Blue Hills Quarry, Neereman

Proposed Quarry

Traffic Impact Assessment Report

Client:

Scope Project Consulting

Project No. 220124

FINAL Report – 5/10/2022

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EXECUTIVE SUMMARY

Scope Project Consulting has engaged Trafficworks to prepare a Traffic Impact Assessment Report (TIAR) for the proposed quarry at Blue Hills Quarry, Neereman.

The following report assesses the traffic and parking matters associated with the proposed site development.

A summary of the site and the proposed development is shown below.

Address	Blue Hills Quarry, Neereman
Zoning	Farming Zone (FZ)
Proposed development	Quarry
Road Network	Stones Road • Local Road • 100km/h Bridgewater-Maldon Road • Arterial Road • 100 km/h
Recommendations	• **Recommendation 1:** ensure that the access point to Stones Road is constructed to permit two semi-trailers to pass simultaneously. • **Recommendation 2:** a designated parking area be shown on the development plan to cater for at least 6 vehicles.

Referenced documents

References used in the preparation of this report include the following:

- Mount Alexander Shire Council:
  - *Planning Scheme*
  - *Public Road Register.*
- Austroads *Guide to Road Design:*
  - *Part 3 – Geometric Design, for operating speed, sight distance, horizontal and vertical geometry*
  - *Part 4 – Intersections and Crossings – General*
  - *Part 4A – Unsignalised and Signalised Intersections, for sight distance criteria and provision for turning vehicles at intersections.*
- Austroads *Guide to Traffic Management:*
  - *Part 6 – Intersections Interchanges and Crossings Management.*
- Infrastructure Design Manual *(IDM) version 5.30, dated 24 March 2020*
- RTA *Guide to Traffic Generating Developments, Version 2.2, October 2002*
- Department of Transport (DoT) *Open Data website:*
  - *Crashes Last 5 years* for crash history of the road network near the development
  - *Traffic Volume* for traffic volumes on Bridgewater-Maldon Road near the development.

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1 INTRODUCTION

Scope Project Consulting has engaged Trafficworks to prepare a Traffic Impact Assessment Report (TIAR) for the proposed quarry at Blue Hills Quarry, Neereman.

This traffic impact assessment was undertaken to:

- estimate traffic generation and distribution associated with the proposed development
- determine the suitability of the proposed access locations onto the adjacent road network
- determine the likely traffic impacts on the existing road network
- identify any necessary mitigating works.

2 EXISTING CONDITIONS

2.1 Subject site

The subject site is located within part of the title '9~11\PP2216' off Bells Lane in Neereman and is located approximately 11 km northwest of Maldon. The site is situated in a Farming Zone (FZ) of the Mount Alexander Shire Planning Scheme.

The location of the subject site and a planning map are shown in Figure 1 and Figure 2.

Figure 1: Aerial Photograph (Source: VicPlan)

