297-299 Canterbury Road, Revesby

Transport Assessment for Planning Proposal

Prepared for:

Canterbury-Bankstown Private Hospital Pty Ltd

31 January 2018

The Transport Planning Partnership

297-299 Canterbury Road, Revesby

Transport Assessment

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Final	31/01/18	Lalaine Malaluan	Jessica Szeto	Wayne Johnson	

Table of Contents

1 Introduction 4
1.1 Background 4
1.2 Secretary's Environmental Assessment Requirements 4
1.3 References 5
1.4 Report Structure 5
2 Existing Conditions 6
2.1 Site Description 6
2.2 Road Network 7
2.3 Public Transport Facilities 8
2.4 Pedestrian and Cycling Facilities 9
2.5 Vehicle Access 9
2.6 BTS Journey to Work Data 10
2.7 Existing Traffic Volumes 12
2.8 Existing Intersection Capacity Analysis 13
2.8.1 Level of Service Criteria 13
2.8.2 2017 Existing Traffic Performance 13
3 Proposed Development 15
3.1 Proposal Description 15
3.2 Proposed Vehicle Access Arrangements 16
3.3 Loading and Pick-Up/Drop-Off Facilities 17
4 Parking Assessment 18
4.1 Car Parking Requirements 18
4.1.1 Roads and Maritime Guide to Traffic Generating Developments 18
4.2 Bicycle Parking Requirements 19
5 Traffic Impact Assessment 21
5.1 Proposed Development Traffic Generation 21
5.2 Future Network Capacity Analysis 22
5.2.1 2027 Future Base Case (i.e. no development) 22
5.2.2 2027 Ultimate Future Case (i.e. with development) 23
6 Transport Management Measures 29
6.1 Green Travel Plans 29
6.2 What is Green Travel Plan (GTP)? 29
6.3 Monitoring of the GTP 29

7 Conclusion 31

Tables

Table 1.1: Review of Compliance with SEARs 4
Table 2.1: BTS Journey to Work (2011) – Directional Distributions 11
Table 2.2: BTS Journey to Work (2016) – Travel Mode, employed residents 11
Table 2.3: Roads and Maritime LoS Criteria 13
Table 2.4: 2017 Existing Weekday Peak Hour Intersection Analysis Results 14
Table 4.1: Roads and Maritime Guide Car Parking Requirements 19
Table 4.2: Canterbury DCP 2012 Guide Bicycle Parking Requirements 20
Table 5.1: Proposed Development Trip Generation Estimates 21
Table 5.2: Proposed Development Mode Split Estimates 21
Table 5.3: 2027 Future Base Weekday Peak Hour Intersection Analysis Results (i.e. without proposed development) 23
Table 5.4: 2027 Ultimate Future Case Weekday Peak Hour Intersection Analysis Results – (No Upgrade Works – 'Do Nothing') 24
Table 5.5: 2027 Ultimate Future Case Weekday Peak Hour Intersection Analysis Results – (Proposed Upgrade Works) 26
Table 5.6: Weekday Peak Hour Intersection Analysis Results Comparison 26

Figures

Figure 2.1: Site Locality Map 6
Figure 2.2: Bankstown LEP 2015 – Land Zoning Map 7
Figure 2.3: Public Transport Map 8
Figure 2.4: Existing Cycle Network 9
Figure 2.5: Existing Vehicle Access Points 10
Figure 2.6: BTS Journey to Work (2011) – Map of Directional Vehicle Routes 11
Figure 2.7: 2017 Existing Weekday Peak Hour Traffic Volumes 12
Figure 3.1: Ground Floor Plan 15
Figure 3.2: Proposed Access Arrangements 16
Figure 3.3: Example of Similar Porte Cochere Arrangement 17
Figure 5.1: 2027 Ultimate Future Base Traffic Volumes (i.e. without proposed development) 22
Figure 5.2: 2027 Ultimate Future Case Traffic Volumes (i.e. with proposed development) 24

Figure 5.3: Without the Development 25
Figure 5.4: With the Development 25
Figure 5.5: Proposed Signalisation of the Canterbury Road-Mavis Street Intersection 27

APPENDICES

A. ARCHITECTURAL LAYOUT PLANS
B. SIDRA NETWORK ANALYSIS RESULTS
C. CORRESPONDENCE DETAILS (AWAITING ROADS AND MARITIME RESPONSE)

1 Introduction

1.1 Background

A Planning Proposal is to be lodged with the Department of Planning and Environment (the 'Department') seeking approval to amend the existing permissible floor space ratio (FSR) to a maximum FSR of 2.9:1 at 297-299 Canterbury Road, Revesby. At this stage, the proposal includes a 251-bed private hospital and associated ancillary clinical facilities with a total gross floor area (GFA) of some 25,000m^2.

The Transport Planning Partnership (TTPP) has prepared this Transport Assessment Report, on behalf of GSA Planning, to assess the transport implications associated with the proposed rezoning of the site.

1.2 Secretary's Environmental Assessment Requirements

On 17 November 2017, the Department issued the Secretary's Environmental Assessment Requirements (SEARs) for the Bankstown Private Hospital Concept Proposal at 297-299 Canterbury Road, Revesby. Specifically, a transport and accessibility impact assessment is required as part of the Environmental Impact Statement (EIS), in accordance with the SEARs for the proposed development.

The issues raised in the SEARs have been considered during the preparation of this Transport Assessment Report for the Planning Proposal and are summarised in Table 1.1 for reference.

Table 1.1: Review of Compliance with SEARs

Secretary's Environmental Assessment Requirement	Report Reference
5. Transport and Accessibility	
• The existing and proposed pedestrian and bicycle movements within the vicinity of and surrounding the site and to public transport facilities as well as measures to maintain road personal safety in line with CPTED principles	Refer to Section 2
• An estimate of the total daily and peak hour trips generated by the proposal, including vehicle, public transport, pedestrian and bicycle trips	Refer to Section 5.1
• The adequacy of public transport, pedestrian and bicycle provisions to meet the likely future demand of the proposed development	Refer to Section 5.1
• Impact of the proposed development on existing and future public transport and walking and cycling infrastructure within and surrounding the site	Refer to Section 5.1
• Measures to promote travel choices that support sustainable travel, such as location-specific sustainable travel plan, provision of end-of-trip facilities, green travel plans and wayfinding strategies	Refer to Section 6. It is envisaged that any approval of the proposed development would include a condition of consent for a green travel plan (GTP). As such, a framework for a future GTP

Secretary's Environmental Assessment Requirement	Report Reference
	has been prepared as part of this report, with the full GTP to be provided prior to the occupation of the proposed development.
• The proposed walking and cycling access arrangements and connections to public transport services	Refer to Section 2.4 and Section 5.2.2.2
• The proposed access arrangements, including car pick-up/drop-off facilities, and measures to mitigate any associated traffic impacts and impacts on public transport, pedestrian and cycle networks	Refer to Section 3 and Section 5.2.2.2
• Proposed car and bicycle parking provision, including consideration of the availability of public transport and the requirements of the relevant parking codes and Australian Standards	Refer to Section 4
• Provision of end-of-trip facilities (i.e. showers, lockers, change of rooms etc.) for the use of employees who choose to walk or cycle to/from work as well as undertake any activities during work hours	Refer to Section 4
• Service vehicle access, delivery and loading arrangements and estimated service vehicle movements (including vehicle type and the likely arrival and departure times)	Refer to Section 3.3

1.3 References

Reference has been made to the following documents in preparation of this report:

- Architectural plans prepared by Anthony Vavayis and Associates
- City of Canterbury-Bankstown Development Control Plans
- Roads and Maritime Services (Roads and Maritime) Guide to Traffic Generating Developments
- Traffic surveys conducted by Trans Traffic Survey
- Other documents and data as referenced in this report.

1.4 Report Structure

The remainder of the report is set out as follows:

- Chapter 2 discusses the existing conditions including a description of the subject site
- Chapter 3 provides a brief description of the proposed development
- Chapter 4 assesses the proposed on-site parking provision and internal layout
- Chapter 5 examines the traffic generation and traffic implications of the proposed development
- Chapter 6 presents the framework for a green travel plan of the subject site
- Chapter 7 presents the conclusions of the assessment.

2 Existing Conditions

2.1 Site Description

The subject site (the 'site') is located at 297-299 Canterbury Road, Revesby, and falls within the jurisdiction of City of Canterbury-Bankstown Council (formerly Bankstown Council).

The site occupies a lot area of approximately 9,000m^2 and is currently occupied by two buildings associated with the baby furniture store, Love n Care, with vehicle access currently provided off Canterbury Road and Mavis Street.

A locality map of the site is provided in Figure 2.1.

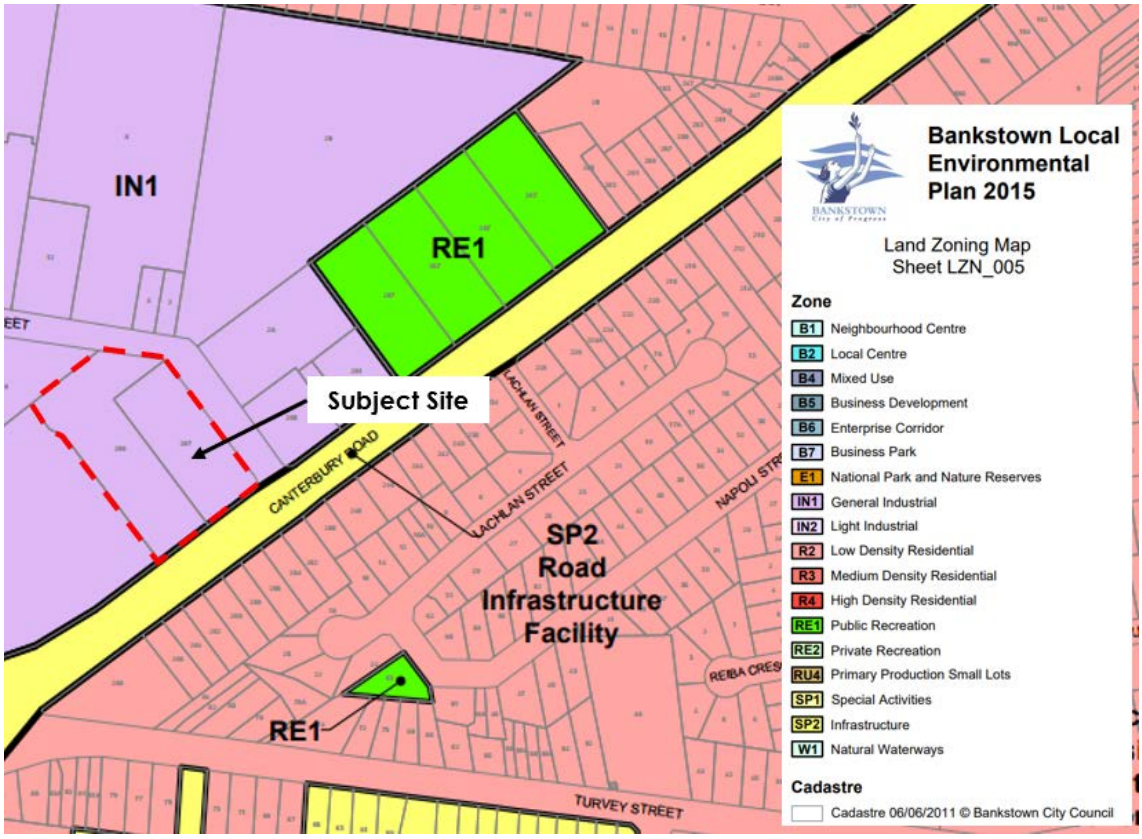
Figure 2.1: Site Locality Map

Source: Nearmap

The site is zoned as IN1 General Industrial, with a maximum permissible FSR of 1:1, in accordance with the Bankstown Local Environment Plan (LEP) 2015. Land uses surrounding the site predominately comprise light industrial and residential uses.

The Bankstown LEP Land Zoning Map is shown in Figure 2.2.

Figure 2.2: Bankstown LEP 2015 – Land Zoning Map



Source: Bankstown LEP 2015

2.2 Road Network

The site is generally bound by Mavis Street to the north-east and Canterbury Road to the south-east. A brief description of these roads is provided below.

Canterbury Road

Canterbury Road is a Roads and Maritime Services (Roads and Maritime) classified State road. The road serves as the main east-west arterial link between Revesby and Hurlstone Park. Within the vicinity of the site, Canterbury Road is generally configured as a six-lane, two-way road, separated by a central median, across a 21m wide road carriageway (kerb to kerb). This road has a posted speed limit of 70km/h, with no kerbside car parking permitted on either side of the road.

Mavis Road

Mavis Road functions as a two-way local cul-de-sac road, generally aligned in a north-west and south-east direction, with a posted speed limit of 50km/h. The road is designed as a seagull intersection with Canterbury Road. Unrestricted kerbside car parking is provided on both sides of the road and is generally used by staff and employees within the area.

2.3 Public Transport Facilities

The site is located approximately 1.7km from Revesby Train Station and 2.5km from Bankstown Train Station. In addition, Bankstown Airport is located approximately 2.2km north-west of the proposed development.

The site is primarily serviced by bus facilities, with a bus stop located directly adjacent to the site on Canterbury Road. This bus stop services bus routes 922, 923, 924, 926 and M90, which provides good connectivity to surrounding suburbs including Bankstown and Burwood via Revesby. Bus services generally run every 5-10 minutes during peak periods.

A map showing the site's proximity to existing public transport facilities is shown in Figure 2.3.

