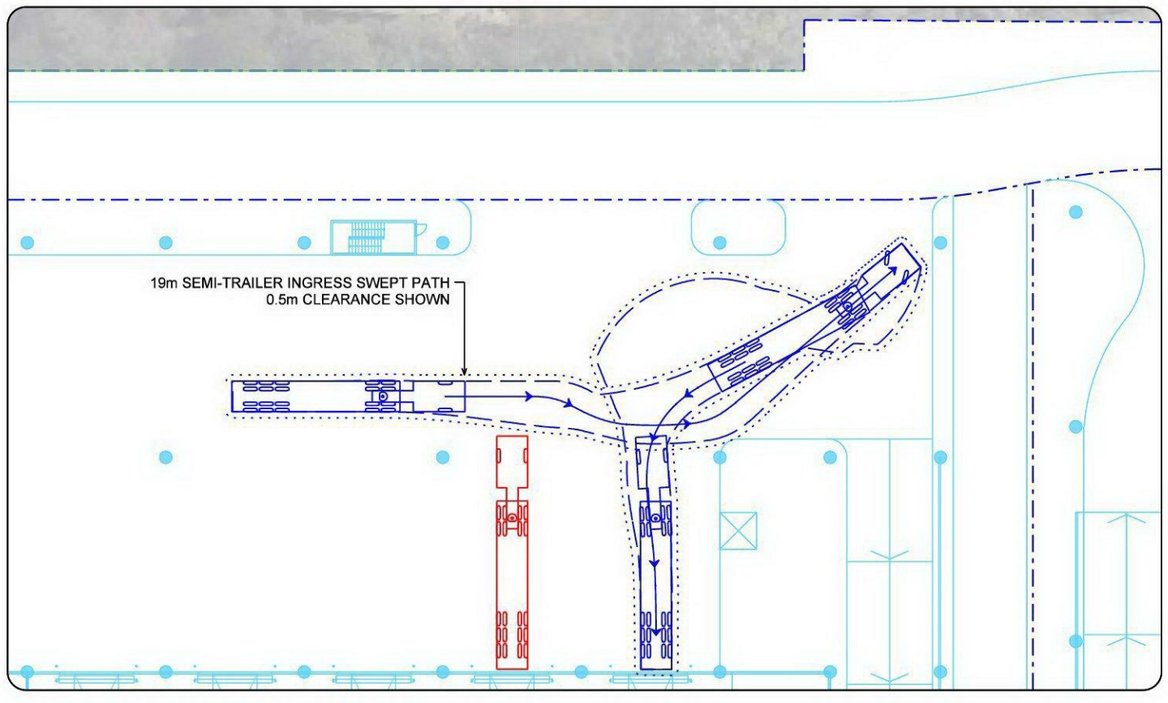
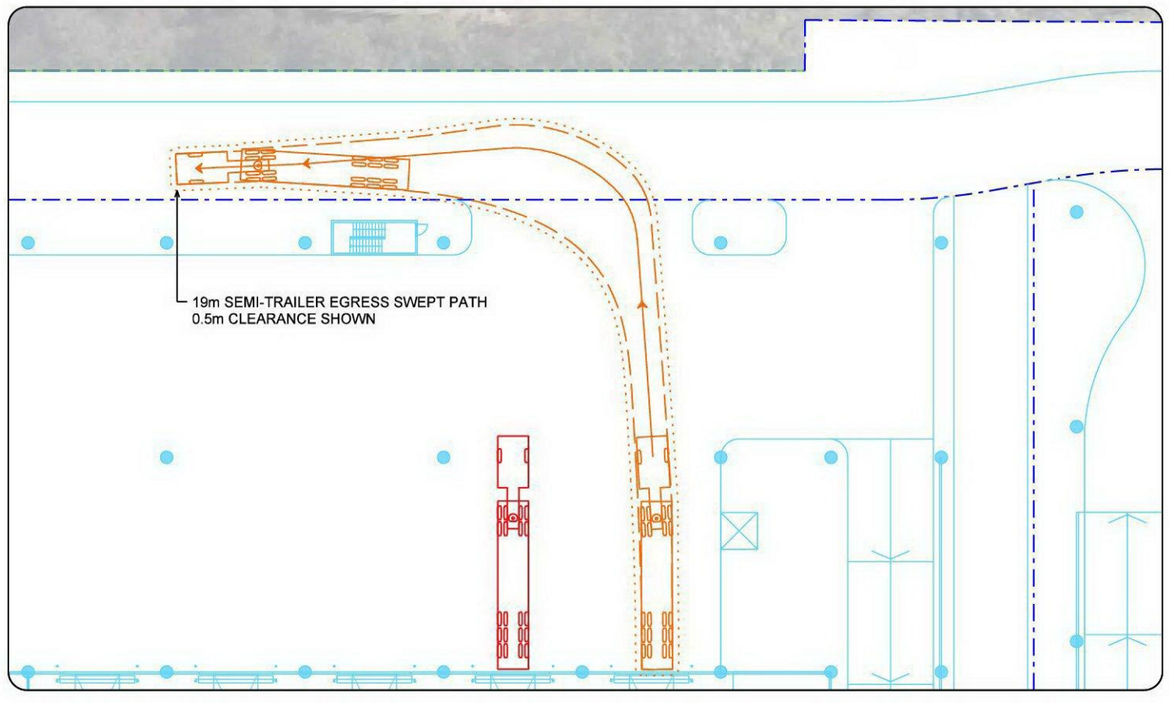
D23-138149









19m SEMI-TRAILER

			METERS
TRACKTOR WIDTH:	2.50	LOCK TO LOCK TIME	: 6.0
TRAILER WIDTH	: 2.50	STEERING ANGLE	: 27.8
TRACKTOR TRACK:	2.50	ARTICULATING ANGLE	: 70.0
TRAILER TRACK	: 2.50		

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MELWAY ONLINE REF: MAP 70 G7

SCALE
1:500 @ A3

Client
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Status
PRELIMINARY

Project
MULTI-STOREY WAREHOUSE DEVELOPMENT
1-31 GILBY ROAD, MOUNT WAVERLEY
CITY OF MONASH

Date
2023-05-17

Drawn / Approved
JT / JPM

Revision Description
ISSUED FOR INFORMATION

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

Drawing Number
IMP2205030 - DRG-01-05

Revision
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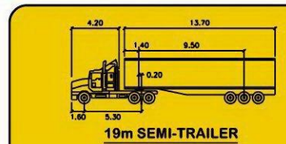
D23-138149

FORSTER ROAD

19m SEMI-TRAILER INGRESS SWEPT PATH
0.5m CLEARANCE SHOWN

WAREHOUSE 1A
AREA 3,930 sqm.
(Incl. Dock Office)
Proposed FFL 99.5 +/- 0.5 m



19m SEMI-TRAILER

			METERS
TRACKTOR WIDTH:	2.50	LOCK TO LOCK TIME	: 6.0
TRAILER WIDTH	: 2.50	STEERING ANGLE	: 27.8
TRACKTOR TRACK:	2.50	ARTICULATING ANGLE	: 70.0
TRAILER TRACK	: 2.50		

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SCALE
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Client
DEXUS

Status
PRELIMINARY

Project
MULTI-STOREY WAREHOUSE DEVELOPMENT
1-31 GILBY ROAD, MOUNT WAVERLEY
CITY OF MONASH

Date
2023-05-17
Drawn / Approved
JT / JPM

Revision Description
ISSUED FOR INFORMATION

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

Drawing Number
IMP2205030 - DRG-01-06

Revision
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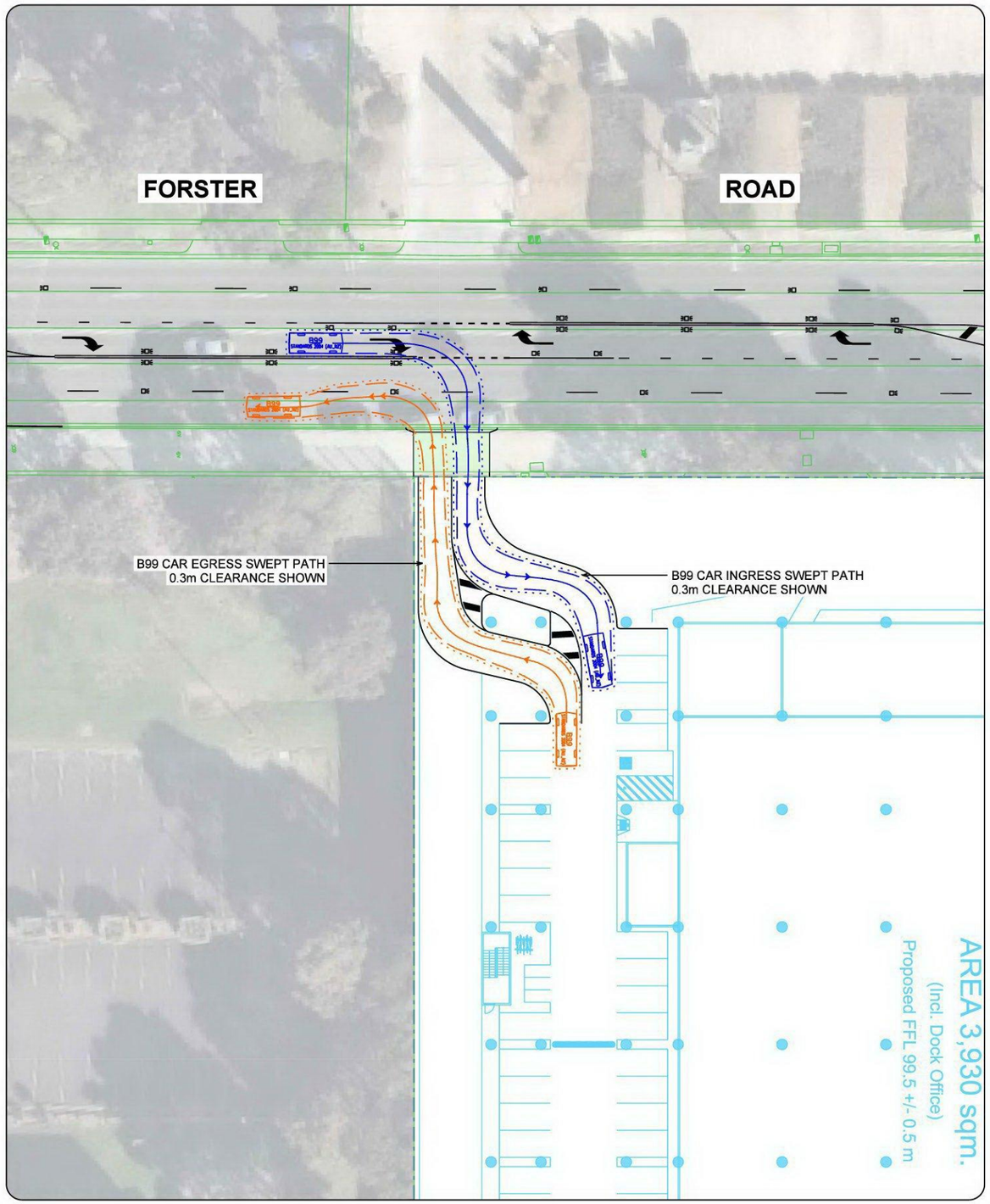
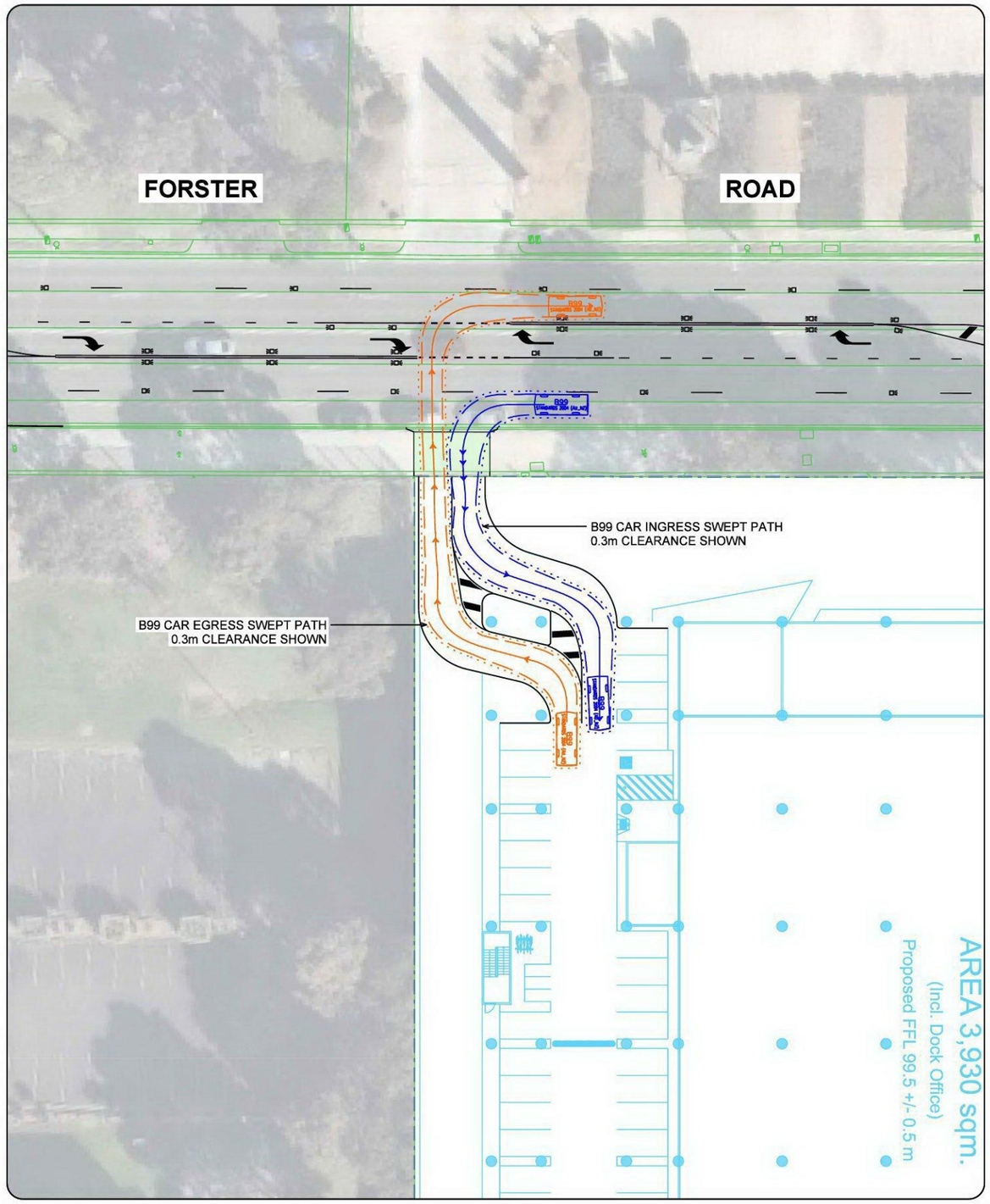
D23-138149





