



PROPOSED RESIDENTIAL SUBDIVISION 119 BRIDGE ROAD, BUSHFIELD

Transport Impact Assessment Report



efficient safe reliable    

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1 Introduction

1.1 Overview

A Development Plan has been prepared for a proposed residential subdivision located at 119 Bridge Road, Bushfield. ESR Transport Planning has been engaged to assess relevant transport implications of the Development Plan.

1.2 Scope of This Report

This report documents a transport impact assessment which investigates the following:

- Existing transport conditions in the vicinity of the site.
- Statutory transport planning requirements.
- Traffic movements generated by the proposed land use.
- Site access arrangements.
- Anticipated impacts on the surrounding road network.

1.3 Referenced Information

- An inspection of the site and surrounds March 2020.
- Austroads Traffic Management and Road Design Guides (various as noted in this report).
- Institute of Transportation Engineers (ITE), 2012, 9th Edition, *Trip Generation Manual*.
- Local Government Infrastructure Design Association, 2019, *Infrastructure Design Manual*.
- Myers Planning Group, July 2020, *Woodfields Estate Development Plan*.
- Roads and Traffic Authority (RTA), 2002, *Guide to Traffic Generating Developments*.
- Sitec, Jul. 2020, Bushfield Estate Bridge Road Bushfield Layout Plan.
- Transport NSW, 2013, *Guide to Traffic Generating Developments - Updated Traffic Surveys*.
- Trips Database Bureau (TDB), 2018, *Trips Database*.
- VicPlan maps and aerial photography (www.mapshare.vic.gov.au/vicplan).
- VicRoads traffic volume and Crashstats accident data (www.data.vic.gov.au).
- Warrnambool City Council, 2017, *Register of Public Roads*.
- Warrnambool Planning Scheme.

1.4 Terms

- | | | | |
|-----------|----------------------------------|-------|----------------------------|
| • AUL | auxiliary left turn treatment | • m | metres |
| • Council | Warrnambool City Council | • RRV | Regional Roads Victoria |
| • CHR | channelised right turn treatment | • vph | vehicle movements per hour |
| • IDM | Infrastructure Design Manual | • vpd | vehicle movements per day |
| • kph | kilometres per hour | | |

2 Existing Conditions

2.1 Site

The site is located south of Bridge Road and east of Brodies Lane. It is currently used as farming land and contains a residential dwelling near its northern boundary which has driveway access from Bridge Road.

Two planning zones apply to the property, a Low Density Residential Zone (LDRZ) with a Development Plan Overlay (DPO 2) for the majority of the site area and a Rural Living Zone (RLZ) with a Development Plan Overlay (DPO 3) for part of the southern area of the site.

Land to the west is also used as farming land with the same planning zones. Land to the south is farming land subject to a Farming Zone (FZ), and land to the east contains residential lots (LDRZ). On the opposite side of Bridge Road are rural living residential properties (RLZ).