Figure 2.3: Public Transport Map

Source: Google Maps Australia

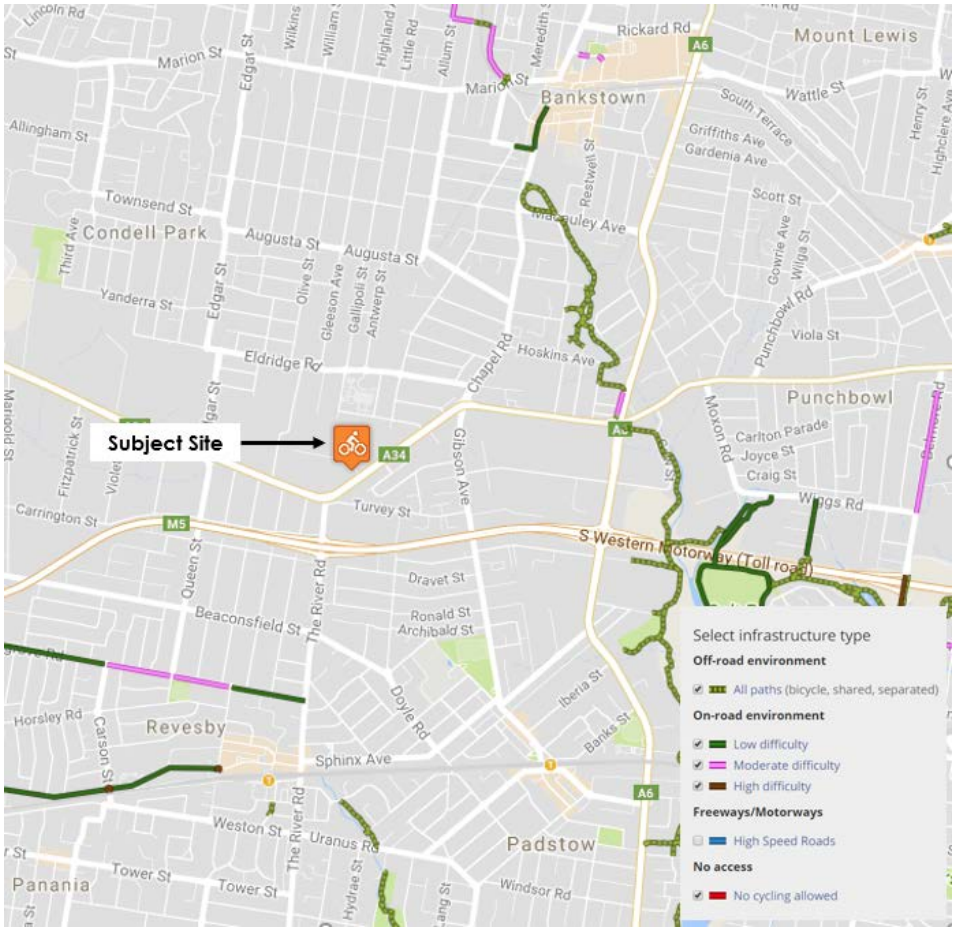
Based on Opal data obtained from Transport for NSW, bus occupancy surveys were conducted from August 2016 to January 2017. A review of the bus occupancy surveys indicates that the existing bus stop fronting the site on Canterbury Road currently operates well within the available seating capacity. The majority of bus routes servicing the bus stop currently operate less than 50% of the seating capacity, with the M90 bus route operating between 50% to 100% of the seating capacity in the morning peak.

2.4 Pedestrian and Cycling Facilities

A sealed pedestrian path is provided on the south side of Canterbury Road and the east side of Mavis Street, which provides pedestrian access to residential properties and light industrial estates, respectively. Limited pedestrian crossing opportunities are currently provided across Canterbury Road, with the nearest pedestrian crossing points located 230m west or 470m east of the site at The River Road-Milperra Road-Canterbury Road and Canterbury Road-Claribel Street intersections, respectively.

Further to this, limited cycling facilities exist within the immediate vicinity of the site. The nearest cycleway is provided approximately 2km east on Exceller Avenue and Warren Avenue in Bankstown. The existing cycle network surrounding the site is shown in Figure 2.4.

Figure 2.4: Existing Cycle Network



Source: Roads and Maritime, Cycleway Finder V3 (last updated 08/12/2017)

2.5 Vehicle Access

At present, the site currently has seven (7) vehicle access points on Canterbury Road and Mavis Street. The existing vehicle access point on Canterbury Road is restricted to left-in/left-

out access arrangements, with the remaining six (6) vehicle access points on Mavis Street allowing all turning movements.

The locations of the existing vehicle access points are shown in Figure 2.5.

Figure 2.5: Existing Vehicle Access Points

Basemap Source: Nearmap

2.6 BTS Journey to Work Data

Mode share patterns at the site were analysed using 2011 and 2016 Journey to Work (JTW) Census data from the Bureau of Transport Statistics (BTS) to understand existing travel patterns for employees working within the immediate vicinity of the proposed private hospital.

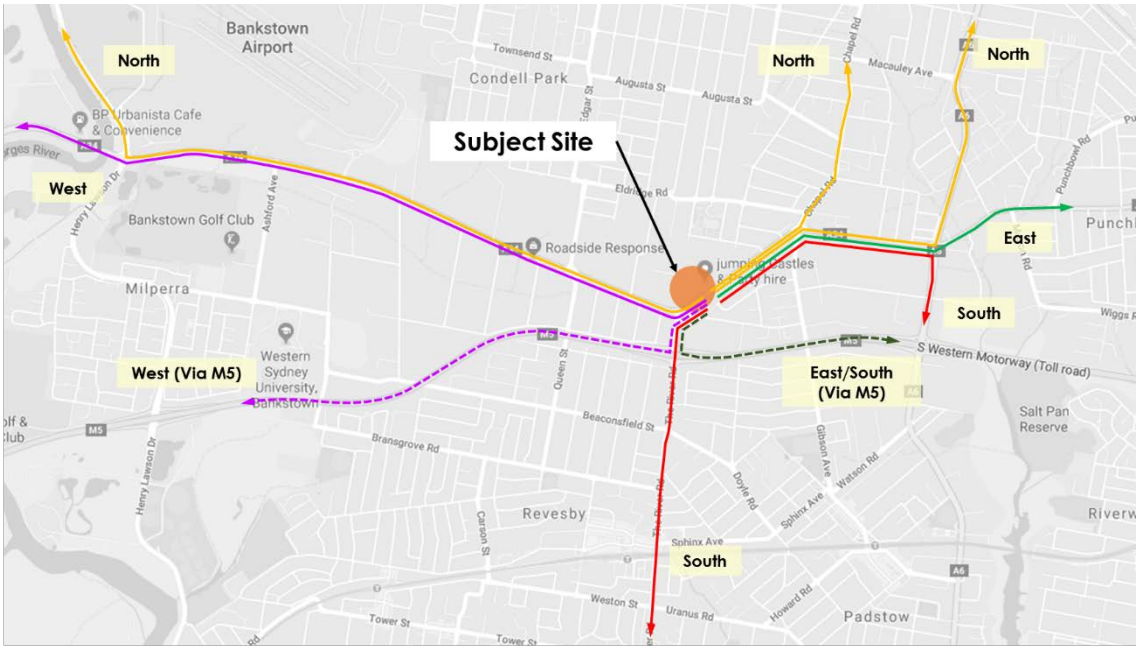
A summary of the existing travel mode splits for where employed people are coming from is provided in Table 2.1, with likely directional vehicle routes based on 2011 JTW data is graphically presented in Figure 2.6.

Table 2.1: BTS Journey to Work (2011) – Directional Distributions

Direction of Travel	Proportion (%)
North	45%
East	11%
West	22%
South	23%
Total	**100%**

Source: BTS Journey to Work 2011

Figure 2.6: BTS Journey to Work (2011) – Map of Directional Vehicle Routes



Source: Google Maps Australia

A summary of the existing mode share splits within the study area is provided in Table 2.2. In addition to this, a comparison against existing mode share splits within the Greater Sydney region is also provided in Table 2.2.

Table 2.2: BTS Journey to Work (2016) – Travel Mode, employed residents

Mode of Travel	Proportion (%)	
	Revesby Area	Greater Sydney Region
Train	5%	15%
Bus	2%	7%
Car, as driver	81%	67%

Mode of Travel	Proportion (%)	
	Revesby Area	Greater Sydney Region
Car passenger	8%	5%
Bicycle	0%	1%
Walked only	4%	5%
Total	**100%**	**100%**

Table 2.2 indicates that a total of 89% of employed people within the subject area travel via private cars, with the remaining 11% travel via non-car modes.

Comparably, it is noted that the car dependency of employed people travelling to the selected area in Revesby is higher than the Greater Sydney Region.

2.7 Existing Traffic Volumes

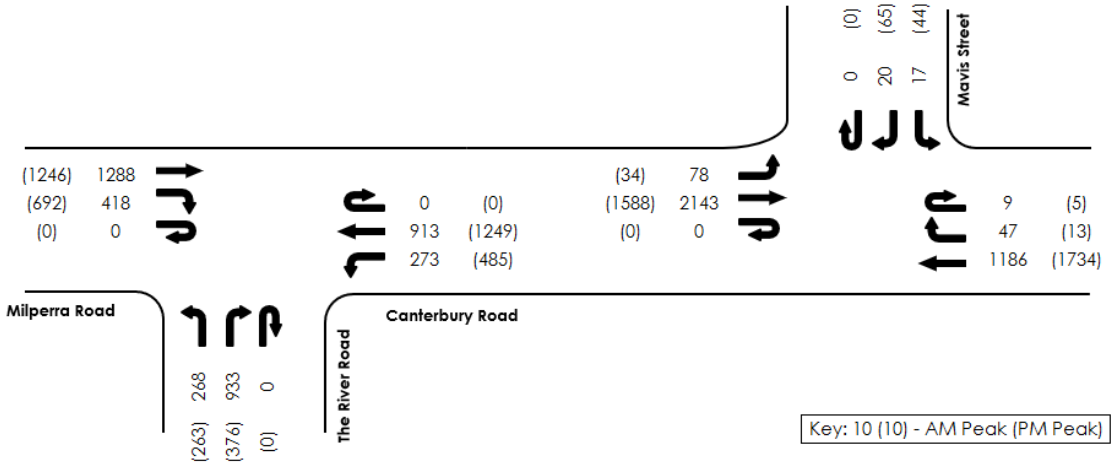
Traffic surveys were conducted on Tuesday, 1 August 2017 from 7:00am to 9:00am in the morning and from 4:00pm to 6:00pm in the afternoon to determine the volume of traffic at the following key intersections:

- Milperra Road-The River Road-Canterbury Road (signalised intersection)
- Canterbury Road-Mavis Street (priority, seagull intersection)

Based on the traffic surveys, the morning and evening peak periods were identified from 7:45am to 8:45am (morning peak) and from 4:30pm to 5:30pm (afternoon peak).

The existing peak hour traffic volumes are shown in Figure 2.7.

Figure 2.7: 2017 Existing Weekday Peak Hour Traffic Volumes



2.8 Existing Intersection Capacity Analysis

2.8.1 Level of Service Criteria

Roads and Maritime uses level of service as a measure of performance for all intersection types operating under prevailing traffic conditions. The level of service ranges from LoS A to LoS F which is directly related to the average intersection delays experienced by traffic travelling through the intersection. LoS A to LoS D are considered to provide acceptable performance with LoS A providing better performance than LoS D. LoS D is the long term desirable level of service. LoS E and LoS F provide unsatisfactory intersection performance.

At signalised intersections, the average delay is the volume weighted average of all movements. For roundabouts and priority (give way and stop sign) controlled intersections, the average delay relates to the worst movement.

Table 2.3 shows the criteria that SIDRA Intersection adopts in assessing the LoS.

Table 2.3: Roads and Maritime LoS Criteria

Level of Service (LoS)	Average Delay per vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Sign
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity, requires other control mode.
F	Greater than 70	Unsatisfactory, requires additional capacity	Unsatisfactory, requires other control mode or major treatment

2.8.2 2017 Existing Traffic Performance

Network intersection capacity analysis has been undertaken using SIDRA Intersection 7 modelling software to model the existing intersection performance at Canterbury Road-Mavis Street and Milperra Road-The River Road-Canterbury Road intersections during peak periods using the peak hour traffic volumes shown in Figure 2.7. The SIDRA Intersection model has been calibrated based on on-site queue length surveys.

A summary of the morning (AM Peak) and afternoon (PM Peak) peak hour traffic modelling results is provided in Table 2.4.

Table 2.4: 2017 Existing Weekday Peak Hour Intersection Analysis Results

Intersection	Control	Peak Period (Hour)	Average Delay (sec)	Level of Service	95th Percentile Queue Length (m)
Canterbury Road-Mavis Street	Priority	AM Peak	144^	F	26
		PM Peak	116^	F	28
Milperra Road-The River Road-Canterbury Road	Signal	AM Peak	37	C	233
		PM Peak	27	B	221

^ *Excessive delays experienced for right-turn movements to/from Mavis Street. All other turning movements operate at LoS A.*

Table 2.4 indicates that Milperra Road-The River Road-Canterbury Road intersection currently operates satisfactory at LoS C or better, with the Canterbury Road-Mavis Street intersection operating at LoS F during both peak periods. This unsatisfactory intersection performance at the Canterbury Road-Mavis Street intersection is primarily due to the right-turn movements to/from Mavis Street, which currently experience delays greater than 70 seconds.

Whilst the delays experienced to/from Mavis Street at the Canterbury Road-Mavis Street intersection are greater than 70 seconds (i.e. unsatisfactory LoS), this is not considered unusual for side streets on a main road. Additionally, it should be noted that all other turning movements at this intersection operate at LoS A. However, any future development within the area would likely further exacerbate delays experienced on the side street.

3 Proposed Development

3.1 Proposal Description

This Planning Proposal seeks approval to amend the existing permissible FSR to a maximum permissible FSR of 2.9:1 to construct a new private hospital facility at 297-299 Canterbury Road, Revesby.

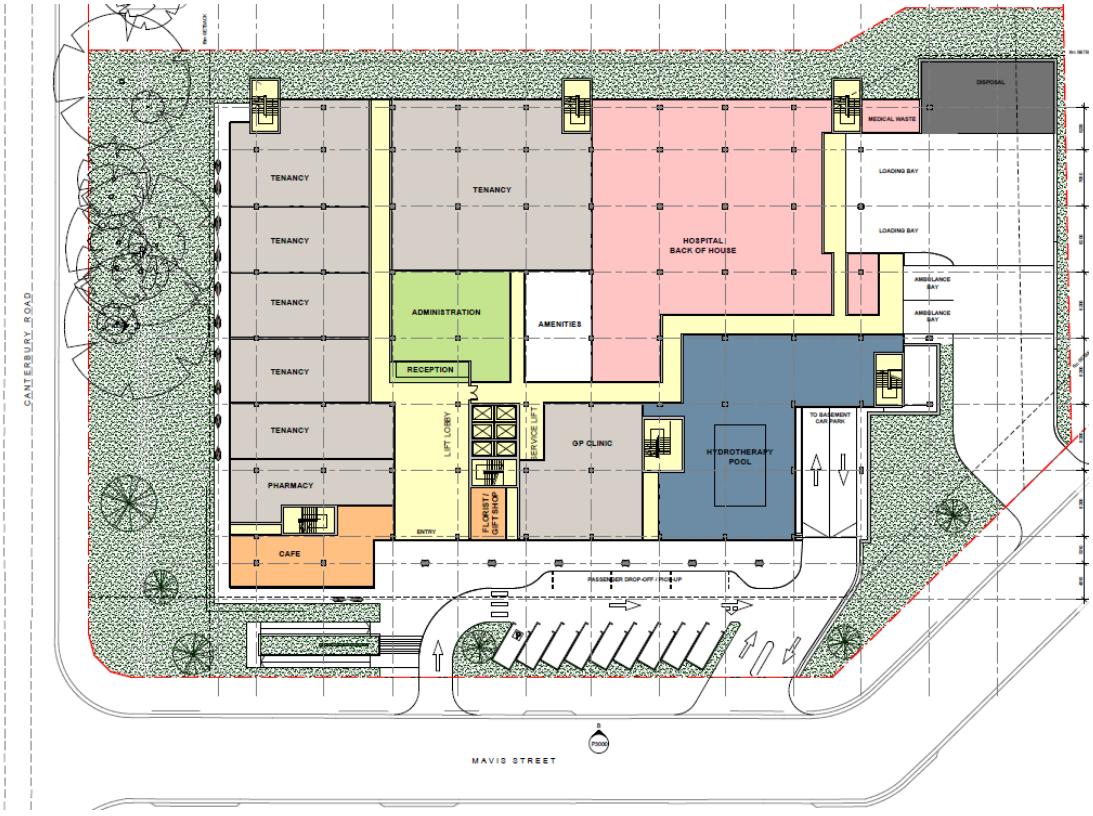
The proposed development is set to comprise the following:

- 251 hospital beds
- 3,655m^2 gross floor area (GFA) of medical consulting centre uses for out-patients
- ancillary shops and clinical services (e.g. florist, theatre rooms, etc.)

