Cardno
Shaping the Future

Albury Wodonga Regional Cancer Centre

Traffic and Car Parking

Job Number: CG120070

Prepared for Billard Leece Partnership

25 January 2013

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Document Control

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1 Introduction

Cardno was retained by Billard Leece Partnership on behalf of the Department of Health to undertake a review of the traffic and car parking implications of the proposed Albury Regional Cancer Centre.

In the course of preparing this assessment, the subject site and its environs have been inspected, plans of the development examined, and all relevant traffic and parking data collected and analysed.

Cardno has previously prepared a master plan report for the Albury campus *(Cardno Report CG120070REP001F01alb dated 27 March 2012)* which outlines the traffic and car parking implications of the ultimate development of the site.

Cardno have also prepared a car parking assessment for the PET facility *(Cardno Letter Report CG120070LET001F02 dated 9 July 2012)* which assesses the provision of additional car parking for the PET facility.

2 Background and Existing Conditions

2.1 Location and Land Use

The subject site abuts Borella Road, Albury as shown in Figure 1.

Figure 1: Site Location

The Albury Wodonga Health - Albury Campus is bounded by Borella Road, East Street, Keene Street and a nature reserve.

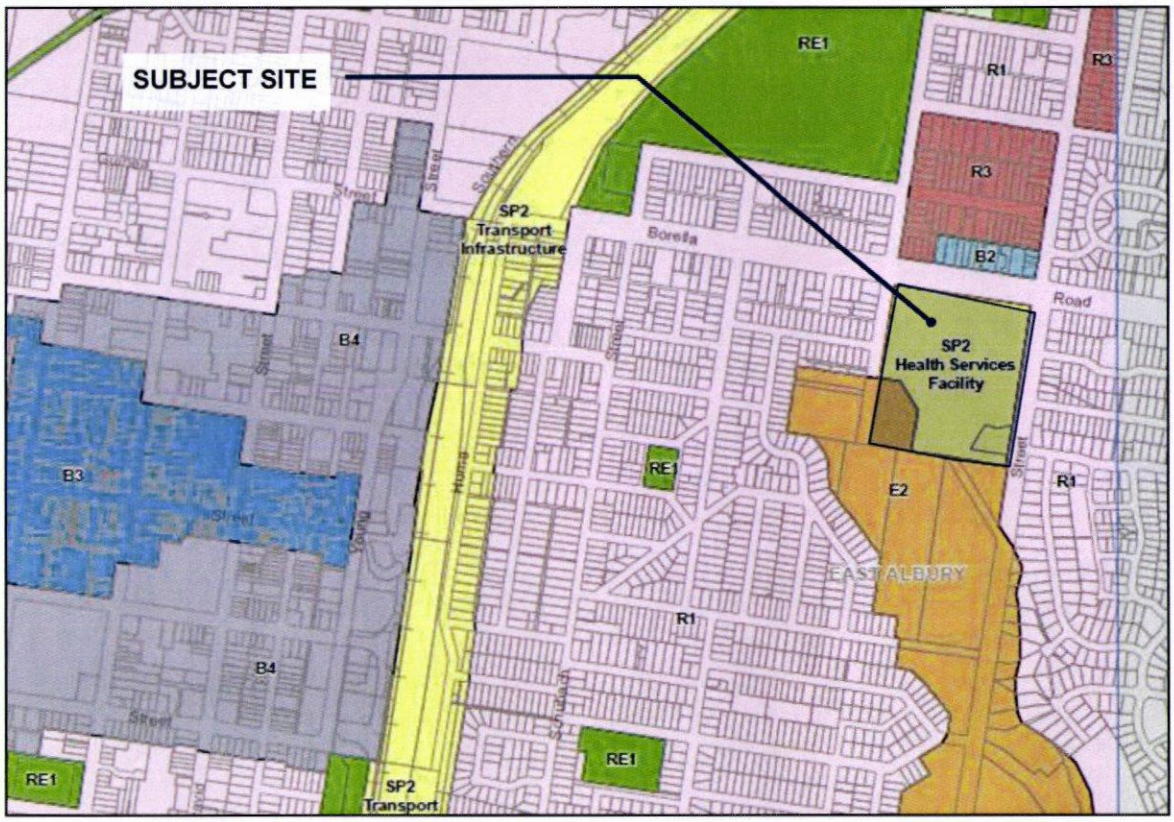
The University of New South Wales Rural Clinic is located to the north, across Borella Road.

The land use surrounding the site is a mixture of uses comprising commercial and retail properties and other key developments including Alexandra Park to the north-west and the Albury Airport to the north-east.

2.2 Planning Zones

Figure 2 shows the location of the site and the Albury Planning Scheme Zones. The Albury Campus is located within an SP2 Zone (Infrastructure as a Health Service Facility).

Figure 2: Planning Scheme Zones



2.3 Road Network

2.3.1 East Street

East Street is a local road from North Street to the Hume Freeway in the south-west. In the vicinity of the site, East Street is aligned in a north–south direction.

East Street generally provides one trafficable lane in each direction in addition to a delineated car parking lane on each side. Traffic is controlled by a posted speed limit of 60 km/h on East Street.

Figure 3 below shows East Street facing south beyond the subject site.

Figure 3: East Street facing south

2.3.2 Borella Road

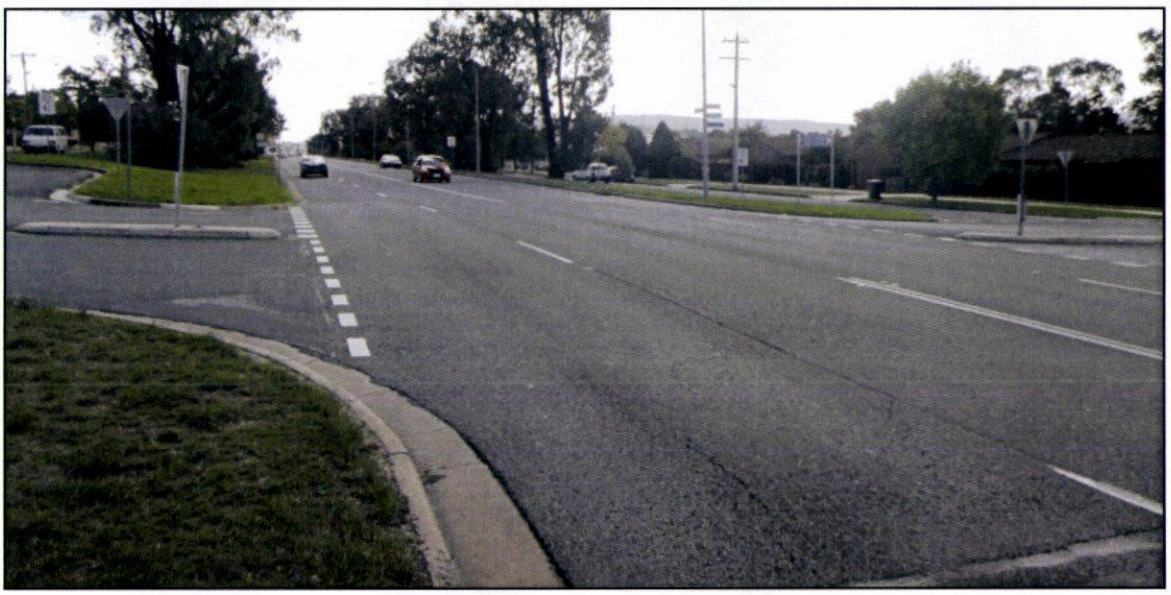
Borella Road is a declared road aligned east–west from Young Street in the west to East Street in the east where it continues as Riverina Highway.

In the vicinity of the site, Borella Road operates as a wide roadway accommodating two lanes of traffic in either direction. A two way directional service lane also exists running parallel to Borella on its northern side, in the vicinity of the site.

The intersection of Borella Road and East Road is controlled by a large roundabout which facilitates two lanes of traffic.

Figure 4 below shows Borella Road facing west beyond the subject site.

Figure 4: Borella Road facing west



2.3.3 Keene Street

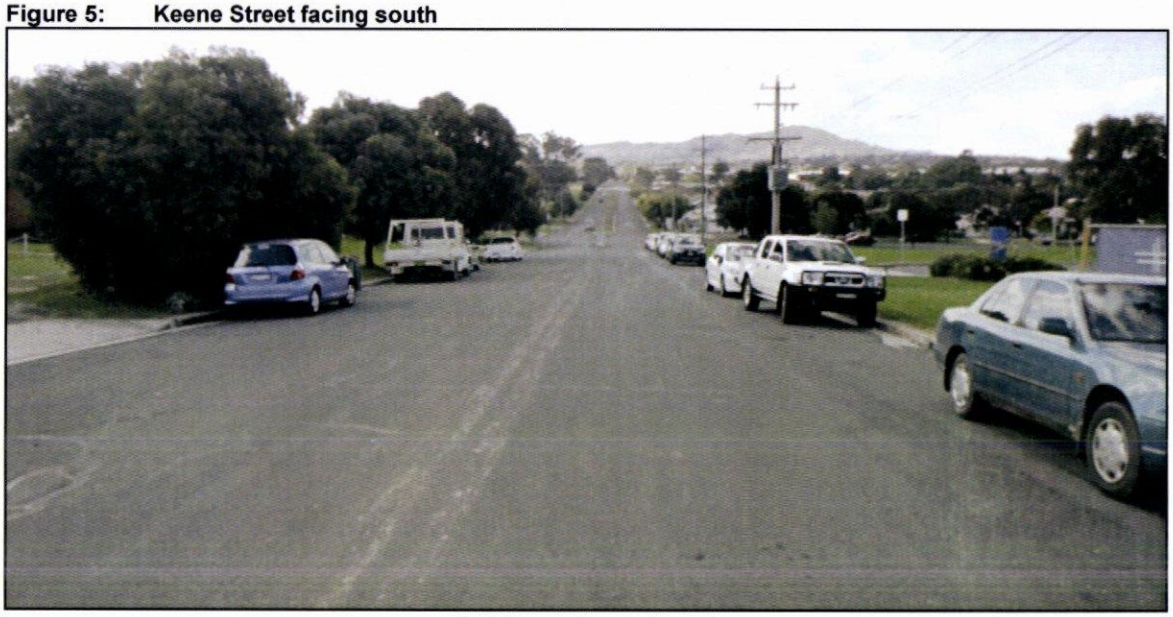
Keene Street is a local road aligned in a north–south direction from North Street to Peechelba Street in the south.

