Traffic Impact Statement

Eulonga Quarry Expansion

338 Darbalara Road, Coolac NSW 2727

CLIENT: Eulonga Quarries Pty Limited	**DATE:** 19 February 2025
SLR PROJECT No: 630.032007.00002	**REVISION:** v1.1
AUTHOR: Duong Nguyen/ Taylor Beauchamp	**REVIEWER:** Jeffrey Baczynski

1.0 Introduction

1.1 Overview

SLR Consulting Australia Pty Ltd (**SLR**) has been engaged by Eulonga Quarries Pty Ltd (**the Proponent**) to prepare a Traffic Impact Statement (**TIS**). The TIS forms part of the Environmental Impact Statement (**EIS**) for the new Eulonga Quarry extraction area proposed (**the Project**) at 338 Darbalara Road, Coolac NSW 2727.

1.2 Assessment Scope

The scope of the TIS documented herein includes:

- Review of the existing road network conditions;
- Outline the proposed operations and any associated impacts of the Project on the surrounding road network; and
- Identify mitigative strategies associated with the Project where appropriate.

1.3 SEARs Items and Responses

Table 1 summarises the traffic and transport related Planning Secretary's Environmental Assessment Requirements (**SEARs**) raised by the NSW Government and Transport for NSW (**TfNSW**) in their correspondence dated 5 September 2024 regarding the subject EIS for the Project.

Table 1 SEARs Items and Report References

NSW SEARs Item	SLR Response and Report Reference
The EIS must address the following specific issues: Traffic and Transport – including:	
• Accurate predictions of the road traffic generated by the construction and operation of the development, including a description of the types of vehicles likely to be used for transportation of quarry products.	**Section 4.4** The proposed development does not intend to make any changes to the existing operation with regards to annual extraction limit. Therefore, SLR is of the opinion that no increase in peak hour or daily truck volumes external to the subject site will be generated by the development expansion beyond that already approved although the duration of operations will be extended. **Section 2.3.1** The client has advised that the existing operation is currently serviced by truck and dog heavy vehicle configuration with this expected to occur for the foreseeable future.
• An assessment of potential traffic impacts on the capacity, condition, safety and efficiency of the local and State road networks, detailing the nature of traffic generated, transport routes, traffic volumes and potential impacts on local and regional roads.	**Section 5.3.3.1** SIDRA assessment was undertaken on the intersection of the Hume Highway and Gobarralong Road to identify the impacts of existing and future traffic demand flows of the proposed development. **Section 4.3 and 4.4** An explanation has been provided in this report behind the assumptions and reasoning for the traffic generation adopted for analysis. **Section 2.3.1** The transport route as part of the proposed development has been detailed via **Figure 3** and Error! Reference source not found. of this report.
• A description of the measures that would be implemented to maintain and/ or improve the capacity, efficiency and safety of the road network (particularly the proposed transport routes) over the life of the development.	**Section 5.3.3.1** Based on the SIDRA assessment undertaken for the intersection of the Hume Highway and Gobarralong Road, no upgrades are triggered by the proposed development. The assessment of the current arrangement is deemed to be sufficient to accommodate existing and future traffic demand from a capacity, efficiency and safety perspective.
• Evidence of any consultation with relevant road authorities, regarding the establishment of agreed contributions towards road upgrades or maintenance.	Any existing arrangement in place with Council is to remain.
• A description of access roads, specifically in relation to nearby Crown roads and fire trails.	**Section 2.3** Information regarding the Crown roads that provide access to the existing and proposed development is provided in the following report.

2.0 Existing Conditions

2.1 Subject Site

The subject site is located at 338 Darbalara Road, Coolac, which is otherwise more formally described as Lot 1 & 2 DP1096529 (**existing operation**) adjacent to the Murrumbidgee River.

The existing operation is shown in the context of the broader area on **Figure 1** below.

Figure 1 Site Location

2.2 Existing Approval

The existing quarry currently operates in accordance with the following approved consents and licenses:

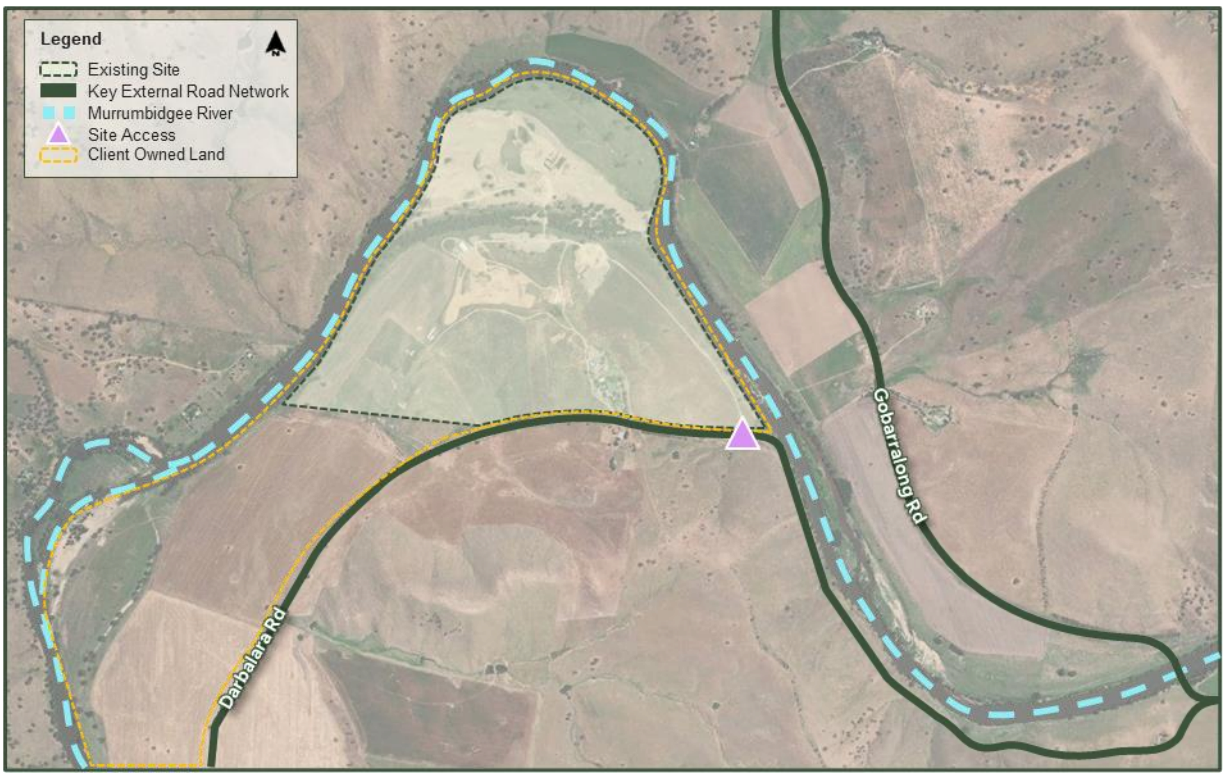
- Development Consent DA 2007/ 78 granted on 11 December 2007, noting that the Development Consent was modified on 17 July 2019 and 8 June 2023 by the Cootamundra-Gundagai Regional Council (**Council**) through Development Consent 2019/ 59/ 1 and 2019/ 59/ 2; and
- Environmental Protection License (**EPL**) 12835.