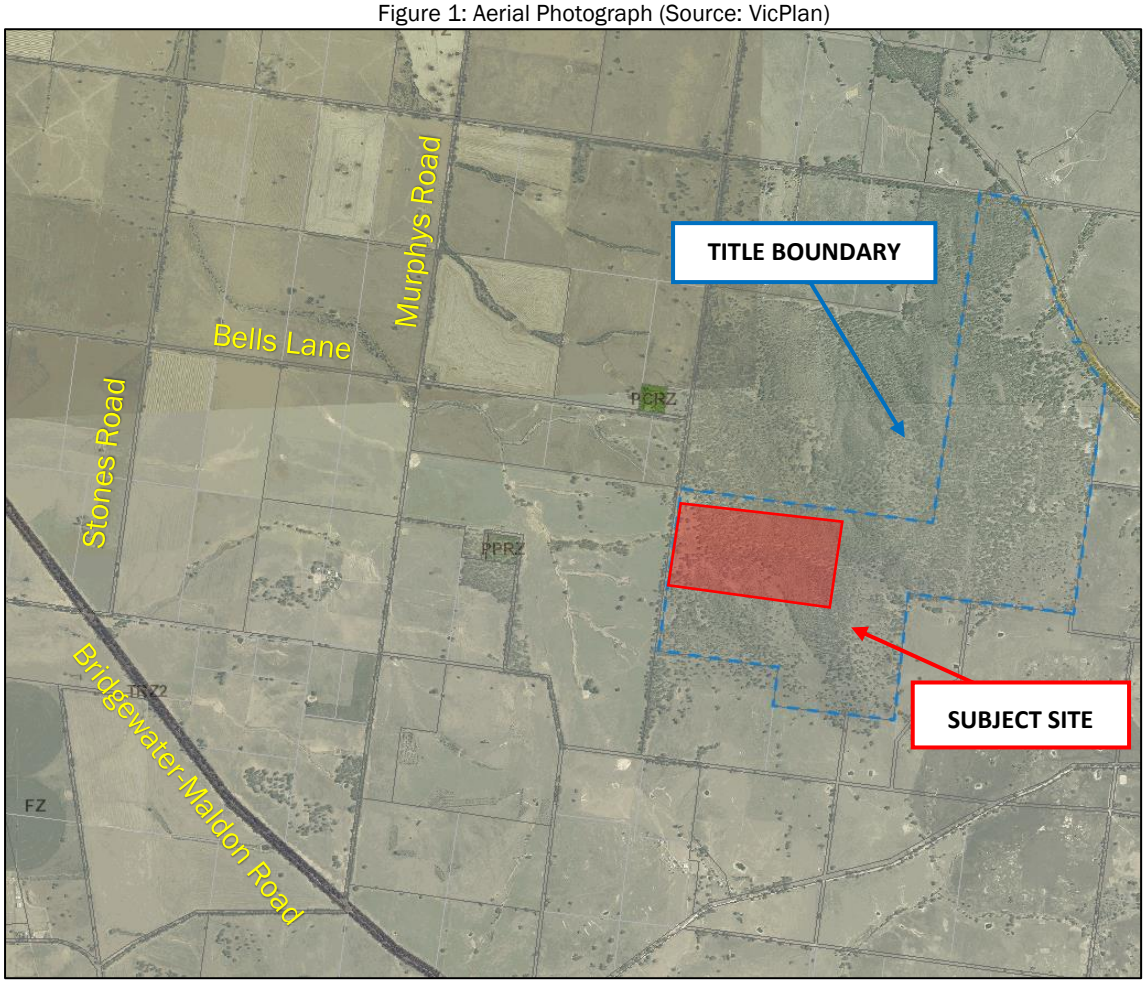
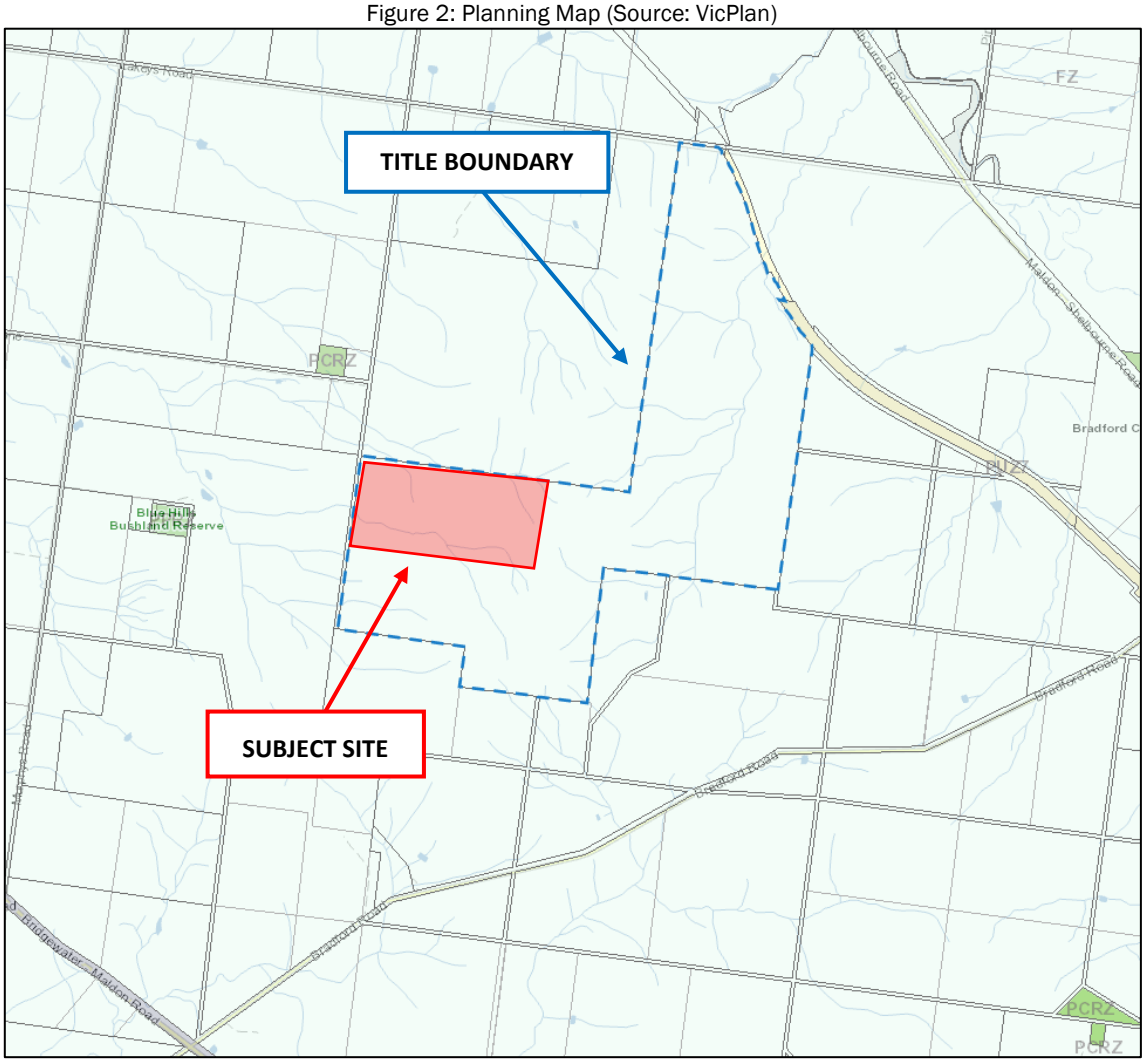


