Woolacotts.
CONSULTING ENGINEERS

Gledswood Hills Public School Traffic Report

23 November 2017 | 16-238

Contents

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1. Introduction

The new Gledswood Hills Public School is to be located on The Hermitage Way, Gledswood Hills. The site will have frontages on The Hermitage Way and new roads MC 06 and MC 07. See Figure 1 for the approximate location of the site. The new school will eventually cater for 1,000 students, but will be constructed in stages accommodating up to 600 students in the initial stage.

This report has been prepared to address traffic issues associated with the proposed public school, including parking, bus zones and traffic generated by the site and to cover issues raised in the SEARs. Traffic requirements for the site have been determined using the RMS *Guide to Traffic Generating Developments*. Where this does not provide data or guidance, reference is made to similar developments. As Oran Park Public School is a similar size to the proposed new school, it is used as a reference.

The site is located within a new development area. See Figure 2 for the overall Master Plan. Traffic reports prepared by Aecom were provided, which detail assumptions made regarding future traffic flows in the area. Copies of these reports are provided in Appendix A.

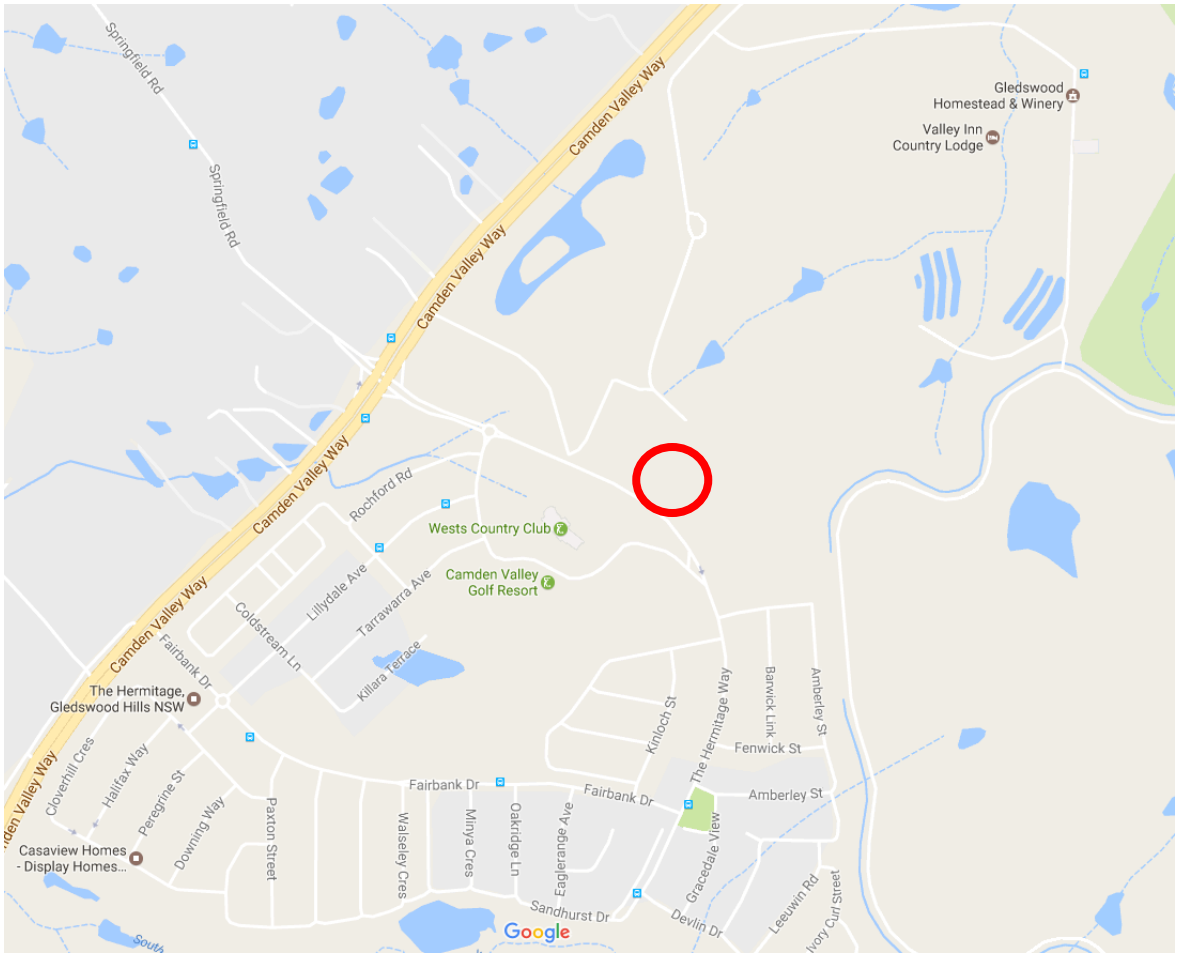

Figure 1 – Approximate Site Location

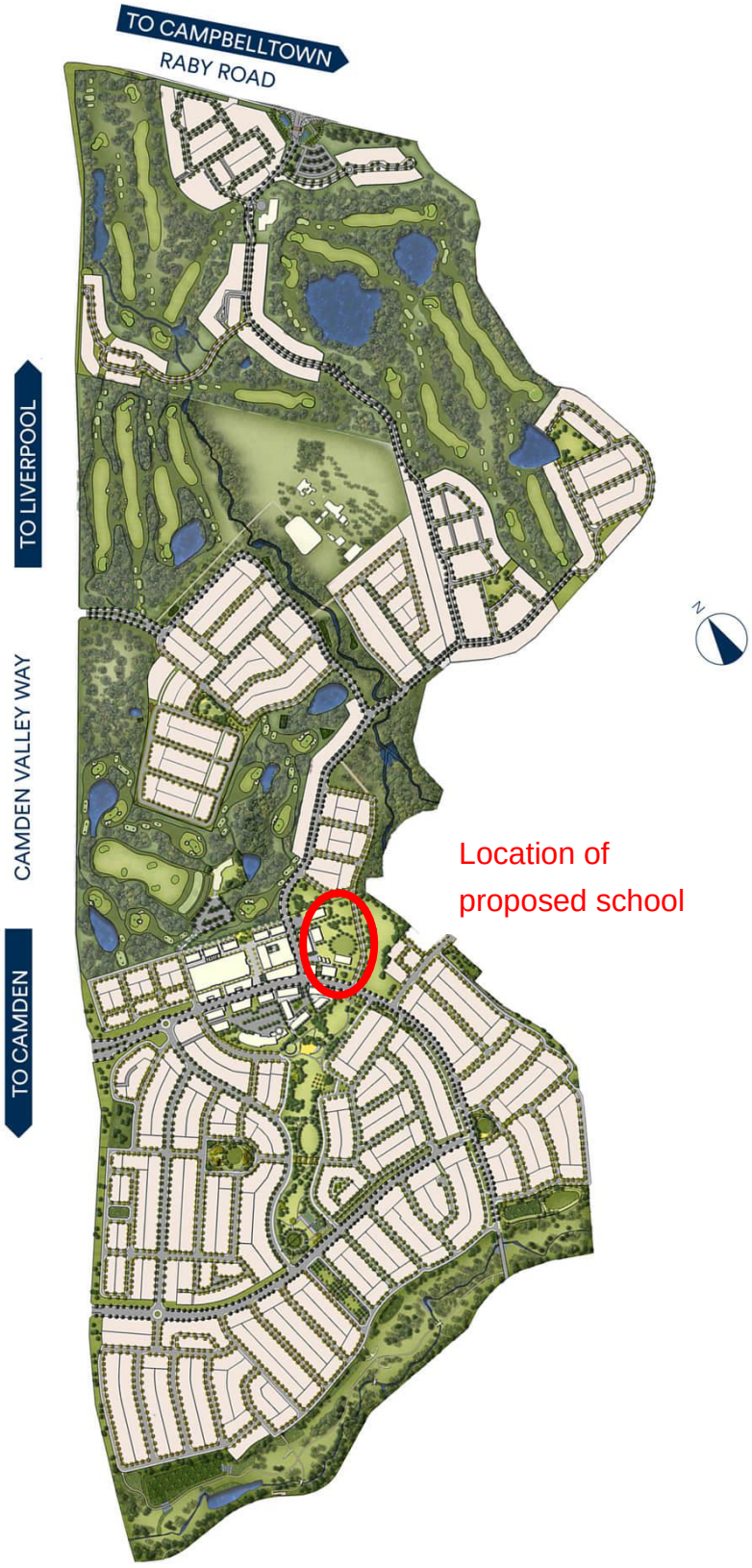

Figure 2 –Gledswood Hills (The Hermitage) Master Plan

2. Existing conditions

2.1 The site and existing roads

The site is located on The Hermitage Way and will also have frontages to new roads MC06 and MC07. The section of The Hermitage Way past the site has recently been completed and handed over to Council. New Roads MC06 and MC07 have not yet been constructed. Construction of MC07 is forecast for completion in February 2018, while MC06 in April 2018. Construction of both roads will be complete before the opening of the school.

The Hermitage Way will be the collector road for the area, connecting Camden Valley Way with the rest of The Hermitage development precinct. It is planned to extend it through to Gregory Hills Road in the future.

In the future, new road MC07 will also act as a collector road, linking The Hermitage Way to Raby Road via El Caballo Blanco and Lakeside.

New road MC06 will be a local access road.

2.2 Public Transport

The current bus routes serving the area are:

- Route 841 – Narellan to Lepppington Station via Gledswood Hills
- Route 850 - Narellan to Minto via Oran Park, Gregory Hills and Catherine Fields
- Route 857 – Narellan to Liverpool via Prestons and Casula
- Route 858 - Oran Park Town Centre to Leppington Station
- Route 899 - Camden to Catherine Field via Narellen.

The 841 bus has a circuit through Gledswood Hills. It currently does not pass the school site. However, a bus stop will be located on The Hermitage Way just before the school, and it is intended that this route will use the stop. The route operates from Monday to Friday and takes approximately 25 minutes to travel from Leppington to Gledswood Hills. It has a 1 hour frequency during the day, increasing to 30 minutes during morning and evening peak.

The 850 bus has a stop at the intersection of Camden Valley Way and Springfield Road, approximately 400m from the school site. It takes approximately 25 minutes to travel from Minto to Gledswood Hills. The service operates 7 days a week. During weekdays it operates on an hourly frequency, increasing to a 30 minute frequency during the morning and evening peaks.

The 857 bus has a stop at the intersection of Camden Valley Way and Springfield Road, approximately 400m from the school site. It takes approximately 10 minutes to travel from Narellen to Gledswood Hills. While it operates 7 days a week, it is an infrequent service.

The 858 bus has a stop at the intersection of Camden Valley Way and Springfield Road, approximately 400m from the school site. It takes approximately 12 minutes to travel from

Leppington Station to Gledswood Hills and operates 7 days a week. During weekdays it has a service at 30 minute intervals

The 899 bus has a stop at the intersection of Camden Valley Way and Springfield Road, approximately 400m from the school site. It is a school service only, and has 4 services in the morning going to Camden and two in the afternoon leaving Camden.

The closest railway stations to the school are Leppinton and Minto. From both, a bus is required to reach the site.

2.3 Parking

The site is currently undeveloped, with no on-site parking.

On-street parking will be available on new roads MC06 and MC07. Along The Hermitage Way, immediately fronting the site, on-street parking is currently available. However, this space has been designated as a bus bay for the proposed school.

2.4 Existing traffic

The Hermitage Way in front of the site has only recently opened to traffic. As such, traffic volumes are low and existing figures are not available.

