KELLEY COVEY
GROUP PTY LTD
Consulting Engineers

TRAFFIC IMPACT ASSESSMENT

FOR

PROJECTED STUDENT GROWTH

AT

CARINYA CHRISTIAN SCHOOL

FOR

CARINYA CHRISTIAN SCHOOL

PROJECT NO: T239960

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1 Introduction

Kelley Covey Group (KCG) has been engaged by Carinya Christian School to prepare a Traffic Impact Assessment to accompany a development application to accommodate projected student population growth at their site in Calala NSW 2340. The assessment will involve analysing the current and projected traffic conditions of the road network in the vicinity of the site resulting from the projected growth of the school. Specifically, it will determine the following critical parameters of existing intersections and roads that comprise the access and egress points to and from the school;

- Level of Service of carriageways and intersections;
- the Degree of Saturation, and
- the Average Delay for vehicles at intersections.

The Traffic Impact Assessment will consider the following;

- The traffic volumes, distributions and Level of Service in both the current and projected conditions during AM and PM peak periods at the following key intersections;
    - Calala Lane and Carinya School West Entrance;
    - Calala Lane and Boronia Drive;
    - Boronia Drive and Carinya School East Entrance.
- Assessment of pedestrian routes and any safety considerations for pedestrians;
- Assessment of potential upgrades/amendments to existing approach roads/intersections;

The study site is located at the western fringe of the Calala residential area, and current traffic conditions reflect this environment, with typical peak periods occurring during the AM and PM hours.

The proposal is considered a Traffic Generating Development pursuant to Schedule 3 of the State Environmental Planning Policy - Transport and Infrastructure, 2021 (SEPP) as it can be defined as "*Any other purpose development generating 200 or more motor vehicles per hour*"; and therefore triggers the requirement for referral to Transport for NSW (TfNSW). The impact of traffic generated by the development is required to be assessed as part of the development application process.

This report will assess the proposed school population growth considering assumptions made in previous Traffic Impact Assessments prepared for other relevant developments in Calala area and the Carinya Christian School itself.

2 Description of Site and Existing Roads/Traffic Conditions

2.1 Site Description

The school is located in the urban area of Calala, NSW, approximately 6 km south of the Tamworth CBD. The site is established on the western fringe of the Calala residential area with a variety of residential, commercial, and education facilities nearby, with Primary Production Small Lots (RU4) land located immediately to the west and south as per the Tamworth Regional Local Environmental Plan 2010 (TRLEP 2010). The school is located within a 15.4 ha lot, which includes classroom and office buildings, playgrounds, sporting fields, carparks, internal roads, and other ancillary structures.

The site currently has two access/egress points. The first, located on the western side of the school, consists of a two-lane, two-way private road (known locally as Raywood Drive) that intersects with Calala Lane. The second access point is located on the eastern side of the school and consists of a two-way driveway connecting to Boronia Drive, a local residential street that also intersects with Calala Lane. The two intersections on Calala Lane are separated by approximately 260m.

Calala lane is a two-lane, two-way, 12.5-metre-wide road with kerb and gutter on both sides and an extensive cycle/footpath on the northern side connecting Calala to the Tamworth CBD. The road can be categorised as a Collector/Distributer Road, and the 20m wide road reserve accommodates a

road verge of variable width which integrates underground services including stormwater drainage, sewer systems, water supply, and communication networks.

Boronia Drive is an 11-metre wide two-lane, two-way local road, with kerb and gutter on both sides and a road verge that accommodates water, sewer, stormwater, and communications services. It cn be categorised as a Local Road, intended to provide access to properties in the residential area where it is located.

The site location is detailed in Figures 1-3 below.