Figure 2: Planning Map (Source: VicPlan)



2.2 Road network

Stones Road is a road that connects Bridgewater-Maldon Road to the west to Lakeys Road in the north, where it continues north as Gallaghers Road.

In the vicinity of the intersection with Bridgewater-Maldon Road, Stones Road comprises an unsealed carriageway of approximately 5.0 m width with unsealed shoulders. Stones Road is subject to a default rural 100 km/h speed limit.

Figure 3: Stones Road looking east, in the vicinity of Bridgewater-Maldon Road

Figure 4: Stones Road looking west, in the vicinity of Bridgewater-Maldon Road

Bridgewater-Maldon Road is an arterial road that connects High Street, Maldon, in the southeast to the Wimmera Highway, Newbridge, in the northwest.

In the vicinity of Stones Road, Bridgewater-Maldon Road provides a single traffic lane in either direction with a sealed pavement width of approximately 7 m with unsealed shoulders on either side.

Bridgewater-Maldon Road is subject to the default rural speed limit of 100 km/h.

Figure 5: Bridgewater-Maldon Road - View North

Figure 6: Bridgewater-Maldon Road - View South

2.3 Traffic volumes

The Department of Traffic (DoT) Open Data Hub provides traffic volumes for the arterial road network in Victoria. The data hub provides an AADT of 1,172 vehicles per day (vpd) on Bridgewater-Maldon Road on a typical weekday, with 578 northbound and 594 southbound vpd (2020) with 9.5% heavy vehicles. The data hub identifies an annual growth rate of less than 1%.

The peak hour has been estimated to be 10% of the daily traffic, resulting in a two-way peak hour volume of 117 vehicles per hour (vph) (i.e. 58 northbound and 59 southbound).

2.4 Crash history

The DoT Open Data Portal details all injury crashes on roads throughout Victoria. Scrutiny of these records indicates that one casualty crash has occurred on Bridgewater-Maldon Road in the vicinity of the proposed access point in the last five-year period that data is available. It can be concluded that there is no discernible crash pattern at this location.

Conclusion 1: no trends in crashes were observed within the vicinity of the subject site in the last five-year period.

3 PROPOSED DEVELOPMENT

3.1 Proposed development summary

The proposed development is for a rock quarry with a peak operating volume of 500,000 tons per annum. The anticipated lifetime of the quarry is between 70 and 100 years.