A summary has been provided below outlining the purpose for the modified Development Consent in 2019 and 2023:

- 2019 Development Consent modification – Permit an extraction limit of up to 172,000 tonnes per annum (**tpa**) from the existing operation.
- 2023 Development Consent modification – Permit an increased depth of extraction from 4m to 8m within the existing operation.

Access to the existing operation is achieved via one (1) access location fronting Darbalara Road, as identified on **Figure 2**. It is noted that the access allows for all turns in/ out from the site.

Figure 2 Approved Existing Operation



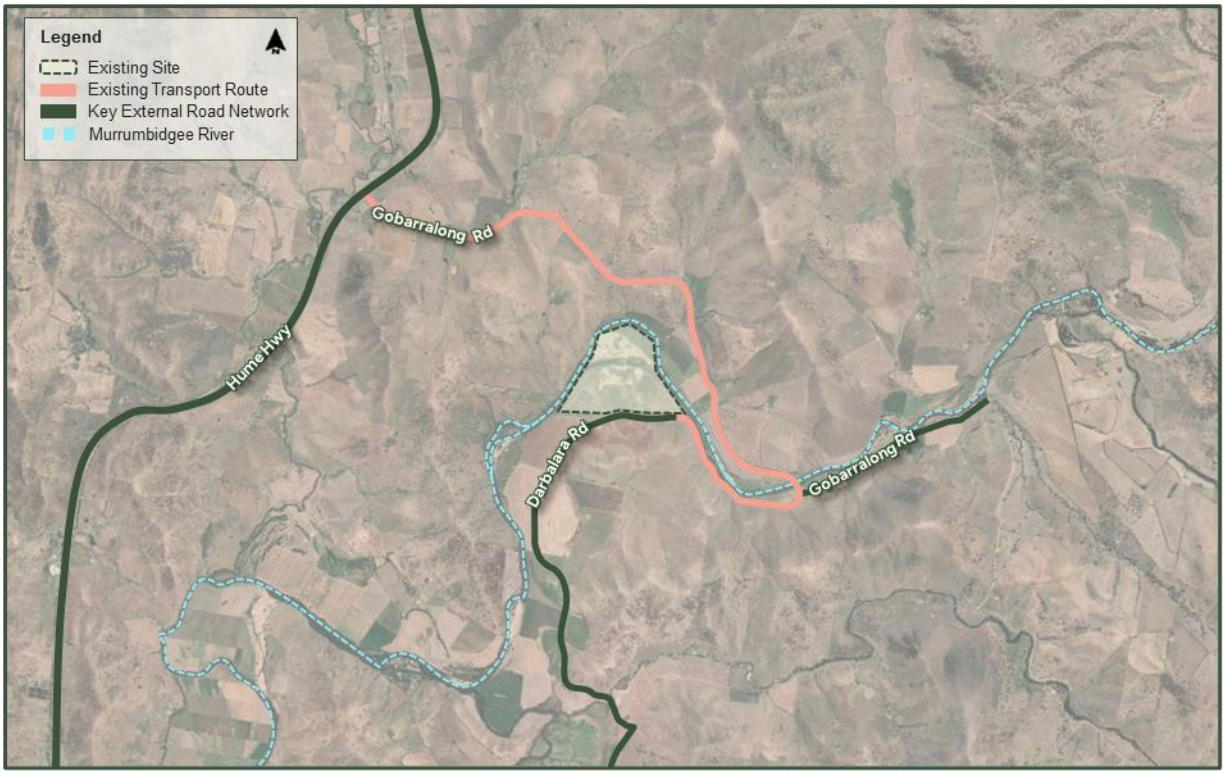
2.3 Existing Operation

2.3.1 Existing Haulage Route

It is known that the existing operation is currently serviced by heavy vehicles of a truck and dog configuration. Haulage associated with the quarry currently occurs as per the defined Restricted Access Vehicle (**RAV**) route from the National Heavy Vehicle Regulator (**NHVR**) National Network Map[1]. This route is via the Council-controlled roads including Darbalara Road and Gobarralong Road, which then connect to the State-controlled road network at the Hume Highway. This transport route is mapped on **Figure 3**.

[1] https://maps.nhvr.gov.au/?networkLayerContext=NATIONAL_MAP&view=Category

Figure 3 Existing Transport Route



2.3.2 Surrounding Road Network

Details of the key roads surrounding the subject site, as detailed in **Section 2.3.1**, are provided in **Table 2**

Table 2 Key Surrounding Roads

Road Name	Authority	Classification	Existing Form	Posted Speed
Hume Highway	TfNSW	Highway	Dual carriageway with two (2) traffic lanes in either direction separated by a median. Typically a rural cross-section with sealed shoulders in both directions.	110km/h
Gobarralong Road	Council	Local Road	Single carriageway with a single traffic lane in either direction. Typically a rural cross-section with unsealed shoulders and the absence of a centreline.	100km/h
Darbalara Road	Council	Local Road	Single carriageway with a single traffic lane in either direction. Typically a rural cross-section with unsealed shoulders and the absence of a centreline.	100km/h [1]

