

37°40'30"S
144°52'12"E

Industrial Subdivision: 140-204 Western Avenue, Westmeadows



Traffic and Transport Assessment

19 August 2022
Prepared for MAB Corporation

IMP2207028REP01F01.docx

Impact

Company Information

Impact Traffic Engineering Pty Ltd

Level 17, 31 Queen Street, Melbourne, Victoria, 3000
ABN: 78 611 424 107

Email create@impactaustralia.com.au

Website www.impactaustralia.com.au

Document Information

Client	MAB Corporation
Report Title	Industrial Subdivision: 140-204 Western Avenue, Westmeadows
Report Reference	IMP2207028REP01F01.docx
Date of Issue	19 August 2022
Approved By	John-Paul Maina

This work is exclusively owned by IMPACT Traffic Engineering Pty Ltd and cannot be reproduced, published, stored, copied, adapted, distributed or transmitted either wholly or in part, in any form or by any means whatsoever (graphic, electronic, mechanical, photocopying, recording or otherwise) without the prior written permission of IMPACT Traffic Engineering Pty Ltd.

© IMPACT Traffic Engineering Pty Ltd 2022. All Rights Reserved.

Document Control

Version	Date	Author
FINAL	19 August 2022	Jake Townley

Contents

1	IMPACT® SNAP SHOT	6
2	INTRODUCTION	9
2.1	Engagement	9
2.2	Site History / Previous Development Proposals	9
2.2.1	2015 Development Scenario (C160 Amendment)	9
2.2.2	2021 Development Scenario (C250 Amendment)	10
3	EXISTING CONDITIONS	11
3.1	Location	11
3.2	Road Network	11
3.2.1	Western Avenue	11
3.2.2	Wright Street	13
3.2.3	Victoria Street	13
3.3	Public Transport	14
3.3.1	Active Transport	15
3.4	Existing Traffic Conditions	16
3.4.1	Peak Hour Traffic Volumes: Intersection Counts	17
3.4.2	Intersection Capacity	17
3.5	Road Safety Statistics	20
4	DEVELOPMENT PROPOSITION	22
4.1	Proposed Development	22
4.2	Access Arrangements	22
4.3	Car Parking Arrangements	23
4.4	Intersection Upgrades / Traffic Mitigation Works	23
4.4.1	Western Avenue Upgrades	23
4.4.2	Mickleham Road / Western Avenue Intersection	23
4.4.3	Mickleham Road / Broadmeadows Road Roundabout	23
5	TRAFFIC CONSIDERATIONS	24
5.1	Traffic Generation	24
5.1.1	General	24
5.1.2	2015 Development Scheme (C160 Amendment)	24
5.1.3	2021 Development Scheme (C250 Amendment)	24
5.1.4	2022 Development Scheme	24
5.1.5	Total Traffic Generation	26
5.1.6	Comparisons with Previous Proposals	26
5.2	Traffic Distribution	27

5.2.1	Mickleham Road / Western Avenue	27
5.2.2	Mickleham Road / Broadmeadows Road.....	27
5.2.3	Site Generated Traffic.....	28
5.2.4	Post Development Traffic Volumes.....	29
5.3	Traffic Impacts - Post Development.....	29
5.3.1	Assessment Framework.....	29
5.3.2	Western Avenue / Mickleham Road	31
5.3.3	Mickleham Road / Broadmeadows Road.....	32
5.4	Conclusion - Traffic Impacts	34
6	DESIGN CONSIDERATIONS - SUBDIVISION LAYOUT.....	35

Tables

Table 1	Public Transport Summary.....	14
Table 2	Mickleham Road / Western Avenue Intersection - Existing Layout.....	18
Table 3	SIDRA Summary - Existing Conditions: Mickleham Road/ Western Avenue	19
Table 4	Mickleham Rd / Broadmeadows Rd Roundabout - Existing Layout	19
Table 5	SIDRA Summary - Existing Conditions: Mickleham Road/ Broadmeadows Rd	20
Table 6	Summary of Road Crash Statistics	20
Table 7	Traffic Generation Comparison	26
Table 8	Mickleham Road / Western Avenue Intersection - Post Development Layout	31
Table 9	SIDRA Summary - Existing Conditions vs Post Development.....	32
Table 10	Mickleham Rd / Broadmeadows Rd Roundabout - Post Development Layout	33
Table 11	SIDRA Summary - Existing Conditions vs Post Development.....	33

Figures

Figure 1	Location of Subject Site.....	11
Figure 2	Western Avenue carriageway, facing east past Wright Street.....	12
Figure 3	Western Avenue carriageway, facing west of Wright Street	12
Figure 4	Views of Wright Street facing north adjacent the subject site	13
Figure 5	Public Transport Map	14
Figure 6	City of Hume Active Transport Network.....	15
Figure 7	Traffic Survey Locations	16
Figure 8	Peak Hour Volume Comparison - May 2019, May 2021 & May 2022	16
Figure 9	Existing Peak Hour Traffic Volumes - Thursday 30 th May 2019	17
Figure 10	Proposed Subdivision Concept Plan	22

Figure 11	Anticipated Site Generated Traffic Volumes.....	28
Figure 12	Post Development Traffic Volumes	29

Appendices

APPENDIX A	SIDRA RESULTS
APPENDIX B	Concept Functional Plans - Western Avenue Upgrades
APPENDIX C	Concept Functional Plans - Mickleham Road / Western Avenue
APPENDIX D	Concept Functional Plans - Mickleham Road / Broadmeadows Road Roundabout
APPENDIX E	VicRoads Submission - 2013
APPENDIX F	Department of Transport Submission - 2021

1 IMPACT® Snap Shot

Development Proposition

Location	37° 40' 30" S 144° 52' 12" E	140-204 Western Avenue, Westmeadows
Use	Industrial	
Yield	21.33 Ha industrial subdivision	

Traffic Considerations

History

Four separate proposals have included the Western Avenue land (2009, 2010, 2013 and 2015) for subdivision and use for industrial purposes.

The first two applications were rejected on the grounds of further traffic assessment (and other issues) being needed.

The latter two proposals (known as Amendments C160 and C202) established a need for and resulted in support from Department of Transport (formally VicRoads) and Council for several road upgrades to address traffic matters post development, including:

- Mickleham Road / Western Avenue / Rylandes Drive Intersection
 - Additional right turn lane required for the western approach
 - New left-turn / slip lane for the eastern approach
 - Mickleham Road / Broadmeadows Road Roundabout
 - A new separate right-turn lane for the south approach
 - Existing right-through lane to be converted to through only
 - Mickleham Road / Tullamarine Freeway Interchange
 - Upgrade / provision of two left exit lanes for southbound traffic onto the Tullamarine Freeway
 - The conversion of an existing through lane above Gladstone Park Drive to become 'exit only' left turn lane.
- Note:** The above two upgrades have since been constructed
- Western Avenue
 - Provision of right turn lanes at Global Drive and Wright Street
 - Provision of roundabout at Hillcrest Drive
 - The construction / continuation of Western Avenue (west of Wright Street) through to Victoria Street road reservation.

MAB have since purchased the land at 140-204 Western Avenue and in a 2021 proposal sought an amendment of the Planning Scheme zones to develop the land for industrial and residential uses, including land at 47-99 Wright Street, Westmeadows.

As part of this process, **IMPACT®** and MAB consulted with the City of Hume and Department of Transport (formally VicRoads). Both authorities requested and subsequently accepted the findings of an updated traffic impact assessment detailing the effects of the proposal on external intersections, specifically: Western Avenue / Mickleham Road signalised intersection & Mickleham Road / Broadmeadows Road roundabout.

Traffic Assessment	
Assessment Framework	<p>In preparing this assessment we have had regard to the VicRoads Guidelines for Transport Impact Assessment Reports (TIAR) - For Major Land Use and Development Proposals (2006).</p> <p>The VicRoads Guidelines are intended to:</p> <ul style="list-style-type: none"> — Provide transparency and certainty in the assessment of land use development proposals and analysis to be undertaken by a road authority; — Promote uniformity, and ensure fairness, in the consideration of larger land use development proposals by a road authority; and — Facilitate early resolution of transport and access issues through the provision of timely and quality reports that reduce (but not necessarily eliminate) the need for discussion and negotiation between road authorities and developers, or their representatives, and reduce administration and rework. <p>The VicRoads Guideline effectively requires the proponent of change to ameliorate the impact of traffic generated by the proposed development by introducing interventions as required to ensure that the road network post development operates at conditions relatively similar to existing conditions in respect to both capacity and safety.</p>
Development Traffic	
	<p>Post development, the subject land (once developed) is projected to generate an additional 418 vehicle movements.</p> <p>This volume is 291 fewer vehicle movements when compared to the 2015 proposal as part of the C160 amendment (for which VicRoads and Council had provided support for in terms of required traffic mitigation measures) and 104 less trips when compared with the 2021 proposal as part of the C250 amendment (for which Department of Transport and Council had provided support for in terms of required traffic mitigation measures).</p>
Intersection Performance	Post Development
Western Avenue / Mickleham Road	<p>Mitigation works at the Mickleham Road / Western Avenue / Rylandes Drive Intersection comprises:</p> <ul style="list-style-type: none"> — Additional right turn lane on the western approach (Western Avenue) — New left-turn / slip lane for the eastern approach (Rylandes Drive) — Additional right turn lane on the eastern approach (Rylandes Drive) <p>SIDRA analysis indicates that this intersection currently operates with a Degree of Saturation (D.O.S) up to 0.90 during the PM peak period.</p> <p>Post development, intersection D.O.S is expected to remain consistent at 0.90 during the PM peak.</p>
Mickleham Road / Broadmeadows Road	<p>Currently operates with a degree of saturation up to 0.94 in the AM peak and 0.9 in the PM peak period.</p> <p>Post development, the degree of saturation is expected to increase marginally to 0.96 in the AM peak period. Conversely, post development in the PM peak period, the roundabout is expected to operate better, with a decrease in the degree of saturation down to 0.84.</p>

Conclusion

The proposed rezoning of the subject site and the subsequent development of the rezoned land for the purpose of industrial use an approximate total yield of 21.33 ha of industrial land area is acceptable.

Specifically, the nearby road network and critical intersections have been analysed and subject to the following infrastructure upgrades, the proposed rezoning will have no adverse impacts to the road network or nearby land uses.

- Mickleham Road / Western Avenue / Rylandes Drive Intersection
 - Additional right turn lane on the western approach (Western Avenue)
 - New left-turn / slip lane for the eastern approach (Rylandes Drive)
 - Additional right turn lane on the eastern approach (Rylandes Drive)
- Mickleham Road / Broadmeadows Road Roundabout
 - A new separate right-turn lane for the south approach
 - Existing right-through lane to be converted to through only
- Western Avenue
 - Provision of right turn lanes at Global Drive and Wright Street
 - Provision of roundabout at Hillcrest Drive
 - The construction / continuation of Western Avenue (west of Wright Street) through to Victoria Street road reservation.

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.

Subject to the above recommendations, we find that there are no traffic engineering reasons that should prevent the proposed rezoning of the subject land.

2 Introduction

2.1 Engagement

IMPACT[®] have been engaged by MAB Corporation to undertake a Traffic and Transport Impact Assessment for the proposed rezoning of the vacant land at 140-204 Western Avenue, Westmeadows.

This report has been prepared to support a Planning Scheme amendment of the rezoning of the subject land to allow the future use and development of the land for industrial use.

Specifically, this report provides a review of the existing conditions of key traffic and road connections, and an assessment of future conditions (with respect to previous proposals for the subject land).

2.2 Site History / Previous Development Proposals

Several applications have previously been made with Council to rezone the subject site.

Of significance to traffic and transport, several mitigation / traffic improvement measures were agreed between the applicant, Council and VicRoads.

2.2.1 2015 Development Scenario (C160 Amendment)

A letter provided by VicRoads (dated 11th October 2013) and addressed to Kelvin Walsh at Hume City Council summarised the mitigation measures that VicRoads consider sufficient to offset the impact of the proposed amendment.

The following set of mitigation measures were agreed to:

- 1) Mickleham Road / Western Avenue / Rylandes Drive Intersection
 - a) Signal upgrades to the Western Avenue / Mickleham Road intersection, including
 - b) New phasing, an additional right turn lane on the western approach and
 - c) a left turn slip lane on the eastern approach (Rylandes Drive);
- 2) Mickleham Road / Broadmeadows Road Roundabout
 - a) Construction of a new right turn lane on the southern approach of the Mickleham Road / Broadmeadows Road roundabout
 - b) The existing right/through lane was to be converted to a through only lane.
- 3) Mickleham Road / Gladstone Park Drive / International Drive On-Ramp to Tullamarine Freeway
 - a) Provision of double left turn lanes from Mickleham Road onto the Tullamarine Freeway and associated pedestrian signal and phasing upgrades as required
 - b) Furthermore, an existing southbound lane north of Gladstone Park Drive to be dedicated to traffic headed to the southbound on-ramp.

Note: Both upgrades at the Mickleham Road / Tullamarine Freeway interchange have since been constructed to improve vehicle circulation at this interchange.

Further to the above, additional roadworks were agreed between the applicant and Council along Western Avenue, including:

- Right turn lanes to be constructed at Global Drive (both east and west intersections);
- Construction of a right turn lane at Wright Street;

- Construction of a roundabout at Hillcrest Drive; and
- The reconstruction of Western Avenue from Wright Street, westwards to the Victoria Street Road Reservation.

A letter provided by VicRoads on the 29th September 2014 confirmed that the previous mitigation measures were still considered appropriate for the proposal contemplated in 2015.

2.2.2 2021 Development Scenario (C250 Amendment)

The 2021 development scenario not only retained the outstanding mitigation measures that were contemplated in the 2015 development scheme but also sought improvements at:

- 1) Mickleham Road / Western Avenue / Rylandes Drive Intersection
 - a) Signal upgrades to the Western Avenue / Mickleham Road intersection, including
 - b) New phasing, an additional right turn lane on the western approach and
 - c) A left turn slip lane on the eastern approach (Rylandes Drive);
 - d) An additional right turn lane on the east approach (Rylandes Drive)

Department of Transport reviewed the assessments and considered the mitigation works sufficient to offset the impact of the proposed development scenario.

3 Existing Conditions

3.1 Location

The subject land 140-204 Western Avenue, Westmeadows, is located to the west of Mickleham Road and straddles both sides of Western Avenue as illustrated in Figure 1.