In addition to this, a basement car park is proposed to serve the development, containing 433 car parking spaces, with vehicle access off Mavis Street. In addition to this, appropriate allocation of loading facilities, ambulance bays, bicycle parking and end-of-trip facilities will be provided as part of the proposed development.

The proposed development ground floor plan is shown in Figure 3.1, with full architectural layout plans provided in Appendix A.

Figure 3.1: Ground Floor Plan



Source: Anthony Vavayis Architects

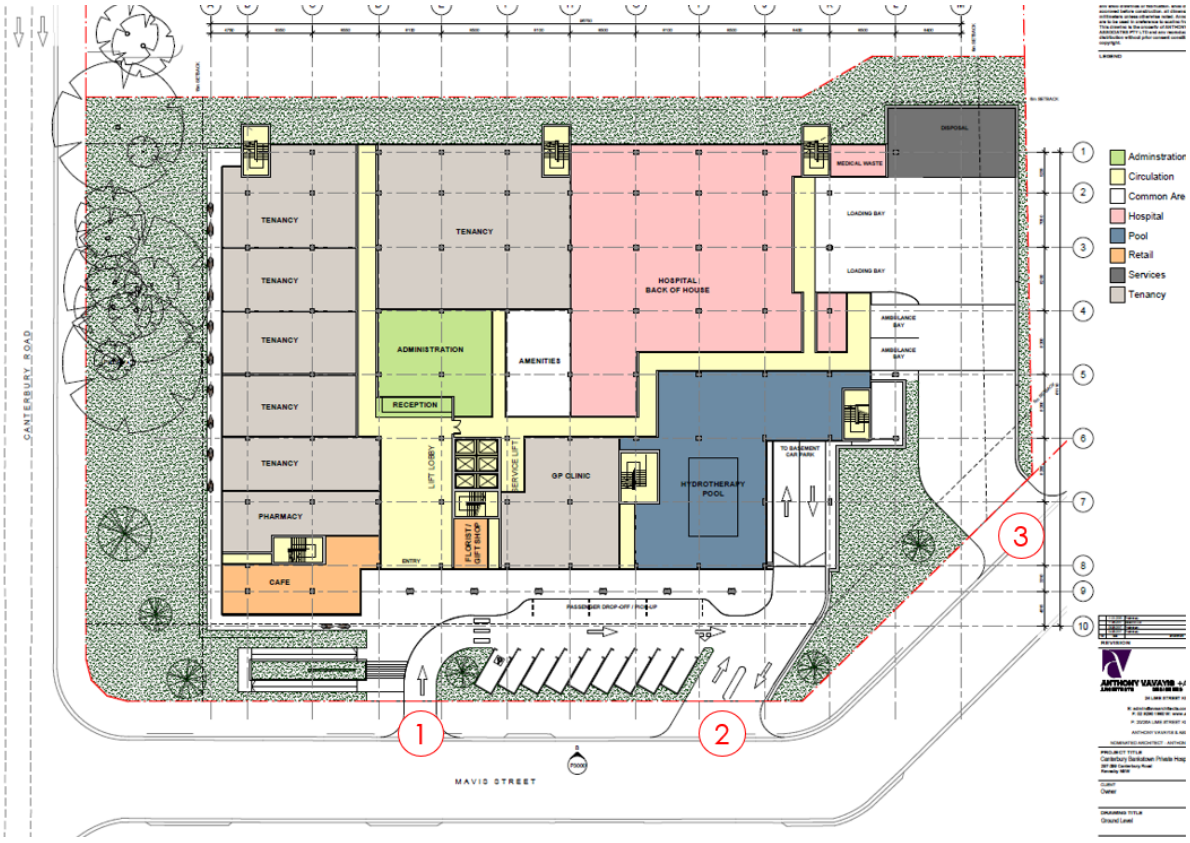
3.2 Proposed Vehicle Access Arrangements

Vehicle access to the site is proposed along the eastern perimeter of the site, via three separate access points as follows:

- **Access 1** – access to porte-cochere system along the main frontage of the hospital building for passenger drop-off and pick-up activities, which is consistent with other similar private hospital developments within the Sydney region (entry access only)
- **Access 2** – two-way main general public access to the basement car park; exit lane to be shared by vehicles leaving the porte-cochere, at-grade parking and basement parking levels
- **Access 3** – ambulance and service vehicle access adjacent to the northern boundary of the site

The proposed access arrangements, including the proposed car pick-up/drop-off porte cochere layout, are shown in Figure 3.2.

Figure 3.2: Proposed Access Arrangements



Source: Anthony Vavayis + Associates Architects

It should be noted that the existing vehicle access point on Canterbury Road will be removed as part of the proposed development. Additionally, the existing six (6) vehicle access points on Mavis Street will be consolidated into the three (3) proposed access points as shown in Figure 3.2.

3.3 Loading and Pick-Up/Drop-Off Facilities

It is proposed to provide two ambulance bays and two loading bays at a discrete location from public access to/from the basement car park and dedicated short-term pick-up/drop-off areas. Access to the loading area will be provided off Mavis Street via a two-way driveway. Additionally, appropriate loading dock management would be provided, with all deliveries managed by management, particularly in relation to the timing of vehicle deliveries to ensure appropriate allocation of loading bays are provided at all times.

Further to this, as indicated above, a dedicated short-term pick-up/drop-off area will be provided and designed as a porte cochere system, similar to other hospital sites within the Sydney region (refer to an example in Figure 3.3). Access to the porte cochere would be provided off Mavis Street via an entry only vehicle access point.

The proposed loading areas will be designed appropriately in accordance with design requirements as set out in the Australian Standards.

Figure 3.3: Example of Similar Porte Cochere Arrangement

Source: Sydney Children's Hospital, Prince of Wales on High Street, Randwick

4 Parking Assessment

4.1 Car Parking Requirements

The Bankstown Development Control Plan (DCP) 2015 (Amended July 2016) does not specify a parking rate requirement for private hospital use. Comparably, the Canterbury DCP (amended 2016) states that *"A Traffic and Parking Assessment Report with a survey of similar developments is required".*

4.1.1 Roads and Maritime Guide to Traffic Generating Developments

To assess the adequacy of proposed parking provision, parking requirements were determined using the rates set out in Roads and Maritime Guide to Traffic Generating Developments (the 'Guide').

Private Hospital Use

The Guide includes a car parking rate for private hospital developments, noting that these rates have been based on the 1994 traffic surveys conducted at 19 private hospitals in the Sydney region. The surveyed hospitals had between 30-99 beds (B) and between 10-102 average staff per weekday shift.

The RMS peak parking accumulation (PPA) at a private hospital is estimated as follows:

- PPA = -26.52 + 1.18B
  (when the average number of staff per weekday day shift is unknown)

Based on the proposed provision of 251 hospital beds, the proposed development would require 270 car parking spaces, in accordance with the Roads and Maritime Guide for private hospital developments.

Medical Consulting Use

TTPP notes that the Bankstown LEP defines a hospital as including ancillary facilities for people that are admitted as in-patients to the hospital, including health consulting rooms, shops and cafes etc. However, the proposed hospital ancillary facilities are likely to be also used by out-patients who do not get admitted as in-patients to the hospital.

Consequently, the parking demand for the medical consulting use has been assessed using recent traffic survey data conducted in 2015 by Roads and Maritime for medical centre developments. Based on recent traffic survey data, the Sydney average PPA at a medical centre is 4.1 spaces per 100m^2 GFA. Using this metric, the proposed 3,655m^2 of medical floor space would require 150 car parking spaces.

A summary of the car parking requirements as set out in the Roads and Maritime Guide is shown in Table 4.1.

Table 4.1: Roads and Maritime Guide Car Parking Requirements

Land Use	Size	Recommend Car Parking Rate	Recommended Car Parking Provision
Private Hospital	251 beds	-26.52 + 1.18B	270 spaces
Medical Centre	3,655m² GFA	4.1 spaces per 100m² GFA	150 spaces
Total Recommended Car Parking Provision			**420 spaces**

Table 4.1 indicates that the proposed development would require 420 car parking spaces.

It is proposed to provide 433 car parking spaces within a proposed basement car park to serve the development, which satisfies with the recommended car parking provision as set out in the Roads and Maritime Guide.

Additionally, the car park layout and associated elements is proposed to be designed in accordance with relevant Australian Standard design requirements, including AS2890.1:2004-Off-street car parking, AS2890.2:2002-Off-street commercial vehicle facilities and AS2890.6:2009-Off-street parking for people with disabilities.

As such, the proposed car parking provision is considered satisfactory. Although, as part of the Transport and Accessibility Report for EIS submission, it is recommended that a survey of a comparable private hospital be undertaken to further assess the adequacy of the proposed car parking provision.

4.2 Bicycle Parking Requirements

The Bankstown DCP 2015 (Amended July 2016) specifies that:

- *"Council may require development to provide appropriate bicycle parking facilities either on-site or close to the development as identified in the Australia Standard 2890.3-Bicycle Parking Facilities."*

Given that no bicycle rates have been specified in the Bankstown DCP, the bicycle parking requirement for the proposed development has been assessed against the Canterbury DCP 2012. It should be noted that the bicycle rates stipulated in the Canterbury DCP for hospitals are consistent with the bicycle parking rates set out in Cycling Aspects of Austroads Guides (Austroads 2014).

A summary of the bicycle parking requirements is provided in Table 4.2.

Table 4.2: Canterbury DCP 2012 Guide Bicycle Parking Requirements

Land Use	Size	Canterbury DCP Bicycle Parking Rate	Canterbury DCP Bicycle Parking Requirement
Private Hospital	251 beds	▪ 1 space per 15 beds for staff, plus ▪ 1 space per 30 beds for visitors	26 spaces
Medical Centre^	3,655m² GFA	1 space per 2 employees	5 spaces
Total Recommended Bicycle Parking Provision			**31 spaces**

^For the purpose of estimating the bicycle parking requirements, it is assumed that the proposed medical centre use would have 8-10 staff on-site at any given time.

On the above basis, the proposed development would require at least 31 bicycle parking spaces in accordance with the Canterbury DCP 2012. It is recommended that the staff bicycle parking spaces (17 spaces) be designed as bicycle lockers, with the bicycle parking spaces for visitors (9 spaces) designed as bicycle rails/ racks in accordance with AS2890.3:2015-Bicycle Parking.

In addition to this, the Canterbury DCP 2012 requires one (1) shower and change room per 10 staff bicycle parking spaces (over 5 spaces). Based on this, the proposed development would require two (2) shower and change rooms.

As such, the proposed development shall provide adequate bicycle parking spaces and appropriate end-of-trip facilities, such as shower and change facilities, in accordance with Canterbury DCP 2012 requirements.

5 Traffic Impact Assessment

5.1 Proposed Development Traffic Generation

Roads and Maritime provide traffic generation rates for different land uses in their Guide to Traffic Generating Developments and Technical Direction (TDT 2013/4a) containing the revised rates. In addition to this, recent traffic generation studies have also been carried out by Roads and Maritime for Medical Centres developments.

Based on the above traffic generation studies, the trip generation estimates of the proposed development are summarised in Table 5.1. It is noted that the proposed shop and clinical ancillary services (e.g. florist shop, theatre rooms etc.) will be an ancillary use to the private hospital and therefore, have been excluded in the below traffic generation estimates.

Table 5.1: Proposed Development Trip Generation Estimates

Land Use	Size	Trip Generation Rate (veh/hr)		Trip Generation Estimate	
		AM Peak	PM Peak	AM Peak	PM Peak
Hospital	251 beds	-12.41 + 0.57B	-11.96 + 0.69B	131 trips	161 trips
Medical Consulting Centre	3,655m²	4.0 trips per 100m² GFA	4.6 trips per 100m² GFA	146 trips	168 trips
Total				**277 trips**	**329 trips**

Table 5.1 indicates that the proposed private hospital would generate 277 and 329 two-way vehicle trips in the morning and afternoon peak hours, respectively. Daily traffic would typically be approximately seven times the peak hour traffic, equating to a daily traffic generation of 1,939-2,303 vehicles.

Further to this, the mode splits for the proposed development has been estimated based off existing BTS Journey to Work data and is summarised in Table 5.2.

Table 5.2: Proposed Development Mode Split Estimates

Mode Splits	Proportion	No. of Trips	
		AM Peak Hour	PM Peak Hour
Train	5%	16 trips	19 trips
Bus	2%	6 trips	7 trips
Car, as driver	81%	277 trips	329 trips
Car passenger	8%		
Bicycle	0%	0 trips	0 trips

Mode Splits	Proportion	No. of Trips	
		AM Peak Hour	PM Peak Hour
Walked only	4%	12 trips	15 trips
Total	**100%**	**311 trips**	**370 trips**

Based on the above, the majority of trips to/from the proposed development site is expected to be generated by car. The impacts on other infrastructure and facilities, e.g. public transport, is therefore expected to be negligible. Additionally, as noted in Section 2.4, the existing bus services within the vicinity of the site currently operate well below capacity. As such, the additional bus trips to/from the proposed development could be adequately accommodated by existing bus services.

