PROPOSED QUARRY EXTENSION

Lot 5 DP255133 at FEDERAL HIGHWAY, WOLLOGORANG

Traffic and Parking Impact Report

Prepared for: Denrith Pty Ltd

N206370A (Version 1c)

September 2020

1. INTRODUCTION

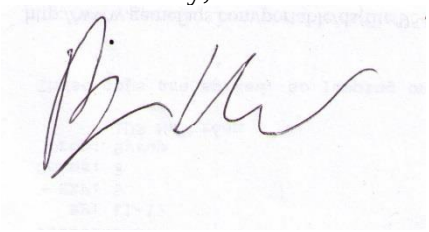
Motion Traffic Engineers was commissioned by Denrith Pty Ltd to undertake a traffic and parking impact assessment of the proposed extension to an existing and operating quarry located on Lot 5 DP 255133 at Federal Highway in Wollogorang.

In the course of preparing this assessment, the subject site and its environs have been inspected, plans of the extension examined, and all relevant traffic and parking data collected and analysed.

Benny Chen, Principal Traffic Engineer, MEngSc, MPublicPolicy.

Benny has significant experience (16 years) with traffic impact assessments and transport planning, having previously worked for multi-disciplinary firms in Sydney, Canberra and London. He has skills in traffic engineering and carpark and driveway design and certification. He is very familiar with AS2890 series on car and vehicle parking. He has also extensive experience in preparing traffic impact assessment for Extension Application approval to Council. Of significance to this project is his recent/current involvement with school related assessments associated with the federal government's Nation Building economic stimulus plan in Sydney.

Yours sincerely,



Benny Chen
Principal

2. BACKGROUND AND EXISTING CONDITIONS

2.1 Location and Land Use

The subject site is located within the *Rural Landscape Zone (RU2)* and the proposed quarry extension is classified as an extractive industry which means the mining or removal of materials. The proposed quarry extension will extract and screen up to 16,000 tonnes of friable granite per annum over 10-year period. The total area of the subject site will be 4.5 ha and it is within 500 metres of another extractive industry that has operated during the last 5 years.

The proposed extension will not increase the volume of extracted material per annum but it will increase the life of the quarry for an estimated 10 years.

Figure 1 shows the location of the subject lot and proposed quarry extension from an aerial perspective.

Figure 2 shows the location of the proposed site in relation to the surveyed intersection.

