Perception Planning

Cangon Park Rural Residential Estate - Stage 2 & 3

TRAFFIC IMPACT ASSESSMENT

WGA242274

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9 December 2024

Revision History

REV	DATE	ISSUE	ORIGINATOR	CHECKER	APPROVER
A	22/11/2024	DRAFT	JM	JM	MV
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1 INTRODUCTION

1.1 General

WGA have been engaged by Perception Planning on behalf of the applicant to prepare a Traffic Impact Assessment (TIA) report in response to a Request for Further Information (RFI) from Dungog Shire Council (Ref: DA 232/2022).

The RFI has been issued in relation to Stage 2 and Stage 3 of the proposed Cangon Park Rural Residential Estate development located at Hanleys Creek Road, Hanleys Creek.

1.2 Documentation Referenced

Whilst preparing this TIA report, the following information and documentation has been referenced:

- Stage 2 and 3 Lot Layout Plan (Rev M) prepared by Delfs Lascelles dated 26 October 2024.
- Landscape Masterplan prepared by Green Space Planning Co dated February 2024
- Dungog Shire Council Development Control Plan.
- Dungog Shire Council Roads Management Strategy.
- Dungog Local Environmental Plan 2014.
- Dungog Development Control Plan No. 1 Part D.9: Cangon Park Rural Residential Development.
- Cangon Park Residential Subdivision Updated Traffic Surveys dated 4 December 2019.
- Traffic movement count surveys conducted on Thursday 31 October 2024 by Trans Traffic Survey.
- TfNSW Guide to Transport Impact Assessment.
- RTA Guide to Traffic Generating Developments.
- Nearmap aerial imagery and Google Streetview imagery, as required.

1.3 Dungog Shire Council Request for Further Information

Dungog Shire Council has requested that a detailed Traffic Impact Assessment (TIA) be prepared in support of the development to address the following:

1. *An assessment of the traffic generated by the proposed development and its impact upon the current Hanleys Creek / Clarence Town Road intersection using SIDRA modelling. Details of any identified upgrade works or non-compliances are to be clearly identified within the TIA and shown on the plans.*
2. *Given the additional vehicle movements associated with the proposed development, the existing subdivision roads and Hanleys Creek Road may not be of sufficient width to comply with the requirements of Council's Roads Management Strategy. The TIA shall incorporate an assessment of the proposed subdivision road hierarchy against Council's Roads Management Strategy and identify any proposed upgrading works or non-compliances in relation to the internal subdivision roads, Hanleys Creek Road and the Hanley Creek Road pipeline crossing.*
3. *Consideration could be given to including the additional lots associated with the potential rezoning of part of the site within the above-mentioned TIA and assessment against Council's Roads Management Strategy.*

The following assessment has therefore been prepared to demonstrate the appropriateness of the proposal from a traffic engineering perspective and outline its compliance with the Dungog Development Control Plan, the Dungog Shire Council Roads Management Strategy and relevant Australian Standards.

2 DEVELOPMENT PROPOSAL

2.1 General

The proposal seeks to permit the subdivision and construction of 88 large residential lots within Stage 2 and Stage 3 of the Cangon Park Rural Residential Estate.

The subject site intends to leverage the existing connection to Hanleys Creek Road provided by Stage 1 of the development. An internal road network forms a loop road and provides local access within the development.

An extract of the development plans by Green Space Planning Co is provided within Figure 2.1.

Figure 2.1: Overview of Site Layout

2.2 Vehicle Access

Access to the site is proposed to be provided via Stage 1 of the Cangon Park Rural Estate development, which ultimately provides connection to the Hanleys Creek Road frontage via an unsignalised intersection. Access to the broader network is achieved via a further unsignalised intersection with Clarence Town Road.

3 SITE CONTEXT

3.1 Subject Site

The subject site is located at Lot 32 DP1282790 Hanleys Creek Road, Hanley Creek. Land uses surrounding the site are generally rural in nature, with the location of the subject site in the context of the surrounding road network shown in Figure 3.1.

Further Nearmap aerial imagery of the site is shown in Figure 3.2.

