

Appendix 4 – Traffic Report

9 Raglan Street & 29 Smith Street, Daylesford

Transport Impact Assessment



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APPENDICES

APPENDIX A CONCEPT LAYOUT PLAN

1 INTRODUCTION

onemilegrid has been requested by hygge property to undertake a Transport Impact Assessment of the proposed residential subdivisions at 9 Raglan Street & 29 Smith Street, Daylesford.

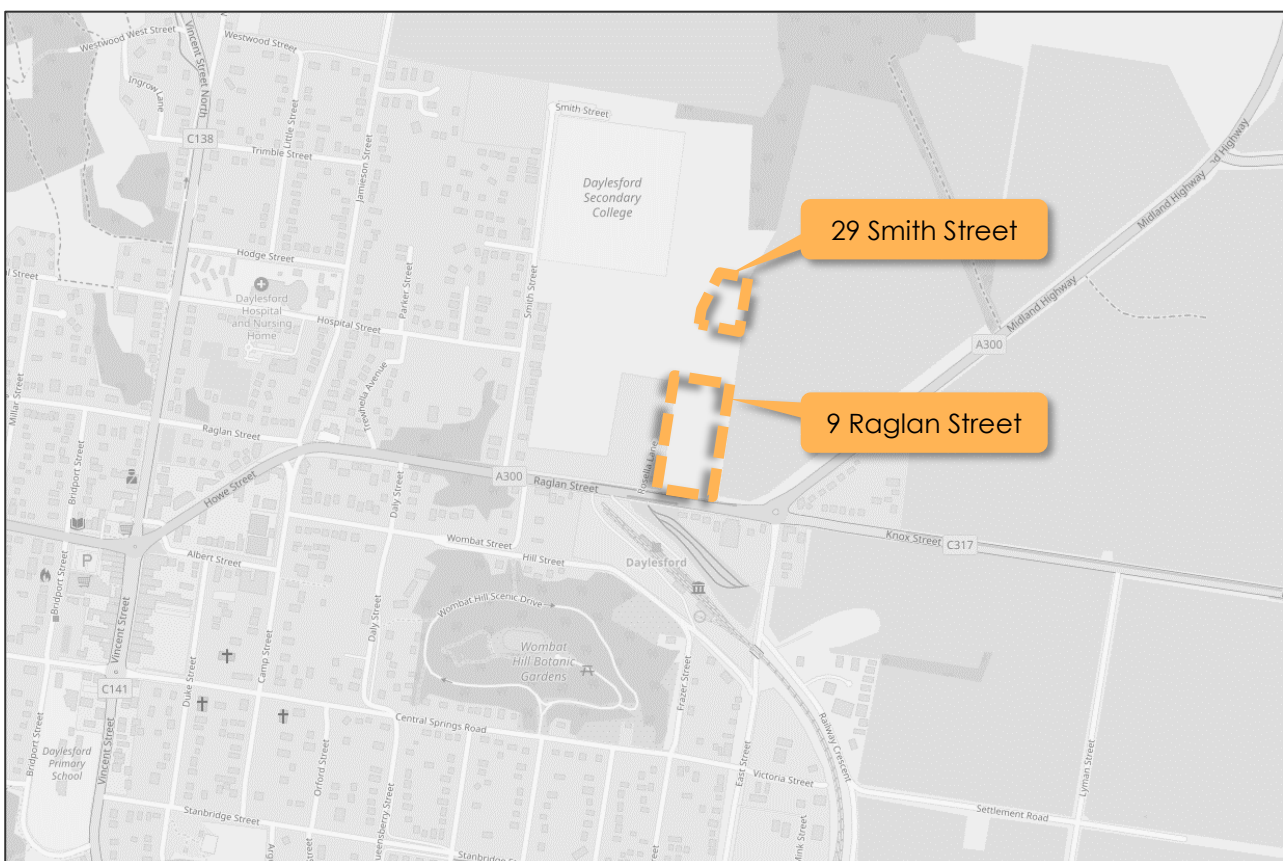
As part of this assessment the subject site has been reviewed with due consideration of the development proposal, traffic data has been sourced and relevant background reports have been reviewed.

2 EXISTING CONDITIONS

2.1 Site Location

The subject site is located at 9 Raglan Street & 29 Smith Street, Daylesford, as shown in Figure 1.

Figure 1 Site Location



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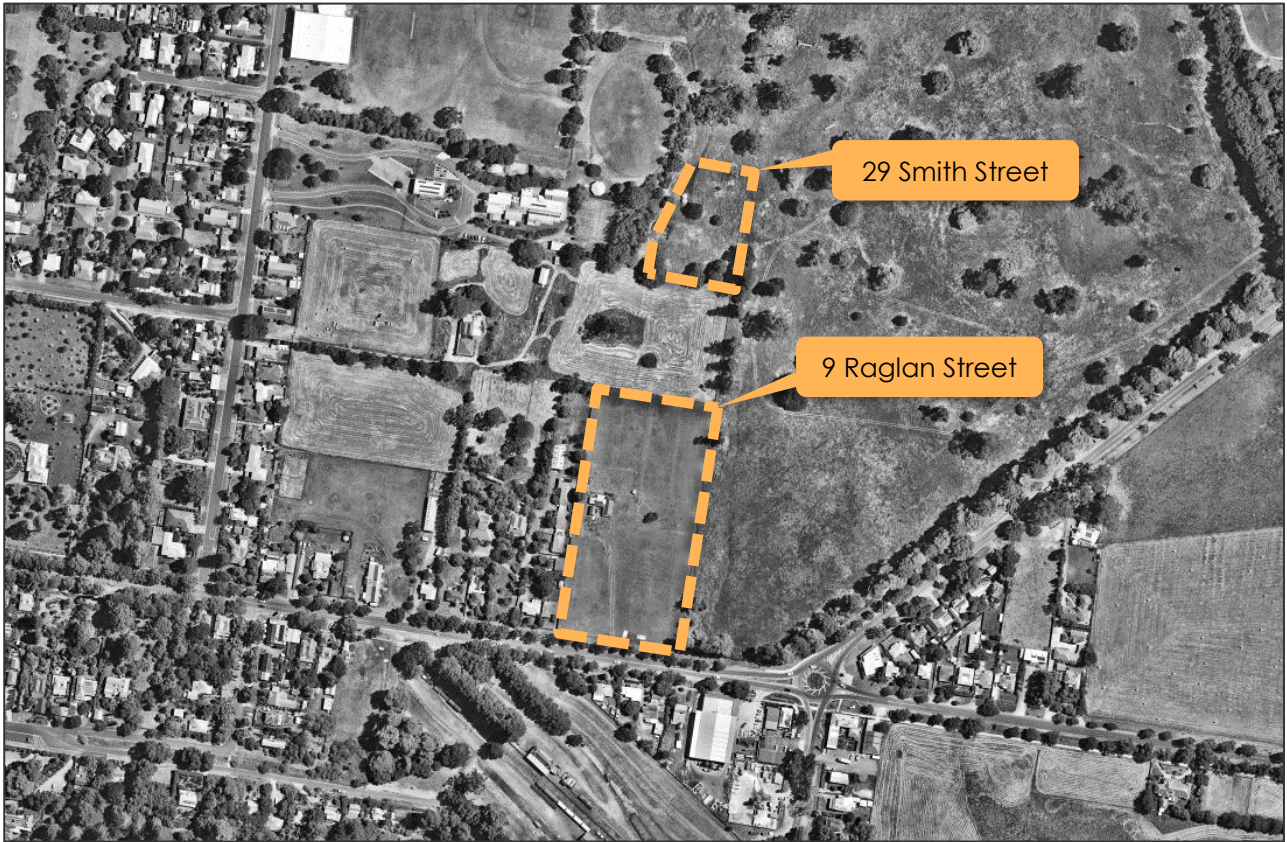
The sites are largely unoccupied, with a single dwelling located at the site addressed 9 Raglan Street. The small section of the site addressed 29 Smith Street which comprises part of the proposal is located in the south-east corner of a larger lot also occupied by St Michael's Primary School to the west.

Vehicle access to 9 Raglan Street is provided via a single width gravel crossover to Raglan Street. Future vehicle access to both sites will be provided via a residential subdivision located at 17 Smith Street which has been approved by Hepburn Shire Council.

Land use in the immediate vicinity of the site is residential in nature or farming land.

An aerial view of the subject site is provided in Figure 2.