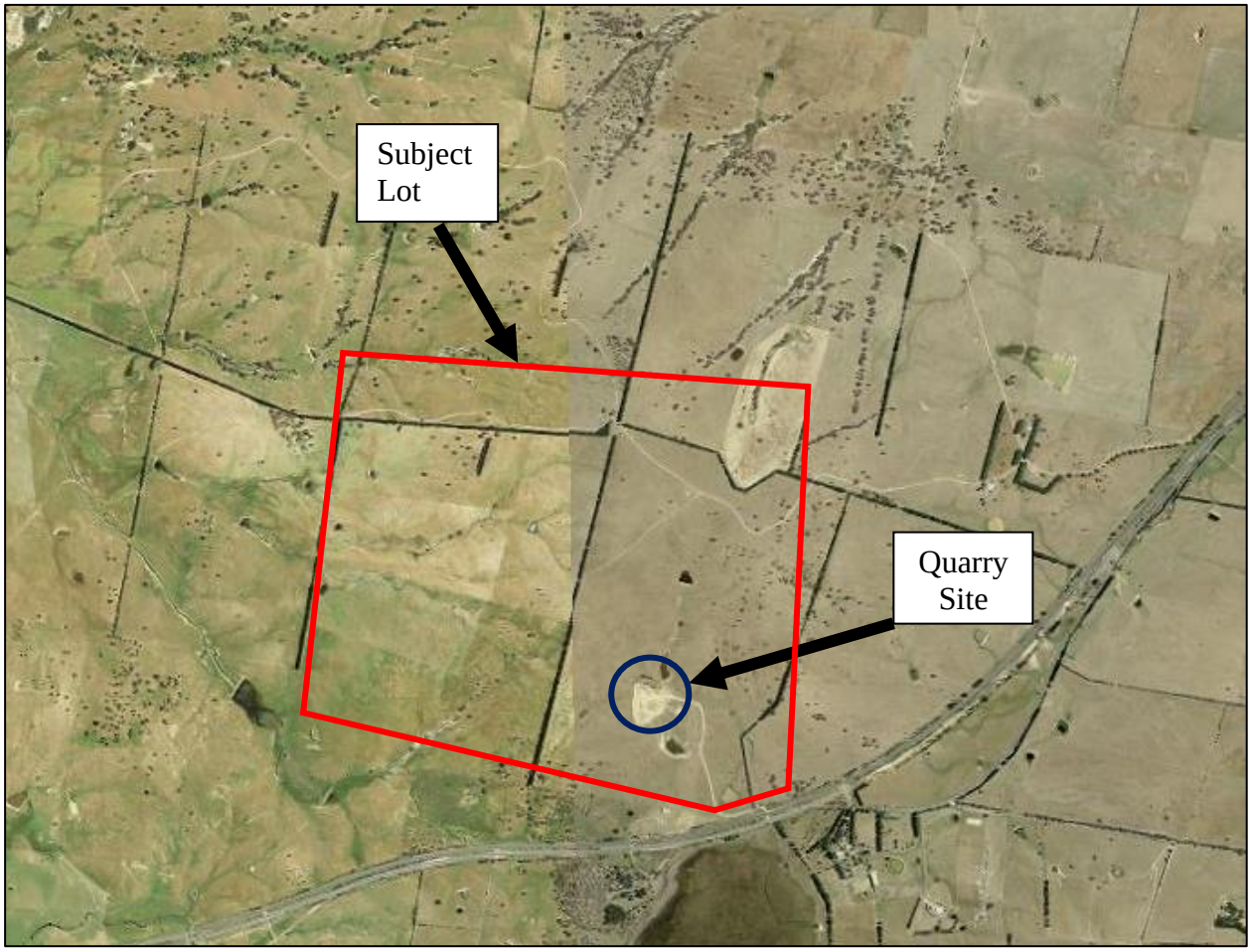


Figure 1: Location of the Subject Site on Aerial Photography

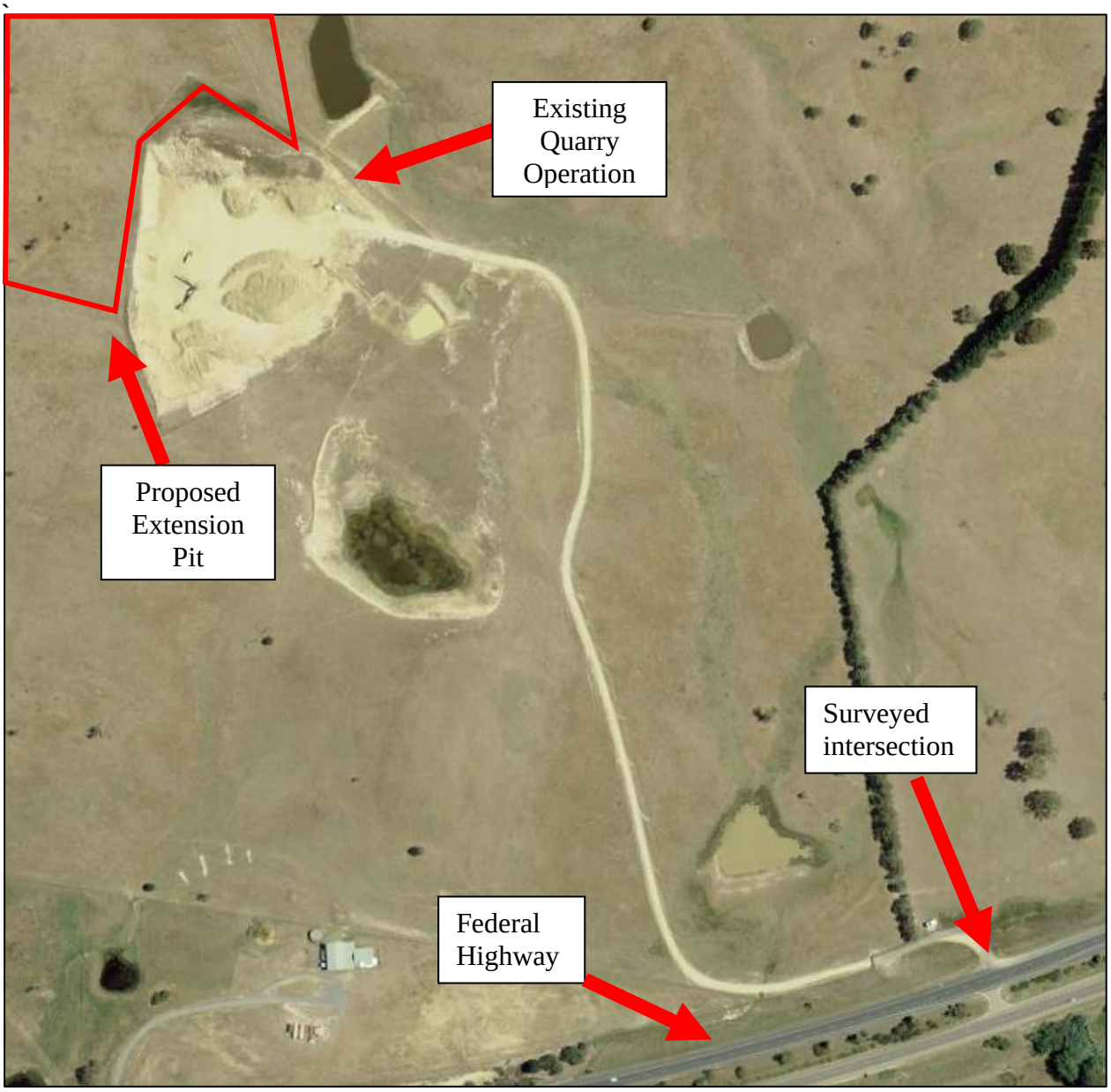


Figure 2: Location of the Subject Site on SIX Maps

2.2 Road Network

This section describes the roads adjacent to the proposed quarry.

