

515 CROOKWELL ROAD, KINGSDALE

TRAFFIC IMPACT ASSESSMENT

**PREPARED FOR ALIMACO PTY LTD | 10 NOVEMBER 2023
300303400**

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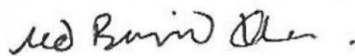


Prepared by:

Signature

Connor Hoang

Printed Name

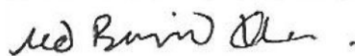


Reviewed by:

Signature

Bayzid Khan

Printed Name



Approved by:

Signature

Bayzid Khan

Printed Name



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1 Introduction

1.1 Background & Proposal

A planning proposal is to be lodged with Goulburn Mulwaree Council (Council) to rezone 52.93 hectares of land at 515 Crookwell Road, Kingsdale to allow for a proposed 25 lot rural residential subdivision with each lot to exceed two hectares.

The surrounding area is also subject to potential future rezoning, with a larger 277-lot residential subdivision located immediately south of the subject site at 407 & 457 Crookwell Road.

Alimaco Pty Ltd engaged Stantec to assess the transport impacts of the development.

1.2 Purpose of this Report

This report sets out an assessment of the anticipated transport implications of the planning proposal, including consideration of the following:

- existing traffic conditions surrounding the site
- the traffic generating characteristics of the proposal
- suitability of the proposed access arrangements
- internal road network layout and design
- the transport impact of the proposal on the surrounding road network.

1.3 References

In preparing this report, reference has been made to the following:

- an inspection of the site and its surrounds
- Goulburn Mulwaree Development Control Plan (DCP) 2009
- Goulburn Mulwaree Local Environmental Plan (LEP) 2009
- Relevant Australian Standard/ New Zealand Standard (AS/NZS 2890.1:2004, AS 2890.2:2018, AS/NZS 2890.6:2009)
- Elton Consulting, Urban and Fringe Housing Strategy (Goulburn and Marulan) dated 28 July 2020
- plans for the proposed development prepared by Precise Planning, project no. 100113, drawing no. 100113-Sk1, rev. B, dated 11 February 2022.
- other documents and data as referenced in this report.



2 Existing Conditions

2.1 Site Location

The site, designated as Lot 103 and 104 DP1007433 515 Crookwell Road, Kingsdale occupies a 165-hectare parcel of land. The subject site has a frontage of approximately 1,350 metres to Crookwell Road to the east and 650 metres to Onslow Road to the north. The site is located about five kilometres north-west of Goulburn Town Centre.

The site is zoned C3 (Environmental Management) and is currently rural grazing land occupied by a single residential development with the surrounding properties being rural farmland or large lot rural residential lots.

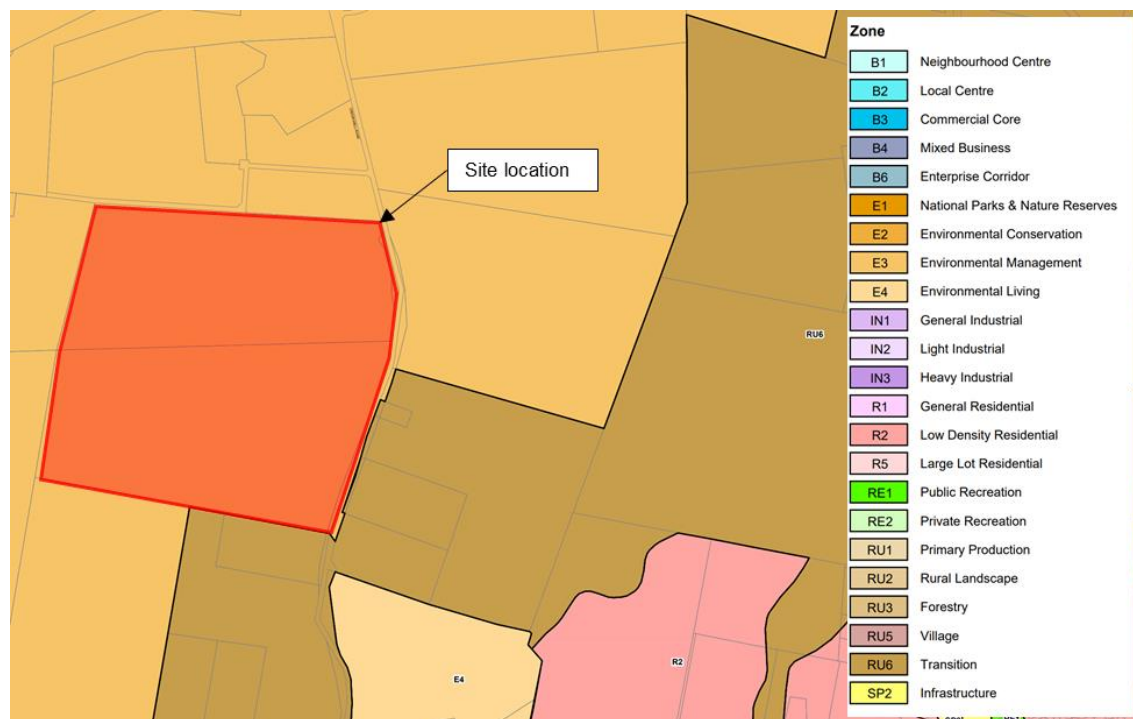
The subject site and surrounding environs are shown in Figure 1 and current land zoning map shown in Figure 2.

Figure 1: Subject site and surrounding environs



Base image source: Nearmap

Figure 2: Land zoning map



Base image source: Goulburn Mulwaree Council LEP 2009

2.2 Transport Network

2.2.1 SURROUNDING ROAD NETWORK

Crookwell Road is a classified State Road orientated in a north-south direction. It provides one travel lane in each direction set within a 10-metre-wide carriageway. Crookwell Road has a posted speed limit of 100 kilometres per hour adjacent to the site. Although no signage is provided, parking is possible on the road shoulder. Crookwell Road transitions to Fitzroy Street to the south providing direct connection to Goulburn town centre and is therefore a main link between Goulburn and towns in the north-west, such as Kingsdale, Wayo, Pejar and Crookwell.

Crookwell Road is shown in Figure 3 and Figure 4.

Figure 3: Crookwell Road (looking north)



Figure 4: Crookwell Road (looking south)



2.2.2 INTERSECTION COUNTS

Traffic surveys were commissioned by Positive Traffic Pty Ltd at the Crookwell Road/ Chinamans Lane intersection (located about 1.5 kilometres south of the site) in June 2023 as part of the adjacent proposed subdivision at 407 & 457 Crookwell Road (discussed further in Section 4.2.3). The results of the traffic surveys are detailed in Table 1.

Table 1: Crookwell Road/ Chinamans Lane June 2023 traffic counts

Road	Location	Weekday AM		Weekday PM	
		NB/ EB	SB/ WB	NB/ EB	SB/ WB
Crookwell Road	North of Chinamans Lane	74	180	162	98
	South of Chinamans Lane	90	226	199	118
Chinamans Lane	West of Crookwell Road	47	17	22	39

Source: Positive Traffic Pty Ltd



Table 1 indicates that north of Chinamans Lane, 254 and 260 vehicles were recorded to travel along the site frontage to Crookwell Road (both directions) during the AM and PM peak hours, respectively.