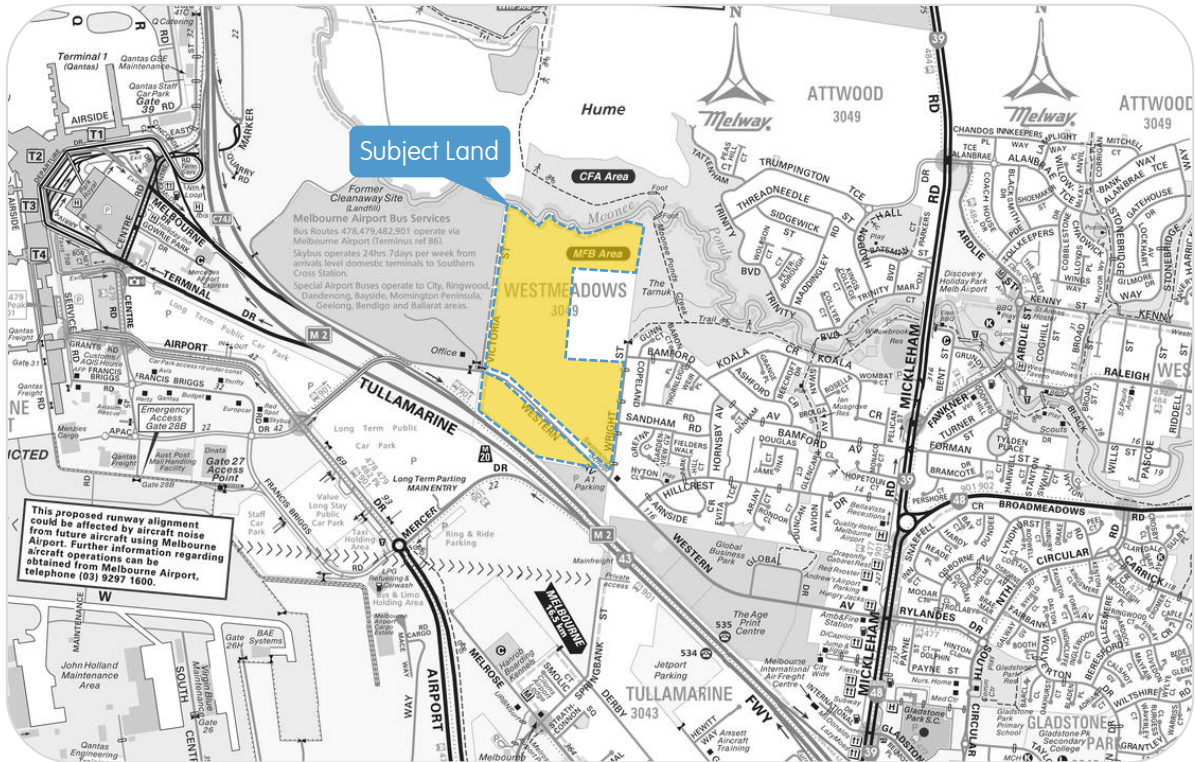


Figure 1 Location of Subject Site

The subject site is located approximately 1 kilometre east of the Melbourne International Airport.

Land uses in the immediate area primarily comprise industrial uses (located either side of Western Avenue to the east of the subject site) and residential uses (north of Western Avenue between the subject site and Mickleham Road).

3.2 Road Network

3.2.1 Western Avenue

Classified as a local connector street, Western Avenue extends in a general westward direction from Mickleham Road for approximately 3 kilometres until it terminates at a private property boundary.

Between Mickleham Road and Wright Street, Western Avenue provides direct access to a number of commercial / industrial uses, as well as an alternative access to Mickleham Road for the residential dwellings to the north.

To the west of Wright Street, Western Avenue functions more akin to a local road, providing access to the subject land and other undeveloped vacant land parcels.

Western Avenue (until Wright Street) is generally contained within an approximate 24 metre road reservation and provides for a single lane of traffic in each direction and kerbside parking lanes (clear of traffic).

A footpath is provided along the northern side of Western Avenue but does not extend all the way through to Wright Street.

To the west of Wright Street, Western Avenue has a central sealed pavement in the order of 6.5 metres wide, with sealed shoulders that appear to be irregularly maintained.

Its typical cross-section to the east of Wright Street is illustrated at Figure 2 and Figure 3.



Figure 2 Western Avenue carriageway, facing east past Wright Street



Figure 3 Western Avenue carriageway, facing west of Wright Street

3.2.2 Wright Street

Classified as a local access street, Wright Street extends north from Western Avenue (along the subject site's eastern boundary) for approximately 450 metres before terminating as a small informal gravel parking area.

Contained within an approximate 20 metre road reservation, Wright Street has been constructed with a 7-metre road pavement and a footpath along the eastern side.

The 7-metre wide road pavement provides for a single lane of traffic in each direction and kerbside parallel parking; where two cars are parked across from one another, Wright Street is reduced to a single lane of traffic.

Local traffic management devices (speed humps) are provided at approximate 100 metre spacings along Wright Street to help mitigate / manage vehicle speeds along this length of road.

Its typical cross-section is illustrated at Figure 4.



Figure 4 Views of Wright Street facing north adjacent the subject site

3.2.3 Victoria Street

Currently unconstructed, Victoria Street is a local access road which is planned to extend north from Western Avenue, along the subject site's western boundary. This ultimate purpose for this road is to provide a local connection for the parcels of land extending along the east and west sides of Victoria Street.

The planned Victoria Street road reservation is approximately 20 metres in width and would allow the street to be developed with similar characteristics as those outlined for Wright Street (see above).

3.3 Public Transport

The subject site has limited direct access to public transport with the most accessible bus stop located at Mickleham Road / Western Avenue intersection, approximately 1,200 metres east of the subject site. Figure 5 shows the subject site in the context of existing public transport routes.

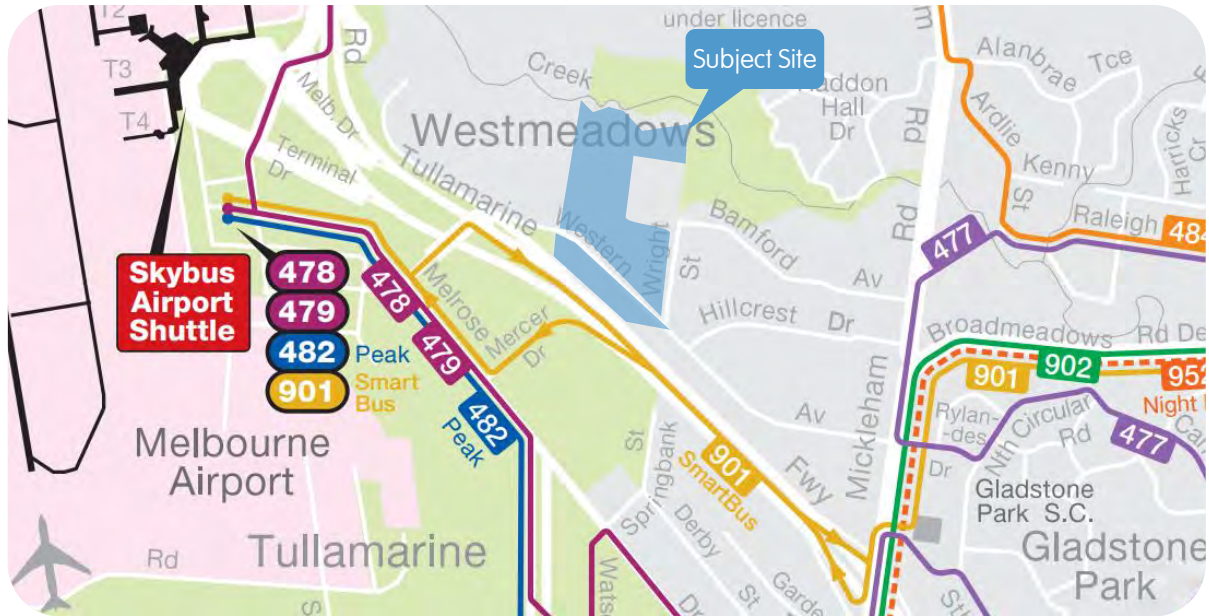


Figure 5 Public Transport Map

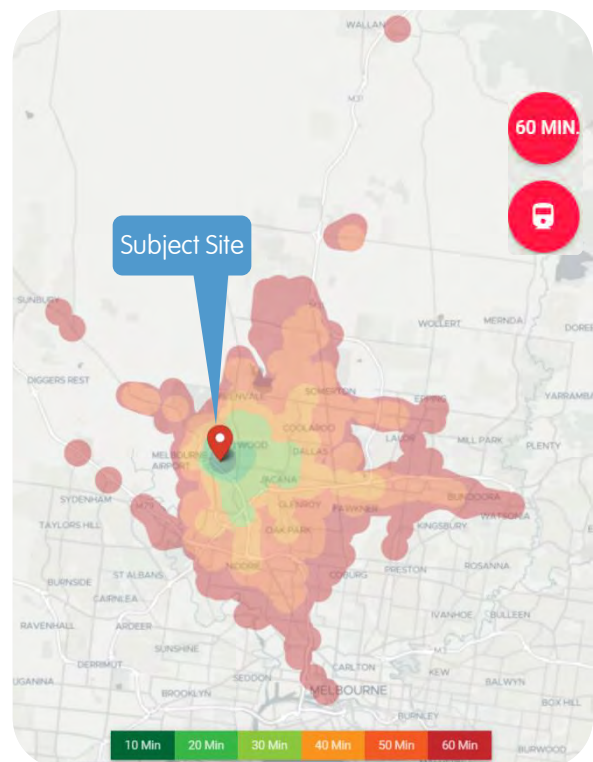
These options are described in Table 1

Table 1 Public Transport Summary

Service	Route	Description
Bus	901	Frankston - Melbourne Airport
	902	Airport West - Chelsea
	959	Broadmeadows Station - City

These services as depicted in the catchment heat map can be leveraged for transport to / from the subject within 60 minutes to the following locations

- North Wallan
- South Melbourne CBD
- West Sunbury
- East Bundoora / Watsonia



3.3.1 Active Transport

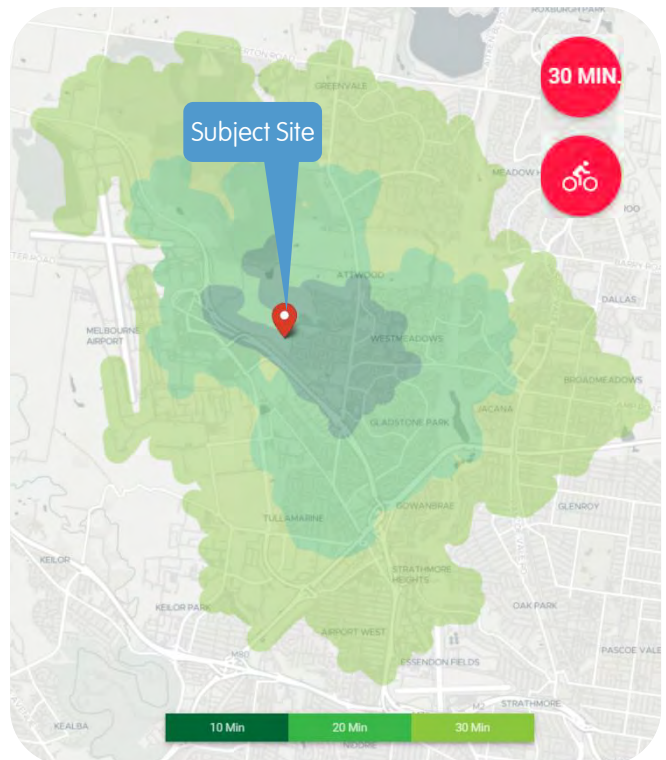
The subject site is well connected to the City of Hume's walking and cycling network. This network comprises on road and off road pathways. The location of the site relative to this active transport network is shown at Figure 6.



Figure 6 City of Hume Active Transport Network

This network as depicted in the catchment heat maps can be leveraged for transport via bicycle to / from the subject within 30 minutes to the following locations

- North Greenvale
- South Airport West
- West Bulla
- East Broadmeadows



3.4 Existing Traffic Conditions

IMPACT® commissioned Matrix Traffic and Transport Data to undertake traffic movement surveys at:

- Mickleham Road / Western Avenue Intersection,
- Mickleham Road / Broadmeadows Road Roundabout

The survey locations are shown at Figure 7.



Figure 7 Traffic Survey Locations

Turning movement counts were undertaken on Thursday 30th May 2019 between 6:00am - 10:00am & 3:00pm - 7:00pm.

To validate the appropriateness of relying on the 2019 data set for analysis, we sourced and reviewed Department of Transport SCATS data from the Mickleham Road / Western Avenue Intersection for comparable periods in 2021 and 2022.

As shown at Figure 8 total volumes at this intersection were higher in 2019 than they were in 2021 and 2022 in both the AM and PM peak periods. The 2019 dataset is therefore suitable for analysis.

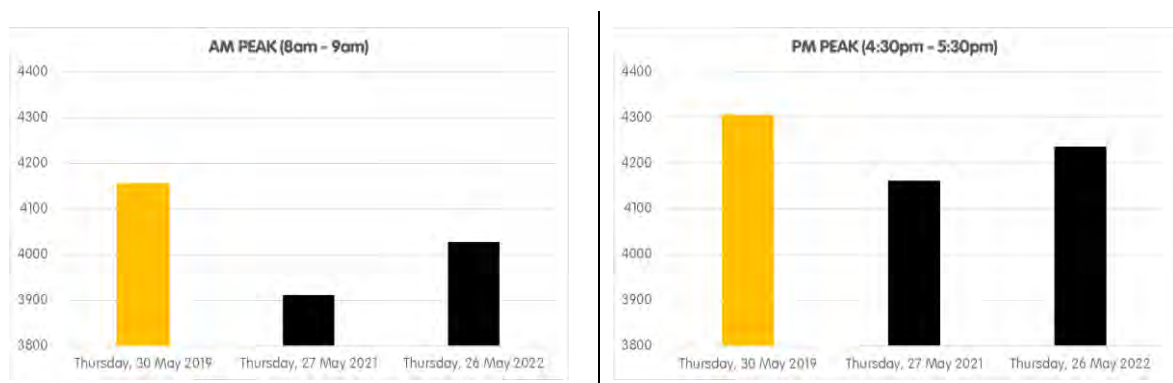


Figure 8 Peak Hour Volume Comparison - May 2019, May 2021 & May 2022

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

A degree of saturation (D.O.S) greater than 1.0 indicates oversaturated conditions. In evaluating intersection performance during capacity analysis and design the target maximum degree of saturation of the critical (maximum) movement is:

- Signalised intersection: 0.9 (desirable) and 0.95 (maximum)
- 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.