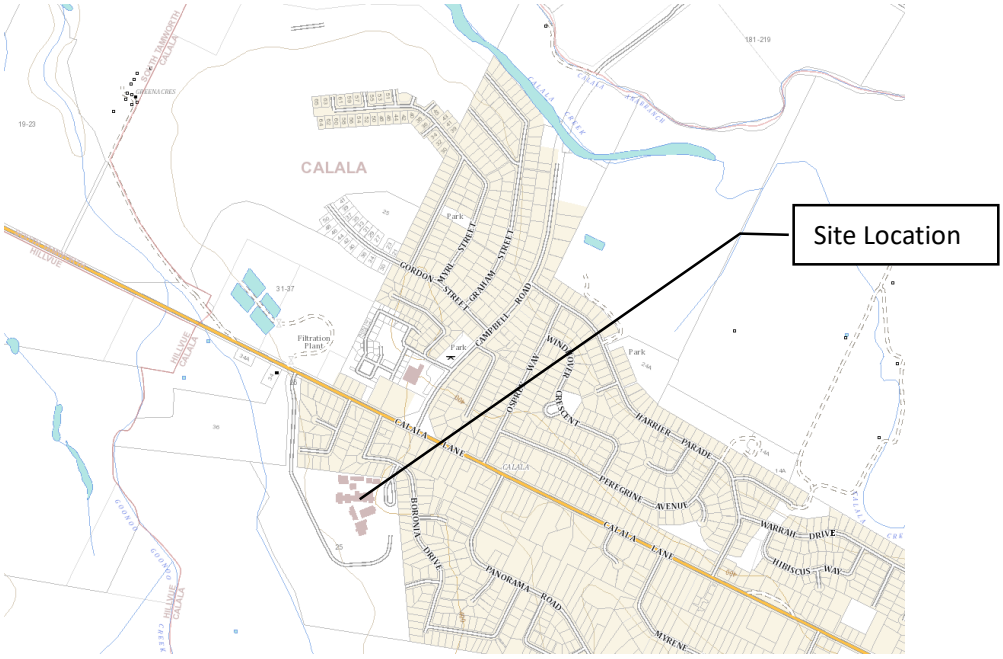

Figure 1. Site Location Plan (*Source: SixMaps, retrieved February 2024)*

Figure 2. Site Aerial Image (*Source: NearMaps, February 2024)*

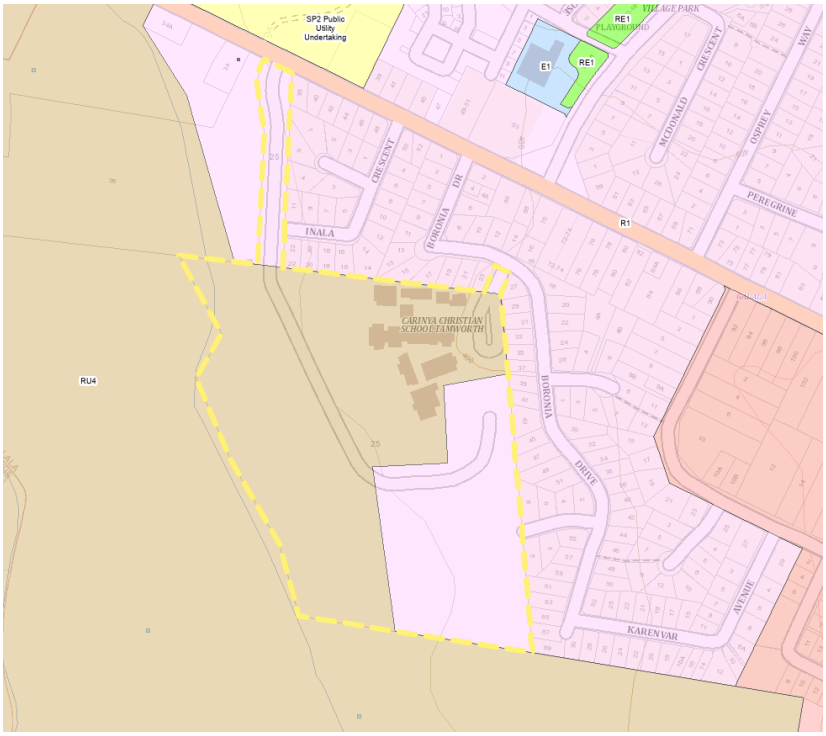

Figure 3. Site Zoning Plan (*Source: NSW Spatial Services, retrieved February 2024)*

2.2 Existing Traffic Environment and Conditions

The site is located within a Residential/Primary Production area, adjacent to Calala Lane – a collector/distributor road which functions as the primary conduit between the locality of Calala and the Tamworth CBD. Calala Lane is the main collector for citybound vehicles and the distributor for vehicles from the CBD into the local residential streets of Calala. The distribution of traffic reflects typical AM/PM peak periods indicating the journey to/from work towards the CBD.

Traffic generating developments in the local area include various residential, commercial, recreational, education, and healthcare developments. The closest traffic generating development sites are the Calala IGA and the Northwest Health Centre located approximately 250 m north of the site, in addition to Carinya Christian School itself.

Calala Lane is considered to be in satisfactory condition, with no large pavement defects observed. Road geometry and sight distance at Calala Lane and Carinya School West Entrance, and Calala Lane and Boronia Drive intersections is adequate, and signage and linemarking are appropriate.