2.3 Public Transport Network

The existing public transport network surrounding the site is limited. Bus routes and train services are available within Goulburn, located five kilometres southeast of the site. Public transport services available within Goulburn are summarised in Table 2.

Table 2: Goulburn public transport network

Public Transport	Route	Description	Frequency (peak/ off peak)
Train	Southern Highlands Line	Goulburn to Central via Campbelltown	Limited services
Bus	821A/ 821B	Goulburn to Kenmore	60 mins/ 80 mins
	823	Goulburn to West Goulburn (loop)	60 mins/ 80 mins
	824	St Aubyn Road to Goulburn	Limited services
	825	Goulburn to Eastgrove (loop)	Limited services

2.4 Active Transport Network

There is limited cycling and walking infrastructure near the site with no footpaths or dedicated cycling lanes available on Crookwell Road. This is typical of semi-rural, high-speed environments and appropriate. Notwithstanding, cycling routes are available on Fitzroy Street south of the site and within Goulburn town centre as shown in Figure 5.



Figure 5: Surrounding cycling network



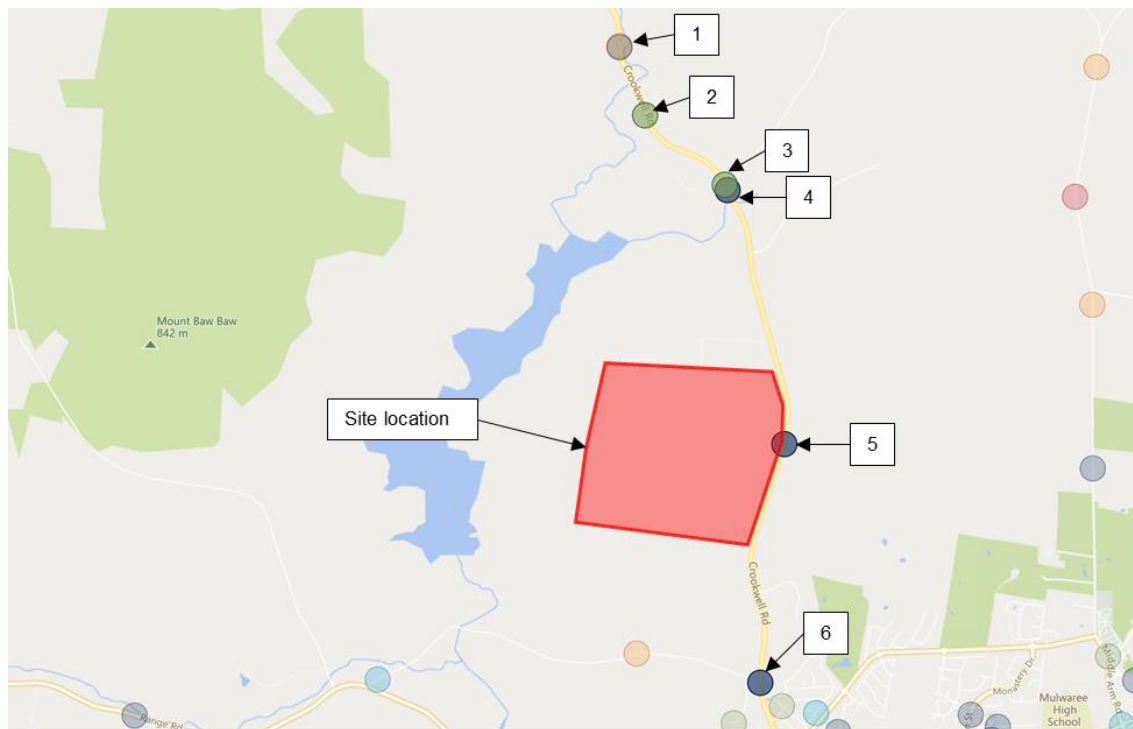
Base image source: Google Maps

2.5 Crash History

An analysis has been undertaken of the most recent five-year period of available crash data (2016-2020) been accessed from the Transport for NSW Centre of Road Safety site. The locations and severity of the crash data for the five-year period is shown in Figure 6 and summarised in Table 3.

515 Crookwell Road, Kingsdale Existing Conditions

Figure 6: Crash map from 2016 to 2020



Degree of crash ● Fatal ● Serious Injury ● Moderate Injury ● Minor/Other Injury ● Non-casualty (towaway)

Base image source: Transport for NSW Centre for Road Safety

Table 3: Recorded crashes

Location	ID	Number of crashes	RUM Code(s)	Injuries
Crookwell Road	1	1	82 – Off right/ right bend	Moderate
	2	1	87 – Off left/ left bend into object	Non-casualty
	3	1	70 – Off road left	Non-casualty
	4	1	32 – Right rear	Moderate
	5	1	83 – Off right/ right bend into object	Moderate
	6	1	13 – Right near	Moderate

Six crashes occurred during the five-year period on Crookwell Road near the site. No fatalities or serious injuries were recorded. The data indicates that four of the six crashes involved a single vehicle leaving the road, with one occurring along the site frontage.