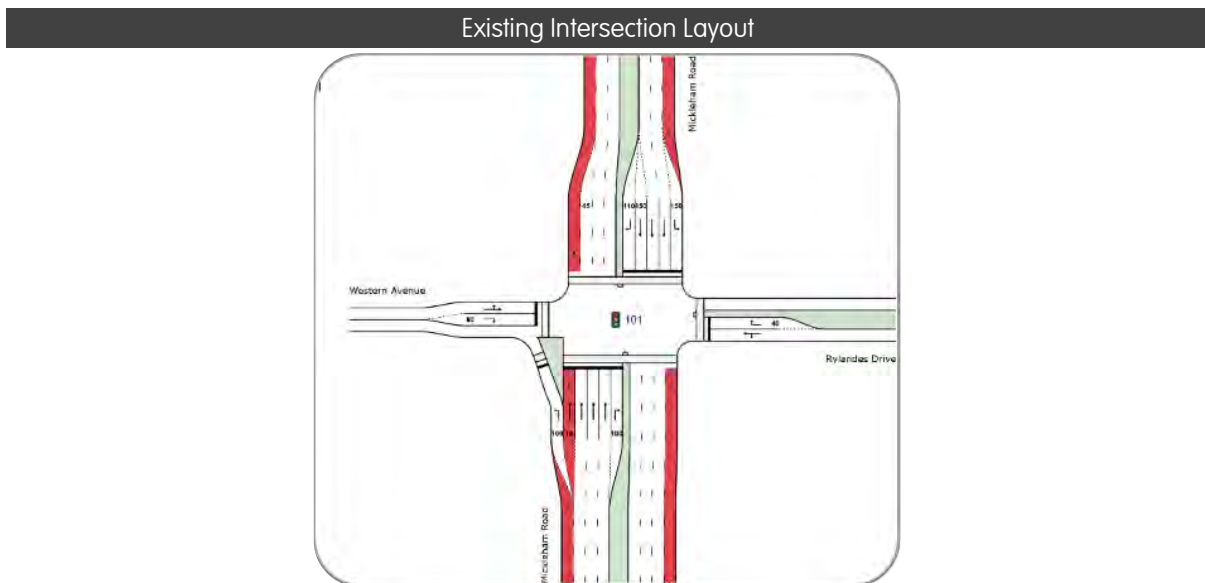
Level of Service (LOS) - Defined as the operational performance of traffic on a given roadway, traffic lane, approach, intersection, route or network, based on measures such as delay, degree of saturation, travel time. This measure provides a quantitative gauge of a performance measure. The scale ranges from A to F, with LOS A representing best operating conditions from a traveller's perspective and LOS F the worst.

The outcomes of the assessment are as follows:

3.4.2.1 Western Avenue / Mickleham Road

The intersection geometry analysed is reflective of the current intersection arrangements based on measurements taken from Nearmap (dated Wednesday 11th September 2019) and illustrated at Table 2.

Table 2 Mickleham Road / Western Avenue Intersection - Existing Layout



Observations from video survey data showed that cycle times for the existing intersection arrangement typically varied between 120 - 140 seconds during both the AM and PM Peak periods.

Accordingly, a cycle time of 130 seconds has been adopted for the existing intersection analysis. Phasing for the existing arrangement has been adopted from the SCATS op's sheets provided by VicRoads.

The results of the existing conditions analysis for the Western Avenue / Mickleham Road intersection are summarised in Table 3.

Table 3 SIDRA Summary - Existing Conditions: Mickleham Road/ Western Avenue

Approach	Degree of Saturation	95 th ile Queue (m)	Average Delay (s)	Level Of Service
AM Peak	South	0.74	89	C
	East	0.82	82	D
	North	0.83	223	C
	West	0.82	89	E
PM Peak	South	0.90	321	D
	East	0.89	156	E
	North	0.69	135	C
	West	0.70	101	D

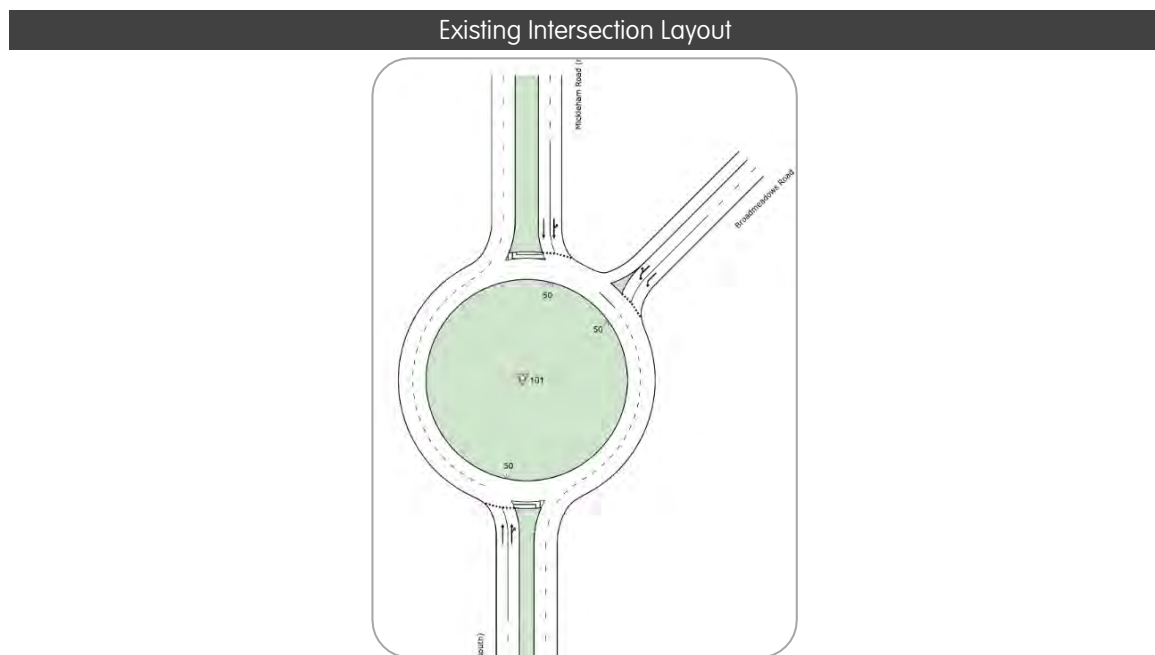
The intersection operates with a degree of saturation of up to 0.83 during the AM peak (Fair Conditions), and 0.90 during the PM peak period (Poor Conditions).

These performance measures provide the base line that will inform consideration of improvements required 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.

3.4.2.2 Mickleham Road / Broadmeadows Road

The intersection layout tested is reflective of the current intersection arrangements based on measurements taken from Nearmap (dated Wednesday 11th September 2019) and illustrated at Table 4.

Table 4 Mickleham Rd / Broadmeadows Rd Roundabout - Existing Layout



The results of the analysis are summarised at Table 5.

Table 5 SIDRA Summary - Existing Conditions: Mickleham Road/ Broadmeadows Rd

Approach	Degree of Saturation	95 th ile Queue (m)	Average Delay (s)	Level of Service
AM Peak	South	0.37	24	A
	North East	0.46	27	C
	North	0.94	218	B
PM Peak	South	0.90	167	B
	North East	0.46	22	B
	North	0.52	38	A

As shown above, the Mickleham Road / Broadmeadows Roundabout is currently operating with a degree of saturation up to 0.94 in the AM peak (Poor Conditions) and 0.9 in the PM peak (Poor Conditions).

Note: The existing roundabout meters the southern and north-eastern legs of the roundabout to ensure buses have sufficient time to enter the roundabout. Due to the intricacies associated with modelling this metering, and the limitations of the SIDRA software, our analysis has not made allowance for bus metering at this intersection.

We expect that intersection performance / capacity will be marginally reduced if metering were allowed for, noting that buses arrive approximately every 6 minutes on average during the peak periods.

These performance measures provide the base line that will inform consideration of improvements required 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.

3.5 Road Safety Statistics

Review of Department of Transport Crash Statistics Database in the period between 2021 - 2015 reveals that along Mickleham Road, in the section between Bamford Road to the north and Western Avenue to the South, that there have been a number of crashes recorded.

The location of the recorded crashes are illustrated in the figure below, whilst the details of these crashes are summarised at Table 6 overleaf.

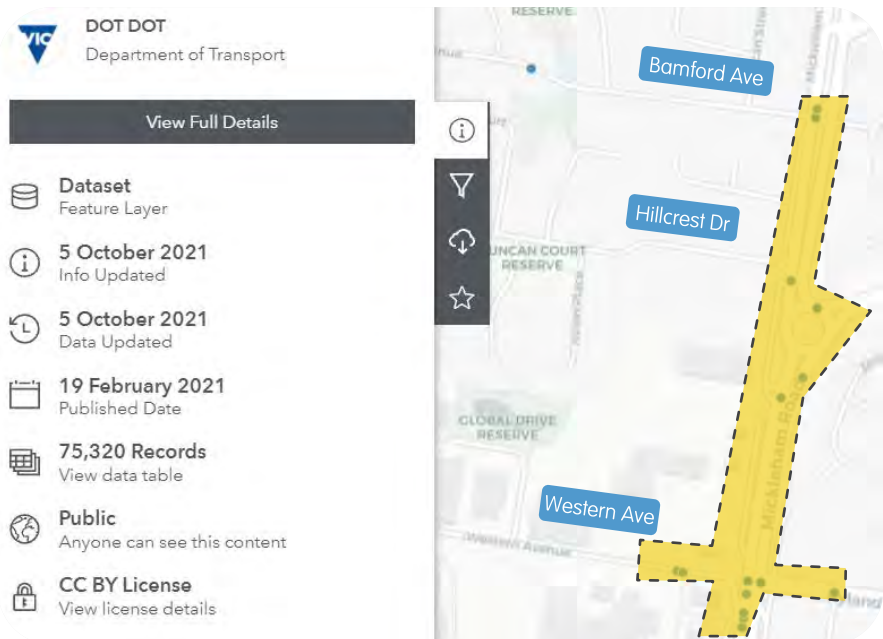


Table 6 Summary of Road Crash Statistics

No	Location	Date	Time	Severity	DCA Code	Description of Accident	
Mickleham Road / Bamford Avenue							
1	Not at Intersection	25/07/2019	18:08	OI	130	Rear end (vehicles in same lane)	
2	At Intersection	07/03/2018	15:50	SI	121	Right Through	
3		12/10/2017	8:36	SI	114	Two Right Turning	
Mickleham Road / Hillcrest Drive							
4	Not at Intersection	27/10/2016	00:12	SI	171	Left off carriageway into object/parked vehicle	
Mickleham Road / Broadmeadows Rd Roundabout							
5	At Intersection	01/02/2017	11:30	OI	116	Left Near (Intersections Only)	
6		04/02/2016	11:50	SI	135	Lane Change Left (Not Overtaking)	
7	Not at Intersection	27/11/2017	10:45	OI	169	Other on Path	
8		2020		OI	130	Rear end (vehicles in same lane)	
Mickleham Road / Western Avenue / Raylandes Drive							
9	At Intersection	21/05/2018	18:00	SI	121	Right Through	
10		22/04/2019	20:50	OI	130	Rear end (vehicles in same lane)	
11		04/08/2018	23:30	OI	130	Rear end (vehicles in same lane)	
12		19/08/2019	10:30	OI	130	Rear end (vehicles in same lane)	
13		23/03/2018	18:10	SI	102	Far side. Ped hit by vehicle from the left	
14		30/09/2016	14:55	OI	121	Right Through	
15		12/12/2019	18:00	OI	116	Left Near (Intersections Only)	
16		07/02/2018	12:30	OI	110	Cross Traffic (Intersections Only)	
17		05/02/2020	17:45	OI	134	Lane Change Right (Not Overtaking)	
18		31/07/2015	9:15	OI	137	Left Turn Sideswipe	
19		08/03/2016	15:55	SI	134	Lane Change Right (Not Overtaking)	
20		Not at Intersection (Mickleham Rd)	17/10/2015	18:45	OI	130	Rear end (vehicles in same lane)
21			09/02/2017	7:00	OI	130	Rear end (vehicles in same lane)
22		Not at Intersection (Western Ave)	04/05/2018	14:34	SI	130	Rear end (vehicles in same lane)
23			26/08/2016	16:05	SI	174	Out of control on carriageway (On Straight)
24		Not at Intersection (Raylandes Dr)	23/10/2015	15:45	SI	121	Right Through
Legend		F = Fatal SI = Serious Injury OI = Other Injury					

A total of 24 crash incident have been recorded in the period between 2021 - 2015.

Mickleham Road is a declared Arterial Road that carries in the order of 37,000 vehicles per day. In this environment, it is typical to expect a higher level of crashes due to a higher level of exposure.

Notwithstanding, the statistics show that most accidents were no serious injury crashes. Importantly, the serious injury crashes (30% of crashes), are varied in location and also type, and therefore do not point to a systematic road safety issue on the road network.

4 Development Proposition

4.1 Proposed Development

The subdivision plan prepared by Land Air Surveys shows the lot mix and is reproduced at Figure 10.

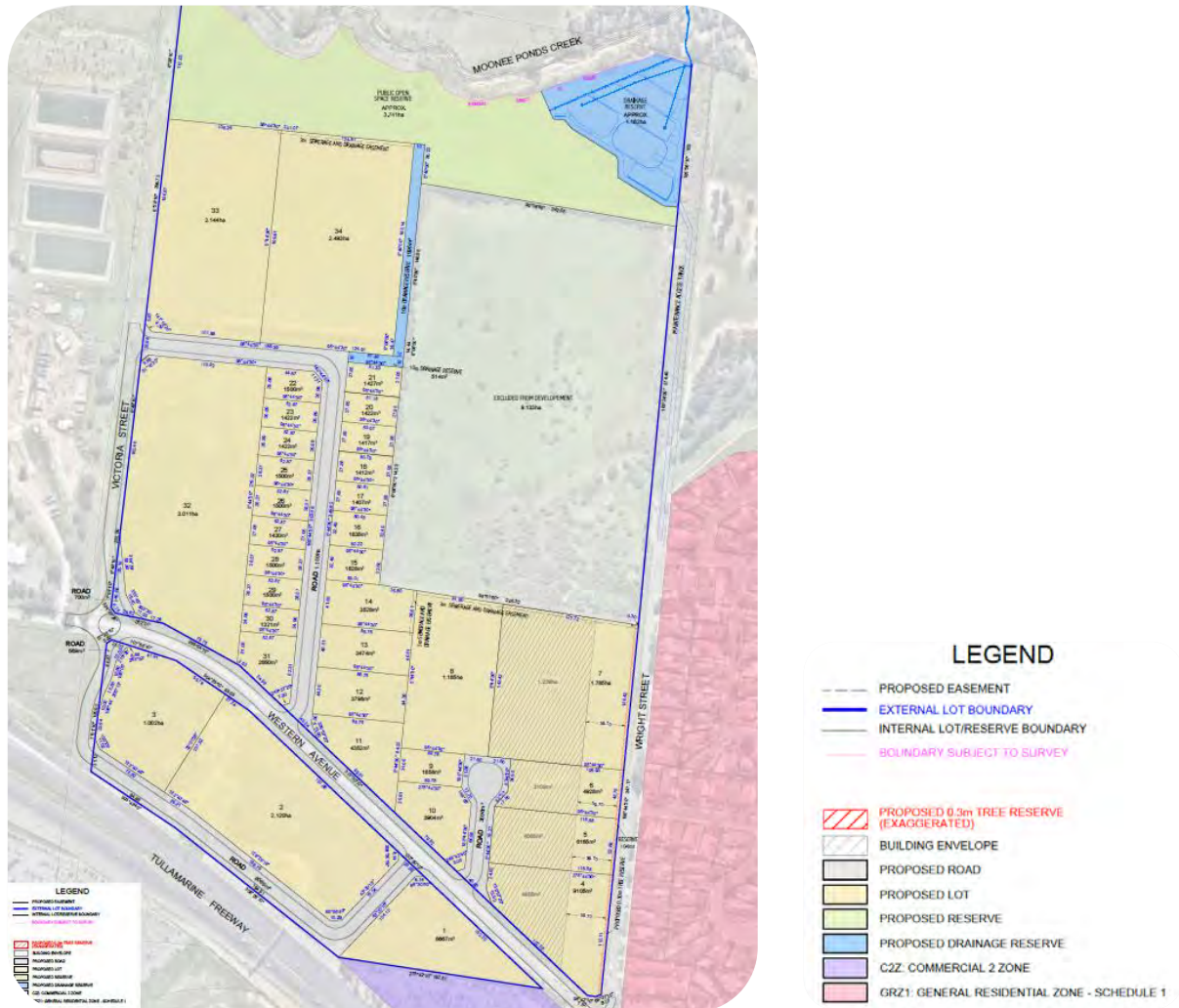


Figure 10 Proposed Subdivision Concept Plan

A total yield of 21.33 Ha is planned. A 40 metre setback will affect land at lots 4, 5, 6, and 7. Allowing for this setback, the developable land area equates to about 20 Ha.