In the vicinity of the site, Keene Street operates as an unmarked roadway accommodating two way traffic flows.

A default speed limit of 50km/h applies along Keene Street in the vicinity of the site.

Figure 5 below shows Keene Street facing south beyond the subject site.

Figure 5: Keene Street facing south

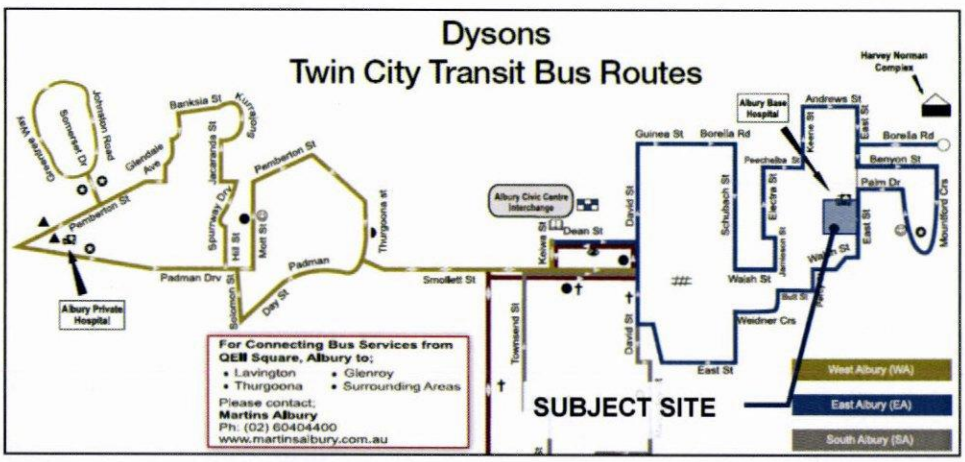


2.4 Public Transport

Public transport within Albury generally comprises of bus services which are operated by one of two companies, Martins and Dysons.

Dysons has a bus service (East Albury) which connects with Albury Wodonga Health - Albury Campus, as shown in Figure 6.

Figure 6: Albury Dysons Bus Service

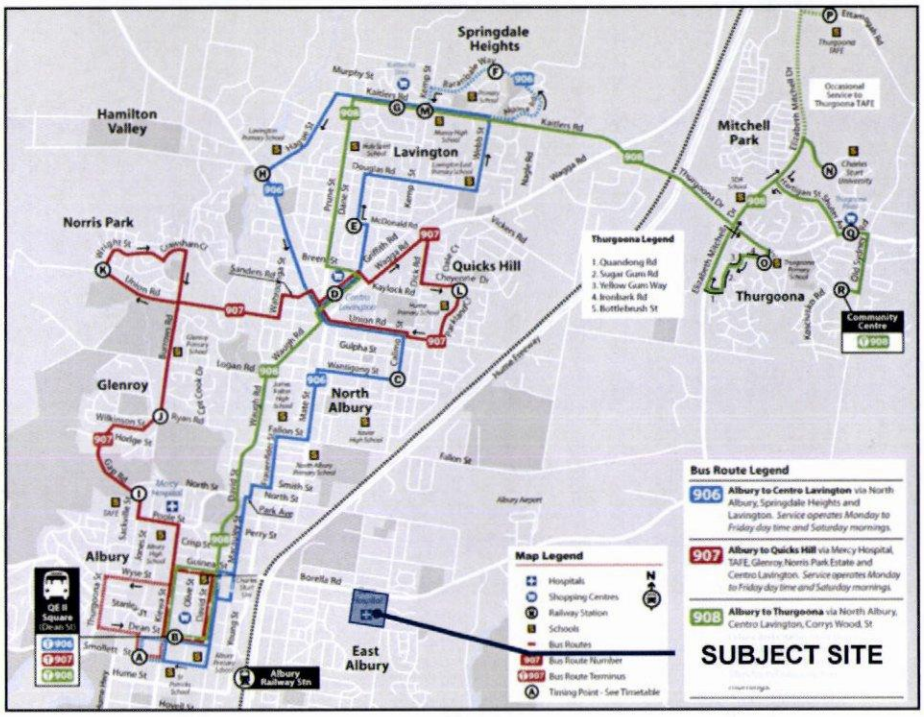


The Dysons service provides access from the subject site to the surrounding areas, as well as a connection to the Martins service at Dean Street. The East Albury service has an approximate frequency of one bus every 1.5 hours during a weekday and 3 services running on Saturdays.

A bus stop is located on East Street in the vicinity of the site. This bus stop is serviced by the Dysons bus route which circulates one-way (southbound along East Street) adjacent the site. The proposed development will have no impact on the existing bus service.

The Martins bus service operates within Albury as shown in Figure 7, and provides further accessibility to the surrounds of Albury.

Figure 7: Albury Martins Bus Service



3 Albury Existing Hospital Operations

3.1 Services and Facilities

It is understood that a total of 181 beds (comprising 167 Multi-Day Beds plus 14 Same Day Beds) are currently provided at the Albury Campus. The existing campus provides for a range of acute and sub-acute services including the following:

- Multi Day Beds
- Same Day Beds
- Day Surgery
- Paediatrics
- Critical Care
- Mental Health
- Emergency Department treatment spaces
- Oncology
- Medical Imaging

Discussions with site management indicate that the Albury Campus of Albury Wodonga Health currently supports in the order 283 staff during the morning peak period and 338 staff during the afternoon changeover period.

3.2 Existing Car Parking

3.2.1 Car Parking Surveys

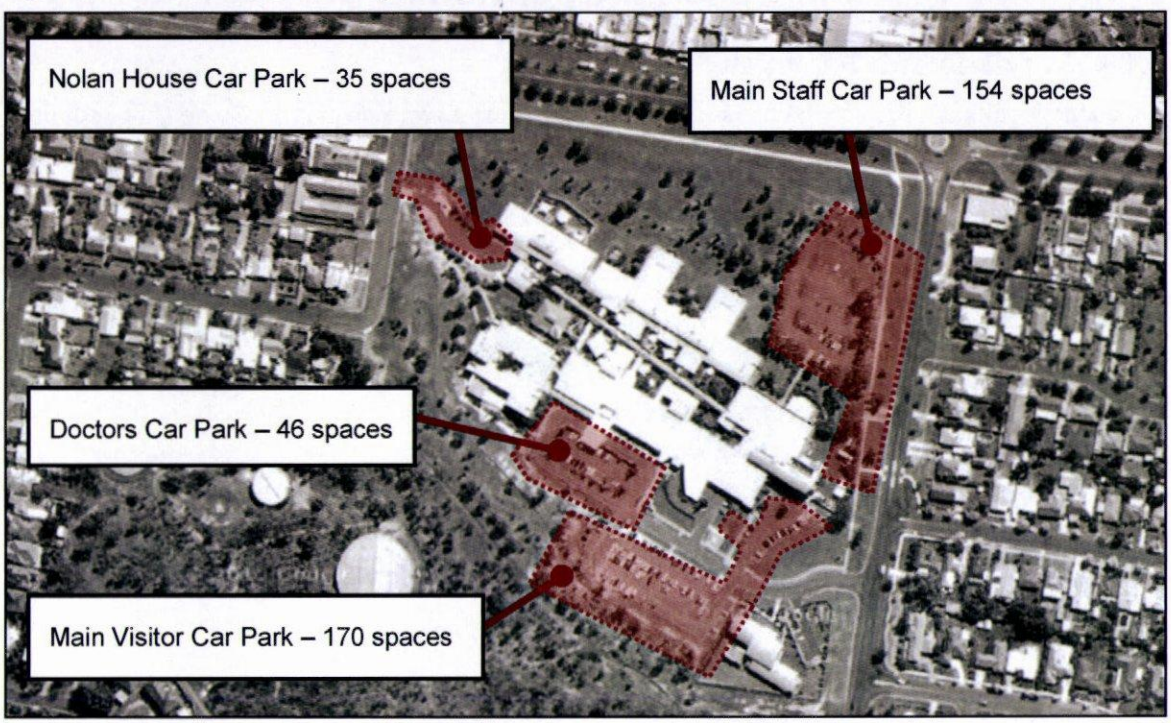
Cardno commissioned car parking surveys between 6:00am - 7:00pm on Wednesday 15th February 2012 of all car parking associated with the hospital. A count of car parking areas was undertaken at hourly intervals to determine the car parking occupancy over the day.