Figure 3.1: Subject Site and Surrounding Road Network

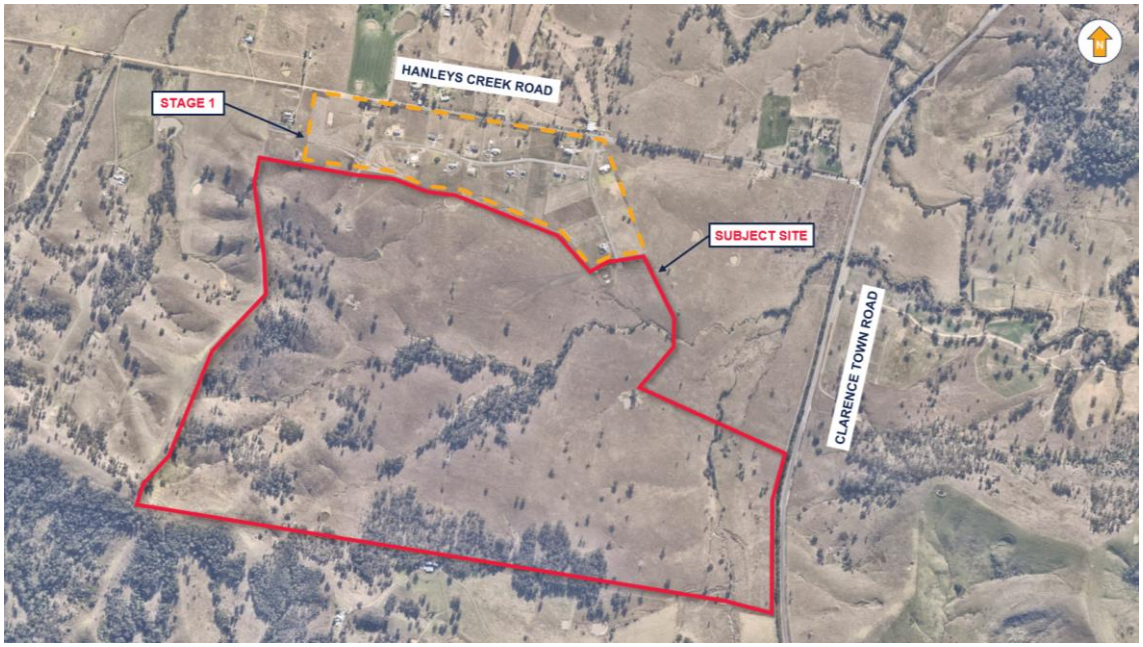

Figure 3.2: Subject Site and Surrounding Environs

3.2 Existing Site

The site is currently vacant and forms part of the broader Cangon Park Rural Residential Estate site.

3.3 Planning Zone

The subject site is located within a Large Lot Residential (R5) and Primary Production (RU1) zone and is generally surrounded by a Primary Production (RU1) zone. The location of the subject site in the context of the surrounding planning zones is shown in Figure 3.3.