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MELWAY ONLINE REF: MAP 70 G7

SCALE
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Client
DEXUS

Status
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Project
MULTI-STOREY WAREHOUSE DEVELOPMENT
1-31 GILBY ROAD, MOUNT WAVERLEY
CITY OF MONASH

Date
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Revision Description
ISSUED FOR INFORMATION

Title
TRAFFIC & TRANSPORT ASSESSMENT
GROUND FLOOR - SWEPT PATH ANALYSIS
B99 CAR DESIGN VEHICLE

Drawing Number
IMP2205030 - DRG-01-07

Revision
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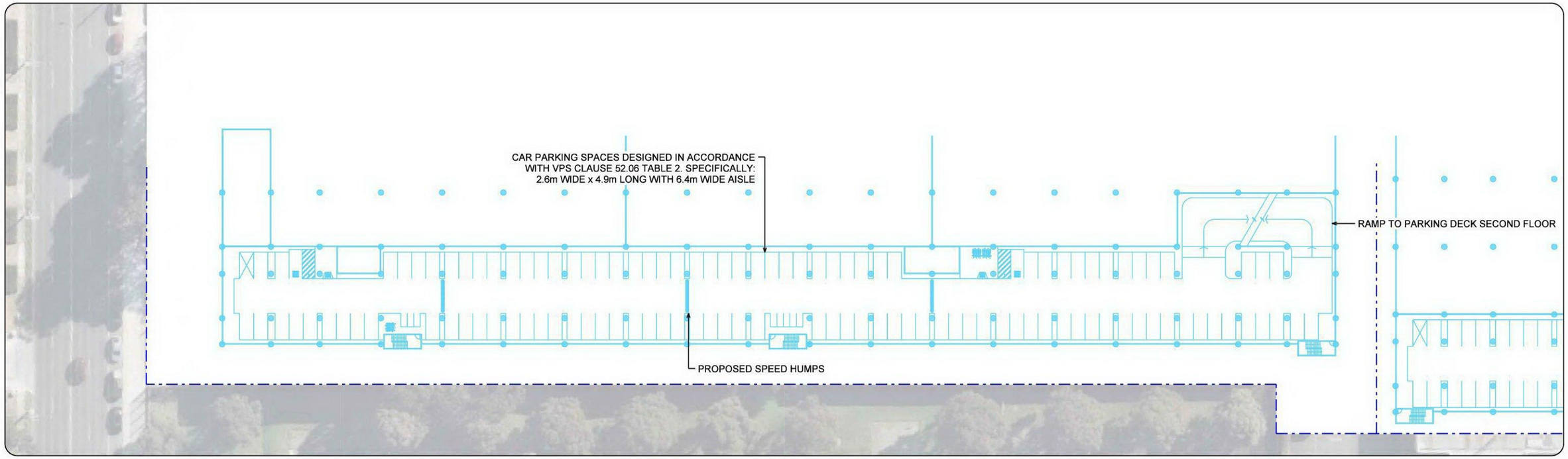

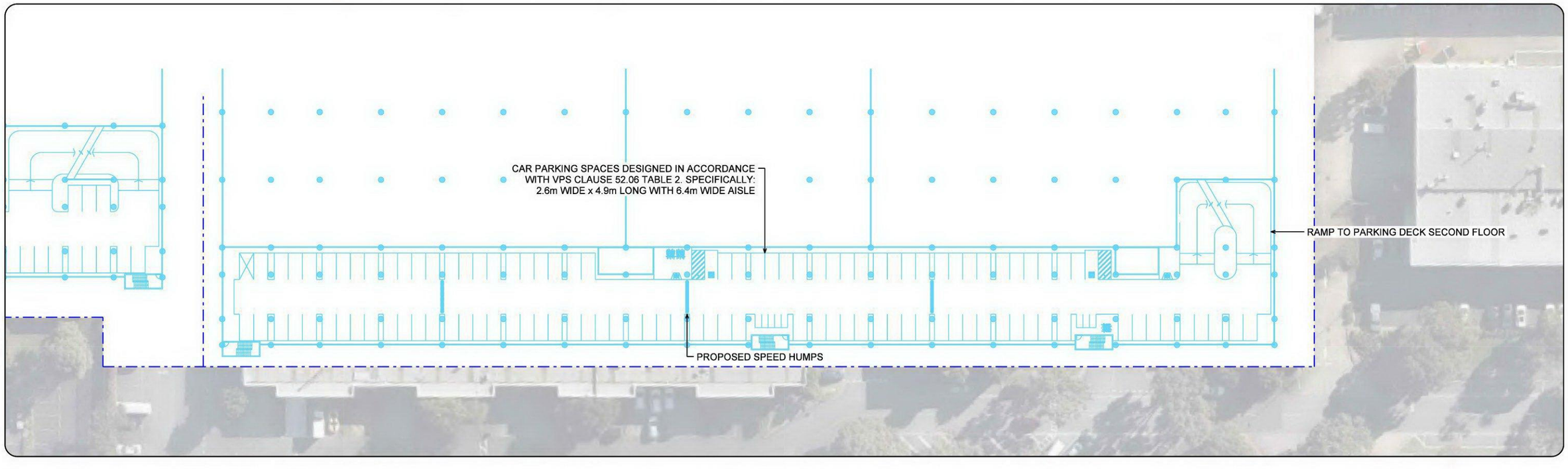

GENERAL NOTES:
1. ALL DIMENSIONS ARE TO FACE OF KERB AND CHANNEL UNLESS NOTED OTHERWISE.
2. LOCAL ROADS - GILBY ROAD (SPEED ZONE 50KM/H).
   DECLARED ROADS - FORSTER ROAD (SPEED ZONE 60KM/H).
3. BASE INFORMATION FROM NEARMAP AERIAL PHOTOGRAPHY DATED 14.09.2022 AND CONCEPT Y 2209-122-DA-010-011-012-013-014(H).dwg DATED 17.05.2023

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SCALE
1:750 @ A3

Client
DEXUS

Status
PRELIMINARY

Project
MULTI-STOREY WAREHOUSE DEVELOPMENT
1-31 GILBY ROAD, MOUNT WAVERLEY
CITY OF MONASH

Date
2023-05-17

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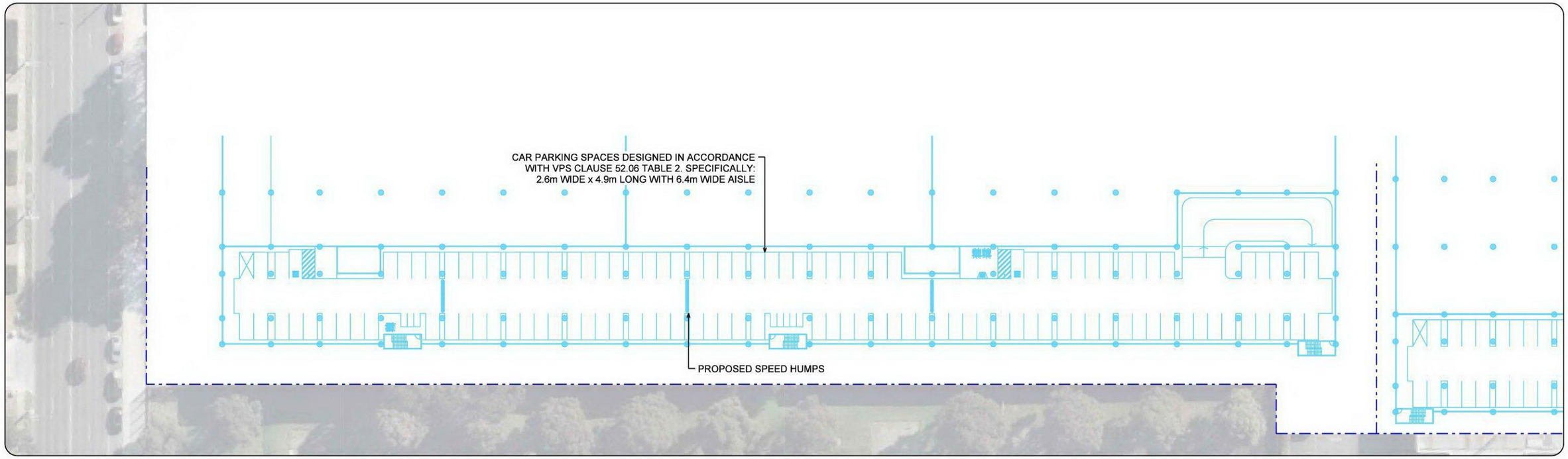
Revision Description
ISSUED FOR INFORMATION

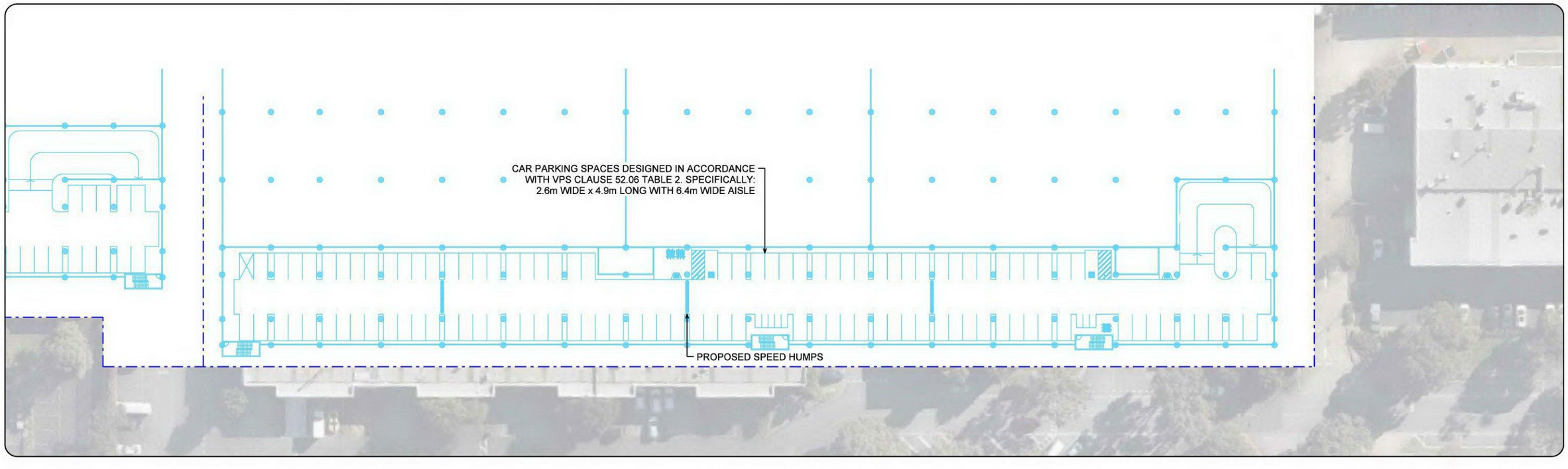
Title
TRAFFIC & TRANSPORT ASSESSMENT
PARKING DECK FIRST FLOOR - LAYOUT PLAN

Drawing Number
IMP2205030 - DRG-01-08

Revision
G

D23-138149





GENERAL NOTES:
1. ALL DIMENSIONS ARE TO FACE OF KERB AND CHANNEL UNLESS NOTED OTHERWISE.
2. LOCAL ROADS - GILBY ROAD (SPEED ZONE 50KM/H).
   DECLARED ROADS - FORSTER ROAD (SPEED ZONE 60KM/H).
3. BASE INFORMATION FROM NEARMAP AERIAL PHOTOGRAPHY DATED 14.09.2022 AND CONCEPT Y 2209-122-DA-010-011-012-013-014(H).dwg DATED 17.05.2023

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MELWAY ONLINE REF: MAP 70 G7

SCALE
1:750 @ A3

Client
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Status
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Project
MULTI-STOREY WAREHOUSE DEVELOPMENT
1-31 GILBY ROAD, MOUNT WAVERLEY
CITY OF MONASH

Date
2023-05-17

Drawn / Approved
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Revision Description
ISSUED FOR INFORMATION

Title
TRAFFIC & TRANSPORT ASSESSMENT
PARKING DECK SECOND FLOOR - LAYOUT PLAN

Drawing Number
IMP2205030 - DRG-01-09

Revision
G

D23-138149

GENERAL NOTES:
1. ALL DIMENSIONS ARE TO FACE OF KERB AND CHANNEL UNLESS NOTED OTHERWISE.
2. LOCAL ROADS - GILBY ROAD (SPEED ZONE 50KM/H).
   DECLARED ROADS - FORSTER ROAD (SPEED ZONE 60KM/H).
3. BASE INFORMATION FROM NEARMAP AERIAL PHOTOGRAPHY DATED 14.09.2022 AND CONCEPT Y 2209-122-DA-010-011-012-013-014(H).dwg DATED 17.05.2023

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MELWAY ONLINE REF: MAP 70 G7

SCALE
1:1200 @ A3

Client
DEXUS

Status
PRELIMINARY

Project
MULTI-STOREY WAREHOUSE DEVELOPMENT
1-31 GILBY ROAD, MOUNT WAVERLEY
CITY OF MONASH

Date
2023-05-17

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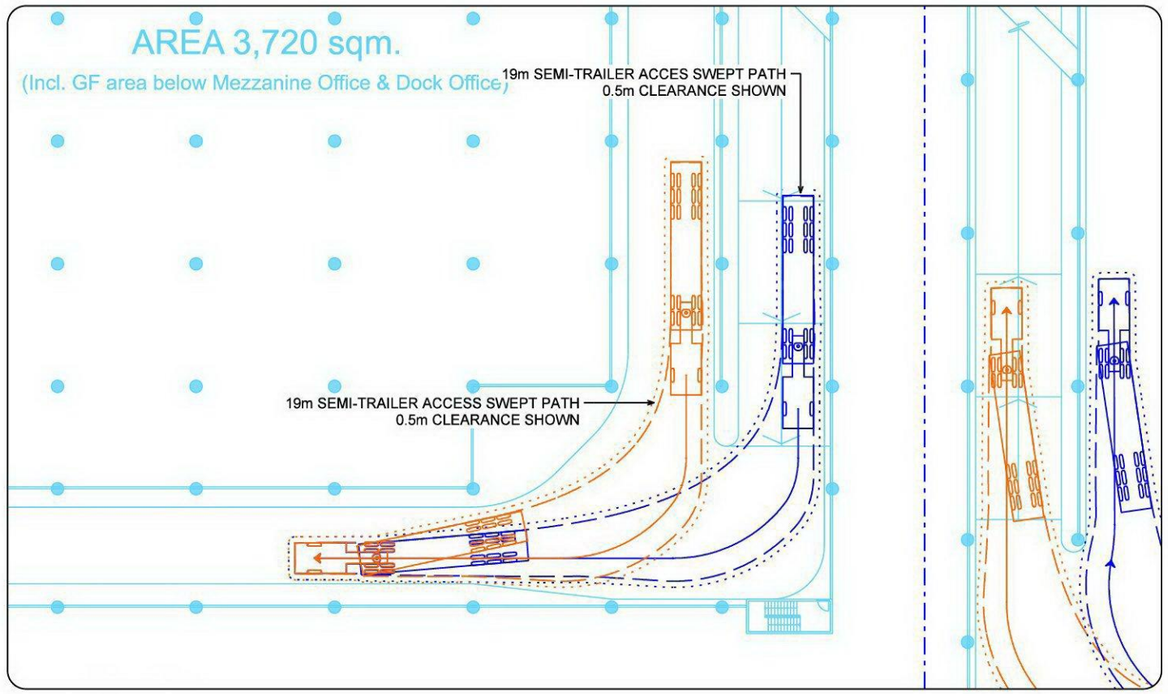
Revision Description
ISSUED FOR INFORMATION