Calala has experienced significant growth in recent years generated by the release of several large-scale residential subdivisions, including Peel River Estate (The Outlook), Redbank Estate and Lampada Estate. Each of these developments has contributed to the growth in traffic volumes on Calala Lane as well as connecting local roads.

In the past two years, two major traffic upgrades to Calala Lane have been completed in response to the growth in population and traffic generation in Calala. The first is a roundabout at the intersection of Calala Lane and Campbell Road, designed to improve intersection efficiency and traffic distribution to developments to the north of Calala Lane and the commercial core of Calala. The second is another roundabout on Calala Lane immediately adjacent to Calala Creek connecting to a new road being constructed to service future stages of The Outlook residential subdivision to the north.

2.3 Existing Car Parking Arrangements

The existing parking arrangements for the subject site provide a mixture of formal (bitumen sealed and line marked) and informal (hardstand area) parking spaces which can be accessed either from

the Boronia Drive or Raywood Drive access points, however there is no internal connectivity between parking areas from these two accesses. Currently there are approximately 95 parking spaces (61 formal and approximately 34 informal) accessible from Boronia Drive. There are 33 formal parking spaces on Raywood Drive, along with a large area of informal parking (approximately 89 spaces) which is generally utilised during major school events.

In total, there are 217 car parking spaces available on the site as a mixture of formal and informal parking.

2.4 Existing Pedestrian Facilities

There are currently formal provisions for pedestrian and cyclist traffic on the northern side of the Calala Lane road reserve, as well as footpaths along Boronia Drive and Carinya Christian School West Entrance. Signage to protect pedestrians is visible and appropriate for a school environment. The Calala Lane cycleway connects to the extensive off-road cycle network located throughout the Tamworth urban area.

2.5 Existing Traffic Information

To quantify the local traffic environment and conditions, and to determine the performance of the pre-development traffic environment, surveys and analysis of the network on the vicinity of Carinya Christian School are required to be completed.

Fortunately, extensive information regarding the existing traffic environment is already available from various sources, including the following;

- Existing traffic count information;
- Previous traffic studies

Rather than complete additional traffic surveys, the analysis of the existing traffic environment will utilise the extensive information already available (with suitable growth rates for extrapolation of older data).

2.5.1 Existing Traffic Counts

Automatic traffic count survey information for sites in proximity to Carinya Christian School has been provided by Tamworth Regional Council. The information was collected using MetroCount Traffic Executive traffic counting hardware and software. The traffic surveys were completed at the following locations over a continuous two-week period in May and June 2022 at the following locations (see Figure 4 below);

- Carinya Christian School West Entrance (Calala Ln 60m South);
- Carinya Christian School East Entrance (Boronia Drive 15m South);

Figure 4. Traffic Surveys Location (*Source: NearMaps, retrieved February 2024*)

A summary of the results of the TRC surveys is included in Appendix A, and for the purposes of this analysis increase in the school population of 2% per year was assumed for the traffic modelling.

2.5.2 Previous Traffic Studies

2.5.2.1 Peel River Estate

In 2008, Masson Wilson Twiney (MWT) conducted a traffic study for the Peel River Estate urban development, located north of Calala Lane in the vicinity of Carinya Christian School. This study included vehicle traffic counts on Calala Lane, which can be extrapolated to model current traffic conditions using a typical growth rate of 2.5% per annum up to the present date.

2.5.3 Carinya Christian School – Carpark Redevelopment

In 2017, Brown & Krippner Pty Ltd was contracted by Carinya to conduct a traffic analysis with the aim of proposing a redevelopment of the existing car park (Ref: L676.11 dated 26/04/2017). The goal was to enhance road safety for students and optimise the utilisation of parking spaces. This analysis examined the traffic at both East and West entrances of Carinya Christian School, considering both the prevailing conditions at the time and those associated with the proposed car park redevelopment.

For the purpose of traffic modelling in this report, the volumes at the intersection of Calala Lane and Carinya School West Entrance have been utilised and extrapolated, assuming an annual school population growth of 2% from 2017 to the present.

Traffic volumes for Boronia Drive were also extracted from the Brown & Krippner traffic study (2017) and extrapolated to model current traffic conditions, assuming a population growth in this sector of 2% per annum up to the present date.

The data from both the TRC traffic counts and each of the previous studies has been collated to develop a snapshot of the existing traffic conditions for adoption in the traffic analysis of this report.