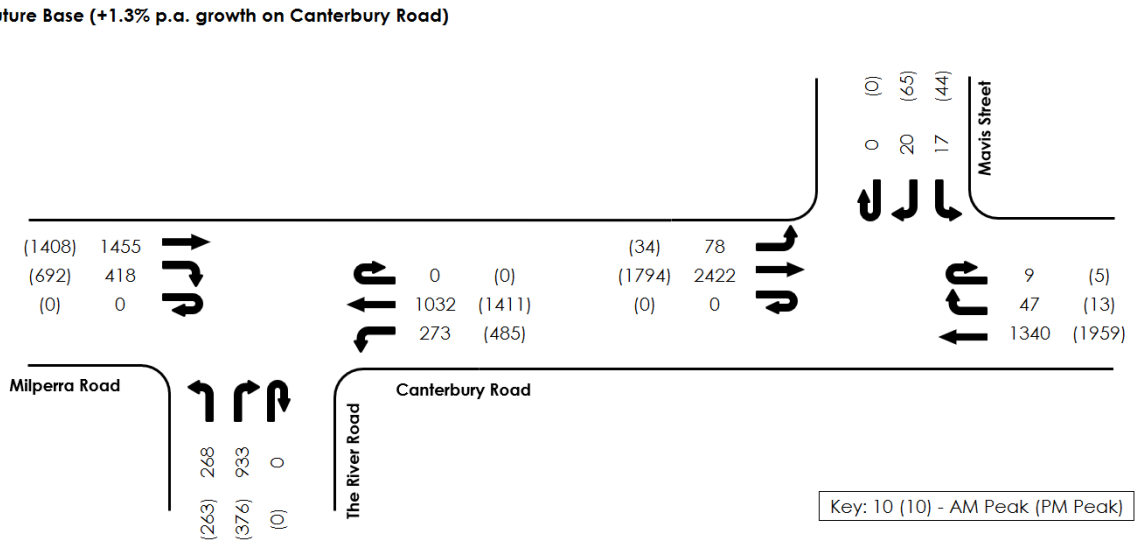
Further intersection capacity analysis has been conducted below to determine the likely implications of the proposed development on the surrounding road network.

5.2 Future Network Capacity Analysis

5.2.1 2027 Future Base Case (i.e. no development)

Assuming a blanket background growth rate of 1.3% p.a. along Canterbury Road based on traffic volume data from Roads and Maritime's permanent counter located on Canterbury Road, west of Stacey Street, the future ten-year projected traffic volumes without the proposed development (Year 2027) is shown in Figure 5.1.

Figure 5.1: 2027 Ultimate Future Base Traffic Volumes (i.e. without proposed development)



The modelling results using the future base case traffic volumes in Figure 5.2 are summarised in Table 5.3. The full movement summaries are provided in Appendix B.

Table 5.3: 2027 Future Base Weekday Peak Hour Intersection Analysis Results (i.e. without proposed development)

Intersection	Control	Peak Period (Hour)	Average Delay (sec)	Level of Service	95th Percentile Queue Length (m)
Canterbury Road-Mavis Street	Priority	AM Peak	545^	F	114
		PM Peak	396^	F	102
Milperra Road-The River Road-Canterbury Road	Signal	AM Peak	40	C	239
		PM Peak	29	C	258

^ *Excessive delays experienced for right-turn movements to/from Mavis Street. All other turning movements operate at LoS A.*

Table 5.3 indicates that the Milperra Road-The River Road-Canterbury Road intersection would continue to operate at an acceptable LoS (i.e. LoS C) during both peak periods. Additionally, the Canterbury Road-Mavis Street intersection would also continue to operate at LoS F in the future with no proposed development as well. However, the average delay has substantially increased for right-turn movements to/from Mavis Street in the future base case scenario.

5.2.2 2027 Ultimate Future Case (i.e. with development)

5.2.2.1 No Intersection Upgrade Works

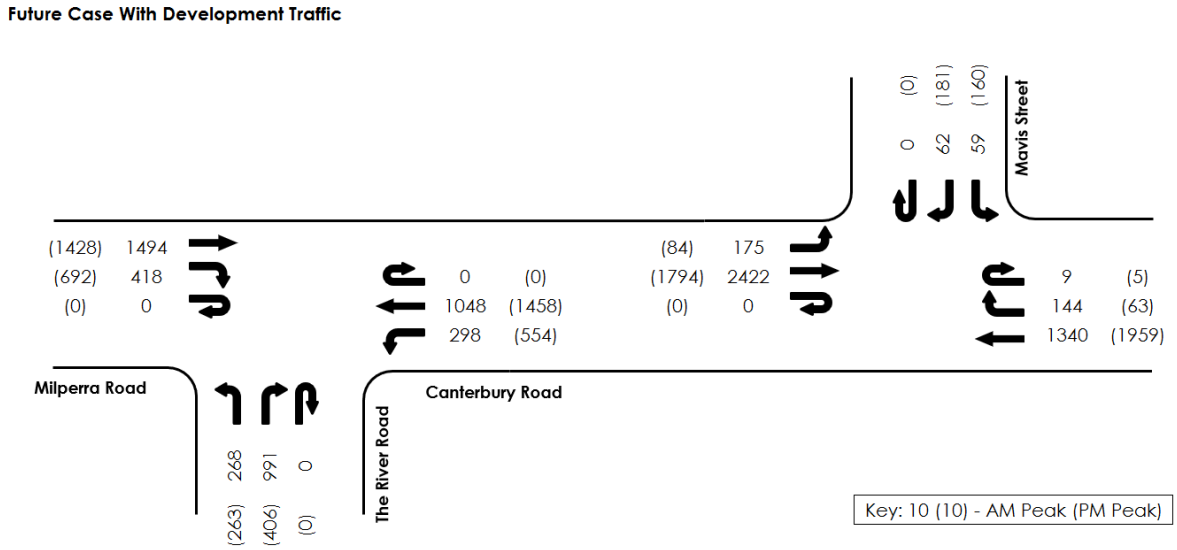
Based on the proposed development traffic volumes outlined in Table 5.1, the proposed development is expected to generate in the order of 277 and 329 two-way trips in the AM and PM Peak hour, respectively.

For the purpose of estimating the traffic impact arising from the proposed development on the surrounding road network, the following inbound and outbound directional splits have been assumed:

- AM Peak – 70% inbound and 30% outbound
- PM Peak – 30% inbound and 70% outbound

On the above basis, the projected traffic volumes in the ultimate future case (i.e. with the proposed development) is shown in Figure 5.2.

Figure 5.2: 2027 Ultimate Future Case Traffic Volumes (i.e. with proposed development)



It should be noted that the existing traffic generation of the site has not been deducted as part of this traffic analysis. As such, a conservative approach has been adopted for the purpose of estimating the traffic impact associated with the proposed development.

The modelling results using the ultimate future case with the proposed development traffic are summarised in Table 5.4. The full movement summaries are provided in Appendix B.

Table 5.4: 2027 Ultimate Future Case Weekday Peak Hour Intersection Analysis Results – (No Upgrade Works – 'Do Nothing')

Intersection	Control	Peak Period (Hour)	Average Delay (sec)	Level of Service	95th Percentile Queue Length (m)
Canterbury Road-Mavis Street	Priority	AM Peak	**2706^**	**F**	**619**
		PM Peak	**2719^**	**F**	**715**
Milperra Road-The River Road-Canterbury Road	Signal	AM Peak	**40**	**C**	**249**
		PM Peak	**29**	**C**	**251**

^ Excessive delays experienced for right-turn movements to/from Mavis Street. All other turning movements operate at LoS A.

Table 5.4 indicates that there would be negligible impacts on the Milperra Road-The River Road-Canterbury Road intersection, which would continue to operate at LoS C in both peak periods. However, excessive queueing and delays would be experienced for right-turn movements to/from Mavis Street at the Canterbury Road-Mavis Street intersection.

5.2.2.2 Proposed Intersection Upgrade Works – Signalisation of Canterbury Road-Mavis Street

As a guide, the Roads and Maritime warrants for a signalised intersection are as follows:

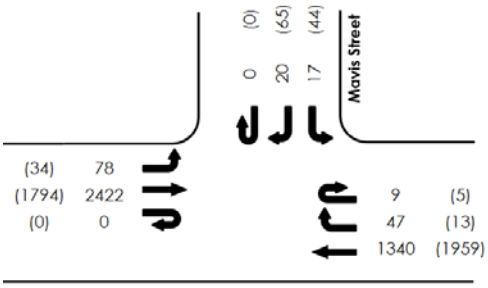
a) Traffic demand:

For each of four one-hour periods of an average day:

i. The **major road** flow exceeds 600 vehicles/hour in each direction; and

ii. The **minor road** flow exceeds 200 vehicles/hour in one direction

The future base case (without the proposed development) and ultimate future case (with the proposed development) traffic volumes are presented in Figure 5.3 and Figure 5.4, respectively.

	Figure 5.3: Without the Development	**Figure 5.4: With the Development**
		
Canterbury Rd (major road)	2422 / 1340 per hour (AM) 1794 / 1959 per hour (PM)	2422 / 1340 per hour (AM) 1794 / 1959 per hour (PM)
Mavis St (minor road)	125 / 37 per hour (AM) 47 / 109 per hour (PM)	319 / 121 per hour (AM) 147 / 341 per hour (PM)

As such, the future projected traffic volumes at the Mavis Street-Canterbury Road intersection are expected to meet the Roads and Maritime warrants for a signalised intersection.

On this basis, it is proposed to provide traffic signals at the Canterbury Road-Mavis Street intersection to ensure that an acceptable intersection performance can be provided in the future years. Notwithstanding this, it should also be noted that the proposed signalisation of the Canterbury Road-Mavis Street intersection would also improve the intersection performance in the future base case, irrespective of the proposed development, as excessive delays are currently experienced to/from Mavis Street.

The traffic modelling results with the proposed signalisation of the Canterbury Road-Mavis Street intersection are summarised in Table 5.5.

Table 5.5: 2027 Ultimate Future Case Weekday Peak Hour Intersection Analysis Results – (Proposed Upgrade Works)

Intersection	Control	Peak Period (Hour)	Average Delay (sec)	Level of Service	95th Percentile Queue Length (m)
Canterbury Road-Mavis Street	New Signal	AM Peak	13	A	245
		PM Peak	50	D	819
Milperra Road-The River Road-Canterbury Road	Signal	AM Peak	35	C	366
		PM Peak	29	C	239

A comparison between the 2017 existing base case, 2027 future base case (do nothing) and 2027 ultimate future case (with upgrade works) is summarised in Table 5.6 overleaf.

Table 5.6: Weekday Peak Hour Intersection Analysis Results Comparison

Intersection	Peak	Existing Base Case		Future Base Case		Ultimate Future Case	
		Ave. Delay (sec)	LoS	Ave. Delay (sec)	LoS	Ave. Delay (sec)	LoS
Canterbury Rd-Mavis St	AM	144^	F	545^	F	13	A
	PM	135^	F	406^	F	50	D
Milperra Rd-The River Rd-Canterbury Rd	AM	37	C	40	C	35	C
	PM	27	B	29	C	29	C

^ *Excessive delays experienced for right-turn movements to/from Mavis Street. All other turning movements operate at LoS A.*

Taking the above into consideration, the proposed signalisation of the Canterbury Road-Mavis Street intersection would significantly improve access to/from Mavis Street, whilst providing an acceptable intersection performance, in the future scenario. Additionally, it should be noted that the traffic modelling results represent a conservative approach as the existing traffic generation of the site has not been deducted as part of this assessment, which could, in theory, generate up to 45 two-way trips[1].

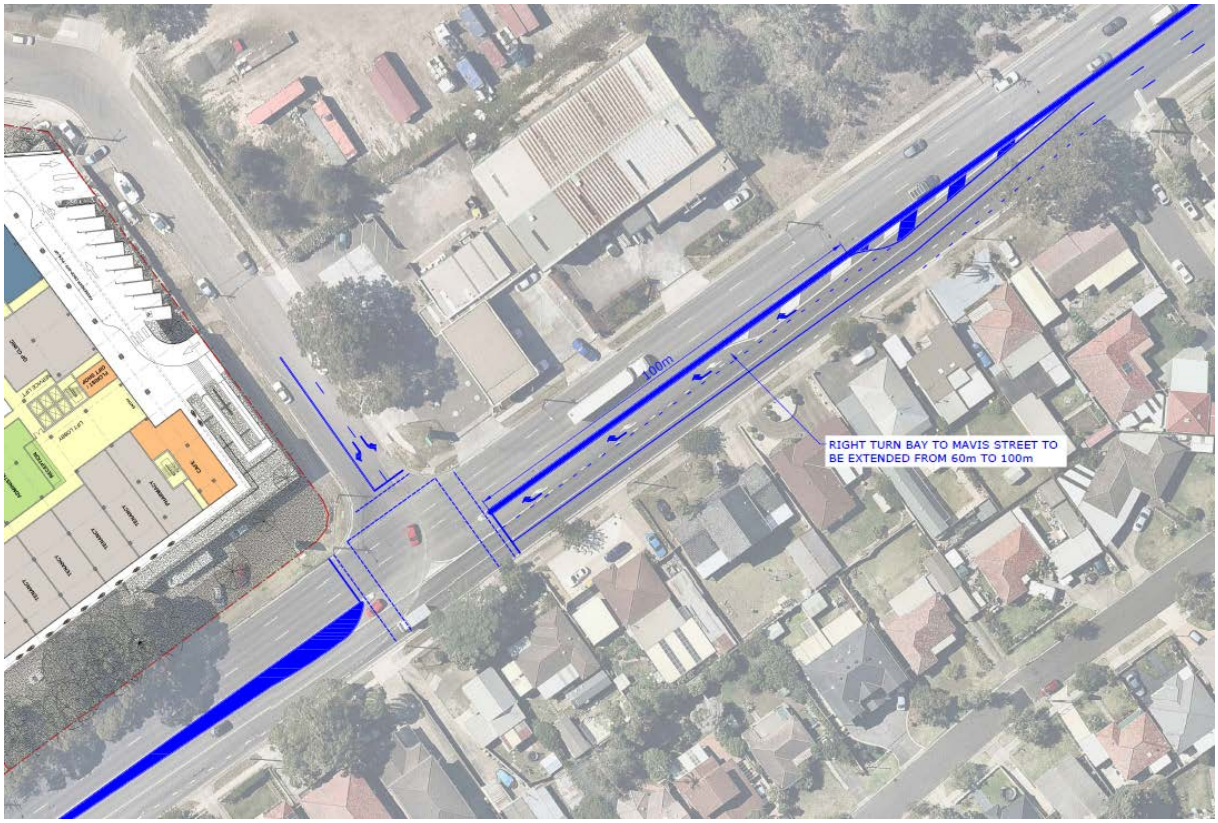
As such, it should be noted that further investigation into the proposed signalisation of Canterbury Road-Mavis Street would be undertaken in consultation with the relevant stakeholders (e.g. RMS, Council and Transport for NSW). It should be noted that additional traffic surveys would also be conducted at the existing site, the Canterbury Road-Claribel Street intersection and at a comparable private hospital site to further refine the traffic generation estimates, as part of the EIS Transport and Accessibility Report submission.