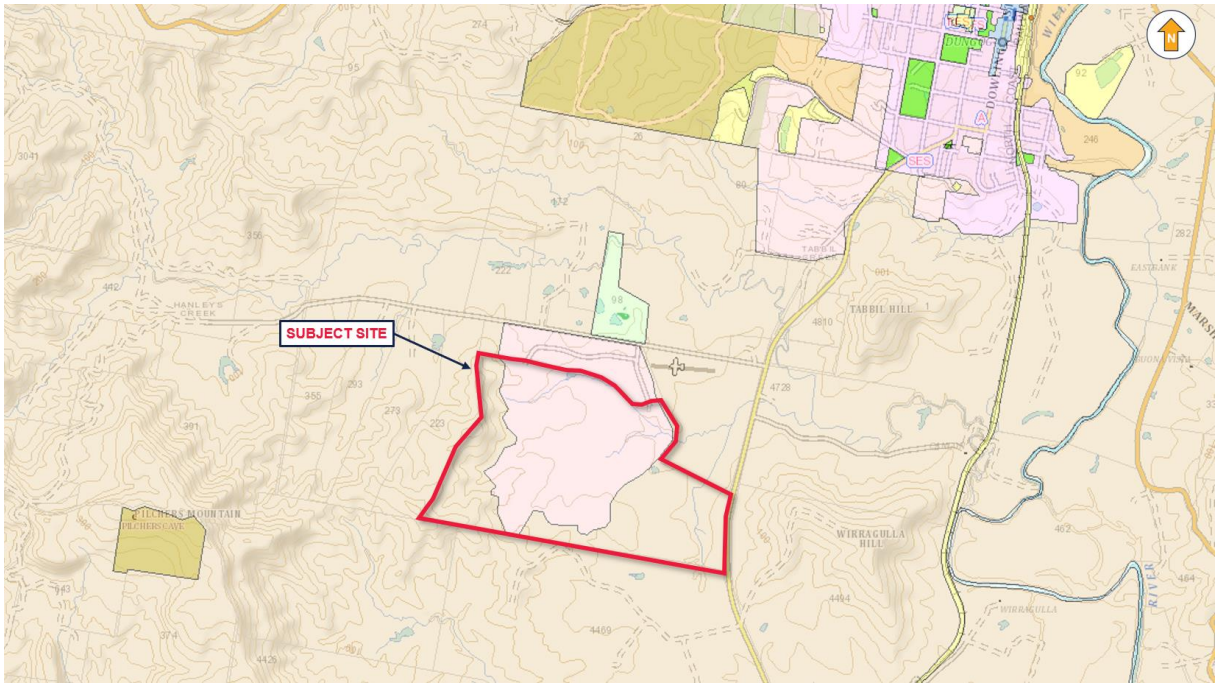

Figure 3.3: Extract of Land Zoning Map

The Dungog Local Environmental Plan 2014 outlines the following objectives for a Large Lot Residential (R5) zone:

- To provide residential housing in a rural setting whilst preserving, and minimising impacts on, environmentally sensitive locations and scenic quality.
- To ensure that large residential lots do not hinder the proper and orderly development of urban areas in the future.
- To ensure that development in the area does not unreasonably increase the demand for public services or public facilities.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.
- To isolate housing from existing intensive agriculture or future intensive agricultural areas.

3.4 Road Network

3.4.1 General

The broader site is accessed via Hanleys Creek Road which is classified as a local road under Transport for NSW's (TfNSW) Road Network Classification. The road hierarchy of the surrounding network has been reproduced in Figure 3.4.

Figure 3.4: Surrounding Road Network Hierarchy

A summary of the Transport for New South Wales (TfNSW) road classifications and their purposes is as follows:

State Roads	Major arterial links through NSW and within major urban areas. They are the principal traffic carrying roads and fully controlled by TfNSW with maintenance fully funded by TfNSW.
Regional Roads	Regional Roads provide the primary connections to and between smaller towns and perform a sub-arterial function in major urban areas. Regional roads are the responsibility of Councils for maintenance funding, though TfNSW funds some maintenance based on traffic and infrastructure. Traffic management on Regional Roads is controlled under the delegations to local government from TfNSW.
Local Roads	Local Roads are the responsibility of Councils for maintenance funding. TfNSW may fund some maintenance and improvements based on specific programs (e.g., urban bus routes, road safety programs). Traffic management on Local Roads is controlled under the delegations to local government from TfNSW.

3.4.2 Hanleys Creek Road

Hanleys Creek Road is a Local Road managed and maintained by Dungog Shire Council. Along the site frontage, Hanleys Creek Road is generally aligned in an east-west direction commencing at Clarence Town Road and extends approximately 5km to the west before continuing as Wallaringa Road.

Hanleys Creek Road provides one (1) traffic lane in each direction across its approximate 7.3m sealed pavement width and has wide grassed shoulders on both sides of the carriageway. Hanleys Creek Road has a posted speed limit of 80km/h along the site frontage.

The overpass at the intersection of Clarence Town Road has recently been upgraded to accommodate concurrent two-way movements. Views of Hanleys Creek Road are shown in Figure 3.5 and Figure 3.6.

Figure 3.5: Hanleys Creek Road Facing West Towards Clarence Town Road (November 2024)

Figure 3.6: Hanleys Creek Road Intersection Facing West from Clarence Town Road (November 2024)

3.4.3 Clarence Town Road

Clarence Town Road is a Regional Road managed and maintained by Dungog Shire Council and is generally aligned in a north-south direction in the vicinity of the subject site.

Clarence Town Road typically comprises one (1) 3.4m wide traffic lane in each direction and provides auxiliary turn treatments at the intersection of Hanleys Creek Road. In the vicinity of the site Clarence Town Road has a posted speed limit of 100km/h.

Views of Clarence Town Road (prior to the construction of the overpass) are shown in Figure 3.7 and Figure 3.8.

Figure 3.7: Clarence Town Road Facing South Beyond Hanleys Creek Road (August 2023)

Figure 3.8: Clarence Town Road Facing North Towards Hanleys Creek Road (August 2023)

It is noted that the Hanleys Creek Road overpass works have not affected the Clarence Town Road arrangement shown above.

3.4.4 Bacon Circuit

Bacon Circuit is a Local Road managed and maintained by Dungog Shire Council and serves as the primary access into the Cangon Rural Residential Estate.