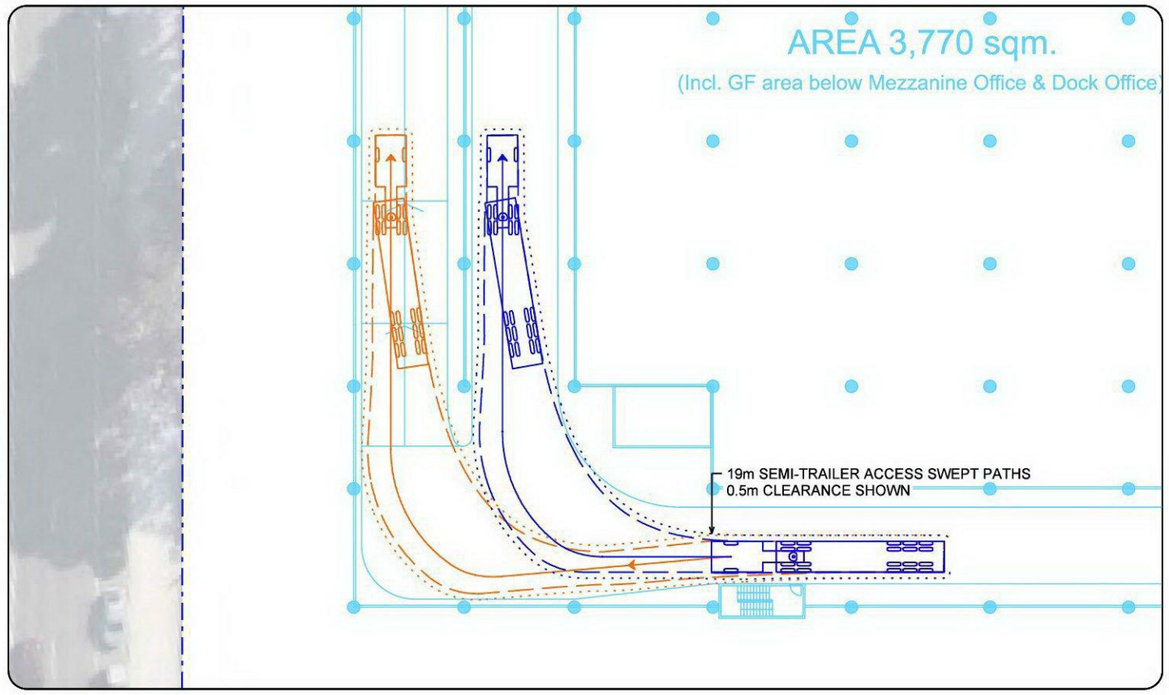
Title
TRAFFIC & TRANSPORT ASSESSMENT
WAREHOUSE FIRST FLOOR - LAYOUT PLAN

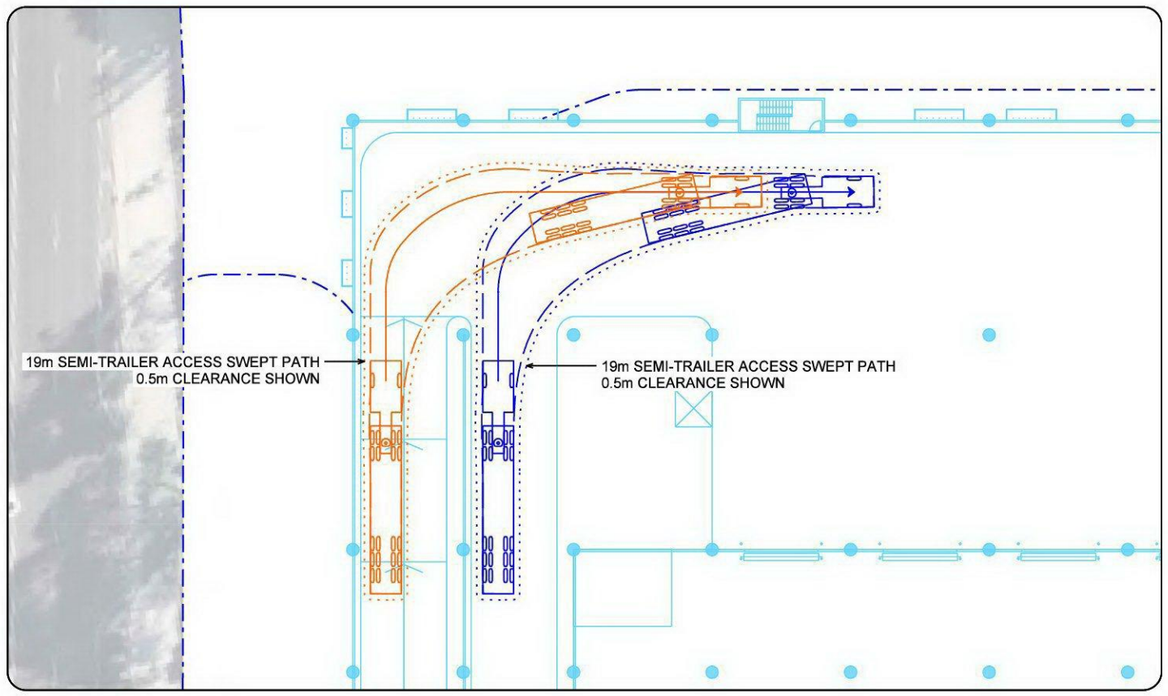
Drawing Number
IMP2205030 - DRG-01-10

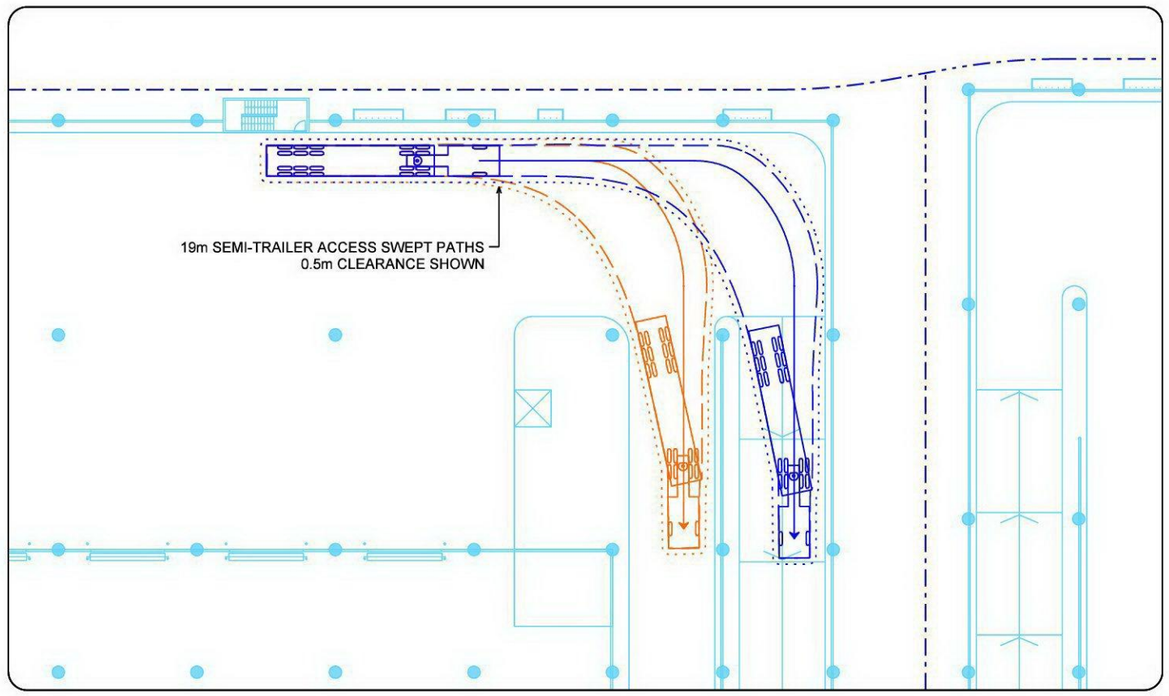
Revision
G

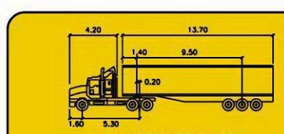
D23-138149











19m SEMI-TRAILER

			METERS
TRACKTOR WIDTH:	2.50	LOCK TO LOCK TIME	: 6.0
TRAILER WIDTH	: 2.50	STEERING ANGLE	: 27.8
TRACKTOR TRACK:	2.50	ARTICULATING ANGLE	: 70.0
TRAILER TRACK	: 2.50		

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MELWAY ONLINE REF: MAP 70 G7

SCALE
1:500 @ A3

Client
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Status
PRELIMINARY

Project
MULTI-STOREY WAREHOUSE DEVELOPMENT
1-31 GILBY ROAD, MOUNT WAVERLEY
CITY OF MONASH

Date
2023-05-17

Drawn / Approved
JT / JPM

Revision Description
ISSUED FOR INFORMATION

Title
TRAFFIC & TRANSPORT ASSESSMENT
WAREHOUSE FIRST FLOOR - SWEPT PATH ANALYSIS
19m SEMI-TRAILER DESIGN VEHICLE

Drawing Number
IMP2205030 - DRG-01-11

Revision
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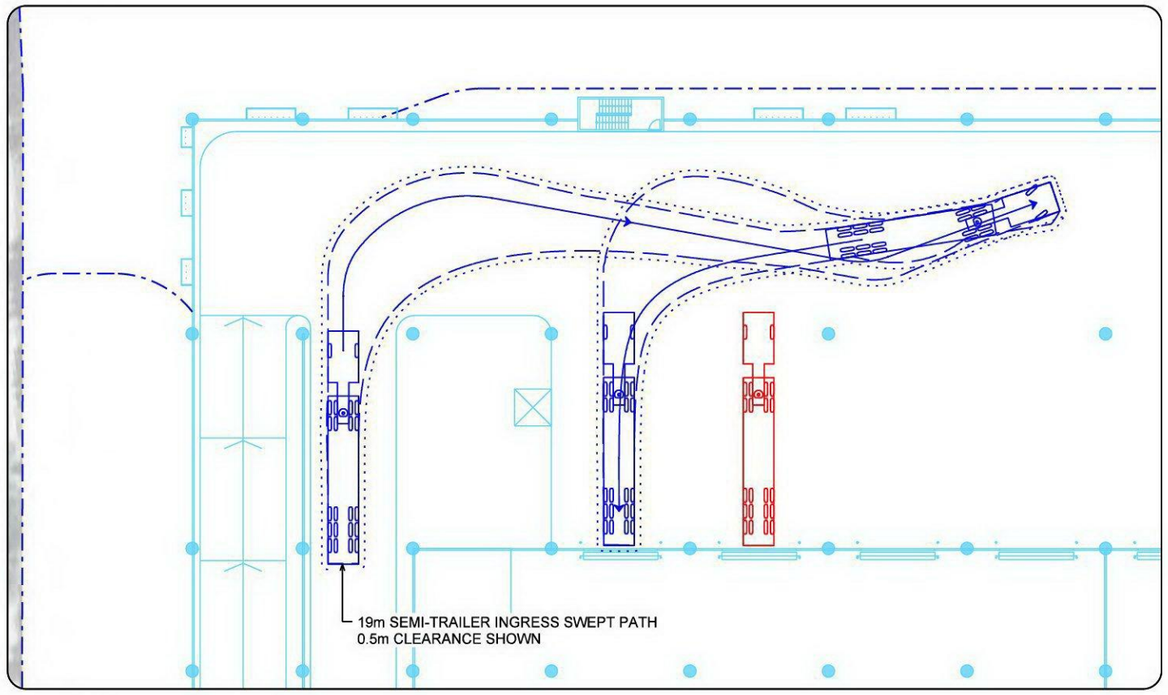