Figure 2.1 Subject Site and Surrounds

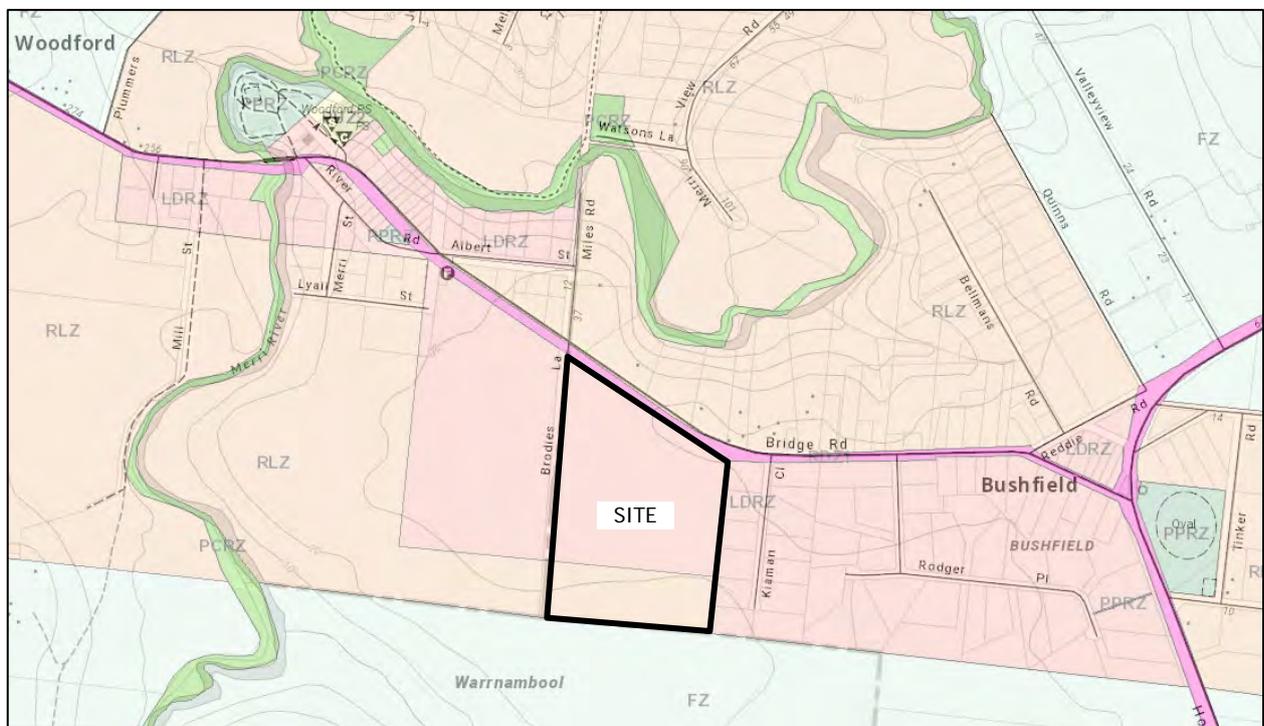


Image Source: VicPlan

2.2 Road Network

Bridge Road is classified as an Arterial Road (Road Zone Category 1, managed by Regional Roads Victoria (RRV)). It's pavement of approximately 8.5m width accommodates a traffic lane in each direction and a 60kph speed limit applies.

Approximately 80m southeast of the site's driveway is a crest. To the southeast and east of this crest, the roadway is relatively flat and curves. Northwest of the crest, the roadway slopes down, flattening near Brodies Lane, followed by a very slight crest a short distance northwest of Brodies Lane. The centreline changes from solid to broken in accordance with overtaking sight distance restrictions from these alignment and elevation changes.

The roadside is grassed and electricity poles and a shared path (pedestrian & cyclist) are located along the northern side. A guard rail is provided along the northern side between carriageway and shared path for a length of approximately 150m northwest from the site’s driveway.

Figure 2.2 Bridge Road (facing southeast, site on right)



Brodies Lane is classified as an Access Road with no posted speed limit. It extends south from Bridge Road for approximately 300m to a dwelling access. In this section it has a paved carriageway of approximately 3.5m width and grassed roadside areas. Further south of the dwelling access the road reserve accommodates a farm track.

Figure 2.3 Brodies Lane (facing south from Bridge Road, site on left)



2.3 Traffic Volumes

VicRoads traffic volumes databases¹ set out the following regarding traffic volumes along Bridge Road.

- Weekday daily volumes vary between approximately 2,000 vpd and 2,300 vpd, with weekend volumes in the order of 1,600 vpd.
- Peak hour volumes are in the order of 220 vph (weekday average) to 257 (highest peak) with relatively even distribution between westbound and eastbound traffic.
- Truck traffic represents approximately 17% of total traffic midweek.

Based on the land use accessed from Brodies Lane, it likely carries minimal traffic, such as 10 vpd.

2.4 Accident History

A review of road accidents in the site's vicinity has been undertaken using VicRoads Crashstats database² which includes accidents reported to police which resulted in personal injury within the last 5 years. The review investigated Bridge Road (Merri River to Hopkins Hwy) and Brodies Lane. In that time, no accidents were recorded providing no evidence of a recurrent accident pattern in the site's vicinity.

2.5 Public Transport, Walking & Cycling

Route bus services do not operate nearby.

A shared path (pedestrian & cyclist) extends along the northern side of Bridge Road. Otherwise, nearby roads generally do not have footpath provisions.