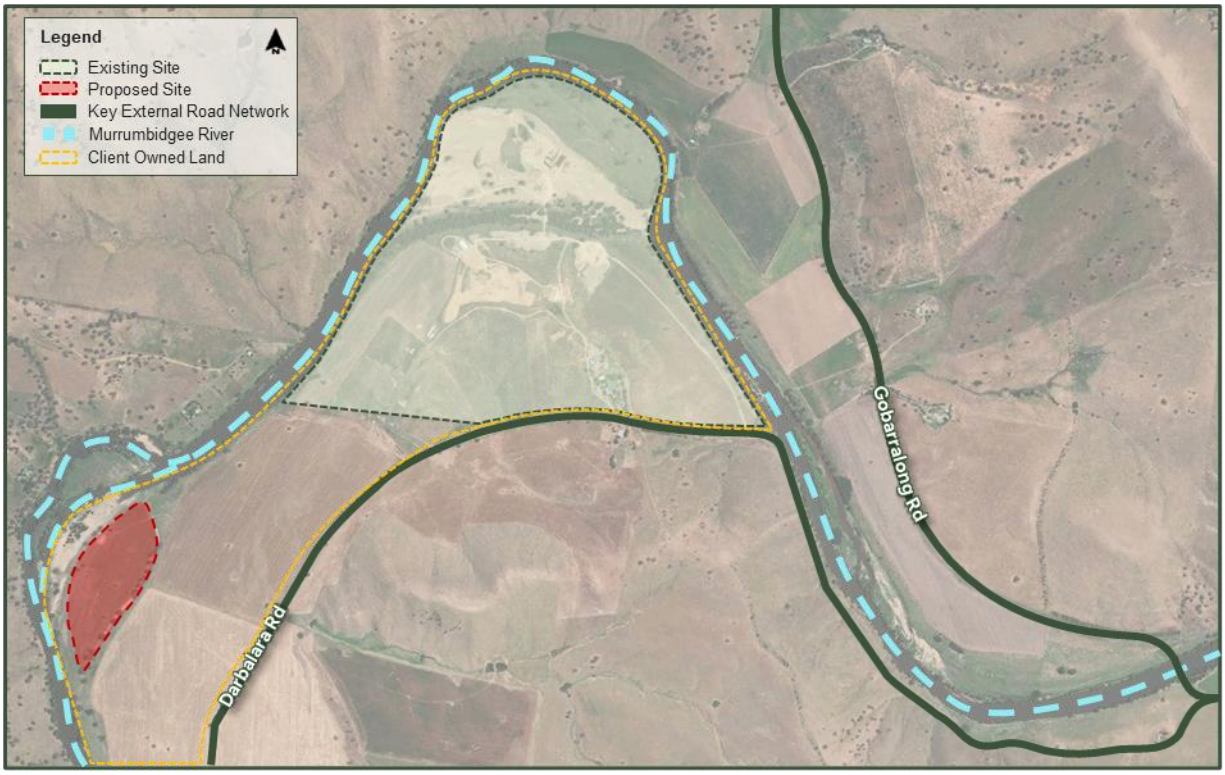
[1] Unposted speed limit.

3.0 Proposed Development

3.1 Development Area

The Proponent proposes to establish a new extraction area, approximately 13.91 hectares (**ha**), south-west of the existing operation, on land formally described as Lot 158 DP750984 and Lot 4 DP1096529. The proposed development location is mapped on **Figure 4** within the subject site controlled by the Proponent. It is understood that the new extraction area is intended to operate under a separate Development Consent to the existing operation.

Figure 4 Proposed Extraction Area



3.2 Proposed Operations

It is intended that the proposed development would support the ongoing operations of the existing quarry without any changes to the approved annual extraction volume, truck movements or traffic generation, hours of operations or any other aspects associated with the existing operation. A summary of extractive operations following the addition of the proposed additional extraction area is detailed in **Table 3**.

Table 3 Comparison of Proposed and Existing Operations

Category	Existing Operation	Proposed Operation
Extraction Area	Lot 1 & Lot 2 DP1096529	Lot 1 & Lot 2 DP1096529 **Lot 158 on DP750985** **Lot 4 on DP 1096529**
External Site Access	Via Darbalara Road	**No change**
Material Extraction Maximum	172,000 tpa	**No change**
Extraction Depth - Existing Area - New Area	8m	No change **4m**
Haulage Route	Via RAV route defined by NHVR	**No change**
Hours of Operation	Mon to Sat: 7am to 6pm No off-site hauling Sun or Public Holiday	**No change**
Staff Number	3	**No change**

In addition, the Proponent proposes to avoid any additional impacts on the local road network, from the proposed development, by upgrading the existing private farm track that runs internally to the site to connect the new extraction area to the existing operation. This will facilitate transportation of all extracted material from the new extraction area back to the existing quarry location, within the subject site, and avoid the public road network.

3.2.1 Ancillary Operations

The new extraction area is for extraction only. No processing of material would occur in the proposed extraction area. All extracted material will be transported to the current quarry site for processing, stockpiling and transport to market by the approved haulage routes.

3.2.2 Services and Infrastructure

Operations within the proposed extraction area do not require any connection to reticulated water, power or telephone infrastructure. All amenities required to service the new extraction area is available at the existing quarry.

4.0 Assessed Traffic Demand

4.1 Existing Traffic Demand

In order to ascertain the existing traffic demands on the road network surrounding the site, traffic surveys were undertaken on Tuesday 22 October 2024 at the key intersection of the Hume Highway and Gobarralong Road. Based on the traffic survey data, the following peak hour periods were determined:

- Weekday AM Peak Hour: 11:00 to 12:00
- Weekday PM Peak Hour: 15:00 to 16:00

4.2 Crash Data

In order to highlight any safety deficiencies in the surrounding road network, particularly along the current haulage route, crash data has been extracted from the New South Wales LGA crash map[2]. Crashes are reported for the latest 5-year period between 2019 and 2023.

Upon reviewing the data, no crashes were reported between the site access and the Hume Highway. In addition to this, no crashes were recorded in the immediate vicinity of the Hume Highway and Gobarralong Road intersection, which provides access to the wider haulage route for the development traffic.

4.3 Background Traffic Growth

A representative growth factor for the Hume Highway has been derived based on traffic volume data available on Transport for NSW's (**TfNSW**) '*Traffic Volume Viewer*' mapping portal[3]. According to data recorded at Station ID 6136, approximately 7km north of the subject intersection, the southbound traffic volumes for 2010 and 2023 were 4,172 and 5,312 vehicles per day (**vpd**), respectively. This equates to a total growth of 27.33% over 13 years and a linear growth rate of 2.10% per annum.

4.4 Development Traffic

The existing quarry is currently in operation. Therefore, truck movements travelling to and from the quarry site would have been captured by the traffic surveys undertaken on Tuesday 22 October 2024.