3.2.1.1 On-Site Car Parking

The surveys revealed a provision of 405 car parking spaces on-site, comprising a variety of restrictions. The on-site car parking and typical parking restrictions are described broadly as follows and illustrated in Figure 8.

- Main Staff Car Park = 154 spaces
  Unrestricted (staff), AWH short term parking, Disabled, Contractor/Engineering
- Main Visitor Car Park = 170 spaces
  Unrestricted, Hospital Vehicles Only, Disabled
- Nolan House Car Park = 35 spaces
  Unrestricted, Breast Screening Client parking, VMO Magistrate parking, Emergency, Disabled
- Doctors Car Park = 46 spaces
  Unrestricted, 5 min drop off, Doctors, Patient Parking Only, Disabled

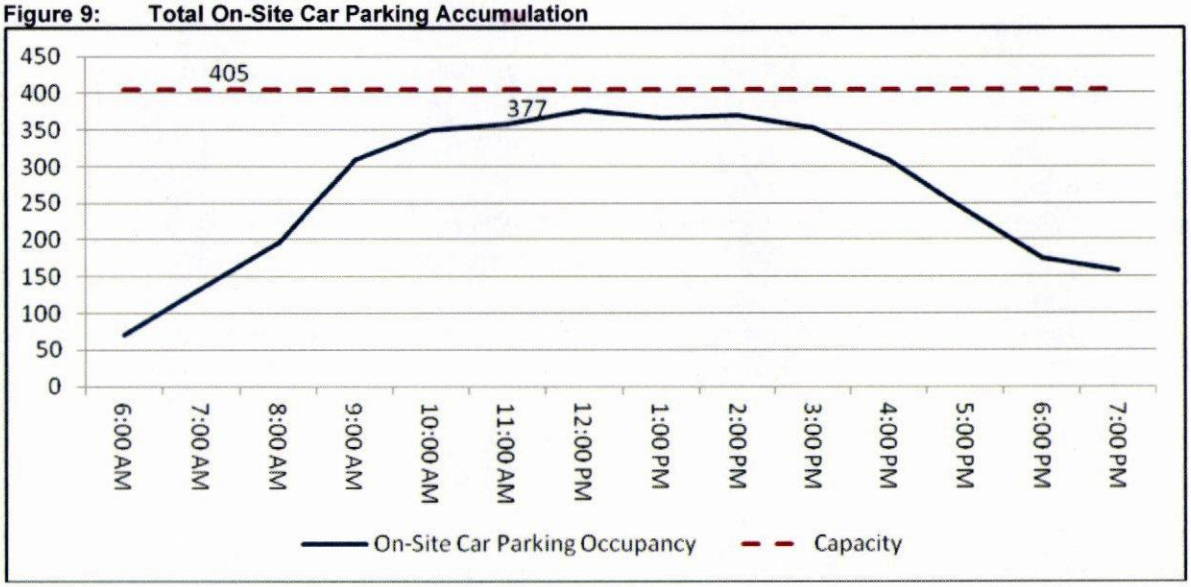
Figure 8: On-Street Car Parking Survey Location



A summary of the car parking accumulation over the course of the surveyed day for all on-site car parking is presented in Figure 9.

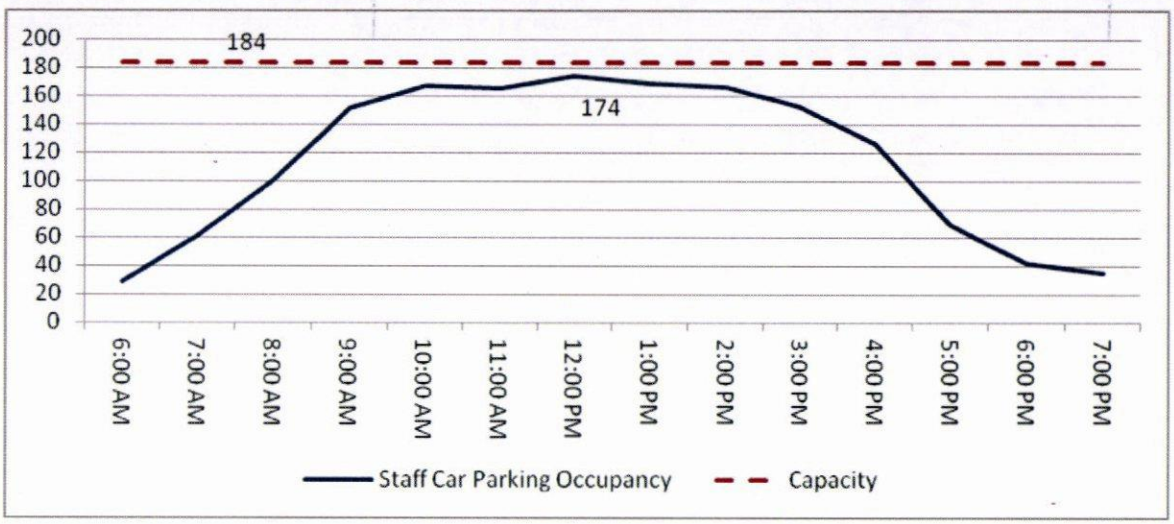
Review of Figure 9 shows that the peak parking accumulation on the site was found to occur at 12:00 noon when 377 cars were parked on-site.

Figure 9: Total On-Site Car Parking Accumulation



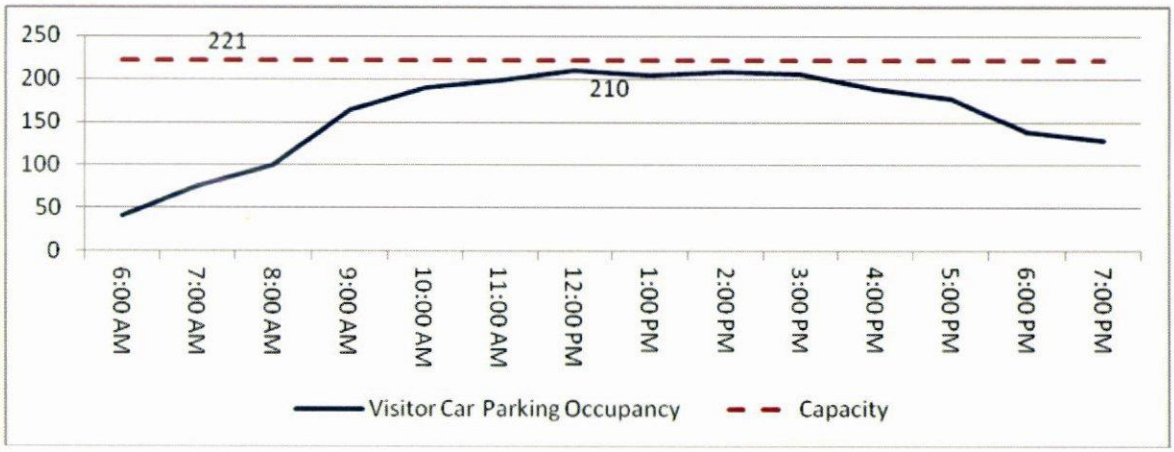
Of the 405 car spaces provided on-site, 184 spaces are restricted for staff use only (approximately 45%). Figure 10 shows the on-site parking accumulation relevant to the designated staff car parking spaces, with peak occupancy of 174 spaces (93% utilisation) observed at 12:00 noon.

Figure 10: On-Site Staff Car Parking Accumulation



A total of 221 spaces are provided on site for visitors. Figure 11 shows the on-site parking demands relevant to the designated visitor car parking spaces, with a peak occupancy of 210 spaces (94% utilisation) observed at12:00 noon.

Figure 11: On-Site Visitor Car Parking Accumulation

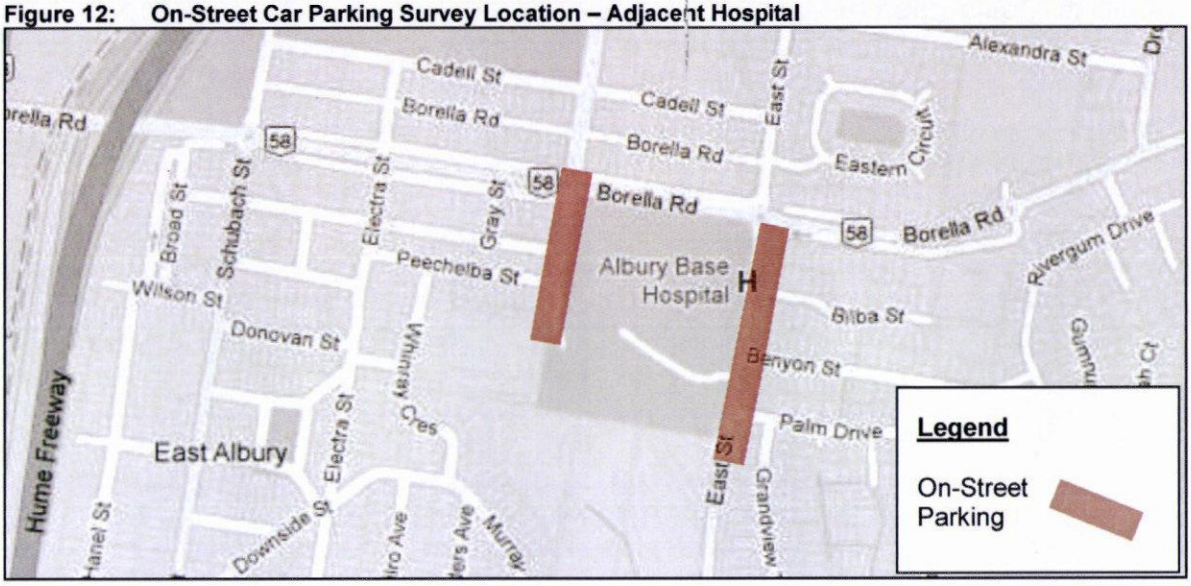


3.2.1.2 On-street Car Parking

It is expected that a high proportion of on street car parking immediately adjacent the site is attributed to the Hospital, based on observation on-site and discussion with site management. In order to account for on-street car parking as part of the future expansion, parking on the roads immediately abutting the site has therefore also been included within the Hospital car parking surveys.