4.2 Access Arrangements

It is proposed to extend / upgrade Western Avenue as a connector level street through to Victoria Street.

Therein, a series of access roads are proposed to connect the industrial lots to Western Avenue.

Each of the access roads is to be contained within a 22-metre road reservation and will be constructed to a standard appropriate for industrial uses, including a wider road pavement and pavement depth.

Roundabouts and court bowls proposed within the industrial area are to be designed to cater to turning requirements for larger vehicles (vehicles up to 26m B-double recommended).

4.3 Car Parking Arrangements

On-site car parking is to be provided for each industrial / warehouse lot.

Parking rates and provision will be assessed and subject to Council requirements at the time of the application.

We expect that on-street parking spaces will also be available along each kerb, clear of crossovers. This on street parking could, as required, be leveraged by warehouse lots subject to Council approval.

4.4 Intersection Upgrades / Traffic Mitigation Works

Consistent with previous proposals, MAB (the applicant) intends to deliver intersection upgrades and road improvements to the external road network to manage the additional traffic movements generated by the subject site. These mitigation works include:

4.4.1 Western Avenue Upgrades

It is proposed to provide a series of intersection upgrades along the length of Western Avenue, consistent with those previously sought by Council in the 2015 development scheme. The mitigation works include:

- Right turn lanes at the intersection of Western Avenue with Global Drive (both east and west);
- Construction of a roundabout at the intersection of Western Avenue and Hillcrest Drive;
- Provision of right turn lane at the intersection of Western Avenue and Wright Street; and
- Construction of a roundabout at the intersection of Western Avenue and Victoria Street

In addition, and as mentioned above, the road pavement for Western Avenue between Wright Street and Victoria Street will be upgraded to a standard suitable for an industrial connector street.

These works are illustrated in the concept plans understood to have been developed by Council provided at Appendix A.

4.4.2 Mickleham Road / Western Avenue Intersection

The previously agreed intersection interventions at the Western Avenue / Mickleham Road signalised intersection are planned.

These upgrades include:

- The provision of an additional right turn lane for vehicles turning right out of Western Avenue;
- The provision of a left turn slip-lane for vehicles travelling south out of Rylandes Drive.
- The provision of an additional right turn lane for vehicles turning right out of Rylandes Drive

These works are shown on **IMPACT**[®] drawing number IMP180119-DG-01 provided at Appendix B.

4.4.3 Mickleham Road / Broadmeadows Road Roundabout

Consistent with the previous development schemes, works at the Mickleham Road / Broadmeadows Road roundabout are planned.

The works as previously agreed will comprise, the provision of an additional lane at the southern approach of the intersection.

The additional lane will be a stand-up right turn lane, with the existing right-through lane converted to a through movement lane only.

These works are illustrated in the concept plan provided at Appendix C.

5 Traffic Considerations

5.1 Traffic Generation

5.1.1 General

Warehouse / industrial uses generate their peak traffic during the early periods of the AM and PM commuter peak periods, i.e. between 6:00am and 8:00am and between 3:00pm and 5:00pm.

The RTA (NSW) Guide to Traffic Engineering Developments lists the daily and peak hour traffic generation rates for industrial developments. The Guide identifies traffic generation as 5 daily trips per 100 square metres gross floor area (GFA) or between 0.8 - 1 trips per 100 square metres GFA in the peak hour.

5.1.2 2015 Development Scheme (C160 Amendment)

The 2015 development proposition contemplated.

- Western Avenue Land: 22.45 hectares of net developable land for Industrial / ancillary office use;
- Wright Street Land: 7.5 hectares of net developable land for industrial / ancillary office use.

The assessment projected that:

- Net building floor area would account for 55% of the developable area, which equated to approximately 164,700 sq.m of industrial / ancillary office for the two parcels of land; and
- These two parcels combined were projected to generate 599 vehicle trips during the peak periods (equivalent to 0.36 trips per 100 sq.m of developable area).

The findings of this assessment were supported by VicRoads, including the mitigation works that resulted from the assessment. Refer Appendix D for copy of VicRoads Submission Letter.

5.1.3 2021 Development Scheme (C250 Amendment)

The 2021 development proposition contemplated a mixed use subdivision, industrial and residential as follows.

- Industrial Land: 15.7 hectares of net developable land;
- Residential: 10.22 hectares of net developable land.

This development scenario was forecast to generate 522 vehicle trips during the peak periods (equivalent to 0.38 trips per 100 sq.m of industrial + 0.86 trips per dwelling). Assessments completed by **IMPACT**[®] were reviewed by Council and Department of Transport, and conclusions found acceptable.

Note: Department of Transport's submission (provided at Appendix F) foreshadowed a need for additional detail to be included in the technical assessment. This detail was subsequently provided to DoT (and is included in this technical report) and agreement reached with Department of Transport.

5.1.4 2022 Development Scheme

Consistent with the 2021 development scheme, assessment of traffic impacts has been undertaken based on the following parameters:

- Net Building Floor Area 55% of developable land
- Traffic Generation Rate 0.38 trips per 100 sq.m.

These rates when applied to the 20 ha industrial land, and reveal a forecast of 418 peak hour trips during the AM and PM peak hours, with distributions summarised as follows:

- AM Peak Period
 - 334 inbound vehicles;
 - 84 outbound vehicles;
- PM Peak Period
 - 84 inbound vehicles;
 - 334 outbound vehicles.

Note:

Industrial / warehouse traffic peaks earlier in the day as compared to the typical commuter peak period. During the commuter peak periods, traffic generated by these uses is generally lower than the rate outlined above.

To validate the rates adopted in this report **IMPACT**[®] undertook case studies at three industrial estates relying on 2019 data.

These estates were accessed via a single signalised intersection as their sole access to / from the external road network. Data was collected for the year 2019 (365 days), and the 30th busiest day of the year (design day) selected. The studies revealed the following rates.

~11.49 Ha Industrial	Distribution Drive (Truganina)	Palmer Road/ Distribution Drive
Peak Hour Volumes (Midday)	155 trips	= 13.49 trips / Ha
Commuter AM Peak Hour Volumes	72 trips	= 6.27 trips / Ha
Commuter PM Peak Hour Volumes	36 trips	= 3.13 trips / Ha

This site is occupied by large format warehouses. In 2019, two of the four warehouses, were occupied by Toll Logistics.

~38.24 Ha Industrial	Drake Blvd (Altona)	Kororoit Creek Road/ Drake Blvd
Peak Hour Volumes (Midday)	365 trips	= 9.54 trips / Ha
Commuter AM Peak Hour Volumes	318 trips	= 8.32 trips / Ha
Commuter PM Peak Hour Volumes	335 trips	= 8.76 trips / Ha

This site is occupied predominantly by large format warehouses, with a small proportion of small format warehouses also provided.

~15.75 Ha Industrial	Grassland Ave (Craigieburn)	Hume Hwy / Grassland Ave
Peak Hour Volumes (Midday)	431 trips	= 27.36 trips / Ha
Commuter AM Peak Hour Volumes	350 trips	= 22.22 trips / Ha
Commuter PM Peak Hour Volumes	322 trips	= 20.44 trips / Ha

This site is occupied predominantly by small and medium format warehouses, with a small proportion of large format warehouses.

~18.32 Ha Industrial	Southlink (Dandenong South)	South Gippsland Highway / South Link
Peak Hour Volumes (Midday)	415 trips	= 22.65 trips / Ha
Commuter AM Peak Hour Volumes	350 trips	= 21.06 trips / Ha
Commuter PM Peak Hour Volumes	316 trips	= 17.25 trips / Ha

This site is occupied predominantly by small and medium format warehouses, with a small proportion of large format warehouses.

The analysis contained within this report forecasts a peak hour volume of 418 trips. This equates to a rate of 20.89 trips per Ha for both the AM and PM peak periods. This rate is higher than the rate observed at large format industrial estates and is comparable to the rate observed at small and medium format industrial estates.

The difference in volumes between the adopted rate and the highest observed peak rate translates in absolute terms to be up to 26 trips during the AM peak period. This additional quantum of traffic would have no material difference to the conclusions reached within this report.

5.1.5 Total Traffic Generation

Based on the foregoing, the subject land is anticipated to generate the following total peak hour vehicle movements:

- AM Peak Period: 418 trips
 - 334 inbound vehicle movements; and
 - 84 outbound vehicle movements.
- PM Peak Period: 418 trips
 - 84 inbound vehicle movements; and
 - 334 outbound vehicle movements.

5.1.6 Comparisons with Previous Proposals

Table 7 provides a comparison of anticipated volumes for the previous schemes vs the current scheme.

Table 7 Traffic Generation Comparison

	2015 Proposal	2021 Proposal	2022 Proposal
AM PEAK			
Inbound	567 (80%)*	301 (57%)	334 (80%)
Outbound	142 (20%)*	221 (43%)	84 (20%)
Total	709*	522	418
PM PEAK			
Inbound	142 (20%)*	182 (35%)	84 (20%)
Outbound	567 (80%)*	340 (65%)	334 (80%)
Total	709*	522	418

* Volumes adopted in O'Brien's analysis to inform road network mitigation works.

The proposed scheme is expected to generate 291 fewer vehicle movements when compared to the 2015 proposal and 104 less trips when compared with the 2021 proposal. This is due to a number of factors namely:

- Adoption of higher than realistic traffic generation rates in the 2015 Scheme informed the mitigation works¹
- Less development intensity and area in the 2022 scheme as compared to the 2021 scheme

¹ This report was peer reviewed and rates refined to reflect more realistic traffic generation rates. The scope of the mitigation works was however not revisited to account for the lower traffic generation profile.

5.2 Traffic Distribution

For the purposes of this assessment, **IMPACT**[®] has reviewed the existing vehicle movements and travel patterns at each of the following intersections:

- Mickleham Road / Western Avenue Intersection; and
- Mickleham Road / Broadmeadows Drive Roundabout.

The existing travel patterns for each of these intersections are outlined as follows.

5.2.1 Mickleham Road / Western Avenue

The vehicle turning movement counts revealed the following distribution patterns:

AM Peak		
— Western Avenue Westbound Movements		
○ Mickleham Road North		17%
○ Mickleham Road South		67%
○ Rylandes Drive		16%
— Western Avenue Eastbound Movements		
○ Mickleham Road North		6%
○ Mickleham Road South		69%
○ Rylandes Drive		26%
PM Peak		
— Western Avenue Westbound Movements		
○ Mickleham Road North		8%
○ Mickleham Road South		62%
○ Rylandes Drive		30%
— Western Avenue Eastbound Movements		
○ Mickleham Road North		26%
○ Mickleham Road South		57%
○ Rylandes Drive		17%

5.2.2 Mickleham Road / Broadmeadows Road

The vehicle turning movement counts revealed the following distribution patterns:

AM Peak		
— Mickleham Road Southbound		
○ Mickleham Road North		96%
○ Broadmeadows Road North East		4%
— Mickleham Road Northbound		
○ Mickleham Road North		82%
○ Broadmeadows Road North East		18%

PM Peak

- Mickleham Road Southbound
 - Mickleham Road North 80%
 - Broadmeadows Road North East 20%
- Mickleham Road Northbound
 - Mickleham Road North 90%
 - Broadmeadows Road North East 10%

5.2.3 Site Generated Traffic

The forecast development peak hour vehicle movements at each intersection are outlined at Figure 11.

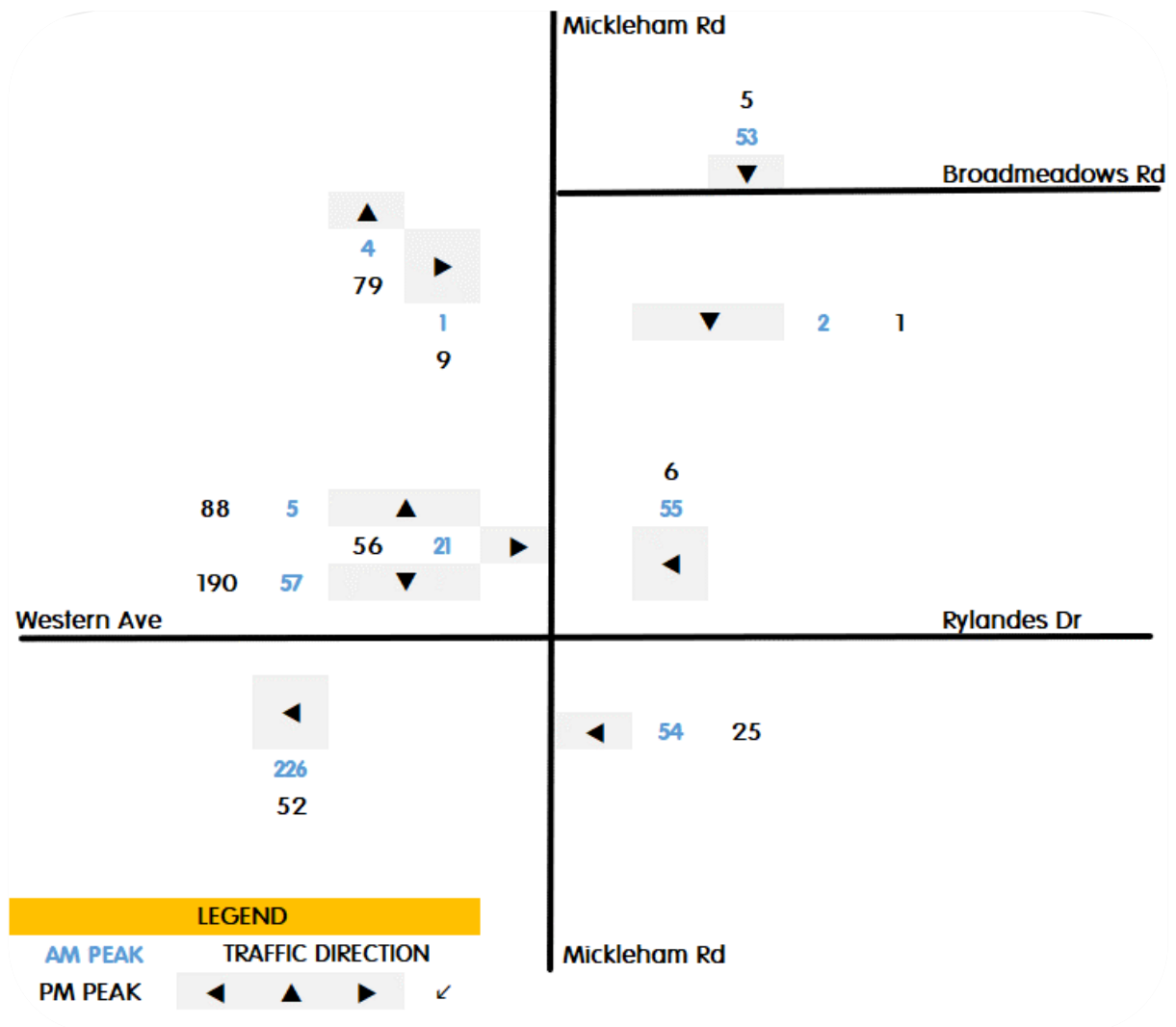


Figure 11 Anticipated Site Generated Traffic Volumes



5.2.4 Post Development Traffic Volumes

Figure 12 shows the projected post development vehicle movements at the critical intersections.