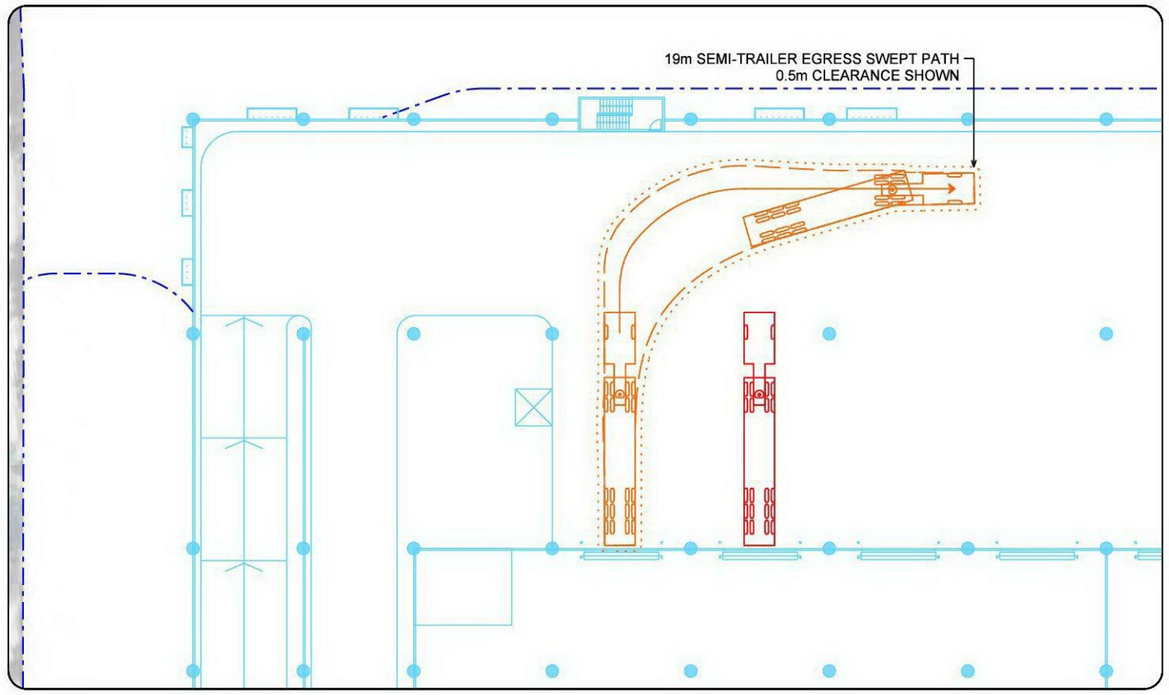

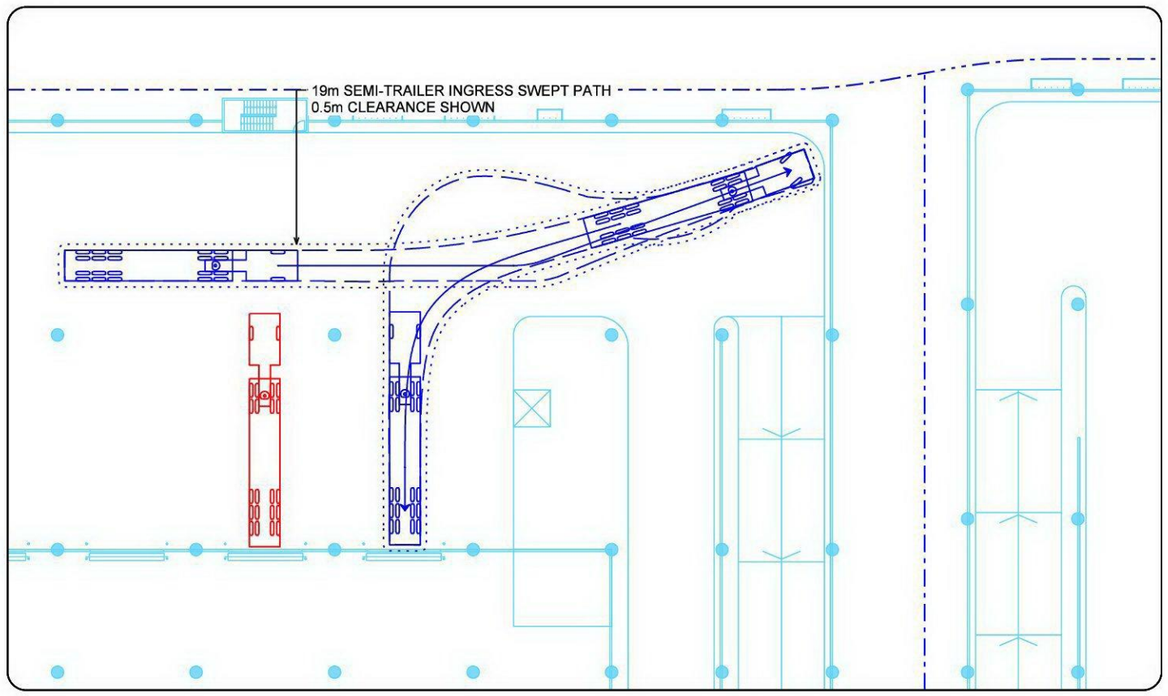

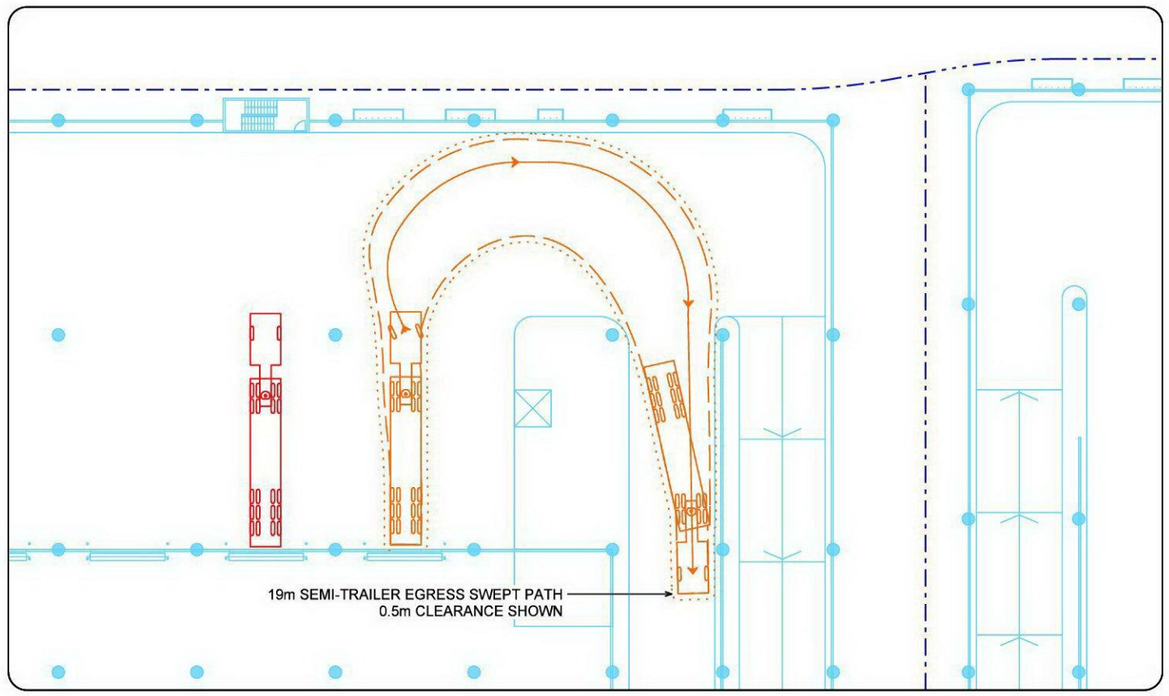

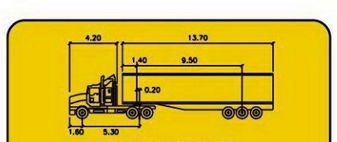

19m SEMI-TRAILER

			METERS
TRACKTOR WIDTH:	2.50	LOCK TO LOCK TIME	: 6.0
TRAILER WIDTH	: 2.50	STEERING ANGLE	: 27.8
TRACKTOR TRACK:	2.50	ARTICULATING ANGLE	: 70.0
TRAILER TRACK	: 2.50		

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MELWAY ONLINE REF: MAP 70 G7

SCALE
1:500 @ A3

Client
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Status
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Project
MULTI-STOREY WAREHOUSE DEVELOPMENT
1-31 GILBY ROAD, MOUNT WAVERLEY
CITY OF MONASH

Date
2023-05-17

Drawn / Approved
JT / JPM

Revision Description
ISSUED FOR INFORMATION

Title
TRAFFIC & TRANSPORT ASSESSMENT
WAREHOUSE FIRST FLOOR - SWEPT PATH ANALYSIS
19m SEMI-TRAILER DESIGN VEHICLE

Drawing Number
IMP2205030 - DRG-01-12

Revision
G

17/05/2023 5:25:36 PM

D23-138149

GENERAL NOTES:
1. ALL DIMENSIONS ARE TO FACE OF KERB AND CHANNEL UNLESS NOTED OTHERWISE.
2. LOCAL ROADS - GILBY ROAD (SPEED ZONE 50KM/H).
   DECLARED ROADS - FORSTER ROAD (SPEED ZONE 60KM/H).
3. BASE INFORMATION FROM NEARMAP AERIAL PHOTOGRAPHY DATED 14.09.2022 AND CONCEPT Y 2209-122-DA-010-011-012-013-014(H).dwg DATED 17.05.2023

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MELWAY ONLINE REF: MAP 70 G7

SCALE
1:1200 @ A3

Client
DEXUS

Status
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Project
MULTI-STOREY WAREHOUSE DEVELOPMENT
1-31 GILBY ROAD, MOUNT WAVERLEY
CITY OF MONASH

Date
2023-05-17

Drawn / Approved
JT / JPM

Revision Description
ISSUED FOR INFORMATION

Title
TRAFFIC & TRANSPORT ASSESSMENT
WAREHOUSE SECOND FLOOR - LAYOUT PLAN

Drawing Number
IMP2205030 - DRG-01-13

Revision
G

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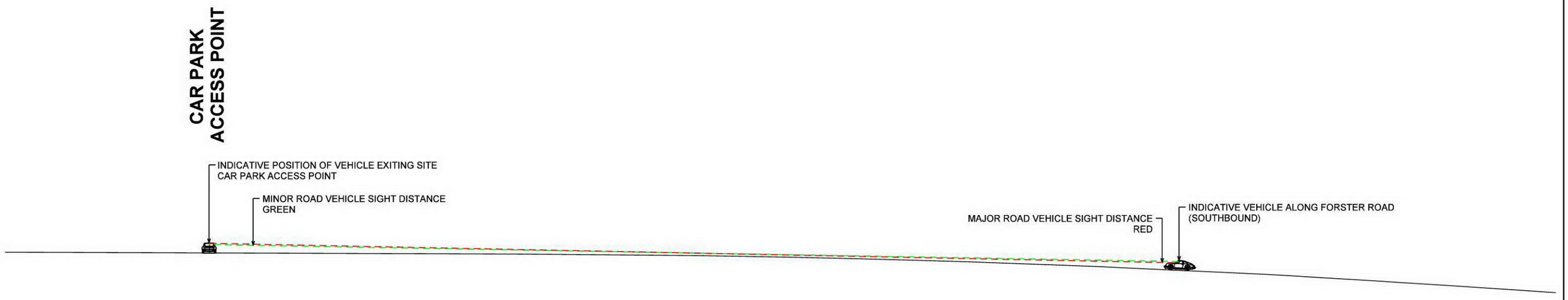
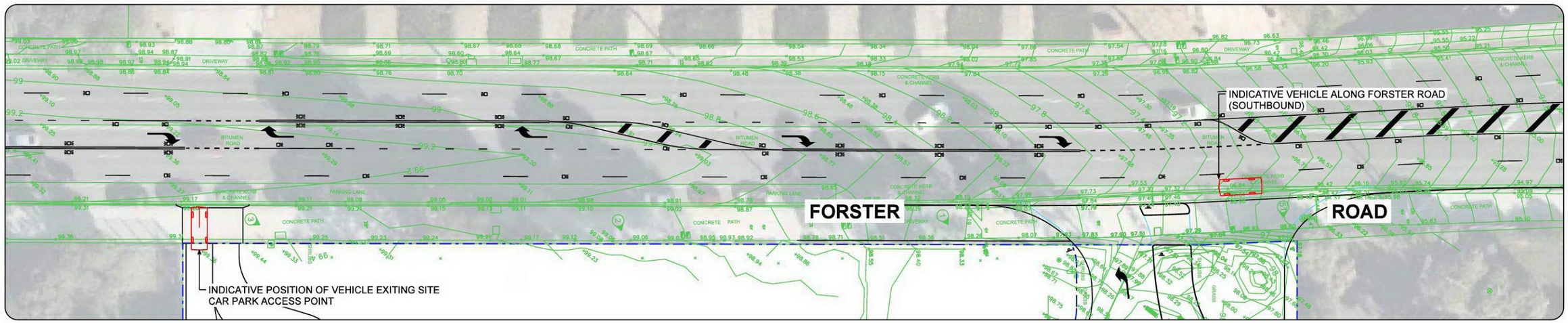
D23-138149

SIGHT DISTANCE ASSESSMENT
FORSTER ROAD
SOUTHBOUND LANE





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SCALE
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Client
DEXUS

Status
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Project
MULTI-STOREY WAREHOUSE DEVELOPMENT
1-31 GILBY ROAD, MOUNT WAVERLEY
CITY OF MONASH

Date
2023-05-18

Drawn / Approved
JT / JPM

Revision Description
ISSUED FOR INFORMATION

Title
FORSTER ROAD LONGITUDINAL SECTION
SOUTHBOUND LANE
CAR PARK ACCESS POINT

Drawing Number
IMP2205030 - DRG-02-03

Revision
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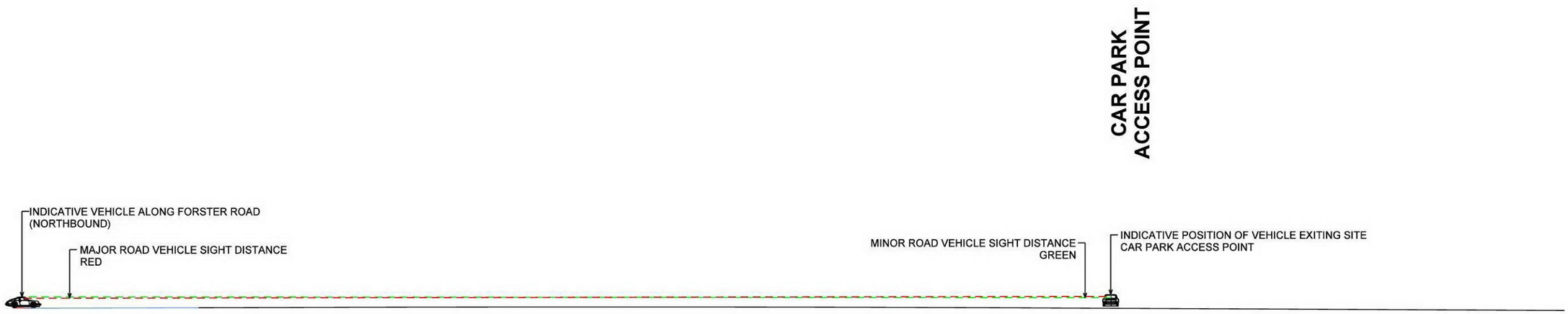
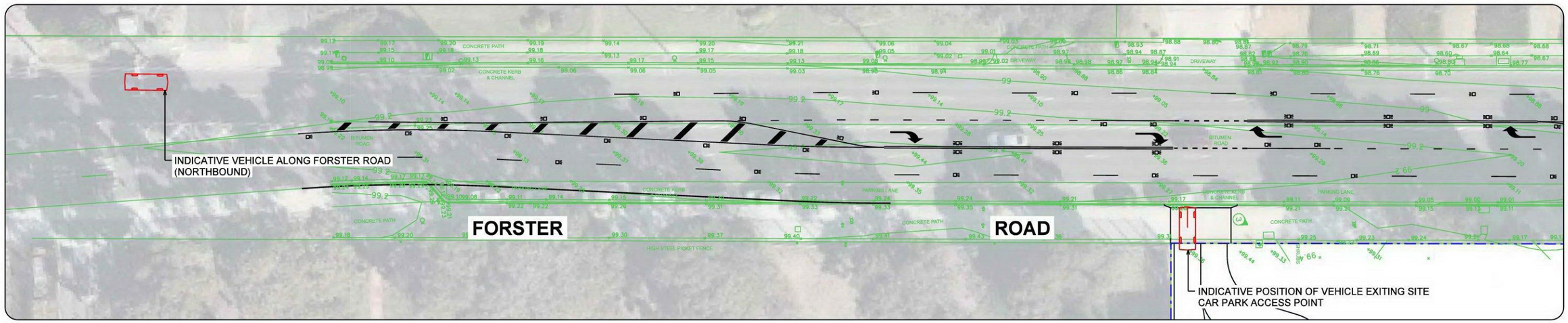
D23-138149

SIGHT DISTANCE ASSESSMENT
FORSTER ROAD
NORTHBOUND LANE





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SCALE
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Status
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Project
MULTI-STOREY WAREHOUSE DEVELOPMENT
1-31 GILBY ROAD, MOUNT WAVERLEY
CITY OF MONASH

Date
2023-05-18
Drawn / Approved
JT / JPM

Revision Description
ISSUED FOR INFORMATION

Title
FORSTER ROAD LONGITUDINAL SECTION
NORTHBOUND LANE
CAR PARK ACCESS POINT

Drawing Number
IMP2205030 - DRG-02-04

Revision
C

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APPENDIX B
Bicycle Parking Specifications

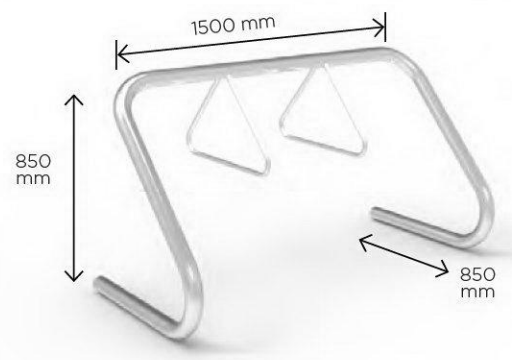
CORA BIKE RACK

PRODUCT SPECIFICATION SHEET

EXPO 1500

MULTIPLE BIKE RACK

The Cora Expo Series is the proven solution where multiple bicycle parking spaces are required.
As Australia's most popular bike rack design, the Expo 1500 uses 500mm spacings to ensure AS2890.3 (2015) compliance, and offers an attractive, secure and versatile facility that is designed for ease of use and installation. It can be installed for single or double sided access for maximum space efficiency, and can be used for indoor and outdoor applications.