Bacon Circuit has one traffic lane in each direction accommodating two-way movements across its approximate 9.0m wide sealed pavement width and is understood to be constructed to a Rural Collector standard. Bacon Circuit has a posted speed limit of 50km/h.

Views of the typical Bacon Circuit arrangement are shown in Figure 3.9 and Figure 3.10.

Figure 3.9: Hanleys Creek Road Facing South Towards Bacon Circuit (November 2024)

Figure 3.10: Bacon Circuit Facing North Towards Hanleys Creek Road (November 2024)

4 CAR PARKING CONSIDERATIONS

4.1 Statutory Requirements

Part C20 of the Dungog Development Control Plan (DCP) specifies the statutory car parking requirements relating to the proposed provision of car parking spaces across a number of uses.

Table 4.1 provides a summary of the car parking requirements relevant to the proposal.

Table 4.1: Statutory Car Parking Requirements – Part C20 Dungog DCP

DEVELOPMENT TYPE	PARKING REQUIREMENTS
Dwelling House	1 space per dwelling. At least 1 space per dwelling to be undercover.

4.2 Adequacy of Proposed Car Parking Supply

Car parking spaces for residents will be primarily provided within each allotment as secure off-street spaces and their visitors will generally be accommodated within driveway areas or on-street, proximate to their destination in accordance with Part C20 of the Dungog DCP. Therefore, the proposal is considered appropriate from a car parking perspective.

5 TRAFFIC CONSDIERATIONS

5.1 Assessed Scenarios

A SIDRA Intersection analysis has been undertaken to determine the current operation of the following intersections whilst gaining an understanding of their likely future operation when accounting for the expected site generated traffic volumes:

1. Bacon Circuit / Hanleys Creek Road
2. Hanleys Creek Road / Clarence Town Road.

To assessed intersections relative to the subject site are shown in Figure 5.1.

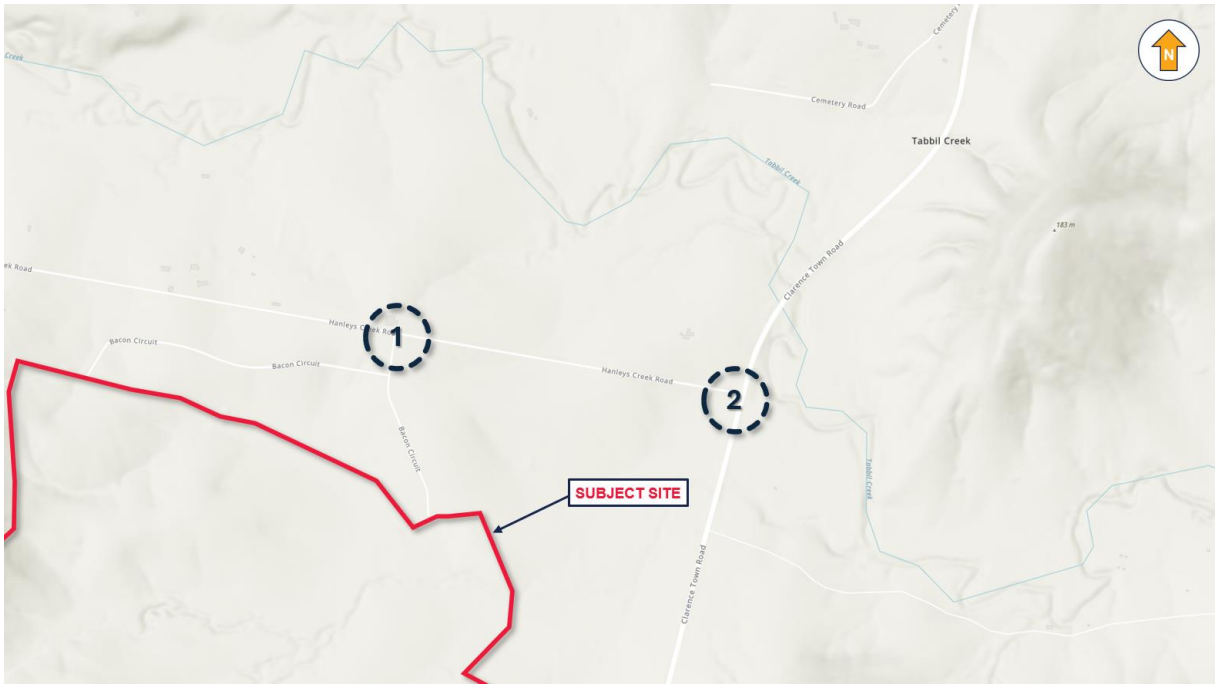

Figure 5.1: Summary of Assessed Intersections

To inform the assessment, the following scenarios have been assessed:

- Existing Conditions.
- Future Conditions: (Year 2036).
- Post Development Conditions (Future Conditions *plus* site generated traffic).