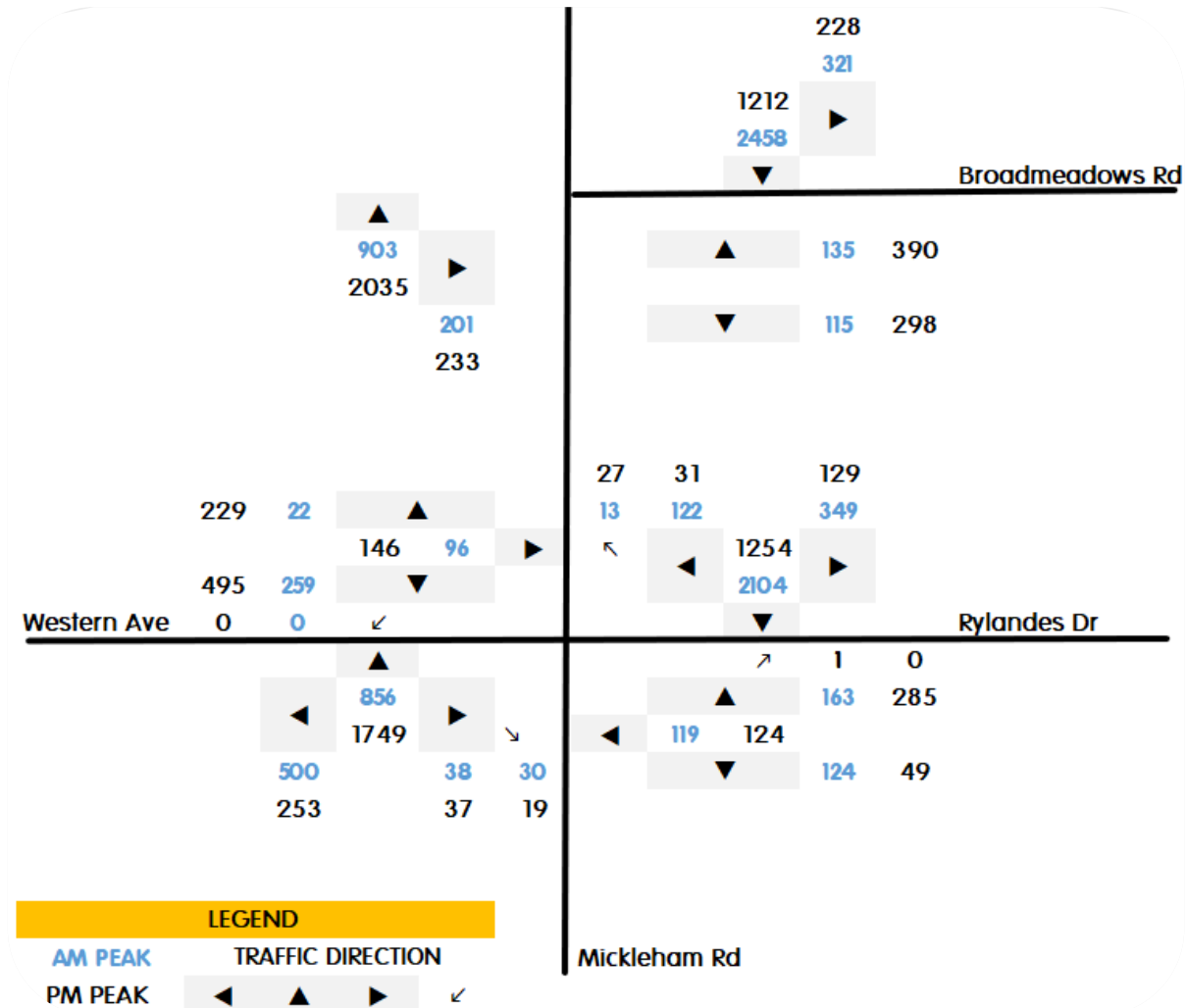


Figure 12 Post Development Traffic Volumes

5.3 Traffic Impacts - Post Development

5.3.1 Assessment Framework

In preparing this assessment I have had regard to the VicRoads Guidelines for Transport Impact Assessment Reports (TIAR) - For Major Land Use and Development Proposals (2006).

The VicRoads Guidelines are intended to:

- Provide transparency and certainty in the assessment of land use development proposals and analysis to be undertaken by a road authority;
- Promote uniformity, and ensure fairness, in the consideration of larger land use development proposals by a road authority; and
- Facilitate early resolution of transport and access issues through the provision of timely and quality reports that reduce (but not necessarily eliminate) the need for discussion and negotiation between road authorities and developers, or their representatives, and reduce administration and rework.

In Section 5.1 (Performance Objectives of a TIAR), the VicRoads Guidelines 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).

The VicRoads Guideline effectively requires the proponent of change to ameliorate the impact of traffic generated by the proposed development by introducing interventions as required to ensure that the road network post development operates at conditions relatively similar to existing conditions in respect to both capacity and safety, and at the site access point, ensure satisfactory operation in safety and capacity over a design horizon of 10 years post development.

5.3.2 Western Avenue / Mickleham Road

5.3.2.1 Intersection Layout

As discussed in Section 2.2, the assessment prepared in support of the previous applications concluded that mitigation measures would be required on the external road network following the development of the subject land. These mitigation measures were subsequently peer reviewed and approved by Council and VicRoads.

The current application intends to provide not only the agreed mitigation measurements / intersection upgrades as part of the proposed development, but also contemplates an **additional right turn lane** on the Rylandes Drive approach

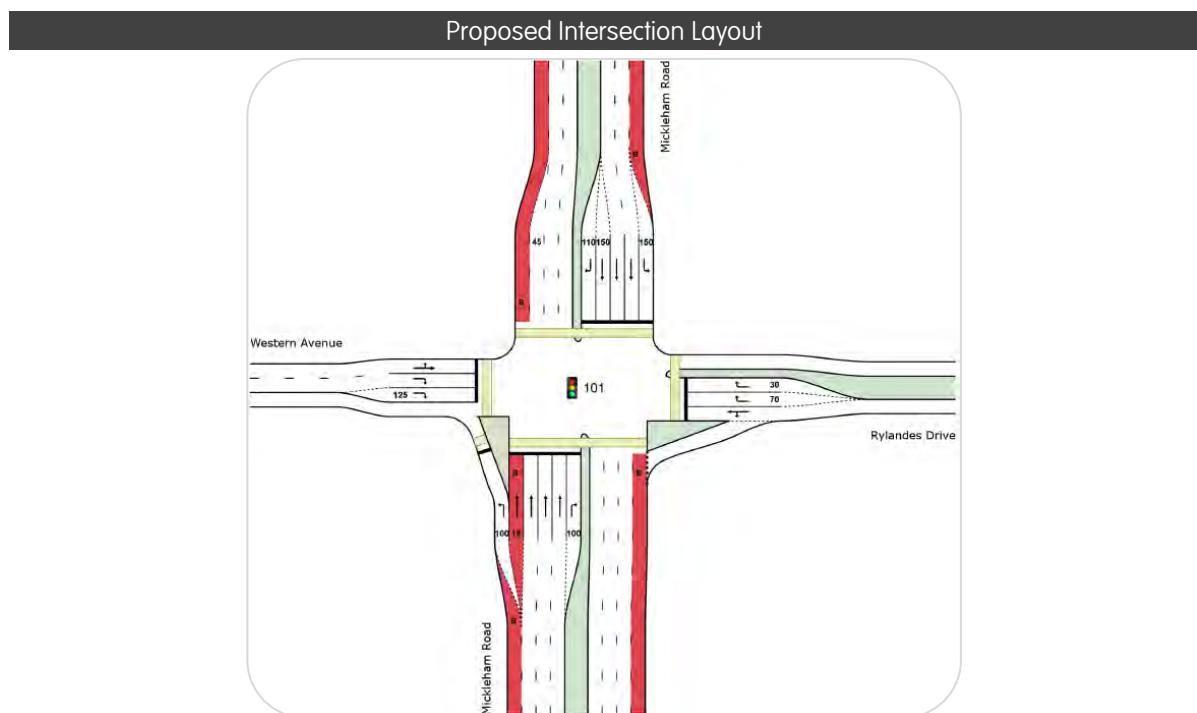
Accordingly, the intersection geometry adopted for the post development scenario assumes that the mitigation measures have been implemented.

The relevant mitigation measures applicable at this intersection are:

- Widening of Western Avenue to provide an additional short right turn lane; and
- The provision of a left-turn slip lane for vehicles exiting from Rylandes Drive.
- Additional right turn lane on Rylandes Drive

The intersection geometry adopted for post development conditions has been reproduced in Table 8 also shown attached as Appendix B.

Table 8 Mickleham Road / Western Avenue Intersection - Post Development Layout



Observations from video survey data showed that cycle times for the existing intersection arrangement typically varied between 120 - 140 seconds during both the AM and PM Peak periods.

Accordingly, a cycle time of 130 seconds has been adopted for the existing intersection analysis. Phasing for the existing arrangement has been adopted from the SCATS op's sheets provided by VicRoads.

Both phasing and timing in the future scenario have been optimised to minimise the impacts on the road network.

The results of the existing conditions analysis for the Western Avenue / Mickleham Road intersection are summarised in Table 9.

Table 9 SIDRA Summary - Existing Conditions vs Post Development

Approach		Degree of Saturation		95 th ile Queue (m)		Average Delay (s)		Level of Service	
		Existing	Post	Existing	Post	Existing	Post	Existing	Post
AM Peak	South	0.74	0.80	89	107	29	33	C	C
	East	0.82	0.85	82	123	54	67	D	E
	North	0.83	0.85	223	313	22	33	C	C
	West	0.82	0.59	89	66	56	67	E	E
Intersection		0.83	0.85	223	313	29	39	C	D
PM Peak	South	0.90	0.89	321	329	52	50	D	D
	East	0.89	0.79	156	84	56	70	E	E
	North	0.69	0.68	135	178	28	40	C	D
	West	0.70	0.76	101	181	36	52	D	D
Intersection		0.90	0.89	321	329	42	49	D	D

Note: Phase times have been adjusted to optimise Degree of Saturation where possible.

Based on the above, the intersection is expected to operate with a degree of saturation of less than 0.9 during the AM peak and PM peak period.

These intersection conditions are no worse than existing conditions.

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

5.3.3 Mickleham Road / Broadmeadows Road

VicRoads 'Access Management Policies' Section 5.7 requires that consideration should be given to assessing road network operational efficiency at intersections where traffic movements are increased by an amount of 10% or more as a result of the traffic generated by the proposed development.

At the Mickleham Road / Broadmeadows Road intersection, we note that no movement in either the AM or PM peak period is increased by an amount of 10% (or more) compared to the existing traffic movement through the Mickleham Road / Broadmeadows Road roundabout, and accordingly an assessment of this intersection is not warranted under the VicRoads guidelines.

Notwithstanding, for the purposes of completeness, and noting that mitigation works are planned at this intersection an assessment of the post development operating conditions has been undertaken.

5.3.3.1 Intersection Layout

The following assessment assumes that the mitigation measures (as discussed in Section 3.4) have been implemented in the post development scenario.

Specifically, an additional lane to separate right turn movements for the southern approach of the roundabout (i.e. two through lanes and one right turn lane) is proposed.

The intersection layouts tested for the post development conditions have been reproduced at Table 10 and results summarised at Table 11.

Table 10 Mickleham Rd / Broadmeadows Rd Roundabout - Post Development Layout

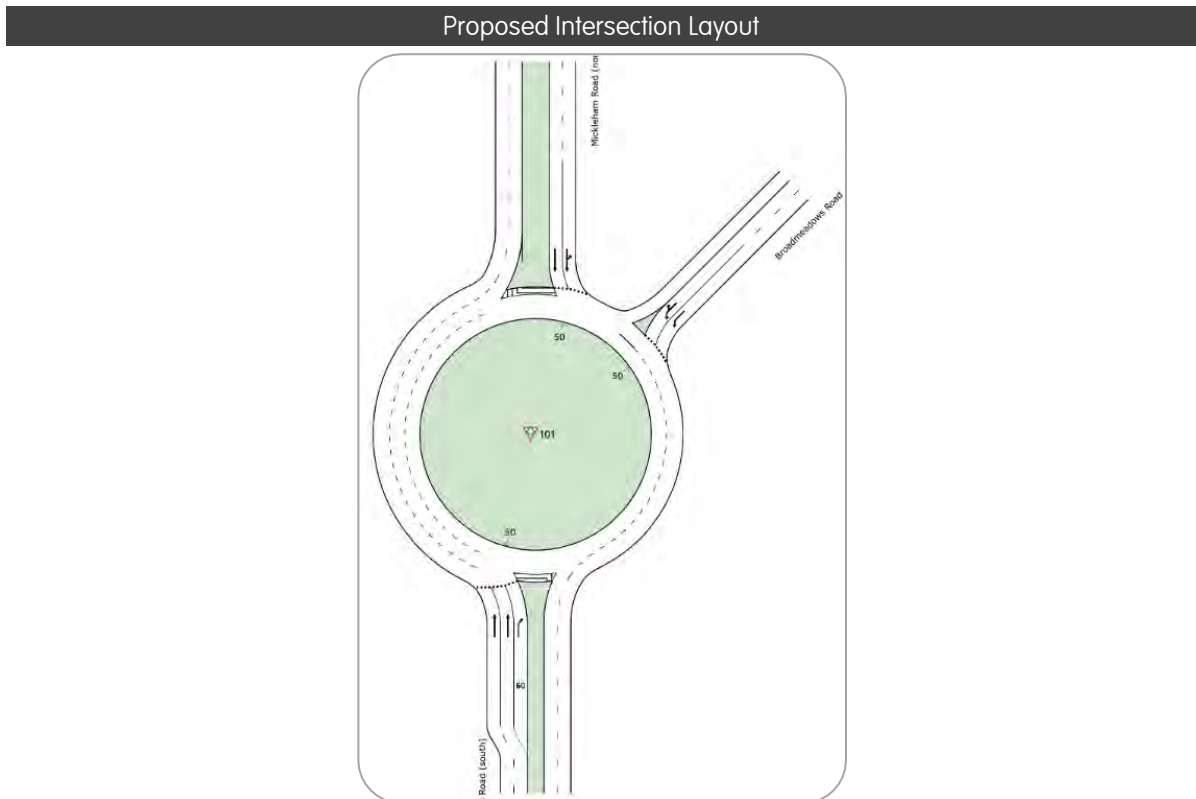


Table 11 SIDRA Summary - Existing Conditions vs Post Development

Approach		Degree of Saturation		95 th ile Queue (m)		Average Delay (s)	
		Existing	Post	Existing	Post	Existing	Post
AM Peak	South	0.37	0.31	24	18	4	4
	North East	0.46	0.49	27	29	25	27
	North	0.94	0.96	218	246	10	12
PM Peak	South	0.90	0.84	167	119	14	10
	North East	0.46	0.46	22	21	11	11
	North	0.52	0.52	38	34	4	4

As shown above, the Mickleham Road / Broadmeadows Roundabout is currently operating with a degree of saturation up to 0.94 in the AM peak and 0.9 in the PM peak period.