Figure 2 Site Context (14 December 2020)

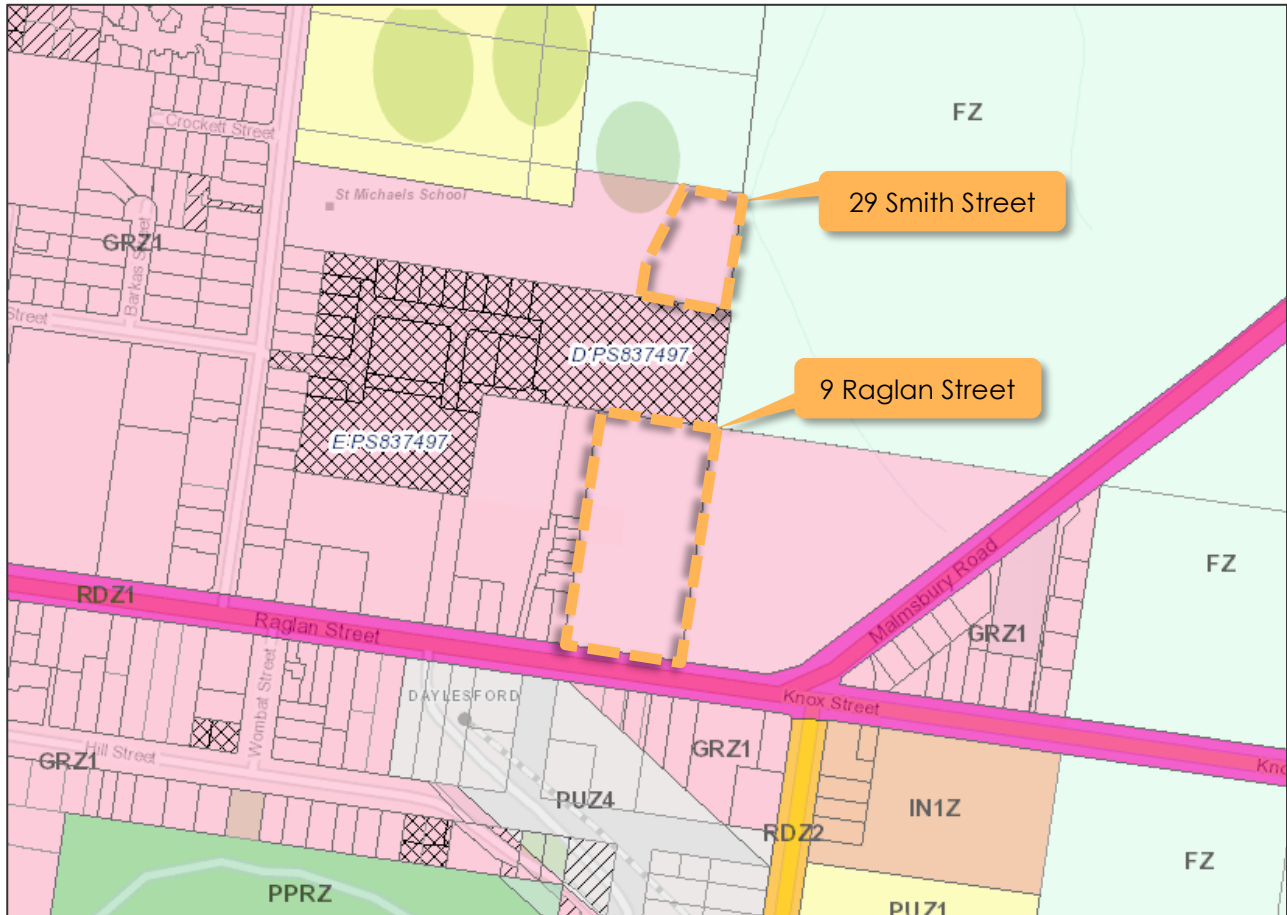


Copyright Nearmap

2.2 Planning Zones and Overlays

It is shown in Figure 3 that the site is located within a General Residential Zone (GRZ). The site addressed 9 Raglan Street is also subject to a Heritage Overlay, with both sites subject to an Environmental Significance Overlay.

Figure 3 Planning Scheme Zones



2.3 Road Network

2.3.1 Raglan Street (Midland Highway)

Raglan Street is an arterial road (managed by DoT along the frontage of the site changing to a Council managed road to the west, east of Wombat Street) generally aligned east-west, which continues as Midland Highway as Malmsbury Road in the east and Howe Street in the west. Raglan Street provides a single traffic lane in each direction adjacent to the site with partially sealed shoulders on each side of the road. Adjacent to the roadway are the Avenue of Honour trees which travel the length of the road.

A 60km/h speed limit applies to Raglan Street in the vicinity of the site, reducing to 50 km/h to the west (where the Council ownership takes place).

2.3.2 Smith Street

Smith Street is a local road generally aligned north-south, running between Raglan Street in the south, and extending approximately 650 metres north. Smith Street provides a single traffic lane in each direction adjacent to the site.

At the intersection with Raglan Street, the shoulders have been sealed to provide for a passing opportunity for east and west bound traffic should it be required.

2.4 Traffic Volumes

Traffic volume information for Raglan Street adjacent to the site was obtained via the Department of Transport (VicRoads) Traffic Profile Viewer. The data indicates that Raglan Street carries the following approximate traffic volumes.

Table 1 Existing Traffic Volumes

<i>Direction</i>	<i>Daily</i>	<i>AM Peak (8:00am)</i>	<i>PM Peak (4:00pm)</i>
Eastbound	-	218	385
Westbound	-	379	374
Total	4,000 (approx.)	597	759

Driscoll Engineering Services Pty Ltd prepared a traffic report dated 8 October 2021 for the site at 17 Smith Street, Daylesford. The report included traffic volumes for the intersection of Smith Street and Hospital Street west of the site from early August, 2019.

Combining the through volumes on Smith Street with the data shown in Table 1, the following existing traffic volumes are expected in the vicinity of the site during the AM and PM peak periods.

Figure 4 Existing Traffic Volumes – AM Peak

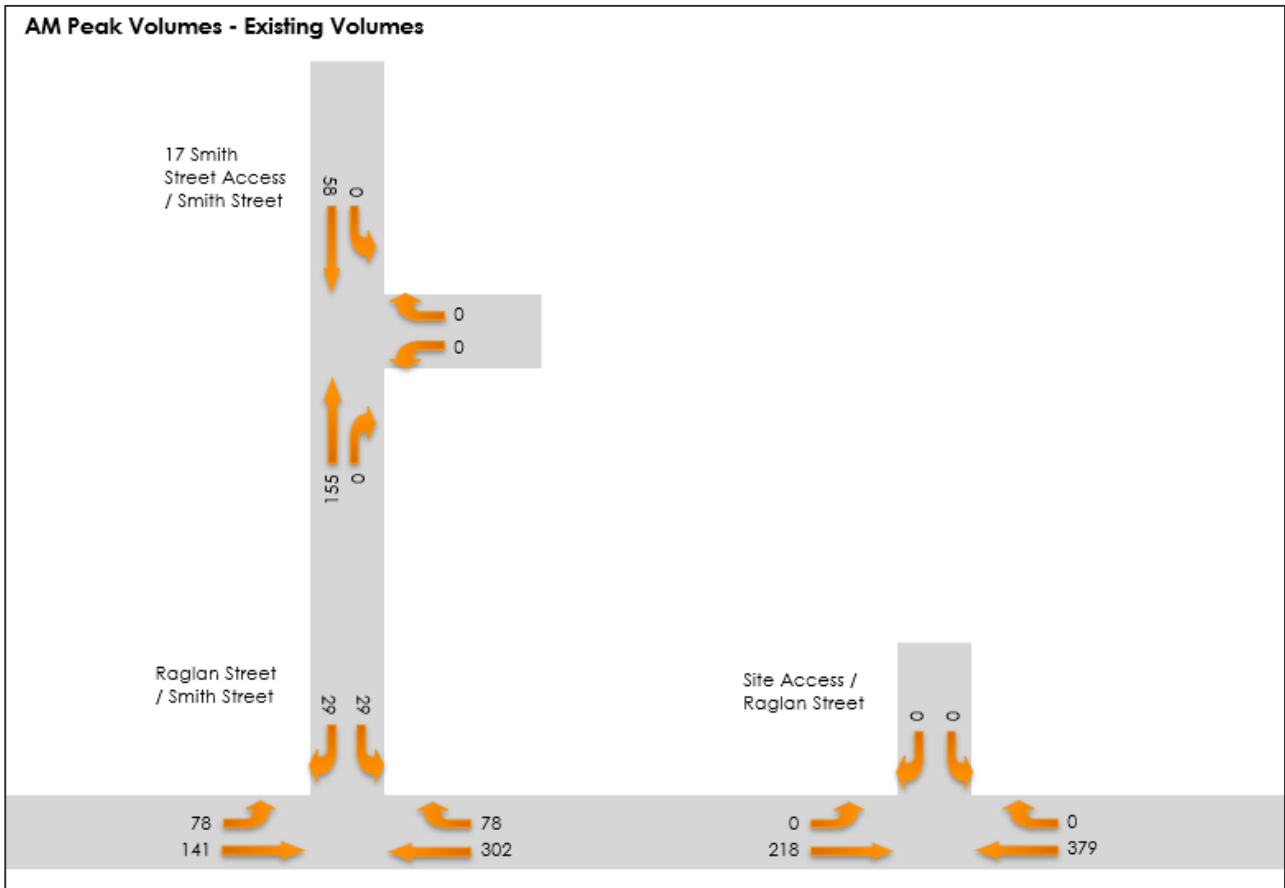
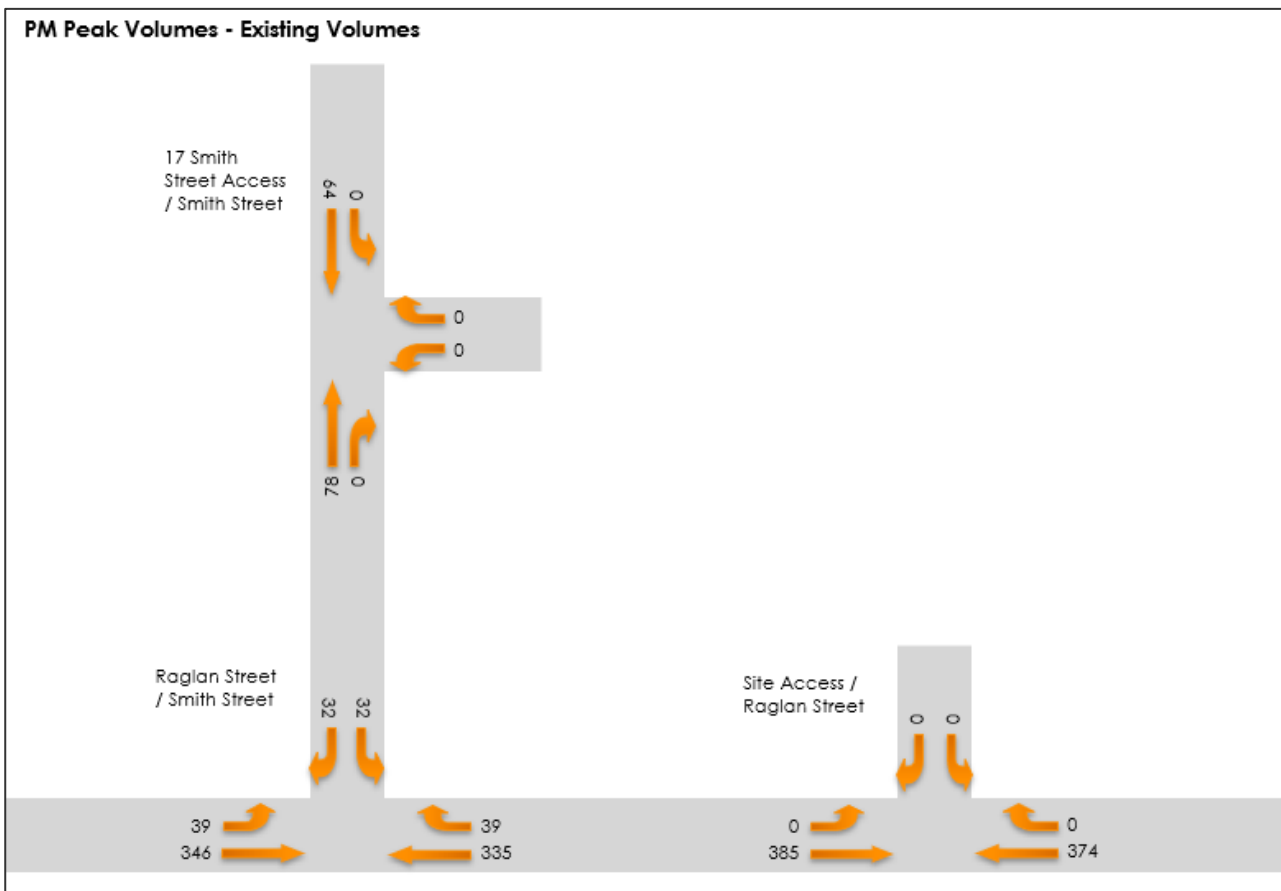