5.2 Existing Traffic Volumes

To gain an understanding of the prevailing traffic conditions proximate to the subject site, WGA commissioned turning movement count surveys at the intersections of Bacon Circuit / Hanleys Creek Road and Hanleys Creek Road / Clarence Town Road across a typical weekday period.

A review of the surveyed traffic volumes suggests that vehicular movements nearby the site peak at the following times:

- **AM Peak:** 8:00am – 9:00am.
- **PM Peak:** 3:00pm – 4:00pm.

The surveyed peak hour traffic volumes are shown in Figure 5.2 and Figure 5.3.

Figure 5.2: Hanleys Creek Road / Bacon Circuit Existing Traffic Volumes

Figure 5.3: Clarence Town Road / Hanleys Creek Road Existing Traffic Volumes

5.3 Future Traffic Conditions

To determine the extent of background growth along Clarence Town Road, historical traffic volume surveys undertaken in 2019 across the afternoon peak period have been referenced and compared against the existing traffic volumes detailed in Section 5.2.

A summary of the surveyed volumes is shown in Table 5.1.

Table 5.1: Surveyed Clarence Town Road Traffic Volumes – 2019 vs 2024 (PM Peak)

DIRECTION	2019 SURVEYED VOLUMES	2024 SURVEYED VOLUMES	CALCULATED GROWTH RATE
Northbound	105 vph	135 vph	+ 5.15%
Southbound	164 vph	185 vph	+ 2.44%
TOTAL	269 vph	320 vph	+ 3.53%

To gain an understanding of the anticipated future traffic volumes, the calculated growth rate outlined within Table 5.1 has been applied to the surveyed Clarence Town Road traffic volumes in accordance with the *Austroads Guide to Traffic Management Part 12: Integrated Transport Assessments for Developments*.

The following factors have been used to determine the future base traffic volumes (pre-development):

- **Applied compounding growth rate:** 3.53%.
- **Estimated year of development completion:** 2026.
- **Design period:** 10 years.
- **Assessed design year:** 2036.

With consideration of the factors outlined above, the projected Clarence Town Road traffic volumes (existing traffic volumes plus background network growth) across the AM and PM peak periods (pre-development) are shown in Table 5.2.

Table 5.2: Clarence Town Road Projected Future Traffic Volumes – Design Year 2036

DIRECTION	2024 SURVEYED VOLUMES		2036 PROJECTED VOLUMES	
	AM PEAK	PM PEAK	AM PEAK	PM PEAK
Northbound	173 vph	135 vph	262 vph	205 vph
Southbound	113 vph	185 vph	171 vph	281 vph

5.4 Traffic Generation

5.4.1 General

The *TfNSW Guide to Transport Impact Assessment* outlines typical traffic generation rates for various land uses and provides guidance for proposed trip generating developments. A number of factors can influence travel behaviour, including (but not limited to):

- Distance to public transport services.
- Distance to and quality of surrounding active transport networks.
- Distance to other destinations, such as schools, retail, etc.
- Type of road access.

Furthermore, in 2022 updated traffic generation rates were published within the *Transport for NSW Trip Generation Surveys*, which provided updated traffic generation rates for low density residential dwellings in regional areas as follows:

- **Daily vehicle trips:** 7.53 per dwelling.
- **Weekday average morning peak hour vehicle trips:** 0.83 per dwelling.
- **Weekday average evening peak hour trips:** 0.84 per dwelling.

It is noted that all surveyed sites did not have any non-residential traffic generating developments (e.g. child care centres, shops, schools, etc.) within the catchment area.

5.5 Anticipated Traffic Distribution

A review of the existing traffic volumes outlined within Section 5.2, suggest that site development traffic movements would exhibit the following distribution when exiting the site to Clarence Town Road:

	Northbound:	Southbound:
AM Peak:	60%	40%
PM Peak:	42%	58%

Furthermore, the following directional splits have been adopted for the site generated traffic movements:

	Inbound:	Outbound:
AM Peak:	30%	70%
PM Peak:	60%	40%

5.6 Site Generated Traffic Volumes

Based on the preceding assumptions, peak hour and daily traffic volumes anticipated to be generated by the subject site are summarised within Table 5.3 and further illustrated within Figure 5.4 and Figure 5.5.