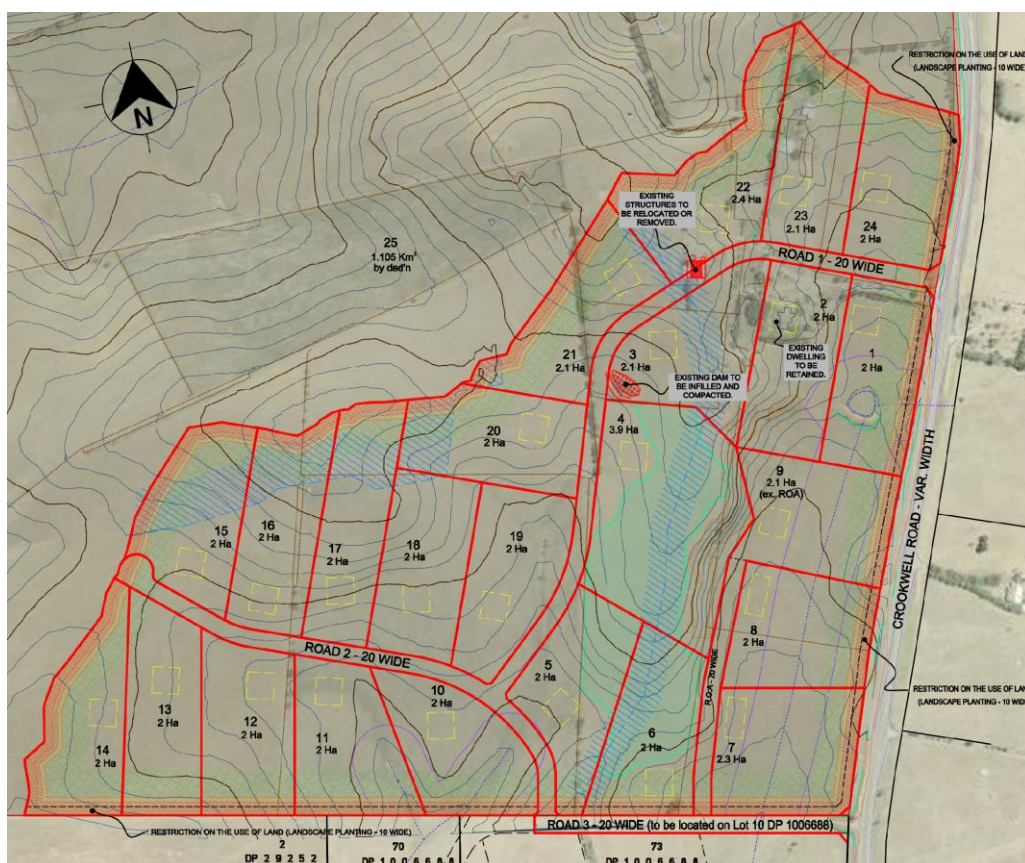
3 Development Proposal

The proposed rezoning is to permit a 25-lot rural residential subdivision. This includes 24 lots each covering a minimum two hectares, with the larger lot 25 on the northern site boundary and without frontage to the internal road network. Access to this lot and appropriate connection to the internal road network will be determined at later stage. This is consistent with the Goulburn and Marulan Urban and Fringe Housing Strategy prepared for Council in July 2020, which includes the site within Precinct 4 Soley and identifies the opportunity for the rezoning of 52.93 hectares under Council Amendment and Resolution 2020/224 and subsequent Resolution 2020/261.

A simple and well configured internal road network provides access to all 24 two hectare lots and includes a 20-metre-wide road reserve. The internal roads primarily form a loop with a single cul-de-sac at the western end of the subdivision. Two new intersections along Crookwell Road are proposed to facilitate all vehicle access. The northern access is about 20 metres north of the existing property access driveway with a new access adjacent to the site's southern boundary. The southern access will be shared with the proposed residential subdivision immediately south of the subject site at 407 & 457 Crookwell Road (discussed further in Section 4.2.3).

The indicative site layout is shown in Figure 7, with the layout subject to change as part of ongoing design development.

Figure 7: Indicative site layout plan



Source: Precise Planning, project no. 100113, drawing no. 100113-Sk1, rev. C, dated 11 November 2023.



4 Parking and Traffic Assessment

4.1 Parking Requirements

The car parking requirements for different development types are set out in Goulburn-Mulwaree Development Control Plan 2009 (DCP 2009). For single dwelling houses, a minimum of one parking space should be provided and wholly contained within each lot. Such provisions can easily be accommodated within each two-hectare lot.

4.2 Traffic Generation

4.2.1 OVERVIEW

Upon discussion with the Council and TfNSW during the meeting held 7 June 2023 and as suggested by TfNSW (TfNSW Pre-Lodgement Advice Letter STH23/00106/01), it has been agreed to combine the proposed southern access road with the adjacent proposed subdivision at 407 & 457 Crookwell Road, Kingsdale to reduce the number of access points to Crookwell Road. The traffic assessment report has been updated to consider the revised traffic generation rates and vehicle trips associated with the adjacent development onto the southern shared access.

4.2.2 SITE TRAFFIC GENERATION

Traffic generation estimates for the proposal have been sourced from the Transport for NSW Guide to Traffic Generating Developments 2002 (the Guide) and Technical Direction: Updated Traffic Surveys (TDT 2013/ 04a).

The rates outlined for low density residential dwellings are 10.7 vehicles trips per day in Sydney and 7.4 per day in regional areas. On this basis, a base rate between eight and 10 vehicle trips per day has been adopted. Applying a 30 per cent buffer to account for the potential usage for secondary dwellings and peak seasonal variation (as discussed and agreed with the Council and TfNSW) on certain larger lots equates to between 260 and 325 daily trips for the indicative 25 lots to be developed.

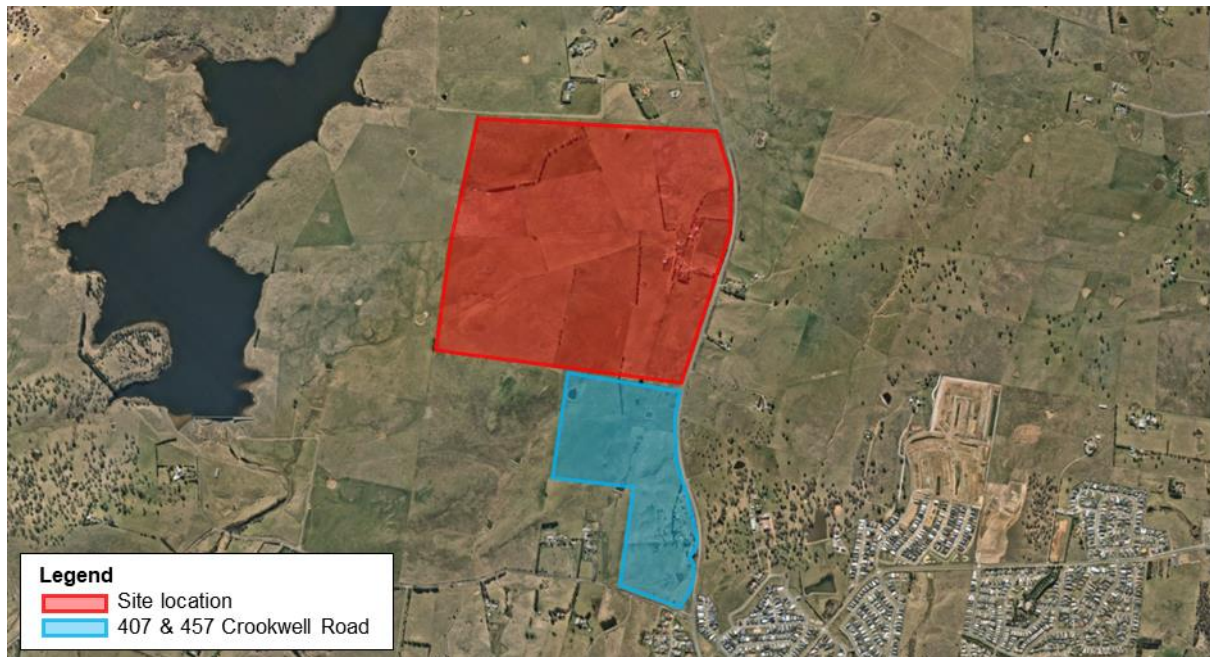
Rates for the weekday AM and PM peak hours are between 0.95 and 0.99 trips. For this assessment, a base rate of one trip per dwelling in any peak hour is considered appropriate for assessing the traffic impacts. Similarly, a 30 per cent buffer has been applied which results in up to 33 vehicle trips in any peak hour.

4.2.3 407 & 457 CROOKWELL ROAD SUBDIVISION

A 277-lot residential subdivision is proposed adjacent to the site at 407 & 457 Crookwell Road, Kingsdale. The location of the adjacent residential subdivision relative to the subject site is shown in Figure 8. Lot sizes for the 407 & 457 Crookwell Road subdivision relative to the development are considerably smaller.