Figure 5 Existing Traffic Volumes – PM Peak



2.5 Public Transport

Public transport in the area is limited to the following bus services. The site is approximately 1.3 km walking distance from the nearest bus stop located at CFA / Bridport Street.

- Ballan – Hepburn Springs via Daylesford;
- Hepburn Springs – Creswick via Daylesford;
- Bendigo to Geelong via Ballarat (V-Line Bus);
- Daylesford – Melbourne via Woodend or Castlemaine (V-Line Bus); and
- Ballarat – Mildura via Swan Hill and Bendigo (V-Line Bus).

3 DEVELOPMENT PROPOSAL

3.1 General

It is proposed to develop the sites for the purposes of residential subdivisions comprising 22 lots within 9 Raglan Street, and 5 lots within 29 Smith Street. A waterway/drainage reserve is located in the south-east corner of 29 Smith Street

The two properties are separated by the site addressed 17 Smith Street which has been approved by Hepburn Shire Council for the purposes of a multi-lot subdivision comprising 53 lots.

3.2 Internal Subdivision Design and Access

Access is proposed to be provided via Raglan Street to the south, and through the approved development at 17 Smith Street which will provide access to Smith Street to the west. The Raglan Street site access proposes a T-intersection with flaring to ensure that no trees are impacted by the site access. Localised formalisation of the existing shoulder is proposed on both sides to allow for turning movements to occur without impacting on through traffic.

9 Raglan Street is proposed with one internal road aligned north-south which proposes a 16 metre road reserve, including a 7.3 metre carriageway and a footpath on the west side of the road.

29 Smith Street is proposed with an internal road aligned north-south which proposes a 14 metre road reserve, including a 7.3 metre carriageway and a footpath on the west side of the road. The internal road is proposed to terminate in a court bowl at the north. The road reservation is reduced to 14 metres where the road is adjacent to a drainage reserve reflecting a reduced verge and no footpath on the reserve side (assuming pedestrian connections can be catered for elsewhere as is common practice).

Access to one lot is proposed to be provided directly from Raglan Street, with access to the remaining lots from internal roads.

4 DESIGN ASSESSMENT

4.1 Clause 52.29 – Land Adjacent to a Road Zone, Category 1

The development proposal is subject to the requirements of Clause 52.29 of the Hepburn Planning Scheme which applies to land adjacent to a Road Zone Category 1 (Raglan Street (Midland Highway) and aims to ensure appropriate access is provided to identified roads.

Relevant to the proposed development, the Clause states that a permit is required to create or alter access to a road in a Road Zone, Category 1, and that the proposal is to be referred to the relevant referral authority (in this case the Department of Transport (VicRoads)).

Before deciding on the appropriateness or otherwise of an application to alter access to the Road Zone, the responsible authority must consider the following:

- The Municipal Planning Strategy and the Planning Policy Framework.
- The views of the relevant road authority.
- The effect of the proposal on the operation of the road and on public safety.
- Any policy made by the relevant road authority pursuant to Schedule 2, Clause 3 of the Road Management Act 2004 regarding access between a controlled access road and adjacent land.

The proposal seeks to provide 27 additional lots. As detailed in Section 6.1, the proposed development is expected to generate up to 216 traffic movements daily, including 22 movements during the AM and PM peak hour periods. This equates to approximately one movement every three minutes during the peak hours. This is low in traffic engineering terms, and is not expected to have a notable impact on the surrounding road network. Similarly, the proposal will provide adequate sight distance at the property boundary to pedestrians along the frontage. As such, the development is not expected to have any material impact on the operation of the road or any impacts on public safety.

In light of the above, it is considered that the proposed development will satisfy the requirements of Clause 52.29.

5 RESIDENTIAL SUBDIVISION DESIGN ASSESSMENT

5.1 General

The design of the proposed residential subdivision has been assessed, in relation to Clause 56 of the Hepburn Planning Scheme (Residential Subdivision), and the Infrastructure Design Manual.

5.2 Hepburn Planning Scheme – Clause 56

Clause 56.06 identifies Access and Mobility Management requirements for residential subdivisions such as that proposed at the site. The following Clauses are applicable.

5.2.1 Clause 56.06-2, Walking and cycling network objectives

Standard C15

The walking and cycling network should be designed to:

- *Implement any relevant regional and local walking and cycling strategy, plan or policy for the area set out in this scheme.*
- *Link to any existing pedestrian and cycling networks.*
- *Provide safe walkable distances to activity centres, community facilities, public transport stops and public open spaces.*
- *Provide an interconnected and continuous network of safe, efficient and convenient footpaths, shared paths, cycle paths and cycle lanes based primarily on the network of arterial roads, neighbourhood streets and regional public open spaces.*
- *Provide direct cycling routes for regional journeys to major activity centres, community facilities, public transport and other regional activities and for regional recreational cycling.*
- *Ensure safe street and road crossings including the provision of traffic controls where required.*
- *Provide an appropriate level of priority for pedestrians and cyclists.*
- *Have natural surveillance along streets and from abutting dwellings and be designed for personal safety and security particularly at night.*
- *Be accessible to people with disabilities.*

The proposed developments include footpaths on one side of all internal streets.

Internal roads are expected to have minimal traffic volumes and low speeds, and are considered suitable for cyclists.

All roads and paths are provided with natural surveillance.

It is therefore considered that the subdivision satisfies the objectives of Clause 56.06-2.

5.2.2 Clause 56.06-3, Public transport network objectives

Standard C16

The public transport network should be designed to:

- *Implement any relevant public transport strategy, plan or policy for the area set out in this scheme.*
- *Connect new public transport routes to existing and proposed routes to the satisfaction of the relevant public transport authority.*

- Provide for public transport links between activity centres and other locations that attract people using the Principal Public Transport Network in Metropolitan Melbourne and the regional public transport network outside Metropolitan Melbourne.
- Locate regional bus routes principally on arterial roads and locate local bus services principally on connector streets to provide:
 - ✦ Safe and direct movement between activity centres without complicated turning manoeuvres.
 - ✦ Direct travel between neighbourhoods and neighbourhood activity centres.
 - ✦ A short and safe walk to a public transport stop from most dwellings.

As detailed in Section 2.5, the site is located approximately 1.3 km walking distance from several bus routes, providing the site with adequate public transport access.

It is therefore considered that the subdivision satisfies the objectives of Clause 56.06-3.

5.2.3 Clause 56.06-4, Neighbourhood street network objective

Standard C17

The neighbourhood street network must:

- Take account of the existing mobility network of arterial roads, neighbourhood streets, cycle paths, cycle paths, footpaths and public transport routes.
- Provide clear physical distinctions between arterial roads and neighbourhood street types.
- Comply with the Roads Corporation's arterial road access management policies.
- Provide an appropriate speed environment and movement priority for the safe and easy movement of pedestrians and cyclists and for accessing public transport.
- Provide safe and efficient access to activity centres for commercial and freight vehicles.
- Provide safe and efficient access to all lots for service and emergency vehicles.
- Provide safe movement for all vehicles.
- Incorporate any necessary traffic control measures and traffic management infrastructure.