2.5 Existing cyclists and pedestrians

Plans for the precinct include a network of cycle and shared paths. The path on the western side of The Hermitage Way is currently under construction and will provide a link from the school site to the precinct network.

3. The development and impact

3.1 Proposed works

The development proposed for the site consists of public school that when fully developed will cater for a total of up to 1,000 students. The anticipated number of staff at the school will be nominally 65.

The major use of the site will occur on weekdays, during normal school hours of approximately 8:30am to 3:30pm. Extracurricular activities will occur after school and on weekends. It is anticipated that there will be before and after school care provided at the school.

3.2 Public transport and bus zones

The current bus routes serving Gledswood Hills are:

- Route 841 – Narellan to Lepppington Station via Gledswood Hills
- Route 850 - Narellan to Minto via Oran Park, Gregory Hills and Catherine Fields
- Route 857 – Narellan to Liverpool via Prestons and Casula
- Route 858 - Oran Park Town Centre to Leppington Station
- Route 899 - Camden to Catherine Field via Narellen.

Route 841 is the only route that will pass the school, with the rest travelling along Camden Valley Way. However, with the ongoing development of the area, it is possible that additional routes could pass the site in the future. The local bus companies, Busabout and Interline, have advised that with development in the area routes and frequency will be adjusted to suit demand and growth, including demand generated by a new school. Staff at the school will be able to utilise these regular services.

The closest railway stations to the school are Leppington and Minto. Bus routes 841 and 850 will be able to be used to get to the site from these stations.

The regular bus routes will be able to be used by students. However, dedicated school services will be required, to transport students within the school's catchment zone and they will be provided by the local bus companies. It is envisaged that the number of services will be similar to that of Oran Park Public School, which currently has 3 school services in the morning and afternoon.

A 58m bus bay has been constructed on The Hermitage Way along the school frontage. This will have room for two standard (12.5m) buses at one time, allowing for independent operation. While three buses can fit into the space, they are closer than recommended by State Transit's *Bus Infrastructure Guide*. Refer to Figure 3 for the location of the bus bay.

When the school reaches its maximum capacity of 1,000 students, it may potentially require additional bus services. When this occurs, the standard practice of the bus companies is to space out the timing of buses leaving the school, so that a maximum of three leave at approximately the same time. Therefore, the length provided for the bus bay is sufficient.

A 16-22 seater min-bus will be used to transport students with a disability. As the existing grade along The Hermitage Way exceeds disabled access requirements, a separate drop off space will be

provided on new road MC07, adjacent to the main entry to the school. This space will be 8.5m long by 3.2m wide, with a 1.6m minimum wide footpath, to comply with access parking requirements. Refer to Figure 3 for the location of this space.

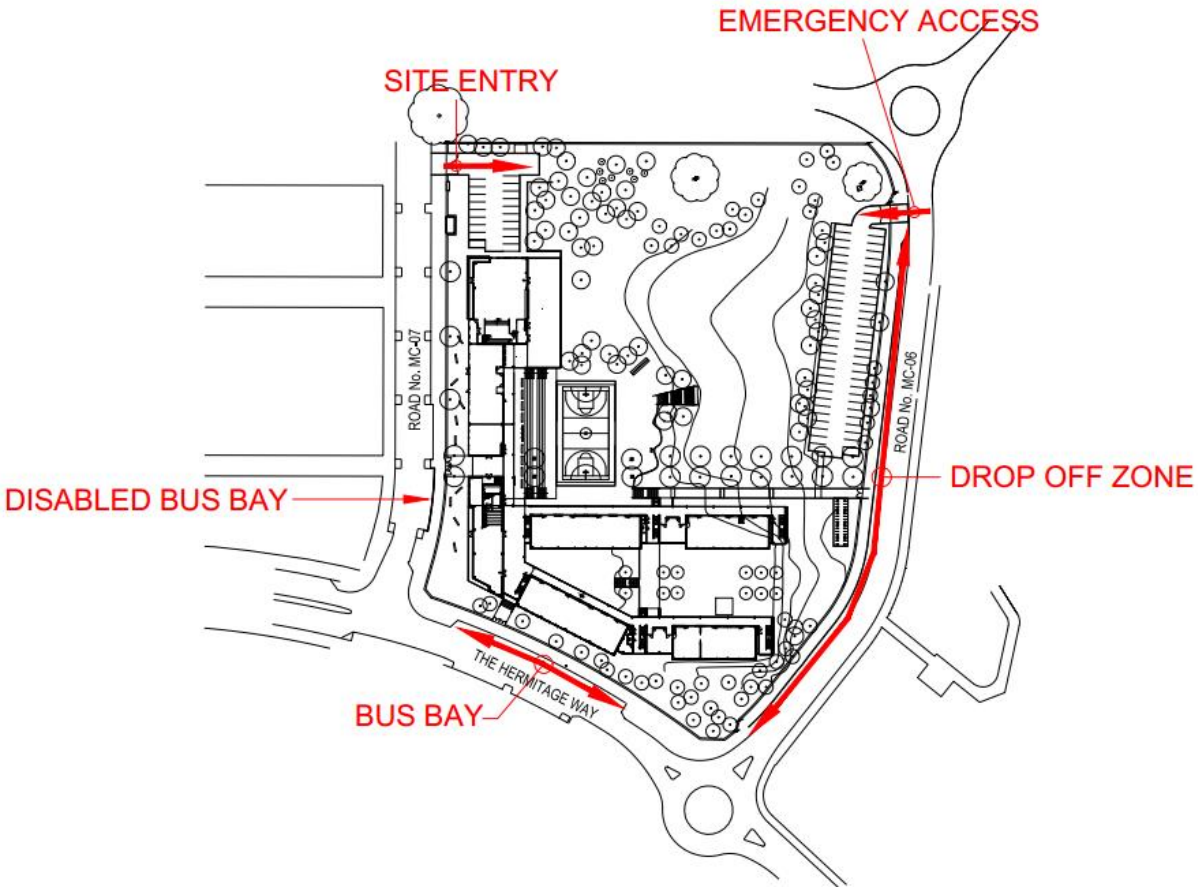

Figure 3 – Location of Bus Bay and Drop Off Zone

Road suitability for school buses

The main road used to access the school will be The Hermitage Way. This road has been designed as a collector road and is sized to cater for bus traffic.

3.3 Drop off / pick up

Drop off / pick up zones are required at schools to provide a safe location where students can be dropped off and picked up and minimise traffic congestion in the area. The space required is dependent on the number of vehicles dropping off or picking up students.

From our experience at other schools and the data obtained from the traffic counts for Oran Park Public School, (a similar sized school to the proposed Gledswood Hills Public School) the following rates have been adopted as typical rates for drop off / pick up:

- In the morning, the number of vehicles dropping off students is 50% of the total student population.
- In the afternoon, the number of vehicles picking up students is 35% of the total student population

- After the peak period, the number of vehicles picking up student from after school care is 10-15% of the total student population.

Sustainable transport measures are to be encouraged at the school, with the intent to reduce the above rates.

A drop off zone will be provided along new road MC06, with space for approximately 28 vehicles. Refer to Figure 3 for location. During the morning peak, if students are dropped off over a 15 minute period, each vehicle can be in the drop off zone for approximately 50 seconds. During the afternoon peak, if students are picked up over a 10 minute period, each vehicle can be in the drop off zone for 50 seconds, which increases to 1.2 minutes per vehicle if the pick-up extends to 15 minutes.

While parking will be available in new road MC07, the spaces will not be signposted as drop off / pick up and parents will be discouraged from using this area unless they have meetings with school staff.

The roundabout at the intersection of The Hermitage Way and new Road MC06 and the future roundabout on new road MC06 past the school will facilitate use of the proposed drop off zone, as they will provide easy access to and from The Hermitage Way and will also provide a location to undertake a safe and legal U-turn. Alternatively they can turn left at the first intersection past the school and then join to new road MC07 to reach The Hermitage Way. Therefore, unless parents need to meet with school staff, new road MC06 will be the preferred location to drop off and pick up students, and will be the location specified in all school documents and correspondence regarding student drop off and pick up.

Gates and paths will be provided at the drop off zone, to allow student access before and after school.

3.4 Parking

The Camden Council DCP 2011 details the minimum car parking requirements for developments. For Schools, the DCP requires the following:

- 1 car parking space per full time equivalent staff member, plus
- 1 car parking space per 100 students, plus
- 1 car parking space per 5 students in Year 12.
- Adequate space for delivery vehicles, drop off / pick up and buses.

For a 1,000 student school with 65 staff, the number of parking spaces required is 75. It is proposed to provide this number of spaces on site, with 17 spaces near the Hall (accessed from new road MC07) and 58 spaces at the bottom of the site, access off new road MC06. The parking will be constructed in stages, with 45 spaces provided in Stage 1 (17 spaces near the Hall plus 28 access off new road MC06) and a further 30 in Stage 2.

The new parking spaces to be provided will comply with the requirements of AS2890.1. As both parking areas are blind aisles, a dedicated turning bay will be provided at the end of each area.

3.5 Access

Driveways

There will be two vehicle access points to the site. The first will be off New Road MC07 and will provide access to the smaller parking area and to the garbage area. The second will be off New Road MC06 and will provide access to the larger parking area.

The driveway off New Road MC07 will be 7.0m wide and be a combined entry and exit. The design of the parking area allows a 9.3m garbage truck to turn around and leave the site in a forward facing direction. Refer to Drawing TP1 in Appendix A for details of the garbage truck turning path. Sight distances in accordance with AS2890.1 are available for the driveway.

The driveway off New Road MC06, will be located approximately 15m from the intersection / future roundabout and 5m clear of the drop off zone. It will be a combined entry / exit with a width of 6.0m. Due to the proximity to the intersection / future roundabout and the traffic generated by the drop off zone, the exit from the parking area will be left turn only. Drivers wishing to head to The Hermitage Way will be able to perform a U-turn at the future roundabout or turn left into the first street to travel to new road MC07 and The Hermitage Way.

Sight distances in accordance with AS2890.1 are available for the driveways.

Emergency vehicle access

Emergency vehicle access will be available to both parking areas. From the lower parking area, accessed from New Road MC06, access will be available to the playgrounds and the lower part of the school.

3.6 Traffic generation and modal split

The RMS *Guide to Traffic Generating Developments* does not give advice on traffic generation for educational establishments. Therefore, estimates need to be made based on data from existing establishments and knowledge of the development.

As the site is a school, the following traffic movements will occur:

- Staff will arrive in the morning, typically in the 30minutes before school starts. Some staff will be in earlier, to undertake administrative tasks. Based on 90% of staff driving their own vehicles, this will result in approximately 64 vehicle movements to the school.
- Parents dropping students will typically arrive and depart in the 30minutes before school begins, with the larger number of movements occurring in the 15minutes before classes start. Based on counts undertaken at Oran Park Public School, during the morning, the number of vehicles dropping students to school is 50% of the total student population, generating 500 vehicles.
- School buses will arrive, set down students and depart. Typically these occur 15minutes before classes begin. We have estimated that there will be 3-4 bus movements to and from the high school in the morning.
- Staff will depart in the afternoon, after classes finish. Leaving times will vary depending on administrative tasks required. Typically all movements will occur in the hour after classes finish. We have estimated that there will be 64 vehicles leaving after school finishes.
- Parents will typically arrive just before or just after classes finish, pick up students and then depart. Based on counts at Oran Park Public School, the number of vehicles used to collect students is 35% of the total student population, which will result in 350 vehicles.