Noting that no additional trucks or increase in extraction limit is anticipated as part of the proposed development and new extraction area, as discussed in **Section 3.2**, the 'development traffic' for the entire site (i.e. including existing and proposed) is expected to remain the same and hence, only background traffic would increase as per the rate derived in **Section 4.3** of this report.

[2] https://www.transport.nsw.gov.au/roadsafety/statistics/interactive-crash-statistics/lga-view-crashes-map
[3] https://www.transport.nsw.gov.au/operations/roads-and-waterways/corporate-publications/statistics/traffic-statistics/traffic-volume

4.5 Assessment Scenarios

In correspondence with the Client, it is anticipated that the overall project extraction will be 1,350,000 tonnes across the entire site. Whilst the is no current project lifespan within the existing approval; to remain conservative, a 10-year design horizon has been adopted for the purpose of this assessment. It is noted that this is the design horizon typically recommended for assessment of traffic networks. Accordingly, the impacted road network has been considered for the following assessment scenarios:

- **2024 Survey Traffic**: to establish the surveyed traffic demand.
- **2034 Background Traffic**: to establish the background traffic conditions at the 10-year design horizon or end of the project lifespan.

Traffic flow diagrams for all of the above scenarios are given in **Appendix A**.

5.0 Traffic Assessment

5.1 Area Assessment Scope

The scope of the impact assessment area has been identified to be the following intersection along the transport route to/ from the quarry:

- Hume Highway/ Gobarralong Road.

It is noted that other intersections along the transport route, particularly connecting to Gobarralong Road are expected to remain consistent with existing conditions, from an operational performance perspective, and have therefore, not been assessed in this report.

5.2 Turn Warrant Assessment

The intersection of the Hume Highway and Gobarralong Road is currently a priority-controlled intersection (unsignalised). A turn warrant assessment has been undertaken to confirm the suitability of the existing turn treatment at the design horizon based on the forecasted demand. It is noted that the intersection is currently provided with a short auxiliary left turn lane (**AUL(s)**).

The turn warrant assessment has been undertaken in accordance with research summarised in *Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management (2020)* (***AGTM6***). To assist the reader interpretation of the assessment, a pictorial description of the various turn treatments that may be considered is provided in **Figure 5** and **Table 4**.

Figure 5 Turn Treatment Types and Volume Criteria (*V* ≥ 100km/h)

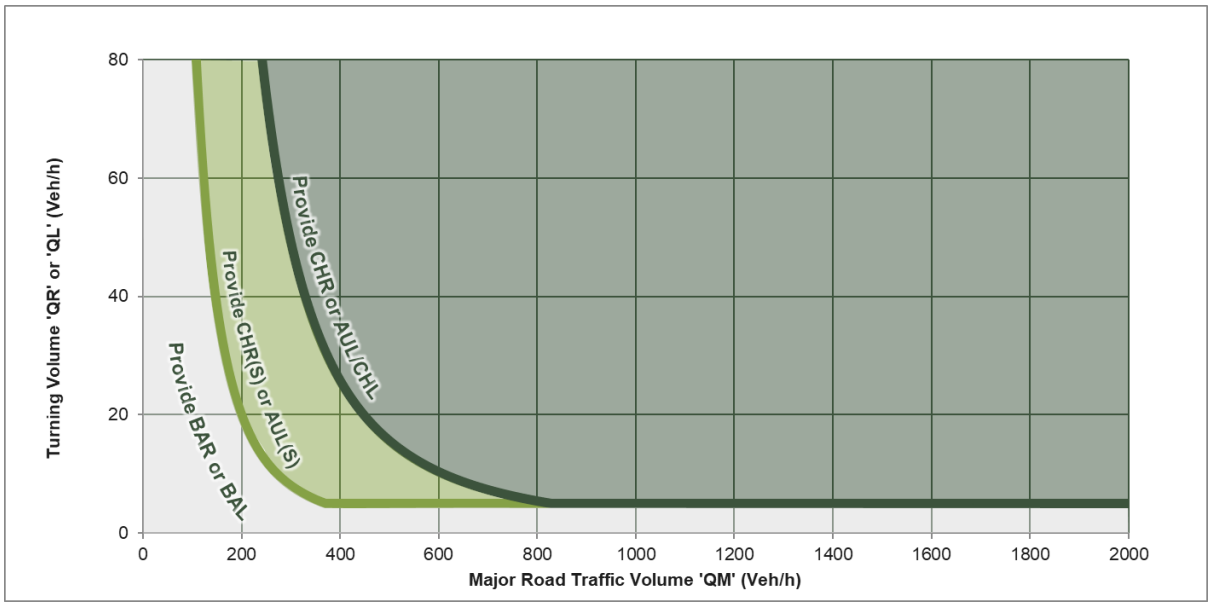
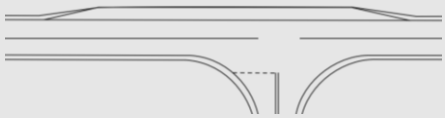
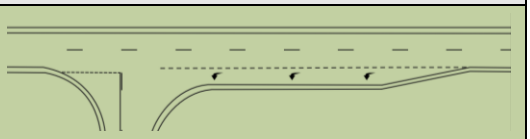
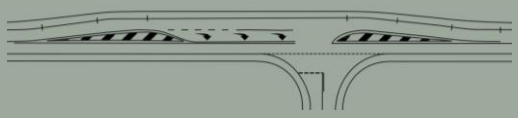
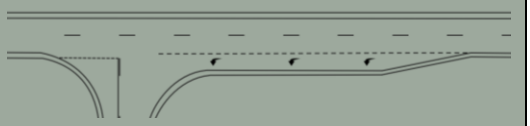
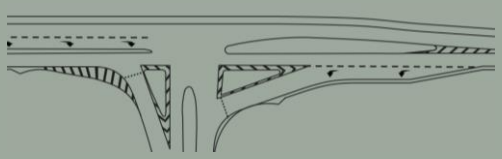
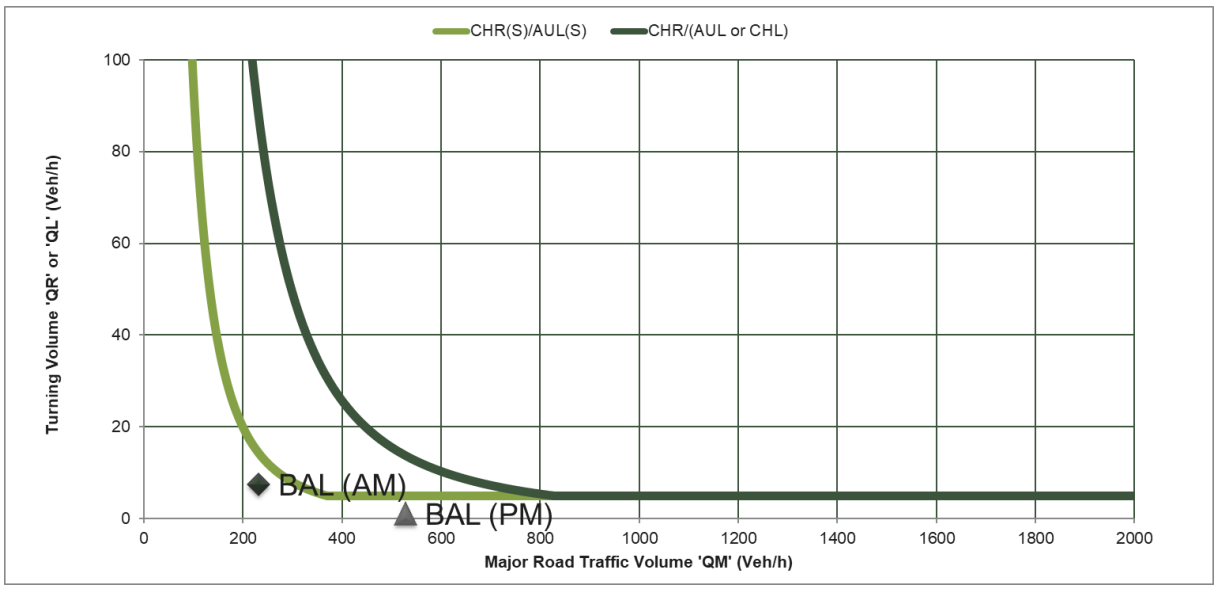