Table 5.3: Anticipated Site Generated Traffic Volumes

DEVELOPMENT TYPE	SIZE / NO.	PERIOD	INBOUND	OUTBOUND	TOTAL (TWO-WAY)
Dwelling House	88 dwellings	AM Peak	22 vph	51 vph	73 vph
		PM Peak	44 vph	30 vph	74 vph
		Daily	332 vpd	331 vpd	663 vpd

Figure 5.4: Hanleys Creek Road / Bacon Circuit Site Generated Traffic Volumes

Figure 5.5: Clarence Town Road / Hanleys Creek Road Site Generated Traffic Volumes

5.7 Post Development Traffic Volumes

Application of the calculated site generated traffic volumes outlined within Figure 5.4 and Figure 5.5 to the projected 2036 Clarence Town Road traffic volumes discussed in Section 5.3 results in the following post development 2036 volumes outlined within Figure 5.6 and Figure 5.7.

Figure 5.6: Hanleys Creek Road / Bacon Circuit 2036 Post Development Traffic Volumes

Figure 5.7: Clarence Town Road / Hanleys Creek Road 2036 Post Development Traffic Volumes

5.8 Post Development Traffic Conditions

The proposed development intends to utilise the Stage 1 road network (Bacon Circuit) to access the site from Hanleys Creek Road. Consequently, an assessment of the intersection of Hanleys Creek Road / Bacon Circuit and Hanleys Creek Road / Clarence Town Road has been undertaken using SIDRA Intersection 9.0 modelling software.

SIDRA Intersection 9.0 is a computer-based modelling tool that allows for the capacity of an intersection or a number of intersections to be analysed in terms of a range of parameters, as described below.

The most commonly used measure of intersection performance is Degree of Saturation (D.o.S), which is the ratio of the volume of traffic observed making a particular movement compared to the maximum capacity for that movement. Various degrees of saturation and their rating are shown in Table 5.4.

Table 5.4: Ratings of Degree of Saturation

DEGREE OF SATURATION (D.o.S)	RATING
Up to 0.6	Excellent
0.6 to 0.7	Very Good
0.7 to 0.8	Good
0.8 to 0.9	Fair
0.9 to 1.0	Poor
Above 1.0	Very Poor

It is considered acceptable for some critical movements in an intersection to operate with a D.o.S up to 0.95 during peak periods, reflecting actual conditions in a significant proportion of suburban signalised intersections. Beyond a D.o.S of 0.95 queuing and delays begin to increase disproportionately.

Additionally, Austroads Guide to Traffic Management Part 3: Transport Study and Analysis Methods refers to target 'practical degrees of saturation' for a number of intersection configurations, as follows:

- Signals: 0.90
- Roundabouts: 0.85
- Unsignalised Intersections: 0.80

95th Percentile (95%ile) Queue represents that maximum queue length, in metres, that can be expected in 95% of observed queue lengths in the peak hour.

Average Delay is the delay time, in seconds, which can be expected over all vehicles making a particular movement in the peak hour.

The results of the SIDRA analysis outlining a comparison between the existing operating conditions and the subsequent post-development conditions has been summarised in Table 5.5 and Table 5.6.

Table 5.5: SIDRA Intersection Results Summary – Hanleys Creek Road & Clarence Town Road

APPROACH	EXISTING CONDITIONS			POST-DEVELOPMENT		
	D.o.S	AVERAGE DELAY (s)	95TH %ILE QUEUE (m)	D.o.S	AVERAGE DELAY (s)	95TH %ILE QUEUE (m)
Weekday AM Peak						
Clarence Town Rd (S)	0.08	0	0	0.13	0	0
Clarence Town Rd (N)	0.05	1	0	0.09	1	1
Hanleys Creek Rd (W)	0.02	7	0	0.07	8	2
Weekday PM Peak						
Clarence Town Rd (S)	0.06	0	0	0.11	1	0
Clarence Town Rd (N)	0.08	0	0	0.14	1	3
Hanleys Creek Rd (W)	0.02	7	1	0.08	9	2

Table 5.6: SIDRA Intersection Results Summary – Hanleys Creek Road & Bacon Circuit