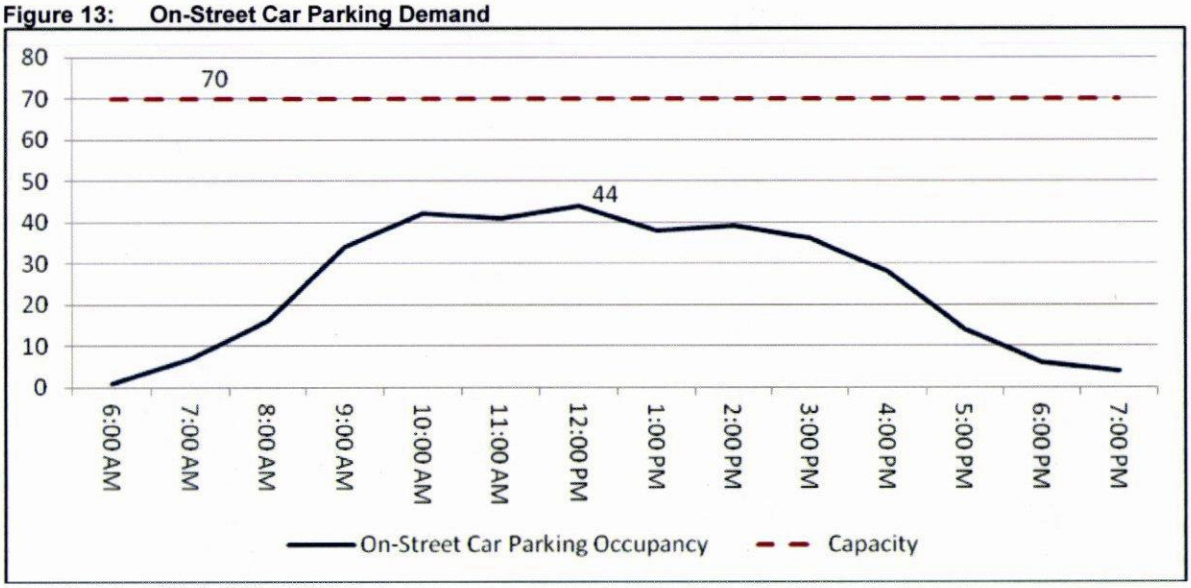
The on-street area included within the Hospital car parking surveys and attributed to the Hospital is shown in Figure 12, and includes in the order of 70 unrestricted spaces. It is noted that whilst the Hospital does front Borella Road, on-street parking on Borella Road is inconveniently located in the context of the Hospital access locations and hence is not considered to be a preferable parking location for visitors. For this reason Borella Road has been excluded from the parking demand calculations.

Figure 12: On-Street Car Parking Survey Location – Adjacent Hospital



A peak accumulation for on-street parking expected to be associated with the Hospital campus was found to occur at 12:00 noon when 44 car spaces were occupied. A summary of the on-street car parking accumulation profile is presented in Figure 13.

Figure 13: On-Street Car Parking Demand



3.2.1.3 Other Car Parking Considerations

In addition to the above it is noted that a carers accommodation building is currently under construction, adjacent the Hospital, and is therefore generating a car parking demand associated with construction contractor parking which can be discounted from the car parking surveys.

Based on discussions with Adam White, the project manager from Southern Cross Developers, there was a total workforce of 5 people on the site on Wednesday 15th February. Adopting a typical driver rate of 80% indicates that a demand for 4 car spaces recorded as part of the surveys can be attributable to the construction works, and is discountable from the peak Hospital demands.

3.2.2 Current Parking Demand

With reference to the preceding, parking on the Hospital site is currently observed to be at approximately 93% capacity, with additional overflow car parking taking place on both Keene Street and East Street abutting the site.

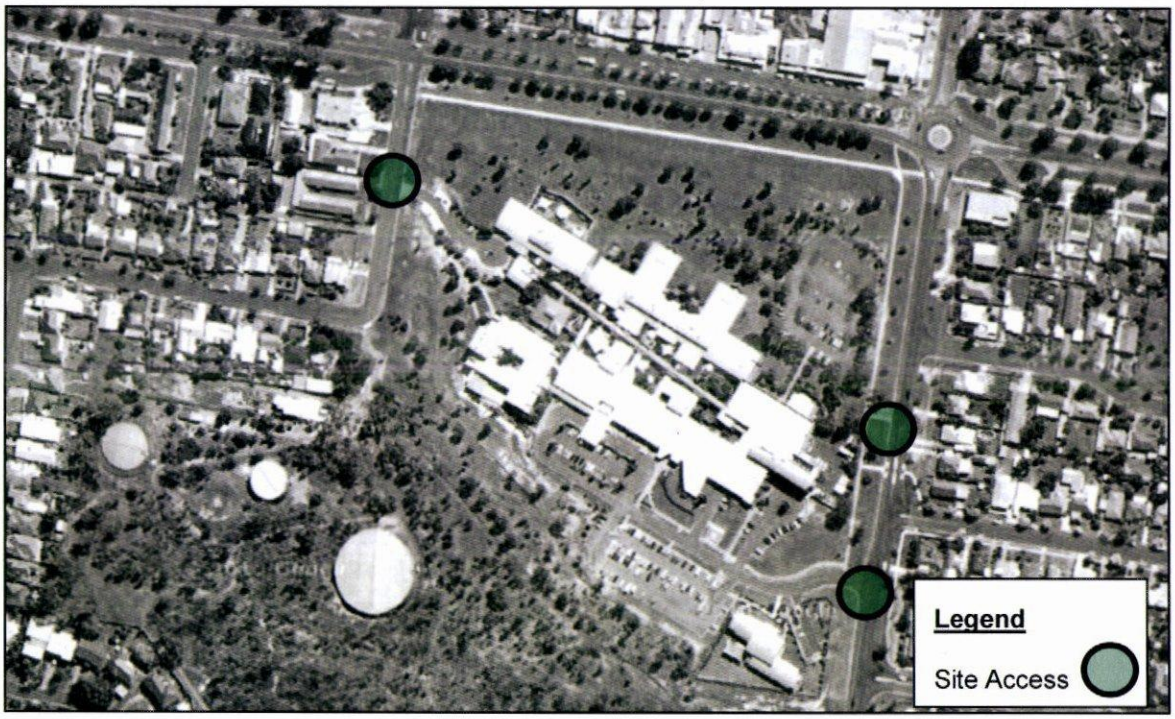
The car parking accumulation associated with the site is considered to be a result of the surveyed on-site demand (377 spaces) + on-street demand (44 spaces) – constructor parking (4 spaces) = 417 car spaces.

Based on the existing provision of 181 beds at the Albury Campus, the peak demand for 417 spaces, equates to a peak car parking rate of **2.30 spaces per bed**.

3.2.3 Existing Access

There are currently three access points for the Albury Campus of Albury Wodonga Health, as shown in the aerial photograph in Figure 14.

Figure 14: Hospital Access Points



As indicated in Figure 14 vehicle access to the site is described as follows:

- A fully directional crossover to East Street approximately central to the campus;
- A second fully directional crossover to East Street at the southern end of the campus; and
- A fully directional crossover to Keene Street.