[1] *This estimate is based on the existing site area of 9,000m² (plus existing FSR 1:1) and the Roads and Maritime trip rate for warehouse land uses of '0.5 trips per 100m² GFA', as per the Roads and Maritime Guide. The trip generation rate for the existing site may in fact be higher as retailing is currently permitted from the site.*

Traffic comments / "in-principle" support has been sought from the Roads and Maritime for the proposed signalisation of the Canterbury Road-Mavis Street intersection. It should be noted that the traffic modelling has since been updated since this correspondence to consider future background growth. This correspondence with Roads and Maritime is appended in Appendix C for reference. It is noted that TTPP are currently awaiting a response from Roads and Maritime.

Notwithstanding this, the proposed concept layout for the signalisation of the Canterbury Road-Mavis Street intersection is shown in Figure 5.5.

Figure 5.5: Proposed Signalisation of the Canterbury Road-Mavis Street Intersection



Basemap Source: Nearmap

Based on the above, the proposed signalisation of the Mavis Street-Canterbury Road intersection will operate at LoS A and D in the AM and PM Peak, respectively, with some increased delays and queues along Canterbury Road. However, the proposal would offer the following benefits:

- improved pedestrian safety as a dedicated signalised pedestrian crossing could be provided on all legs of the intersection (particularly favourable to improve public transport accessibility to/from key bus stop locations)
- traffic signals are generally more favourable to manage unequal distributions of incoming traffic and congested traffic conditions, which may be the case as a result of future development and expansion of the area.

In addition to the proposed signalisation of the Canterbury Road-Mavis Street intersection, transport management measures should be implemented as part of the proposed development, such as a green travel plan, to minimise the traffic impact arising from the proposal. These transport management measures would target staff and employees to promote the use of more sustainable modes of travel (i.e. walking, cycling and public transport) and consequently, reduce vehicle trips to/from the development site and improve overall intersection performance at key surrounding intersections.

6 Transport Management Measures

6.1 Green Travel Plans

The key role of a Green Travel Plan (GTP) is to bring about better transport arrangements to manage travel demands, particularly promoting more sustainable modes of travel, modes which have a low environmental impact such as walking, cycling, public transport and better management of car use.

It is envisaged that any approval of the proposed development would include a condition of consent requiring a GTP to be prepared to promote sustainable travel. This GTP would be prepared to mainly target the staff of the proposed development. This section provides a framework for the implementation of such a travel plan, noting that the full GTP document will be provided at a later stage.

6.2 What is Green Travel Plan (GTP)?

The transport sector is a large contributor of Australia's energy-related greenhouse gas emissions through fossil fuels such as petrol, oil, diesel and gas. Whilst transport is a necessary part of life, the effects can be managed through the implementation of a travel plan.

A GTP is a package of coordinated strategies and measures to promote and encourage sustainable travel, such as walking, cycling and public transport etc. Such plans aim to influence the way people move to/from a business, residential complex or any other organisation to deliver better environmental outcomes and provide a range of travel choices, whilst also reducing the reliance on private car usage, particularly single occupancy car trips.

The planning of the new development would need to accommodate innovative ideas to better manage the transport demand of the project. It will be necessary to introduce new measures to ensure that trips generated by the proposed development are not solely private car based, particularly single occupancy trips.

6.3 Monitoring of the GTP

Whilst there is no standard methodology for monitoring of GTP, it is recommended that the GTP be monitored on a regularly basis to ensure that the desired benefits are achieved or otherwise, suitable measures be implemented to reduce private car usage (particularly single car occupancy trips). At this early stage, it is not possible to identify what additional modifications may be required to reach the desired outcomes of the GTP as this would be dependent upon the particular circumstances at the time.

Thus, it is recommended that the GTP be monitored on a regularly basis, e.g. yearly, through travel surveys or similar. Travel surveys would show how staff/visitors travel to/from the site and assist identify whether the proposed initiatives and measures outlined in the GTP are effective or are required to be replaced or modified to ensure that the best outcomes are achieved. Regular consultation would also be beneficial to help understand people's reasons for travelling the way they do and help identify any potential barriers to change their travel behaviours.

In order to ensure successful implementation of the GTP, a Travel Plan Coordinator (TPC) or management should be appointed to oversee the measures and resultant impacts of the GTP.

7 Conclusion

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

- The Planning Proposal seeks to amend the current planning controls to permit a maximum FSR of 2.9:1 to provide a 251-bed private hospital and associated ancillary clinical facilities with a total gross floor area (GFA) of some 25,000m^2.
- It is proposed to provide a basement car park, containing some 433 car parking spaces, with access off Mavis Street. This provision of parking satisfies the recommended car parking rates set out in the Roads and Maritime Guide, noting that Council does not specify any car parking rates for private hospital developments. Additionally, appropriate allocation of loading, drop-off/pick-up and bicycle facilities will be provided.
- The car park layout and associated elements are proposed to be designed in accordance with the design requirements as set out in the relevant Australian Standards.
- All vehicular access points are proposed to be provided off Mavis Street. The existing vehicle access on Canterbury Road will be removed as part of the proposed development.
- The proposed development is anticipated to generate up to 270 and 329 two-way vehicle movements in the morning and afternoon peak hours, respectively.
- At present, excessive delays are currently experienced for right-turn movements to/from Mavis Street during peak periods, which is not unusual for side streets located on a main road (i.e. Canterbury Road). However, delays are expected to be significantly increased in the future, irrespectively of the proposed development and as such, should be upgraded to improve movements to/from Mavis Street.
- Traffic modelling results indicated that the existing priority controlled, seagull Canterbury Road-Mavis Street intersection would need to be upgraded to provide an acceptable intersection performance in the future with traffic generated by the proposed private hospital.
- The Roads and Maritime warrants for traffic signals will be satisfied with the traffic generated by the proposed private development.
- The proposed signalisation of the Canterbury Road-Mavis Street intersection would result in the intersection performing at LoS A and D in the morning and evening peak, respectively, in Year 2027 with traffic generated by the proposed development. Furthermore, the proposal would improve access to/from Mavis Street and pedestrian crossing opportunities.
- The traffic modelling will be further refined as part of the EIS Transport and Accessibility Report submission, with additional traffic surveys undertaken, including at the existing site,

other surrounding intersections and at a comparably private hospital site, to update the traffic model and assessment accordingly.

Overall, it is concluded that the traffic and parking aspects of the proposed development could be satisfactorily accommodated on the surrounding road network.

Appendix A

Architectural Layout Plans

Adminstration
Circulation
Common Areas
Hospital
Pool
Retail
Services
Tenancy

NOTE

All dimensions to be verified prior to commencement of any shop drawings or fabrication. shop drawings are to be approved before construction. all dimensions are in millimeters unless otherwise noted. Annotated dimensions are to be used in preference to scaling from drawings.

LEGEND

rev	date	amendment
	11.01.2018	Preliminary
	11.08.2017	Issued to CQI
	09.08.2017	Preliminary
	04.08.2017	Preliminary

REVISION

ANTHONY VAVAYIS +ASSOCIATES
ARCHITECTS DESIGNERS PLANNERS

24 LIME STREET KING STREET WHARF
SYDNEY NSW 2000
E: admin@avaarchitects.com.au T: 02 9290 1810
F: 02 9290 1860 W: www.avaarchitects.com.au

P: 20/26A LIME STREET KING STREET WHARF
SYDNEY NSW 2000
ANTHONY VAVAYIS & ASSOCIATES PTY. LTD.
ACN 069 737 935
NOMINATED ARCHITECT - ANTHONY VAVAYIS NO.5243

PROJECT TITLE
Canterbury Bankstown Private Hospital
297-299 Canterbury Road
Revesby NSW

CLIENT
Owner

DRAWING TITLE
Ground Level

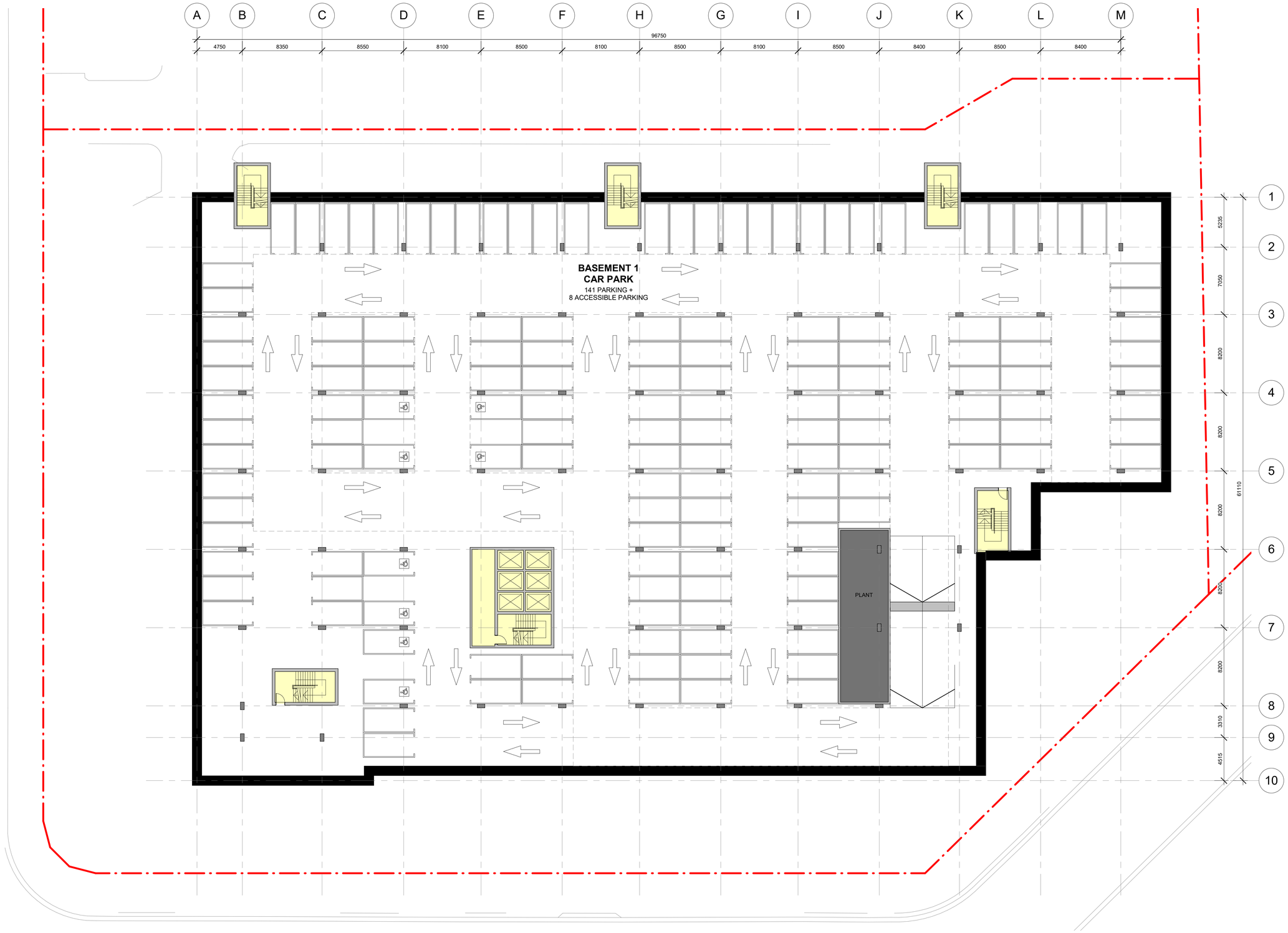
SCALE @ A1 1 : 200 **DATE** JULY 2017
DRAWN BY DK **PROJECT** 17018

P2010

NOTE
All dimensions to be verified prior to commencement of any shop drawings or fabrication. shop drawings are to be approved before construction. all dimensions are in millimeters unless otherwise noted. Annotated dimensions are to be used in preference to scaling from drawings.

LEGEND

Car Park
Circulation
Services



rev	date	amendment
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REVISION

ANTHONY VAVAYIS +ASSOCIATES
ARCHITECTS DESIGNERS PLANNERS

24 LIME STREET KING STREET WHARF
SYDNEY NSW 2000
E: admin@avaarchitects.com.au T: 02 9290 1910
F: 02 9290 1860 W: www.avaarchitects.com.au

P: 20/26A LIME STREET KING STREET WHARF
SYDNEY NSW 2000
ANTHONY VAVAYIS & ASSOCIATES PTY. LTD.
ACN 069 737 935
NOMINATED ARCHITECT - ANTHONY VAVAYIS NO.5243

PROJECT TITLE
Canterbury Bankstown Private Hospital
297-299 Canterbury Road
Revesby NSW

CLIENT
Owner

DRAWING TITLE
Basement 01

SCALE @ A1 1 : 200 **DATE** JULY 2017
DRAWN BY DK **PROJECT** 17018

P2009

LEGEND

- Car Park
- Circulation
- Pathology
- Services

1 P2008_Basement 02

1 : 200

rev	date	amendment
	11.01.2018	Preliminary
	11.08.2017	Issued to CGI
	09.08.2017	Preliminary
	04.08.2017	Preliminary

REVISION

ANTHONY VAVAYIS +ASSOCIATES
ARCHITECTS DESIGNERS PLANNERS

24 LIME STREET KING STREET WHARF
SYDNEY NSW 2000
E: admin@avaarchitects.com.au T: 02 9290 1910
F: 02 9290 1860 W: www.avaarchitects.com.au

P: 20/26A LIME STREET KING STREET WHARF
SYDNEY NSW 2000
ANTHONY VAVAYIS & ASSOCIATES PTY. LTD.
ACN 069 737 935
NOMINATED ARCHITECT - ANTHONY VAVAYIS NO.5243

PROJECT TITLE
Canterbury Bankstown Private Hospital
297-299 Canterbury Road
Revesby NSW