Table 4 Rural Turn Treatment Types

Acronym	Right Turn Treatment	Left Turn Treatment
BAR or **BAL**	 **BAR** (Basic Right Turn)	 **BAL** (Basic Left Turn)
CHR(S) or **AUL(S)**	 **CHR(S)** (Channelised Right Turn (Short))	 **AUL(S)** (Auxiliary Left Turn (Short))
CHR or **AUL** or **CHL**	 **CHR** (Channelised Right Turn)	 **AUL** (Auxiliary Left Turn)  **CHL** (Channelised Left Turn)

The results of the turn warrant assessment for both the AM and PM peak periods are shown in **Figure 6**. The results of the assessment indicate that based on the traffic volumes at the design horizon, a basic left turn treatment (**BAL**) is warranted. As an AUL(s) is already provided, this is deemed sufficient to facilitate left-turn movements from the Hume Highway for existing and future traffic demands, including the existing (and ongoing) traffic demands associated with the development.

Figure 6 Hume Highway/ Gobarralong Road Turn Warrant Assessment - 2034



5.3 SIDRA Capacity Assessment

5.3.1 Intersection Performance Thresholds

The study intersection has been analysed for each of the traffic demand scenarios set out in **Section 4.5** using SIDRA Intersection 9.1 (**SIDRA**). SIDRA is an industry recognised analysis tool used to estimate the capacity and performance of intersections based on input parameters, including geometry and traffic volumes. SIDRA provides an estimate of an intersection's Degree of Saturation (**DoS**), queues and delays.

DoS thresholds, as defined in Section 4.2.4 of *Austroads Guide to Traffic Management Part 3: Transport Study and Analysis Method (2020)* (**AGTM3**) have been used to understand the operational performance of the study intersection. The DoS thresholds, as defined in AGTM3, are presented in **Table 5** below.

Table 5 Degree of Saturation Capacity Thresholds

Intersection Type	DoS Threshold
Signalised intersections	Less than or equal to 0.90
Roundabout	Less than or equal to 0.85
Priority-controlled intersections	Less than or equal to 0.80

Source: Austroads

DoS values exceeding those presented in **Table 5** indicate that an intersection is nearing its practical capacity and upgrade works may be required. Above these thresholds, users of the intersection are likely to experience rapidly increasing delays and queuing.

Importantly, it is noted that DoS is not the only performance indicator and that other measures such as delay should also be considered when assessing the performance of an intersection.

Section 7.4.5 of AGTM3 provides a summary of Level of Service (**LoS**) criteria based on the average delay per vehicle at intersections and makes further reference to guidance contained in the *Guide to Traffic Generating Developments* (TfNSW, October 2002), the latter of which states that the best indicator for the LoS is the average delay experienced by vehicles at that intersection. A summary of the average delay thresholds recommended by TfNSW for all intersection types is provided in **Table 6**.

Table 6 Critical Delay Capacity Thresholds

LoS	Average Delay [1] (sec/ vehicle)	Traffic Signals/ Roundabout	Priority-Controlled Intersections
A	< 14	Good operation	Good operation
B	15 – 28	Good with acceptable delays and spare capacity	Good with acceptable delays and spare capacity
C	29 – 42	Satisfactory	Satisfactory, but accident study required
D	43 – 56	Operating near capacity	Operating near capacity and accident study required
E	57 – 70	At capacity, incidents will cause excessive delays Roundabouts require other control mode	At capacity, requires other control mode

[1] For priority intersections/ roundabouts the reported LoS is based on the critical (or maximum) average delay. For signalised intersections the reported LoS is based on the Average Delay for all movements.

Source: TfNSW

The LoS D threshold (i.e. critical delay > 43 seconds) is important and has been adopted to evaluate the operational and safety of the existing and future priority-controlled intersection formation.

5.3.2 SIDRA Input – Modelling Parameters

Standard SIDRA default values were utilised in the intersection assessment with the exception of the parameters identified in **Table 7** below.

Table 7 Adopted SIDRA Parameters

Parameter	Default Value	Adopted Value	Justification
Vehicle Movements – Site Level of Service Method	Delay (SIDRA)	Delay (RTA NSW)	Preference is given to the RTA Method as it is based on TfNSW's *Guide to Traffic Generating Developments*, where as the Delay (SIDRA) method is based on the *US Highway Capacity Manual 2000*

5.3.3 Intersection Assessment

5.3.3.1 Hume Highway/ Gobarralong Road

The Hume Highway and Gobarralong Road intersection is currently a three-way priority-controlled intersection, with the northbound/ southbound carriageways along the Hume Highway separated by a grassed median. The existing layout and the assessed SIDRA intersection form are shown on **Figure 7**. The results of the SIDRA assessment are presented in **Table 8**.