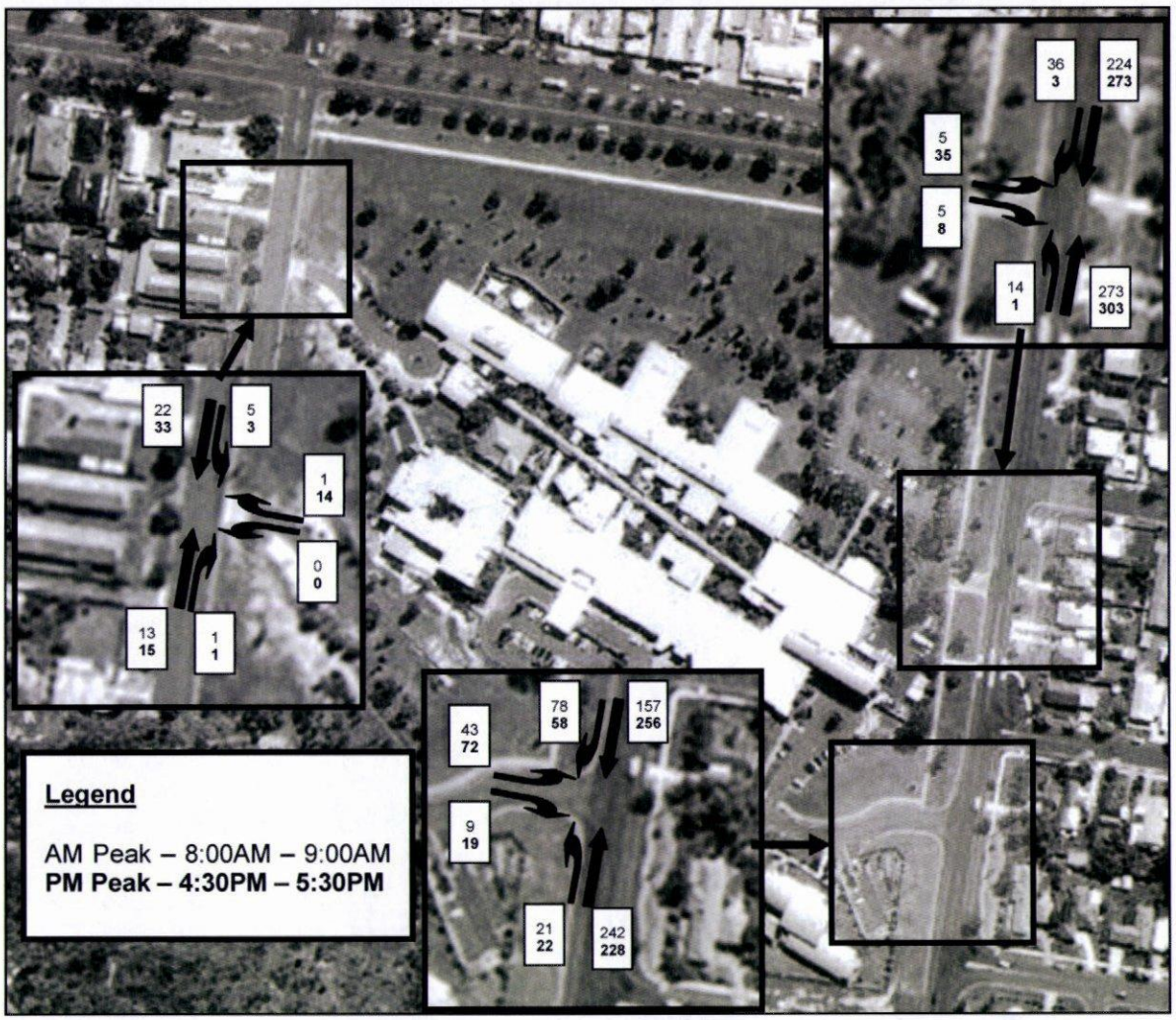
There are two primary East Street entry points. The first, closest to Borella Road, gives access to back of house areas and the lower car park with a capacity of 154 cars. The second gives access to the main entry of the hospital, including the forecourt and drop off areas, and associated car parking with a capacity of 216 cars. This access is also used by ambulances and others attending the emergency department. The Ambulatory Care building is also accessed from this entry forecourt.

The Keene Street entry provides access to Mental Health and Breast Screening and is also used as a secondary entry to the Ambulatory Care building. This area has a capacity for 35 cars.

3.3 Existing Traffic Conditions

Traffic movement surveys were undertaken on behalf of Cardno at the main access points to Albury Campus of Albury Wodonga Health on the Wednesday 15th February 2012, between 8:00AM and 7:00PM. The peak hour results of the surveys are shown in Figure 15.

Figure 15: Existing Traffic Volumes – Hospital Access



Reference to the results of the surveys indicate that the hospital generates in the order of 218 movements during the AM peak periods and 236 movements during the evening peak periods which equates to a typical traffic generation rate of about 0.54 and 0.58 movements per car space, respectively.

It is noted that traffic movements associated with on-street car parking have been excluded from this assessment as they are not expected to increase as a result of the proposed hospital expansion.

A summary of the AM and PM peak hour traffic generation derived for the site is summarised in Table 1.

Table 1: Existing Hospital Traffic Generation

Period	Parking Supply	Vehicle Movements			Generation per Parking Space		
		In	Out	Total	In	Out	Total
AM Peak	405	155	63	218	0.38	0.16	0.54
PM Peak	405	88	148	236	0.22	0.36	0.58

3.4 Borella Road Traffic Volumes

Further turning movement counts were commissioned by Cardno at the intersection of Borella Road / Keene Street and Borella Road / East Street (located approximately 350 metre east of the Borella Road / Keene Street intersection), on Wednesday 19th September, between 7:00am and 9:30am, and between 4:00pm and 7:00pm. The AM and PM peak hour volumes are shown in Figure 16 and Figure 17.

It is noted that for the purposes of this assessment, movements to and from the service roads were grouped together with the Keene Street north and south legs as appropriate.

It is also noted that a service road accesses the roundabout intersection of Borella Road / East Street, these volumes have been shown as they exit directly into the roundabout as shown in Figure 17.

Figure 16: Existing Traffic Volumes –Borella Road / Keene Street

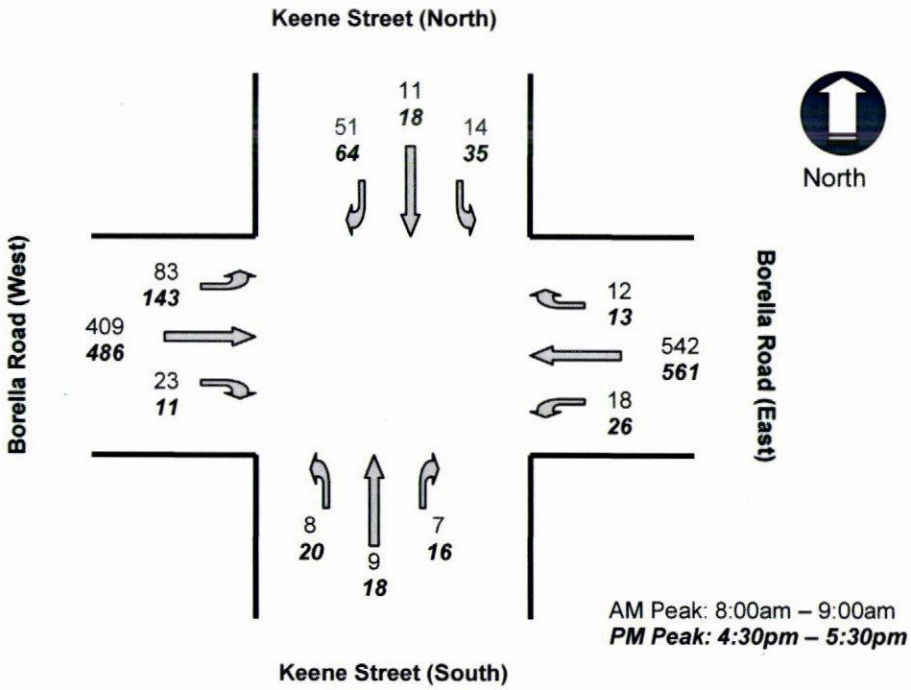
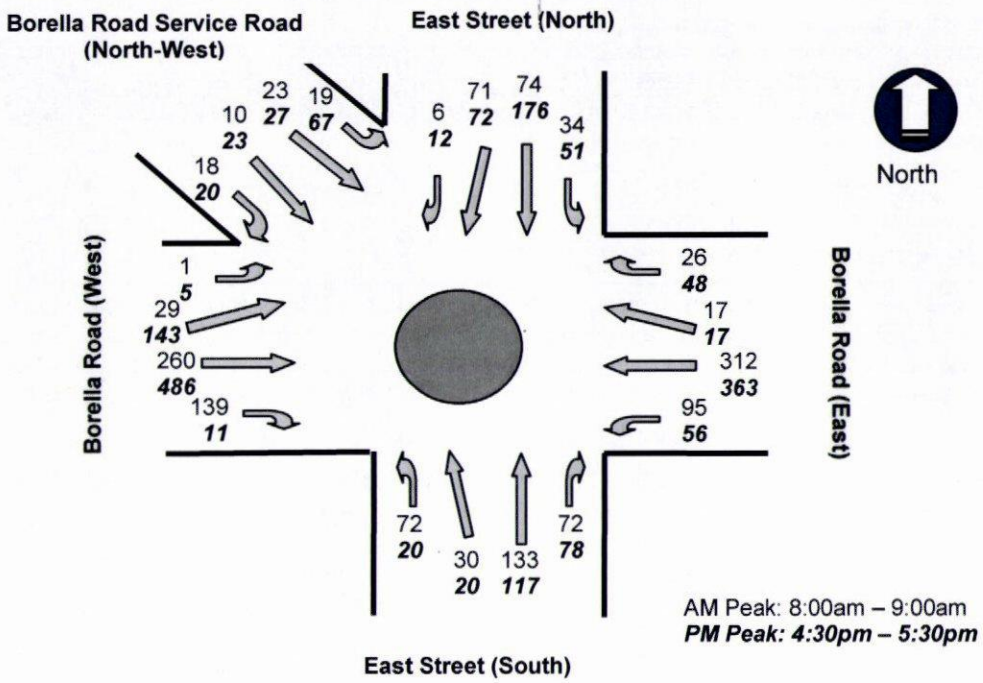


Figure 17: Existing Traffic Volumes –Borella Road / East Street



3.5 Intersection Analysis

The operation of the hospital access to Borella Road, Keene Street and East Street respectively have been analysed using SIDRA. This computer package, originally developed by the Australian Road Research Board, provides information about the capacity of an intersection in terms of a range of parameters, as described below:

Degree of Saturation (D.O.S.) is the ratio of the volume of traffic observed making a particular movement compared to the maximum capacity for that movement. Various values of degree of saturation and their rating are shown in Table 2:

Table 2: Rating of Degrees of Saturation

D.O.S	Rating
Up to 0.6	Excellent
0.6 to 0.7	Very Good
0.7 to 0.8	Good
0.8 to 0.9	Fair
0.9 to 1.0	Poor
Above 1.0	Very Poor

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

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

The results of the SIDRA Intersections analysis are summarised in Table 3.