- School buses will arrive around school finish time, pick up students and then depart. This generates 3-4 movements to and from the site.
- Visitors and deliveries will occur throughout the day.

In summary, the traffic generated during the morning and afternoon peaks when the school is at peak capacity is estimated as follows:

- AM peak - 568 vehicles driving to the school
  - 504 vehicles leaving the school
- PM peak - 354 vehicles driving to school
  - 418 vehicles leaving the school

The AM Peak associated with the schools will occur in the period from 50 minutes before school commences and the 10 minutes after school starts. This will be from approximately 8:20 – 9:20am. The PM peak associated with the schools will occur in the period from 15 minutes before classes finish until 45 minutes after classes finish. This will be approximately 2:45 – 3:45pm.

3.7 Future traffic conditions and impact of generated traffic

As detailed in Section 2.1, The Hermitage Way has only recently opened to traffic. It has one lane in each direction, with a bus bay provided along the school frontage (currently used for parking) and parking bays on the opposite (western) side.

New road MC 07 is due to be complete in February 2018. Its intersection with The Hermitage Way will be a standard T intersection. It will have one traffic lane in each direction, with parking bays on both sides.

New road MC06 is due to be complete in April 2018. Its intersection with The Hermitage Way is a roundabout, which has already been constructed. In will have one lane of traffic flow in each direction. Along the school frontage, a drop off zone will be provided for use during school start and finish times and for parking at other times. There is no parking on the opposite side of the road.

At present the area around the school is relatively undeveloped. As part of the traffic management prepared for the precinct, Aecom have prepared reports on traffic volumes an intersection operation in the area. Refer to Appendix A for copies of reports.

Aecom have estimated the traffic volumes in the area for 2026, when full development of the precinct has occurred. In their estimations, they allowed for a 1,000 student school on the site with a staff of 50. They allowed for 390 trips by parents and 50 trips by teachers in the AM Peak. As the school finish time, and hence peak traffic period, occurs before the afternoon commuter peak, they did not allow for any traffic associated with the school in the afternoon commuter peak.

In their January 2016 memorandum, Aecom assumed that all school traffic arrived via MC06 and left via MC07. Since that time, a future roundabout has been proposed for MC06, which will allow parents to drop off at the bottom of the school, perform a U-turn at the roundabout and leave via MC06. This reduces traffic flows on MC07, which will become a collector road in the future.

The traffic volumes estimated by Aecom for the school site are potentially low. We have estimated that number of drops offs are 50 per 100 students, with Aecom estimating 39 per 100 students.

Aecom's analysis of the intersection of The Hermitage Way with new road MC06 and MC07 show a level of Service of A, the best level of service under RMS guidelines. While Aecom's estimation of traffic generated by parent drop off in the morning may potentially be low (at a rate of 39 trips / 100 students compared with our estimate of 45/100 students), the intersections do have capacity for the higher traffic volumes. Additionally, the addition of the roundabout on road MC06 will allow parents to enter and leave via the roundabout on The Hermitage Way, which will have greater capacity than the T intersection at MC07. Therefore, the road network has capacity to cater for the proposed school.

RMS requested that the impact of the development on the intersection of The Hermitage Way and Camden Valley Way be considered. As part of the planning for the precinct, Aecom analysed the intersection for the AM and PM commuter peaks. A copy of their report is presented in Appendix A. The analysis allowed for a school on the site and included school traffic during the AM commuter peak. School traffic was excluded from the PM commuter peak as it occurs earlier in the afternoon and does not impact on the commuter peak.

3.8 Pedestrians and cyclists

Pedestrian access to the school will be available from new roads MC06 and MC07. Footpaths along these roads will connect to the area wide cycle and shared path system.

The Gledswood Hills development includes 50km of cycle and shared paths. Links will be available from the school onto the path network. These paths, and the remainder of the network throughout the Gledswood Hills Precinct, will provide cycle and pedestrian access to the school.

To facilitate students and staff riding to school, bicycle storage racks will be provided, which allow students and staff to store and lock bicycles. At least 60 spaces will be provided at the school.

To facilitate staff walking or cycling to school, end of journey facilities, including lockers and showers, will be provided for staff.

4 Construction traffic

The main access to the construction site will be from Camden Valley Way via The Hermitage Way and new road MC06. Refer to Appendix B for Construction Traffic Management Plan.

Truck movements will occur throughout construction, with delivery of materials occurring on a daily basis, throughout the day. The largest number of truck movements is typically during concrete pours, when up to 30 trucks a day could be attending the site.

Contractors' vehicles will generally arrive in the morning and leave at the end of the working day. Additional movements of these vehicles may occur at lunch, with groups of contractors driving to the town centre to purchase food and drinks. Parking for contractors' vehicles will be provided on site, with entry and exit to the parking area from the main access on new road MC06. Based on 60 to 80 contractors on site on any one day, temporary parking will be provided for approximately 45-65 contractors' vehicles.

Pedestrian and cyclist routes past the site will be protected during construction where required. Fencing and/or hoarding in accordance with the relevant standards will be provided around the site to provide protection and prevent unauthorised access. Where works are required in the public domain, safe routes will be provided around the worksite, which will require a site specific management plan. All vehicles leaving the site and crossing a pathway will be required to be going forwards (and not reverse). At times when large pedestrian movements occur at a site access a traffic controller will be provided at the gate when vehicles arrive or leave.

5 Conclusion

The proposed new Public School will result in increased traffic volumes in the area compared with current volumes. However, the entire area is being progressively developed, with traffic volumes increasing throughout the area as new areas open and houses are constructed. Additionally, the site location was planned as a school site in all the development plans for the area, which allowed for traffic volumes associated with a school.

The school will require school bus services to transport students to and from the school. A bus zone with space for up to 3 buses has been provided at the site by the area developer.

A drop zone will be provided along New Road MC06, with space for 28 vehicles. Direct access is then available into the school.

A drop off zone for disabled students will be provided on new road MC07, adjacent to the main entry. This space will be sized to cater for a 16-22 seater mini-bus and footpath grades in the area will be compliant with disabled access requirements.

Parking spaces for 75 vehicles will be provided for the site, in accordance with Camden Council's requirements. The new parking areas will be in accordance with AS2890.1.

The network of pedestrian and cycle paths provided for the Gledswood Hills area will provide access to the school for cyclists and pedestrians. Bicycle storage facilities will be provided at the school to encourage this transport mode. End of trip facilities, including showers and lockers, will be provided within the school for staff, to enable use of sustainable transport measures.

A Green Travel Plan has been developed for the site. Refer to Appendix C for details.

Appendix A

Aecom Traffic Statements

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Memorandum

To	Brent Thompson (Sekisui House)	Page	1
CC	Andy Yung (AECOM)		
Subject	Camden Valley Way / The Hermitage Way / Springfield Road intersection		
From	Marcel Cruz		
File/Ref No.		Date	18-Mar-2016

1.0 Introduction and background

AECOM has been engaged by Sekisui House to prepare a traffic review of the performance of the intersection of Camden Valley Way | Springfield Road | The Hermitage Way as a result of an updated structure plan for The Entertainment Precinct within the Turner Road precinct of The Hermitage. This technical note accompanies the DCP amendment submission lodged with Camden Council for amendments to Part B of the Turner Road DCP 2007.

The masterplan for The Hermitage consists of approximately 2,000 residential dwellings within three precincts which include Turner Road, El Caballo Blanco, Gledswood and Lakeside. The Turner Road precinct also includes mixed use zoned land referred to as The Entertainment Precinct, which is proposed to consist of retail, commercial and residential uses.

This note provides a summary of the analysis undertaken to review the impacts of the updated structure plan for The Entertainment Precinct at the intersection of Camden Valley Way | Springfield Road | The Hermitage Way. A SIDRA analysis has been undertaken to understand the impacts of the development.

AECOM has previously undertaken a number of assessments to determine the proposed intersection layout of Camden Valley Way | Springfield Road | The Hermitage Way as part of the Camden Valley Way upgrade taking into account the traffic flows that are expected to be generated by the development of The Hermitage.

A review was previously undertaken in 2013 to assess the right hand turn bay performance from Camden Valley Way into The Hermitage Way such that the length and size of the right turn bay can be confirmed prior to construction. The intersection modelling and configuration outcomes of this 2013 assessment were approved by RMS, and have been used as the base case for this traffic review to assess the impacts of the latest structure plan for The Entertainment Precinct.

A separate traffic statement, *The Hermitage Way (at Entertainment Precinct) – Traffic Review*, has been prepared to support the construction of a section of The Hermitage Way and associated intersections in the vicinity of the Entertainment Precinct. This traffic statement confirmed the proposed section of The Hermitage Way through the Entrainment Precinct as well as the associated intersections (MC06, MC07 and MC08) have the capacity to cater for the expected forecast traffic generation by The Hermitage and The Entertainment Precinct. A copy of this statement is included as Appendix A.

2.0 Precinct Access

The intersection of Camden Valley Way | Springfield Road | The Hermitage Way provides direct access to The Hermitage development, including The Entertainment Precinct. The Hermitage Way is the main collector road which provides access between Camden Valley Way and the rest of The Hermitage development including the Entertainment Precinct.

There is a plan to further extend The Hermitage Way to the south east and link to Gregory Hills Drive through a bridge crossing of South Creek currently under construction. A north-south Collector Road between The Hermitage Way and Raby Road will also provide access to the northern part of the development - El Caballo Blanco, Gledswood and Lakeside. A future east-west link from The Hermitage Way over the Sydney Catchment Authority water canal will also provide links to the proposed Mirvac development to the east.

Figure 1 shows the location of the precinct and the connections to major road network.

Figure 1 Entertainment Precinct location

3.0 Proposed development

A number of proposed developments in the area are expected to influence the operation of the intersection. **Table 1** provides a comparison of the previous and latest development yield utilising the intersection.

It should be noted that some of the land uses and scale of development are indicative only for the purpose of estimating the potential traffic that could be using the intersection of Camden Valley Way | Springfield Road | The Hermitage Way. This analysis represents an absolute worst case scenario given some of the land uses applied here could be higher traffic generating development than the final actual uses and the scale of development applied is at its upper development limit. In this regard, **Table 1** should not necessarily be construed as the scale of development ultimately proposed.

Table 1 Indicative land use breakdown

Precinct	Indicative Land Use	Base case (2013)	Current scenario
Turner Road – Residential Precinct	Residential	1,245 dwellings	1,230 dwellings
	Education (Primary School)	-	1,000 students 50 teachers
Turner Road – Entertainment Precinct	Retail	3,500 sqm	5,250 sqm
	Commercial	20,000 sqm	20,000 sqm
	Residential apartments	390 apartments	400 apartments
El Caballo Blanco Precinct	Residential (including Gledswood) ^	-	400 lots
	Golf Club - Recreational facilities ^	-	9-hole golf course 50 driving positions
Lakeside Precinct	Residential ^	-	400 lots
Mirvac Development	Residential ^	-	520 lots
Camden Valley Country Club*	Club	2,300 sqm	7,300 sqm
	Independent Living Units (retirement housing)	-	100 units

*- Indicative Development proposal and Master Plan prepared by Curtin Architects (Oct, 2015)

^- These uses are not new, but were not included in the 2013 modelling as the yield were unconfirmed at that stage.