It is acknowledged that the SIDRA Outputs in **Table 8** represent the southbound carriageway and minor leg approach only. This is due to the fact that the development traffic access the Highway via a left-in, left-out arrangement from Gobarralong Road. The SIDRA analysis did capture the northbound direction of the Hume Highway, which can be seen in the detailed SIDRA outputs provided in **Appendix B**.

Figure 7 Hume Highway/ Gobarralong Road Intersection Form

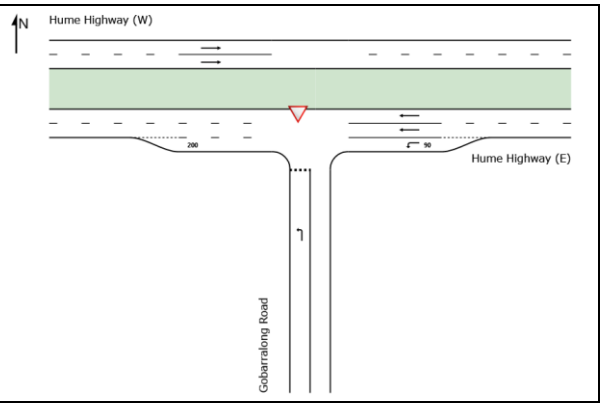


Table 8 SIDRA Outputs: Hume Highway/ Gobarralong Road Intersection

Scenario	AM Peak Hour			PM Peak Hour		
	Max DOS	Crit. Delay (sec)	95thile Queue (m)	Max DOS	Crit. Delay (sec)	95thile Queue (m)
2024 Survey	0.12	6.3	0.0	0.14	6.7	0.0
2034 Design Horizon	0.14	6.3	0.0	0.18	6.9	0.0

The SIDRA analysis summarised in **Table 8** identifies that the existing intersection form will operate at an acceptable performance level, with significant spare capacity, through the indicative project lifespan (i.e. 2034) and beyond. Therefore, no upgrades to the existing intersection are required as part of the proposed development.

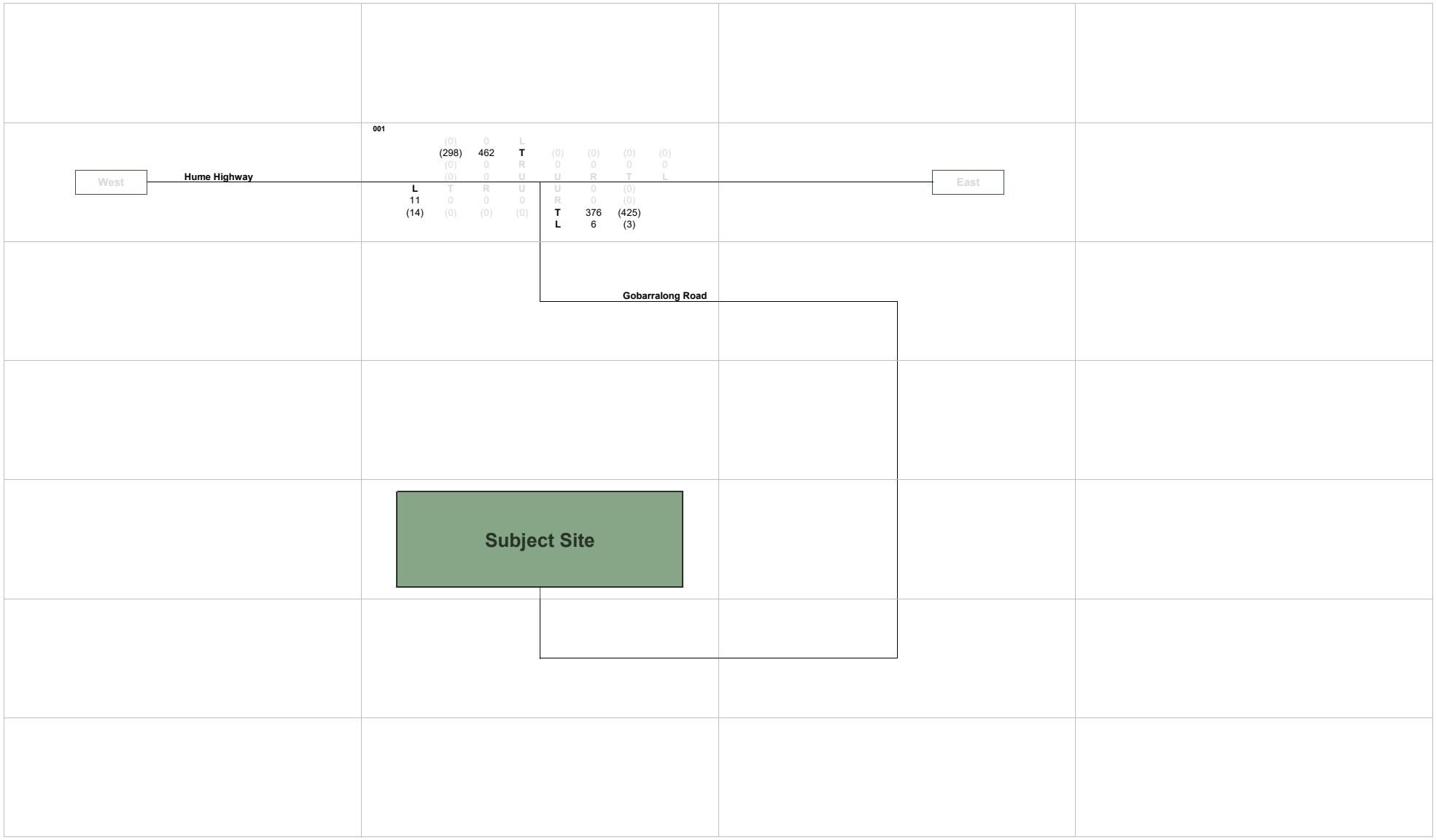
6.0 Summary and Conclusions

SLR Consulting Australia has been engaged by Eulonga Quarries Pty Ltd to prepare a Traffic Impact Statement, as part of the overall Environmental Impact Statement, for the new Eulonga Quarry extraction area development at 338 Darbalara Road, Coolac NSW 2727.