Nearby roadways generally do not incorporate on-road cycling lanes.

¹ Traffic Volumes for Freeways and Arterial Roads and Typical Hourly Volume (between Warrnambool-Caramut Rd & Warrnambool-Mortlake Rd), source: www.data.vic.gov.au.

² VicRoads Crashstats Last 5 Years database (www.data.vic.gov.au).

3 Development Plan

A Development Plan defines proposed development of the site. It envisages 2 phases of development planning, the first associated with development of the site area zoned as Low Density Residential, and the second associated with the balance of the site zoned as Rural Living with an associated planning scheme amendment.

The Development Plan sets out a total site yield of 38 residential lots (with 28 lots within the first phase of development).

A supporting internal road network forms a loop throughout the site and has a connection to Bridge Road near the site's eastern boundary. There are also 2 cul-de-sac roadways of approximately 40m length in the southern section of the site.

Internal roadways will predominately have 6.2m wide pavements (bound by 0.6m kerbing, i.e. effective carriageway width of 6.8m). The 2 cul-de-sac roadways will have 4.0m wide pavements (bound by 0.3m kerbing).

A 2.5m shared path (pedestrian & cyclist) is proposed along one side of the internal loop roads. The shared path is shown extending to Bridge Road at the site access intersection and near the site's northwest. A connection through to Brodies Lane in the south of the site is also proposed.

4 Traffic Assessment

4.1 Traffic Generation

Guidance on the likely traffic generating characteristics of the proposed development has been sought from TDB 2018, Transport NSW 2013, ITE 2012 and RTA 2002. These sources indicate that low density residential land use typically generates traffic as follows:

- AM peak hour, 0.7-0.8 vph / lot, 25% entering, 75% exiting.
- PM peak hour, 0.8-1.1 vph / lot, 65% entering, 35% exiting.
- Daily, 7.5-10 vpd / lot, 50% entering, 50% exiting.

Adopting traffic generation rates approximately midway within the ranges above, full occupation of the proposed subdivision is expected to generate site traffic movements in the AM peak hour, PM peak hour and daily time periods in the order of 29, 36 and 333 vehicle movements, respectively.

4.2 Traffic Distribution

The direction in which vehicles travel to and from the site will be influenced by a variety of factors including the site's location, characteristics of the surrounding road network and trip purpose.

After reviewing these factors, it is expected that development traffic will have a bias to / from Bridge Road east, compared to northwest, such as a 60-70% majority.

4.3 Traffic Volume Increase

Based on the analysis in Sections 4.1 and 4.2 above, additional traffic along Bridge Road due to the site's residential development will be in the order of 200-233 vpd east of the site and 100-133 vpd northwest of the site.

4.4 Ability of Nearby Road Network to Absorb Development Traffic

Existing weekday traffic volumes along Bridge Road vary between approximately 2,000 vpd and 2,300 vpd.

As a general rule, roadways with 2 traffic lanes typically experience high delays during commuter peak periods when daily traffic volumes are in the vicinity of 15,000 - 20,000 vpd³.

Clearly, Bridge Road has ample spare capacity to accommodate the relatively minor volume of additional traffic generated by the proposed development.

³ Interrupted flow capacity = 900 vph lane (Austroads Guide to Traffic Management Part 3), with 10% peak to daily ratio = 18,000 vpd.

4.5 Site Access Intersection

Location

The proposed site access location has been adopted following advice from ESR Transport Planning regarding suitable locations to avoid crests impeding on safe intersection sight distances.

Sight Distance

For a 60kph design speed, Austroads Guide to Road Design specifies the following minimum sight distances⁴: ASD (Approach Sight Distance) = 73m, MGSD (Minimum Gap Sight Distance) = 83, SISD (Safe Intersection Sight Distance) = 123m.

Field and desktop measurements indicate that a SISD in the order of 145m will be available between vehicles at the give-way position and cars emerging over the crest to the northwest.

Sight distances to / from the east will be far greater, such as several hundred metres.