4.0 Trip generation

The Roads and Maritime's Guide to Traffic Generating Developments (2002) has been used to determine the trip rate of land uses for the Turner Road precinct. The following trips rates have been used:

- Residential
  - Low – 0.85 per dwelling during the AM and PM peak
  - Medium – 0.53 per dwelling during the AM and PM peak
  - High – 0.29 per dwelling during the AM and PM peak
- Retail – 2 per 100 sqm during the AM peak and 12.3 per 100 sqm during the PM peak
- Commercial – 2 per 100 sqm during the AM and PM peak

For the retail component of the Entertainment Precinct (as a local centre serving the surrounding development), it has been assumed that 50 per cent of the retail trips would be generated to and from the internal network, such as Lakeside / The Hermitage / ECB.

For the Mirvac development situated to the east of The Hermitage (See Figure 1), it has been assumed that 30 per cent of its traffic would access the wider network via The Hermitage Way, while the remainder access via Raby Road.

A traffic survey was undertaken in April 2015 to determine the number of vehicle movements generated by the existing Camden Valley Country Club. The survey results indicate that a total of 8 and 100 vehicle trips were generated during the AM Peak and PM Peak periods respectively. Camden Valley Country Club is earmarked to be expanded, in the order of 3.2 times both the existing floor area and the existing off-street car parking provision. Accordingly, the traffic generated has been grown to 3.2 times the existing situation proportional to the proposed increase in parking provision and GFA.

As the Roads and Maritime's Guide to Traffic Generating Developments (2002) does not provide guidance for traffic generation relating to golf courses and driving ranges, the trip generation rates from The Institution of Transportation Engineers (ITE) "Trip Generation" guide book was used to estimate the trip generation from the proposed El Caballo Blanco Golf Club. A trip generation rate of 1.25 trips per hour per driving position for the AM and PM peaks has been adopted. However, the number of vehicular trips from the club house and the golf course is assumed to be the same as the existing Camden Valley Country Club, as this represents the worst case scenario, since the number of trips generated by using ITE rates for golf course is lower.

Table 2 provides a summary of trips generated utilising the intersection of Camden Valley Way | Springfield Road | The Hermitage by land use. It shows the number of trips generated during the AM and PM peak hour and the number of trips expected to be generated by each land use. It has been assumed a relatively small component of the traffic generated by El Caballo Blanco, Lakeside and the Mirvac development would use The Hermitage Way to access the external road network as there are other main accesses proposed for these two precincts north of The Hermitage Way.

Table 2 Trips generation at the intersection of Camden Valley Way | Springfield Road | The Hermitage Way

Land use	Base case		Current scenario	
	AM peak	PM peak	AM peak	PM peak
Turner Road – Residential Precinct				
Residential	522	469	557	582
Primary school	-	-	201#	-
Turner Road – Entertainment Precinct				
Retail	21	114	32	194
Commercial	189	170	240	240
Residential	104	93	108	108
Other developments				
ECB & Lakeside	-	-	70	74
Mirvac Development~	-	-	133	133
Others including the Golf Clubs	13^	34^	58	298
Total	**848**	**880**	**1,398**	**1,629**

* It should be noted that previous modelling undertaken for the intersection of Camden Valley Way | The Hermitage Way did not model the AM Peak.

A number of school trips have been assigned as linked trips, it has been assumed 50% of trips to / from the south use the intersection of Camden Valley Way | Springfield Road | The Hermitage Way and the rest use the bridge.

~ 30 per cent of the Mirvac has been assumed to use The Hermitage Way to access Camden Valley Way.

^ Forecasted 2026 EMME through traffic on Springfield Road and The Hermitage Way.

Table 3 provides a summary of inbound and outbound movements from The Hermitage Way approach. These additional movements along The Hermitage Way (just east of the intersection at Camden Valley Way) will be required to access the intersection of Camden Valley Way | Springfield Road | The Hermitage Way and as a result will influence the operation of the intersection.

Table 3 Inbound and outbound trips at The Hermitage Way

The Hermitage Way	Base case	Latest yield
AM Peak		
Inbound	194	506
Outbound	654	892
Total	**848**	**1,398**
PM Peak		
Inbound	446	1,034
Outbound	434	595
Total	**880**	**1,629**

Source: AECOM, 2016

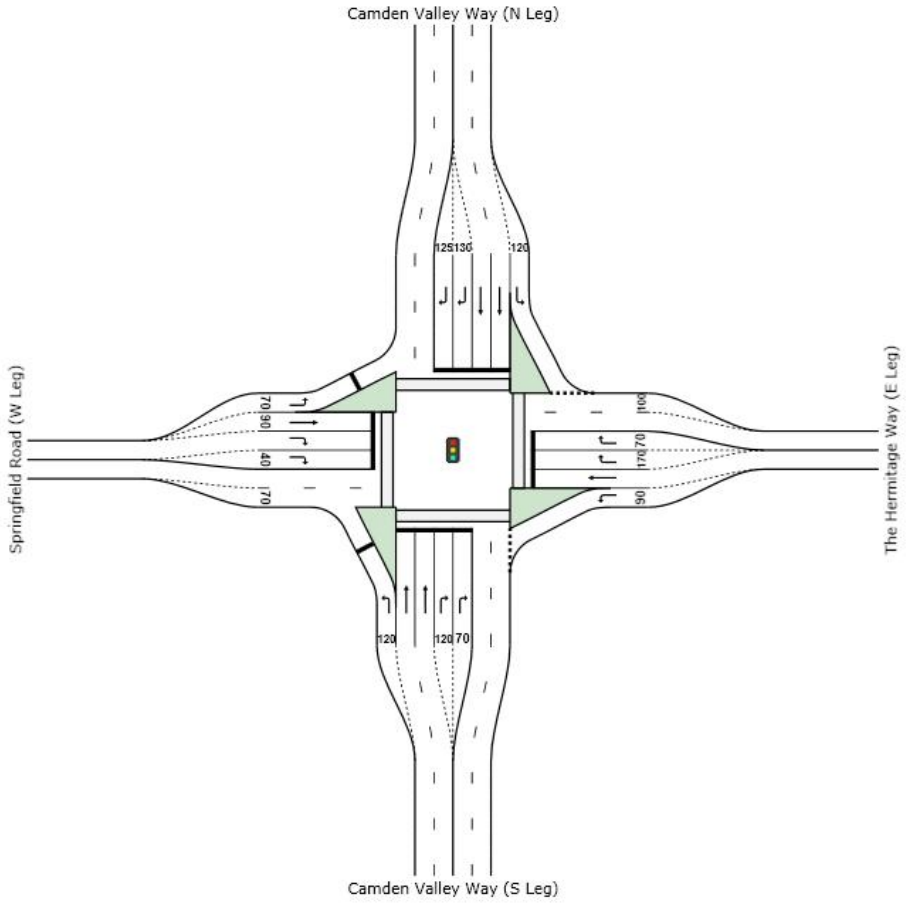
5.0 Intersection assessment

The 2026 AM peak and PM peak turning movements at the intersection of Camden Valley Way | Springfield Road | The Hermitage Way have been modelled in SIDRA 6.1 to determine future intersection operating conditions. It should be noted that previous modelling undertaken in 2013 was done using SIDRA 5.1, for comparative purposes the Base Case (2013) modelling has been update in SIDRA 6.1.

The intersection has been modelled with the assumption the operation of the signalised intersection is co-ordinated along Camden Valley Way and with a cycle time of 150 seconds. As a worst case scenario, the SIDRA modelling assumed that each of the pedestrian crossing phase will be called every cycle.

Table 4 and **Table 5** provide a summary of the intersection performance for the 2013 and latest development yield and assumptions respectively. The intersection layout modelled in SIDRA has been updated to reflect the current intersection layout.

Figure 2 Intersection layout



5.1 Base case intersection performance

Table 4 2026 – Base Case intersection performance

Approach	Vehicles	LoS	DoS	Average Delay (sec)	95th Percentile Queue (m)
AM Peak					
Camden Valley Way (S Leg)	2,179	F	1.035	129.6	888
The Hermitage Way (E Leg)	654	F	1.015	124.3	201
Camden Valley Way (N Leg)	1,594	B	0.954	27.2	224
Springfield Road (W Leg)	502	E	0.736	66.0	152
Total	**4,929**	**F**	**1.035**	**89.3**	**888**
PM Peak					
Camden Valley Way (S Leg)	1,783	C	0.930	33.7	242
The Hermitage Way (E Leg)	434	F	0.991	107.5	115
Camden Valley Way (N Leg)	2,358	F	1.064	172.9	986
Springfield Road (W Leg)	281	F	0.631	71.3	52
Total	**4,856**	**F**	**1.064**	**110.1**	**986**

Note: the intersection layout has been updated to reflect the intersection layout that is built

Source: AECOM, 2016

Modelling of the Base case (previous development yield) indicates the intersection of Camden Valley Way | Springfield Road | The Hermitage will exceed capacity operating with a DoS greater than 1.0 and performing at a LoS F during both the 2026 AM and PM peak. This is mainly due to limited capacity of the two traffic lanes on Camden Valley Way in each direction.

The AM peak indicates The Hermitage Way operates at capacity with a DoS greater than 1.0. The queue length of 201 m, as a result of the heavy right turn movement, extends beyond the storage bay and approaches the adjacent roundabout intersection (approximately 190m to the east). Camden Valley Way (S Leg) also operates at capacity experiencing significant queues.

The PM peak results show The Hermitage Way operates close to capacity with a DoS of 0.991.The queue length of 115 m as a result of the right turn movement is stored within the turning bay. Camden Valley Way (N Leg) operates at capacity experiencing significant queues.

It should be noted that the 2013 modelling was replicated here as a base case of this review to support the DCP amendment. Consultation was undertaken with RMS in 2012/2013 regarding the modelling and the intersection operations and layout. The 2013 modelling and the intended level of future operations / performance of the intersection has been accepted by RMS based on the approved and constructed intersection layout.

5.2 Current scenario intersection performance

Table 5 2026 – Current scenario intersection performance

Approach	Vehicles	LoS	DoS	Average Delay (sec)	95th Percentile Queue (m)
AM Peak					
Camden Valley Way (S Leg)	2,032	E	0.964	60.8	519
The Hermitage Way (E Leg)	893	E	0.974	68.2	149
Camden Valley Way (N Leg)	1,694	B	0.690	24.9	211
Springfield Road (W Leg)	517	E	0.652	63.1	144
Total	**5,136**	**D**	**0.974**	**50.5**	**519**
PM Peak					
Camden Valley Way (S Leg)	1,856	E	1.105	69.5	321
The Hermitage Way (E Leg)	595	F	1.090	165.2	177
Camden Valley Way (N Leg)	2,541	F	1.127	215.3	1,266
Springfield Road (W Leg)	330	E	0.683	70.4	53
Total	**5,322**	**F**	**1.127**	**149.9**	**1,266**

Note: the intersection layout has been updated to reflect the intersection layout that is built

Source: AECOM, 2016

Results of the current scenario indicate an improved performance of the intersection during the AM peak where the LoS improves from F to D and the DoS falling under 1.0. The average delay and queue lengths experienced at all approaches reduces, particularly for Camden Valley Way (S Leg) and The Hermitage Way. The queue lengths for right turn movements experienced at The Hermitage Way is also stored within the provided storage bay. The improvement in performance is a result of the change in the timings allocated for the phasing of the intersection as a result of the updated traffic volumes at the intersection.

During the PM peak the performance of the intersection experiences an increase in DoS, average delays and queue lengths, particularly for Camden Valley Way (N Leg). The additional volume of traffic entering The Hermitage Way reduces the amount of time allocated to the phase for the through movements on the Camden Valley Way approaches, therefore increasing the delays and queue length on Camden Valley Way.