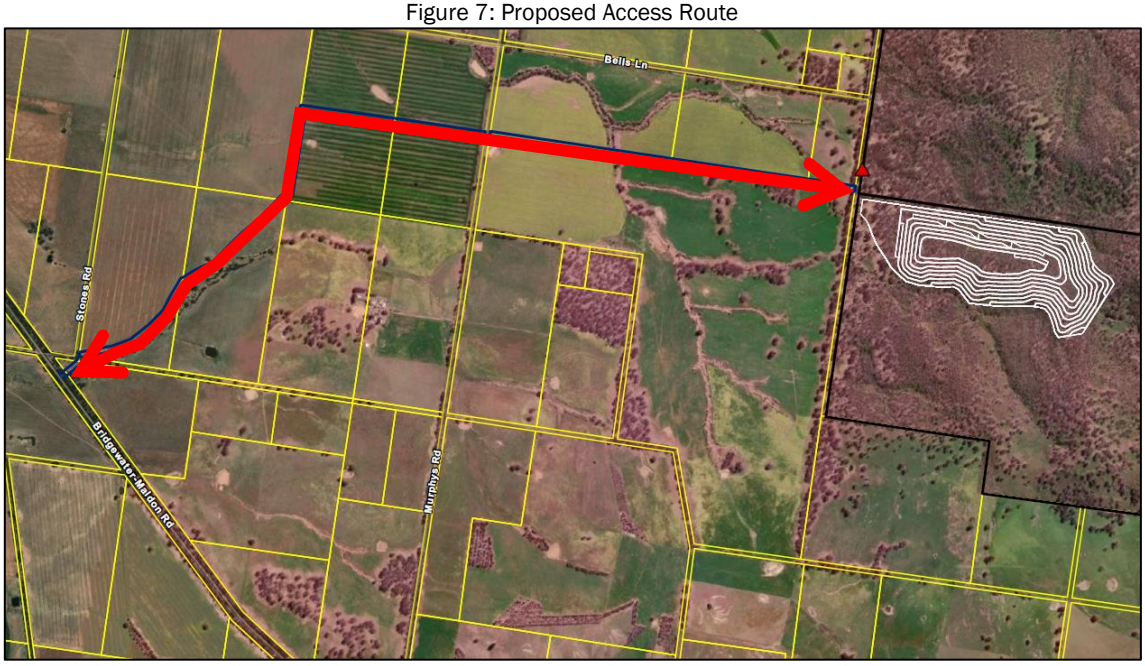
The quarry will employ approximately 6 full-time staff and a number of contractors. The proposed operating hours of the quarry are likely to be as follows:

- Quarry opening and haulage hours 7:00 am to 5:00 pm Monday to Saturday
- Blasting operations 9:00 am to 3:00 pm Monday to Friday (on demand).

The proposed quarry will generate approximately 14,700 truck movements annually (or about 60 loads per day).

The proposed access route for the quarry is via a private road constructed from the proposed quarry through to Stones Road to Bridgewater-Maldon Road, as shown in Figure 7.

Figure 7: Proposed Access Route



3.2 Trip Generation and Distribution

3.2.1 Traffic generation

The operator of the proposed quarry has estimated the traffic generation associated with the proposed quarry based on the expected truck and staff movements. A summary of the expected traffic volumes is below:

- Heavy vehicles: 14,700 annual total trips to commercial activities (approximately 120 trips per day)
- light vehicles: 12 total daily trips primarily related to staff.

The largest trucks to utilise the site will likely be semi-trailers and truck and dog vehicles.

3.2.2 Traffic distribution

During the peak period, it has been assumed that the traffic distribution will be 50% in and 50% out for each movement, except for staff movements which will be 100% in during the AM peak and 100% out during the PM peak. All traffic will enter and exit the site to Bridgewater-Maldon Road via Stones Road and the private access road.

Given the location of the quarry within the arterial road network and the proximity to the major highway corridors likely to need the high volumes of crushed rock produced by the quarry, distribution along Bridgewater-Maldon Road is expected to be:

- 50% to the southeast
- 50% to the northwest.

3.2.3 Anticipated traffic volumes

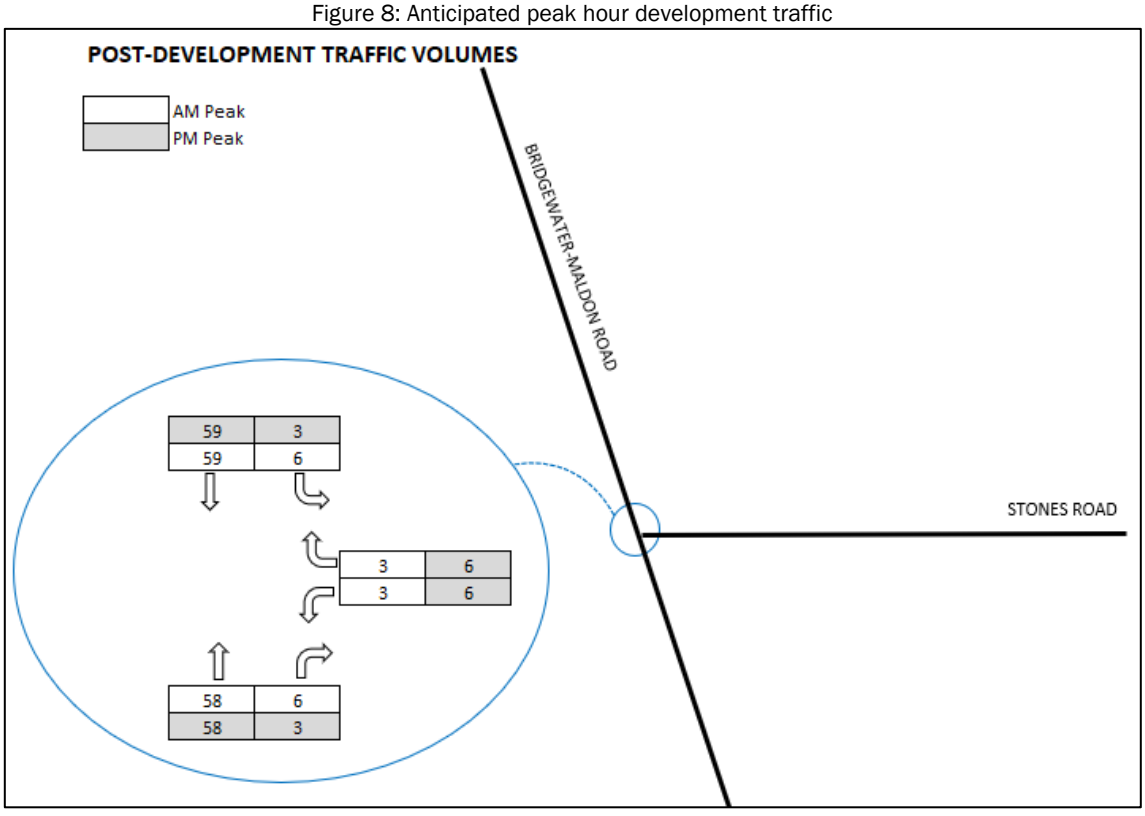
As noted in the section above, the proposed development will result in an additional 120 heavy vehicle trips and 12 car trips per day.