3 Existing Conditions Traffic Analysis

To determine the performance of the existing traffic environment, mid-block and intersection analysis has been performed using SIDRA Intersection (Version 9) software. SIDRA is the industry standard for intersection and network capacity analysis of traffic environments.

SIDRA analysis determines the following relevant performance measures for each approach/departure movement at each intersection, as well as the network as a whole;

- *Degree of Saturation*; this is a ratio of vehicle volumes to theoretical capacity. The capacity of an intersection is the maximum sustainable flow rate that can be achieved under prevailing conditions and is determined by physical characteristics including geometry, number of lanes, approach distances and speed limits as well as traffic volume and distribution.
- *Average Delay*; the average delay is the excess travel time experienced by a vehicle relative to the free-flow travel time (ie. if there were no other vehicles using the intersection), and is measured in seconds.
- *Level of Service (LOS)*; indicates the general performance of the movement/intersection and is determined using the average delay per vehicle criteria given in Table 4.2 of the RMS publication "*Guide To Traffic Generating Developments*" (RTA, 2002).

3.1 Trip Distribution

Based on an observation of existing traffic movements and identification of trip generation origin/destination points within the local traffic environment, it has been assumed that vehicles arriving and departing Carinya Christian School would do so in accordance with the distribution shown in Table 5. A visual representation of the trip distribution pathways as detailed in Table 5 are shown as Figure 5.

Traffic volumes on Calala Lane and Boronia Drive generally reflect the flow of vehicles into Carinya Christian School from Calala Lane and out of Calala itself into the Tamworth CBD during the AM peak hours. Similarly, during the PM peak hours, there is a flow of vehicle traffic primarily out of Carinya Christian School (CCS) to Calala Lane and general traffic movement from the CBD into Calala.

The following table summaries the adopted trip distributions and traffic volumes adopted as inputs into the SIDRA analysis of the existing traffic environment

Table 5. Existing Traffic Conditions – Trip Distribution and Peak Hour Volumes (2024)

Lane	Approach/Departure Route	AM %	PM %	AM (vph)	PM (vph)
CCS West Entrance	1 – West Entrance – Left Turn Out	85%	85%	93	79
	2 – West Entrance – Right Turn Out	15%	15%	16	14
Calala Ln at CCS West Entrance	3 – Calala Ln WB – Left Turn In	1.9%	1.85%	19	10
	4 – Calala Ln WB – Outbound	98.1%	98.15%	999	531
	5 – Calala Ln EB – Right Turn In	20.8%	6.7%	110	57
	6 – Calala Ln EB – Inbound	79.2%	93.3%	418	795
Boronia Dr at Calala Ln	7 – Boronia Dr WB – Left Turn Outbound	86.5%	73.8%	64	76
	8 – Boronia Dr EB – Right Turn Inbound	13.5%	26.2%	10	27
Calala Ln at Boronia Dr	9 – Calala Ln WB – Left Turn In	3.6%	4.5%	36	22
	10 – Calala Ln WB – Outbound	96.4%	95.5%	954	465
	11 – Calala Ln EB – Right Turn In	16.3%	6.4%	71	52

Lane	Approach/Departure Route	AM %	PM %	AM (vph)	PM (vph)
	12 – Calala Ln EB – Inbound	83.7%	39.6%	363	757
CCS East Entrance	13 – East Entrance – Left Turn Out	95%	94.6%	39	88
	14 – East Entrance – Right Turn Out	5%	5.4%	2	5
Boronia Dr at CCS East Entrance	15 – Boronia Dr WB – Left Turn In	5.7%	6.6%	2	1
	16 – Boronia Dr WB – Outbound	94.3%	93.4%	33	14
	17 – Boronia Dr EB – Right Turn In	90.7%	39.2%	97	29
	18 – Boronia Dr EB – Inbound	9.3%	60.8%	10	45

Figure 5. Trip Distribution Nodes and Pathways

3.2 Existing Conditions Traffic Analysis Results

The traffic survey data for Calala Lane and Carinya Christian School West Entrance (Intersection 1), Calala Lane and Boronia Drive (Intersection 2), and Boronia Drive and Carinya Christian School East Entrance (Intersection 3) intersections was entered into SIDRA traffic analysis software to create a model that enables the overall traffic environment to be analysed.