The neighbourhood street network should be designed to:

- Implement any relevant transport strategy, plan or policy for the area set out in this scheme.
- Include arterial roads at intervals of approximately 1.6 kilometres that have adequate reservation widths to accommodate long term movement demand.
- Include connector streets approximately halfway between arterial roads and provide adequate reservation widths to accommodate long term movement demand.
- Ensure connector streets align between neighbourhoods for direct and efficient movement of pedestrians, cyclists, public transport and other motor vehicles.
- Provide an interconnected and continuous network of streets within and between neighbourhoods for use by pedestrians, cyclists, public transport and other vehicles.
- Provide an appropriate level of local traffic dispersal.
- Indicate the appropriate street type.
- Provide a speed environment that is appropriate to the street type.
- Provide a street environment that appropriately manages movement demand (volume, type and mix of pedestrians, cyclists, public transport and other motor vehicles).
- Encourage appropriate and safe pedestrian, cyclist and driver behaviour.
- Provide safe sharing of access lanes and access places by pedestrians, cyclists and vehicles.
- Minimise the provision of culs-de-sac.
- Provide for service and emergency vehicles to safely turn at the end of a dead-end street.
- Facilitate solar orientation of lots.
- Facilitate the provision of the walking and cycling network, integrated water management systems, utilities and planting of trees.

- *Contribute to the area's character and identity.*
- *Take account of any identified significant features.*

The internal road network has been designed in consideration of the objectives of Clause 56.06-4. It is therefore considered that the subdivision generally satisfies the objectives of Clause 56.06-4.

5.2.4 Clause 56.06-5, Walking and cycling detail network objectives

Standard C18

Footpaths, shared paths, cycle paths and cycle lanes should be designed to:

- *Be part of a comprehensive design of the road or street reservation.*
- *Be continuous and connect.*
- *Provide for public transport stops, street crossings for pedestrians and cyclists and kerb crossovers for access to lots.*
- *Accommodate projected user volumes and mix.*
- *Meet the requirements of Table C1.*
- *Provide pavement edge, kerb, channel and crossover details that support safe travel for pedestrians, footpath bound vehicles and cyclists, perform required drainage functions and are structurally sound.*
- *Provide appropriate signage.*
- *Be constructed to allow access to lots without damage to the footpath or shared path surfaces.*
- *Be constructed with a durable, non-skid surface.*
- *Be of a quality and durability to ensure:*
 - ✦ *Safe passage for pedestrians, cyclists, footpath bound vehicles and vehicles.*
 - ✦ *Discharge of urban run-off.*
 - ✦ *Preservation of all-weather access.*
 - ✦ *Maintenance of a reasonable, comfortable riding quality.*
 - ✦ *A minimum 20 year life span.*
- *Be accessible to people with disabilities and include tactile ground surface indicators, audible signals and kerb ramps required for the movement of people with disabilities.*

It is noted that a number of objectives are related to detailed design not covered by the current drawing set. Nonetheless, will be satisfied as part of detailed designs.

5.2.5 Clause 56.06-6, Public transport network detail objectives

Standard C19

Bus priority measures must be provided along arterial roads forming part of the existing or proposed Principal Public Transport Network in Metropolitan Melbourne and the regional public transport network outside Metropolitan Melbourne to the requirements of the relevant roads authority.

Road alignment and geometry along bus routes should provide for the efficient, unimpeded movement of buses and the safety and comfort of passengers.

The design of public transport stops should not impede the movement of pedestrians.

Bus and tram stops should have:

- *Surveillance from streets and adjacent lots.*
- *Safe street crossing conditions for pedestrians and cyclists.*
- *Safe pedestrian crossings on arterial roads and at schools including the provision of traffic controls as required by the roads authority.*

- Continuous hard pavement from the footpath to the kerb.
- Sufficient lighting and paved, sheltered waiting areas for forecast user volume at neighbourhood centres, schools and other locations with expected high patronage.
- Appropriate signage.

The road network has not been designed to cater for a public transport route, therefore the requirements of Clause 56.06-6 do not apply.

5.2.6 Clause 56.06-7, Neighbourhood street network detail objective

Standard C20

The design of streets and roads should:

- Meet the requirements of Table C1. Where the widths of access lanes, access places, and access streets do not comply with the requirements of Table C1, the requirements of the relevant fire authority and roads authority must be met.
- Provide street blocks that are generally between 120 metres and 240 metres in length and generally between 60 metres to 120 metres in width to facilitate pedestrian movement and control traffic speed.
- Have verges of sufficient width to accommodate footpaths, shared paths, cycle paths, integrated water management, street tree planting, lighting and utility needs.
- Have street geometry appropriate to the street type and function, the physical land characteristics and achieve a safe environment for all users.
- Provide a low-speed environment while allowing all road users to proceed without unreasonable inconvenience or delay.
- Provide a safe environment for all street users applying speed control measures where appropriate.
- Ensure intersection layouts clearly indicate the travel path and priority of movement for pedestrians, cyclists and vehicles.
- Provide a minimum 5 metre by 5 metre corner splay at junctions with arterial roads and a minimum 3 metre by 3 metre corner splay at other junctions unless site conditions justify a variation to achieve safe sight lines across corners.
- Ensure streets are of sufficient strength to:
 - ✦ Enable the carriage of vehicles.
 - ✦ Avoid damage by construction vehicles and equipment.
- Ensure street pavements are of sufficient quality and durability for the:
 - ✦ Safe passage of pedestrians, cyclists and vehicles.
 - ✦ Discharge of urban run-off.
 - ✦ Preservation of all-weather access and maintenance of a reasonable, comfortable riding quality.
- Ensure carriageways of planned arterial roads are designed to the requirements of the relevant road authority.
- Ensure carriageways of neighbourhood streets are designed for a minimum 20 year life span.
- Provide pavement edges, kerbs, channel and crossover details designed to:
 - ✦ Perform the required integrated water management functions.
 - ✦ Delineate the edge of the carriageway for all street users.
 - ✦ Provide efficient and comfortable access to abutting lots at appropriate locations.
 - ✦ Contribute to streetscape design.
- Provide for the safe and efficient collection of waste and recycling materials from lots.
- Be accessible to people with disabilities.
- Meet the requirements of Table C1. Where the widths of access lanes, access places, and access streets do not comply with the requirements of Table C1, the requirements of the relevant fire authority and roads authority must be met. Where the widths of connector streets do not comply with the requirements of Table C1, the requirements of the relevant public transport authority must be met.

A street detail plan should be prepared that shows, as appropriate:

- The street hierarchy and typical cross-sections for all street types.
- Location of carriageway pavement, parking, bus stops, kerbs, crossovers, footpaths, tactile surface indicators, cycle paths and speed control and traffic management devices.
- Water sensitive urban design features.
- Location and species of proposed street trees and other vegetation.
- Location of existing vegetation to be retained and proposed treatment to ensure its health.
- Any relevant details for the design and location of street furniture, lighting, seats, bus stops, telephone boxes and mailboxes.

Table C1 Design of roads and neighbourhood streets

Element	Access Lane	Access Place	Access Street – Level 1	Access Street – Level 2	Connector Street – Level 1	Connector Street – Level 2
Traffic Volume	300 vpd	300-1000 vpd	1000-2000 vpd	2000-3000 vpd	3000 vpd	3000-7000 vpd
Target Speed	10 km/h	15 km/h	30 km/h	40 km/h	50 km/h (40 km/h at schools, 20km/h at crossing points)	60 km/h or 50 km/h (40 km/h at schools)
Carriageway Width	5.5m	5.5m	5.5m	7 – 7.5m	3.5m per lane (4.0m at intersections)	3.5m per lane (4.0m at intersections)
Parking Within Street	None	1 verge space per 2 lots, or one-side on carriageway	1 verge space per 2 lots	Both sides	Dedicated lane 2.3m where required	Dedicated lane 2.3m where required
Verge Width	Not required	7.5m (3.5m / 2.5m min)	4.0 / 4.0m	4.5 / 4.5m	4.5 / 4.5m	6.0 / 6.0m
Footpath Provision	Shared Zone	1.5m (Not required if < 5 dwellings)	2 x 1.5m (2.0m at schools, shop, activity centre)	2 x 1.5m (2.0m at schools, shop, activity centre)	2 x 1.5m (2.0m at schools, shop, activity centre)	2 x 1.5m (2.0m at schools, shop, activity centre)
Cycle Path Provision	None	None	Shared Zone	Shared Zone	0.7 - 1.7m	0.7 - 1.7m or shared path

Appropriate plays are provided on the corner of intersections.

Road cross-sections are generally in accordance with Table C1 of the Planning Scheme. Access Streets are proposed with a road reserve of 16 metres or 14 metres adjacent to a drainage reserve. The access streets provide a 7.3 metre carriageway, accommodating parking on both sides of the street with sufficient space for one-way traffic flow (when two cars are parked on both sides, and two-way flow otherwise). Footpaths are proposed on one side of the access streets.

The availability for kerbside parking is dependent on the location of crossovers which will be determined as part of the detailed design for each residential lot. It is expected that the provision for kerbside parking will be acceptable in meeting the visitor parking demands associated with development of the site.

It is therefore considered that the subdivision satisfies the objectives of Clause 56.06-7.

5.2.7 Clause 56.06-8, Lot access objective

Standard C21

Vehicle access to lots abutting arterial roads should be provided from service roads, side or rear access lanes, access places or access streets where appropriate and in accordance with the access management requirements of the relevant roads authority.

Vehicle access to lots of 300 square metres or less in area and lots with a frontage of 7.5 metres or less should be provided via rear or side access lanes, places or streets.

The design and construction of a crossover should meet the requirements of the relevant road authority.

The internal road network proposes no arterial roads.