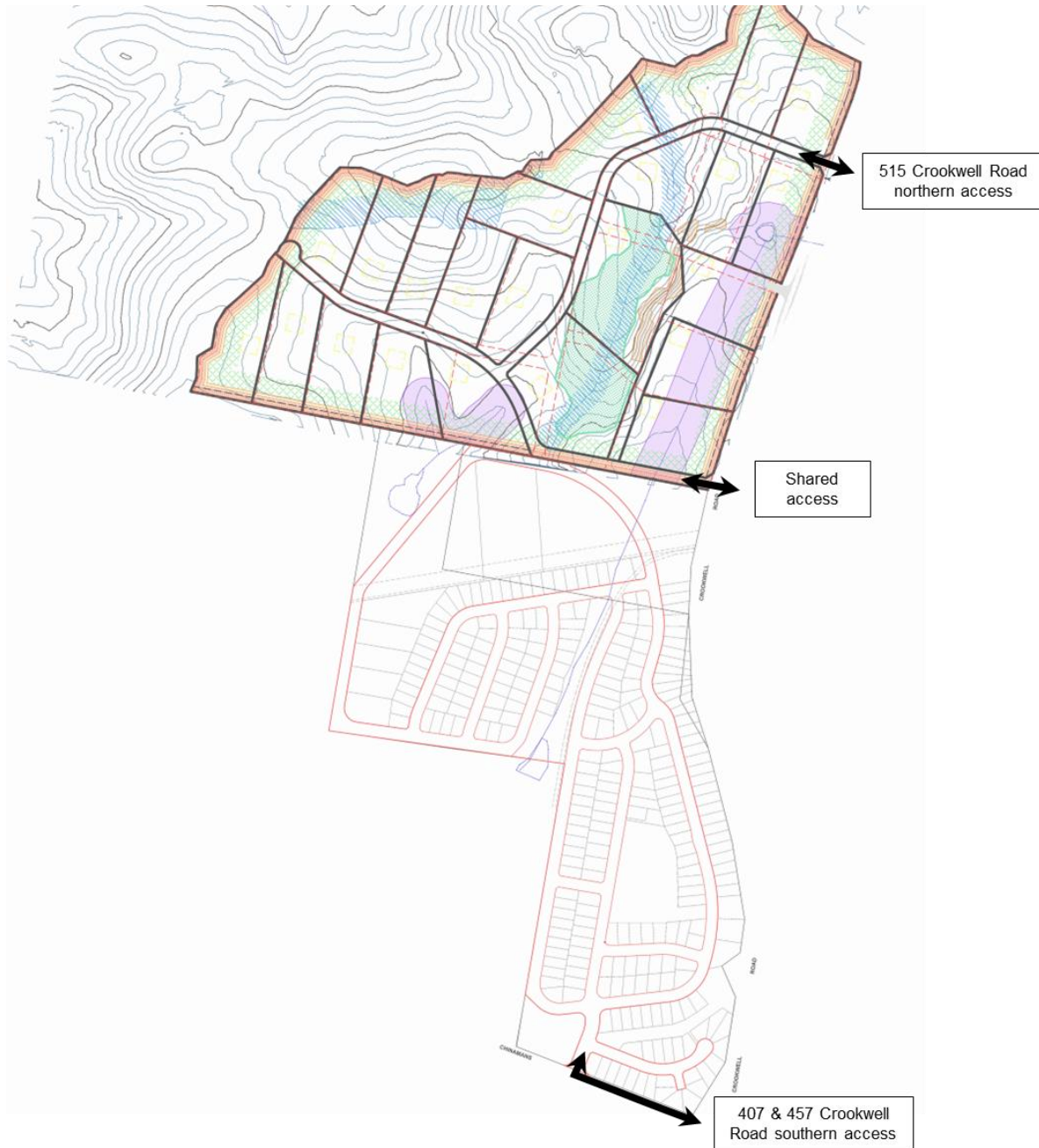
Figure 8: 407 & 457 Crookwell Road, Kingsdale residential subdivision



Base image source: Nearmap

The southern site access to 515 Crookwell Road (subject site) will be shared with the proposed residential subdivision at 407 & 457 Crookwell Road. It will also be provided with a main access to Crookwell Road via Chinamans Lane. The 407 & 457 Crookwell Road subdivision site layout and shared access arrangements are shown in Figure 9.

Figure 9: Residential subdivision site access



The subdivision would allow for the possibility of secondary dwellings on 166 lots with the remaining being single dwelling lots. Considering this, and the traffic generation rates adopted in Section 4.2.2, the estimated traffic volumes for the 407 & 457 Crookwell Road subdivision is summarised in Table 4.

Table 4: 407 & 457 Crookwell Road traffic volumes

Description	Size	Peak Hour Traffic Volumes
Secondary Dwelling Lot	166 lots	216 [1]
Single Dwelling Lot	111 lots	111
Total	277 lots	327 vehicle trips/ hour

[1] As stated in Section 4.2.2, a 30 per cent buffer to account for the potential for construction of secondary dwellings (as agreed with the Council and TfNSW) has been applied to these lots.

Based on the distribution of lots of the adjacent 407 & 457 Crookwell Road subdivision, it is anticipated that trips associated with the 33 lots, including 20 secondary lots would be using the proposed southern shared access road, while the remaining trips would utilise Chinamans Lane to access the subdivision. This results in an additional 39 trips using the southern shared access.

4.3 Traffic Distribution

The directional split of traffic arriving and departing the site is important when considering the impacts, if any on Crookwell Road in the vicinity. Unless specified the following directional distributions were applied to both residential subdivisions:

- As advised by TfNSW in the Pre-Lodgement Advice Letter (STH23/00106/01) dated 5 May 2023, a directional distribution to/ from Goulburn of 95 per cent is recommended with the remaining traveling to/ from the north.
- Inbound and outbound splits of 20 per cent and 80 per cent, respectively, for the AM peak, and vice versa in the PM peak.
- For the proposal (515 Crookwell Road subdivision) 30 per cent of traffic would use the northern access on approach and departure, with the remaining 70 per cent using the southern access (shared access with 407 & 457 Crookwell Road subdivision).
- For the 407 & 457 Crookwell Road subdivision Positive Traffic Pty Ltd advised that approximately 20 lots allowing for secondary dwellings and 13 standalone lots would be accessed via the shared access with the remaining relying on Chinamans Lane.

As such, the estimated traffic volumes for the subject site during the peak hours are summarised in Table 5.

Table 5: Subject Site peak hour traffic volumes

Size	Trip Generation Rate	Traffic Volumes	Traffic Volumes (veh. trips)			
			AM		PM	
			IN	OUT	IN	OUT
25 lots	1 vehicle trip per dwelling [1]	33 vehicle trips	7	26	26	7

[1] A 30% buffer has been applied as advised by TfNSW to account to construction of secondary dwellings on certain lots.

Figure 10 and Figure 11 presents traffic volumes on Crookwell Road at both site access locations to the subject site during the AM and PM peak hours, respectively, and considers the subject site and 407 & 457 Crookwell Road subdivision traffic volumes separately.