6.0 Sensitivity test

With the high volume of traffic at the intersection, it can be assumed that a proportion of trips generated by the proposed development utilising the intersection are not necessarily new trips. In this regard, a proportion of trips into The Hermitage Way are no longer through movements from the Camden Valley Way approaches. A sensitivity test has been undertaken to reflect this.

In addition, the SIDRA modelling undertaken in **Section 5.0** calls the pedestrian crossing every cycle. Given the indicative land-use surrounding the intersection, mainly residential, it can be assumed the pedestrian crossing is not called every cycle. A sensitivity test has been also been undertaken where the pedestrian crossing is called 50 per cent of time.

A summary of the sensitivity tests undertaken is provided below:

- Test 1: 25 per cent of new trips into The Hermitage Way (current scenario turning movements into The Hermitage minus existing turning movements into The Hermitage) removed as through movements from the Camden Valley Way approaches.
- Test 2: Pedestrian crossing called 50 per cent of the time.

Table 6 Sensitivity test

Approach	Vehicles	LoS	DoS	Average Delay (sec)	95th Percentile Queue (m)
Base Case – PM Peak					
Camden Valley Way (S Leg)	1,783	C	0.930	33.7	242
The Hermitage Way (E Leg)	434	F	0.991	107.5	115
Camden Valley Way (N Leg)	2,358	F	1.064	172.9	986
Springfield Road (W Leg)	281	F	0.631	71.3	52
Total	**4,856**	**F**	**1.064**	**110.1**	**986**
Sensitivity Test 1 – PM Peak					
Camden Valley Way (S Leg)	1,747	E	1.066	62.5	273
The Hermitage Way (E Leg)	595	F	1.007	98.2	124
Camden Valley Way (N Leg)	2,410	F	1.077	155.5	978
Springfield Road (W Leg)	330	E	0.631	69.0	52
Total	**5,082**	**F**	**1.077**	**111.2**	**978**
Sensitivity Test 2 – PM Peak					
Camden Valley Way (S Leg)	1,856	D	1.041	51.9	265
The Hermitage Way (E Leg)	595	F	1.007	115.5	164
Camden Valley Way (N Leg)	2,541	F	1.046	116.4	905
Springfield Road (W Leg)	330	F	0.631	71.8	54
	5,322	**F**	**1.046**	**91.0**	**905**

Modelling results show the sensitivity tests produce the same results as the base case PM peak. It is our expectation that the sensitivity tests are more reflective of the likely operating conditions of the intersection.

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Memorandum

To	Brent Thompson	Page	1
CC			
Subject	The Hermitage Way (at Entertainment Precinct) - Traffic Review		
From	Andy Yung		
File/Ref No.	60318146	Date	29-Jan-2016

1.0 Introduction

AECOM has been engaged by Sekisui House to prepare a traffic statement to support the construction of the section of The Hermitage Way, and adjoining roads to the north, in the vicinity of the Entertainment Precinct.

The following technical note provides a summary of assumptions and analysis undertaken to review and confirm the proposed road layout of this section of The Hermitage Way.

2.0 Background

Sekisui House is proposing approximately 2,000 residential dwellings as part of The Hermitage development, which consists of development in the Turner Road, El Caballo Blanco / Gledswood and Lakeside Precincts. In additional, the Turner Road Precinct includes a 7.6ha mixed use zone referred to in the Turner Road Development Control Plan (DCP) 2007 as The Entertainment Precinct. The Entertainment Precinct allows retail, commercial and residential development.

Camden Council has issued Development Consent 1230/2015 for the construction of the balance of The Hermitage Way as well as roads MC06, MC07 and MC08 extending to the north. Condition 1.0 (3) a) of that Consent states:

"detailed plans and supporting information must be submitted to demonstrate the suitability of the intersections of Road No's MC07 and MC08 with The Hermitage Way. The plans/information must include lane widths and traffic generation estimates."

We note that lane widths information has been provided to Council during the DA and CC assessment processes. This statement responds to the second request in relation to traffic generation estimates.

3.0 The Hermitage Way

The intersection of Camden Valley Way | Springfield Road | The Hermitage Way provides direct access to The Hermitage development. The Hermitage Way is the main collector road and provides access between Camden Valley Way and the rest of The Hermitage development including the Entertainment Precinct.

There is a plan to further extend The Hermitage Way to the south east and link to Gregory Hills Drive through a crossing of South Creek currently under construction. A north-south Collector Road between The Hermitage Way and Raby Road will also provide access to the northern part of the development - El Caballo Blanco and Lakeside.

Figure 1 shows the location of the precinct and the connections to major road network.

It should be noted that sections of The Hermitage Way have been constructed:

- Western section between Camden Valley Way traffic signals and Long View Road roundabout
- Southern section between MC06 and South Creek.

The section of The Hermitage Way referred to in this memo will connect these two sections of the road, as approved under Development Consent 1230/2015.

Figure 1 Context and location of The Hermitage Way

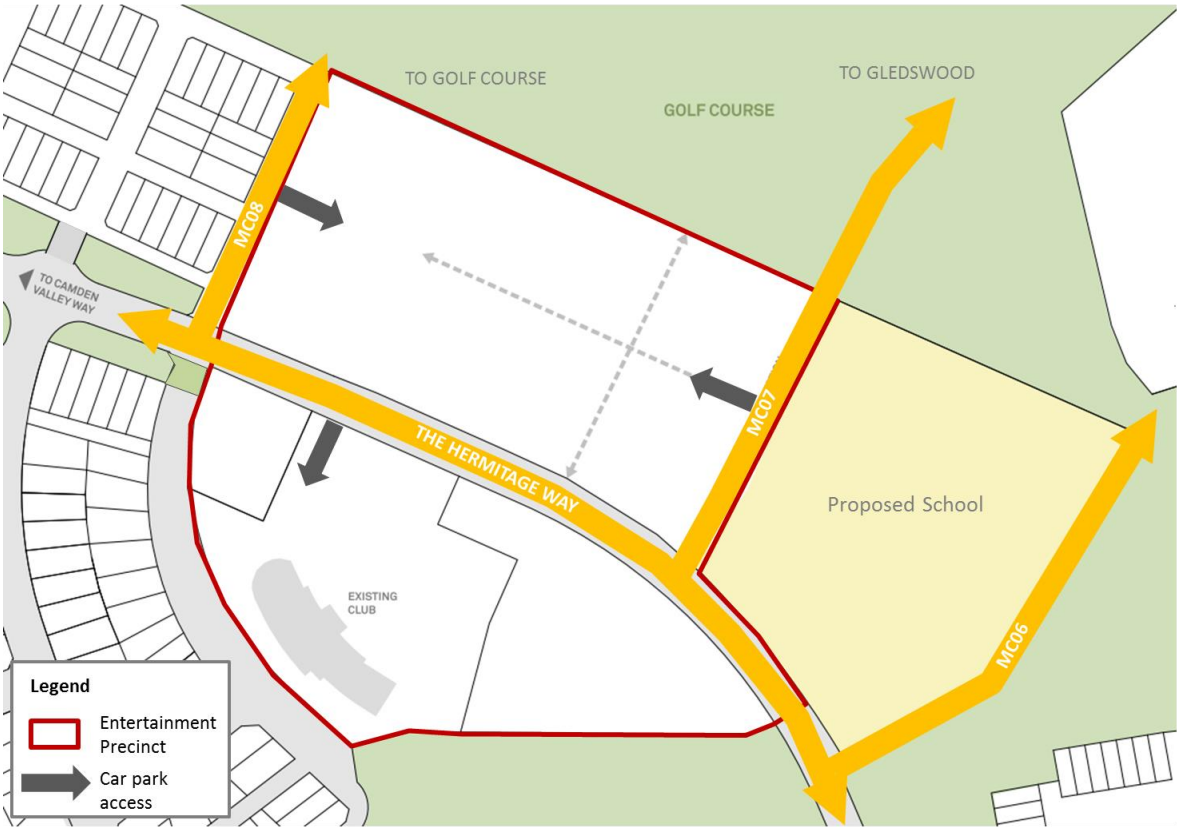
4.0 Proposed Intersections

Three key intersections with The Hermitage Way have been approved under development consent 1230/2015 in the vicinity of the Entertainment Precinct.

- MC08 will provide connections to a 9-hole golf course and driving range within El Caballo Blanco, as well as the Entertainment Precinct. This intersection has been approved as a T-junction.
- MC07 will provide connections to the Entertainment Precinct and future school staff car park. This road will be extended north to provide the main internal precinct connection to Gledswood, El Caballo Blanco and Lakeside.
- MC06 will provide connection to the potential school 'kiss and drop' areas / spaces. MC08 is also proposed to provide connection to the local roads in El Caballo Blanco Precinct.

Based on the forecast traffic turning volumes, priority controlled intersections have been proposed on MC08 and MC07 and a roundabout for MC06. Figure 2 shows the approved local road network in the precinct.

Figure 2 Entertainment Precinct local road network



5.0 Traffic generation and distribution

In order to determine the potential traffic generation onto this section of The Hermitage Way, the land use and the potential trip generation of the residential development as well as the Entertainment Precinct (a mixed use zone comprising of retail, commercial and residential land uses) have been considered. A breakdown of the land uses is presented in Table 1.

It should be noted that some of the land uses and scale of development are indicative only for the purpose of estimating the potential traffic that could be using this section of The Hermitage Way. This analysis represents an absolute worst case scenario given some of the land uses applied here could be higher traffic generating development than the final actual uses and the scale of development applied is at its upper development limit. In this regard, Table 1 should not necessarily be construed as the scale of development ultimately proposed.

Table 1 Indicative land use breakdown

Precinct	Indicative Land Use	Indicative Size / Scale
Turner Road – Entertainment Precinct	Retail	5,250 sqm
	Commercial	20,000 sqm
	Residential apartments	40,000 sqm (approx. 400 apartments)
Camden Valley Country Club*	Club	7,300 sqm
	Independent Living Units (retirement housing)	100 units
Turner Road – Residential Precinct	Residential	1,230 lots
	Education (Primary School)	1,000 students / 50 teachers
El Caballo Blanco Precinct	Residential (including Gledswood)	400 lots
	Golf Club - Recreational facilities	9-hole golf course 50 driving positions
Lakeside	Residential	400 lots
Mirvac Development	Residential	520 lots

*- Indicative Development proposal and Master Plan prepared by Curtin Architects (Oct, 2015)

The Roads and Maritime's Guide to Traffic Generating Developments (2002) has been used to determine the number of vehicle trips the assumed development will generate. For the retail component of Entertainment Precinct (as a local centre serving the surrounding development), it has been assumed that 50 per cent of the retail trips would be generated to and from the internal network, such as Lakeside / The Hermitage / ECB.

For the Mirvac development situated to the east of The Hermitage (See Figure 1), it has been assumed that 30 per cent of its traffic would access the wider network via The Hermitage Way, while the remainder access via Raby Road. The master plan indicates that there are 520 residential lots in the Mirvac development which is estimated to generate approximately 133 vehicular trips to The Hermitage Way.

A traffic survey was undertaken in April 2015 to determine the number of vehicle movements generated by the existing Camden Valley Country Club. The survey results indicate that a total of 8 and 100 vehicle trips were generated during the AM Peak and PM Peak periods respectively. Camden Valley Country Club is earmarked to be expanded, in the order of 3.2 times both the existing floor area and the existing off-street car parking provision. Accordingly, the traffic generated has been grown to 3.2 times the existing situation proportional to the proposed increase in parking provision and GFA.