The analysis indicates the following;

- **Existing AM Peak Period**

- Calala Lane (East Bound and West Bound) at Intersections 1 and 2 currently operates satisfactorily, providing a Level of Service (LOS) of A, the top condition level indicating that the road provides "*a condition of free flow in which drivers are virtually unaffected by the presence of others in the traffic stream."* Similarly, Carinya Christian School East Entrance, and Boronia Drive East Bound have a Level of Service of A, indicating that "*the general level of comfort and convenience provided is excellent*".
- Boronia Drive West Bound and Carinya Christian School West Entrance West Bound – Movement 1 (see Figure 5 above), indicate a Level of Service B, providing a "*zone of stable flow where drivers still have reasonable freedom to select their desired speed and to manoeuvre within the traffic stream*".
- Carinya Christian School West Entrance West Bound – Movement 2 (see Figure 5), currently operates at a Level of Service D, indicating that the right-turn movement "*is close to the limit of stable flow but is approaching unstable flow".*

- **Existing PM Peak Period**
  - All lanes in the analysed network except for Carinya Christian School West Entrance West Bound (Movement 2 as per Figure 5), currently provide a Level of Service A, indicating an excellent level of comfort.
  - Carinya Christian School West Entrance West Bound – (Movement 2 as per Figure 5) currently operates with a Level of Service C, which indicates a stable flow.

The degree of saturation for each lane at each intersection within the network in both the AM and PM peak periods is less than 0.6, indicating that there is a significant amount of spare capacity. For comparison, a degree of saturation of 1.0 indicates the intersections are at full capacity, and as per RMS guidelines (RTA Guide to Traffic Generating Developments, 2002), a degree of saturation of 0.8 or lower is considered acceptable. The concept of carriageway capacity and Level of Service are discussed in the RTA Guide to Traffic Generating Developments (2002) together with the criteria for their assessment.

It should be noted that heavy vehicles constituted less than 10% of the overall traffic volume at the sites observed.

4 Proposed Development

Carinya Christian School has projected its school population to the year 2032. Currently, Carinya Christian School has an imposed student cap of 780 students (as per TCC DA84/95), and the annual growth rate is expected to vary from 0.83% to 3.63% over the next eight (8) years, resulting in the school student population increasing to and estimated 1,032 students by 2032.

Existing school infrastructure, including buildings, classrooms and ancillary facilities, are considered satisfactory to meet this demand, however the increase in student population will inevitably result in an increase in traffic generated at the site, triggering the requirement for either modification of the existing development consent or the lodgement of a new development application seeking to increase the student cap.

In that regard, the school is proposing to modify the existing consent (DA84/95) to increase the student cap from 780 students to 1,050 students.

5 Impact of Development

5.1 Traffic Generation of Development

The RTA Guide to Traffic Generating Developments (2002), does not specify traffic generation rates for schools. However, in 2014 RMS engaged GTA Consultants to conduct a study to determine the traffic volumes generated by schools in both urban and regional areas. The study also aimed to determine other parameters, such as parking demand, vehicle directional split, among others.

The resulting GTA Consultants "*Roads and Maritime Services Trip Generation Surveys Schools Analysis and Report*" (*GTA Report*) suggests, for All School Types, the following trip generation rates apply;

- AM Peak Hour Vehicle Trips: 0.62 per student;
- PM Peak Hour Vehicle Trips: 0.43 per student.

For the 270 additional students anticipated by Carinya Christian School student population growth estimates, this results in the following additional trip generation;

- AM Peak Hour Vehicle Trips: 0.62 x 270 = 168 vehicles;
- PM Peak Hour Vehicle Trips: 0.43 x 270 = 116 vehicles.

Additionally, the GTA Report suggests the following vehicle directional split, shown in Table 6 below;

Table 6. Vehicle Directional Split

School Type	Period	Vehicle Trip In %	Vehicle Trip Out %
All	AM	55%	45%
	PM	43%	57%

Consequently, the vehicle directional split for the proposed school population growth is as follows;

Table 7. Proposed Development Vehicle Directional Split

School Type	Period	Vehicles In	Vehicles Out
Carinya Christian School (2032)	AM	93	75
	PM	50	66

According to recent traffic counts (TRC, 2022) for the two access roads to Carinya Christian School 42% of the vehicles currently use the East entrance, while 58% of the vehicles use the West entrance. However this distribution is not expected to continue with the additional students due to the following;

- The east entrance is dominated by staff and administration parking, and student drop off/pick up is prohibited;;
- The west entrance is designated as the drop-off/pick-up route and is where the majority of students arrive/depart from the school.