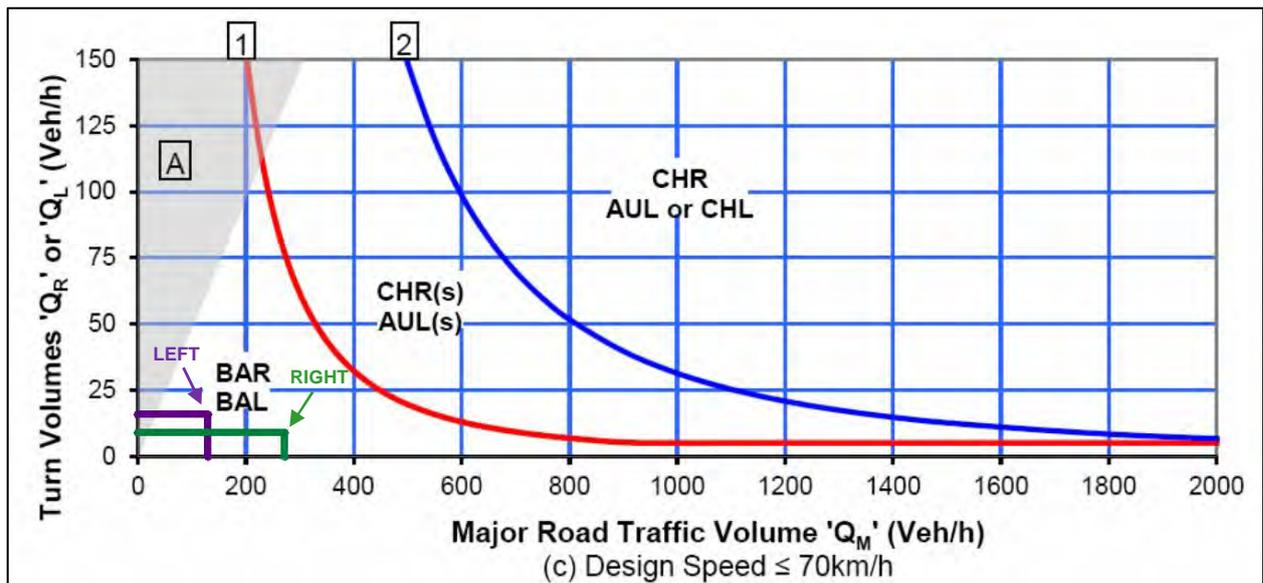
Layout

In the critical PM peak hour, traffic volumes entering the site are expected to be in the order of 16 vph left in and 9 vph right in. Given such low traffic volumes, together with existing low volumes along Bridge Road, the site access intersection is expected to operate well within available capacity without turning lanes.

Intersection turning lanes are provided at intersections for reasons including increasing capacity and safety benefits (e.g. reducing risk of through traffic rear ending turning traffic). Decisions regarding when turning lanes should be provided are typically based on cost versus benefit.

Austroads Guide to Traffic Management (Part 6) includes warrants for preferred minimum intersection turn treatments, based on 2006 analysis of benefit cost relationships focussing on road safety outcomes. These warrants give some quantitative guidance around decisions regarding turn lane provisions. Figure 4.1 sets out an assessment against these warrants.

Figure 4.1 Austroads Warrants Graph with Post Development PM Peak Turn Volumes



⁴ Coefficient of deceleration 0.36 (car on wet pavement), 2.0 second reaction time, 3.0 observation time, 5.0 second acceptance gap, flat grade, Normal Design Domain (NDD).

Figure 4.1 indicates that under post development traffic volumes, warrants for auxiliary or channelised turn lanes are not met. Figure 4.1 should be used for guidance only and other relevant considerations include the following:

- Bridge Road has a relatively high proportion of heavy vehicles.
- There is a crest nearby.
- Turn lanes are generally not provided along Bridge Road (only 1 exception being a right turn lane into Victoria Street).
- Bridge Road traffic volumes may increase in future as development in the local area occurs.
- The site's development incorporates in excess of 1km of new road construction, meaning a short length of Bridge Road widening may be considered a relatively small increase in road construction scope.
- Widening to provide a right turn lane would enable provision of a central pedestrian refuge (within painted median on the opposite side of the intersection).

Responsible Authorities sometimes require upgrade of the nearby road network as part of conditional approval of development proposals. These are typically mitigating works the Responsible Authority considers necessary as a result of the proposed development. Important considerations are nexus (the correlation between the proposed development and the project need) and equity (fairness, or that a developments share of benefit / use matches its contribution).