Evenly distributing the heavy vehicle trips across a 10 hour workday (as discussed previously) would result in 12 total heavy vehicle trips during a peak hour.

It is also estimated that the 12 total staff movements are comprised of 6 'in' 'movements occurring during the AM peak hour and 6 'out' movements occurring during the PM peak hour. There may also be occasional lunchtime trips, but this is not considered significant.

Combining the estimated peak hourly traffic volumes from the DoT Data Portal with the traffic generation and distribution above will result in the following anticipated peak hour traffic volumes.

Figure 8: Anticipated peak hour development traffic

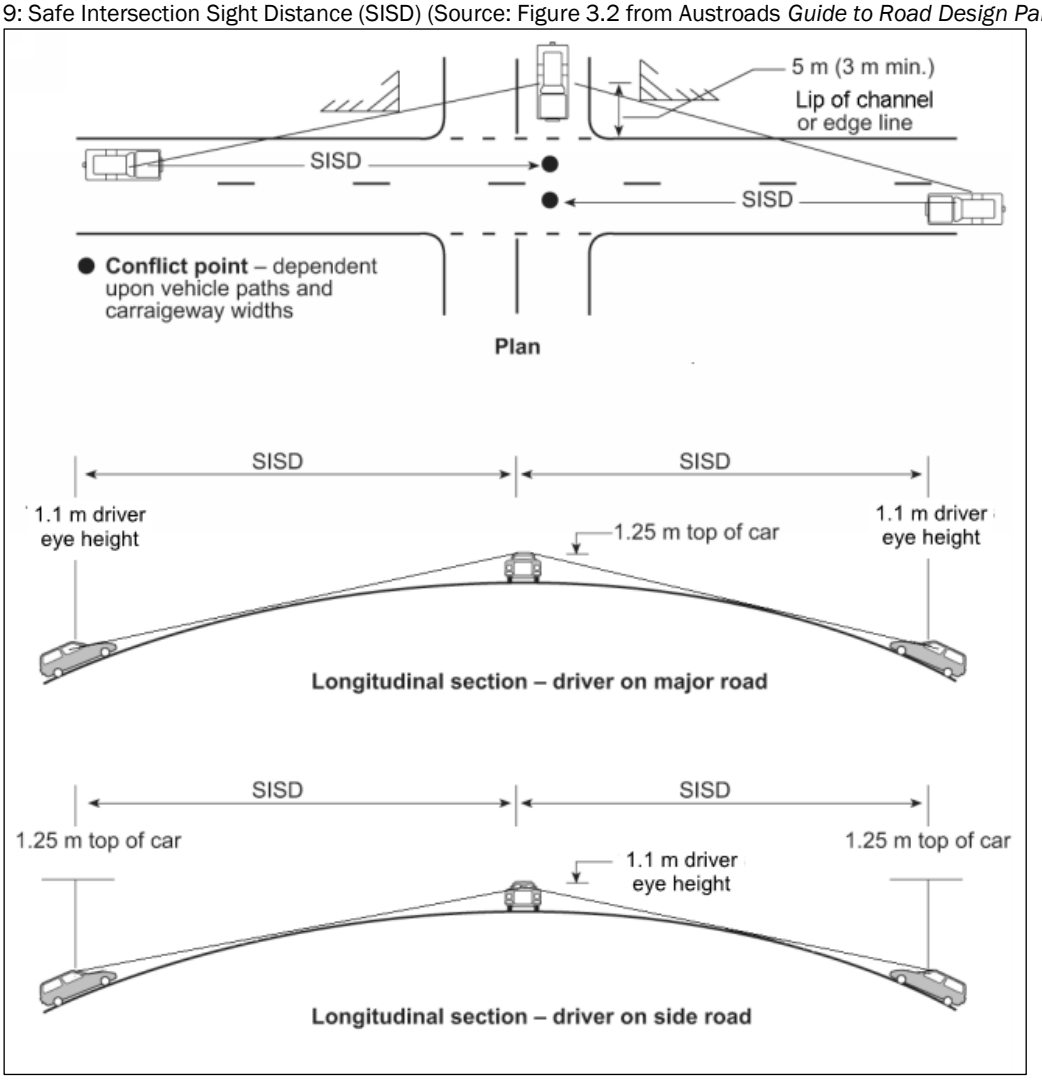


4 ASSESSMENT

4.1 Sight distance

The visibility criterion commonly applied to intersections is Safe Intersection Sight Distance (SISD). This is nominated in the Austroads Guide to Road Design, Part 4A (AGRD4) as the minimum distance which should be provided on the major road at any intersection (refer to Section 3.2.2 in AGRD4A) and