Federal Highway is classified as a motorway and provides links between Hume Highway and Canberra (Australian Capital Territory). Federal Highway is labelled as the M23 between its northern terminus and Sutton, then as the A23 from there to its southern terminus. The sign posted speed limit of the road within New South Wales is 110km/hr and within the Australian Capital Territory the speed limit reduces to 80km/hr. This road has two lanes of traffic each way (at the midblock) on a divided carriageway for the entire length.

The road shoulder for the left turn out from the private road is sealed as shown in Figure 3B.

Figure 3A: Federal Highway Facing East from near the Quarry

The Private Road is the entry point of the existing quarry and will remain without any changes after the extension. This road does not require to manage two-way truck traffic as the truck movements are low (an average of two in and two out per day). Figure 4 presents a photograph of the Private Road from Federal Highway.

Figure 3B: Federal Highway Facing East from near the Quarry showing sealed road shoulder

Figure 4: Quarry Entry/Exit from Federal Highway

2.3 Intersection Description of Federal Highway with Private Road to the Quarry

As part of this traffic impact assessment the intersection Federal Highway at the proposed quarry extension entry is assessed, as it is the nearest cross intersection where there are right and left turn movements permitted out of the Private Road.

The subject intersection is a T junction with vehicles on the Private Road needing to give way to traffic on Federal Highway. The Federal Highway is on two carriageways with two lanes for each direction and there is a storage median between the two carriageways to allow for right turn vehicles into the Private Road, and the right turn out of Private Road. The storage median has a width of approximately 19 metres and an articulated truck is able to stop in the median safely while waiting to turn right into Private Road. The layout of this intersection is shown in Figure 5 using SIDRA – an industry standard intersection software. The number on the lane is the length of a short lane in metres.

There is a deceleration lane for the right turn into Private Road from the Federal Highway and also short lane is provided for eastbound movement for the right turn movement into storage median.

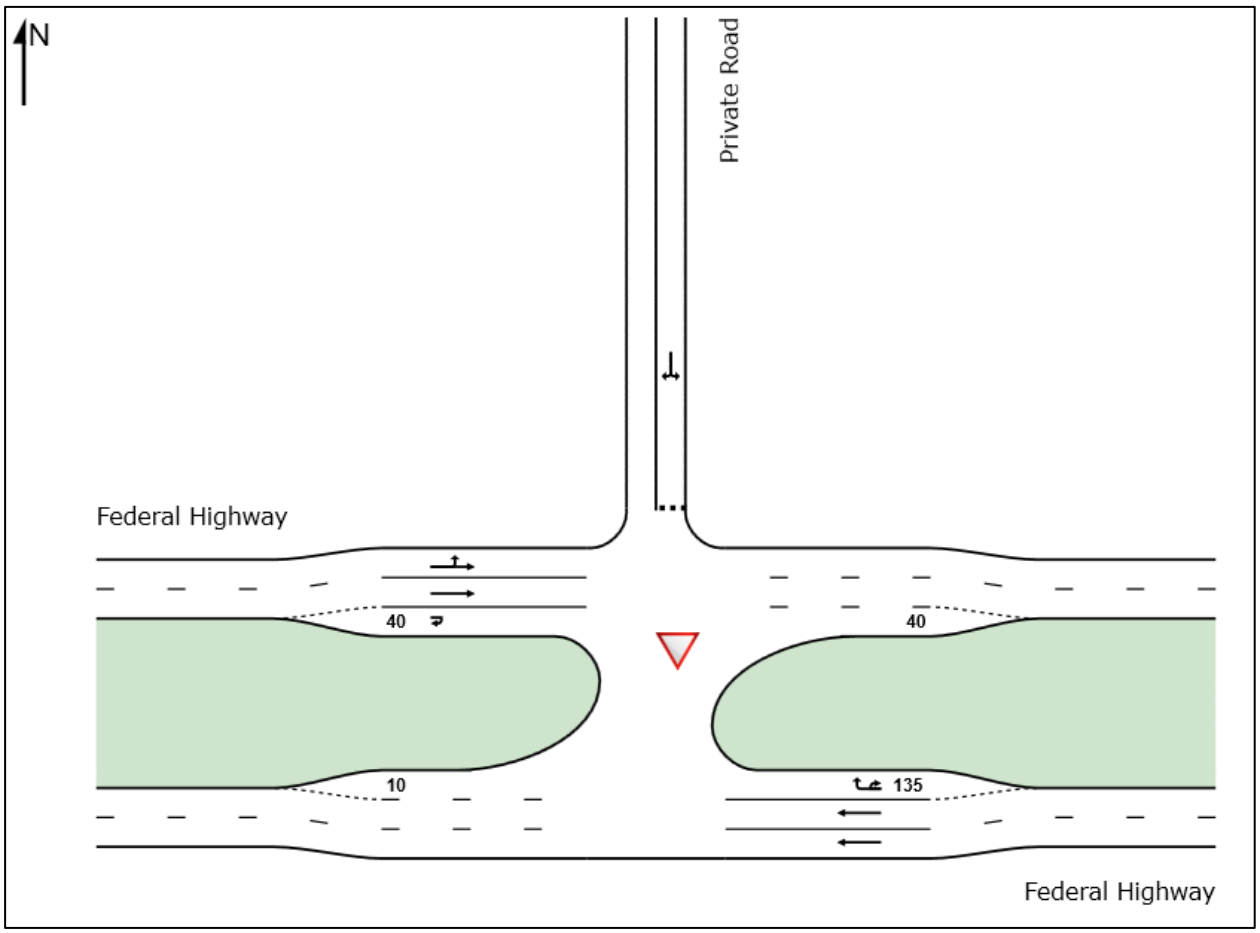


Figure 5: Intersection of the Federal Highway with Private Road

2.4 Existing Public Parking Situation

There is no public parking near the quarry. All parking demand from the proposed quarry will be met on site.