APPROACH	EXISTING CONDITIONS			POST-DEVELOPMENT		
	D.o.S	AVERAGE DELAY (s)	95TH %ILE QUEUE (m)	D.o.S	AVERAGE DELAY (s)	95TH %ILE QUEUE (m)
Weekday AM Peak						
Bacon Circ (S)	0.01	6	0	0.06	6	1
Hanleys Creek Rd (E)	0.01	5	0	0.02	5	0
Hanleys Creek Rd (W)	0.00	1	0	0.00	1	0
Weekday PM Peak						
Bacon Circ (S)	0.00	6	0	0.03	6	1
Hanleys Creek Rd (E)	0.00	2	0	0.03	5	0
Hanleys Creek Rd (W)	0.01	1	0	0.01	1	0

The results of the SIDRA assessment outlined in Table 5.5 and Table 5.6 suggest that the proposed development will have a negligible impact on the operation of the intersections of Bacon Circuit / Hanleys Creek Road and Hanleys Creek Road / Clarence Town Road, with all site generated traffic volumes able to be readily absorbed by the surrounding road network.

6 OTHER CONSIDERATIONS

6.1 Proposed Road Network Hierarchy and Capacity

Figure 6.1 has been prepared to demonstrate the anticipated daily volumes within the internal road network, based on the daily traffic generation outlined within Section 5.4 and the assumed distribution of internal movements relative to the respective lots.

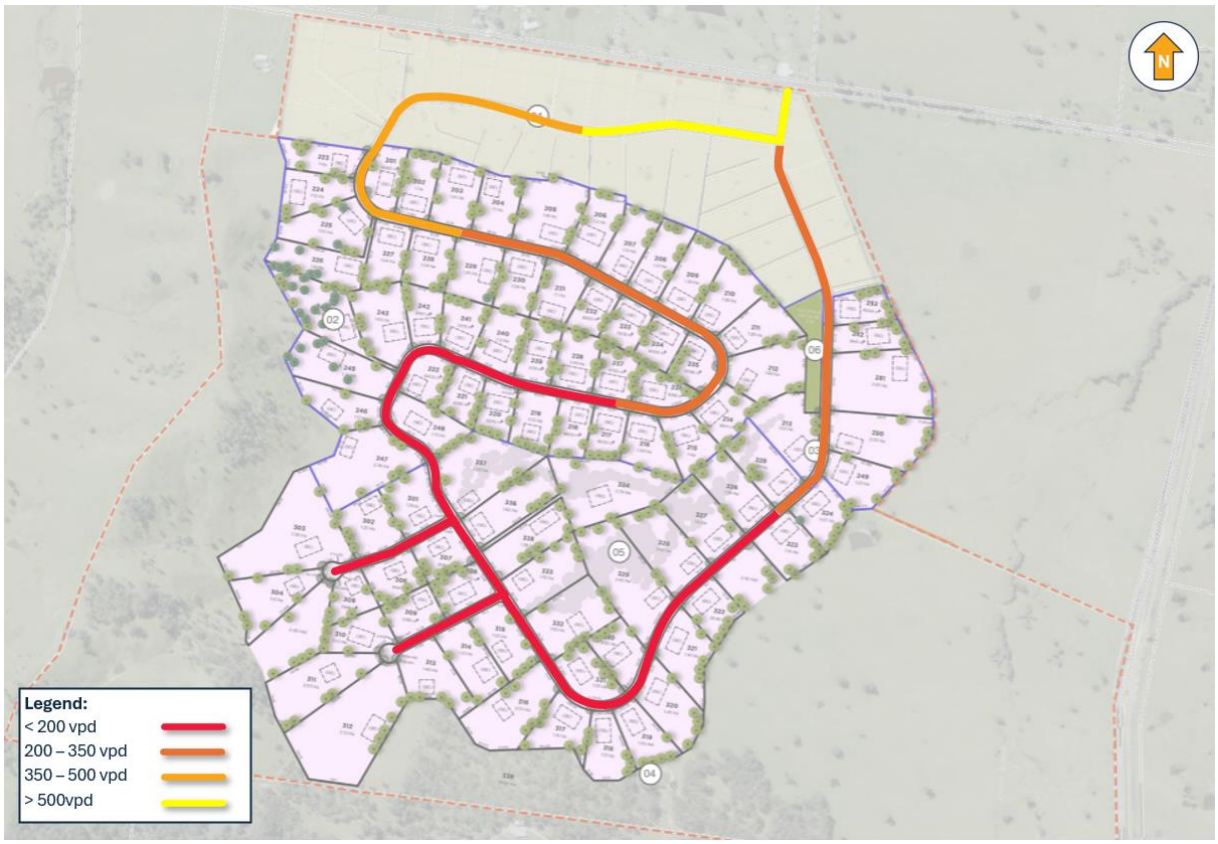

Figure 6.1: Daily Internal Traffic Volumes

Section 3.3 of the Dungog Shire Council Roads Management Strategy outlines the road hierarchy applicable to new rural subdivisions. The design characteristics of the various cross-sections proposed as part of this proposal are reproduced in Table 6.1.