provides sufficient distance for a driver of a vehicle on the major road to observe a vehicle from the minor access approach moving into a collision situation (e.g. in the worst case, stalling across the traffic lanes) and to decelerate to a stop before reaching the collision point (refer Figure 7).

Figure 9: Safe Intersection Sight Distance (SISD) (Source: Figure 3.2 from Austroads *Guide to Road Design Part 4A*)



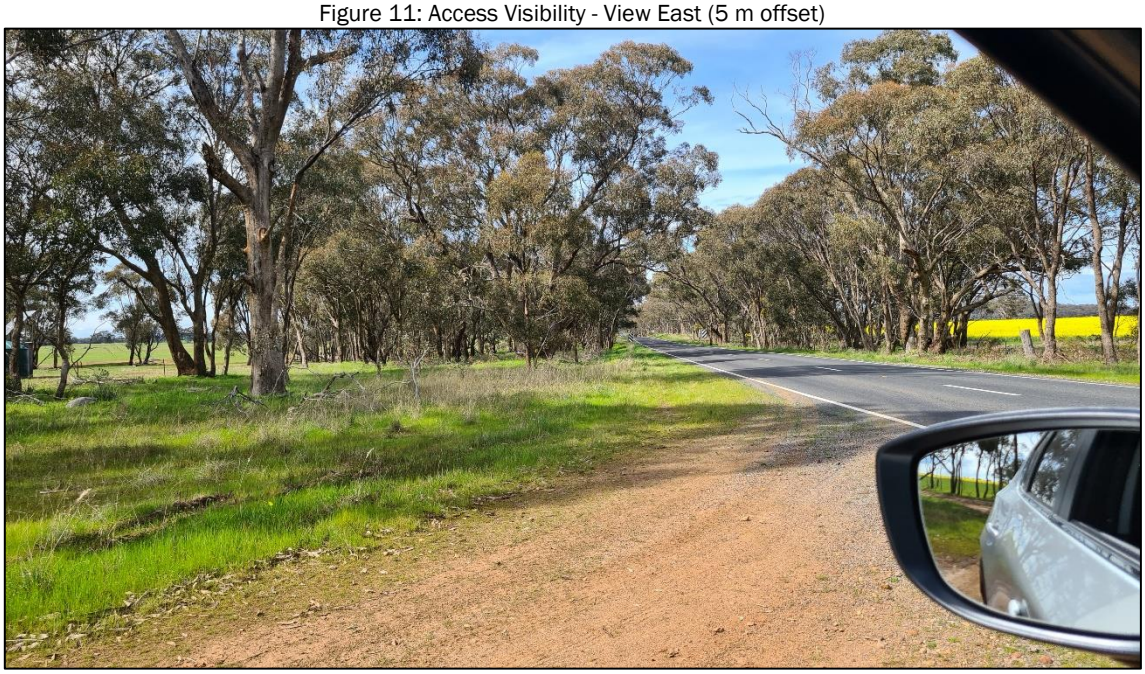
The minimum SISD criterion specified in Table 3.2 of the Austroads Guide requires clear visibility for a desirable minimum distance of 285 m, relating to the general reaction time R_T of 2 seconds and a design speed of 110 km/h (posted speed limit plus 10 km/h). This sight distance applies to Bridgewater-Maldon Road.

SISD for trucks should also be considered along Bridgewater-Maldon Road. SISD for trucks can be established from SSD (stopping sight distance) for trucks (given in Table 5.6 AGRD3) plus 3 seconds reaction time. This equates to SISD for trucks of 303 m for 100 km/h.