Post development, the degree of saturation is expected to increase marginally to 0.96 during the AM peak period. Conversely, post development in the PM peak period, the roundabout is expected to operate better, with a decrease in the degree of saturation down to 0.84.

Notwithstanding, we note that the delay time between existing and proposed remains relatively consistent between the two scenarios.

Note: The existing roundabout meters the southern and north-eastern legs of the roundabout to ensure bus vehicles have sufficient time to enter the roundabout. Due to the intricacies associated with modelling this metering, and the limitations of the SIDRA software, our analysis has not made allowance for bus metering at this intersection.

We expect that intersection performance / capacity will be marginally reduced if metering were allowed for, noting that buses arrive approximately every 6 minutes on average during the peak periods.

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

5.4 Conclusion - Traffic Impacts

The current proposal is forecast to generate 418 trips. This traffic intensity is 291 fewer vehicle movements when compared to the 2015 proposal and 104 less trips when compared with the 2021 proposal

An assessment of the critical intersections reveals that subject to mitigation works at the Western Avenue / Mickleham Road signalised intersection and Mickleham Road / Broadmeadows Road roundabout (as described at Section 4.4, and illustrated conceptually at Appendix B & C), the proposed industrial subdivision have manageable impacts on the road network.

Specifically, the results reveal 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.

6 Design Considerations - Subdivision Layout

As outlined in Section 4.4, it is proposed to extend / upgrade Western Avenue as a connector level street through to Victoria Street to provide access to the subject site.

Along this extended section of Western Avenue, a series of access roads are proposed to connect the industrial lots to Western Avenue.

These roads are contained within a 22-metre road reservation, and will be constructed to a standard appropriate for industrial uses, including a wider road pavement and pavement depth, and footpaths to promote and encourage pedestrian connectivity.

Roundabouts and court bowls proposed within the industrial area are to be designed to cater to turning requirements for larger vehicles (vehicles up to 26m B-double recommended).

APPENDIX A

SIDRA RESULTS

AM & PM PEAK PERIODS

MOVEMENT SUMMARY

Site: 101 [Western Ave-Mickleham Rd-Rylandes Dr- AM Peak - Future - INDUSTRIAL (Site Folder: General)]

Future Conditions

AM Peak

8:00am - 9:00am

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 140 seconds (Site User-Given Phase Times)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Mickleham Road														
1	L2	500	5.0	526	5.0	0.520	25.5	LOS C	13.0	94.6	0.67	0.78	0.67	40.3
2	T1	856	5.4	901	5.4	0.405	32.6	LOS C	14.6	106.8	0.77	0.66	0.77	33.5
3	R2	68	5.0	72	5.0	* 0.798	84.8	LOS F	5.3	39.0	1.00	0.87	1.29	23.2
Approach		1424	5.2	1499	5.2	0.798	32.6	LOS C	14.6	106.8	0.74	0.71	0.76	35.1
East: Rylandes Drive														
4	L2	124	5.0	131	5.0	0.845	72.3	LOS E	16.9	123.3	1.00	1.03	1.19	26.2
5	T1	119	5.0	125	5.0	* 0.845	66.6	LOS E	16.9	123.3	1.00	1.03	1.19	28.2
6	R2	163	5.0	172	5.0	0.319	63.6	LOS E	5.3	38.7	0.94	0.77	0.94	25.7
Approach		406	5.0	427	5.0	0.845	67.1	LOS E	16.9	123.3	0.97	0.93	1.09	26.6
North: Mickleham Road														
7	L2	349	5.0	367	5.0	0.398	27.6	LOS C	15.1	109.9	0.66	0.77	0.66	37.3
8	T1	2104	5.0	2215	5.0	* 0.848	32.3	LOS C	42.9	313.2	0.86	0.82	0.90	33.6
9	R2	135	5.0	142	5.0	0.462	62.5	LOS E	8.8	64.6	0.95	0.80	0.95	26.1
Approach		2588	5.0	2724	5.0	0.848	33.2	LOS C	42.9	313.2	0.84	0.81	0.87	33.6
West: Western Avenue														
10	L2	22	5.0	23	5.0	0.517	68.2	LOS E	8.1	59.1	0.98	0.79	0.98	25.6
11	T1	96	5.0	101	5.0	0.517	62.6	LOS E	8.1	59.1	0.98	0.79	0.98	29.6
12	R2	259	5.0	273	5.0	* 0.591	69.1	LOS E	9.0	65.7	0.99	0.80	0.99	26.3
Approach		377	5.0	397	5.0	0.591	67.4	LOS E	9.0	65.7	0.99	0.80	0.99	27.1
All Vehicles		4795	5.1	5047	5.1	0.848	38.6	LOS D	42.9	313.2	0.83	0.79	0.86	32.4

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.

Intersection and Approach LOS values are based on average delay for all vehicle 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.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
						[Ped ped	Dist] m					
South: Mickleham Road												
P1	Full	50	53	64.3	LOS F	0.2	0.2	0.96	0.96	105.6	53.7	0.51
P1B	Slip/Bypass	50	53	64.3	LOS F	0.2	0.2	0.96	0.96	83.0	24.3	0.29

East: Rylandes Drive												
P2 Full	50	53	64.3	LOS F	0.2	0.2	0.96	0.96	92.9	37.2	0.40	
North: Mickleham Road												
P3 Full	50	53	64.3	LOS F	0.2	0.2	0.96	0.96	105.6	53.7	0.51	
West: Western Avenue												
P4 Full	50	53	64.3	LOS F	0.2	0.2	0.96	0.96	91.3	35.2	0.39	
All Pedestrians	250	263	64.3	LOS F	0.2	0.2	0.96	0.96	95.7	40.8	0.43	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
 Pedestrian movement LOS values are based on average delay per pedestrian movement.
 Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Western Ave-Mickleham Rd-Rylandes Dr- PM Peak - Future - INDUSTRIAL (Site Folder: General)]

Future Conditions

PM Peak

4:30pm - 5:30pm

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 140 seconds (Site User-Given Phase Times)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV %]	[Total veh/h]	[HV %]				[Veh. veh]	[Dist m]				
South: Mickleham Road														
1	L2	253	5.0	266	5.0	0.212	13.4	LOS B	6.2	45.5	0.38	0.67	0.38	47.4
2	T1	1749	5.4	1841	5.4	* 0.890	54.8	LOS D	45.0	328.8	1.00	1.00	1.13	25.8
3	R2	56	5.0	59	5.0	0.657	81.7	LOS F	4.3	31.2	1.00	0.80	1.11	23.7
Approach		2058	5.3	2166	5.3	0.890	50.4	LOS D	45.0	328.8	0.92	0.95	1.04	27.7
East: Rylandes Drive														
4	L2	49	5.0	52	5.0	0.693	68.9	LOS E	11.5	84.3	1.00	0.89	1.04	27.2
5	T1	124	5.0	131	5.0	0.693	63.3	LOS E	11.5	84.3	1.00	0.89	1.04	29.3
6	R2	286	5.0	301	5.0	* 0.788	72.9	LOS E	10.4	76.2	0.99	0.89	1.17	23.7
Approach		459	5.0	483	5.0	0.788	69.9	LOS E	11.5	84.3	1.00	0.89	1.12	25.6
North: Mickleham Road														
7	L2	129	5.0	136	5.0	0.204	37.3	LOS D	6.2	45.4	0.72	0.75	0.72	33.1
8	T1	1254	5.0	1320	5.0	0.627	38.4	LOS D	24.4	178.1	0.88	0.77	0.88	31.0
9	R2	58	5.0	61	5.0	* 0.681	82.1	LOS F	4.4	32.4	1.00	0.81	1.14	22.2
Approach		1441	5.0	1517	5.0	0.681	40.1	LOS D	24.4	178.1	0.87	0.77	0.88	30.7
West: Western Avenue														
10	L2	229	5.0	241	5.0	0.755	55.4	LOS E	24.8	181.4	0.97	0.87	0.99	28.0
11	T1	146	5.0	154	5.0	* 0.755	49.8	LOS D	24.8	181.4	0.97	0.87	0.99	32.2
12	R2	495	5.0	521	5.0	0.508	50.5	LOS D	14.8	108.3	0.89	0.82	0.89	30.9
Approach		870	5.0	916	5.0	0.755	51.7	LOS D	24.8	181.4	0.93	0.84	0.93	30.4
All Vehicles		4828	5.1	5082	5.1	0.890	49.4	LOS D	45.0	328.8	0.91	0.87	0.98	28.7

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.

Intersection and Approach LOS values are based on average delay for all vehicle 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.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
						[Ped ped]	[Dist m]					
South: Mickleham Road												
P1	Full	50	53	64.3	LOS F	0.2	0.2	0.96	0.96	105.6	53.7	0.51
P1B	Slip/Bypass	50	53	64.3	LOS F	0.2	0.2	0.96	0.96	83.0	24.3	0.29

East: Rylandes Drive												
P2 Full	50	53	64.3	LOS F	0.2	0.2	0.96	0.96	92.9	37.2	0.40	
North: Mickleham Road												
P3 Full	50	53	64.3	LOS F	0.2	0.2	0.96	0.96	105.6	53.7	0.51	
West: Western Avenue												
P4 Full	50	53	64.3	LOS F	0.2	0.2	0.96	0.96	91.3	35.2	0.39	
All Pedestrians	250	263	64.3	LOS F	0.2	0.2	0.96	0.96	95.7	40.8	0.43	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

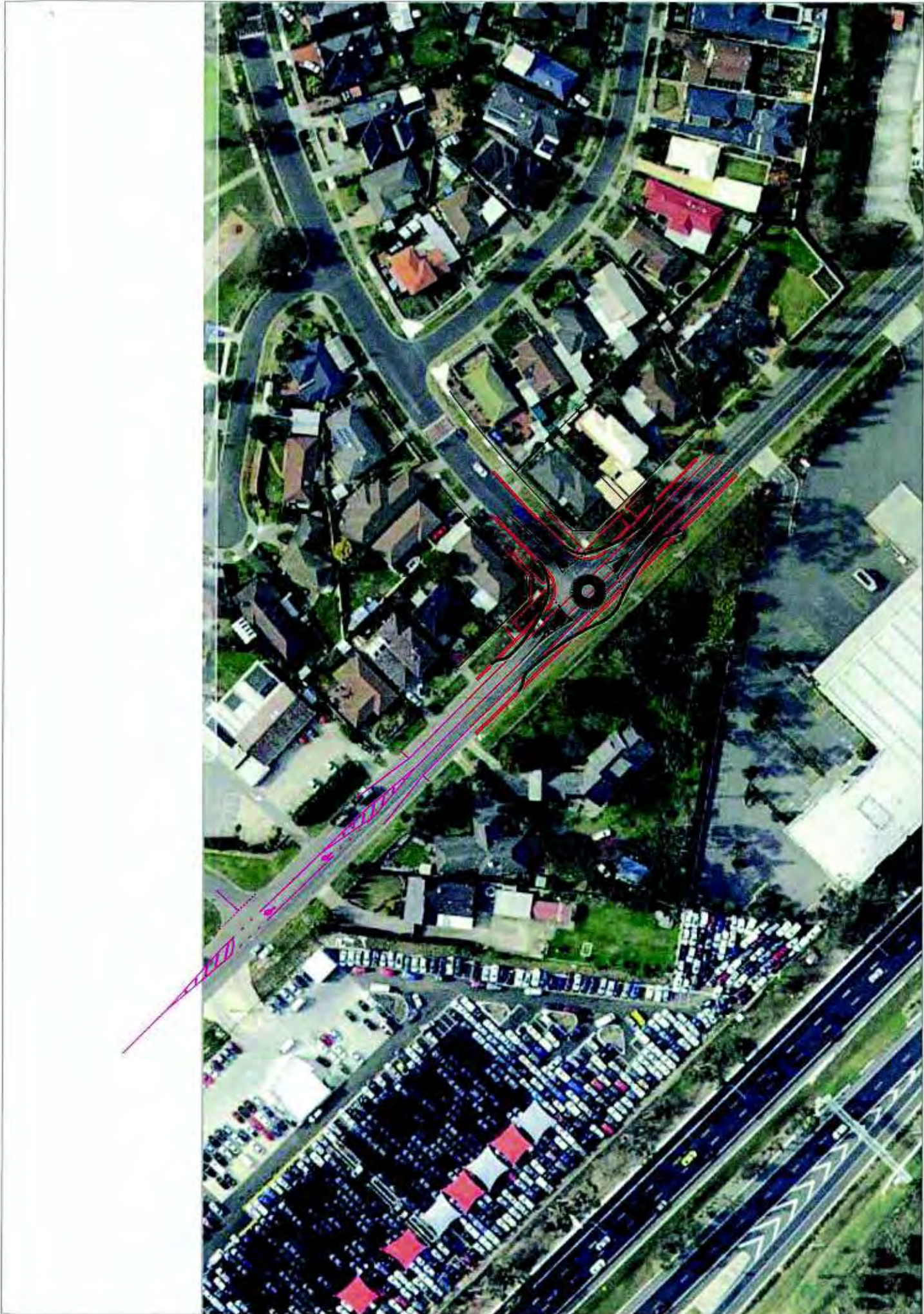
SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: IMPACT TRAFFIC ENGINEERING | Licence: NETWORK / 1PC | Processed: Friday, 19 August 2022 5:26:57 PM

Project: C:\IMPACT Dropbox\01. Projects\2022\IMP2207028 - 140-204 Western Avenue, Westmeadows (MAB)\6. ENGINEERING\04 SIDRA \IMP2207028SIDRA01F01.sip9