Table 3: SIDRA Intersection Analysis Summary

Period	Approach	Degree of Saturation	95th%ile Queue	Average Delay
Keene Street / Site Access				
AM Peak	Keene Street (North)	0.015	0.0 m	1.5 sec
	Keene Street (South)	0.008	0.3 m	0.7 sec
	Site Access (East)	0.002	0.1 m	8.5 sec
PM Peak	Keene Street (North)	0.020	0.0 m	0.7 sec
	Keene Street (South)	0.009	0.3 m	0.7 sec
	Site Access (East)	0.019	0.5 m	9.0 sec
East Street / Site Access (North)				
AM Peak	East Street (North)	0.160	8.1 m	2.7 sec
	Site Access (West)	0.021	0.5 m	13.1 sec
	East Street (South)	0.159	0.0 m	0.4 sec
PM Peak	East Street (North)	0.154	8.7 m	1.7 sec
	Site Access (West)	0.070	1.8 m	11.6 sec
	East Street (South)	0.168	0.0 m	0.0 sec
East Street / Site Access (South)				
AM Peak	East Street (North)	0.162	7.2 m	4.2 sec
	Site Access (West)	0.073	1.9 m	10.6 sec
	East Street (South)	0.134	0.0 m	0.7 sec
PM Peak	East Street (North)	0.197	9.9 m	2.9 sec
	Site Access (West)	0.138	3.7 m	11.2 sec
	East Street (South)	0.126	0.0 m	0.7 sec

The results indicate that all three intersections with the Site Access points currently operate under 'excellent' conditions during times of peak traffic generation.

The results of the SIDRA Intersection analysis for the intersection of Borella Road / Keene Street and Borella Road / East Street are summarised in Table 4 and Table 5 respectively.

Table 4: SIDRA Intersection Analysis Summary – Borella Road / Keene Street

	Approach	Degree of Saturation	95th%ile Queue	Average Delay
AM Peak	**Keene St (N)**	0.347	8.4 m	25.7 sec
	Borella Rd (W)	0.153	10.1 m	3.4 sec
	Keene St (S)	0.105	2.2 m	20.5 sec
	Borella Rd (E)	0.163	10.8 m	1.9 sec
	Intersection	**0.347**	**10.8 m**	**4.4 sec**
PM Peak	**Keene St (N)**	0.590	16.0 m	33.9 sec
	Borella Rd (W)	0.183	13.8 m	3.9 sec
	Keene St (S)	0.284	6.6 m	26.4 sec
	Borella Rd (E)	0.172	13.3 m	2.6 sec
	Intersection	**0.590**	**16.0 m**	**6.7 sec**

Table 5: SIDRA Intersection Analysis Summary – Borella Road / East Street

	Approach	Degree of Saturation	95th%ile Queue	Average Delay
AM Peak	**East St (N)**	0.158	5.1 m	10.4 sec
	Borella Rd (E)	0.222	7.9 m	8.1 sec
	East St (S)	0.216	7.0 m	9.0 sec
	Borella Rd (W)	0.261	8.9 m	8.9 sec
	Borella Service Rd (NW)	0.060	1.8 m	10.1 sec
	Intersection	**0.261**	**8.9 m**	**8.9 sec**
PM Peak	**East St (N)**	0.283	10.1 m	10.3 sec
	Borella Rd (E)	0.260	9.9 m	8.9 sec
	East St (S)	0.208	6.8 m	9.4 sec
	Borella Rd (W)	0.325	11.9 m	8.9 sec
	Borella Service Rd (NW)	0.085	2.8 m	9.5 sec
	Intersection	**0.325**	**11.9 m**	**9.3 sec**

Review of Table 4 indicates that the critical period for the intersection of Borella Road / Keene Street is during the PM peak hour, when the intersection operates under 'excellent' conditions. It is noted that the northern leg of Keene Street experiences the highest Degree of Saturation for both analysis periods.

Review of Table 5 indicates that the intersection of East Street / Borella Road currently operates under 'excellent' conditions during both peak periods.

4 Other Considerations

Having consideration to the preceding, it should be noted that planning for works for the PET project has been undertaken separately. Cardno have previously prepared a letter *(Cardno Letter CG120070LET001F01 dated 9 July 2012)* which assesses the car parking implications of the PET project alone.

The PET facility will be located on the southern side of the existing hospital and include a reconfiguration of the existing doctor's car park. As part of the works, a total of 78 car spaces will be provided in place of the existing doctors' car park, increasing the overall car parking supply of the hospital to **437 spaces**, representing an increase of 32 spaces.

5 Proposed Development

5.1 General

Based on the information provided by Billard Leece Partnership, the proposed Regional Cancer Centre includes the additional services as summarised in Table 6.

Table 6: Summary of Existing, and Regional Cancer Centre Facilities

Component	Existing	Change	Total
Multi-Day Beds	167	+30	197
Same Day Beds	14	+30	44
Sub-Total Beds	**181**	**+60**	**241**
Consulting Rooms	0[1]	23[2]	23[2]

[1] *The exact number of consulting rooms currently operating on-site is unknown at this point in time and as such it will conservatively be assumed that all consulting rooms will commence operation after the proposed expansion.*
[2] *Consulting rooms includes Radiation Bunkers; but does not include the PET facility which has been assessed previously.*

Reference to the above indicates that an additional 60 beds and 20 consulting suites are proposed as part of the proposed Regional Cancer Centre. For the purposes of the following assessment the 3 radiation bunkers have been counted as consulting suites as it is understood that they will each generate up to 50 patients per day.

5.2 Parking and Access

Access to the hospital site from the road network is proposed to remain typically as per the existing conditions outlined as follows:

The visitor access and primary access to the hospital is from East Street, with a secondary entry for staff only, and Mental Health and Breast Screening from Keene Street.

The intersection of Borella Road / East Street is controlled by a roundabout the hospital will promote the intersection of East Street / Borella Road as the preferred access route for visitors to and from the site. Wayfinding signage and information will be supplied to visitors to ensure visitors access the site from East Street.

A new at-grade car park is proposed on the northern portion of the site, which will provide for the additional car parking requirement associated with the proposed cancer centre. The new car park will take access from both the existing Keene Street access (Nolan House Car Park); and East Street via the existing main staff car park.

An additional 148 car parking spaces (inclusive of 9 disabled spaces and 1 patient transfer bay) are proposed to be provided within the new northern car park, increasing the overall supply of parking to the hospital to 586 car spaces (noting that the PET project will increase the existing overall supply to 437 spaces).

The existing staff car park, accessed from East Street, will be reconfigured to provide access to the new northern car park, whilst retaining the existing supply of car parking.

Car parking within the western side of the car park will be restricted for staff use only, with visitor car parking to take place within the eastern side of the site. This has been provided to further enforce the use of the East Street access for visitors.

The proposed car parking arrangements are indicated within the signage and line marking plan provided within Annex 2, and illustrated in Figure 18 and Figure 19.

An additional sixteen (16) bicycle parking spaces are proposed comprised of 6 visitors spaces in the vicinity of the main entrance to the site, and 10 employee spaces within securable lockers adjacent the service vehicle access.

A pedestrian link is proposed within the site, from the main entrance to the footpath on the western side of East Street.

It is noted as part of the proposed Cancer Centre a direct access to the on-site car park has been investigated from Borella Road, however based on discussions with Road and Maritime services it is understood that direct access will not be permitted. It is therefore proposed to provide an internal connection within the site in order to provide access to the on-site car park from both Keane Street and East Street via existing access points.