2.5 Traffic Volumes

Traffic volumes were collected at the intersection of the Federal Highway with Private Road as part of this project for the weekday AM (7:00am to 8:45am) and PM commuter periods (4pm to 6pm). The peak hours were 7:30am to 8:30am, and 5:30pm to 6:30pm for the AM and PM respectively. The traffic counts were undertaken on 6th August 2020.

Figures 6 and 7 present the weekday AM and PM peak hour traffic volumes respectively. The un-bracketed numbers are cars and the ones bracketed are heavy vehicles. The traffic volumes to and from Private Road are very low.

U-turn movements are permitted at this intersection. There were no observed U-turn movements in the survey period on the 6th August 2020/

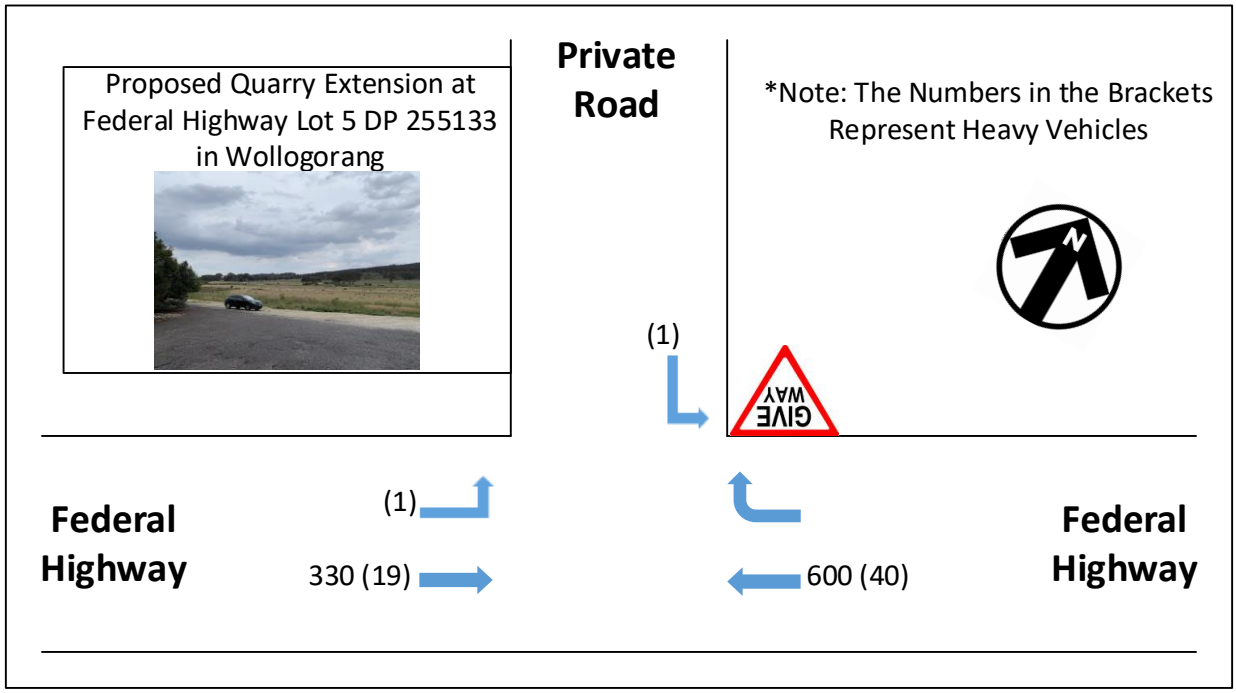


Figure 6: Weekday AM Peak Hour Traffic Volumes

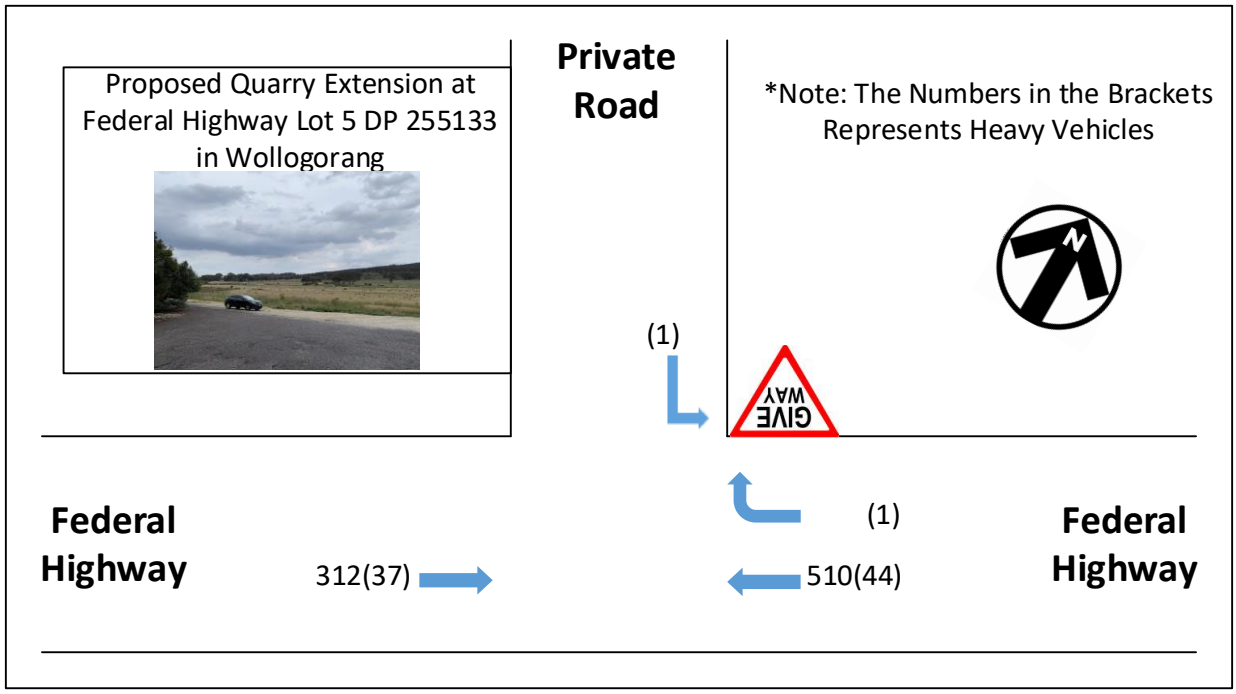


Figure 7: Weekday PM Peak Hour Traffic Volumes

2.6 Intersection Assessment

An intersection assessment has been undertaken for the weekday AM and PM hours for the intersections of the Federal Highway with Private Road.

The existing intersection operating performance was assessed using the SIDRA software package to determine the Degree of Saturation (DS), Average Delay (AVD in seconds) and Level of Service (LoS) at each intersection. The SIDRA program provides Level of Service Criteria Tables for various intersection types. The key indicator of intersection performance is Level of Service, where results are placed on a continuum from 'A' to 'F', as shown in Table 1.

LoS	Traffic Signal / Roundabout	Give Way / Stop Sign / T-Junction control
A	Good operation	Good operation
B	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	Satisfactory	Satisfactory, but accident study required
D	Operating near capacity	Near capacity & accident study required
E	At capacity, at signals incidents will cause excessive delays.	At capacity, requires other control mode