It is anticipated that upon review of this report, Regional Roads Victoria (RRV) will specify any requirements for intersection turn lanes. The provision of a short auxiliary left turn lane (AUL(s)) and a short channelised right turn lane (CHR(s)) are considered the highest order treatment that could reasonably be imposed upon the developer.

A concept plan has been prepared showing a potential layout of AUL(s) and CHR(s) treatments at the proposed intersection location, refer Appendix A.

4.6 Traffic Impact Summary

Given all of the above, the proposed subdivision is not expected to compromise the safe and efficient operation of the surrounding road network.

5 Transport Network Design Review

Preamble

The proposed transport network has been reviewed to assess its ability to accommodate the safe and efficient movement of all road users. The Warrnambool Planning Scheme and Infrastructure Design Manual (IDM) have been referred to as they provide specific guidance for new residential subdivisions. Other guideline documents include the Austroads road design publications.

Road Layout, Hierarchy and Cross Sections

The proposed road network layout will be easily navigated and provides convenient access to all lots.

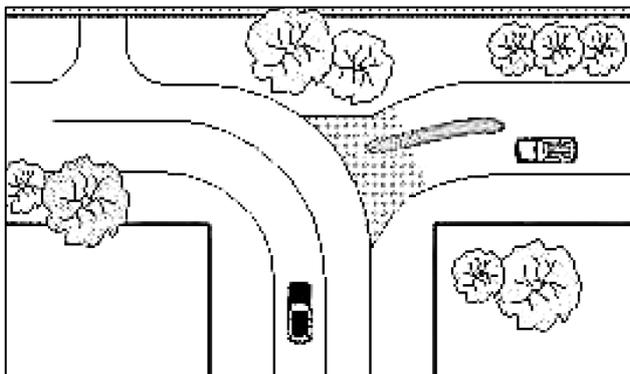
The internal roads forming a loop and a connection with Bridge Road could be classified as Access Roads. The proposed 6.2m width pavement is consistent with IDM specification for a Rural Living Access Road.

Both cul-de-sac roadways in the south of the site provide access to either 2 or 3 lots and are approximately 40m in length. Therefore, they will function as low traffic volume, low vehicle speed Access Lanes or Access Places. Short lengths of a single vehicle width carriageway is considered suitable for such roadway types.

Internal Intersections

A total of 3 internal intersections are shown in the Development Plan, all are T intersections and all are likely to experience highest traffic activity around the 90 degree corner, rather than straight through. Accordingly, it would be appropriate that a modified priority T intersection be provided, as per the example in Figure 5.1.

Figure 5.1 Example of a Modified Priority T Intersection



Walking & Cycling

The Development Plan incorporates walking and cycling connectivity throughout the subdivision and to Bridge Road in both the northwest and southeast directions, together with a connection to Brodies Lane and potential future residential land in that direction.

At the northwest Bridge Road connection, it should be noted that a guard rail exists on the northern side of Bridge Road. For a suitable road crossing location, the path will need to extend further northwest along Bridge Road as shown in Figure 5.2.

Figure 5.2 Recommended Shared Path Extension Northwest to Connect with Bridge Road Path