515 Crookwell Road, Kingsdale Parking and Traffic Assessment

Figure 10: Estimated traffic volumes – AM peak

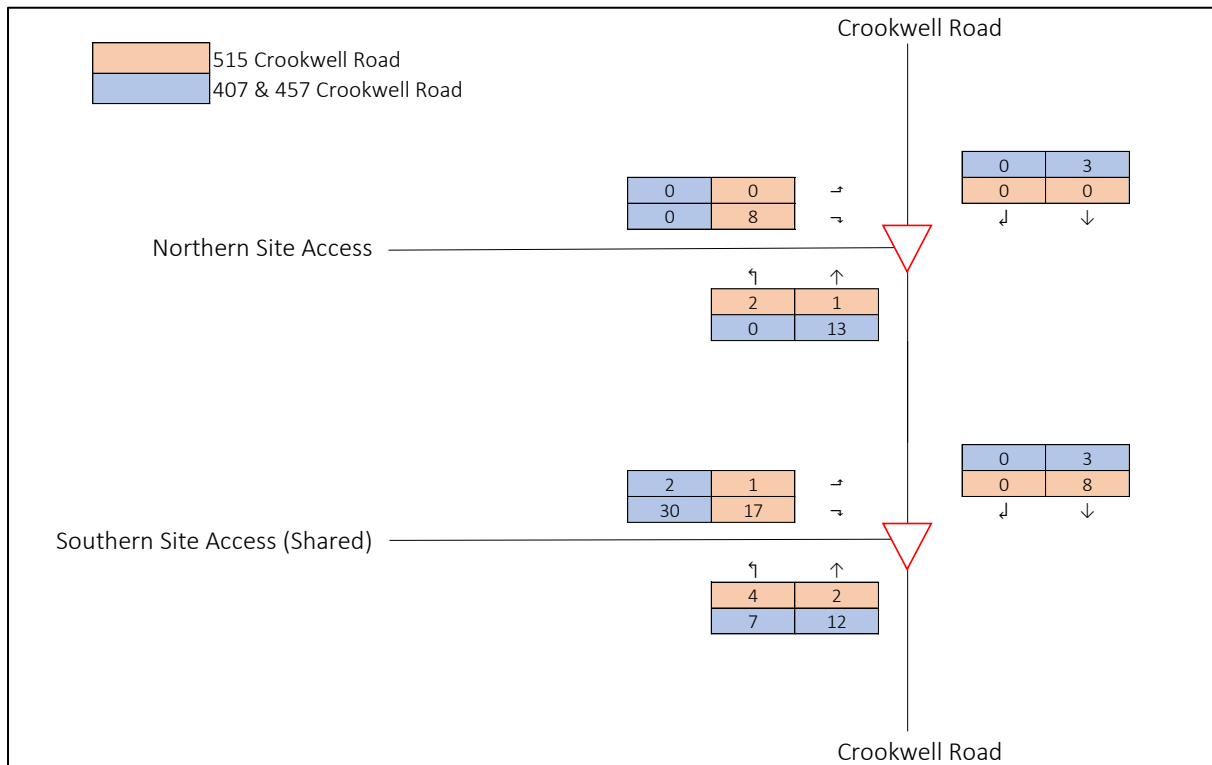
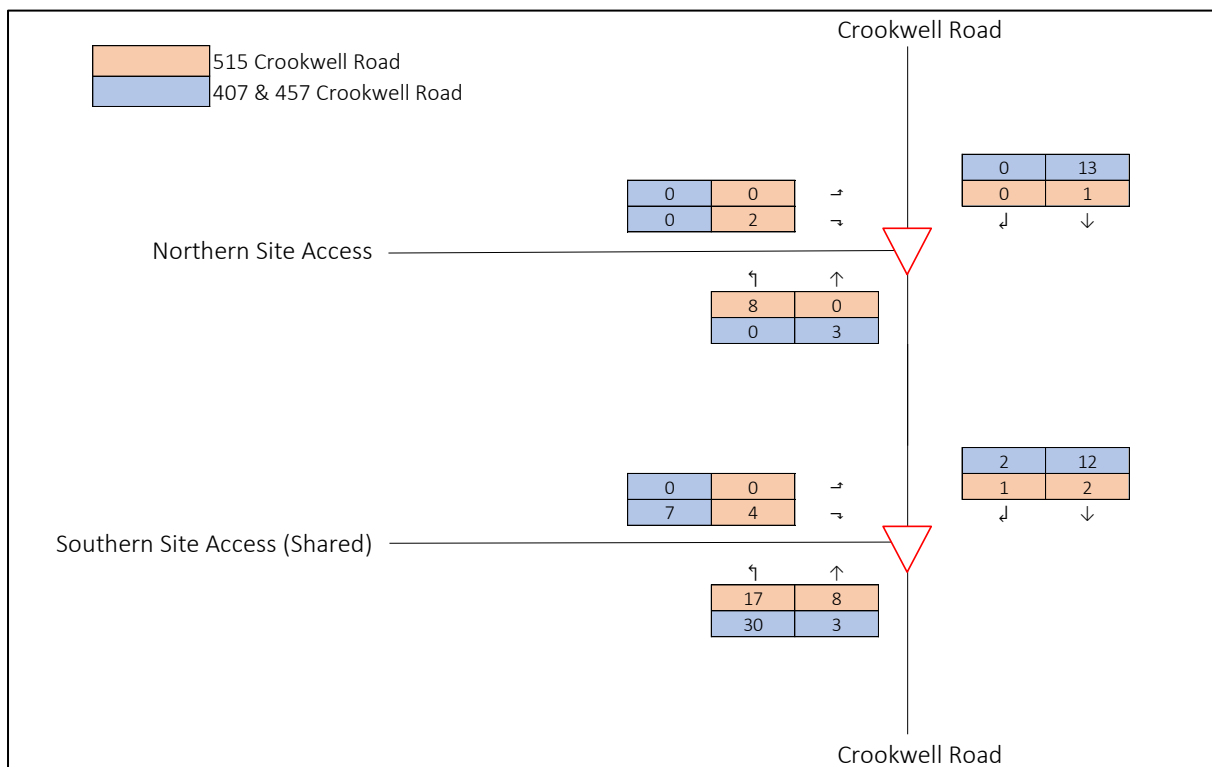


Figure 11: Estimated traffic volumes – PM peak



4.3.1 TRAFFIC IMPACT

Considering the low traffic volumes on Crookwell Road passing the site, the additional 33 vehicle trips generated by the development (or one vehicle about every two minutes) is not expected to materially change the safety or function of the surrounding road network. Figure 10 and Figure 11 indicate that the majority of additional vehicle trips along the Crookwell Road site frontage are contributed by the adjacent 407 & 457 Crookwell Road subdivision. However, considering directional distributions recommended by TfNSW being primarily to/ from Goulburn to the south, traffic volumes from the 407 & 457 Crookwell Road subdivision that travel past the subject site are overall considered minimal.

The details of road layout and design, together with treatments is discussed in the subsequent section of this report.



5 Design Review

5.1 References

In recommending road hierarchy and cross-sectional requirements for the subdivision, the following documents have been referenced:

- Goulburn-Mulwaree Council Development Control Plan (DCP) 2009, Chapter 7 Engineering Requirements Subdivision of Land.
- Goulburn-Mulwaree Council Standards for Engineering Works, 2013 – AUS-SPEC #1 Development Specification Series Design.
- Goulburn-Mulwaree Council Standard Drawings.
- Australian Standards, Parking Facilities, Part 5: On-Street Parking AS 2890.5-1993.