As the Roads and Maritime's Guide to Traffic Generating Developments (2002) does not provide guidance for traffic generation relating to golf courses and driving ranges, the trip generation rates from The Institution of Transportation Engineers (ITE) "Trip Generation" guide book was used to estimate the trip generation from the proposed El Caballo Blanco Golf Club. A trip generation rate of 1.25 trips per hour per driving position for the AM and PM peaks has been adopted. However, the number of vehicular trips from the club house and the golf course is assumed to be the same as the existing Camden Valley Country Club, as this represents the worst case scenario, since the number of trips generated by using ITE rates for golf course is lower.

Table 2 shows the trip rates used to determine the number of trips generated by the development in the AM and PM peak hour and the number of trips expected to be generated by each land use. It has been assumed a relatively small component of the traffic generated by El Caballo Blanco, Lakeside and the Mirvac development would use The Hermitage Way to access the external road network as there are other main accesses proposed for these two precincts north of The Hermitage Way. Therefore, the detailed breakdown of trip generation of these uses are not included in the table below, however these trips are included in the traffic forecasts as shown in Figure 3 and 4 as well as the intersection analysis.

Table 2 Proposed development trip generation

Land use	Trip rate*		No. of trips	
			AM Peak	PM Peak
The Hermitage				
Residential	1,230 dwellings		983	
Low	84%	0.85 per dwelling		
Medium	16%	0.53 per dwelling		
Entertainment Precinct				
Retail	5,250m^2	2 per 100m^2 (AM) 12.3 per 100m^2 (PM)	105^	646^
Commercial	20,000m^2	2 per 100m^2	400	
Residential	400 apartments	0.45 per dwelling	180	
Camden Valley Country Club				
Club	7,300m^2	~0.35 per 100m^2 (AM) ~4.5 per 100m^2 (PM)	25	335
Independent Living Units	100	0.15 per dwelling (PM)	-	15
Education				
Primary school	1000 students	39 trips per 100 students (equivalent)	390^^	-
	50 teachers	1 trip per teacher	50^^	-
		Total trips	2,133	2,559

^ Assumes 50 per cent of retail trips would be generated from the internal network such as Lakeside / The Hermitage / ECB during PM peak whilst several internal trips from the ECB & Lakeside will not use The Hermitage Way.

^^ The PM peak hour assumed to be outside the school period.

* Adopted from Roads and Maritime's Guide to Traffic Generating Developments (2002), site surveys or ITE Trip Generation Guide Book.

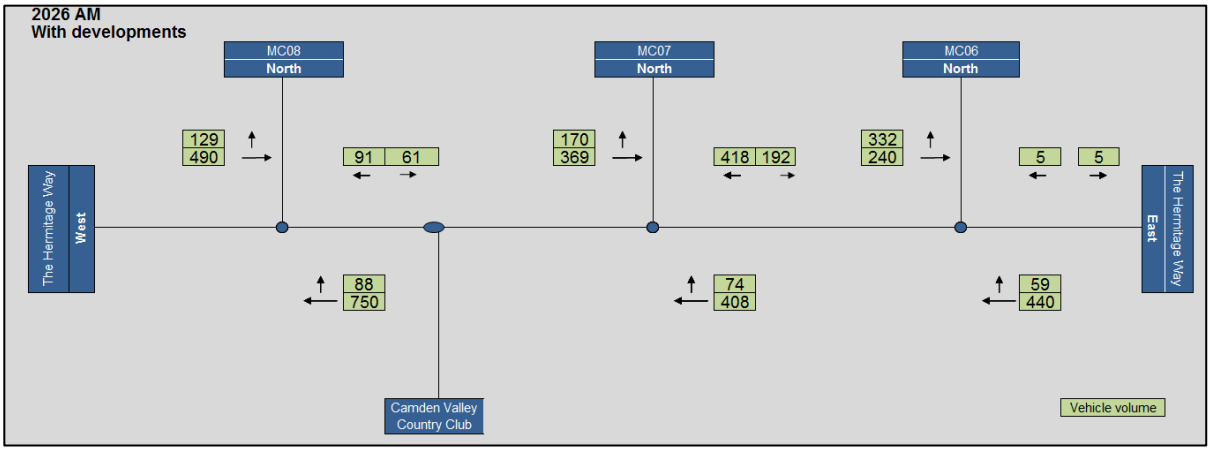
The table shows that the proposed development will generate a total of 2,133 to 2,559 trips in the peak hour. The following assumptions have been made with regards to trip movements in and out of the proposed development in the vicinity of this section of The Hermitage Way:

- 80% of retail trips will enter the site in the AM peak and 20% will leave the site.
- 40% of retail trips will enter the site in the PM peak and 60% will leave the site.
- 80% of commercial trips will enter the site in the AM peak and 20% will leave the site, with the reverse occurring in the PM peak.
- 10% of residential trips will enter the site in the AM peak and 90% will leave the site.
- 80% of residential trips will enter the site in the PM peak and 20% will leave the site.
- 90% of the development in The Entertainment Precinct is located at the northern side of The Hermitage Way. Of these 90% traffic:
    - 50% of retail / commercial / residential traffic use MC08
    - 50% of retail / commercial / residential traffic use MC07
- All incoming school trips will use MC06 and outgoing trips will use MC07 back to The Hermitage Way.

In the weekday peak period, it was assumed that 60 per cent of trips generated by the development will use Camden Valley Way (in West direction) to access the site and 40 per cent of trips will use the bridge over South Creek to connect The Hermitage Way with Gregory Hills Drive (in East direction). This recognises trips from Campbelltown via Gregory Hills Drive, which once completed will be a four lane road connecting to Campbelltown Railway Station.

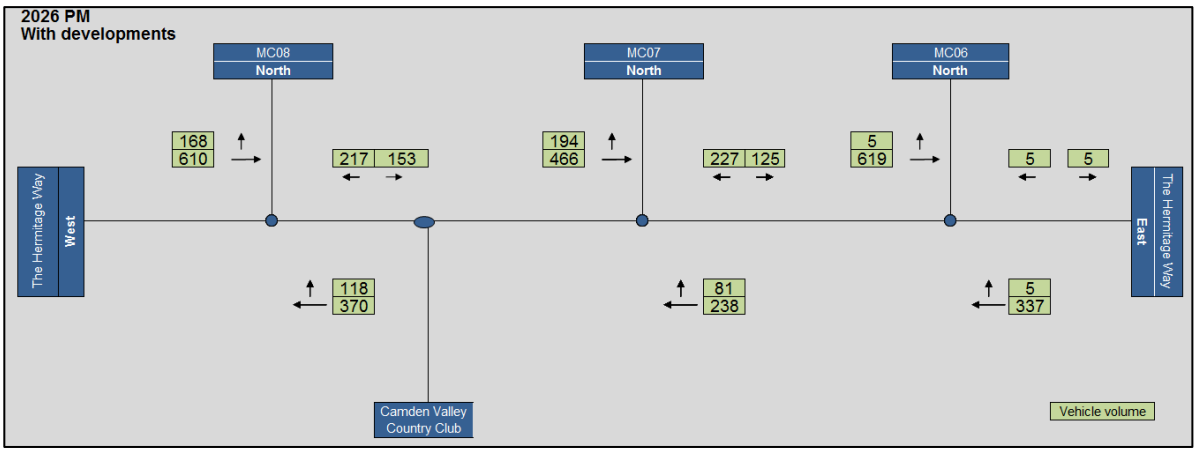
Figure 3 and Figure 4 present the turning movements for AM Peak and PM Peak at the intersections along The Hermitage Way in the Entertainment Precinct respectively.

Figure 3 2026 AM peak traffic movements (with development)



Source: AECOM, 2015

Figure 4 2026 PM peak traffic movements (with development)



Source: AECOM, 2015

The Hermitage Way is classified as a 2-lane sub-arterial road in Turner Road Precinct Development Control Plan (DCP) 2007. The estimated traffic volume on The Hermitage Way in Entertainment Precinct is approximately 1,000 – 1,500 vehicles per peak hour (in both directions) which is well within the capacity limit of 1,800 vehicles per hour for a two-lane road (one lane in each direction) in accordance with Roads and Maritime Services' Guide to Traffic Generating Developments.

6.0 Intersection assessment

The 2026 AM peak and PM peak turning movements at the intersections along The Hermitage Way were modelled in SIDRA to assess future intersection operation. A summary of the intersection performance is shown in Table 3.

Table 3 2026 peak hour intersection performance

	Intersection Type	Vehicles	LoS	DoS	Average Delay (sec)	95th Percentile Queue (m)
AM Peak						
The Hermitage Way / MC08	Priority control	1,609	B*	0.48	24.3*	15.0
The Hermitage Way / MC07	Priority control	1,699	A*	0.67	12.1*	25.2
The Hermitage Way / MC06	Roundabout	1,081	A	0.39	3.3	20.8
PM Peak						
The Hermitage Way / MC08	Priority control	1,636	B*	0.68	22.7*	23.0
The Hermitage Way / MC07	Priority control	1,454	A*	0.36	11.5*	9.0
The Hermitage Way / MC06	Roundabout	976	A	0.36	2.9	19.2

*Level of Service and average delay for Priority intersections is based on the worst movement average delay.

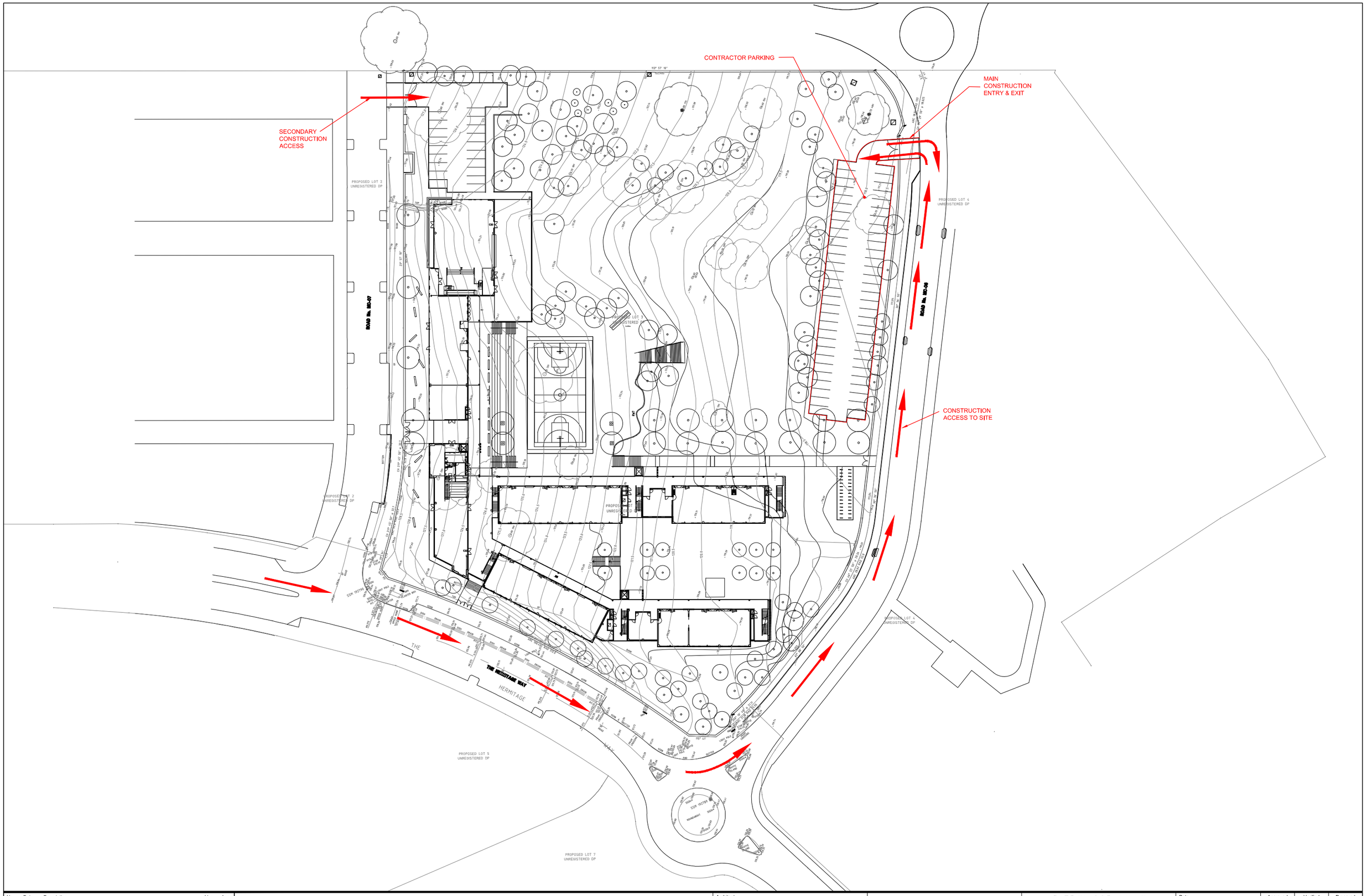
Source: AECOM, 2015.