In that regard, all of the growth in vehicle numbers is expected to be directed towards the west entrance, and therefore the following traffic volumes are obtained for each of the entrances to the school for the proposed additional 270 students;

Table 8. Proposed Development Traffic Volumes at each School Entrance

	CCS West Entrance		CCS East Entrance	
Period	Vehicles In	Vehicles Out	Vehicles In	Vehicles Out
AM	93	75	0	0
PM	50	76	0	0

5.2 Post-Development Trip Distribution

Using these post-development traffic volumes and distributions, as well as projected volumes and distributions for Calala Lane (including an annual growth rate of 2.5%), the post-development

traffic volume and distributions in the year 2032 have been determined and are summarised in Table 9 below.

It is noted that the recent construction of the new roundabout on Calala Lane west of the school will have an impact on both traffic generation and distribution in future. It could be assumed that the majority of traffic generated at The Outlook subdivision will use this route for trips to and from the CBD, rather than by using Myrl St and Campbell Road as per the current arrangement, which will reduce the volume of traffic passing the school entrance on Calala Lane and Boronia Drive. However, a timeframe for full connectivity of this route to the subdivision, as well as a timeframe for the completion of the subdivision, is unclear; and so an assumption that existing traffic volumes will simply increase by 2.5% annually is considered to represent a balanced and conservative estimate of future traffic volumes on Calala Lane.

Similarly, for the purposes of assessing the impact of traffic growth alone, the adopted distributions of post-development traffic movements assumes that the recently constructed roundabouts both east and west of the site will have no impact on driver behaviour, and vehicles will continue to enter/exit the site in the same way as if the roundabouts had not been constructed.

Table 9. Post-Development Trip Distribution (2032).

Lane	Approach/Departure Route	AM %	PM %	AM	PM
CCS West Entrance	1 – West Entrance – Left Turn Out	86%	86%	174	158
	2 – West Entrance – Right Turn Out	14%	14%	29	26
Calala Ln at CCS West Entrance	3 – Calala Ln WB – Left Turn In	3%	3%	36	19
	4 – Calala Ln WB – Outbound	97%	97%	1170	622
	5 – Calala Ln EB – Right Turn In	30%	22%	208	110
	6 – Calala Ln EB – Inbound	70%	89%	490	931
Boronia Dr At Calala Ln	7 – Boronia Dr WB – Left Turn Outbound	87%	74%	75	89
	8 – Boronia Dr EB – Right Turn Inbound	13%	26%	12	32
Calala Ln At Boronia Dr	9 – Calala Ln WB – Left Turn In	4%	5%	42	26
	10 – Calala Ln WB – Outbound	96%	95%	1118	545
	11 – Calala Ln EB – Right Turn In	16%	6%	83	61
	12 – Calala Ln EB – Inbound	84%	94%	425	887
CCS East Entrance	13 – East Entrance – Left Turn Out	95%	95%	46	103
	14 – East Entrance – Right Turn Out	5%	5%	2	6
BORONIA DR AT CCS EAST ENTRANCE	15 – Boronia Dr WB – Left Turn In	6%	7%	3	2
	16 – Boronia Dr WB – Outbound	94%	93%	39	16
	17 – Boronia Dr EB – Right Turn In	91%	39%	114	34
	18 – Boronia Dr EB – Inbound	9%	61%	12	53

Trip distribution Movement ID's as detailed in Table 9 are are as per Figure 5 (see chapter 2.5.2).

5.3 SIDRA Modelling Results of Proposed Development

A SIDRA analysis of the post-development traffic conditions as been undertaken to assess the impact of the increased student population and corresponding increase in traffic generation on the local traffic environmnent.

The SIDRA results of the individual intersection sites as well as the overall network (detailed results are included in Appendix B) indicate that the proposed school population growth as well as the projected population growth within the vicinity of the site will have noticeable impact on the operation of the road network, specifically in the AM peak period. The individual Level of Service results for each of the sites and lane approaches are as follows;

AM Peak Time

- Calala Lane West Bound, Boronia Drive East Bound, and the Carinya Christian School East Entrance approaches remain at a **LoS A**, indicating a minimal impact on the lane capacities.
- Calala Lane East Bound at Boronia Drive approach indicated a Level of Service **LoS B**, still providing a stable flow.
- Boronia Drive West Bound denoted a **LoS C**, providing a "*stable flow, but most drivers are restricted to some extent in their freedom to select their desired speed and to manoeuvre within the traffic stream*" as per the RTA Guide to Traffic Generating Developments.
- The intersection of Calala Lane and Raywood Drive (the west entrance), indicates a Level of Service **LoS F**, resulting in a "*forced flow. With it, the amount of traffic approaching the point under consideration exceeds that which can pass it. Flow break-down occurs and queuing and delays result*". The poor Level of Service is driven mainly by delays caused by queued vehicles waiting to turn right both into Raywood Drive from Calala Lane and out of Raywood Drive into Calala Lane. The high volume of through traffic in Calala Lane in the mornings makes right turn movements into and out of the site virtually impossible.