All lots with areas of less than 300 square metres or frontages of less than 7.5 metres are provided with access via access streets or lanes.

It is therefore considered that the subdivision satisfies the objectives of Clause 56.06-8.

5.3 Infrastructure Design Manual

The Infrastructure Design Manual (IDM) is a document prepared by numerous Victorian rural and regional Councils, providing a set of consistent requirements and standards for the design and development of infrastructure.

The manual provides cross-sectional requirements for rural and urban roads, with the relevant requirements to the subject site reproduced in Table 2.

Table 2 IDM Road Cross-Sectional Requirements – Urban Roads

Road Type	Max. Traffic Volumes (veh/day)	Min. Reserve	Carriageway Width	Min. Verge Width	Parking	Pedestrian / Cycle Provision
Access Lane	300	N/A	5.5m	N/A	Yes (x1)	No footpath No cycles
Access Place	300	14.0m	6.0m	3.5m	Yes (x1)	Footpath x2 No cycles
Access Street	1,000	16.0m	7.3m	3.5m	Yes (x2)	Footpath x2 No cycles
Collector Street Level 1	3,000	24.0m	11.0m	6.0m	Yes (x2)	Shared path x2
Collector Street Level 2	6,000	34.0m	2x7.0m + 5m median	6.0m	Yes (x2)	Footpath x2 Shared path x2
Court Bowl (Residential)	N/A	28.0m	10.0m radius	3.5m	N/A	Footpath x2 No cycles

Road cross-sections within the development are generally in accordance with the Infrastructure Design Manual. Access Streets are proposed with a road reserve of 16 metres or 14 metres adjacent to a drainage reserve. The access streets provide a 7.3 metre carriageway, accommodating parking on both sides of the street with sufficient space for one-way traffic flow (when two cars are parked on both sides, and two-way flow otherwise). Footpaths are proposed on one side of the access streets.

The proposed internal roads are therefore considered acceptable and in line with the IDM.

6 TRAFFIC

6.1 Traffic Generation

It is generally accepted that single dwellings on a lot in outer suburban areas may generate traffic at up to 10 vehicle trips per day (with 10% of these movements occurring in the respective peak hours), whilst in areas with good public transport, and for higher density dwellings, lower traffic generation rates are often recorded.

Considering the size of the dwellings proposed and the location of the site, it is anticipated that the proposed lots may generate up to 8 vehicle trips per lot per day, including 0.8 trips per lot during the peak periods.

Application of the above rates to the 27 lots proposed on-site equates to a daily traffic generation of 216 movements, including 22 movements during the AM and PM peak hour periods.

6.2 Traffic Distribution

For the purposes of this assessment, the following directional splits will be adopted:

- AM peak hour: 75 % outbound, 25 % inbound; and
- PM peak hour: 40 % outbound, 60 % inbound.

Application of the above rates to the proposed 27 lots equates to the traffic volumes detailed in Table 3.

Table 3 Anticipated Traffic Generation

<i>Period</i>	<i>Inbound</i>	<i>Outbound</i>	<i>Total</i>
AM Peak	4	18	22
PM Peak	13	9	22

Considering the surrounding road network, it is expected that the majority of traffic generated by the site would exit via Raglan Street to the south, with fewer vehicles exiting to Smith Street through the site addressed 17 Smith Street.

Furthermore, it is anticipated that the additional access proposed to Raglan Street will re-distribute some of the traffic generated by 17 Smith Street.

Considering the location of the site in relation to the arterial road network, public transport facilities, schools, recreation and retail and employment precincts, the directional distribution shown in Table 4 has been adopted.

Table 4 Adopted Directional Traffic Distribution

<i>Origin/Destination</i>	<i>Percentage</i>	<i>Distribution to Raglan Street Access</i>	<i>Distribution to Smith Street Access</i>
Smith Street – North	10%	100%	0%
Raglan Street – West	50%	50%	50%
Raglan Street – East	40%	0%	100%

6.3 Expected Future Traffic Volumes

As the traffic generated by the 53 lot residential subdivision approved to be developed at 17 Smith Street would not have been taken into account in the existing traffic volumes, and considering the proposed site access to Raglan Street would impact the distribution of the site, the following traffic assessment will also consider the traffic expected to be generated by 17 Raglan Street, assuming the same traffic generation rates and directional distributions identified above.

Based on the above, the expected future traffic volumes are shown below.

Figure 6 Expected Future Traffic Volumes – AM Peak

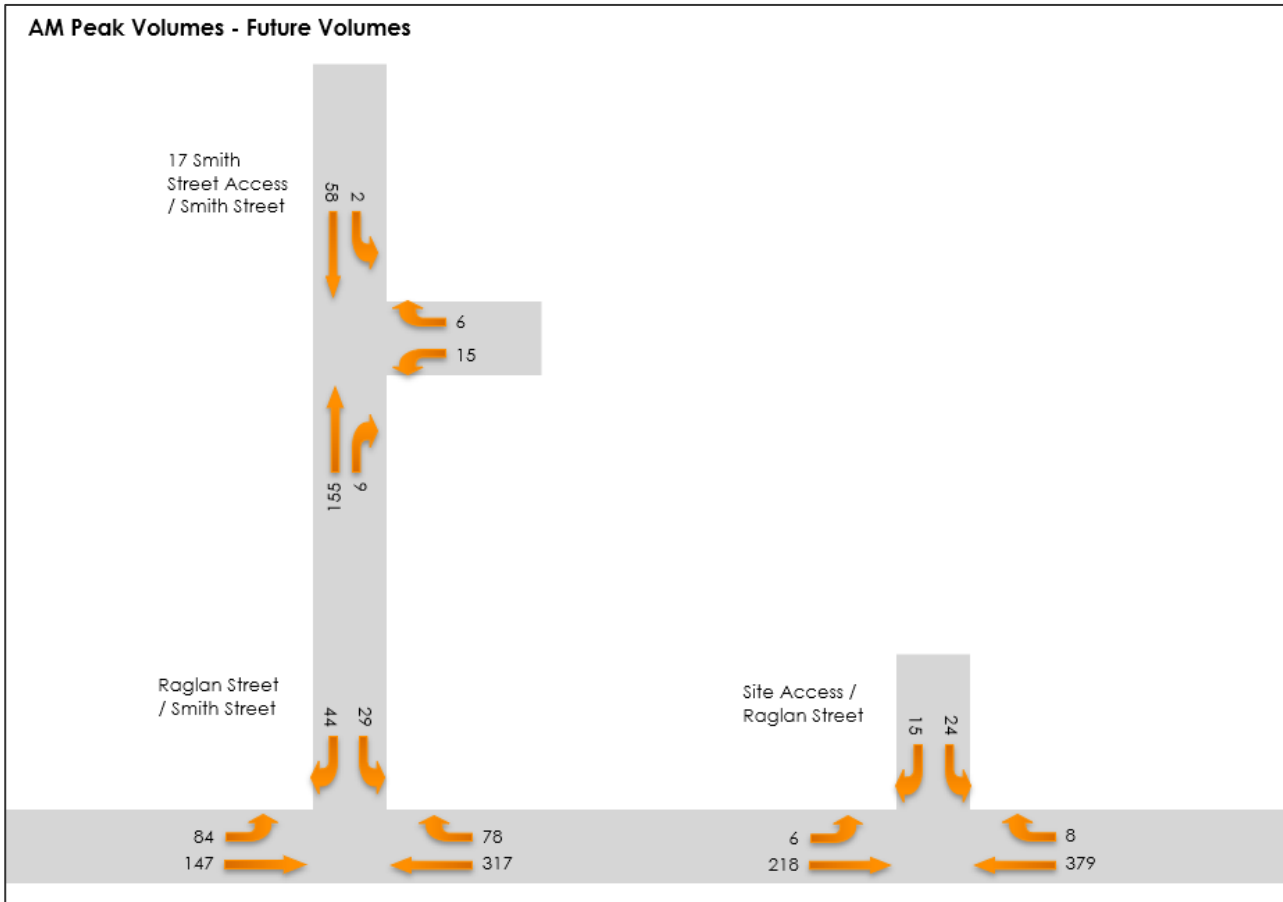
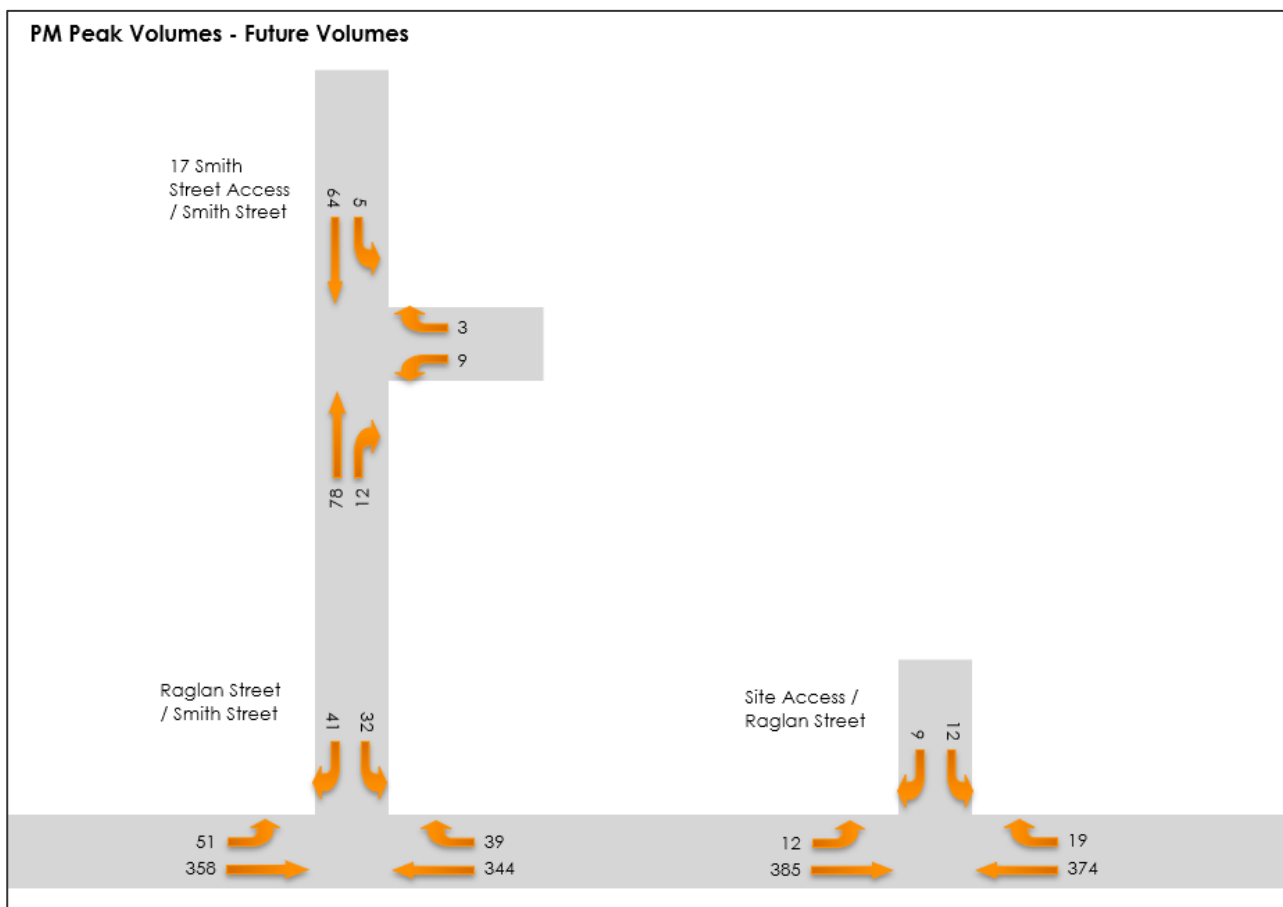