Figure 18: Proposed Access Arrangements

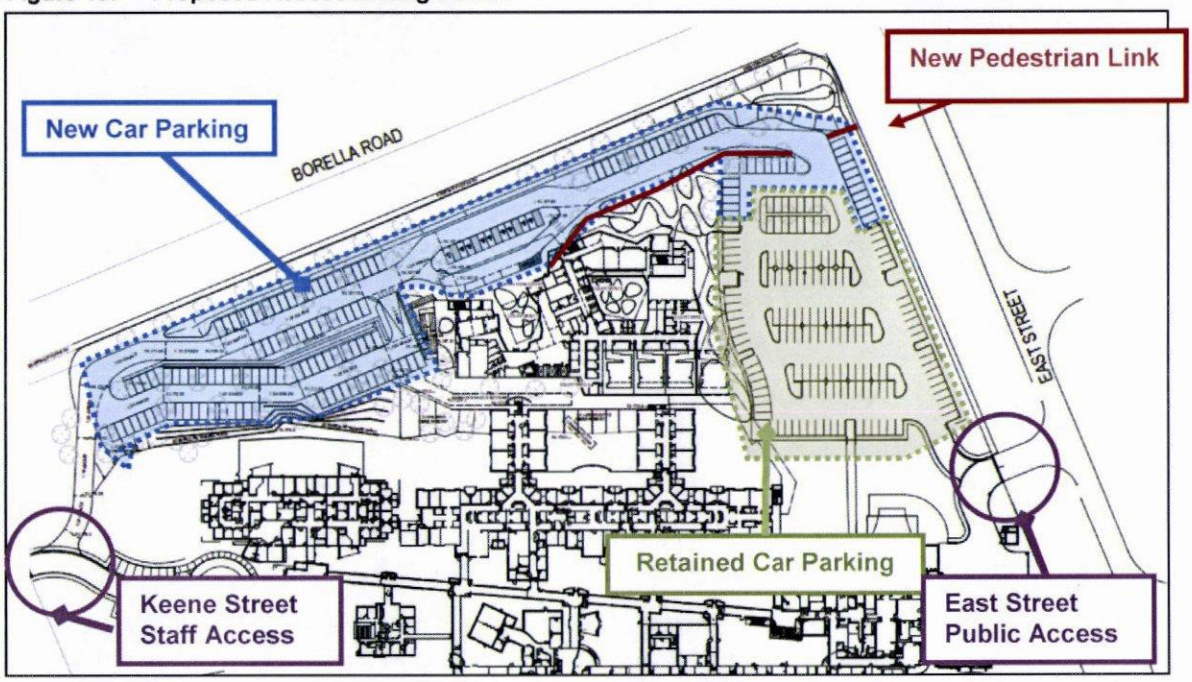
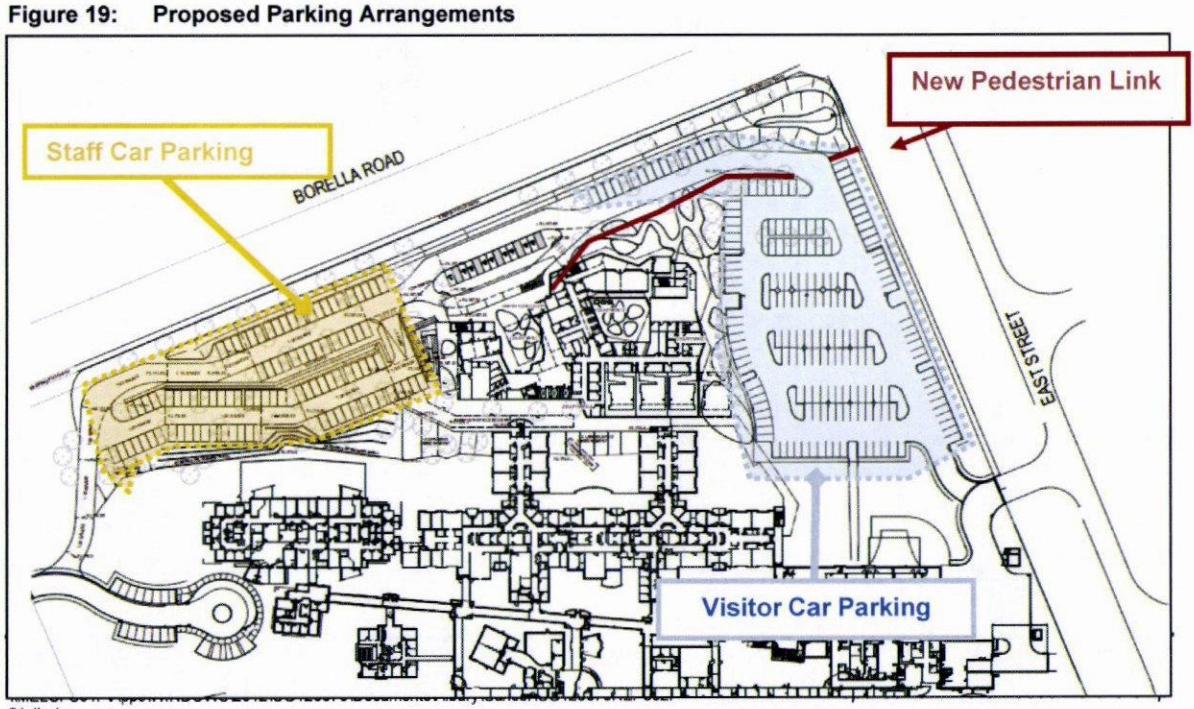


Figure 19: Proposed Parking Arrangements



Proposed Development

6 Design Considerations

6.1 Parking and Access

6.1.1 General

The car park and access design has been provided in accordance with the requirements of the Australian Standard for off-street car parking (AS/NZS 2890.1). Specifically, all car spaces meet the minimum dimension requirement for User Class 3 (which includes Hospital use) of the Australian Standard, being 2.6 metres wide and 5.4 metres long, with an aisle width of at least 5.8 metres.

Car park circulation aisles have been provided with a minimum width of 5.5m, and is in accordance with the minimum specifications of the Australian Standard for two-lane access. Furthermore, access through the site has been designed to accommodate a vehicle up to 19.0m in length for the infrequent occurrence (3-4 times a year) of medical imaging equipment deliveries and servicing. At these times, the 19.0m semi would prop in the main accessway and the Hospital/Driver/Contractor would manage safety aspects of traffic and pedestrians for this area.

Access ramps to car parking on the site do not exceed 1:8, and have been provided with widths in excess of the minimum 6.1 metres between obstructions for two-way flow (where two-way flow is required).

The bicycle parking design is to be provided in accordance with the requirements of the Australian Standard for Bicycle parking facilities (AS 2890.3).

6.1.2 East Street Access

It is proposed to give priority, and guide motorists, entering the hospital site from East Street to continue north to the main car park (as opposed to south to the services area).

In order to facilitate this it is recommended appropriate linemarking and signage be provided at the access, as illustrated in the signage and linemarking plan prepared by Cardno (Drawing CG120070T01P2), attached as Annex 2 to this report.

6.2 Emergency Vehicles

A patient transfer bay is proposed to be located in a drop off zone adjacent the entry. A swept path analysis of the proposed patient transfer and drop off area is provided within Annex 1 of this report. It is noted the proposed patient transfer bay and loading area results in the reduction of one parking space from the architectural plans provided, with this reduction being included in the proposed parking supply for this assessment (additional 148 car spaces).

6.3 Loading

Loading and transfer of goods and materials will continue to occur through the existing hospital loading facilities, located on the eastern end of the site accessed from East Street.

Additionally, a service vehicle access is proposed for access to the new regional cancer centre, accessed from within the new northern car park and ultimately from Keene Street (or East Street). Typically this area will be utilised as an outdoor 'break-out' area for patients of the wellness centre. Service vehicle access through this area will be infrequent and each instance will be managed by hospital staff to ensure that both access to the area is available (through three car spaces within the car park), and that the outdoor area for the wellness centre is not being used. As such all service vehicle access to this area will be under the supervision of hospital staff.

The service vehicle access to the rear of the building (to the plant area) has been provided to accommodate SR vehicles (6.4m long). In order to achieve the required change in RL the following

ramp layout will be provided, in accordance with AS 2890.2 – 2002, commencing from the new car park to the 'break-out' area.

- 4 metres @ 1:12
- 7.5 metres @ 1:7
- 4 metres @ 1:12

7 Car Parking Considerations

7.1.1 Planning Scheme Requirements

Chapter 17 of the Albury Development Control Plan (DCP) 2010 sets out the requirements for the provision of car parking for a variety of land uses.

For the land use 'Hospital', the DCP car parking rate is set at *1 space per 4 beds plus 1 space per 2 employees.*

In regards to Consulting rooms, the DCP sets out a parking rate for a 'Medical Centre', 'Health Services Facility' or 'Health Consulting Rooms' at *3 spaces per surgery, consultation room or treatment room.*

At this stage exact future staffing numbers for the site are unsure, and as such future staffing has been estimated based on application of the ratios of existing staff numbers and existing beds to future bed numbers.

Table 7: Estimated Future Staff Numbers

	Existing	Interim
Employees	338	450[1]

[1] *Future employee numbers are estimated based on the proportion of increased bed numbers and the current number of employees.*

Staff numbers are estimated to increase by 112 as part of the Regional Cancer Centre project, inclusive of the PET facility (which will conservatively be adopted).

Application of the DCP car parking rates to the proposed expansion of the site is presented in Table 8 below.

Table 8: Albury DCP car parking requirements

Component	Car Parking Rate	Interim Expansion	
		Proposed Additional	Car Spaces
Beds	1 space per 4 beds	60	15
Employees	1 space per 2 employees	112	56
Consulting Rooms	3 spaces per room	23	69
Total			**140**

Review of the above indicates that the proposed Regional Cancer Centre expansion will generate a statutory requirement to provide an additional 140 car spaces on the site.

For the purposes of a conservative analysis, it has been assumed that the additional requirement is to be provided over and above the existing supply. Based on the existing on-site car parking supply of 437 spaces (including the additional PET spaces), the total parking requirement on the site post development of the Regional Cancer centre will be for **577 spaces**.

7.1.2 Department of Health Car Parking (DOH) Evaluation Tool

The Department of Health Car Parking Evaluation Tool has also been used to estimate potential peak car parking demands for future expansion.

This tool is primarily based on staffing numbers for the Hospital and provides two separate car parking rates based on whether the site is located in a Country or a City location (primarily to offset public transport accessibility). For the purposes of this analysis, the rates for country have been adopted.

Based on the existing staffing estimates provided by Albury Wodonga Health and the number of beds and consulting suites proposed as part of the cancer centre, the Department of Health Tool estimates the peak on-site car parking demands, summarised in Table 9 below.

Table 9: DOH Evaluation Tool

	Interim Expansion
Morning Peak	441 spaces
Afternoon Peak	493 spaces

The DOH calculations have been provided within Annex 1 of this report. It is noted that this represents the total future demand for the site.

Based on the Department of Health Car Parking Evaluation Tool a minimum of **493 on-site car parking spaces** will be required to be provided to accommodate the anticipated demand for the regional cancer Centre.