5.2 Road Design

All new rural roads within the site should be designed and constructed to comply with Goulburn-Mulwaree Council Standard Drawings. Council's cross-sectional requirements for applicable roads in residential areas are reproduced in Table 6.

Table 6: Roads in residential road networks

Road Type	Number of lots or dwellings	Carriageway Width	Road Reserve Width	Kerb Type	Footpath Requirement	Verge Width (m)	Unsealed Shoulder Width
Cul-de-sac access lane (max length 100m)	8	5.5m	10.5m	Rollover layback or concrete edge strip	Nil	5m in total	3 point turn facility for single unit truck
Access Street	Up to 20 in each direction	6m	15m	Rollover or layback	One side	4.5m each side	Cul-de-sac head of 10m radius at kerb line
Local Street	More than 20 in each direction	9m	18m	Rollover or layback	Both sides	4.5m each side	As above
Collector Street		11m	20m	Barrier	Both sides	4.5m each side	As above

Source: Goulburn-Mulwaree Council Standards for Engineering Works, 2013 – AUS-SPEC #1 Development Specification Series Design

Table 6 indicates that the internal roads within the subdivision could be designed in accordance with the characteristics of either an access or local street.



Given the sites rural location, surrounding environs and anticipated low traffic volumes within the subdivision, the need for formal footpaths may not be necessary. Such road reserve set outs can be confirmed as part of any future development application.

5.3 Sightline Assessment

5.3.1 SIGHT DISTANCE REQUIREMENT

Two site accesses are proposed with the first located 20 metres north of the existing property access driveway and the second on the southern boundary. The available sightlines at the northern site access would not noticeably vary from current conditions.

A preliminary Safe Intersection Stopping Distance (SISD) assessment has been completed along Crookwell Road to inform the location of the proposed southern site access road.

The definition of SISD in the Glossary of Terms (Austroads, 2015) is the “distance required for a driver or rider on the priority road to observe a vehicle from a side road moving into a collision situation, and to decelerate to a stop before reaching the collision point”.

The *Guide to Road Design Part 4A: Unsignalised and Signalised Intersections* (Austroads, 2017) set out the SISD requirements, reproduced in Figure 12 and Figure 13.

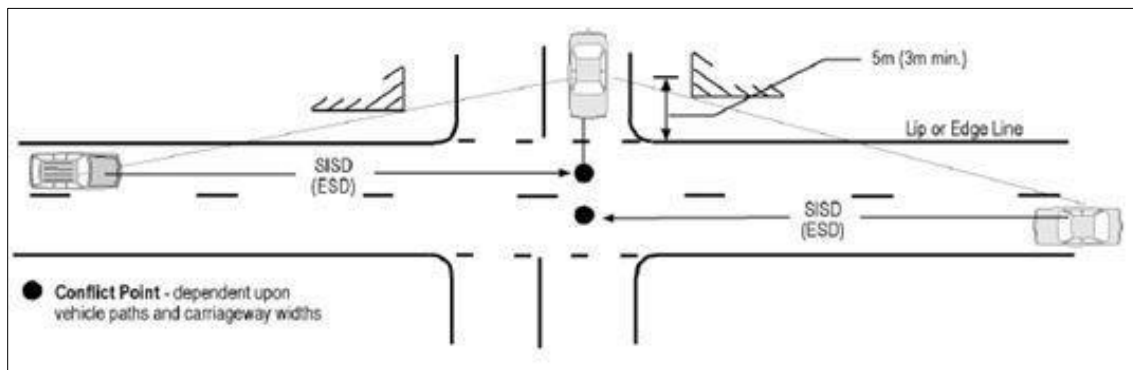
Figure 12: Austroads Part 4A Table 3.2 SISD Calculation

Design speed (km/h)	Based on safe intersection sight distance for cars ⁽¹⁾ $h_1 = 1.1$; $h_2 = 1.25$, $d = 0.36$ ⁽²⁾ ; Observation time = 3 sec					
	$R_T = 1.5 \text{ sec}^{(3)}$		$R_T = 2.0 \text{ sec}$		$R_T = 2.5 \text{ sec}$	
	SISD (m)	K	SISD (m)	K	SISD (m)	K
40	67	4.9	73	6	–	–
50	90	8.6	97	10	–	–
60	114	14	123	16	–	–
70	141	22	151	25	–	–
80	170	31	181	35	–	–
90	201	43	214	49	226	55
100	234	59	248	66	262	74
110	–	–	285	87	300	97

Source: Table 3.2, Guide to Road Design Part 4A: Unsignalised and Signalised Intersections, Austroads 2017



Figure 13: Austroads Part 4A Figure 3.2 - SISD Criteria



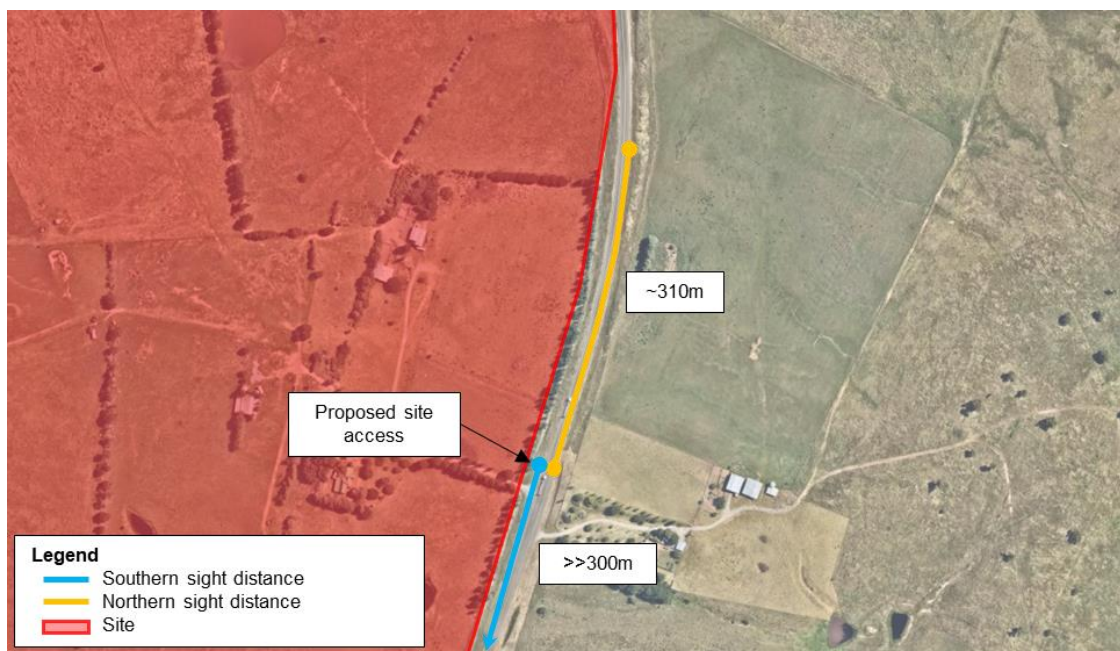
Source: Figure 3.2, Guide to Road Design Part 4A: Unsignalised and Signalised Intersections, Austroads 2017

Figure 12 indicates that for a 100 kilometre per hour posted speed zone (110-kilometre design speed), and application of a conservative reaction time of 2.5 seconds, the corresponding SISD is 300 metres.