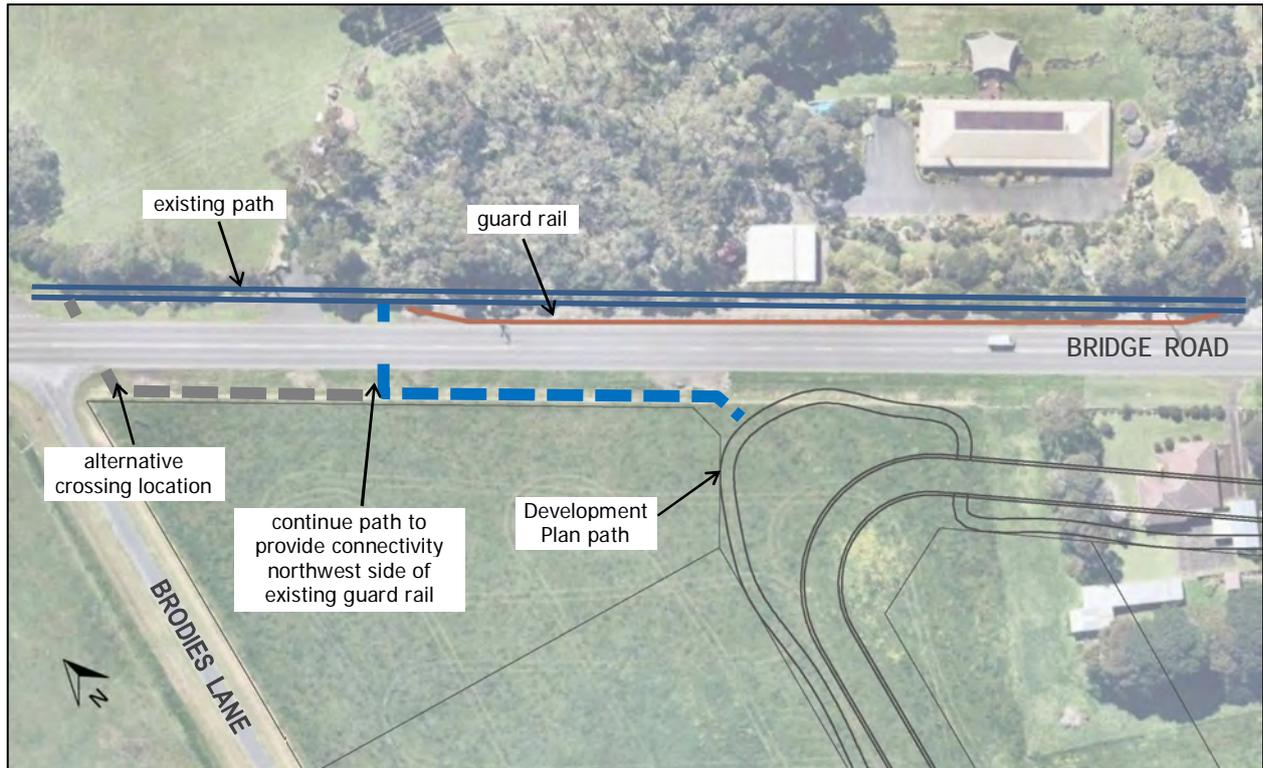


Image Source: Nearmap

The short cul-de-sac Access Lanes / Places can function as low speed shared carriageways (shared vehicular, cyclist and pedestrian use).

As noted above, should a right turn lane be provided at the Bridge Road site access intersection, it would be prudent to incorporate a central pedestrian refuge.

Large Vehicle Access

The internal Access Roads forming a loop have a geometry to cater for medium rigid trucks, such as waste collection and fire trucks, without any need for reversing movements.

It is anticipated that bins from lots within the cul-de-sac Access Lanes / Places will need to be placed kerbside of the looping Access Road for collection.