F	Unsatisfactory and requires additional capacity, Roundabouts require other control mode	At capacity, requires other control mode

Table 1: Intersection Level of Service

The Average Vehicle Delay (AVD) provides a measure of the operational performance of an intersection as indicated below, which relates AVD to LOS. The AVD's should be taken as a guide only as longer delays could be tolerated in some locations (i.e. inner-city conditions) and on some roads (i.e. minor side street intersecting with a major arterial route). For traffic signals, the average delay over all movements should be taken. For roundabouts and priority control intersections (sign control) the critical movement for level of service assessment should be that movement with the highest average delay.

LoS	Average Delay per Vehicles (seconds/vehicle)
A	Less than 14
B	15 to 28
C	29 to 42
D	43 to 56
E	57 to 70
F	>70

Table 2: Intersection Average Delay (AVD)

The degree of saturation (DS) is another measure of the operational performance of individual intersections. For intersections controlled by traffic signals both queue length and delay increase rapidly as DS approaches 1. It is usual to attempt to keep DS to less than 0.9. Degrees of Saturation in the order of 0.7 generally represent satisfactory intersection operation. When DS exceed 0.9 queues can be anticipated.

The results of the intersection assessment are as follows:

- The intersection overall performs well with all turn movements having an acceptable Level of Service A in the weekday AM and PM peak hour

The full details of the SIDRA results for the existing conditions are presented in Appendix A.

2.7 Reported Accidents

Transport for NSW(TfNSW) has provided reported accidents at or near the intersection of Federal Highway with the Private Road.

Six accidents have been reports between October 2006 to September 2019 (approximately a 13 year period). The accident rate is not high.