The results indicate that in the AM and PM peak hour, all three intersections along The Hermitage Way in the vicinity of Entertainment Precinct operate satisfactorily in 2026 with development traffic at Level of Service (LoS) A and B. In addition, the 95th percentile queue lengths do not exceed 30 metres or five vehicles for any of the assessed intersections. The assessment shows that the intersections will perform with significant spare capacity (approximately 30 to 60 per cent) under priority control or roundabout.

7.0 Conclusion

The traffic statement confirmed that the proposed section of The Hermitage Way in Entrainment Precinct as well as the associated intersections has the capacity to cater for the forecast traffic generation.

Appendix B
Drawings



No.	Date	Description	Ver.	Appr.

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GLEDSWOOD HILLS PUBLIC SCHOOL

CONSTRUCTION TRAFFIC PLAN

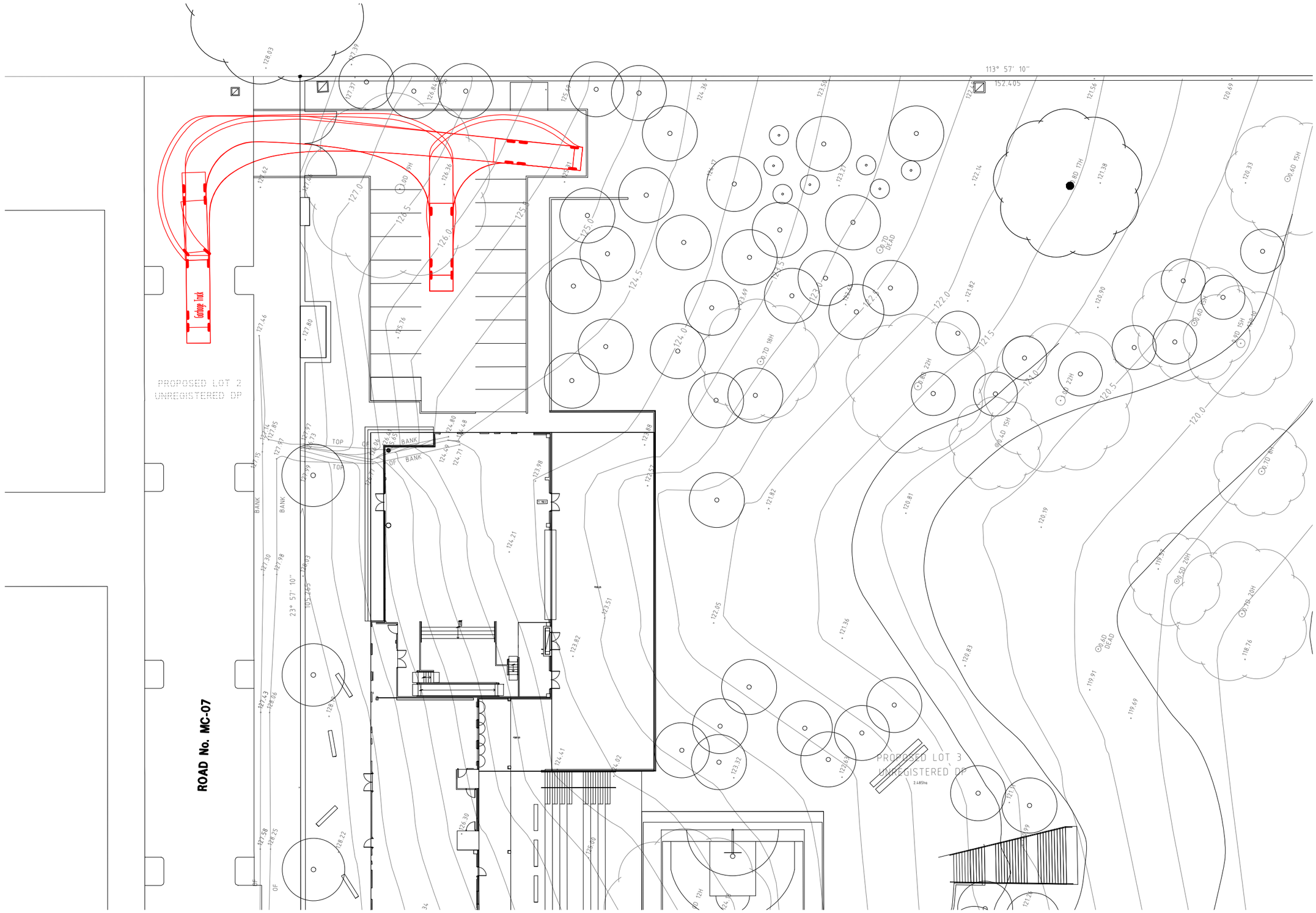
Date	Approved	Verified	Prepared
JUNE 2017		C.M.W 09.08.17	J.K 09.08.17

Scale @ A1: 1:500

Job number: 16-238

Drawing number: CTP1

Amendment: B



No.	Date	Description	Ver.	Appr.
A	10.10.17	CARPARKING AMENDED		
B	16.10.17	TURNING PATH AMENDED		

Architect
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GLEDSWOOD HILLS
PUBLIC SCHOOL

TURNING PATH - GARBAGE TRUCK

Date	Approved	Verified	Prepared
JUNE 2017		C.M.W 09.08.17	J.K 09.08.17
Scale @ A1: 1:200			
Job number: 16-238	Drawing number: TP1		Amendment: C

Appendix C

Green Travel Plan

Woolacotts.
CONSULTING ENGINEERS

Gledswood Hills Public School
Green Travel Plan

23 November 2017 | 16-238

Contents

Document control

Rev No	Date	Revision details	Approved	Verified	Prepared
A	10.8.2017	Approved Issue	CMW	KEC	CMW
B	17.8.2017	Minor amendments	CMW	KEC	CMW
C	9.10.2017	Parking amended	CMW	KEC	CMW
D	23.11.2017	Minor amendments	CMW	KEC	CMW

Introduction

The new Gledswood Hills Public School is to be located on The Hermitage Way, Gledswood Hills. The site will have frontages on The Hermitage Way and new roads MC 06 and MC 07. See Figure 1 for location. The new school will eventually cater for 1,000 students, but will be constructed in stages.

This report has been prepared to detail the measures provided to encourage sustainable transport measures for the site.

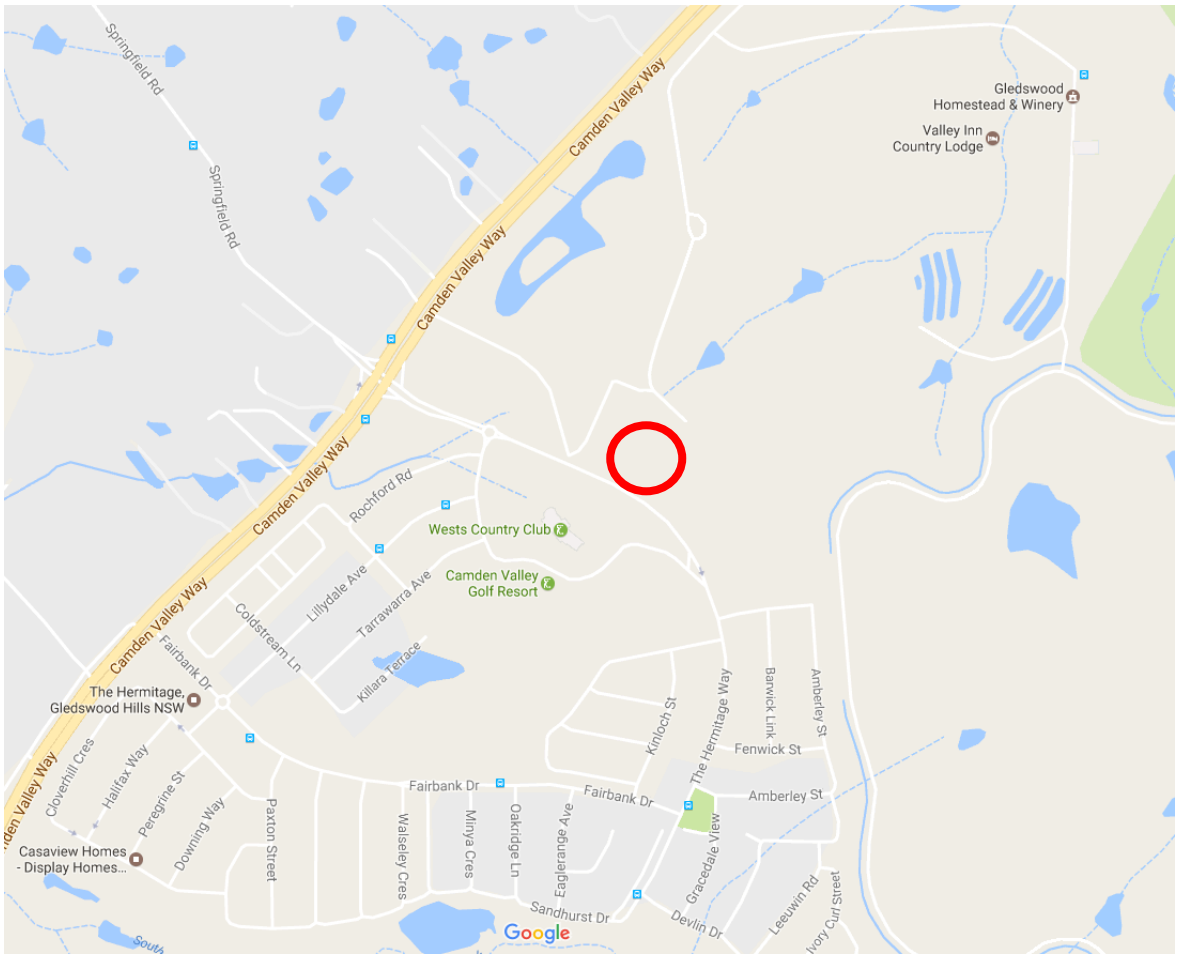

Figure 1 – Approximate Site Location

Site location

The site is located on The Hermitage Way and will also have frontages to new roads MC06 and MC07. The section of The Hermitage Way past the site has recently been completed and handed over to Council. New Roads MC06 and MC07 have not yet been constructed. Construction of MC07 is anticipated to commence in the next couple of months, while MC06 will follow within 6-9months. Construction of both roads will be complete before the opening of the school. Refer to Figure 2 for the location of school.