Capacity

- Single side access - 1 bike in each inside bay and 1 bike on each outside end = 5 spaces
- Double sided access - 1 bike in each inside bay, from each side, and 1 bike on each outside end = 8 spaces

Construction

- Heavy duty high quality steel or 316 stainless steel
- Mainframe 60.3 OD x 3.2 MD. Hangers 20mm round bar

Fixings

- 2 x M10 x 125mm stainless steel anchor bolts with tamper resistant fasteners supplied

Finishes

- In Stock - Galvanised
- In Stock - 316 Stainless Steel with Electropolish
- Option - 304 Stainless Steel
- Option - Colour Powder Coat (Cora standard colour range)

Assembly

- Supplied fully welded and assembled

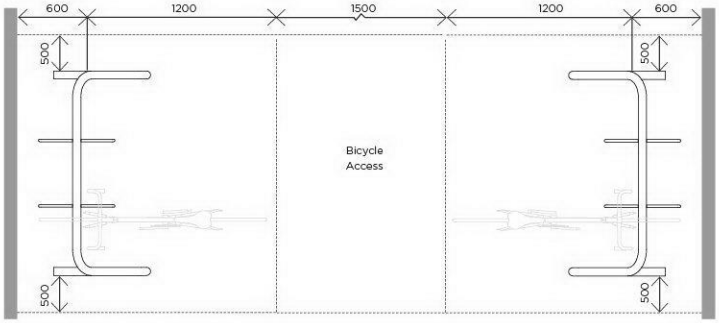
Compliance

- Rack is AS2890.3 (2015) compliant

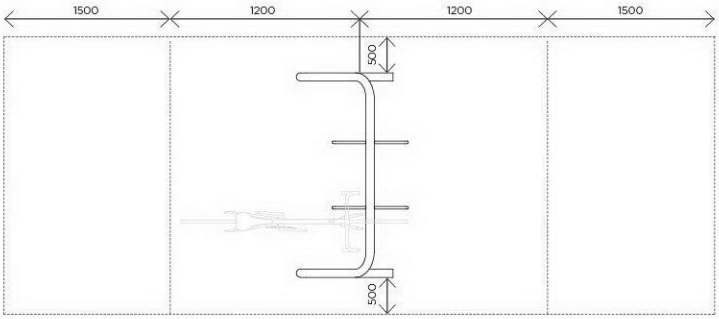
CORA BIKE RACK

PRODUCT SPECIFICATION SHEET

Single Side Access



Double Side Access

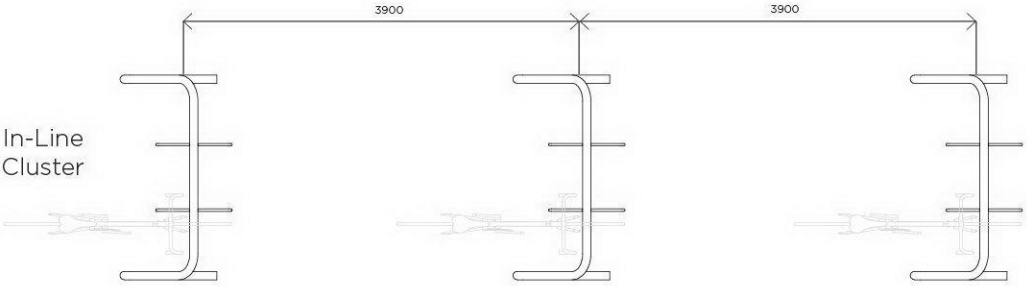


To comply with AS2890.3 (2015) Expo 1500 racks should be mounted with the spacings shown.

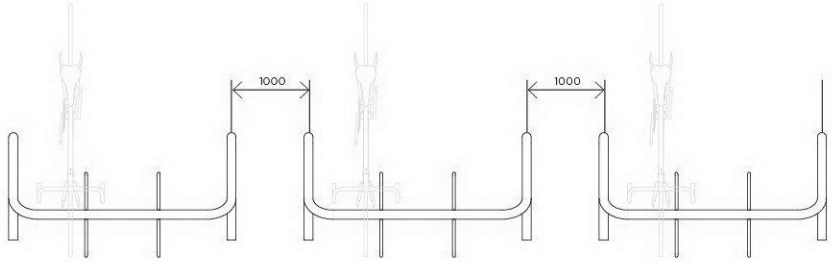
For specific assembly and installation instructions relating to Expo 1500 racks, please refer to individual instruction information sheets.

Racks should not be installed, based on the information on this sheet alone.

In-Line Cluster



Parallel Cluster



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APPENDIX C
SIDRA Analysis - Post Development

Post Development

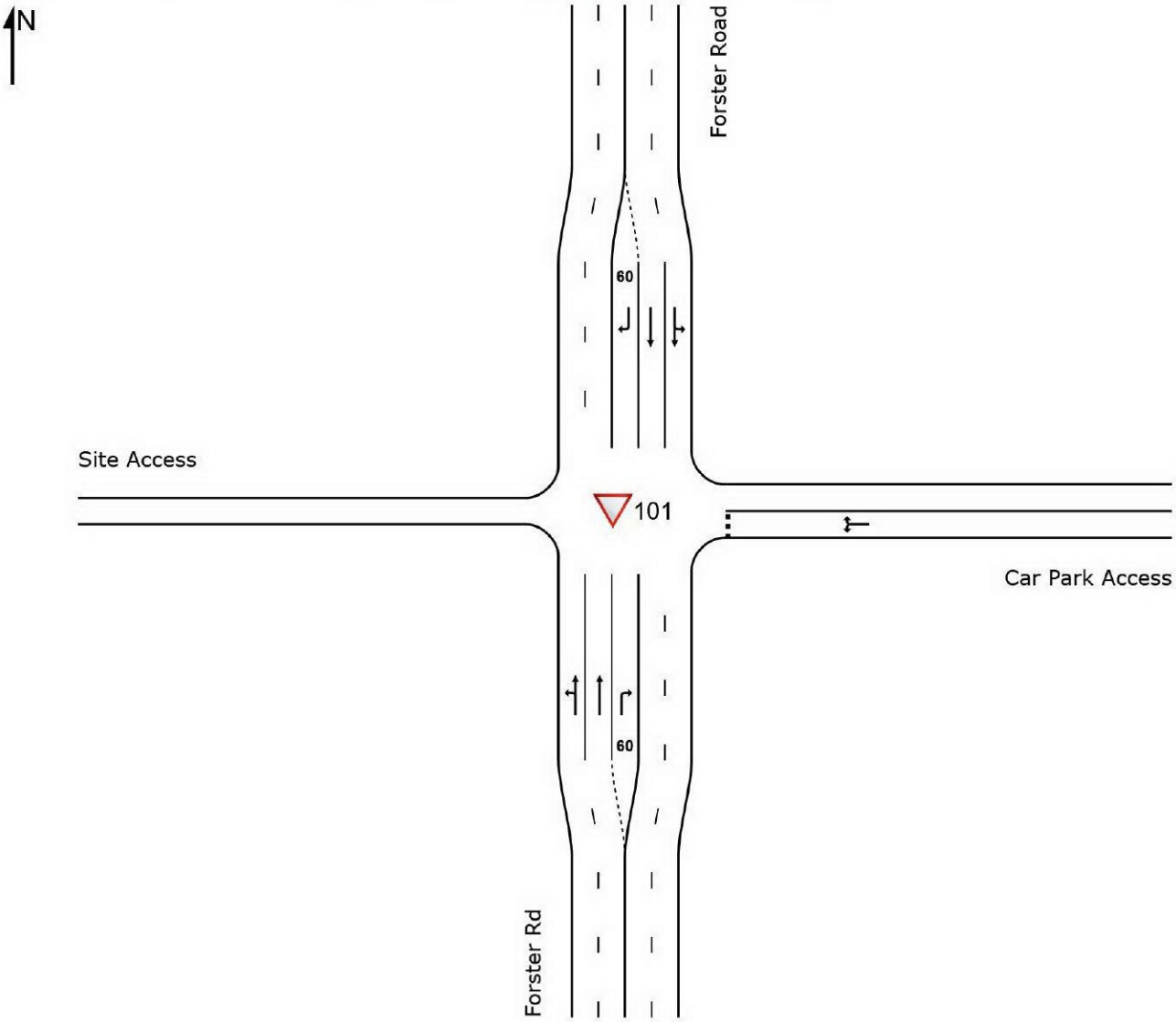
- Forster Road / Car Park Access
- Forster Road / Heavy Vehicle Access
- Gilby Road / Lionel Road/ Site Access

SITE LAYOUT

▽ Site: 101 [Forster Rd / Car Park _AM PEAK - POST DEV (Site Folder: Forster Rd - Access)]

New Site
Site Category: (None)
Give-Way (Two-Way)

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



MOVEMENT SUMMARY

▽ Site: 101 [Forster Rd / Car Park _AM PEAK - POST DEV (Site Folder: Forster Rd - Access)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Forster Rd														
1	L2	50	5.0	53	5.0	0.158	5.6	LOS A	0.0	0.0	0.00	0.11	0.00	57.1
2	T1	510	5.0	537	5.0	0.158	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	59.5
3	R2	38	5.0	40	5.0	0.061	10.0	LOS B	0.2	1.4	0.61	0.79	0.61	49.9
Approach		598	5.0	629	5.0	0.158	1.1	NA	0.2	1.4	0.04	0.10	0.04	58.6
East: Car Park Access														
4	L2	28	5.0	29	5.0	0.216	8.3	LOS A	0.7	5.4	0.70	0.82	0.73	44.1
6	R2	23	5.0	24	5.0	0.216	34.4	LOS D	0.7	5.4	0.70	0.82	0.73	44.2
Approach		51	5.0	54	5.0	0.216	20.0	LOS C	0.7	5.4	0.70	0.82	0.73	44.1
North: Forster Road														
7	L2	79	5.0	83	5.0	0.264	5.7	LOS A	0.0	0.0	0.00	0.10	0.00	57.1
8	T1	860	5.0	905	5.0	0.264	0.1	LOS A	0.0	0.0	0.00	0.05	0.00	59.4
9	R2	50	5.0	53	5.0	0.058	7.8	LOS A	0.2	1.4	0.41	0.67	0.41	51.3
Approach		989	5.0	1041	5.0	0.264	0.9	NA	0.2	1.4	0.02	0.08	0.02	58.8
All Vehicles		1638	5.0	1724	5.0	0.264	1.6	NA	0.7	5.4	0.05	0.11	0.05	58.1

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

MOVEMENT SUMMARY

▽ Site: 101 [Forster Rd / Car Park _PM PEAK - POST DEV (Site Folder: Forster Rd - Access)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Forster Rd														
1	L2	50	5.0	53	5.0	0.270	5.7	LOS A	0.0	0.0	0.00	0.06	0.00	57.5
2	T1	917	5.0	965	5.0	0.270	0.1	LOS A	0.0	0.0	0.00	0.03	0.00	59.6
3	R2	15	5.0	16	5.0	0.018	7.8	LOS A	0.1	0.4	0.41	0.63	0.41	51.5
Approach		982	5.0	1034	5.0	0.270	0.5	NA	0.1	0.4	0.01	0.04	0.01	59.3
East: Car Park Access														
4	L2	65	5.0	68	5.0	0.704	26.6	LOS D	4.3	31.7	0.74	1.10	1.61	34.2
6	R2	77	5.0	81	5.0	0.704	59.0	LOS F	4.3	31.7	0.74	1.10	1.61	34.2
Approach		142	5.0	149	5.0	0.704	44.2	LOS E	4.3	31.7	0.74	1.10	1.61	34.2
North: Forster Road														
7	L2	46	5.0	48	5.0	0.162	5.6	LOS A	0.0	0.0	0.00	0.10	0.00	57.2
8	T1	528	5.0	556	5.0	0.162	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.5
9	R2	50	5.0	53	5.0	0.083	10.2	LOS B	0.3	1.9	0.62	0.83	0.62	49.6
Approach		624	5.0	657	5.0	0.162	1.3	NA	0.3	1.9	0.05	0.11	0.05	58.4
All Vehicles		1748	5.0	1840	5.0	0.704	4.3	NA	4.3	31.7	0.08	0.15	0.15	55.7