APPENDIX B

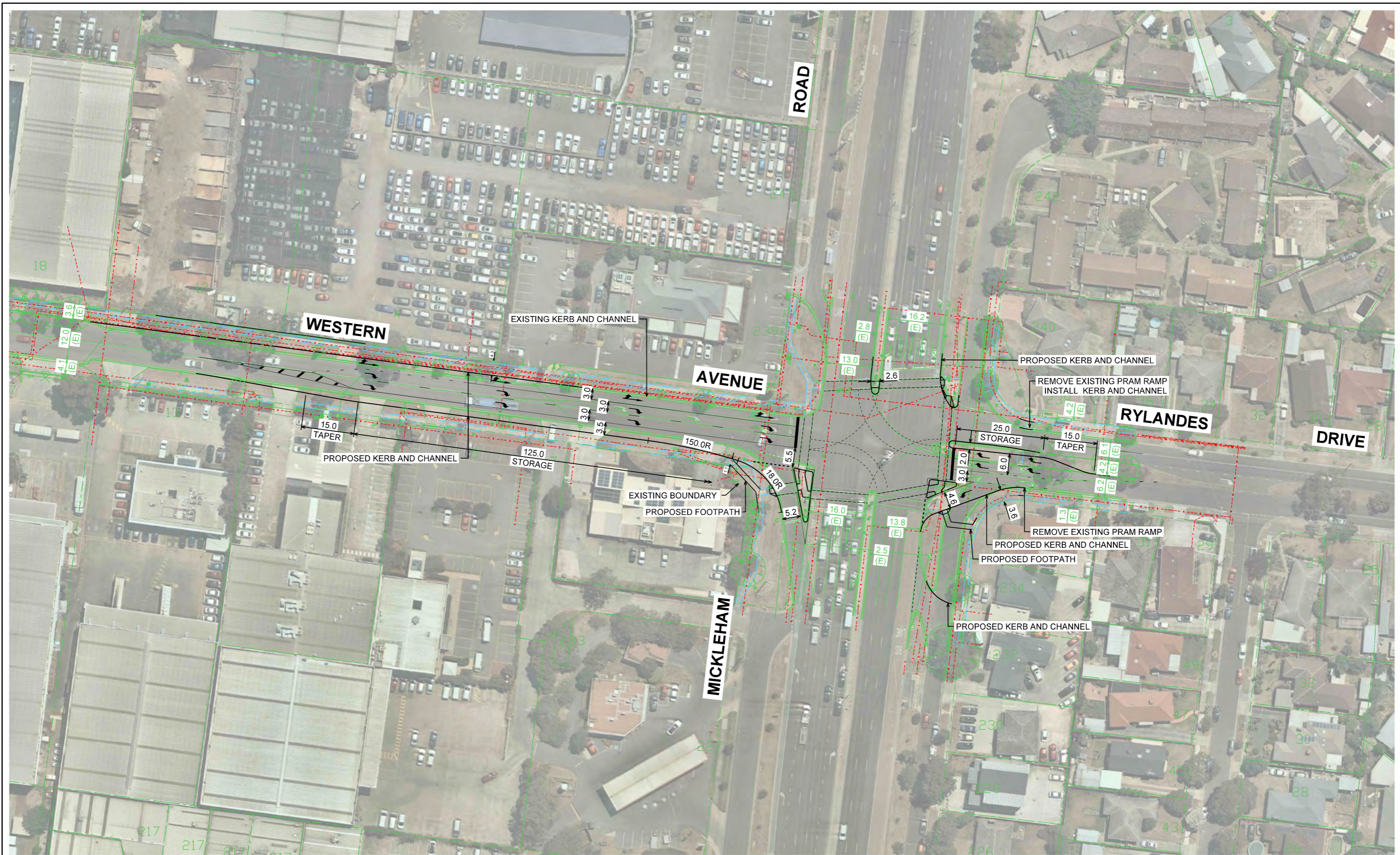
Concept Functional Plans - Western Avenue Upgrades





APPENDIX C

Concept Functional Plans - Mickleham Road / Western Avenue



GENERAL NOTES:

1. ALL DIMENSIONS ARE TO FACE OF KERB AND CHANNEL UNLESS NOTED OTHERWISE.
2. DECLARED MAIN ROAD - MICKLEHAM ROAD - (SPEED ZONE 70KM/H).
LOCAL ROADS - WESTERN AVENUE (SPEED ZONE 50KM/H).
- RYLANDES DRIVE (SPEED ZONE 50KM/H).
3. BASE INFORMATION FROM NEARMAP AERIAL PHOTOGRAPHY DATED 21.11.2017
4. ALL SIGNS AND LINE MARK TO BE IN ACCORDANCE WITH AUSTRADS GUIDE TO TRAFFIC MANAGEMENT VOLUME 10, AS1742 AND RELEVANT VICROADS SUPPLEMENTS.
5. SERVICES SHOWN ARE INDICATIVE ONLY.
6. DESIGN SUBJECT TO CHANGE AT FUNCTIONAL DESIGN STAGE WHEN FULL FEATURE AND LEVEL SURVEY HAS BEEN PROVIDED.



IMPACT TRAFFIC ENGINEERING PTY LTD
 LEVEL 17, 31 QUEEN STREET, MELBOURNE VIC 3000
 create@impactaustralia.com.au
 impactaustralia.com.au



MELWAY ONLINE REF: MAP 5 J9

SCALE
 1:1000 @ A3

Client
MAB

Project
**MICKLEHAM RD / WESTERN AV / RYLANDES DR
 140-204 WESTERN AVENUE, WESTMEADOWS
 CITY OF HUME**

Title
**CONCEPT FUNCTIONAL LAYOUT PLAN
 SIGNALISED INTERSECTION**

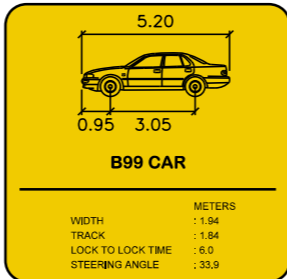
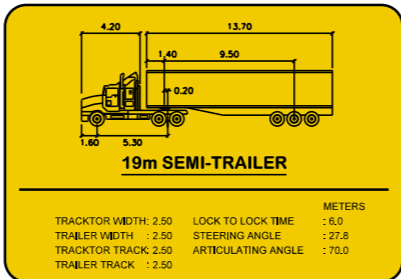
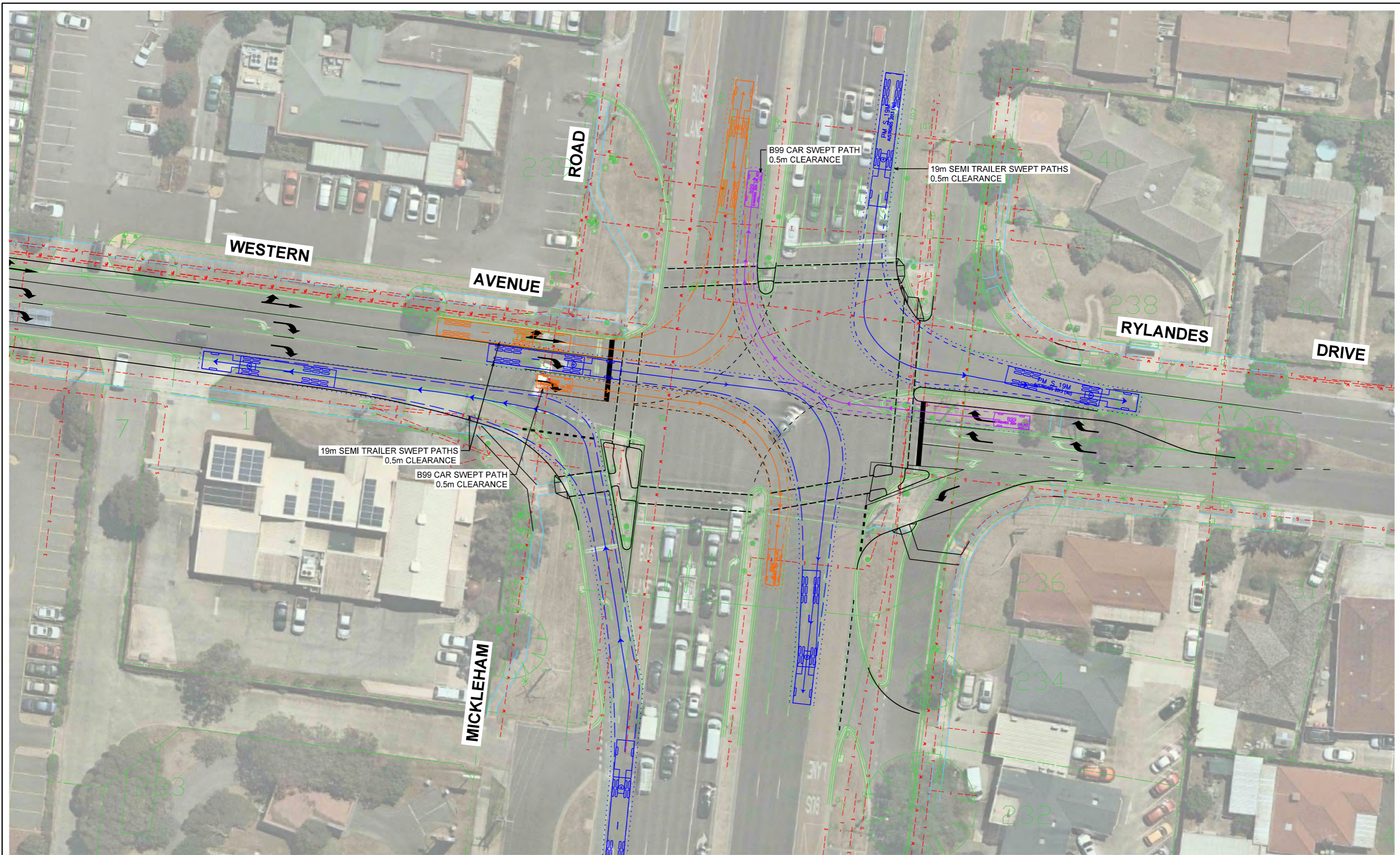
Status
PRELIMINARY

Date
 2021-10-14
 Drawn / Approved
 ES / JPM

Revision Description
**WIDENED DOUBLE RIGHT TURN
 LANES TO 3.3m**

Drawing Number
IMP180119 - DG-01-01

Revision
E



MAB

IMPACT TRAFFIC ENGINEERING PTY LTD. © 2020. ALL RIGHTS RESERVED.
 THIS WORK IS EXCLUSIVELY OWNED BY IMPACT TRAFFIC ENGINEERING PTY LTD
 AND CANNOT BE REPRODUCED, PUBLISHED, STORED, COPIED, ADAPTED,
 DISTRIBUTED OR TRANSMITTED EITHER WHOLLY OR IN PART, IN ANY FORM OR
 BY ANY MEANS WHATSOEVER (GRAPHIC, ELECTRONIC, MECHANICAL,
 PHOTOCOPIING, RECORDING OR OTHERWISE) WITHOUT THE PRIOR WRITTEN
 PERMISSION OF IMPACT TRAFFIC ENGINEERING PTY LTD.

Impact

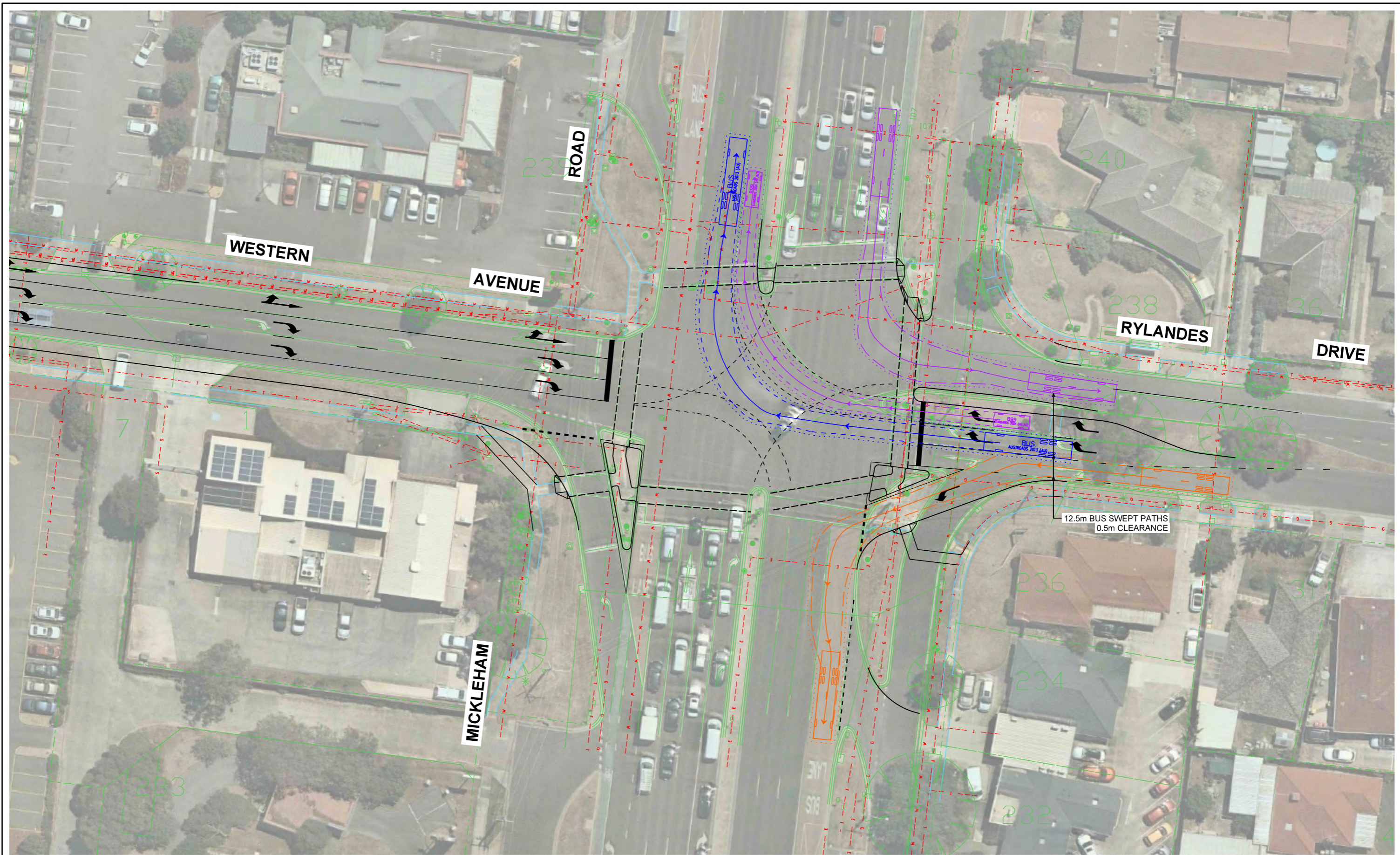
IMPACT TRAFFIC ENGINEERING PTY LTD
 ABN 78 611 424 107
 LEVEL 17, 31 QUEEN STREET, MELBOURNE VIC 3000
 create@impactaustralia.com.au
 impactaustralia.com.au

MELWAY ONLINE REF: MAP 5 J9

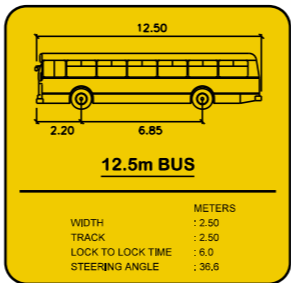
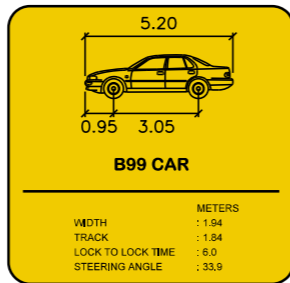
SCALE
 1:500 @ A3