CLIENT
Owner

DRAWING TITLE
Basement 02

SCALE @ A1 1 : 200 **DATE** JULY 2017

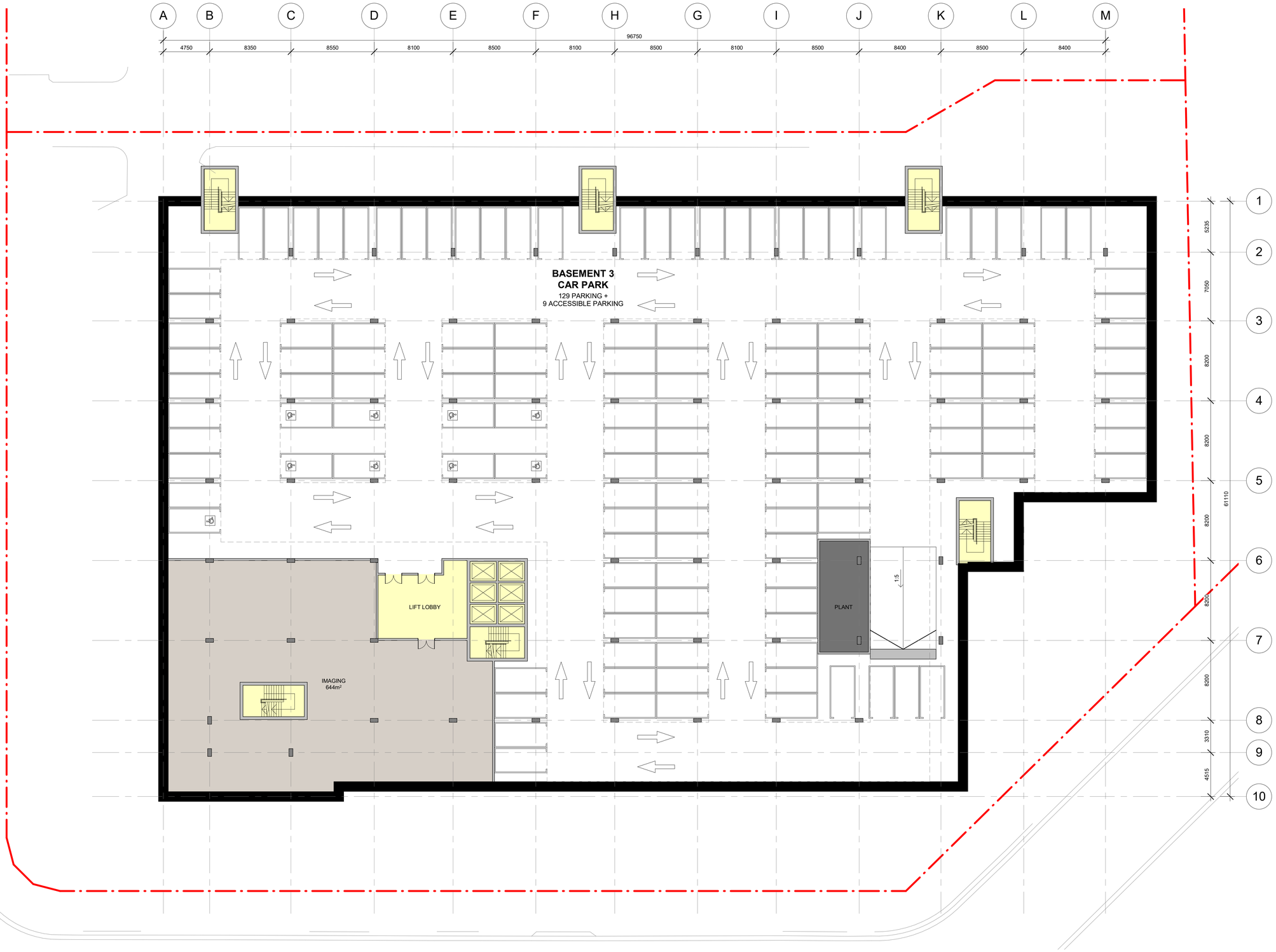
DRAWN BY DK **PROJECT** 17018

P2008

NOTE
All dimensions to be verified prior to commencement of any shop drawings or fabrication. shop drawings are to be approved before construction. all dimensions are in millimeters unless otherwise noted. Annotated dimensions are to be used in preference to scaling from drawings.

LEGEND

- Car Park
- Circulation
- Imaging
- Services



rev	date	amendment
	11.01.2018	Preliminary
	11.08.2017	Issued to CGI
	09.08.2017	Preliminary
	04.08.2017	Preliminary

REVISION

ANTHONY VAVAYIS +ASSOCIATES
ARCHITECTS DESIGNERS PLANNERS

24 LIME STREET KING STREET WHARF
SYDNEY NSW 2000
E: admin@avaarchitects.com.au T: 02 9290 1910
F: 02 9290 1860 W: www.avaarchitects.com.au

P: 20/26A LIME STREET KING STREET WHARF
SYDNEY NSW 2000
ANTHONY VAVAYIS & ASSOCIATES PTY. LTD.
ACN 069 737 935
NOMINATED ARCHITECT - ANTHONY VAVAYIS NO.5243

PROJECT TITLE
Canterbury Bankstown Private Hospital
297-299 Canterbury Road
Revesby NSW

CLIENT
Owner

DRAWING TITLE
Basement 03

SCALE @ A1 1 : 200 **DATE** JULY 2017
DRAWN BY DK **PROJECT** 17018

P2007

Appendix B

SIDRA Network Analysis Results

ttpp transport planning

2017 Existing Base Case

MOVEMENT SUMMARY

Site: 101 [Milperra Road - The River Road - Ex AM]

Network: N101 [Canterbury Road Network - Ex AM]

New Site
Signals - Fixed Time Coordinated Cycle Time = 140 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: The River Road													
1	L2	282	14.6	282	14.6	0.615	32.4	LOS C	31.1	232.9	0.78	0.83	38.1
3	R2	982	3.2	982	3.2	0.615	33.8	LOS C	31.1	232.9	0.79	0.83	28.8
Approach		1264	5.7	1264	5.7	0.615	33.5	LOS C	31.1	232.9	0.79	0.83	31.6
East: Canterbury Road													
4	L2	287	10.6	287	10.6	0.251	11.9	LOS A	4.6	35.2	0.44	0.72	47.0
5	T1	961	13.9	961	13.9	0.774	55.5	LOS D	24.9	195.4	0.98	0.87	28.3
Approach		1248	13.2	1248	13.2	0.774	45.5	LOS D	24.9	195.4	0.85	0.84	31.1
West: Milperra Road													
11	T1	1356	11.7	1356	11.7	0.566	30.8	LOS C	22.8	175.4	0.80	0.71	32.4
12	R2	440	8.1	440	8.1	0.712	44.8	LOS D	10.3	76.9	0.95	0.87	35.5
Approach		1796	10.8	1796	10.8	0.712	34.2	LOS C	22.8	175.4	0.84	0.75	33.6
All Vehicles		4308	10.0	4308	10.0	0.774	37.3	LOS C	31.1	232.9	0.83	0.80	32.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %
Number of Iterations: 6 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	64.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Organisation: TTPP - THE TRANSPORT PLANNING PARTNERSHIP | Processed: Tuesday, 30 January 2018 9:44:32 AM
Project: X:\17163 Canterbury-Bankstown Private Hospital - No.297 Canterbury Rd, Revesby\07 Modelling Files\17163sid_180130.sip7

MOVEMENT SUMMARY

Site: 101 [Canterbury Road - Mavis St (A) - Ex AM]

Network: N101 [Canterbury Road Network - Ex AM]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Canterbury Road													
6	R2	49	8.5	49	8.5	0.804	135.2	LOS F	3.5	26.0	0.99	1.15	18.7
6u	U	9	0.0	9	0.0	0.804	123.3	LOS F	3.5	26.0	0.99	1.15	19.5
Approach		59	7.1	59	7.1	0.804	133.3	NA	3.5	26.0	0.99	1.15	18.8
North: Mavis St													
7	L2	18	29.4	18	29.4	0.048	13.5	LOS A	0.2	1.6	0.66	0.79	41.7
8	T1	21	20.0	21	20.0	0.525	142.3	LOS F	1.6	13.4	0.98	1.05	10.4
Approach		39	24.3	39	24.3	0.525	83.1	LOS F	1.6	13.4	0.83	0.93	19.6
West: Canterbury Road													
10	L2	82	14.1	82	14.1	0.422	6.6	LOS A	0.0	0.0	0.00	0.07	58.1
11	T1	2256	7.9	2256	7.9	0.422	0.0	LOS A	0.0	0.0	0.00	0.02	69.5
Approach		2338	8.1	2338	8.1	0.422	0.3	NA	0.0	0.0	0.00	0.02	69.0
All Vehicles		2436	8.4	2436	8.4	0.804	4.8	NA	3.5	26.0	0.04	0.06	61.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %
Number of Iterations: 6 (maximum specified: 10)

MOVEMENT SUMMARY

Site: 101 [Canterbury Road - Mavis St (B) - Ex AM]

Network: N101 [Canterbury Road Network - Ex AM]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Canterbury Road													
5	T1	1248	13.2	1248	13.2	0.347	0.0	LOS A	0.0	0.0	0.00	0.00	69.9
Approach		1248	13.2	1248	13.2	0.347	0.0	NA	0.0	0.0	0.00	0.00	69.9
North: Median													
9	R2	21	20.0	21	20.0	0.013	2.0	LOS A	0.0	0.0	0.00	0.50	19.2
Approach		21	20.0	21	20.0	0.013	2.0	LOS A	0.0	0.0	0.00	0.50	19.2
All Vehicles		1269	13.3	1269	13.3	0.347	0.1	NA	0.0	0.0	0.00	0.01	69.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %
Number of Iterations: 6 (maximum specified: 10)

MOVEMENT SUMMARY

Site: 101 [Milperra Road - The River Road - Ex PM]

Network: N101 [Canterbury Road Network - Ex PM]

New Site
Signals - Fixed Time Coordinated Cycle Time = 130 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: The River Road													
1	L2	277	14.8	277	14.8	0.673	49.3	LOS D	21.6	166.7	0.94	0.85	32.4
3	R2	396	4.8	396	4.8	0.673	55.4	LOS D	21.6	166.7	0.97	0.84	21.7
Approach		673	8.9	673	8.9	0.673	52.9	LOS D	21.6	166.7	0.96	0.84	26.8
East: Canterbury Road													
4	L2	511	3.5	511	3.5	0.664	18.3	LOS B	11.3	81.2	0.73	0.81	42.4
5	T1	1315	8.4	1315	8.4	0.695	37.6	LOS C	29.5	221.3	0.90	0.79	35.0
Approach		1825	7.0	1825	7.0	0.695	32.2	LOS C	29.5	221.3	0.85	0.79	36.8
West: Milperra Road													
11	T1	1312	5.5	1312	5.5	0.412	8.3	LOS A	11.3	82.8	0.45	0.40	53.3
12	R2	728	3.8	728	3.8	0.784	26.4	LOS B	11.2	81.1	0.83	0.85	43.3
Approach		2040	4.9	2040	4.9	0.784	14.8	LOS B	11.3	82.8	0.58	0.56	47.6
All Vehicles		4538	6.3	4538	6.3	0.784	27.4	LOS B	29.5	221.3	0.75	0.70	38.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.8 %
Number of Iterations: 6 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Pedestrian Back of Queue	Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
All Pedestrians		105	59.3	LOS E			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Canterbury Road - Mavis St (A) - Ex PM]

Network: N101 [Canterbury Road Network - Ex PM]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Canterbury Road													
6	R2	14	23.1	14	23.1	0.373	112.7	LOS F	1.2	9.7	0.97	1.02	21.9
6u	U	5	0.0	5	0.0	0.373	80.5	LOS F	1.2	9.7	0.97	1.02	23.1
Approach		19	16.7	19	16.7	0.373	103.8	NA	1.2	9.7	0.97	1.02	22.3
North: Mavis St													
7	L2	46	6.8	46	6.8	0.070	8.3	LOS A	0.3	2.1	0.54	0.70	48.2
8	T1	68	4.6	68	4.6	0.828	114.1	LOS F	3.9	28.4	0.99	1.26	12.3
Approach		115	5.5	115	5.5	0.828	71.4	LOS F	3.9	28.4	0.81	1.03	21.4
West: Canterbury Road													
10	L2	36	32.4	36	32.4	0.302	6.8	LOS A	0.0	0.0	0.00	0.04	52.0
11	T1	1672	4.7	1672	4.7	0.302	0.0	LOS A	0.0	0.0	0.00	0.01	69.7
Approach		1707	5.3	1707	5.3	0.302	0.2	NA	0.0	0.0	0.00	0.01	69.2
All Vehicles		1841	5.4	1841	5.4	0.828	5.7	NA	3.9	28.4	0.06	0.09	59.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.8 %
Number of Iterations: 6 (maximum specified: 10)

MOVEMENT SUMMARY

Site: 101 [Canterbury Road - Mavis St (B) - Ex PM]

Network: N101 [Canterbury Road Network - Ex PM]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Canterbury Road													
5	T1	1825	7.0	1825	7.0	0.525	0.1	LOS A	0.0	0.0	0.00	0.00	69.7
Approach		1825	7.0	1825	7.0	0.525	0.1	NA	0.0	0.0	0.00	0.00	69.7
North: Median													
9	R2	68	4.6	68	4.6	0.038	2.0	LOS A	0.0	0.0	0.00	0.51	19.2
Approach		68	4.6	68	4.6	0.038	2.0	LOS A	0.0	0.0	0.00	0.51	19.2
All Vehicles		1894	6.9	1894	6.9	0.525	0.2	NA	0.0	0.0	0.00	0.02	69.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.8 %
Number of Iterations: 6 (maximum specified: 10)

ttpp transport planning

2027 Future Base Case

MOVEMENT SUMMARY

Site: 101 [Milperra Road - The River Road - FB AM]

Network: N101 [Canterbury Road Network - FB AM]

New Site
Signals - Fixed Time Coordinated Cycle Time = 140 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: The River Road													
1	L2	282	14.6	282	14.6	0.615	32.4	LOS C	31.1	232.9	0.78	0.83	38.1
3	R2	982	3.2	982	3.2	0.615	33.8	LOS C	31.1	232.9	0.79	0.83	28.8
Approach		1264	5.7	1264	5.7	0.615	33.5	LOS C	31.1	232.9	0.79	0.83	31.6
East: Canterbury Road													
4	L2	287	10.6	287	10.6	0.251	11.9	LOS A	4.6	35.2	0.44	0.72	47.0
5	T1	1086	12.3	1086	12.3	0.867	63.4	LOS E	30.9	239.3	0.98	0.96	26.1
Approach		1374	12.0	1374	12.0	0.867	52.6	LOS D	30.9	239.3	0.87	0.91	28.7
West: Milperra Road													
11	T1	1482	10.7	1482	10.7	0.615	31.7	LOS C	25.6	196.0	0.82	0.73	31.9
12	R2	440	8.1	440	8.1	0.738	46.8	LOS D	10.4	78.0	0.97	0.89	34.9
Approach		1922	10.1	1922	10.1	0.738	35.2	LOS C	25.6	196.0	0.86	0.77	32.9
All Vehicles		4560	9.5	4560	9.5	0.867	40.0	LOS C	31.1	239.3	0.84	0.83	31.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.0 %
Number of Iterations: 9 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	South Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	64.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Canterbury Road - Mavis St (A) - FB AM]