Based on the assessment contained in this Traffic Impact Statement, the following is concluded:

- The proposed development seeks to undertake operations south-west from existing operations on land formally described as Lot 158 DP750984 and Lot 4 DP1096529. It is intended that the proposed development would support ongoing operations of the existing quarry without any changes to the approved annual extraction volume, truck movements or any other aspect associated with the existing operation.
- The current haulage route for the development is along the defined Restricted Access Vehicle route as defined by the National Heavy Vehicle Regulator for truck movements to and from the quarry.
- It is proposed that access to the new extraction area will be provided internally within the site, with no additional access to the external road network proposed as part of the application.
- The assessment of the Hume Highway and Gobarralong Road intersection identified that the existing arrangement would facilitate an acceptable level of performance, with significant spare capacity, through to an indicative project lifespan and design horizon of 10 years (i.e. 2034). No upgrades have been proposed to the existing intersection as part of the new development.

Appendix A Traffic Flow Diagrams



A1

2024 Survey Traffic Volumes

630.032007

Eulonga Quarry Expansion

L	Left Turn
T	Through
R	Right Turn
U	U-Turn

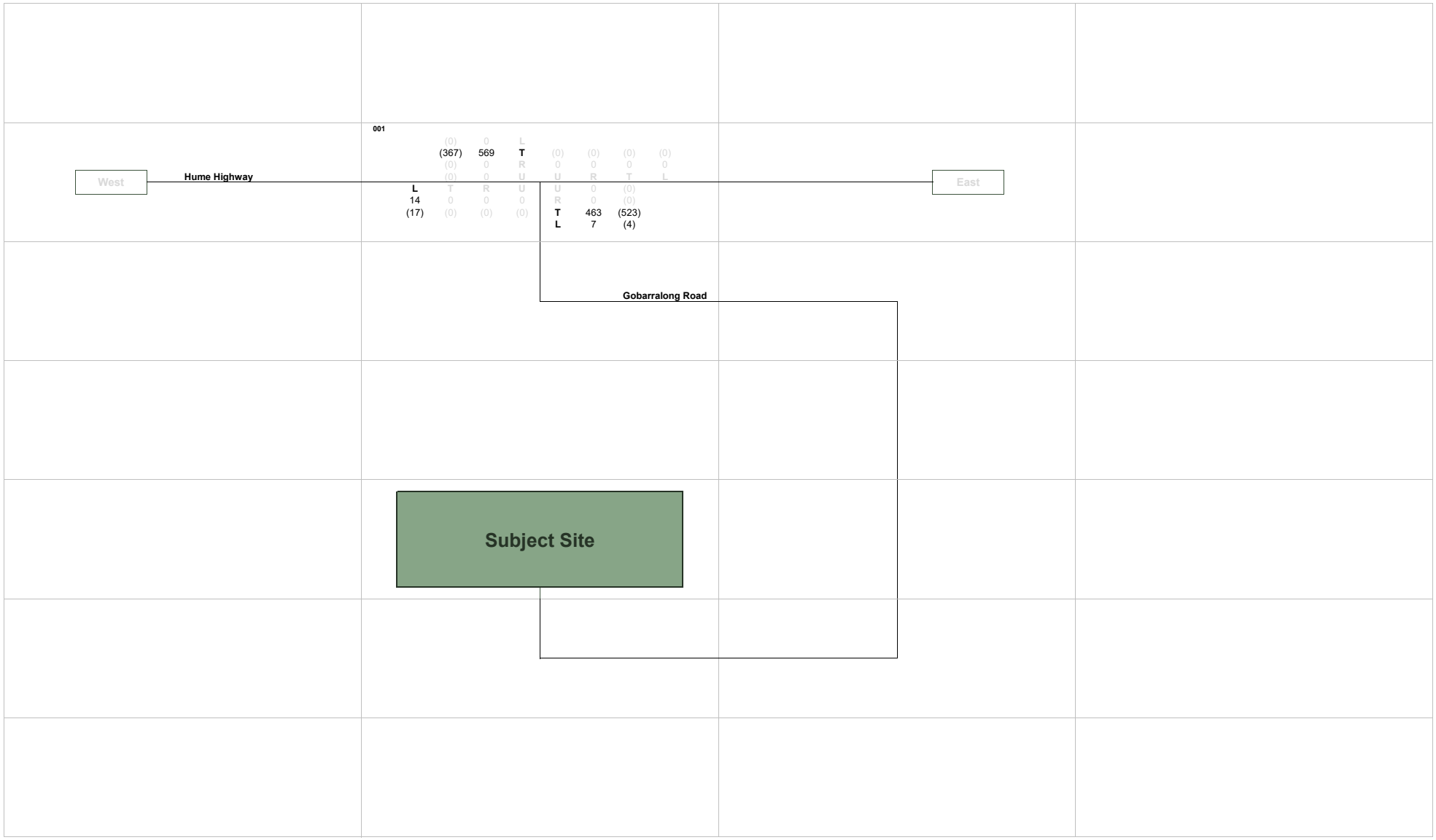
Legend

00 Weekday AM Peak Hour Volumes

(00) Weekday PM Peak Hour Volumes

Subject Site

N



A2

2034 Background Traffic Volumes (Design Horizon)

630.032007

Eulonga Quarry Expansion

L	Left Turn
T	Through
R	Right Turn
U	U-Turn

Legend

00 Weekday AM Peak Hour Volumes

(00) Weekday PM Peak Hour Volumes

Subject Site

N

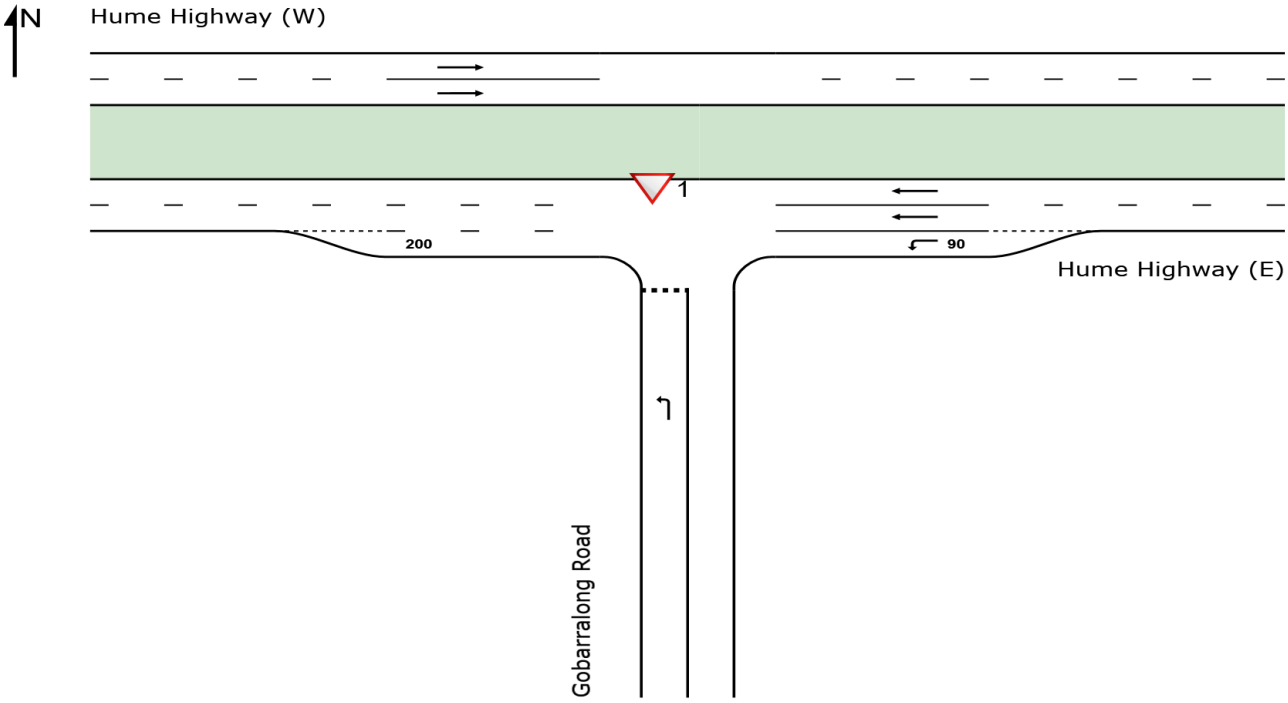
Appendix B SIDRA Outputs

SITE LAYOUT

Site: 1 [1_E 2024 Survey AM (Site Folder: General)]

Hume Hwy and Gobarralong Rd Intersection
Prepared by: DN
Reviewed by: TB
Site Category: Existing Design
Give-Way (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 1 [1_E 2024 Survey AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Hume Hwy and Gobarralong Rd Intersection
Prepared by: DN
Reviewed by: TB
Site Category: Existing Design
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival 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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Gobarralong Road															
1	L2	All MCs	12	9.1	12	9.1	0.009	6.0	LOS A	0.0	0.0	0.00	0.57	0.00	52.5
Approach			12	9.1	12	9.1	0.009	6.0	LOS A	0.0	0.0	0.00	0.57	0.00	52.5
East: Hume Highway (E)															
4	L2	All MCs	6	66.7	6	66.7	0.005	6.3	LOS A	0.0	0.0	0.00	0.57	0.00	50.2
5	T1	All MCs	396	23.9	396	23.9	0.116	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			402	24.6	402	24.6	0.116	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.8
West: Hume Highway (W)															
11	T1	All MCs	486	21.6	486	21.6	0.141	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			486	21.6	486	21.6	0.141	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
All Vehicles			900	22.8	900	22.8	0.141	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 1 [1_E 2024 Survey PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Hume Hwy and Gobarralong Rd Intersection