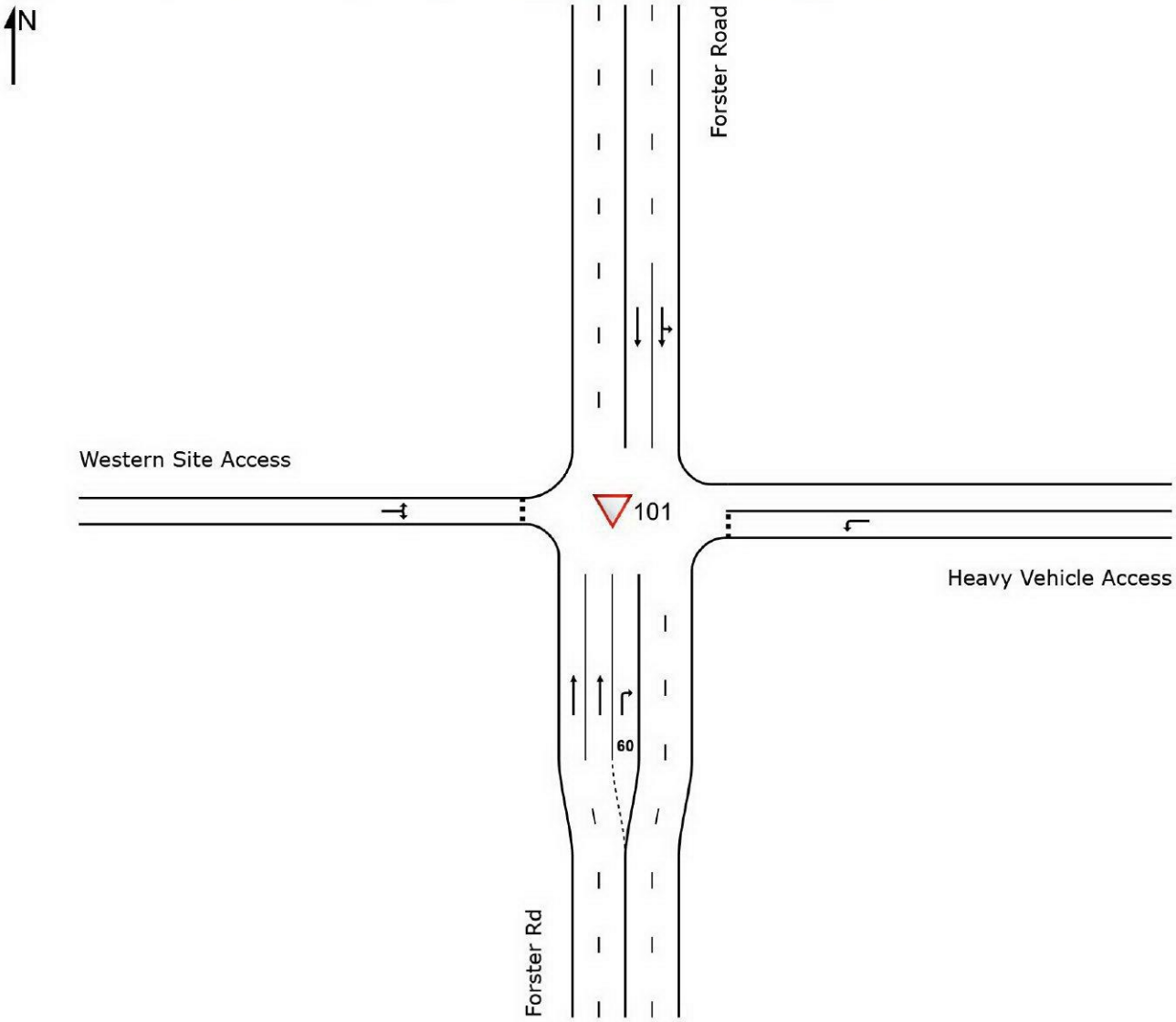
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and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

SITE LAYOUT

▽ Site: 101 [Forster Rd / Heavy Vehicle_AM PEAK - POST DEV (Site Folder: Forster Rd - Access)]

New Site
Site Category: (None)
Give-Way (Two-Way)

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



MOVEMENT SUMMARY

▽ Site: 101 [Forster Rd / Heavy Vehicle_PM PEAK - POST DEV (Site Folder: Forster Rd - Access)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Forster Rd														
2	T1	991	5.0	1043	5.0	0.276	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
3	R2	3	100.0	3	100.0	0.006	11.6	LOS B	0.0	0.3	0.53	0.65	0.53	45.5
Approach		994	5.3	1046	5.3	0.276	0.1	NA	0.0	0.3	0.00	0.00	0.00	59.8
East: Heavy Vehicle Access														
4	L2	25	100.0	26	100.0	0.047	9.7	LOS A	0.2	2.3	0.43	0.63	0.43	47.0
Approach		25	100.0	26	100.0	0.047	9.7	LOS A	0.2	2.3	0.43	0.63	0.43	47.0
North: Forster Road														
7	L2	8	100.0	8	100.0	0.157	6.7	LOS A	0.0	0.0	0.00	0.02	0.00	53.4
8	T1	549	5.0	578	5.0	0.157	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.8
Approach		557	6.4	586	6.4	0.157	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.7
West: Site Access														
10	L2	20	5.0	21	5.0	0.242	10.3	LOS B	0.8	5.9	0.81	0.93	0.89	40.8
12	R2	22	5.0	23	5.0	0.242	41.8	LOS E	0.8	5.9	0.81	0.93	0.89	40.7
Approach		42	5.0	44	5.0	0.242	26.8	LOS D	0.8	5.9	0.81	0.93	0.89	40.7
All Vehicles		1618	7.1	1703	7.1	0.276	1.0	NA	0.8	5.9	0.03	0.04	0.03	58.8

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

MOVEMENT SUMMARY

▽ Site: 101 [Forster Rd / Heavy Vehicle_AM PEAK - POST DEV (Site Folder: Forster Rd - Access)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Forster Rd														
2	T1	523	5.0	551	5.0	0.147	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	10	100.0	11	100.0	0.037	18.2	LOS C	0.1	1.5	0.75	0.89	0.75	42.1
Approach		533	6.8	561	6.8	0.147	0.4	NA	0.1	1.5	0.01	0.02	0.01	59.5
East: Heavy Vehicle Access														
4	L2	14	100.0	15	100.0	0.035	12.4	LOS B	0.1	1.6	0.54	0.71	0.54	45.4
Approach		14	100.0	15	100.0	0.035	12.4	LOS B	0.1	1.6	0.54	0.71	0.54	45.4
North: Forster Road														
7	L2	21	100.0	22	100.0	0.268	6.8	LOS A	0.0	0.0	0.00	0.03	0.00	53.3
8	T1	925	5.0	974	5.0	0.268	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	59.7
Approach		946	7.1	996	7.1	0.268	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.5
West: Western Site Access														
10	L2	21	5.0	22	5.0	0.106	7.0	LOS A	0.3	2.5	0.58	0.70	0.58	46.5
12	R2	10	5.0	11	5.0	0.106	34.3	LOS D	0.3	2.5	0.58	0.70	0.58	46.4
Approach		31	5.0	33	5.0	0.106	15.8	LOS C	0.3	2.5	0.58	0.70	0.58	46.5
All Vehicles		1524	7.8	1604	7.8	0.268	0.7	NA	0.3	2.5	0.02	0.03	0.02	59.0

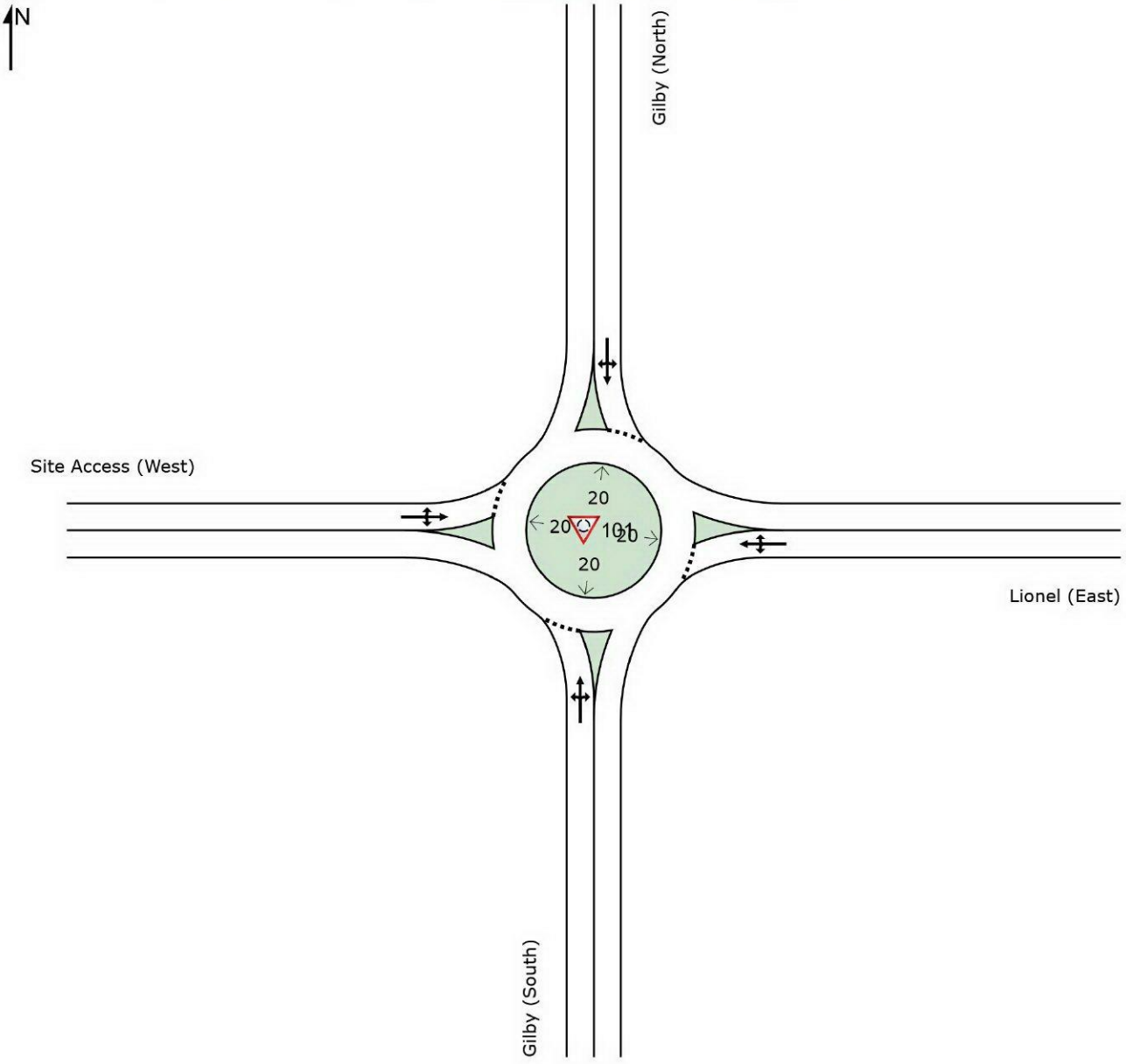
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and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

SITE LAYOUT

Site: 101 [Gilby_Lionel_Site Access- PM PEAK - POST DEV (Site Folder: General)]

PM PEAK
Site Category: (None)
Roundabout

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



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Project: Not Saved

MOVEMENT SUMMARY

Site: 101 [Gilby_Lionel_Site Access- AM PEAK - POST DEV (Site Folder: General)]

AM PEAK
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Gilby (South)														
1	L2	94	5.0	99	5.0	0.195	5.9	LOS A	1.1	8.3	0.54	0.62	0.54	53.0
2	T1	69	5.0	73	5.0	0.195	6.1	LOS A	1.1	8.3	0.54	0.62	0.54	54.3
3	R2	24	5.0	25	5.0	0.195	10.7	LOS B	1.1	8.3	0.54	0.62	0.54	54.1
Approach		187	5.0	197	5.0	0.195	6.6	LOS A	1.1	8.3	0.54	0.62	0.54	53.6
East: Lionel (East)														
4	L2	95	5.0	100	5.0	0.329	5.7	LOS A	2.1	15.1	0.53	0.62	0.53	52.7
5	T1	180	5.0	189	5.0	0.329	5.9	LOS A	2.1	15.1	0.53	0.62	0.53	54.0
6	R2	61	5.0	64	5.0	0.329	10.6	LOS B	2.1	15.1	0.53	0.62	0.53	53.9
Approach		336	5.0	354	5.0	0.329	6.7	LOS A	2.1	15.1	0.53	0.62	0.53	53.6
North: Gilby (North)														
7	L2	31	5.0	33	5.0	0.204	4.7	LOS A	1.2	8.5	0.34	0.54	0.34	52.9
8	T1	121	5.0	127	5.0	0.204	4.9	LOS A	1.2	8.5	0.34	0.54	0.34	54.1
9	R2	86	5.0	91	5.0	0.204	9.5	LOS A	1.2	8.5	0.34	0.54	0.34	54.0
Approach		238	5.0	251	5.0	0.204	6.6	LOS A	1.2	8.5	0.34	0.54	0.34	53.9
West: Site Access (West)														
10	L2	19	5.0	20	5.0	0.115	4.7	LOS A	0.6	4.5	0.35	0.56	0.35	52.6
11	T1	50	5.0	53	5.0	0.115	5.0	LOS A	0.6	4.5	0.35	0.56	0.35	53.8
12	R2	60	5.0	63	5.0	0.115	9.6	LOS A	0.6	4.5	0.35	0.56	0.35	53.7
Approach		129	5.0	136	5.0	0.115	7.1	LOS A	0.6	4.5	0.35	0.56	0.35	53.6
All Vehicles		890	5.0	937	5.0	0.329	6.7	LOS A	2.1	15.1	0.46	0.59	0.46	53.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Gilby_Lionel_Site Access- PM PEAK - POST DEV (Site Folder: General)]

PM PEAK
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Gilby (South)														
1	L2	41	5.0	43	5.0	0.146	4.6	LOS A	0.8	5.9	0.33	0.50	0.33	53.5
2	T1	96	5.0	101	5.0	0.146	4.8	LOS A	0.8	5.9	0.33	0.50	0.33	54.8
3	R2	31	5.0	33	5.0	0.146	9.5	LOS A	0.8	5.9	0.33	0.50	0.33	54.7
Approach		168	5.0	177	5.0	0.146	5.6	LOS A	0.8	5.9	0.33	0.50	0.33	54.4
East: Lionel (East)														
4	L2	101	5.0	106	5.0	0.199	5.7	LOS A	1.1	8.2	0.51	0.62	0.51	52.9
5	T1	53	5.0	56	5.0	0.199	6.0	LOS A	1.1	8.2	0.51	0.62	0.51	54.2
6	R2	41	5.0	43	5.0	0.199	10.6	LOS B	1.1	8.2	0.51	0.62	0.51	54.0
Approach		195	5.0	205	5.0	0.199	6.8	LOS A	1.1	8.2	0.51	0.62	0.51	53.4
North: Gilby (North)														
7	L2	21	5.0	22	5.0	0.202	5.7	LOS A	1.2	8.5	0.51	0.60	0.51	52.7
8	T1	147	5.0	155	5.0	0.202	5.9	LOS A	1.2	8.5	0.51	0.60	0.51	54.0
9	R2	32	5.0	34	5.0	0.202	10.5	LOS B	1.2	8.5	0.51	0.60	0.51	53.9
Approach		200	5.0	211	5.0	0.202	6.6	LOS A	1.2	8.5	0.51	0.60	0.51	53.8
West: Site Access (West)														
10	L2	50	5.0	53	5.0	0.274	5.0	LOS A	1.6	12.0	0.41	0.58	0.41	52.5
11	T1	132	5.0	139	5.0	0.274	5.2	LOS A	1.6	12.0	0.41	0.58	0.41	53.8
12	R2	129	5.0	136	5.0	0.274	9.8	LOS A	1.6	12.0	0.41	0.58	0.41	53.7
Approach		311	5.0	327	5.0	0.274	7.1	LOS A	1.6	12.0	0.41	0.58	0.41	53.5
All Vehicles		874	5.0	920	5.0	0.274	6.6	LOS A	1.6	12.0	0.44	0.58	0.44	53.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX D
SIDRA Analysis - Post Development + Suburban Rail Loop