Summary

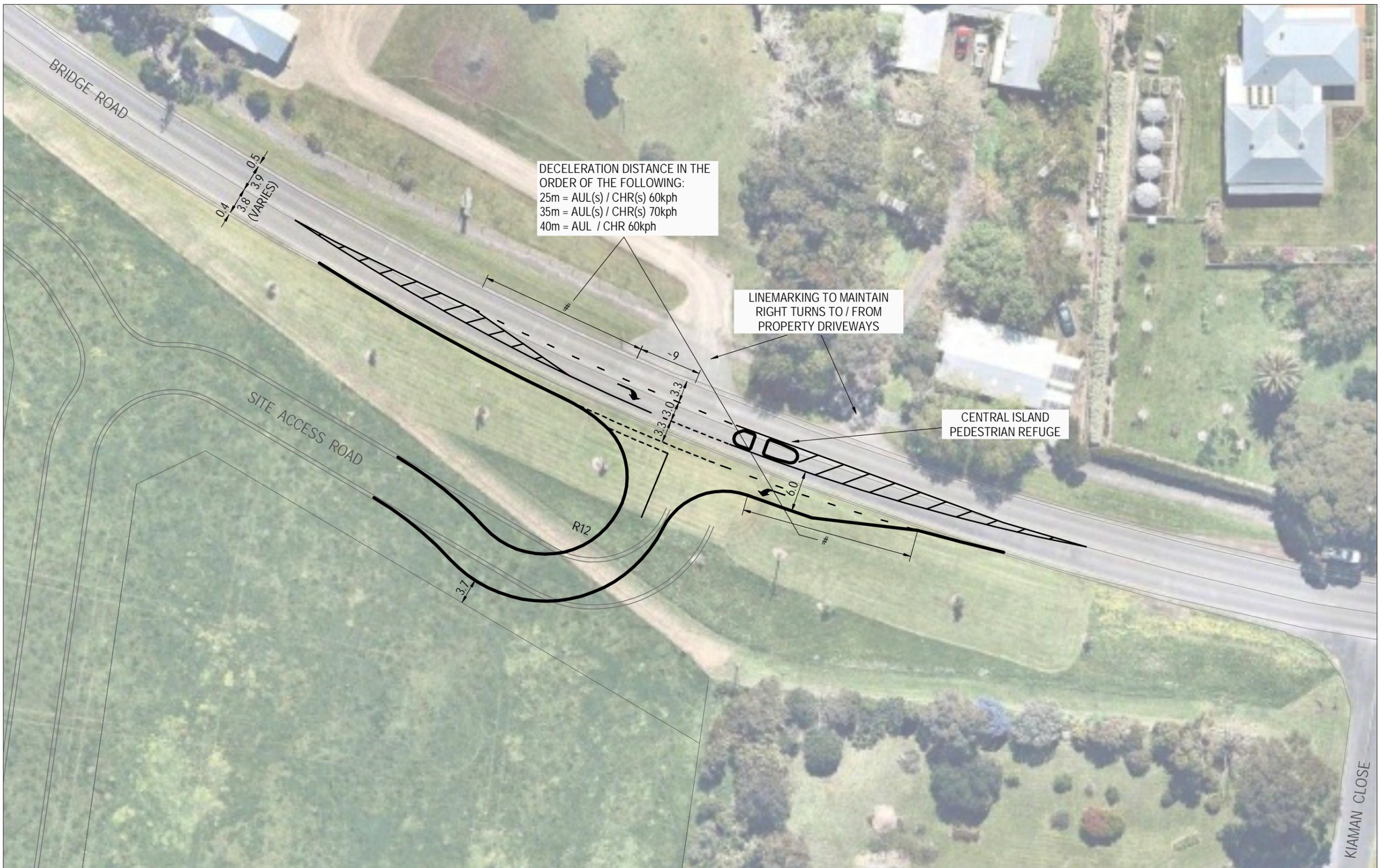
Given all of the above, the proposed Development Plan is considered consistent with the objectives of the Planning Scheme given it provides for the direct, safe and convenient movement for all road users.

6 Conclusions

The following conclusions have been made within this report:

1. The proposed subdivision is expected to generate traffic movements in the AM peak hour, PM peak hour and daily time periods in the order of 29, 36 and 333 vehicle movements, respectively.
2. The proposed subdivision is not expected to compromise the safe and efficient operation of the surrounding road network
3. The proposed subdivision will provide direct, safe and convenient movement for road users.

Appendix A Intersection Layout Plan



DECELERATION DISTANCE IN THE ORDER OF THE FOLLOWING:
 25m = AUL(s) / CHR(s) 60kph
 35m = AUL(s) / CHR(s) 70kph
 40m = AUL / CHR 60kph

LINEMARKING TO MAINTAIN RIGHT TURNS TO / FROM PROPERTY DRIVEWAYS

CENTRAL ISLAND PEDESTRIAN REFUGE

PROJECT: 119 BRIDGE ROAD, BUSHFIELD
 TITLE: PROPOSED SITE ACCESS ROAD INTERSECTION CONCEPT LAYOUT PLAN
 DATE: 1 SEPTEMBER 2020

NOTES:
 1. POSTED SPEED LIMIT = 60 kph.
 2. AERIAL PHOTO: NEARMAP, 01/10/19.
 3. BASE PLAN: SITEC, JUL. 2020, BUSHFIELD ESTATE BRIDGE ROAD BUSHFIELD LAYOUT PLAN.



SCALE: 1:500 (A3)

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