PM Peak Time

- For the PM Peak Period Time, the results indicated a Level of Service A for almost all approach lanes, with the exception of Boronia Drive West Bound, which indicated a **LoS B**. This is considered to be of minimal impact as current conditions indicate the same Level of Service.
- However, and as per the AM situation, right-turn movements exiting the school (Movement 2 - see Figure 5) indicate a Level of Service **LoS F**, providing a very poor general level of comfort to drivers. Again this is driven by the high volume of through traffic on Calala Lane making right-turn movements out of the sight difficult and delayed.

The Degree of Saturation for the PM Peak Time remains unchanged (<0.6). In contrast, for the AM Peak Time, the Degree of Saturation remained <0.6 at Boronia Drive East Bound and Carinya Christian School East Entrance. For the approaching lanes of Boronia Drive West Bound and Calala Lane East and West Bound, the Degree of Saturation was in the range of 0.6-0.7, indicating satisfactory operation of the intersections.

However, for right-turn movements out of the West Entrance (see Movement 2 in Figure 5), the Degree of Saturation obtained was >1, indicating poor intersection performance.

As previously mentioned; the SIDRA analysis of existing and future traffic projections assumes a like-for-like approach considering the impacts of the projected increase in traffic volumes using similar distributions for both the current and future traffic environments. The analysis does not account for changes in driver behaviour that may result from the recent construction of the two new roundabouts on Calala Lane both east and west of the site. The impact of these roundabouts will be discussed later in this report.

Details of the solutions to these conflicts are presented in Chapter 6 of this document.

5.4 Car Parking Demand Generation of Development

The GTA Report suggests, for All School Types, the following Peak Parking demand per Student applies;

- Average Peak Parking demand: 0.10 spaces per student.

Application of these rates at for the 2032 student population at Carinya suggests the following demand;

- 1050 x 0.10 = 105 spaces.

The traffic study conducted by Brown and Krippner in 2017 proposed the redevelopment of the car park at Carinya Christian School. The aim was to formalize several parking spaces and enhance the pedestrian safety of the students and school staff, and a total of two hundred and forty-two (242) parking spaces was proposed, including 35 accessible from the Carinya Christian School East Entrance and 207 from the West Entrance.

The study was prepared to accompany a Development Application (ref: DA2017/0492) for the construction of the additional carparking, and the application was approved by Tamworth Regional Council in August 2017. The consent was not enacted prior to it lapsing in 2022; the car parking has not been constructed and the existing 217 spaces (both formal and informal) remain. The school intends to (separate to the subject of the development for which this report relates to) construct the car parking as per the provisions of Chapter 3 (Educational Establishments and Child Care Facilities) of the State Environmental Planning Policy (Transport and Infrastructure) 2021.

Existing parking provisions are considered sufficient to meet the current student population as well as the anticipated future student population growth. Provision of the approved additional car parking to provide a total of 242 formal (designed as per AS2890.1, bitumen sealed and linemarked) spaces will provide additional surplus capacity and will be beneficial during periods of high demand, such as school performances and events.

5.5 Impact of Proposed Development on Pedestrian Safety

The school has extensive pedestrian facilities that promote the safety of pedestrians travelling to and from Carinya Christian School. A School Crossing located just west of the Calala Ln/Campbell Rd intersection as well as a concrete footpath constructed in the Boronia Drive verge provides connectivity between Carinya Christian School and the footpath/cycleway network located in Calala Lane, and an internal footpath connects the main school building area to Calala Lane via Reywood Drive.

The additional student load can be accommodated by the existing pedestrian facilities.

6 Recommendations for Improved Traffic Flow

The SIDRA analysis results indicate that the additional traffic generated by the increased student population to 2032 will have a varied impact on traffic flow and network efficiency. Overall, the impact on Calala Lane carriageway performance and lane capacity is relatively minor, which reflects the priority given to Calala Lane at each of the intersecting roads. However, there are several individual movements that currently operate at a reduced capacity and are expected to deteriorate with the addition of the anticipated student population increase.