Post Development + Suburban Rail Loop

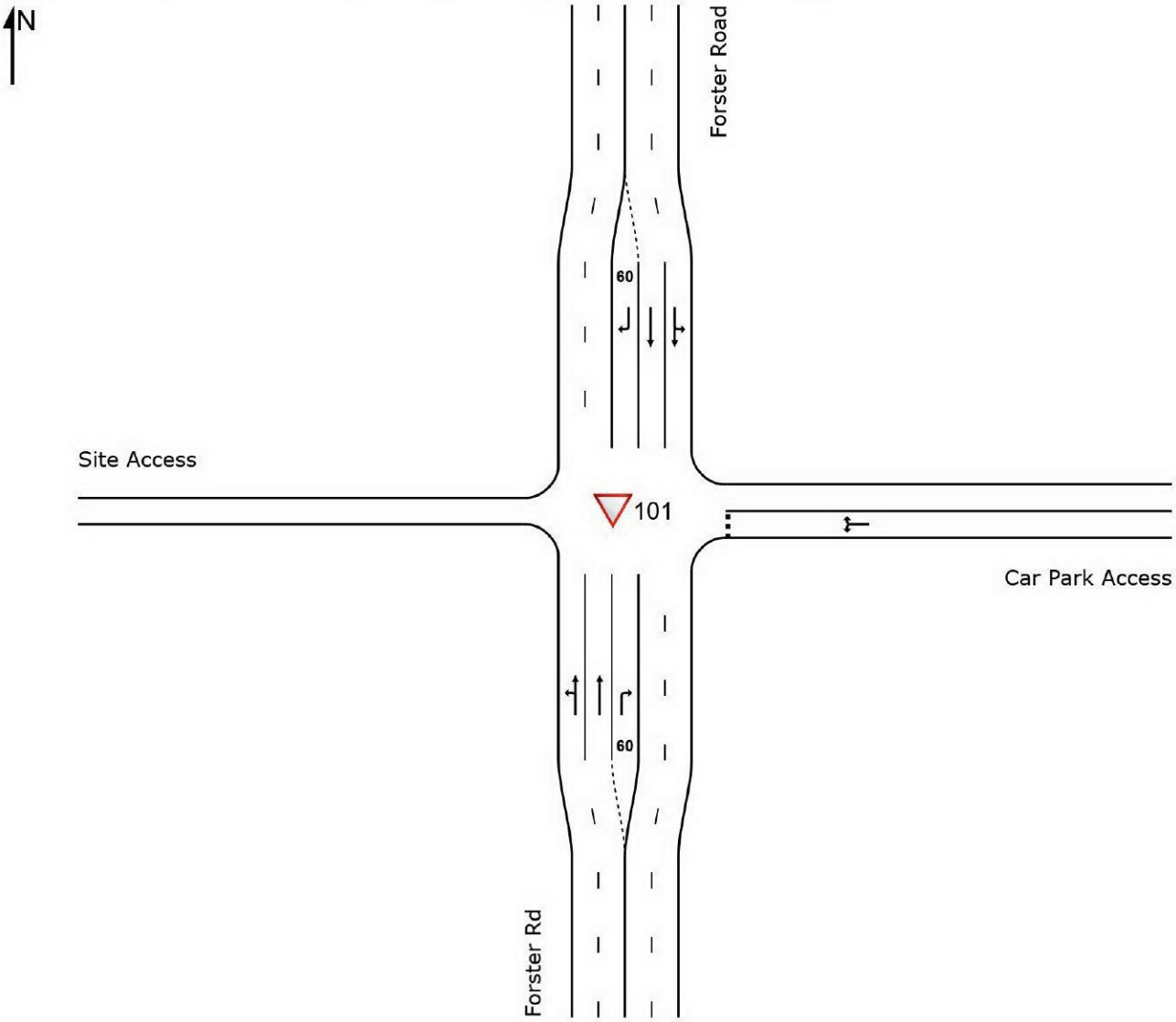
- Forster Road / Car Park Access
- Forster Road / Heavy Vehicle Access
- Gilby Road / Lionel Road/ Site Access

SITE LAYOUT

Site: 101 [Forster Rd / Car Park _PM PEAK - POST DEV + 10 YEAR GROWTH (Site Folder: Forster Rd - Access - Copy)]

New Site
Site Category: (None)
Give-Way (Two-Way)

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



Organisation: IMPACT TRAFFIC ENGINEERING | Licence: NETWORK / 1PC | Created: Friday, 19 May 2023 7:35:56 AM
Project: C:\Users\John-Paul\Maina\IMPACT Dropbox\01. Projects\2022\IMP2205030 - Lot 1 and Lot 2 Axxess Corporate Park, Mount Waverley (Dexus)\6. ENGINEERING\04 SIDRA\IMP2205030SID01.sip9

MOVEMENT SUMMARY

▽ Site: 101 [Forster Rd / Car Park _AM PEAK - POST DEV + 10 YEAR GROWTH (Site Folder: Forster Rd - Access - Copy)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Forster Rd														
1	L2	50	5.0	53	5.0	0.235	5.7	LOS A	0.0	0.0	0.00	0.07	0.00	57.4
2	T1	786	5.0	827	5.0	0.235	0.1	LOS A	0.0	0.0	0.00	0.03	0.00	59.6
3	R2	18	5.0	19	5.0	0.044	13.4	LOS B	0.1	0.9	0.76	0.90	0.76	47.7
Approach		854	5.0	899	5.0	0.235	0.7	NA	0.1	0.9	0.02	0.05	0.02	59.1
East: Car Park Access														
4	L2	13	5.0	14	5.0	0.234	13.1	LOS B	0.7	5.1	0.89	0.97	0.95	35.1
6	R2	11	5.0	12	5.0	0.234	74.5	LOS F	0.7	5.1	0.89	0.97	0.95	35.2
Approach		24	5.0	25	5.0	0.234	41.2	LOS E	0.7	5.1	0.89	0.97	0.95	35.2
North: Forster Road														
7	L2	37	5.0	39	5.0	0.383	5.7	LOS A	0.0	0.0	0.00	0.03	0.00	57.6
8	T1	1328	5.0	1398	5.0	0.383	0.1	LOS A	0.0	0.0	0.00	0.02	0.00	59.6
9	R2	50	5.0	53	5.0	0.074	9.4	LOS A	0.2	1.7	0.56	0.77	0.56	50.2
Approach		1415	5.0	1489	5.0	0.383	0.6	NA	0.2	1.7	0.02	0.04	0.02	59.2
All Vehicles		2293	5.0	2414	5.0	0.383	1.1	NA	0.7	5.1	0.03	0.06	0.03	58.7

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

MOVEMENT SUMMARY

▽ Site: 101 [Forster Rd / Car Park _PM PEAK - POST DEV + 10 YEAR GROWTH (Site Folder: Forster Rd - Access - Copy)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Forster Rd														
1	L2	50	5.0	53	5.0	0.411	5.7	LOS A	0.0	0.0	0.00	0.04	0.00	57.5
2	T1	1422	5.0	1497	5.0	0.411	0.1	LOS A	0.0	0.0	0.00	0.02	0.00	59.5
3	R2	7	5.0	7	5.0	0.010	9.1	LOS A	0.0	0.2	0.54	0.67	0.54	50.6
Approach		1479	5.0	1557	5.0	0.411	0.4	NA	0.0	0.2	0.00	0.02	0.00	59.4
East: Car Park Access														
4	L2	29	5.0	31	5.0	0.821	88.1	LOS F	4.0	29.5	0.92	1.27	1.96	18.8
6	R2	35	5.0	37	5.0	0.821	167.8	LOS F	4.0	29.5	0.92	1.27	1.96	18.8
Approach		64	5.0	67	5.0	0.821	131.7	LOS F	4.0	29.5	0.92	1.27	1.96	18.8
North: Forster Road														
7	L2	21	5.0	22	5.0	0.232	5.7	LOS A	0.0	0.0	0.00	0.03	0.00	57.7
8	T1	806	5.0	848	5.0	0.232	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	59.7
9	R2	50	5.0	53	5.0	0.137	14.9	LOS B	0.4	2.9	0.80	0.92	0.80	46.7
Approach		877	5.0	923	5.0	0.232	1.0	NA	0.4	2.9	0.05	0.07	0.05	58.8
All Vehicles		2420	5.0	2547	5.0	0.821	4.1	NA	4.0	29.5	0.04	0.07	0.07	56.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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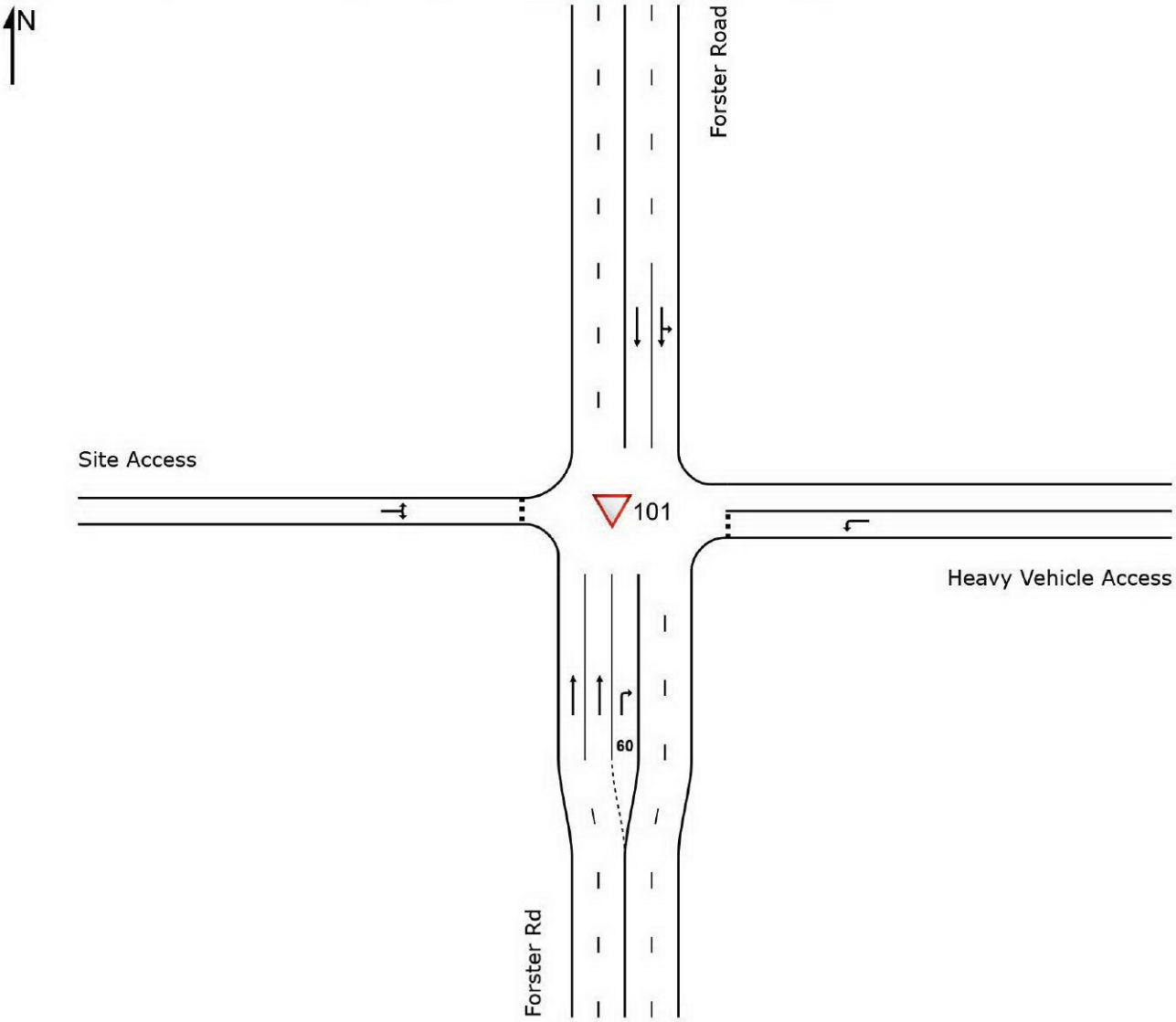
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

▽ Site: 101 [Forster Rd / Heavy Vehicle_PM PEAK - POST DEV + 10 YEAR GROWTH (Site Folder: Forster Rd - Access - Copy)]

New Site
Site Category: (None)
Give-Way (Two-Way)

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



MOVEMENT SUMMARY

▽ Site: 101 [Forster Rd / Heavy Vehicle_AM PEAK - POST DEV + 10 YEAR GROWTH (Site Folder: Forster Rd - Access - Copy)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Forster Rd														
2	T1	787	5.0	828	5.0	0.221	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	10	100.0	11	100.0	0.071	30.8	LOS D	0.2	2.6	0.88	0.95	0.88	36.7
Approach		797	6.2	839	6.2	0.221	0.4	NA	0.2	2.6	0.01	0.01	0.01	59.4
East: Heavy Vehicle Access														
4	L2	14	100.0	15	100.0	0.051	17.3	LOS C	0.2	2.3	0.68	0.85	0.68	42.8
Approach		14	100.0	15	100.0	0.051	17.3	LOS C	0.2	2.3	0.68	0.85	0.68	42.8
North: Forster Road														
7	L2	21	100.0	22	100.0	0.387	6.8	LOS A	0.0	0.0	0.00	0.02	0.00	53.4
8	T1	1351	5.0	1422	5.0	0.387	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	59.6
Approach		1372	6.5	1444	6.5	0.387	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.5
West: Western Site Access														
10	L2	21	5.0	22	5.0	0.235	9.7	LOS A	0.7	5.2	0.79	0.87	0.84	38.5
12	R2	10	5.0	11	5.0	0.235	79.3	LOS F	0.7	5.2	0.79	0.87	0.84	38.4
Approach		31	5.0	33	5.0	0.235	32.2	LOS D	0.7	5.2	0.79	0.87	0.84	38.5
All Vehicles		2214	6.9	2331	6.9	0.387	0.9	NA	0.7	5.2	0.02	0.03	0.02	58.9

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Queue Model: SIDRA Standard.
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MOVEMENT SUMMARY