The main access to the school will be via new road MC07, with a second access point via new road MC06. A bus zone will be located on The Hermitage Way and a drop off zone along new road MC06. Refer to Figure 3 for the location of the site entry, bus bay and drop off zone.

Figure 2 –Gledswood Hills (The Hermitage) Master Plan

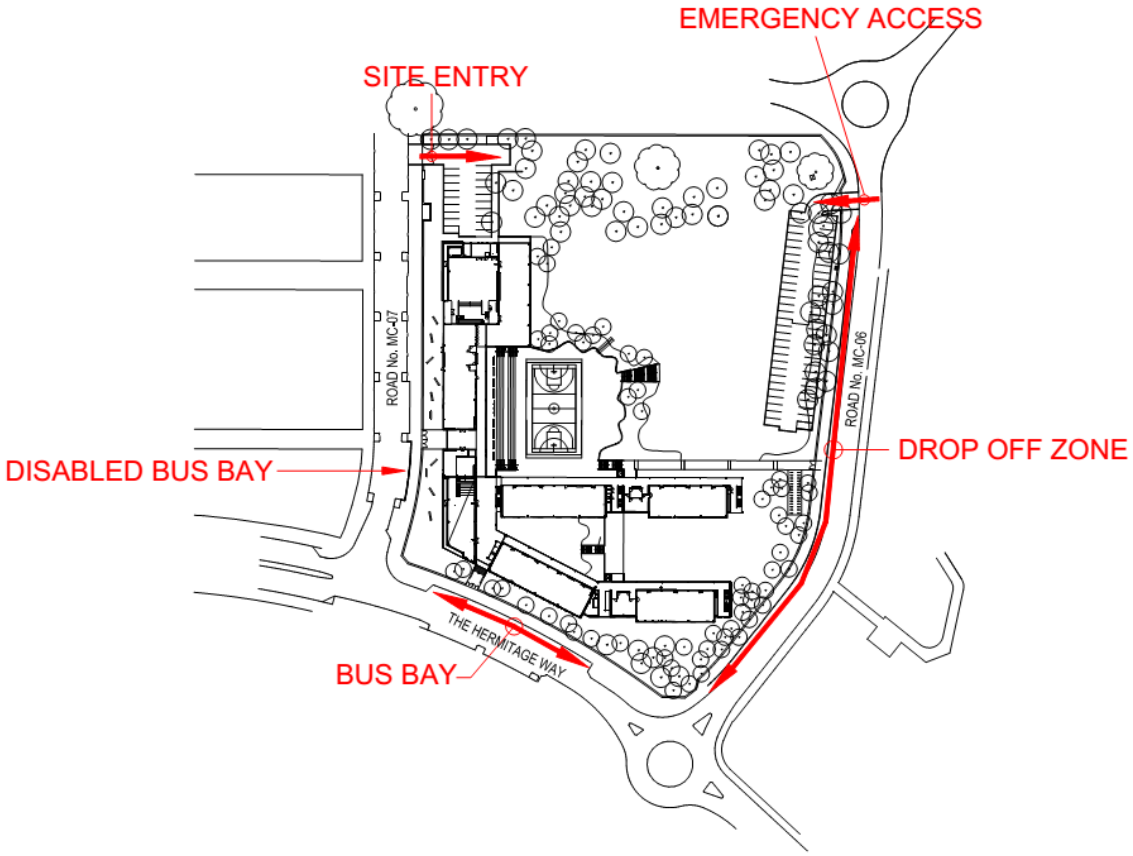

Figure 3 – Location of Bus Bay and Drop Off Zone

Proposed development

The development proposed for the site consists of public school to cater for a total of up to 1,000 students. Staff numbers are the school will be nominally 65.

The major use of the site will occur on weekdays, during normal school hours of approximately 8:30am to 3:30pm. Extracurricular activities will occur after school and on weekends. The public school may have before and after school care, which will continue when the school is expanded.

Available transport infrastructure

Bus services

The current bus routes serving Gledswood Hills are:

- Route 841 – Narellan to Lepppington Station via Gledswood Hills
- Route 850 - Narellan to Minto via Oran Park, Gregory Hills and Catherine Fields
- Route 857 – Narellan to Liverpool via Prestons and Casula
- Route 858 - Oran Park Town Centre to Leppington Station
- Route 899 - Camden to Catherine Field via Narellen.

Route 841 is the only route that will pass the school, with the rest travelling along Camden Valley Way. However, with the ongoing development of the area, it is possible that additional routes could pass the site in the future. Staff at the school will be able to utilise these regular services.

The closest railway stations to the school are Leppington and Minto. Bus routes 841 and 850 will be able to be used to get to the site from these stations.

The regular bus routes will be able to be used by students. However, dedicated school services will also be provided, to transport students within the school's catchment zone.

School bus services will be required for the school. It is envisaged that the number of services will be similar to that of Oran Park Public School, which currently has 3 school services in the morning and afternoon, increasing as the school population increases.

A 58m bus bay has been constructed on The Hermitage Way along the school frontage. This will have room for 2 standard (12.5m) buses at one time, allowing for independent operation. While 3 buses can fit into the space, they are closer than recommended by State Transit's *Bus Infrastructure Guide*. When the school reaches its capacity, additional buses will be required. When this occurs, the bus company will stagger departure times, as occurs at other schools.

With the bus services detailed above, there will be suitable public transport to service the school.

Pedestrian and cycleway infrastructure

Pedestrian access to the school will be available from new roads MC06 and MC07. Footpaths along these roads will connect to the area wide cycle and shared path system.

The Gledswood Hills development includes 50km of cycle and shared paths. Links will be available from the school onto the path network. These paths, and the remainder of the network throughout the Gledswood Hills Precinct, will provide cycle and pedestrian access to the school.

To facilitate students and staff riding to school, bicycle storage racks will be provided, which allow students and staff to store and lock bicycles. At least 60 spaces will be provided at the school.

To facilitate staff walking or cycling to school, end of journey facilities, including lockers and showers, will be provided for staff.

Parking

Parking for 75 vehicles will be provided on site, with 45 spaces provided in Stage 1 and an additional 30 in Stage 2. On-street parking will be available on new road MC 07. Outside of school start and finish times, on-street parking will also be available in new road MC06.

Pick up and drop off facilities

A drop off zone will be provided along New Road MC06, with space for approximately 28 vehicles. During the morning peak, if students are dropped off over a 15minute period, each vehicle can be in the drop off zone for approximately 50 seconds. During the afternoon peak, if students are picked up over a 10minute period, each vehicle can be in the drop off zone for 50 seconds , which increases to 1.2 minutes per vehicle if the pick-up extends to 15minutes.

While parking will be available in new road MC07, the spaces will not be signposted as drop off / pick up and parents will discouraged from using this area unless they have meetings with school staff.

The roundabout at the intersection of The Hermitage Way and new Road MC06 and the future roundabout on new road MC06 past the school will facilitate use of the proposed drop off zone, as they will provide easy access to and from The Hermitage Way and will also provide a location to undertake a safe and legal U-turn. Alternatively they can turn left at the first intersection past the school and then join to new road MC07 to reach The Hermitage Way.

Therefore, unless parents need to meet with school staff, new road MC06 will be the preferred location to drop off and pick up students.

Opportunities to increase green travel options

The public school will have all new staff. As there are no existing transport patterns to change for the new staff members, there are opportunities for the combined site to encourage green transport options. Initiatives that may be implemented are:

- Encourage walking and cycling to the site by students and staff
- Encourage the use of public transport
- Formalise a car pool system at the school

Each of these measures is discussed below.

Walking and cycling

The development of the Gledswood Hills precinct includes a network of shared paths, which will allow students and staff to safely cycle or walk to the school. To encourage use of the shared path network, the new works will incorporate suitable end of trip facilities. These will include:

- Suitable bicycle storage areas, including a means of securing bicycles.
- Lockers for staff and students to store clothing and other articles required for walking or cycling, such as helmets
- Staff shower and change facilities, to allow them to wash / clean themselves prior to commencing work.

As part of the management of the school, senior staff will need to develop specific plans to encourage the use of walking and cycling to school. This may include measures to minimise the materials that staff and students need to take home, the use of electronic documentation and remote connection to the school's network.

Public transport

At present, there is only one bus service in close proximity to the site. However, with the rapid development currently occurring in the area, the route and frequency of bus services will change and increase to meet demand. As such, it is probable that future bus services will pass the site and provide an improved service that does not require staff to walk from Camden Valley Way. Local bus companies have confirmed that they review services on an annual basis and adjust routes and frequency of services to cater for demand and new development.

With the anticipated improvement in bus services, school management will be able to encourage use of public transport by staff. As with cycling and walking, this may require measures to minimise the materials staff have to transport between home and school, to enable public transport to be a viable option.

Car-pooling

The set start and finish times of schools readily enable a car pooling system to be implemented. Senior staff at the new school will need to consider implementing a scheme and for encouraging the use of the scheme One measure to be adopted is to reserve part of the on-site parking area for car pool members.

Implementation

The school will be responsible implementing the measures discussed above, after assessing the viability of each measure. A checklist is provided in Appendix A, identifying tasks to be undertaken by the school to implement the green travel plan.

The plan will be updated annually, to include any changes that have occurred and to incorporate any new measures identified by the school.

Appendix A

Green Travel Plan Checklist

Gledswood Hills Public School
Green Travel Plan Checklist

General Requirements	Completed by
Elect a staff member to be responsible for co-ordinating the activities required to implement green travel measures	
Prepare a new starter pack for staff and students. The pack will include the following: - Maps and timetables of public transport in the area - Maps of the shared path network in the precinct - Details of end of trip facilities available in the school for pedestrians and cyclists, such as showers and lockers - Details of measures provided to secure bicycles - Details of the car pool scheme and how to join - Details of any measures provided by the school to minimise transport of heavy or bulky materials	
At the start of each year: - Provide a forum to link possible cycling or walking partners - Set up a new forum to form new groups as part of the car pool, taking into consideration the timetable for the following year. - Review the plan and update as required.	
Utilise the school website, newsletters and facebook page to keep students, parents and staff informed of any changes to public transport, shared paths or other sustainable transport measures	
Public Transport	Completed by
Develop a map showing the public transport routes to the school – both regular services and school service. Map to be available on the school website	
At the start of the school year and mid-year, update the map to reflect any changes.	
Provide links on the school website to public transport companies servicing the area	
Walking and cycling	Completed by
Produce a map showing walking and cycling routes to the school, including distances and approximate travel times	
Identify employees living within walking or cycling distance of the school and develop measures to assist in allowing them to walk to school	

Monitor that the bicycle storage area to ensure that the area is secure and bicycles are not being stolen. If required, implement measures to upgrade to secure the area.	
Car pooling	Completed by
Set up a car pool system for staff. Identify (with appropriate confidentiality) which staff live near each other and could car pool.	
Reserve a section of the parking area for those involved in the car pool program.	
Communications	Completed by
Have a section of the school website dedicated to sustainable transport measures. Section will include maps prepared as part of the green travel plan	
Provide opportunities for staff and students to provide input on sustainable transport measures	
Utilise school newsletters, website and facebook page to keep students and staff informed of changes in public transport, shared paths or other events affecting access to the school.	