This visibility requirement, measured at 5.0 m from the edge of the traffic lane, is satisfied at the intersection of Bridgewater-Maldon Road and Stones Road (see Figure 10 and Figure 11), and no further treatment is required in this regard.

Figure 10: Intersection Visibility - View West (5 m offset)

Figure 11: Access Visibility - View East (5 m offset)



Conclusion 2: Safe intersection sight distance is satisfied at the proposed access location, and no further treatment is required.

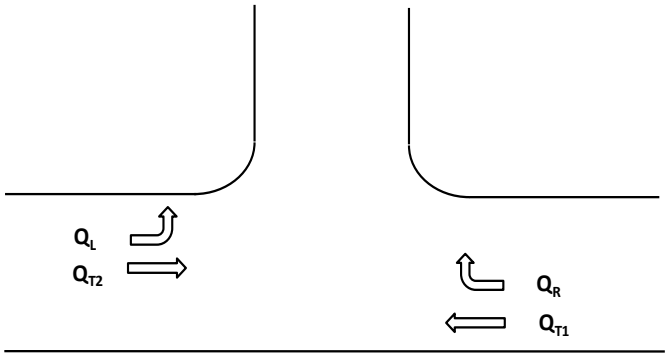
4.2 Access route

The proposed access route will generally be constructed on private land up to Stones Road, unsealed, with a formation width of 7-8 m.

4.3 Turn provisions

The traffic turning from major roads into minor roads should not delay through traffic. Turn treatments from major roads into minor roads at sign-controlled intersections are generally provided for safe and efficient intersection operation. The anticipated traffic generated from the proposed development is shown in Figure 8. The formulas (shown in Figure 12) were used to determine the major road volume (Q_M). The results were then applied to Figure 3.25 from Austroads *Guide to Traffic Management, Part 6: Intersections, Interchanges and Crossings Management* to determine the turning treatments for the intersections.

Figure 12: Formulas used to determine the major road traffic



Intersection	Turn Type		Major Traffic Volume Q_M
Major Road	Left Turn from the west into Minor Road	Q_L	Q_{T2}
	Right Turn from the east into Minor Road	Q_R	$Q_{T1} + Q_{T2} + Q_L$

Table 1 summarises the anticipated through and turning traffic volumes at the Bridgewater-Maldon Road / Stones Road intersection under the peak operating conditions of the quarry. Figure 13 determines the turning warrants required at the intersection based on these traffic volumes.

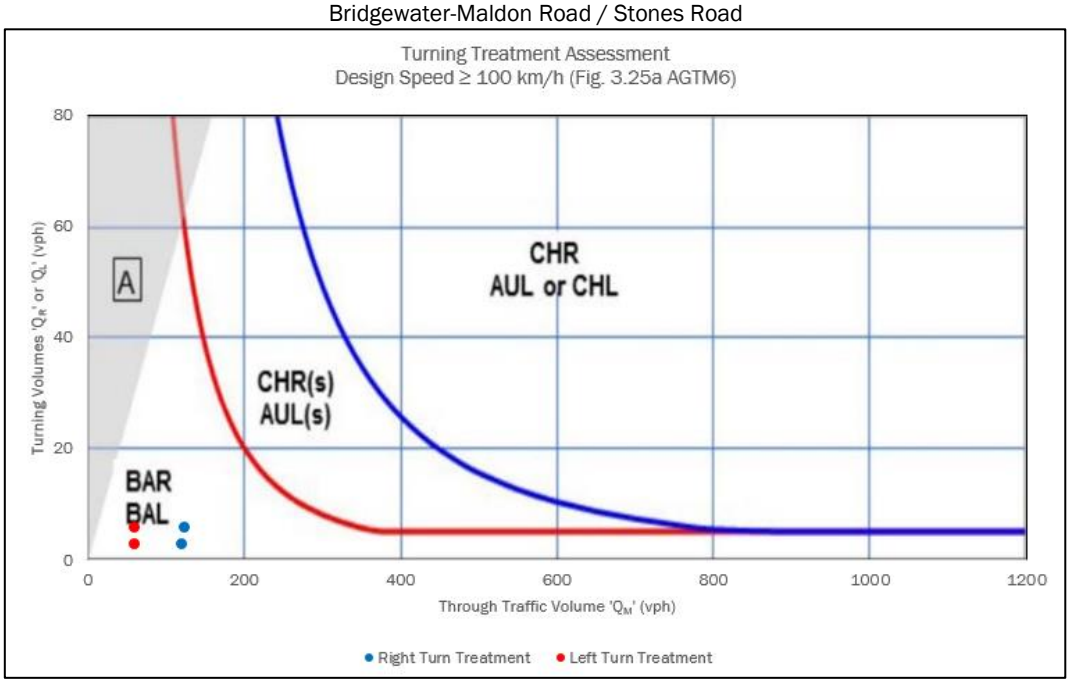
Table 1: Peak hour turn parameters at the intersection of Bridgewater-Maldon Road / Stones Road for uses in Figure 13