Network: N101 [Canterbury Road Network - FB AM]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Canterbury Road													
6	R2	49	8.5	49	8.5	1.401	544.8	LOS F	15.4	114.2	1.00	1.71	5.8
6u	U	9	0.0	9	0.0	1.401	529.1	LOS F	15.4	114.2	1.00	1.71	5.9
Approach		59	7.1	59	7.1	1.401	542.3	NA	15.4	114.2	1.00	1.71	5.8
North: Mavis St													
7	L2	18	29.4	18	29.4	0.059	16.2	LOS B	0.2	1.9	0.72	0.87	40.4
8	T1	21	20.0	21	20.0	0.991	451.1	LOS F	3.9	32.1	1.00	1.21	3.8
Approach		39	24.3	39	24.3	0.991	251.3	LOS F	3.9	32.1	0.87	1.05	8.8
West: Canterbury Road													
10	L2	82	14.1	82	14.1	0.472	6.6	LOS A	0.0	0.0	0.00	0.06	58.2
11	T1	2549	7.0	2549	7.0	0.472	0.0	LOS A	0.0	0.0	0.00	0.02	69.5
Approach		2632	7.2	2632	7.2	0.472	0.2	NA	0.0	0.0	0.00	0.02	69.1
All Vehicles		2729	7.5	2729	7.5	1.401	15.5	NA	15.4	114.2	0.03	0.07	48.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.0 %
Number of Iterations: 9 (maximum specified: 10)

MOVEMENT SUMMARY

Site: 101 [Canterbury Road - Mavis St (B) - FB AM]

Network: N101 [Canterbury Road Network - FB AM]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Canterbury Road													
5	T1	1411	11.6	1411	11.6	0.452	0.1	LOS A	0.0	0.0	0.00	0.00	69.8
Approach		1411	11.6	1411	11.6	0.452	0.1	NA	0.0	0.0	0.00	0.00	69.8
North: Median													
9	R2	21	20.0	21	20.0	0.013	2.0	LOS A	0.0	0.0	0.00	0.50	19.2
Approach		21	20.0	21	20.0	0.013	2.0	LOS A	0.0	0.0	0.00	0.50	19.2
All Vehicles		1432	11.8	1432	11.8	0.452	0.1	NA	0.0	0.0	0.00	0.01	69.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.0 %
Number of Iterations: 9 (maximum specified: 10)

MOVEMENT SUMMARY

Site: 101 [Milperra Road - The River Road - FB PM]

Network: N101 [Canterbury Road Network - FB PM]

New Site
Signals - Fixed Time Coordinated Cycle Time = 130 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: The River Road													
1	L2	277	14.8	277	14.8	0.673	49.3	LOS D	21.6	166.7	0.94	0.85	32.4
3	R2	396	4.8	396	4.8	0.673	55.4	LOS D	21.6	166.7	0.97	0.84	21.7
Approach		673	8.9	673	8.9	0.673	52.9	LOS D	21.6	166.7	0.96	0.84	26.8
East: Canterbury Road													
4	L2	511	3.5	507	3.5	0.670	18.3	LOS B	11.2	80.4	0.73	0.80	42.5
5	T1	1485	7.4	1475	7.5	0.778	39.8	LOS C	34.6	257.7	0.93	0.83	34.0
Approach		1996	6.4	1982 N1	6.4	0.778	34.3	LOS C	34.6	257.7	0.88	0.83	35.8
West: Milperra Road													
11	T1	1482	4.8	1482	4.8	0.464	8.7	LOS A	13.5	98.2	0.47	0.43	52.7
12	R2	728	3.8	728	3.8	0.826	32.3	LOS C	13.2	95.1	0.86	0.88	40.5
Approach		2211	4.5	2211	4.5	0.826	16.5	LOS B	13.5	98.2	0.60	0.58	45.9
All Vehicles		4879	5.9	4865 N1	5.9	0.826	28.8	LOS C	34.6	257.7	0.76	0.72	37.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.1 %
Number of Iterations: 10 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
All Pedestrians		105	59.3	LOS E			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Canterbury Road - Mavis St (A) - FB PM]

Network: N101 [Canterbury Road Network - FB PM]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Canterbury Road													
6	R2	14	23.1	14	23.1	0.616	231.1	LOS F	2.0	16.1	0.99	1.05	13.2
6u	U	5	0.0	5	0.0	0.616	174.1	LOS F	2.0	16.1	0.99	1.05	13.6
Approach		19	16.7	19	16.7	0.616	215.3	NA	2.0	16.1	0.99	1.05	13.3
North: Mavis St													
7	L2	46	6.8	46	6.8	0.078	9.2	LOS A	0.3	2.3	0.58	0.74	47.7
8	T1	68	4.6	68	4.6	1.269	393.7	LOS F	14.0	101.8	1.00	1.94	4.2
Approach		115	5.5	115	5.5	1.269	238.5	LOS F	14.0	101.8	0.83	1.46	8.7
West: Canterbury Road													
10	L2	36	32.4	36	32.4	0.339	6.8	LOS A	0.0	0.0	0.00	0.03	52.1
11	T1	1888	4.2	1888	4.2	0.339	0.0	LOS A	0.0	0.0	0.00	0.01	69.7
Approach		1924	4.7	1924	4.7	0.339	0.1	NA	0.0	0.0	0.00	0.01	69.3
All Vehicles		2058	4.9	2058	4.9	1.269	15.4	NA	14.0	101.8	0.06	0.10	48.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.1 %
Number of Iterations: 10 (maximum specified: 10)

MOVEMENT SUMMARY

Site: 101 [Canterbury Road - Mavis St (B) - FB PM]

Network: N101 [Canterbury Road Network - FB PM]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Canterbury Road													
5	T1	2062	6.2	2062	6.2	0.692	0.2	LOS A	0.0	0.0	0.00	0.00	69.4
Approach		2062	6.2	2062	6.2	0.692	0.2	NA	0.0	0.0	0.00	0.00	69.4
North: Median													
9	R2	68	4.6	54	4.6	0.030	2.0	LOS A	0.0	0.0	0.00	0.51	19.2
Approach		68	4.6	54[N1]	4.6	0.030	2.0	LOS A	0.0	0.0	0.00	0.51	19.2
All Vehicles		2131	6.2	2116[N1]	6.2	0.692	0.3	NA	0.0	0.0	0.00	0.01	69.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.1 %
Number of Iterations: 10 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

2027 Ultimate Future Case

No Upgrades - 'Do Nothing'

MOVEMENT SUMMARY

Site: 101 [Milperra Road - The River Road - UF AM (No Upgrades)]

Network: N101 [Canterbury Road Network - UF AM (No Upgrades)]

New Site
Signals - Fixed Time Coordinated Cycle Time = 140 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: The River Road													
1	L2	282	14.6	282	14.6	0.644	33.0	LOS C	33.3	248.6	0.80	0.84	37.9
3	R2	1043	3.0	1043	3.0	0.644	34.4	LOS C	33.3	248.6	0.81	0.84	28.6
Approach		1325	5.5	1325	5.5	0.644	34.1	LOS C	33.3	248.6	0.81	0.84	31.2
East: Canterbury Road													
4	L2	314	9.7	304	9.9	0.264	12.0	LOS A	4.9	37.4	0.44	0.72	47.0
5	T1	1103	12.1	1070	12.3	0.859	62.4	LOS E	30.3	234.6	0.98	0.95	26.3
Approach		1417	11.6	1375[N1]	11.7	0.859	51.2	LOS D	30.3	234.6	0.86	0.90	29.2
West: Milperra Road													
11	T1	1573	10.1	1573	10.1	0.650	32.4	LOS C	27.8	211.6	0.84	0.75	31.5
12	R2	440	8.1	440	8.1	0.736	46.7	LOS D	10.4	77.9	0.97	0.89	34.9
Approach		2013	9.7	2013	9.7	0.736	35.6	LOS C	27.8	211.6	0.87	0.78	32.6
All Vehicles		4755	9.1	4712[N1]	9.2	0.859	39.7	LOS C	33.3	248.6	0.85	0.83	31.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.0 %
Number of Iterations: 7 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	64.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Organisation: TTPP - THE TRANSPORT PLANNING PARTNERSHIP | Processed: Tuesday, 30 January 2018 9:46:13 AM
Project: X:\17163 Canterbury-Bankstown Private Hospital - No.297 Canterbury Rd, Revesby\07 Modelling Files\17163sid_180130.sip7

MOVEMENT SUMMARY

▽ Site: 101 [Canterbury Road - Mavis St (A) - UF AM (No Upgrades)]

Network: N101 [Canterbury Road Network - UF AM (No Upgrades)]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Canterbury Road													
6	R2	152	2.8	152	2.8	3.929	2706.1	LOS F	86.5	619.1	1.00	2.59	1.3
6u	U	9	0.0	9	0.0	3.929	2701.3	LOS F	86.5	619.1	1.00	2.59	1.3
Approach		161	2.6	161	2.6	3.929	2705.8	NA	86.5	619.1	1.00	2.59	1.3
North: Mavis St													
7	L2	62	8.5	62	8.5	0.146	12.6	LOS A	0.6	4.5	0.67	0.84	45.4
8	T1	65	6.5	65	6.5	3.088	2028.3	LOS F	35.9	265.5	1.00	2.05	0.9
Approach		127	7.4	127	7.4	3.088	1045.4	LOS F	35.9	265.5	0.84	1.46	2.4
West: Canterbury Road													
10	L2	184	6.3	184	6.3	0.490	6.5	LOS A	0.0	0.0	0.00	0.13	60.4
11	T1	2549	7.0	2549	7.0	0.490	0.0	LOS A	0.0	0.0	0.00	0.04	69.1
Approach		2734	7.0	2734	7.0	0.490	0.5	NA	0.0	0.0	0.00	0.04	68.4
All Vehicles		3022	6.8	3022	6.8	3.929	188.7	NA	86.5	619.1	0.09	0.24	11.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.0 %
Number of Iterations: 7 (maximum specified: 10)

MOVEMENT SUMMARY

▽ Site: 101 [Canterbury Road - Mavis St (B) - UF AM (No Upgrades)]

Network: N101 [Canterbury Road Network - UF AM (No Upgrades)]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Canterbury Road													
5	T1	1411	11.6	1411	11.6	0.442	0.1	LOS A	0.0	0.0	0.00	0.00	69.8
Approach		1411	11.6	1411	11.6	0.442	0.1	NA	0.0	0.0	0.00	0.00	69.8
North: Median													
9	R2	65	6.5	21	6.5	0.012	2.0	LOS A	0.0	0.0	0.00	0.51	19.2
Approach		65	6.5	21[N1]	6.5	0.012	2.0	LOS A	0.0	0.0	0.00	0.51	19.2
All Vehicles		1476	11.4	1432[N1]	11.8	0.442	0.1	NA	0.0	0.0	0.00	0.01	69.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.0 %
Number of Iterations: 7 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 101 [Milperra Road - The River Road - UF PM (No Upgrades)]

Network: N101 [Canterbury Road Network - UF PM (No Upgrades)]

New Site
Signals - Fixed Time Coordinated Cycle Time = 130 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: The River Road													
1	L2	277	14.8	277	14.8	0.715	51.3	LOS D	22.9	176.0	0.96	0.86	31.8
3	R2	427	4.4	427	4.4	0.715	56.5	LOS E	22.9	176.0	0.98	0.85	21.4
Approach		704	8.5	704	8.5	0.715	54.5	LOS D	22.9	176.0	0.98	0.85	26.2
East: Canterbury Road													
4	L2	583	3.1	546	3.2	0.715	18.6	LOS B	12.4	88.9	0.75	0.81	42.2
5	T1	1535	7.2	1439	7.5	0.764	39.4	LOS C	33.7	251.1	0.92	0.83	34.2
Approach		2118	6.1	1984 N1	6.4	0.764	33.7	LOS C	33.7	251.1	0.88	0.82	36.1
West: Milperra Road													
11	T1	1503	4.8	1503	4.8	0.470	8.8	LOS A	13.8	100.2	0.47	0.43	52.6
12	R2	728	3.8	728	3.8	0.823	31.9	LOS C	13.0	94.2	0.86	0.88	40.7
Approach		2232	4.4	2232	4.4	0.823	16.3	LOS B	13.8	100.2	0.60	0.58	46.0
All Vehicles		5054	5.7	4920 N1	5.8	0.823	28.8	LOS C	33.7	251.1	0.77	0.72	37.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.9 %
Number of Iterations: 9 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Pedestrian Back of Queue ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
All Pedestrians		105	59.3	LOS E			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Canterbury Road - Mavis St (A) - UF PM (No Upgrades)]

Network: N101 [Canterbury Road Network - UF PM (No Upgrades)]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Canterbury Road													
6	R2	66	4.8	66	4.8	1.942	987.5	LOS F	28.0	203.1	1.00	1.96	3.3
6u	U	5	0.0	5	0.0	1.942	976.3	LOS F	28.0	203.1	1.00	1.96	3.4
Approach		72	4.4	72	4.4	1.942	986.7	NA	28.0	203.1	1.00	1.96	3.3
North: Mavis St													
7	L2	168	1.9	168	1.9	0.258	9.2	LOS A	1.2	8.2	0.61	0.81	48.6
8	T1	191	1.7	191	1.7	3.962	2717.2	LOS F	100.6	714.5	1.00	3.43	0.7
Approach		359	1.8	359	1.8	3.962	1446.6	LOS F	100.6	714.5	0.82	2.20	1.8
West: Canterbury Road													
10	L2	88	13.1	88	13.1	0.349	6.6	LOS A	0.0	0.0	0.00	0.08	58.3
11	T1	1888	4.2	1888	4.2	0.349	0.0	LOS A	0.0	0.0	0.00	0.03	69.4
Approach		1977	4.6	1977	4.6	0.349	0.3	NA	0.0	0.0	0.00	0.03	68.9
All Vehicles		2407	4.2	2407	4.2	3.962	245.3	NA	100.6	714.5	0.15	0.41	9.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.9 %
Number of Iterations: 9 (maximum specified: 10)

MOVEMENT SUMMARY

Site: 101 [Canterbury Road - Mavis St (B) - UF PM (No Upgrades)]

Network: N101 [Canterbury Road Network - UF PM (No Upgrades)]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Canterbury Road													
5	T1	2062	6.2	2062	6.2	0.672	0.2	LOS A	0.0	0.0	0.00	0.00	69.4
Approach		2062	6.2	2062	6.2	0.672	0.2	NA	0.0	0.0	0.00	0.00	69.4
North: Median													
9	R2	191	1.7	48	1.7	0.026	2.0	LOS A	0.0	0.0	0.00	0.51	19.2
Approach		191	1.7	48[N1]	1.7	0.026	2.0	LOS A	0.0	0.0	0.00	0.51	19.2
All Vehicles		2253	5.8	2110[N1]	6.2	0.672	0.3	NA	0.0	0.0	0.00	0.01	69.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.9 %
Number of Iterations: 9 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 101 [Milperra Road - The River Road - UF AM (New Signal Option)]