Figure 7 Expected Future Traffic Volumes – PM Peak



6.4 Traffic Impact

6.4.1 Austroads Turn Lane Warrants

A review of the post-development traffic volumes against the Austroads turn lane warrants suggests that a short channelised right-turn treatment (CHR(S)), and a basic left turn treatment (BAL) may be warranted. These warrants should balance the additional construction cost of higher-order treatments against the reduction in estimated crash costs.

Commentary within the associated Austroads Guide to Traffic Management Part 6 does however note that these warrants are based on the construction of intersections on new roads (i.e., greenfield sites), and are not strictly applicable for the construction of new intersections on existing roads, where construction costs of these treatments may be higher, and are not intended for direct application for property accesses and driveways. Noting the proposal has sensitive interfaces with The Avenue of Honour these are important considerations.

It is proposed to provide a BAL and BAR treatment at the site access to Raglan Street. A Concept Layout Plan has been prepared and is attached within Appendix A showing the proposed site access. The proposed arrangements seek to formalise the existing shoulders that are provided to ensure that there is no impact to the significant trees as part of The Avenue of Honour. It is considered that this approach achieves the balance sought by the Austroads turn lane warrants of safety, functionality and practicality.

To review the appropriateness of the existing access under future conditions from a traffic capacity point of view, the traffic volumes have been input into SIDRA Intersection, a traffic modelling software package.

6.4.2 Intersection Capacity Assessment

To assess the operation of the intersections between Raglan Street / Site Access, and Raglan Street / Smith Street, the traffic volumes have been input into SIDRA Intersection, a traffic modelling software package.

The SIDRA Intersection software package has been developed to provide information on the capacity of an intersection with regard to a number of parameters. Those parameters considered relevant are, Degree of Saturation (DoS), 95th Percentile Queue, and Average Delay as described below.

Table 5 SIDRA Intersection Parameters

Parameter	Description
Degree of Saturation (DoS)	The DoS represents the ratio of the traffic volume making a particular movement compared to the maximum capacity for that particular movement. The value of the DoS has a corresponding rating depending on the ratio as shown below.
	It is noted that whilst the range of 0.91 – 1.00 is rated as 'poor', it is acceptable for critical movements at an intersection to be operating within this range during high peak periods, reflecting actual conditions in a significant number of suburban signalised intersections.
Average Delay (seconds)	Average delay is the time delay that can be expected for all vehicles undertaking a particular movement in seconds.
95th Percentile (95%ile) Queue	95%ile queue represents the maximum queue length in metres that can be expected in 95% of observed queue lengths in the peak hour

The results of the analysis are provided below.

Table 6 Raglan Street / Site Access – Future Conditions

Approach	DoS	Avg. Delay (sec)	Queue (m)
AM Peak			
Raglan Street (East)	0.215	0.2	0.5
Site Access (North)	0.047	7.7	1.1
Raglan Street (West)	0.119	0.2	0.0
PM Peak			
Raglan Street (East)	0.227	0.6	0.2
Site Access (North)	0.033	9.2	0.1
Raglan Street (West)	0.227	0.2	0.0

Table 7 Raglan Street / Smith Street – Future Conditions

<i>Approach</i>	<i>DoS</i>	<i>Avg. Delay (sec)</i>	<i>Queue (m)</i>
AM Peak			
Raglan Street (East)	0.233	1.5	1.9
Smith Street (North)	0.106	10.5	2.6
Raglan Street (West)	0.129	2.1	0.0
PM Peak			
Raglan Street (East)	0.225	1.1	3.2
Smith Street (North)	0.132	12.1	3.2
Raglan Street (West)	0.225	0.8	0.0

As shown above, both intersections are operating under excellent conditions during both the morning and afternoon peak hours with minimal queues and delays experienced by motorists. Of note, there is not expected to be a queue of vehicles turning into the site therefore the impact to through traffic is not expected to be realised thereby verifying the proposed BAL and BAR treatments.

In view of the foregoing, the proposed access arrangements are considered satisfactory.