5.3.2 NORTHERN SITE ACCESS

A desktop assessment has been completed for the northern site access, with the SISD compliance shown in Figure 14 with the observed sight lines in Figure 15 and Figure 16.

Figure 14: Measured sight distance (northern access)



Base image source: Nearthmap

Figure 15: Crookwell Road (looking north from proposed northern site access)



Figure 16: Crookwell Road (looking south from proposed northern site access)



5.3.3 SOUTHERN SITE ACCESS

A desktop assessment has similarly been completed for the southern site access, with the SISD compliance shown in Figure 17 with the observed sight lines in Figure 18 and Figure 19.

Figure 17: Measured sight distance (southern access)

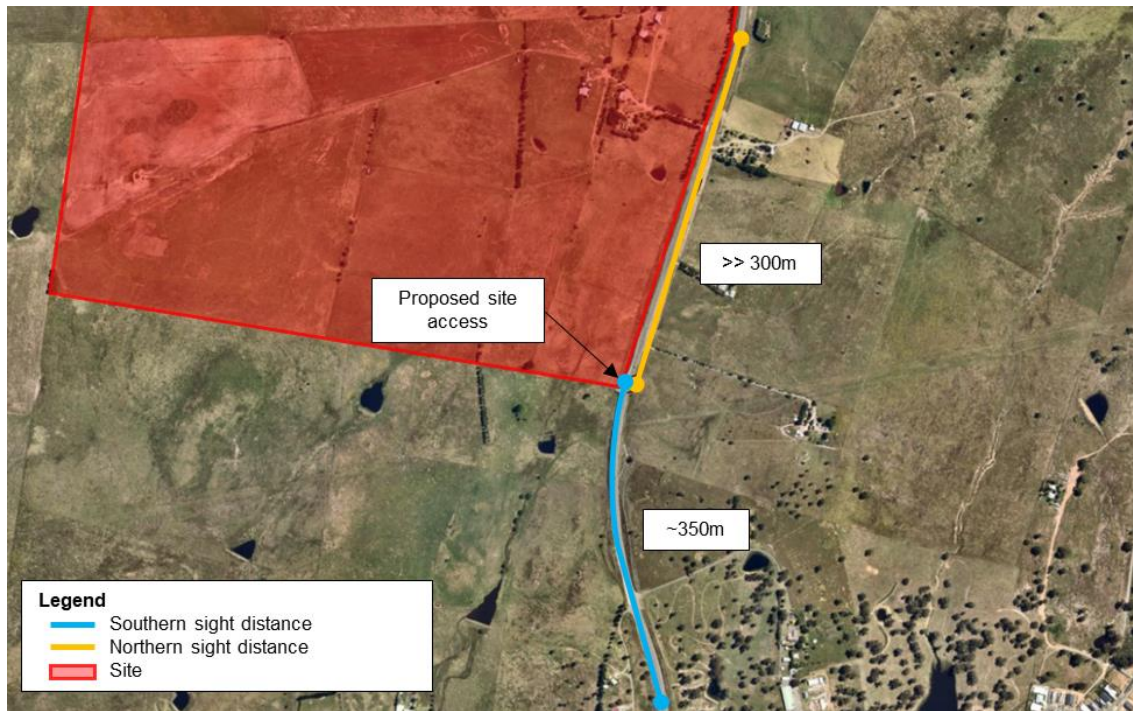


Figure 18: Crookwell Road (looking north from proposed southern site access)



Figure 19: Crookwell Road (looking south from proposed southern site access)



5.3.4 SUMMARY

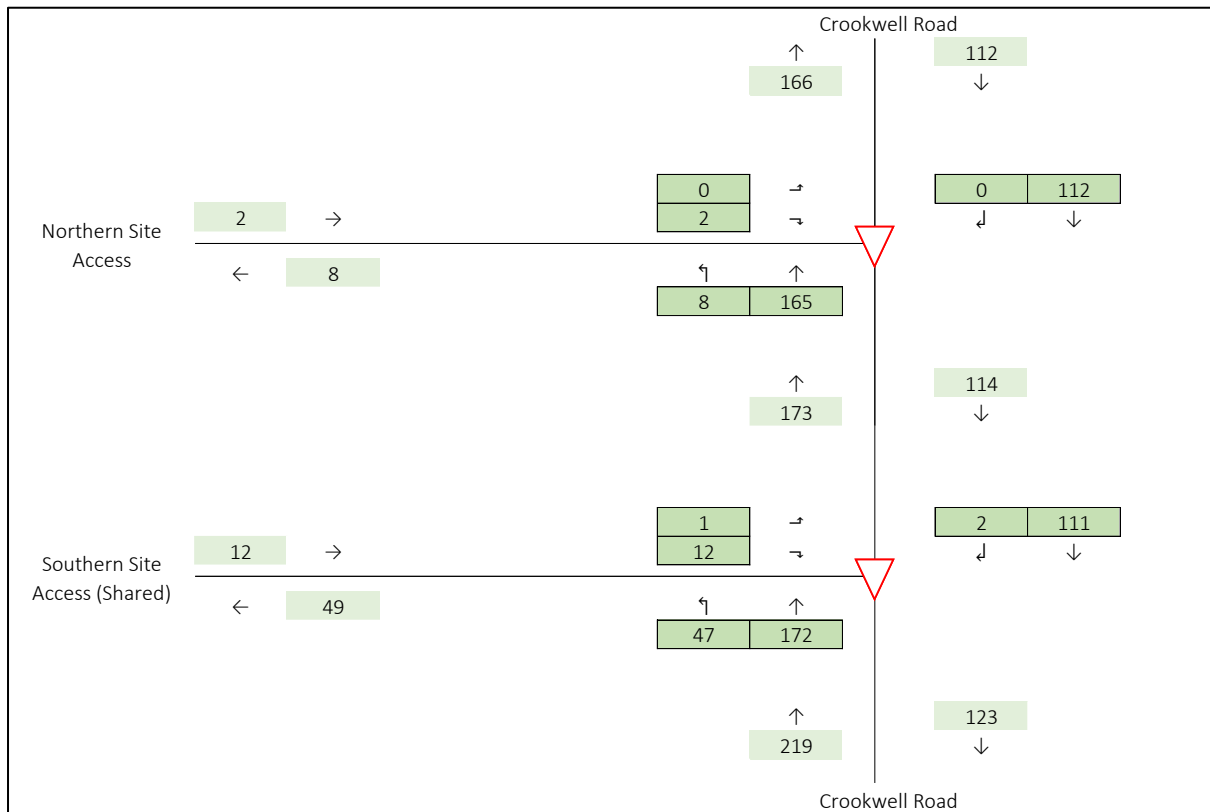
The sight distance assessment confirms that the indicative location of the site accesses can comply with the SISD requirements outlined in *Guide to Road Design Part 4A: Unsignalised and Signalised Intersections* (Austroads, 2017).

5.4 Basic Turn Treatments

An assessment of the appropriate site access treatment has also been completed. In this regard, reference to relevant Austroads design guidelines has been made.