Date 2021-10-14	Status PRELIMINARY
Project MICKLEHAM RD / WESTERN AV / RYLANDES DR	
Title WESTESTERN AVENUE SWEEP PATH ASSESSMENT	
Drawing Number IMP180119 - DG-01-02 E	

14/10/2021 7:04:48 PM



14/10/2021 7:04:49 PM



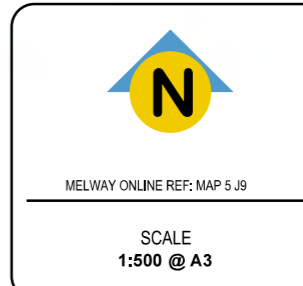
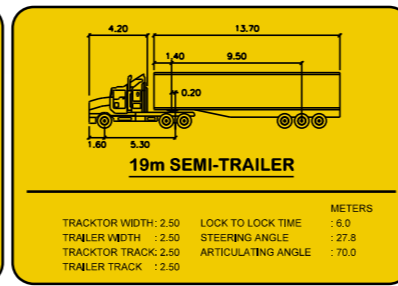
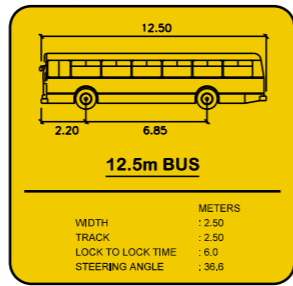
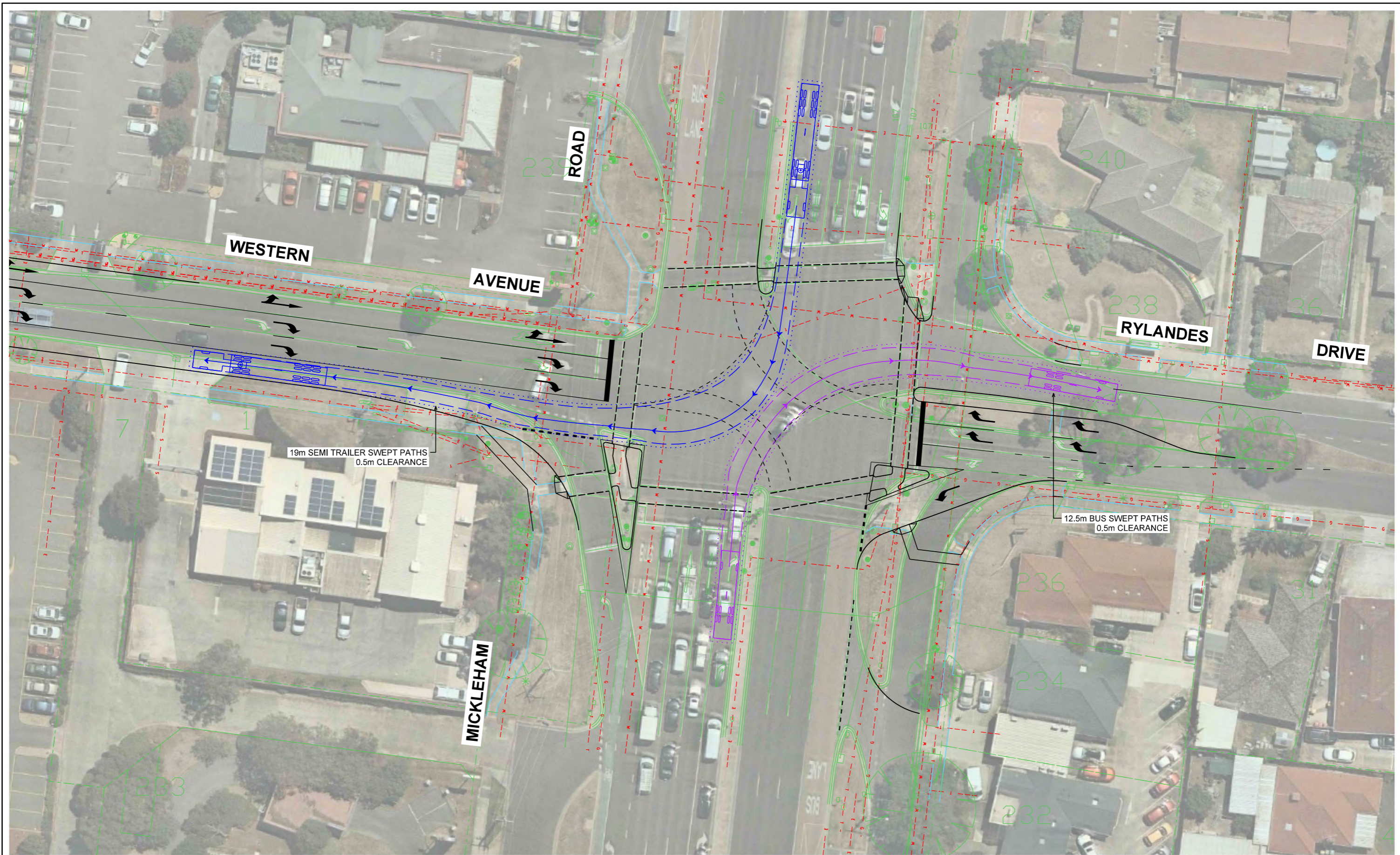
IMPACT TRAFFIC ENGINEERING PTY LTD. © 2020. ALL RIGHTS RESERVED.
 THIS WORK IS EXCLUSIVELY OWNED BY IMPACT TRAFFIC ENGINEERING PTY LTD
 AND CANNOT BE REPRODUCED, PUBLISHED, STORED, COPIED, ADAPTED,
 DISTRIBUTED OR TRANSMITTED EITHER WHOLLY OR IN PART, IN ANY FORM OR
 BY ANY MEANS, WHETHER IN GRAPHIC, ELECTRONIC, MECHANICAL,
 PHOTOCOPIING, RECORDING OR OTHERWISE, WITHOUT THE PRIOR WRITTEN
 PERMISSION OF IMPACT TRAFFIC ENGINEERING PTY LTD.

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

MELWAY ONLINE REF: MAP 5 J9

SCALE
 1:500 @ A3

Date 2021-10-14	Status PRELIMINARY
Project MICKLEHAM RD / WESTERN AV / RYLANDES DR	
Title RYLANDES DRIVE SWEEP PATH ASSESSMENT	
Drawing Number IMP180119 - DG-01-03 E	



Date 2021-10-14	Status PRELIMINARY
Project MICKLEHAM RD / WESTERN AV / RYLANDES DR	
Title MICKLEHAM ROAD SWEEP PATH ASSESSMENT	
Drawing Number IMP180119 - DG-01-04 E	

14/10/2021 7:04:50 PM

APPENDIX D

Concept Functional Plans - Mickleham Road / Broadmeadows Road Roundabout



MICKLEHAM ROAD

BROADMEADOWS ROAD DEVIATION

MICKLEHAM ROAD



ISSUE	DATE	AMENDMENTS	BY

NOTES:



•Traffic Planning •Transport Planning
 •Traffic Engineering •Road Safety

SUITE 2, 22 GILLMAN STREET
 HAWTHORN EAST, VIC, 3123
 Ph: +613 9811 3111
 FAX: +613 9811 3131
 email: design@obrientraffic.com

ENGINEER:	T.HARDINGHAM	CAD FILE:	11307305.DGN
DESIGNED BY:	B.VANDERWERF	DRAWING NO:	11307305
SCALE:	1:1000	ORIGINAL:	A3
DATE:	17/09/13	JOB NO:	11307
Hor. Scale:	0 10 20	SHEET NO:	1 OF 1
Ver. Scale:		ISSUE:	

MICKLEHAM RD/BROADMEADOWS RD DEVIATION

ROUNDAABOUT UPGRADE
 SOUTHERN LEG

MELWAYS REF: 5 K8

APPENDIX E

VicRoads Submission - 2013



Metropolitan North West Region
489 Ballara Road
Sunshine Victoria 3020
Private Bag 4000, Sunshine Victoria 3088
Telephone (03) 9313 1313
Fax (03) 9313 1199
vicroads.nw@vic.gov.au

Contact: Simon Basic
Telephone: 9313 1321
Our Ref: 0451439
File No. SY 200 HUM C370

Kelvin Walsh
Director City Sustainability
Hume City Council
PO Box 119
DALLAS VIC 3047

11 October 2013

Dear Mr Walsh,

**HUME PLANNING SCHEME AMENDMENT
AIRPORT ANNEXE ESTATE
140-300 WESTERN AVENUE, TULLAMARINE
HUME PLANNING SCHEME AMENDMENT C160**

I refer to VicRoads' letter of 22 February 2013 and the resolution of Hume City Council at their meeting on 29 April 2013, Item LE559 to accept recommendation 2.3. Sections 5.7 and 5.8 of the supporting report refer to concerns held by both Council and VicRoads.

VicRoads has worked with consultants for Transpacific Industries Group Pty Ltd to achieve the objective stated in section 5.7. VicRoads is confident that the set of proposed mitigation works on Mickleham Road, listed below, will result in an outcome where the additional traffic from development of the land proposed to be rezoned, will not have a detrimental impact on Mickleham Road.

VicRoads recognises that traffic volumes on the section of Mickleham Road near Western Avenue are expected to grow in the immediate future years. VicRoads considers the set of mitigation works proposed, are appropriate and of a scale, to achieve an outcome where traffic congestion on this section of Mickleham Road, during the AM and PM peaks, will be no worse than if the additional traffic from development did not exist. Outside of the peak traffic periods, the mitigation works can be expected to improve the traffic conditions on Mickleham Road over the situation where the development did not occur.

The following set of mitigation works on Mickleham Road have been agreed to:

1. Mickleham Road / Western Avenue / Rylandes Drive Signalised Intersection

- Signals upgrading including new phasing together with roadworks on the western and eastern approaches to maintain Mickleham Road through capacity generally in accordance with Concept Layout Plan by O'Brien Traffic (Job No: 11307, dated 08/06/12).
- These roadworks will provide double right turn lanes, as well as maintaining the existing shared through and left turn lane from Western Avenue to Mickleham Road. A strip of land on the south side of Western Avenue will need to be acquired. On the opposite side of Mickleham Road, a left turn slip lane will be constructed from Rylandes Drive to Mickleham Road.

2. Mickleham Road / Broadmeadows Road Deviation Roundabout

- The construction of a new right turn lane on the southern approach to the roundabout and if required the installation and programming of some additional detector loops. The roadworks are to be generally in accordance with the Plan by O'Brien Traffic (Drawing No: 11307305, dated 17/09/13).
- The addition of a separate right turn lane on the southern approach, possibly together with some additional detector loops will allow the existing traffic signals on each approach to improve the flow of traffic north of Western Avenue in the PM peak.

3. Mickleham Road / Gladstone Park Drive / International Drive Signalised Intersection to the On-Ramp to the Tullamarine Freeway

- Roadworks and installation of Pedestrian Operated Signals (POS), together with modifications to line marking and traffic signs, generally in accordance with the Plan by O'Brien Traffic (Drawing No: 11307304, 2 sheets, dated 15/08/13).
- This will provide additional capacity with double left turn lanes from Mickleham Road to the southbound on-ramp to the Tullamarine Freeway. The installation of POS across to the traffic island, will allow the southbound on-ramp traffic to be controlled, when the northbound traffic in Mickleham Road, are turning right onto the on-ramp. The existing situation where southbound traffic from the off-ramp from the Tullamarine Freeway are allowed to directly access the southbound on-ramp will need to be prevented to avoid conflict.
- North of Gladstone Park Drive, the existing southbound left lane (to the right of the dedicated bus lane) will become dedicated to traffic headed to the southbound on-ramp. The center lane, north of Gladstone Park Drive, will be a shared lane for traffic also headed to southbound on-ramp, together with traffic headed to the south on Mickleham Road. The two lanes onto the southbound on-ramp will not have to merge until well towards the Freeway.

VicRoads can therefore advise Council, that agreement has been reached with Transpacific Industries Group Pty Ltd to provide the above set of mitigation works, following the proposed rezoning in Hume Planning Scheme Amendment C160.

If you have any queries on the above, please contact Simon Basic on 9313 1321 or simon.basic@roads.vic.gov.au.

Yours sincerely,



SIMON BASIC
MANAGER TRAFFIC AND PLANNING
METROPOLITAN NORTH WEST REGION

APPENDIX F

Department of Transport Submission - 2021



Department of Transport

GPO Box 2392
Melbourne, VIC 3001 Australia
Telephone: +61 3 9651 9999
www.transport.vic.gov.au
DX 201292

Andrew Johnson
Manager Strategic Planning
Hume City Council
BROADMEADOWS VICTORIA 3047

Dear Mr Johnson,

RE: HUME PLANNING SCHEME AMENDMENT C250

Thank you for the opportunity to reply to the proposed Amendment C250 to Hume Planning Scheme.

Department of Transport (DoT) understands that this amendment seeks to rezone land within the Urban Growth Boundary from Farming Zone – Schedule 3 (FZ3) to General Residential Zone – Schedule 1 (GRZ1) and Industrial 3 Zone (IN3Z) and apply the Development Plan Overlay – Schedule 33 (DPO33) to the whole of the land.

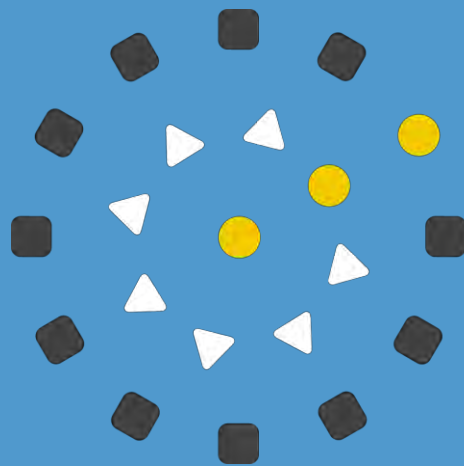
DoT has reviewed supporting documents for the Amendment and makes the following submission:

- An Integrated Transport Plan is required which includes the details of the existing and surrounding movement network and traffic volumes, public transport provisions and pedestrian and cycling infrastructure (including important connections to Moonee Ponds Creek) and informs the need for Traffic Impact Assessment reports to accompany any planning application associated with the Development Plan.
- Due consideration is also required in terms of Tullamarine Freeway noise. Whilst the residential properties are set behind the industrial use, noise studies should be conducted to determine if any mitigating measures are required to the satisfaction of Head, Transport for Victoria.

The Department of Transport appreciates the opportunity to engage in this process. If you have any further query, please contact Solmaz Jahed Shiran on 9313 1171 or Solmaz.JahedShiran@roads.vic.gov.au.

Yours sincerely

Dwayne Singleton
Team Leader Statutory Planning
Under delegation from the Head, Transport for Victoria
15/06/2021



Purposeful