Table 6.1: Proposed Road Hierarchy

ROAD CLASS	NO. OF TRAFFIC LANES	TRAFFIC LANE WIDTH	CARRIAGEWAY WIDTH	VEHICLES PER DAY	DESIGN SPEED (min.)
Rural Collector	2	3.5m	9.0m	> 500 vpd	80km/h
Rural Distributor	2	3.25m	8.0m	> 350 vpd	60km/h
Rural Local 1	2	3.0m	7.0m	> 200 vpd	60km/h
Rural Local 2	2	3.0m	6.0m	50 – 200 vpd	40km/h

It is understood that the internal road network generally comprises a 9.0m carriageway width with corresponds to a capacity of more than 500 vehicular movements per day. Therefore, the internal road network is considered to have sufficient capacity to accommodate the anticipated number of traffic movements.

6.1.1 Hanleys Creek Road Capacity

Section 4.2.4 of the RTA Guide to Traffic Generating Developments provides guidance on mid-block capacities for rural roads and likely levels of service and has been reproduced in Figure 6.2.

Terrain	Level of Service	Percent of Heavy Vehicles			
		0	5	10	15
Level	B	630	590	560	530
	C	1030	970	920	870
	D	1630	1550	1480	1410
	E	2630	2500	2390	2290
Rolling	B	500	420	360	310
	C	920	760	650	570
	D	1370	1140	970	700
	E	2420	2000	1720	1510
Mountainous	B	340	230	180	150
	C	600	410	320	260
	D	1050	680	500	400
	E	2160	1400	1040	820

Figure 6.2 Peak Hour Flow on Two-lane Rural Roads (veh/h) (Design Speed of 100km/h)

The RTA Guide states that where design speeds of 80 km/h are used, the resulting capacities are between 85% - 95% of the figures quoted, depending on the level of service.

At the site frontage, Hanleys Creek Road has an average grade of approximately 4% towards the west. Additionally, with consideration of the existing Hanleys Creek Road cross-section and posted speed limit of 80km/h, the criteria for Hanleys Creek Road have been taken as the following:

- **Terrain:** Rolling.
- **Percentage Heavy Vehicles:** 9%.
- **Speed Limit:** 80km/h.
- **Reduction Factor:** 0.85.

Application of the calculated site generated traffic volumes to the existing Hanleys Creek Road traffic volumes outlined within Section 5.7 suggests that during peak periods, Hanleys Creek Road would be expected to carry approximately 46 vph.

The RTA Guide states that a desirable level of service (LOS) for a minor rural road is LOS C or better. Application of the reduction factor to the specified traffic volume threshold of 650 veh/h equates to a revised target level of service threshold of 553 vph.

Therefore, with consideration of the above, the additional traffic anticipated to be generated by the subject site post-development is expected to be readily absorbed by the surrounding road network (particularly Hanleys Creek Road and Clarence Town Road), with negligible impacts on safety and performance expected.

7 SUMMARY & CONCLUSIONS

This Traffic Impact Assessment (TIA) report has been prepared in support of proposed Stage 2 and 3 of the Cangon Park Rural Residential Estate located at Hanleys Creek Road, Hanleys Creek

Based on the discussions and analysis outlined within this report the following key conclusions are derived:

- Stage 2 and Stage 3 of the Cangon Park Rural Residential Estate is to comprise 88 residential lots.
- Access to the site is proposed to be achieved by Bacon Circuit and internal roads associated with the broader subdivision.
- The proposal attracts a statutory requirement to provide one (1) car parking space per dwelling, Car parking for residents will be primarily provided within each allotment, which is considered appropriate.
- The proposal is anticipated to generate up to 74 new vehicular movements during the critical PM peak demand period (combined inbound and outbound movements) and up to 663 daily movements.
- The projected post development traffic volumes across the internal road network and Hanleys Creek Road are within the theoretical midblock capacity and are considered appropriate.
- The level of traffic movements expected to be generated by the proposed development is expected to pose negligible impacts to the safety / operations of the surrounding road network and intersections, particularly at the intersection of Clarence Town Road and Hanleys Creek Road.
- The proposal is considered to be compliant with the relevant requirements for the respective road hierarchy outlined within Section 3.3 of the Dungog Shire Council Roads Management Strategy and is considered appropriate.

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