▽ Site: 101 [Forster Rd / Heavy Vehicle_PM PEAK - POST DEV + 10 YEAR GROWTH (Site Folder: Forster Rd - Access - Copy)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Forster Rd														
2	T1	1454	5.0	1531	5.0	0.405	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
3	R2	3	100.0	3	100.0	0.009	15.2	LOS C	0.0	0.4	0.67	0.74	0.67	43.6
Approach		1457	5.2	1534	5.2	0.405	0.2	NA	0.0	0.4	0.00	0.00	0.00	59.7
East: Heavy Vehicle Access														
4	L2	25	100.0	26	100.0	0.057	11.6	LOS B	0.2	2.8	0.52	0.71	0.52	45.8
Approach		25	100.0	26	100.0	0.057	11.6	LOS B	0.2	2.8	0.52	0.71	0.52	45.8
North: Forster Road														
7	L2	8	100.0	8	100.0	0.227	6.7	LOS A	0.0	0.0	0.00	0.01	0.00	53.5
8	T1	802	5.0	844	5.0	0.227	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	59.8
Approach		810	5.9	853	5.9	0.227	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.7
West: Site Access														
10	L2	20	5.0	21	5.0	0.617	50.1	LOS F	2.1	15.5	0.96	1.09	1.36	23.2
12	R2	22	5.0	23	5.0	0.617	135.6	LOS F	2.1	15.5	0.96	1.09	1.36	23.2
Approach		42	5.0	44	5.0	0.617	94.9	LOS F	2.1	15.5	0.96	1.09	1.36	23.2
All Vehicles		2334	6.5	2457	6.5	0.617	2.0	NA	2.1	15.5	0.02	0.03	0.03	57.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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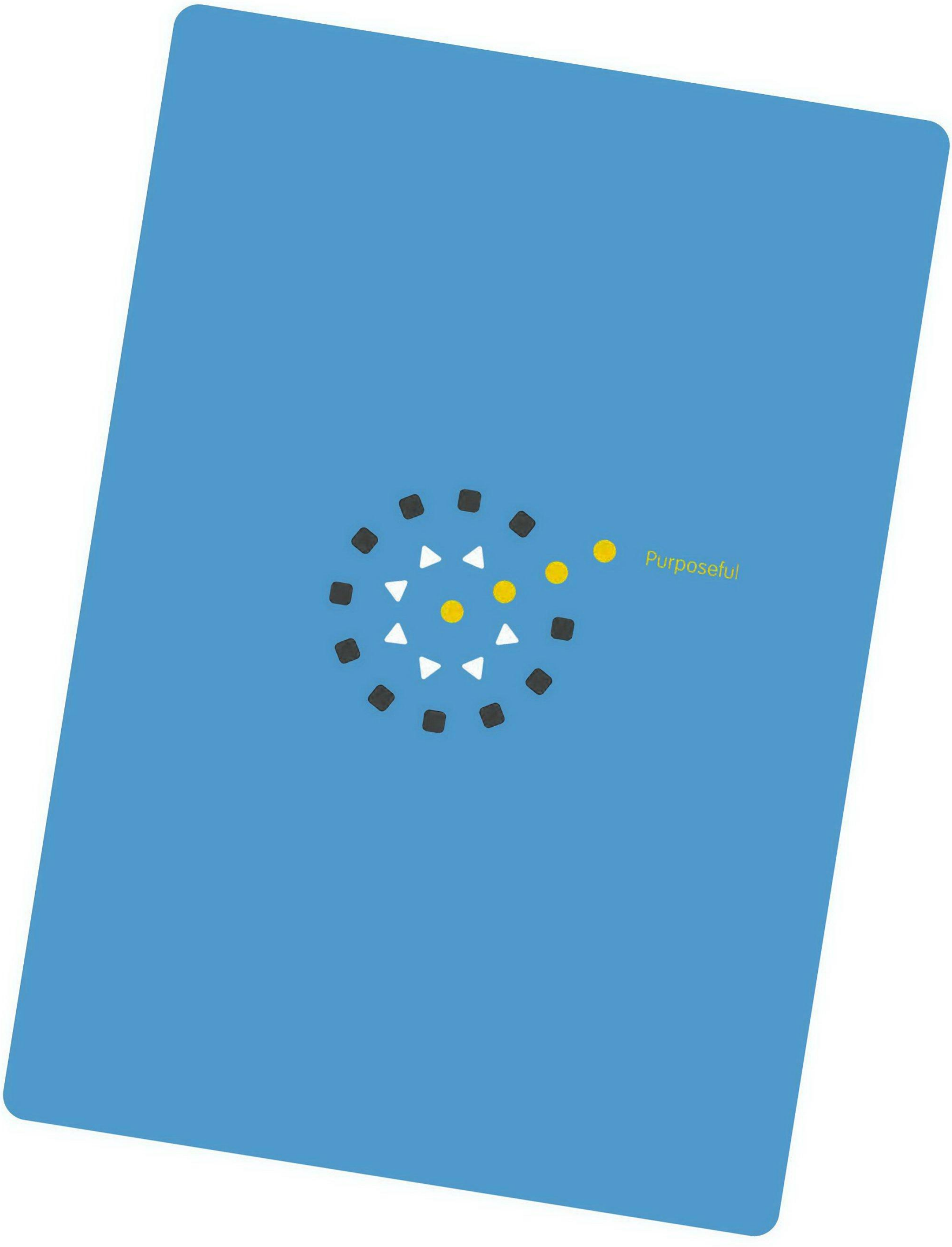
D23-138149



D23-138149

IMPACT Traffic Engineering Pty Ltd
ABN: 78 611 424 107

Level 17, 31 Queen Street, Melbourne, Victoria 3000
impactaustralia.com.au

19 May 2023
Reference: IMP2205030LET01F01.docx

37° 49' 6" S 144° 57' 42" E

James Noy
Senior Statutory Planner
Department of Transport and Planning
Level 23, 1 Spring Street
Melbourne VIC 3000

Dear James,

SUBJECT: RESPONSE TO DEPARTMENT OF TRANSPORT & PLANNING FURTHER INFORMATION REQUEST
PROJECT: MULTI STOREY WAREHOUSE DEVELOPMENT
SITE ADDRESS: 1-31 GILBY ROAD, MOUNT WAVERLEY

PREAMBLE

IMPACT® continue to act on behalf of Dexus in relation to the Traffic & Transport related considerations associated with the proposal to develop part of the site at 1-31 Gilby Road, Mount Waverley for the purpose of a Multi Storey Warehouse.

IMPACT® have prepared a Transport Impact Assessment dated 25th November 2022 which accompanied an application for a permit.

Department of Transport and Planning have reviewed the application, including the Transport Impact Assessment and via correspondence received on 2nd March 2023 sought additional information to assist with their assessment.

In the interim, discussions have been progressed with DTP to initially explore and better understand the feedback provided, and subsequently to present our informal responses to the matters raised.

This correspondence provides a formal response the items contained in the DTP further information request. This letter is to be read in conjunction with the updated Transport Impact Assessment dated 19th May 2023 - provided as an enclosure.

PRECINCT CONCERNS

DTP COMMENT	RESPONSE
The Transport Impact Assessment Report (TIAR) has not considered future scenarios including a 10-year traffic growth on Forster Road, nor has it considered the likely impacts from the future land use of the overall site as per the Draft Axxess Corporate Park Masterplan.	Two future scenarios considered and documented at section 6.5. These include: **10 Year Scenario**: DTP DATA indicates that volumes along Forster Road are reducing by an annual rate of 0.3%. The assessments undertaken do not adjust volumes downwards and are also based on inflated development volume forecasts. **Suburban Rail Loop**: Delivery of the Suburban Rail

37° 49' 6" S 144° 57' 42" E

	Loop and Train station at Monash will include land use in the locality and shall have impacts on the road network and modes of transport. This scenario has been assessed, including ddjusting the development volume forecasts to reflect the case study rate of 0.3 trips / 100 sq.m, and adopting an aggressive compounding rate of 4.5% per annum over 10 years has been adopted. The findings are that the road network will continue to operate comfortably, and that road network operational efficiency will not be affected.
The proposal is not in keeping with Safe System Principles with filtering right turns required over two southbound lanes for both heavy vehicles and for commuter cars. No provision for any dedicated turning lane(s) both left and right turns has been provided or considered.	The proposal has been amended to include mitigation works along Forster Road in the form of right turn lanes for both heavy and commuter cars. To accommodate these lanes, on street parking on the eastern side of Forster Road will be removed. These works are identified in the functional plans provided at Appendix A of the accompanying report. A dedicated left turn lane cannot be accommodated within the road reservation noting the presence of the strategic cycling corridor along the eastern verge. Left turn movements have less conflict points that right turn movements. Accordingly, the proposed outcome enhances safety for the most
The TIAR states that there have not been any casualty crashes along the frontage of the site along Forster Road during the period of 2015 and 2021. Respectfully we consider that the application should consider the signalised intersection at Forster, Hardner and Ricketts Roads as a guide for traffic conditions in this precinct. In the most recent five year period to June 2022 there have been 8 casualty crashes, including 2 right turn against crashes involving North South traffic and 2 rear end crashes involving North South traffic.	It is not contemporary practise to extrapolate crash statistics from other locations to a location which is currently operational. The assessment has benefits from evidence of an existing condition, which is intended to be replicated. Existing evidence is that filtering right turns over two southbound lanes or northbound lanes for both heavy vehicles and for commuter cars can and has occurred without incident. Notwithstanding, there is an opportunity as noted above to provide a dedicated right turn lanes that will benefit not only this development but also the neighbouring development to the west.
The Department is of the view that with land use intensification proposed and the precinct as a whole in the future these types of crashes will replicate along the frontage of the site,	

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particularly with the constrained sight distance available

SPECIFIC CONCERNS	
Access A1 (heavy vehicle access) as shown in Figure 1 of the TIA will be directly opposite an existing exit only access on the west side of Forster Road. This will make it even more problematic to turn right out of the subject site and has not been mentioned in the TIAR.	Right turn movements from Access A1 (heavy vehicle access) will be prohibited.
Forster Road is a C1 cycling route and the TIAR in Section 4.4.2 does not acknowledge safety impact on cyclists with the proposed access points. The frontage at present has a shared path.	The design responds to the shared path and C1 cycle route. Specifically: — The heavy vehicle access point is designed with a central median that will allow a pedestrian or cyclist to prop (if required) — The design proposes green pavement marking across all driveways to reinforce the cycle lane. The proposal also contemplates the opportunity to introduce right turn lanes on Forster Road. These dedicated right turn lanes ensure that motorists turning right can do so without the pressure of blocking through traffic, and taking unnecessary short gaps in traffic. This means that motorists will be able to better respond to cyclist demand along this corridor.
The TIAR states that the Monash Planning Scheme has a carparking requirement of 1,230 spaces with a reduction of carparking dispensation requested. However, in Table 7 with the warehouse case study sites, the peak car parking demand is a maximum of 62 car spaces for sizes that vary up to 56,000 sqm? Also where does the adopted rate of 0.6 spaces per 100 sqm come from?	Table 7 is case study data that has been relied on to assist with our opinion on parking demand rates We observe that the 62 car spaces referenced in DTP's correspondence is demand recorded at a site in Somerville. This equates to a peak rate of 0.44 spaces / 100 sq.m The 0.6 spaces / 100 sq.m rate is the observed rate at Table 7 for sites that have between 3,500 sq.m - 5,500 sq.m NLA. Importantly, we draw your attention to comparable outputs between statistics from our Case Study data and the RMS case study data.
For the traffic generation, do we have any	Local Case study presented at Section 6.2.2.

37° 49' 6" S 144° 57' 42" E

local case studies to base the projected traffic generation? The formulas proposed in the TIA with logarithmic functions are difficult to endorse as proposed.	The local case study confirm that the formula based approach is conservative by a factor of 2, that is the formula approach suggest a peak traffic generation rate of about 0.6 trips / 100 sq.m, whilst local case study reveals a rate of about 0.3 trips / 100 sq.m
What are the directional splits for arrivals and departures as contained in Table 13 of the TIA based on? How can we acquire this information? What does local knowledge and case study tell us	Direction trip distribution is consistent with local case study data that shows a circa 70/30 trip bias in the peak direction.
How does the existing traffic bias relate to the future traffic distribution? If the access points are altering across the precinct traffic flow is likely to change. For example, Forster Road access points will provide quicker access to the freeway interchange as opposed to using Gilby Road. This needs to be considered in the masterplan to ensure sound future proof and planning of the transport network in the precinct. Moreover, the distributed traffic does not add up to the total traffic generated	The Masterplan is not part of this application. The specifics attributable to land use and development intensity are yet to be confirmed. Importantly, we observe that the overall site has extensive frontage for Ferntree Gully Road and Gilby Road, which can and shall continue to be leverage for access. These opportunities for access via alternative roads provides ample future proofing for the site. A detailed analysis of the Masterplan impacts on the road network will be undertaken at the appropriate time.
The 8 second gap time in Table 17 refers to a 6-lane road? The cross section of Forster Road is only 4 lanes. This needs clarification, particularly in the context of heavy vehicle movements. The table also refers to an 8 second headway in the notes but only shows a 3 second headway?	Right turn movements out of the heavy vehicle access will be prohibited.
The Critical Gap Absorption Capacity analysis only considers the development traffic and not the other traffic from the Axxess Corporate Park that also may use these proposed access points? Presumably Figures 12 and 13 relate to expected traffic generated from new warehouses only?	Existing uses within the Axxess Corporate Park that are conveniently accessed via Forster Road will be displaced to make way for the proposed development. We however highlight that Figure 12 and 13 relate to the anticipated volumes which have been derived using a formula that has overestimated the development volumes by a factor of X2. To this end, volumes used for analysis have a factor of contingency to allow for modest volume increases

37° 49' 6" S 144° 57' 42" E

	from the balance of the Axxess Corporate Park.
The TIAR has not undertaken any SIDRA analysis to show what delay times may be experienced at the Forster Road access points. The only SIDRA analysis is for the roundabout of Gilby/Lionel.	SIDRA analysis has been completed for the Forster Road Access points.
It is unclear where the sight line has been measured in terms of offsets from the give way line and as to whether they comply with the requirements of the VicRoads Supplement to AustRoads Guide to Road Design Part 4A. In addition, the sightlines for the commuter car park access to southbound traffic seems a little constrained and needs further clarification.	The image on the top of the page presents a measure of the site lines as taken in accordance with AS2890.1:2004 and AS2890.2:2018 The image at the bottom of the page provides a corresponding plan view of where the vehicles will be on the road alignment. Views to the south from the car park access are comfortably achieved.
The ramp down for the exit from the site at the commercial vehicle access is quite close to Forster Rd and may be blocked by other vehicles waiting. The swept paths show a 12.5m vehicle making this left turn sweep. Is 12.5m the largest vehicle expected to come down this ramp, as a swept path for a larger vehicle has not been shown.	Swept Path provided for the ramp down showing the satisfactory movement of a Semi Trailer. The heavy vehicle access will carry a most level of traffic with outbound movements restricted to left turn out only. SIDRA analysis calculates queues as being in the order of 3 meters. Therefore the probability of truck traveling down the ramp and having the access obscured by a waiting vehicle is expected to be low. If and when that occurs, the truck on the ramp would be able to wait momentarily, approximately 10 seconds based on the SIDRA calculations. This outcome is not unreasonable.

KIND REGARDS,

John-Paul Maina
Director
M: 0423 419 900
E: jp@impactaustralia.com.au

Enclosed: Traffic Impact Assessment Report - Dated 19th May 2023