The poor performing movements are identified as those right-turn movements both into and out of Calala Lane at the school West Entrance at Raywood Drive. Although through traffic is able to go around queued vehicles in Calala Lane, and there are dedicated right and left turn lanes out of Raywood Drive, the queue lengths at both legs of the intersection result in a Level of Service of LoS F and a Degree of Saturation exceeding 1.

The most common and effective way to treat poor performing right-turn movements at intersections is to restrict them altogether and rely on the distribution of traffic within the broader network rather than depending on concentrated distributions at the intersection itself. Indeed, the school has

already implemented passive controls at the Raywood Drive intersection (signage and line marking) preventing right-turn movements out of the site, although the impact of these controls relies on compliance by drivers, and these controls do not restrict right-turn movements from Calala Lane into Raywood Drive, which makes their potential impact limited.

We recommend expanding the right-turn restrictions at the Calala Lane/Raywood Drive intersection further by constructing a central concrete median (and associated linemarking and signage) located in Calala Lane and extending across the width of the Raywood Drive intersection that will physically restrict right-turn movements into and out of the school at that intersection.

The implementation of right-turn restrictions at the Raywood Drive intersection will likely see the intersection and each lane Level of Service return to LoS B or better at the 2032 traffic volumes.

Historically, the impact of these restrictions would have been significant – there were previously limited opportunities for drivers to reverse their direction and approach the intersection with left in/out movements without either performing unsafe mid-block U-Turns or to drive all the way to Goonoo Goonoo Road to negotiate a U-Turn at the roundabout there. However, with the recent construction of two roundabouts, one both east and west of the Raywood Drive intersection, there are now proximal opportunities for drivers to safely reverse their approach direction and negotiate the Raywood Drive/Calala Lane intersection with more efficient left-turn movements with minimal disruption to travel times.

7 Summary and Conclusions

Carinya Christian School is anticipating an increase the student population at it's Calala campus by 270 students to a total of 1,050 students by the year 2032, based on annual school growth projections made by the school. To accommodate this growth, a modification to a previous development consent is being prepared for submission to Tamworth Regional Council to increase the permissible student cap.

The increase in student population will result in a related increase in traffic generation at the school, and the impact of this additional traffic on the local traffic environment is required to be assessed. Kelley Covey Group have been engaged to complete this traffic assessment.

The study site has been the subject of several traffic studies related to various developments in recent years. Traffic volumes from studies conducted in 2008, 2017, and 2022 have been obtained and were collated to gain a comprehensive understanding of the road network's behaviour.

A population growth rate has been applied to conduct traffic analysis under both current and projected future conditions in 2032. The projected traffic distribution closely mirrors the current traffic distribution, reflecting typical AM and PM peak traffic periods associated with travel to and from the CBD.

Currently, the local traffic network maintains a good Level of Service, with a few lane approaches causing minimal traffic disruption. After analysing the modelling results of the proposed traffic volume increases, including the population growth of Carinya Christian School as well as the broader Calala locality projected to 2032, it was determined that right turn movements in and out of the school at the Raywood Drive (west) entrance would generate significant conflicts and a reduction in overall network performance. This leads to a decrease in the Level of Service, and an increase in the Degree of Saturation and Average Delay at the intersections and lanes of the analysed road network.

To mitigate these conflicts and to minimise the impact of the increased traffic generation, we recommend restricting right-turn movements at the Raywood Drive/Calala Lane intersection by the construction of a concrete median in Calala Lane. The impact of restricted right-turn movements is mitigated by two nearby roundabouts located at the Calala Ln/Campbell Road and Calala Ln/The Outlook Estate intersections that will allow road users to negotiate safe approach reversal manoeuvres and to enter/exit the site via more efficient and safe left-turn movements.

A Development Application in 2017 proposed the redevelopment of the car park at the school to provide a total of 242 parking spaces, a significant increase to the 95 formal parking spaces currently provided. Whilst this development consent has lapsed, a new planning pathway is being follwed as per the provisions of Chapter 3 (Educational Establishments and Child Care Facilities) of the State Environmental Planning Policy (Transport and Infrastructure) 2021 for the construction of the additional spaces. The provision of the 242 spaces will provide surplus capacity and will cater for surge demand during school performances and events, and we endorse the continued implementation of the carparking construction program approved by that development consent.

The increase in student population will not have a detrimental impact on existing pedestrian facilities at the site, which are considered satisfactory to cater for both the existing and future demands at the site and for the local environment more generally.

Appendix A – TRC Traffic Count Data