Prepared by: DN
Reviewed by: TB
Site Category: Existing Design
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival 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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Gobarralong Road															
1	L2	All MCs	15	42.9	15	42.9	0.013	6.7	LOS A	0.0	0.0	0.00	0.57	0.00	51.2
Approach			15	42.9	15	42.9	0.013	6.7	LOS A	0.0	0.0	0.00	0.57	0.00	51.2
East: Hume Highway (E)															
4	L2	All MCs	3	33.3	3	33.3	0.002	5.9	LOS A	0.0	0.0	0.00	0.57	0.00	51.5
5	T1	All MCs	447	41.6	447	41.6	0.144	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			451	41.5	451	41.5	0.144	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.8
West: Hume Highway (W)															
11	T1	All MCs	314	28.2	314	28.2	0.094	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach			314	28.2	314	28.2	0.094	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
All Vehicles			779	36.2	779	36.2	0.144	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 1 [1_E 2034 BG AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Hume Hwy and Gobarralong Rd Intersection
Prepared by: DN
Reviewed by: TB
Site Category: Existing Design
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival 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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Gobarralong Road															
1	L2	All MCs	14	9.1	14	9.1	0.011	6.1	LOS A	0.0	0.0	0.00	0.57	0.00	52.5
Approach			14	9.1	14	9.1	0.011	6.1	LOS A	0.0	0.0	0.00	0.57	0.00	52.5
East: Hume Highway (E)															
4	L2	All MCs	8	66.7	8	66.7	0.006	6.3	LOS A	0.0	0.0	0.00	0.57	0.00	50.2
5	T1	All MCs	487	23.9	487	23.9	0.143	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			495	24.6	495	24.6	0.143	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.7
West: Hume Highway (W)															
11	T1	All MCs	599	21.6	599	21.6	0.173	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			599	21.6	599	21.6	0.173	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
All Vehicles			1108	22.8	1108	22.8	0.173	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 1 [1_E 2034 BG PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Hume Hwy and Gobarralong Rd Intersection
Prepared by: DN
Reviewed by: TB
Site Category: Existing Design
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival 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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Gobarralong Road															
1	L2	All MCs	18	42.9	18	42.9	0.017	6.9	LOS A	0.0	0.0	0.00	0.57	0.00	51.2
Approach			18	42.9	18	42.9	0.017	6.9	LOS A	0.0	0.0	0.00	0.57	0.00	51.2
East: Hume Highway (E)															
4	L2	All MCs	4	33.3	4	33.3	0.003	5.9	LOS A	0.0	0.0	0.00	0.57	0.00	51.5
5	T1	All MCs	551	41.6	551	41.6	0.178	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			555	41.5	555	41.5	0.178	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.8
West: Hume Highway (W)															
11	T1	All MCs	386	28.2	386	28.2	0.116	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			386	28.2	386	28.2	0.116	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
All Vehicles			959	36.2	959	36.2	0.178	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.