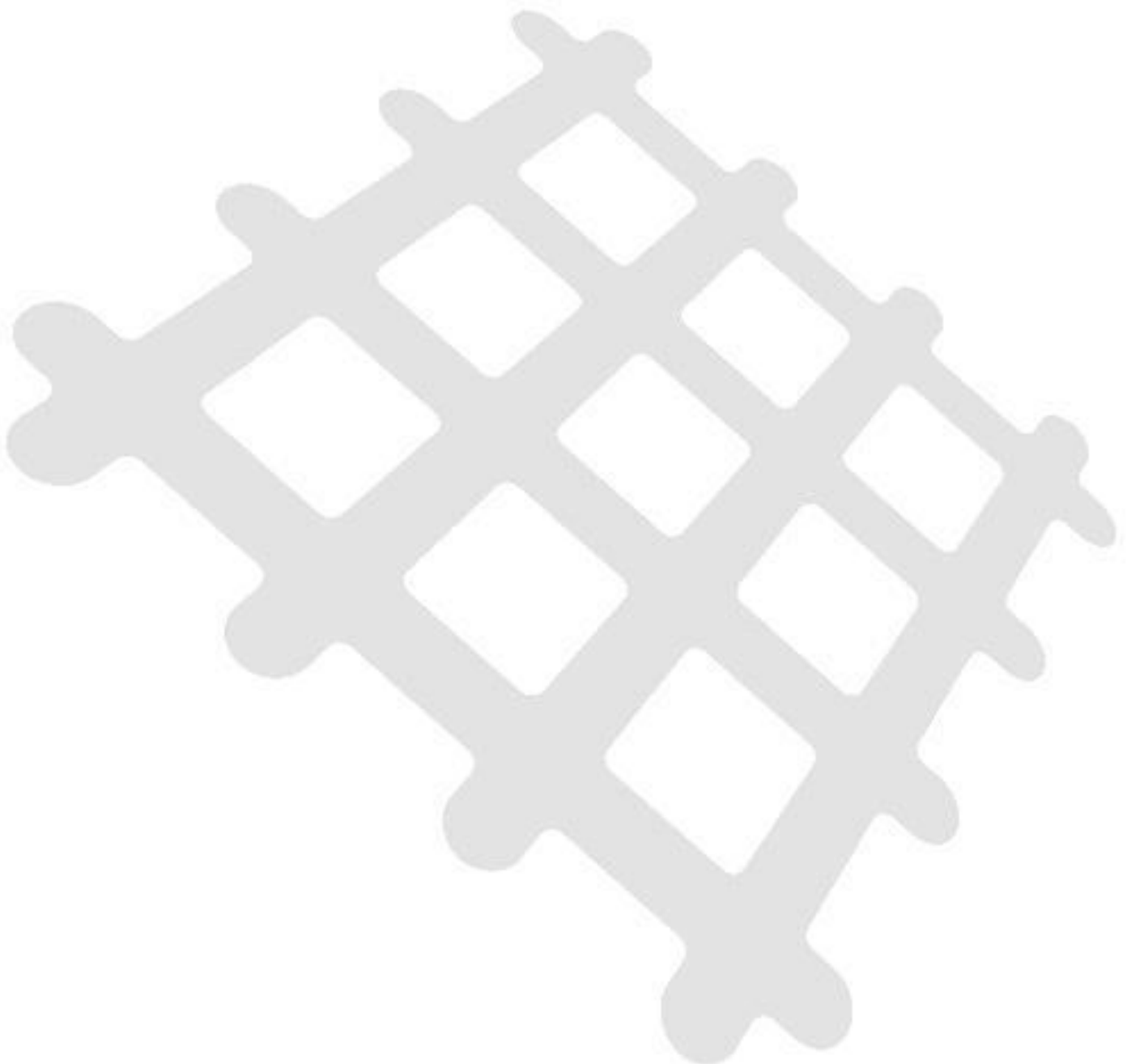
7 CONCLUSIONS

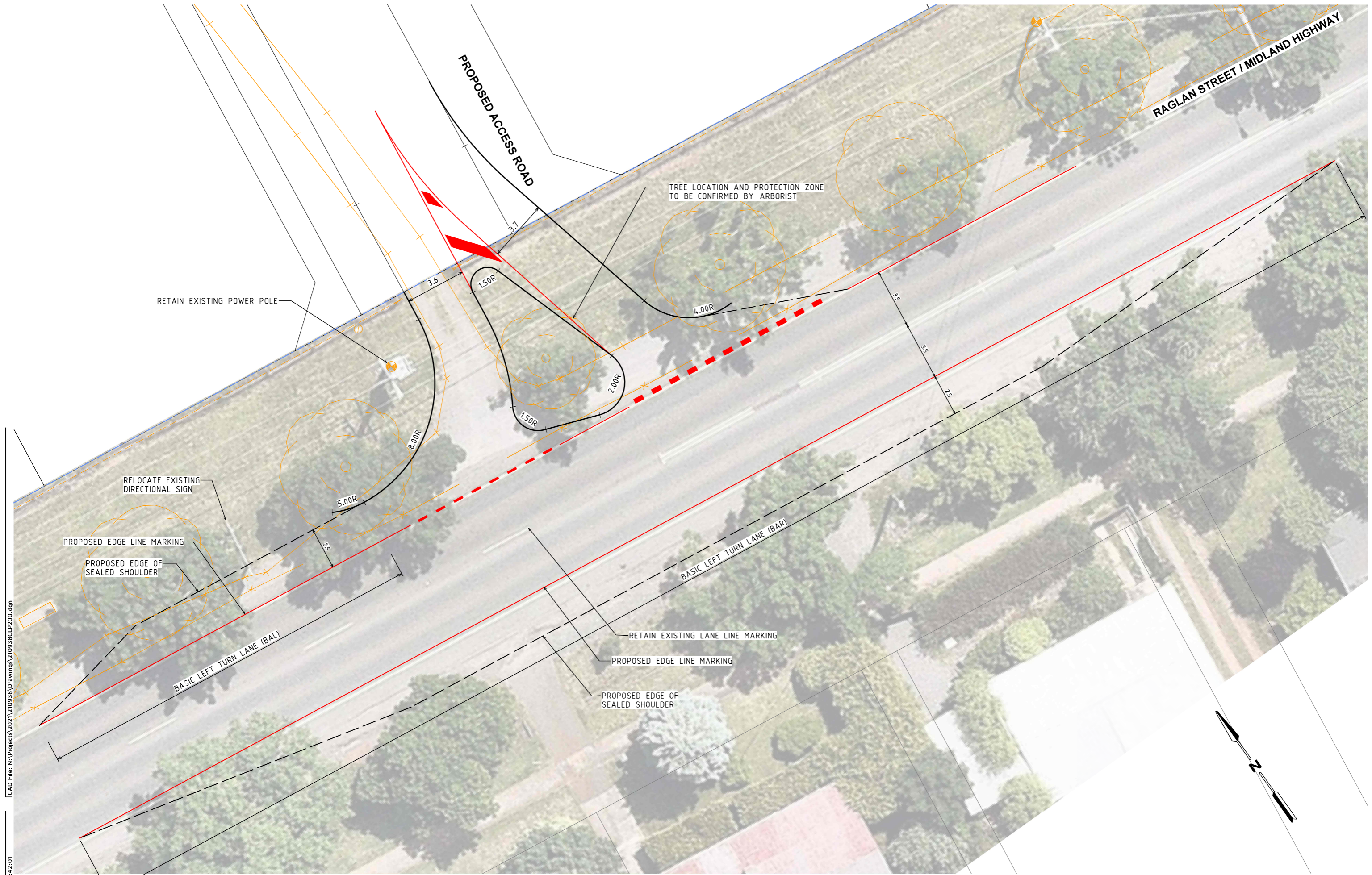
It is proposed to develop the subject site for the purposes of two residential subdivisions comprising a combined total of 27 lots.

Considering the analysis presented above, it is concluded that:

- The subdivision road network has been designed in accordance with Clause 56 requirements of the Hepburn Planning Scheme and the IDM guidelines;
- The layout of access streets throughout the development provides for on-street parking for use by visitors to the area;
- The developments are projected to generate 216 daily vehicle movements and up to 22 vehicle movements during the peak hour periods; and
- The proposed development is expected to have a negligible impact on the surrounding road network when compared to the existing operation.

Appendix A Concept Layout Plan





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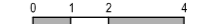
GENERAL NOTES

1. ALL DIMENSIONS TO FACE OF KERB AND CHANNEL UNLESS NOTED.
2. DECLARED ROAD - RAGLAN STREET / MIDLAND HIGHWAY (SPEED ZONE 60KM/H).
3. SIGNS AND LINE MARKING TO BE INSTALLED IN ACCORDANCE WITH VICROADS SUPPLEMENT TO AS1742.2.
4. ADOPT VICROADS SUPPLEMENT TO AUSTRALIAN STANDARDS AS REQUIRED.
5. TREE PROTECTION ZONE IS ESTIMATED AND TO BE CONFIRMED BY A QUALIFIED ARBORIST.
6. REMOVE ALL REDUNDANT SIGNS AND LINE MARKING.



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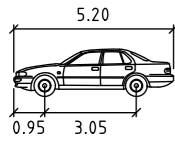
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Drawing Title
 9 RAGLAN STREET, DAYLESFORD
 PROPOSED INTERSECTION
 CONCEPT LAYOUT PLAN

Designed	Approved	Metway Ref
DK	VG	VR

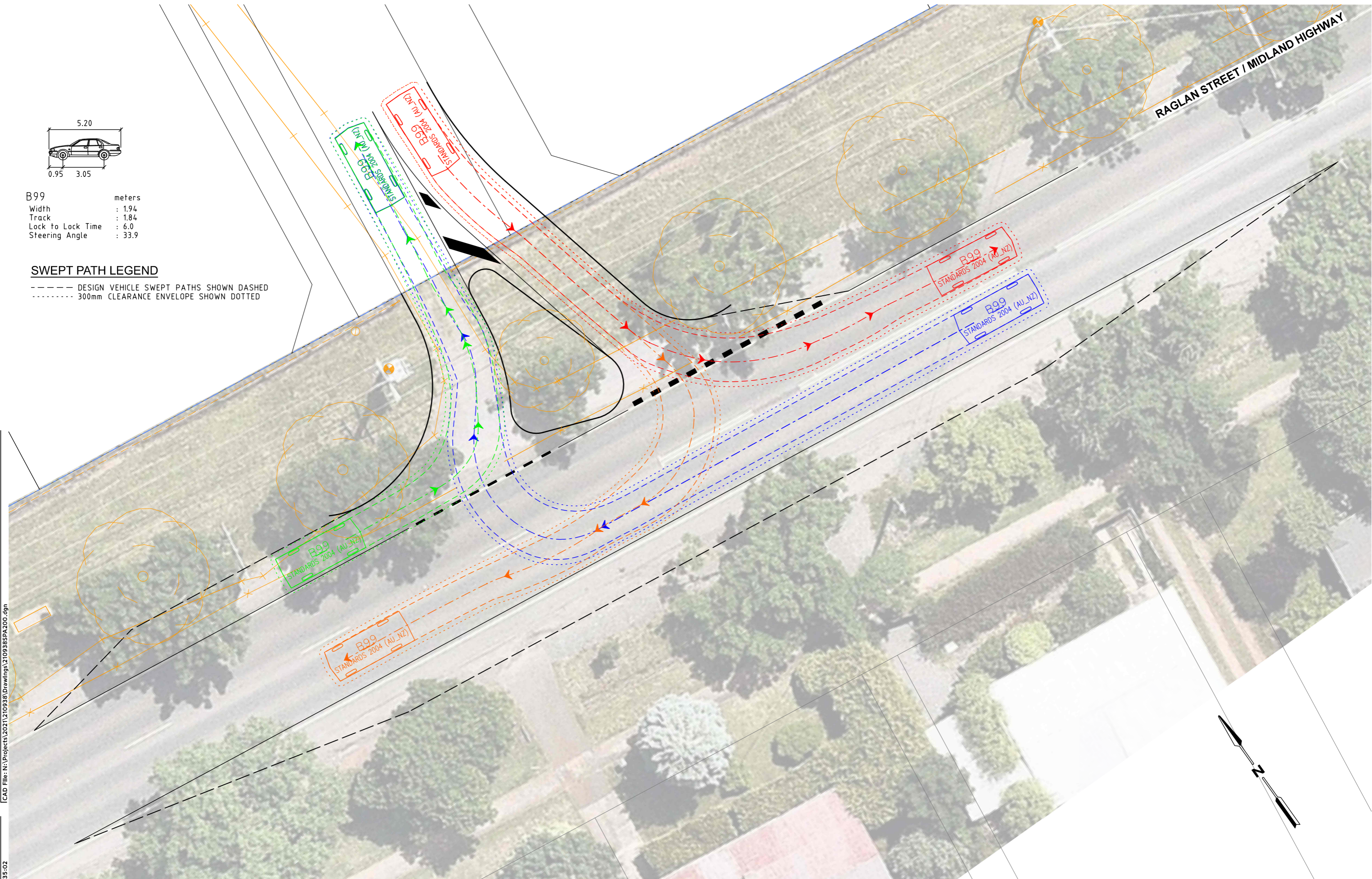
Project Number	Drawing Number	Revision
210938	CLP200	A