Network: N101 [Canterbury Road Network - UF AM (New Signal)]

New Site
Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: The River Road													
1	L2	282	14.6	282	14.6	0.898	61.1	LOS E	49.0	366.1	1.00	0.96	29.4
3	R2	1043	3.0	1043	3.0	0.898	62.5	LOS E	49.0	366.1	1.00	0.96	20.0
Approach		1325	5.5	1325	5.5	0.898	62.2	LOS E	49.0	366.1	1.00	0.96	22.5
East: Canterbury Road													
4	L2	314	9.7	314	9.7	0.302	14.2	LOS A	5.9	44.5	0.38	0.70	45.2
5	T1	1103	12.1	1103	12.1	0.666	44.6	LOS D	24.8	191.7	0.86	0.74	32.0
Approach		1417	11.6	1417	11.6	0.666	37.9	LOS C	24.8	191.7	0.75	0.73	34.2
West: Milperra Road													
11	T1	1573	10.1	1573	10.1	0.573	12.3	LOS A	14.8	112.8	0.44	0.40	47.8
12	R2	440	8.1	440	8.1	0.469	27.0	LOS B	7.3	54.8	0.82	0.80	42.9
Approach		2013	9.7	2013	9.7	0.573	15.5	LOS B	14.8	112.8	0.53	0.49	46.0
All Vehicles		4755	9.1	4755	9.1	0.898	35.2	LOS C	49.0	366.1	0.73	0.69	33.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.0 %
Number of Iterations: 8 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	64.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

2027 Ultimate Future Case

With Upgrades

MOVEMENT SUMMARY

Site: 101 [Canterbury Road - Mavis St - UF AM (New Signal)]

Network: N101 [Canterbury Road Network - UF AM (New Signal)]

New Site
Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Canterbury Road													
5	T1	1411	11.6	1411	11.6	0.612	6.2	LOS A	24.4	187.7	0.42	0.38	56.7
6	R2	161	2.6	161	2.6	0.597	63.3	LOS E	10.8	77.4	0.99	0.99	29.0
Approach		1572	10.7	1572	10.7	0.612	12.1	LOS A	24.4	187.7	0.47	0.44	48.2
North: Mavis Street													
7	L2	62	8.5	62	8.5	0.171	45.2	LOS D	3.2	23.9	0.86	0.73	32.3
9	R2	65	6.5	65	6.5	0.396	71.2	LOS F	4.3	32.1	0.98	0.76	17.2
Approach		127	7.4	127	7.4	0.396	58.5	LOS E	4.3	32.1	0.92	0.75	24.7
West: Canterbury Road													
10	L2	184	6.3	184	6.3	0.795	19.6	LOS B	33.0	244.7	0.60	0.65	40.4
11	T1	2549	7.0	2549	7.0	0.795	11.5	LOS A	33.0	244.7	0.56	0.55	52.6
Approach		2734	7.0	2734	7.0	0.795	12.1	LOS A	33.0	244.7	0.57	0.55	51.5
All Vehicles		4433	8.3	4433	8.3	0.795	13.4	LOS A	33.0	244.7	0.54	0.52	48.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.0 %
Number of Iterations: 8 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		158	64.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Organisation: TTPP - THE TRANSPORT PLANNING PARTNERSHIP | Processed: Tuesday, 30 January 2018 9:47:04 AM
Project: X:\17163 Canterbury-Bankstown Private Hospital - No.297 Canterbury Rd, Revesby\07 Modelling Files\17163sid_180130.sip7

MOVEMENT SUMMARY

Site: 101 [Milperra Road - The River Road - UF PM (New Signal Option)]

Network: N101 [Canterbury Road Network - UF PM (New Signal)]

New Site
Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: The River Road													
1	L2	277	14.8	277	14.8	0.877	67.5	LOS E	27.7	213.3	1.00	0.95	27.9
3	R2	427	4.4	427	4.4	0.877	71.1	LOS F	27.7	213.3	1.00	0.95	18.3
Approach		704	8.5	704	8.5	0.877	69.7	LOS E	27.7	213.3	1.00	0.95	22.7
East: Canterbury Road													
4	L2	583	3.1	580	3.1	0.772	24.5	LOS B	21.0	150.8	0.76	0.82	38.6
5	T1	1535	7.2	1527	7.2	0.755	34.0	LOS C	32.1	238.7	0.83	0.74	36.8
Approach		2118	6.1	2107 N1	6.1	0.772	31.4	LOS C	32.1	238.7	0.81	0.76	37.3
West: Milperra Road													
11	T1	1503	4.8	1503	4.8	0.446	6.6	LOS A	11.9	86.9	0.41	0.37	56.0
12	R2	728	3.8	728	3.8	0.579	28.7	LOS C	12.0	86.6	0.88	0.89	42.2
Approach		2232	4.4	2232	4.4	0.579	13.8	LOS A	12.0	86.9	0.56	0.54	48.3
All Vehicles		5054	5.7	5043 N1	5.7	0.877	29.0	LOS C	32.1	238.7	0.73	0.69	37.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 9.2 %
Number of Iterations: 10 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
All Pedestrians		105	59.3	LOS E			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Canterbury Road - Mavis St - UF PM (New Signal)]

Network: N101 [Canterbury Road Network - UF PM (New Signal)]

New Site
Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Canterbury Road													
5	T1	2062	6.2	2062	6.2	1.016	64.0	LOS E	111.1	819.4	0.72	1.01	20.4
6	R2	72	4.4	72	4.4	0.336	39.2	LOS C	3.8	27.7	0.85	0.81	35.8
Approach		2134	6.2	2134	6.2	1.016	63.1	LOS E	111.1	819.4	0.73	1.01	21.0
North: Mavis Street													
7	L2	168	1.9	168	1.9	0.442	43.7	LOS D	8.6	61.1	0.90	0.77	33.3
9	R2	191	1.7	191	1.7	1.114	190.4	LOS F	23.2	164.4	1.00	1.40	8.0
Approach		359	1.8	359	1.8	1.114	121.6	LOS F	23.2	164.4	0.95	1.11	15.4
West: Canterbury Road													
10	L2	88	13.1	88	13.1	0.593	28.0	LOS B	29.4	215.6	0.79	0.74	36.9
11	T1	1888	4.2	1888	4.2	0.593	21.9	LOS B	31.1	225.5	0.81	0.74	44.0
Approach		1977	4.6	1977	4.6	0.593	22.1	LOS B	31.1	225.5	0.81	0.74	43.6
All Vehicles		4469	5.1	4469	5.1	1.114	49.7	LOS D	111.1	819.4	0.78	0.90	27.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 9.2 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
All Pedestrians		158	59.3	LOS E			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Appendix C

Correspondence Details (awaiting Roads and Maritime response)

From: Wayne Johnson
Sent: Thursday, 25 January 2018 1:57 PM
To: development.sydney@rms.nsw.gov.au
Cc: Jessica Szeto
Subject: Canterbury Road and Mavis Street Traffic Signals - RMS Consultation
Attachments: SSD 8834 SEARs.pdf; SEARs Request.pdf; 17163CAD01-Intersection-180122.pdf

To whom it may concern,

The Transport Planning Partnership (TTPP) are providing transport planning services for the proposed development of the Bankstown Private Hospital at 297-299 Canterbury Road, Revesby **(Ref No.: SSD 8834)**. Refer attached SEARS documentation.

The proposal includes a 251-bed private hospital and associated facilities, consulting room, café and ancillary facilities. An associated basement car park will also be provided across three basement levels, containing some 433 car parking spaces, with vehicle access directly off Mavis Street.

TTPP would like to obtain "in principle" support from Roads and Maritime to provide traffic signals at the intersection of Canterbury Road-Mavis Street intersection. The proposed signals would be designed with full signalised pedestrian crossings on all legs to improve pedestrian crossing opportunities across Canterbury Road (including key bus stop locations) and to/from the site. See attached concept signal design for reference.

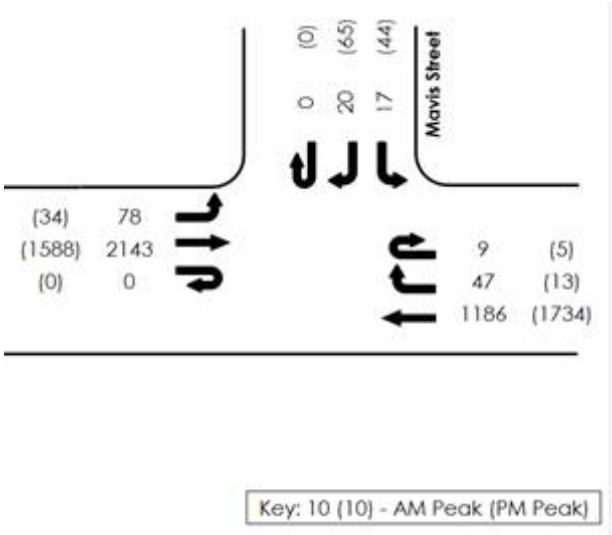
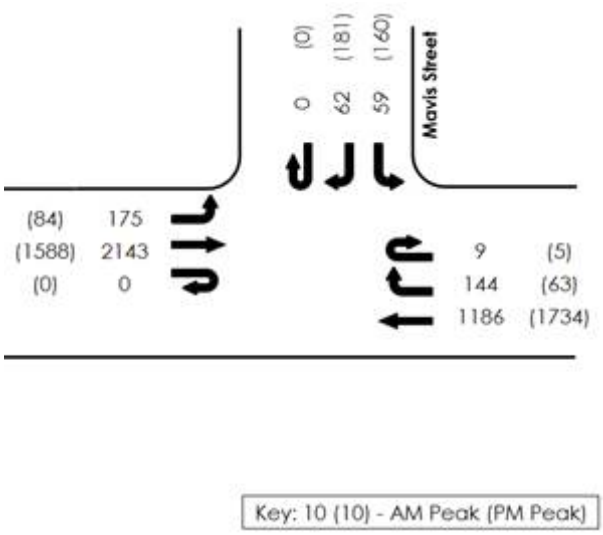
In terms of traffic generation, the proposed development would generate circa 277-330 vehicle trips (2-way) in the peak hour. See trip generation estimate in Table 1.

Table 1: Proposed Development Trip Generation Estimates

Land Use	Size	Trip Generation Rate (veh/hr)		Trip Generation Estimate	
		AM Peak	PM Peak	AM Peak	PM Peak
Private Hospital	251 beds	-12.41 + 0.57B	-11.96 + 0.69B	131 trips	162 trips
Medical Consulting^	3,655m²	4.0 trips per 100m² GFA	4.6 trips per 100m² GFA	146 trips	168 trips
Total				**277 trips**	**330 trips**

^Trip generation rates based upon recent Roads and Maritime traffic surveys conducted for Medical Centres

The existing and proposed development traffic volumes are presented in Figure 1 and Figure 2, respectively.

	Figure 1: Existing Traffic Volumes – Mavis St/Canterbury Road	Figure 2: Proposed Development Traffic Volumes – Mavis St/Canterbury Road (existing + proposed development traffic)
		
Canterbury Rd (major road)	2143 / 1186 per hour (AM) 1588 / 1734 per hour (PM)	2143 / 1186 per hour (AM) 1588 / 1734 per hour (PM)
Mavis St (minor road)	125 / 37 per hour (AM) 47 / 109 per hour (PM)	319 / 121 per hour (AM) 147 / 341 per hour (PM)

As a guide, the Roads and Maritime warrants for a signalised intersection are as follows:

a) Traffic demand:
For each of four one-hour periods of an average day:
   i. The **major road** flow exceeds 600 vehicles/hour in each direction; and
   ii. The **minor road** flow exceeds 200 vehicles/hour in one direction

As such, the future projected traffic volumes at the Mavis Street-Canterbury Road intersection are expected to meet the Roads and Maritime warrants for a signalised intersection.

Further to the above, TTPP has conducted preliminary traffic modelling analysis to determine the likely traffic implications of the proposed signalisation of the Mavis Street-Canterbury Road intersection. The existing intersection is currently configured as a priority controlled seagull intersection. It is noted that right-turn movements to/from Mavis Street currently experience delays greater than 70 seconds, which is not unusual for side streets on a main road. Notwithstanding this, the future private hospital development is set to exacerbate delay on the side street, such that traffic signals would be required to ensure an acceptable intersection operation.

The preliminary traffic modelling results are presented in Table 2 below.

Table 2: Preliminary Traffic Modelling Results

Time of the Day	Existing Base Case			Proposed Development Case (no signal upgrade)			Proposed Development Case (with signal upgrade)		
	Ave. Delay (s)	LoS	95th %tile Queue Length (m)	Ave. Delay (s)	LoS	95th %tile Queue Length (m)	Ave. Delay (s)	LoS	95th %tile Queue Length (m)
AM Peak	318^	F	28	1779^	F	507	18	B	271
PM Peak	90^	F	22	1251^	F	537	23	B	390

^ Excessive delays experienced for right-turn movements to/from Mavis Street. All other turning movements generally operate at LoS A.

Based on the above, the proposed signalisation of the Mavis Street-Canterbury Road intersection will operate at LoS B during peak periods, although, with some increased delays and queues along Canterbury Road. However, the proposal would offer the following benefits:

- improved pedestrian safety as a dedicated signalised pedestrian crossing could be provided on all legs of the intersection (particularly favourable to improve public transport accessibility to/from key bus stop locations)
- traffic signals are generally more favourable to manage unequal distributions of incoming traffic and congested traffic conditions, which may be the case as a result of future development and expansion of the area.

In summary, the proposed signalisation of the Mavis Street-Canterbury Road intersection would operate at LoS B. The proposal would improve pedestrian crossing opportunities across Canterbury Road and turning movements to/from Mavis Street.

TTPP would be grateful therefore if Roads and Maritime could confirm their support of the proposed signalisation of the Mavis Street-Canterbury Road intersection. Further detail regarding the proposal would be included in the transport assessment report as part of the Planning Proposal application.

We trust the above is satisfactory. Should you wish for further clarification, please do not hesitate to contact me.

Wayne Johnson

Associate Director
p: +61 2 8437 7800 m: +61 420 416 322
a: Suite 402, 22 Atchison Street, St Leonards NSW 2065
w: www.ttpp.net.au e: Wayne.Johnson@ttpp.net.au

The Transport Planning Partnership
Suite 402 Level 4, 22 Atchison Street
St Leonards NSW 2065

P.O. Box 237
St Leonards NSW 1590

02 8437 7800

info@ttpp.net.au

www.ttpp.net.au