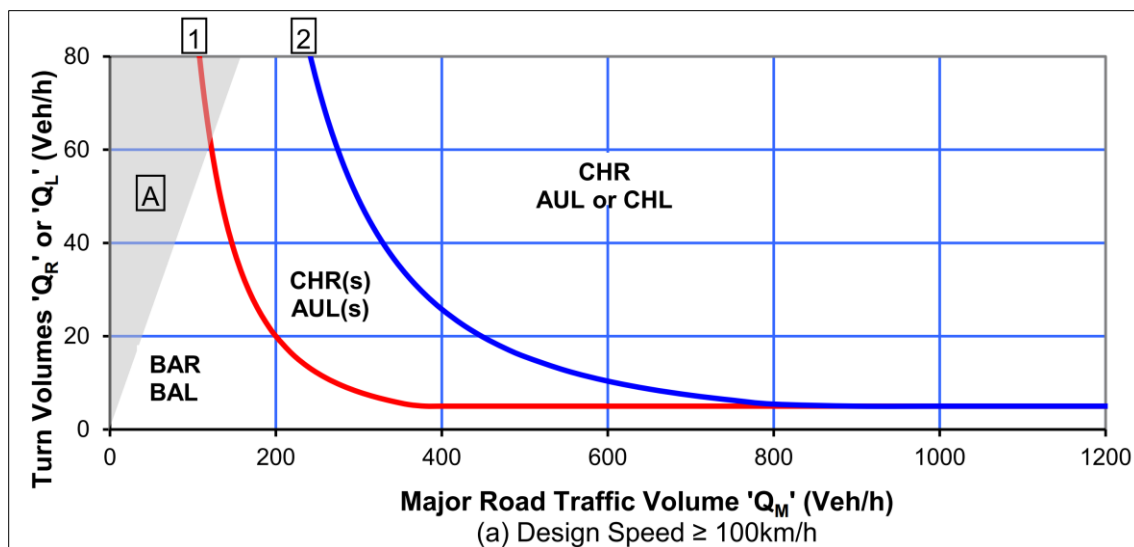
The existing through traffic volumes on Crookwell Road and estimated development traffic turning right on entry to the site during the weekday PM peak hour (when most residents return home) is summarised in Figure 20. It is noted that the base through traffic volumes outlined in Figure 20 are sourced from the updated 2023 volume data north of Chinamans Lane on Crookwell Road (as outlined in Table 1).

Figure 20: Estimated PM traffic volumes at the Crookwell Road



With reference to Figure 20 and Figure 3.25 from Austroads *Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management*, reproduced in Figure 21, the PM volumes would warrant the intersections be designed to include a basic right treatment, with an auxiliary left (short lane) (AUL(s)) also required at the southern shared access (based on existing speed zonings on Crookwell Road).

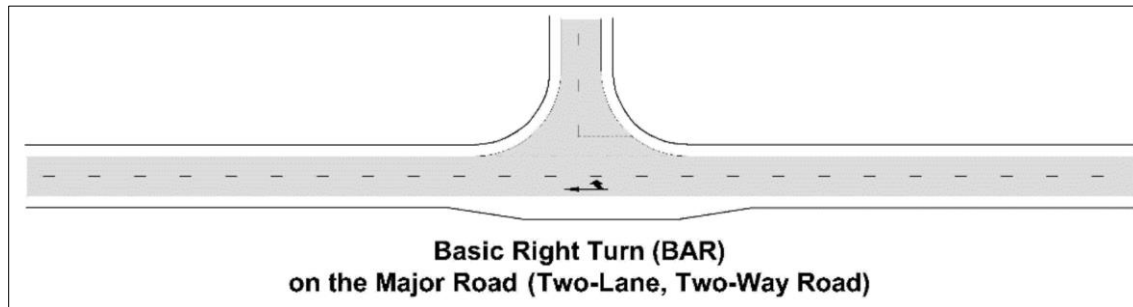
Figure 21: Warrants for turn treatments on major roads at unsignalised intersections



Source: Austroads Guide to Traffic Management Part 6: Intersections, Interchanges Crossings Management, Figure 3.25

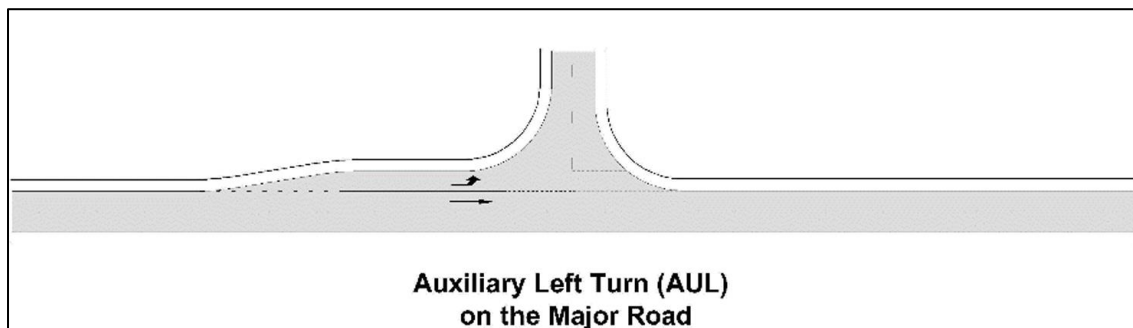
A typical rural BAR treatment is shown in Figure 22 and typically involves widening of the road shoulder to accommodate passing vehicles. A typical rural AUL(s) treatment is shown in Figure 23, with road widening works also required. The intersection designs are subject to future detailed design and consultation with adjacent property owners.

Figure 22: Basic right (BAR) intersection treatment



Source: Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management, Figure 3.1

Figure 23: Auxiliary left turn (AUL) intersection treatment



Source: Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management, Figure 3.5

6 Conclusion

Based on the analysis and discussions presented within this report, the following conclusions are made:

- The proposed rezoning of land at 515 Crookwell Road, Kingsdale is to permit a 25-lot rural residential subdivision, consistent with Council's Goulburn and Marulan Urban and Fringe Housing Strategy. This comprises 24 lots each covering two hectares and one larger lot with no street frontage to the internal road network.
- The proposal is likely to generate up to 33 vehicles during any peak hour.
- All internal roads will be designed in accordance with the Goulburn-Mulwaree Council Standard Drawings with details to be included in future consultation and defined as part of future development applications.
- The indicative layout plan shows two site accesses along Crookwell Road; one located about 20 metres north of the existing site access and the other on the site's southern boundary. Both accesses would have appropriate sight distances when considering Austroads *Guide to Road Design Part 4A: Unsignalised and Signalised Intersections* (Austroads, 2017).
- Based on existing and estimated traffic volumes on Crookwell Road, the site accesses should be designed to include a basic right turn treatment in accordance with Austroads *Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management* (Austroads, 2020). An auxiliary left (short lane) turn treatment is required at the shared access with the 407 & 457 Crookwell Road intersection.
- Considering the low traffic volumes along Crookwell Road (some 200 vehicle per hour, two-way), the additional 33 vehicles generated by the development (or one vehicle every two to three minutes) is not expected to materially change the safety or function of the surrounding road network should the abovementioned intersection treatments be adopted. Notwithstanding vehicles on Crookwell Road would be minor relative to those generated by the adjacent 407 & 457 Crookwell Road residential subdivision.

On this basis, the proposed rezoning can be supported from a traffic and transport perspective.