B99 meters
 Width : 1.94
 Track : 1.84
 Lock to Lock Time : 6.0
 Steering Angle : 33.9

SWEPT PATH LEGEND

- DESIGN VEHICLE SWEEP PATHS SHOWN DASHED
- 300mm CLEARANCE ENVELOPE SHOWN DOTTED



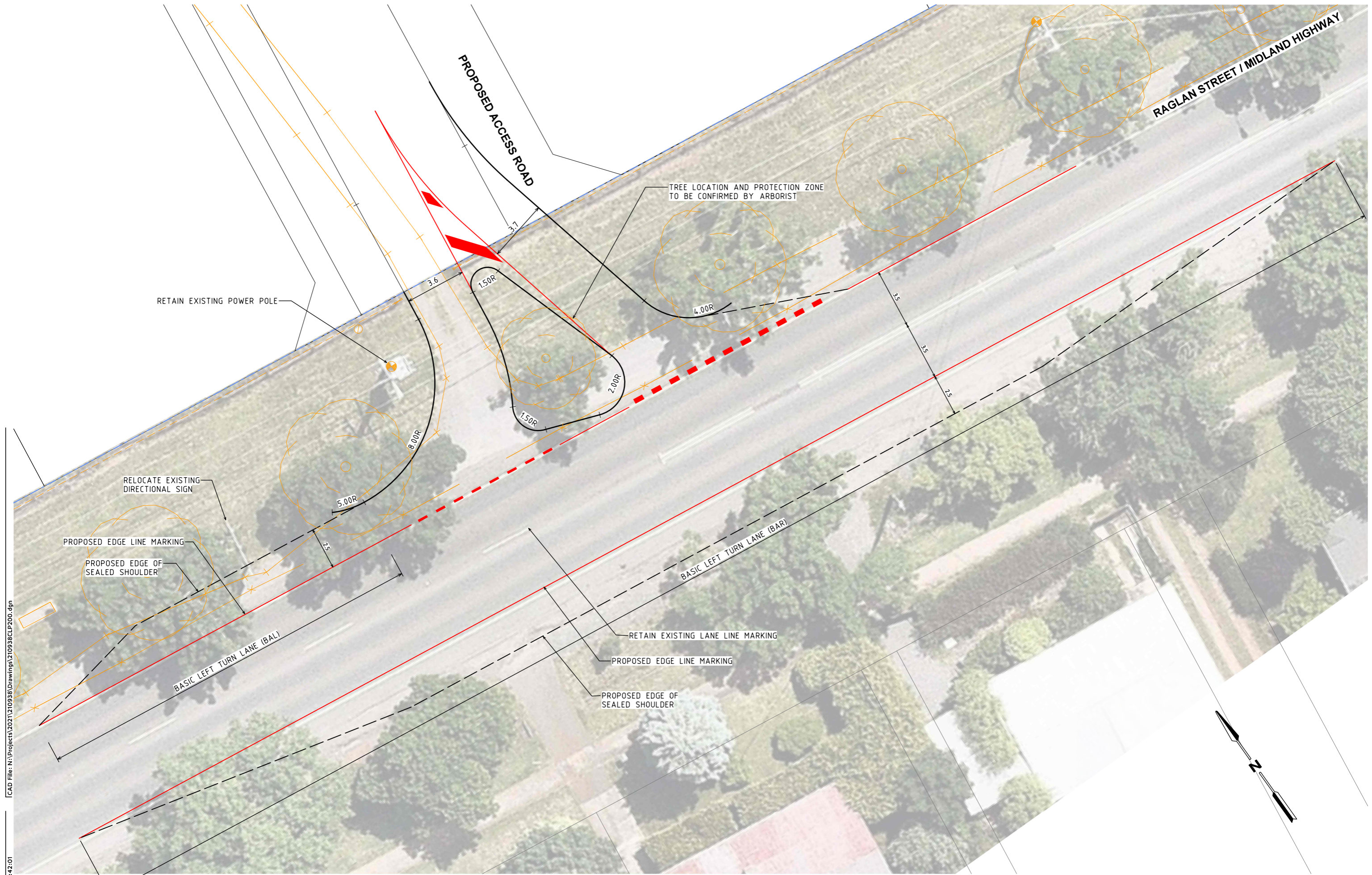
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Date Plotted: 02-12-2021 13:35:02

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Drawing Title 9 RAGLAN STREET, DAYLESFORD PROPOSED INTERSECTION SWEPT PATH ANALYSIS		
Designed DK	Approved VG	Metway Ref VR
Project Number 210938	Drawing Number SPA200	Revision A



CAD File: N:\Projects\2021\210938\Drawings\210938CLP200.dgn

Date Plotted: 02-12-2021 13:42:01

GENERAL NOTES

1. ALL DIMENSIONS TO FACE OF KERB AND CHANNEL UNLESS NOTED.
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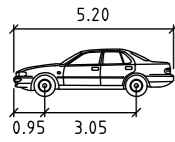
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Scale: 1:200 @ A3

Drawing Title
 9 RAGLAN STREET, DAYLESFORD
 PROPOSED INTERSECTION
 CONCEPT LAYOUT PLAN

Designed	Approved	Metway Ref
DK	VG	VR

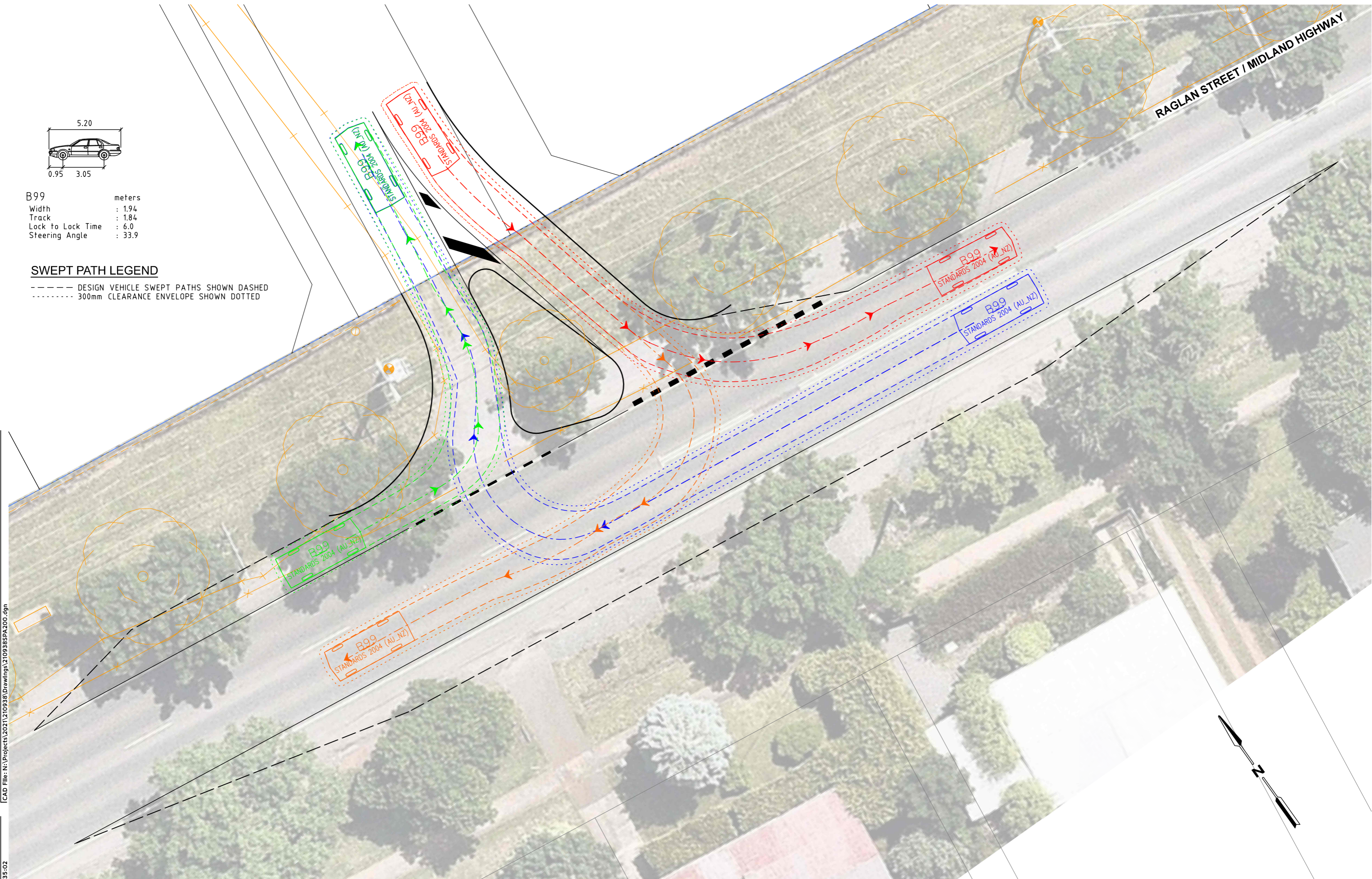
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Drawing Title 9 RAGLAN STREET, DAYLESFORD PROPOSED INTERSECTION SWEPT PATH ANALYSIS		
Designed DK	Approved VG	Metway Ref VR
Project Number 210938	Drawing Number SPA200	Revision A