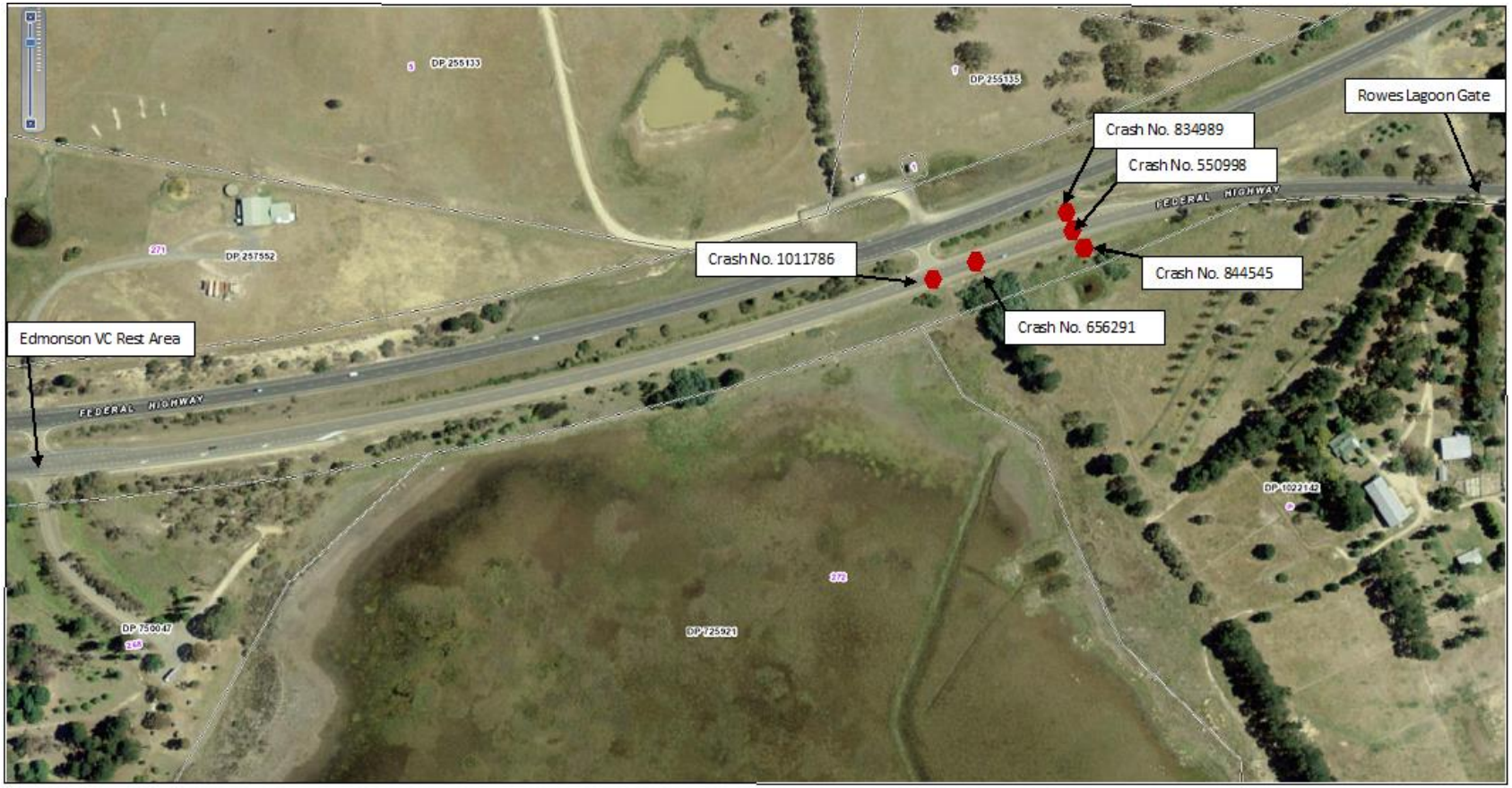
There is no distinguishable patterns (since the sample is too small and covers a long period) and does not suggest that the intersection of Federal Highway with the Private Road is unsafe.

An examination of the Detailed Crash Data – Sorted indicate the following conclusions:

- All accidents occurred whilst travelling south or west; i.e. towards Canberra.
- All accidents occurred during rain.
- All accidents occurred during evening or early morning times.
- All accidents occurred whilst negotiating the curve adjacent to the Rowes Lagoon gate.

No accidents occurred on the northbound carriageway at this location.

The following aerial photograph indicates the location of the crashes (except Crash No. 854652 being location unable to be determined).


Rowes Lagoon Gate
Crash No. 834989
Crash No. 550998
Crash No. 1011786
Crash No. 844545
Crash No. 656291
Edmonson VC Rest Area
FEDERAL HIGHWAY
FEDERAL HIGHWAY

2.8 Conclusions on Existing Conditions

An assessment of the existing conditions showed the following:

- The proposed extension will only increase the lifetime of the quarry and will not create any additional trips.

3. PROPOSED QUARRY EXTENSION

The current extraction tonnage is 16,000 tonnes per annum and is to remain the same after the proposed expansion is finalised. The quarry operates Monday to Friday for 48 weeks per annum. The proposed extension will not increase the annual tonnage of material extracted.

The existing quarry is currently excavating granite at a rate of nine (9) trucks per week with the capacity of 37 tonnes, approximately two (2) trucks per day (typically articulated trucks) over five (5) days.

The articulated trucks pick up the material and deliver the product to the clients to and from the Goulburn area. The quarry will operate from 7am to 5pm with staff arrivals outside of the commuter peak hour in the morning. Staff departures will occur after 5pm. Truck arrivals and departures will be no more than two (2) trucks per day. The quarry is a low traffic generator.