Major	Minor Road	Peak Period	Left Turn Q_L (vph)	Right Turn Q_R (vph)	Through Q_T (vph)		Q_M Left Turn	Q_M Right Turn
Bridgewater -Maldon Road	Stones Road	AM	6	6	Q_{T1}	58	59	123
					Q_{T2}	59		
		PM	3	3	Q_{T1}	58	59	120
					Q_{T2}	59		

The turning warrants assessment reveals that the intersection of Bridgewater-Maldon Road and Stones Road warrants a basic left (BAL) turn lane and a basic right (BAR) turn lane treatment for a 100 km/h and greater design speed for the quarry development.

It is noted that in Figure 13 below, the dots are in the lowest segment of the graph.

Figure 13: Graph used to determine the warrants for the left turn and right turn treatments at the intersection of Bridgewater-Maldon Road / Stones Road



Due to the very low Bridgewater-Maldon Road volumes and peak hour development volumes, providing a basic left (type BAL) and basic right (type BAR) turn lane treatment is not considered necessary at this intersection.

However, the intersection of Bridgewater-Maldon Road and Stones Road is atypical, with an unconstructed low angled entry and exit points, as shown in Figure 14.

Figure 14: Intersection of Bridgewater-Maldon Road and Stones Road

Given the proposed use of this intersection as an access road, it is recommended to reconstruct this intersection to accommodate two semi-trailers simultaneously entering and exiting the site.

Conclusion 3: no turn lane treatments are required at the intersection of Bridgewater-Maldon Road and Stones Road; however, the access should be redesigned and squared up to permit two semi-trailers to pass each other simultaneously.

Recommendation 1: ensure that the access is reconstructed to permit two semi-trailers to pass each other simultaneously.

4.4 Impact on the existing road network

As discussed in Section 4.1, the proposal will result in an additional 120 truck trips and 12 passenger vehicle trips per day, with 12 truck trips and 6 passenger trips occurring during each peak period.

Given that the magnitude of traffic generated by the site is minimal, there will be no material impacts on the operation of the intersection of Bridgewater-Maldon Road and Stones Road or the mid-block capacity of any relevant roads.

4.5 Parking

4.5.1 Statutory car parking requirements

Clause 52.06 of the Mt Alexander Shire Planning Scheme sets out the requirements for car parking for various land uses. The proposed development falls under the land use term 'Stone Extraction' under Clause 73 of the Planning Scheme.

Given that 'Stone Extraction' is not listed under Table 1 of Clause 52.06, parking must be provided to the satisfaction of the responsible authority.

On this basis, a car parking demand assessment will be undertaken to determine the parking demands of the proposed development.

4.5.2 Empirical assessment of car parking demand

We understand that the proposed development will result in an additional 6 staff members. It has been assumed that the additional staff car parking demand for the proposed development will be 6 parking spaces.

It is recommended to provide 6 parking spaces within the new development to accommodate the additional staff parking demand.

Conclusion 4: the staff car parking demand for the site is likely to be 6 spaces

Conclusion 5: the car parking demand can be accommodated within the subject site utilising a designated formal off-street car parking area, to be shown on the development plan for the subject site.

Recommendation 2: a designated parking area be shown on the development plan to cater for at least 6 passenger vehicles.

4.5.3 Truck parking requirements

There is no requirement for truck parking on the site as the vehicles will not be storing on the site overnight.

There is sufficient space on the site for the trucks to store before loading.

5 CONCLUSIONS

The following conclusions are drawn from assessing traffic impacts resulting from the proposed development of the Blue Hill Quarry in Neereman.

- no trends in crashes were observed within the vicinity of the subject site in the last five-year period; hence there are no traffic safety problems that require urgent remedial action
- safe intersection sight distance is satisfied at the intersection of Bridgewater-Maldon Road and Stones Road, and no further treatment is required
- no turn lane treatments are required at the intersection of Bridgewater-Maldon Road and Stones Road; however, the access should be designed to permit two B-triples to pass simultaneously.

The following recommendations have been made:

- **Recommendation 1:** ensure that the access point to Stones Road is constructed to permit two semi-trailers to pass simultaneously.
- **Recommendation 2:** a designated parking area be shown on the development plan to cater for at least 6 vehicles.

Provided the recommendations outlined in this report are implemented, no traffic-related reasons would prevent this development from occurring.

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