Figure 8 shows the proposed site quarry extension on a survey layout. The proposed extraction pit will have an approximate area of 115,000 m^2.

The proposed expansion will not increase truck movements on a daily or weekly basis. The expansion will increase the lifetime of the quarry and not increase vehicle traffic.

A “Stop” sign is recommended on the private road at the Federal Highway intersection together with rehabilitation widening and bitumen sealing of the existing access and intersection. This can be conditioned as part of a Development Consent.

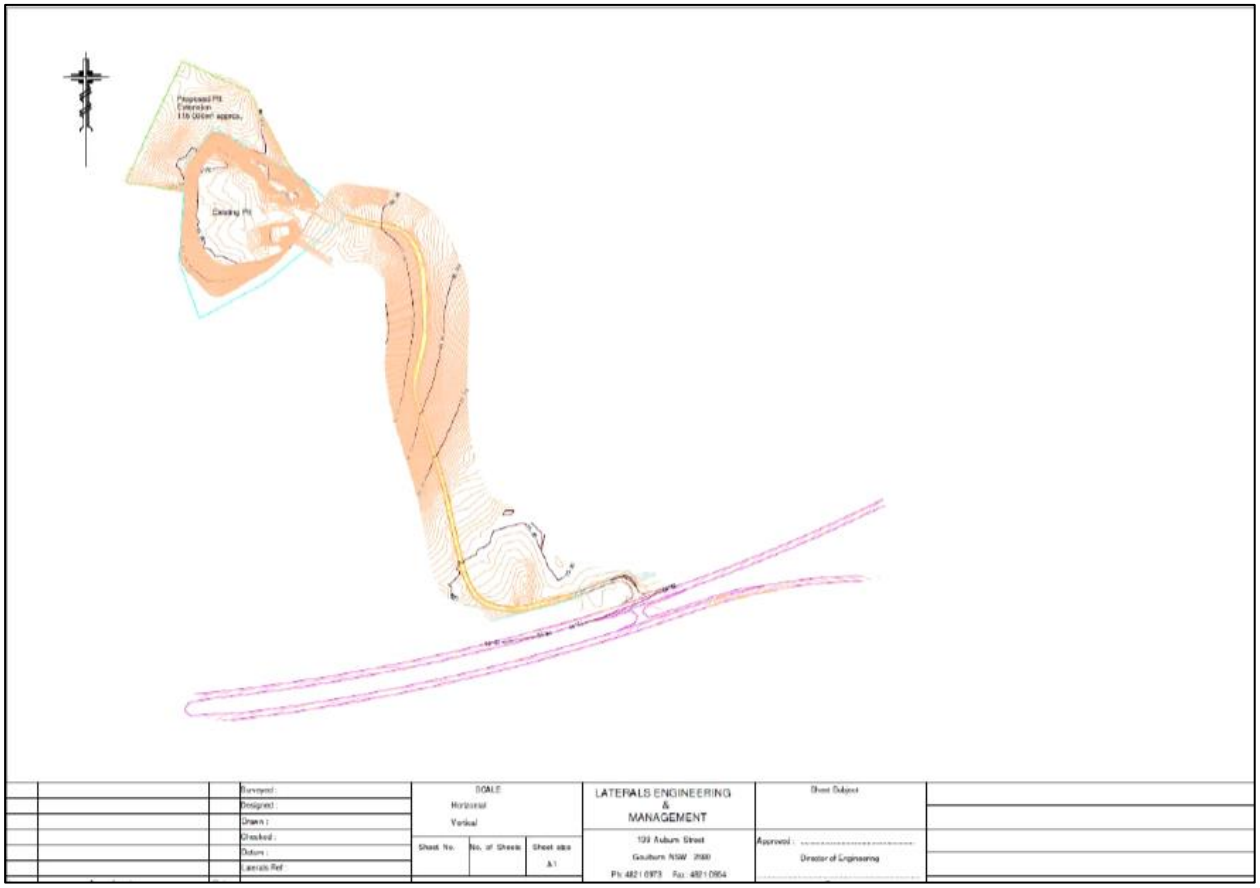


Figure 8: Proposed Site Layout survey

4. PARKING ASSESSMENT

4.1 Parking Considerations using Extension Control Plan Rates of Upper Lachlan Council

Neither the Upper Lachlan Council nor the NSW Roads and Traffic Authority publish parking rates for a quarry. Hence a first principles parking assessment has been undertaken. It should also be said that the quarry is not constrained in terms of area to allocate parking. There is ample room to provide sufficient number of car spaces.

4.2 First Principles Assessment of Parking Demand

The proposed quarry has two employees with an average arrival and departure rate of two articulated trucks per day respectively. Based on these characteristics, the following parking would be required:

- Two staff car spaces
- One visitor car space

The proposed quarry has a sufficient area to cater for the estimated parking demand in an informal parking form.

Trucks are not required to park on site. All trucks are parked overnight at the Divall depot at Towrang. Any operational equipment (excavation/screen) are delivered and remain on site to stockpile material as required.

5. TRAFFIC ASSESSMENT

As discussed previously, the proposed expansion will not increase truck movements on a daily or weekly basis. The expansion will increase the lifetime of the quarry and not increase vehicle traffic. The existing traffic volumes (see Section 2.5) will remain the same with the quarry expansion.

6. TRUCK MOVEMENTS ASSESSMENT

Truck inbound and outbound adequate manoeuvrability is checked using a swept path analysis for a 19-metre long articulated truck.

Trucks travelling to and from the site will depart and travel to Goulbourn and thus, the following truck swept paths have been undertaken:

- 19-metres truck right turn out of Federal Highway and into the proposed site.
- 19-metres truck left turn out of the proposed site and into Federal Highway.

As discussed previously, truck movements turning left into the Federal Highway from the private road is typical two per day. The low traffic volume does not warrant a need for an acceleration lane on traffic performance ground and it is noted there has been no accidents at this intersection during the operation of the existing quarry.

The truck swept paths show adequate manoeuvrability. However, it is acknowledged that verge work (widening and bitumen sealing) will be required at the intersection and centre median as indicated in the swept paths. This can be conditioned in a Development Consent.

The swept paths are presented in the Appendix B of this report

7. CONCLUSIONS

Based on the considerations presented in this report, it is considered that:

Parking

- All parking demand from the quarry can be contained on site.

Traffic

- The proposed extension will not increase the annual tonnage of the quarry only the estimated life of the quarry. No additional truck or car movements will be generated.
- Tuck movements turning left into the Federal Highway from the private road is typical two per day. The low traffic volume does not warrant a need for an acceleration lane on traffic performance grounds.
- Trucks turning left onto Federal Highway are able to cross the sealed road shoulder
- Verge work (widening and bitumen sealing) will be required at the intersection and centre median and can be conditioned in a development consent.
- There are no traffic engineering reasons why a planning permit for the proposed Quarry extension at Lot 5 DP255133 in Wollogorang, should be refused.

APPENDIX A

SIDRA Intersection Results for Existing Traffic Conditions

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Federal Highway														
5	T1	640	40	674	6.3	0.180	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	109.9
6	R2	1	0	1	0.0	0.003	9.7	LOS A	0.0	0.1	0.44	0.62	0.44	52.1
6u	U	1	0	1	0.0	0.003	10.1	LOS A	0.0	0.1	0.44	0.62	0.44	55.9
Approach		642	40	676	6.2	0.180	0.0	NA	0.0	0.1	0.00	0.00	0.00	109.6
North: Private Road														
7	L2	1	1	1	100.0	0.009	8.3	LOS A	0.0	0.3	0.56	0.67	0.56	42.3
9	R2	1	0	1	0.0	0.009	29.0	LOS C	0.0	0.3	0.56	0.67	0.56	45.2
Approach		2	1	2	50.0	0.009	18.6	LOS B	0.0	0.3	0.56	0.67	0.56	43.7
West: Federal Highway														
10	L2	1	1	1	100.0	0.098	11.2	LOS A	0.0	0.0	0.00	0.00	0.00	49.1
11	T1	349	19	367	5.4	0.098	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	109.9
12u	U	1	0	1	0.0	0.003	14.6	LOS B	0.0	0.1	0.64	0.70	0.64	47.7
Approach		351	20	369	5.7	0.098	0.1	NA	0.0	0.1	0.00	0.00	0.00	109.1
All Vehicles		995	61	1047	6.1	0.180	0.1	NA	0.0	0.3	0.00	0.00	0.00	109.1

Table A1: Intersection Assessment of the Federal Highway with Private Road Weekday AM Peak Hour

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: The Federal Highway														
5	T1	554	44	583	7.9	0.157	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	110.0
6	R2	1	0	1	0.0	0.003	9.7	LOS A	0.0	0.1	0.45	0.62	0.45	52.0
6u	U	1	0	1	0.0	0.003	10.2	LOS A	0.0	0.1	0.45	0.62	0.45	55.9
Approach		556	44	585	7.9	0.157	0.0	NA	0.0	0.1	0.00	0.00	0.00	109.5
North: Private Road														
7	L2	1	1	1	100.0	0.008	8.3	LOS A	0.0	0.2	0.53	0.66	0.53	43.3
9	R2	1	0	1	0.0	0.008	24.9	LOS B	0.0	0.2	0.53	0.66	0.53	46.3
Approach		2	1	2	50.0	0.008	16.6	LOS B	0.0	0.2	0.53	0.66	0.53	44.8
West: The Federal Highway														
10	L2	1	1	1	100.0	0.101	11.2	LOS A	0.0	0.0	0.00	0.00	0.00	49.1
11	T1	349	37	367	10.6	0.101	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	109.9
12u	U	1	0	1	0.0	0.002	13.0	LOS A	0.0	0.1	0.58	0.67	0.58	48.6
Approach		351	38	369	10.8	0.101	0.1	NA	0.0	0.1	0.00	0.00	0.00	109.1
All Vehicles		909	83	957	9.1	0.157	0.1	NA	0.0	0.2	0.00	0.00	0.00	109.0

Table A2: Intersection Assessment of the Federal Highway with Private Road Weekday PM Peak Hour

APPENDIX B

Truck Swept Paths

APPENDIX C

Reported Accidents