Based on the existing on site car parking supply of 437 spaces (including the additional PET spaces) this represents an additional **56** on site car parking spaces.

7.1.3 Case Study Data

7.1.3.1 General

Based on the surveyed rate at the Albury Campus a relative rate of 2.30 car parking spaces per bed has been calculated, as detailed previously in Section 3.2.2.

7.1.3.2 Regional Cancer Centre

Applying these rates to the additional 60 beds proposed as part of the interim plan indicates that the site will generate a car parking demand of an additional **138 car spaces**.

Whilst the above surveyed rate does allow for existing consulting rooms, it is noted that it is unclear as to exactly how many consulting rooms are currently operational on-site. Therefore it is unclear if the number of consulting rooms increases proportionally to the number of beds proposed as a result of the introduction of the Cancer Centre. In any case it is understood that some consulting suites will operate as ancillary to the Regional Cancer Centre with patients visiting the consulting suites part of a combined trip. While the others which generate a parking demand in their own right are considered to be accommodated by the above rate.

Furthermore it is noted that the above demand is similar to the Albury DCP rate.

7.1.4 Car Parking Summary

Based on the preceding assessment, the future car parking demands for the site are summarised in Table 10.

Table 10: Car Parking Summary

Analysis Tool	Car Parking Requirement – Post Cancer Expansion[1]	Additional Car Parking Requirement
Planning Scheme	577 spaces	+ 140 spaces
Department of Health CP Tool	493 spaces	+ 56 spaces
Survey of Existing Demand	575 spaces	+138 spaces

[1] *Includes additional car parking to be provided as part of the PET project at the southern side of the hospital building.*

Based on the preceding it is considered appropriate for future car parking demands of the site be provided to accommodate both the number of spaces based on the car parking rate as defined by the Albury DCP rate and also the number of spaces determined from the survey of the existing conditions.

It is noted that as part of the PET works, additional car parking will be provided over and above the anticipated requirement. Notwithstanding it is considered appropriate to provide the entirety of additional car parking requirement as part of the Cancer Centre works in order to ensure sufficient car parking is available in close proximity to the new building and facilities.

7.1.5 Adequacy of the Proposed Provision

Based on the preceding it is recommend that an additional 140 car spaces be provided as part of the Regional Cancer Centre. Based on an existing supply of 437 spaces (inclusive of additional spaces proposed as part of the PET works), a minimum of 577 car spaces should be provided for the overall site.

As discussed in Section 5.2, an additional 148 car parking spaces are proposed as part of the regional cancer centre works, this is in excess of the additional 140 spaces recommended and is considered appropriate. Furthermore it is noted that the total supply of car parking to the hospital will be:

- New northern at-grade: 149 spaces;
- Existing northern at-grade: 154 spaces;
- Existing southern visitors car park: 170 spaces;
- Reconfigured Docotrs Car Park (southern) 78 spaces; and
- Nolan House Parking 35 spaces.

Total = 586 spaces.

This is in excess of the 577 spaces specified by the Albury DCP and is considered appropriate. Furthermore it is considered beneficial to provide additional car parking given the hospital context of the site.

7.1.6 Disabled Car Parking

The Albury Development Control Plan (DCP) 2010 specifies that disabled parking be provided at a rate of 1 disabled space for every 33 car parking spaces. Application of this rate to the proposal is summarised in Table 11.

Table 11: Disabled Parking Requirements – Albury DCP

	Cancer Centre	
	Car Parking Spaces	Disabled Car Parking Spaces
Disabled Parking Spaces	+149 spaces	+5 spaces

Nine (9) additional disabled car parking spaces are proposed as part of the regional cancer centre, which is in excess of the Albury DCP requirement and is considered appropriate.

7.2 Bicycle and Motorcycle Considerations

7.2.1 Statutory Requirements

Government policy currently aims to encourage the use of bicycles as a mode of transport. Clause 17.3.3 of the Albury Development Control Plan (DCP) 2010 specifies the requirements for bicycle facilities and motorcycle parking spaces. Table 12 shows the relevant bicycle and motorcycle parking requirements for the proposed development.

Table 12: Parking Requirements - Albury DCP 2010

Parking	Bicycle Parking
Bicycle	1 to 10 car parking spaces for car parks with 30 or more spaces
Motorcycle	1 to 30 car parking spaces for car parks with 30 or more spaces

Based on the above, Table 13 summarises the facilities required by the interim expansion and the master plan expansion of the proposed development for motorcyclists and cyclists.

Table 13: Parking Facility Requirements

	Number of car parking spaces	Required Bicycle Parking	Required Motorcycle Parking
Interim Expansion	+149 spaces	+ 15 spaces	+ 5 spaces

The proposed provision of 16 bicycle parking spaces exceeds the statutory requirement of 15 spaces.

It is recommended that motorcycle parking be provided in accordance with the Albury DCP specifications.

8 Traffic Considerations

8.1 Traffic Generation

Based on the proposed changes the new northern car park, the overall increase in car parking which is to be accessed via East Street (northern access) and Keene Street is equal to 149 spaces.

Application of the traffic generation rates surveyed as part of Section 3.3 (and shown in Table 14) to the additional car parking provided enables the additional hospital traffic to be calculated and is presented in Table 15.

Table 14: Existing Hospital Traffic Generation

Period	Generation per Parking Space		
	In	Out	Total
AM Peak	0.38	0.16	0.54
PM Peak	0.22	0.36	0.58

Table 15: Additional Hospital Traffic

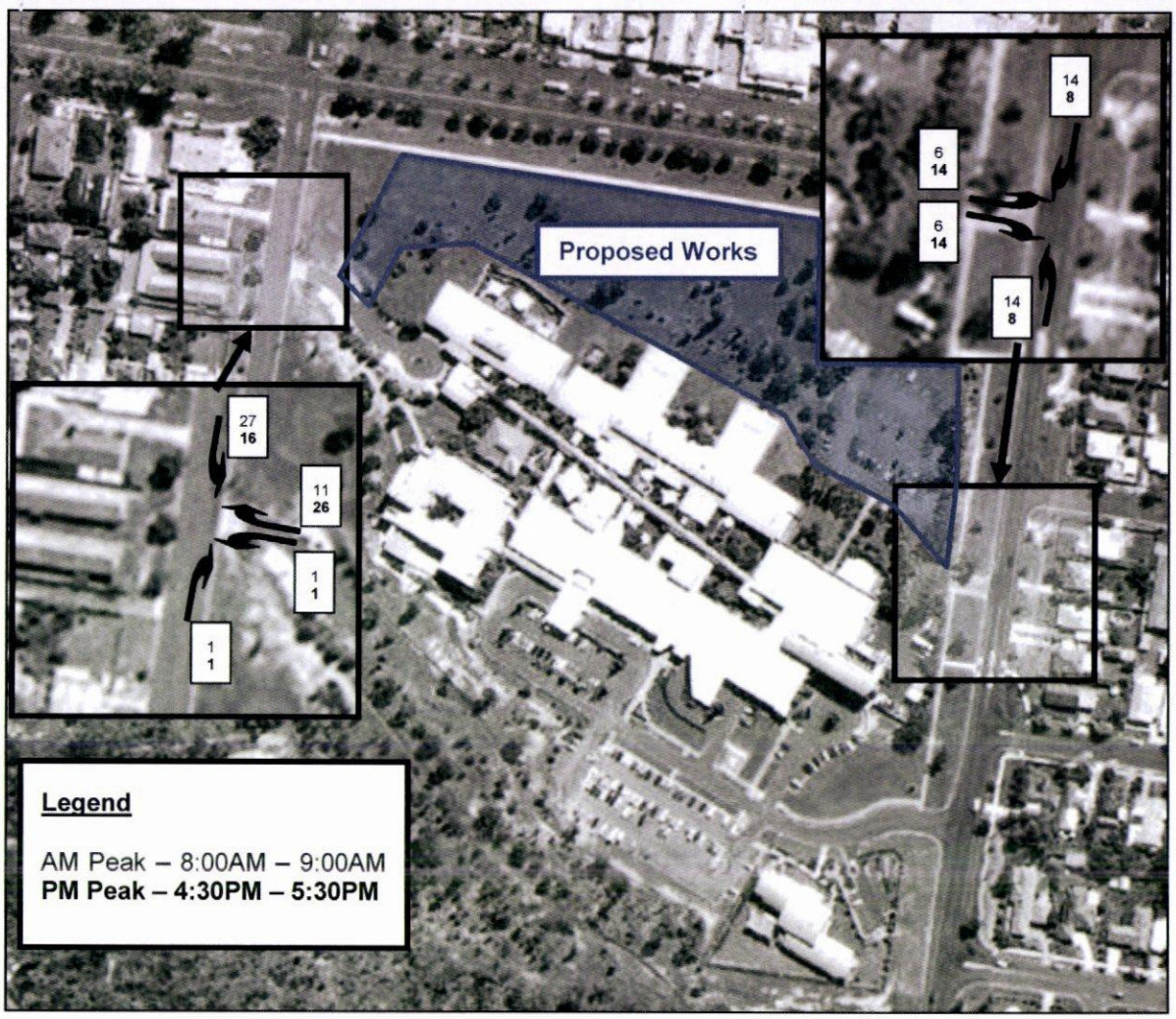
Period	Number Spaces	In	Out	Combined
AM Peak	149	57	24	81
PM Peak	149	33	54	87

With consideration of the existing traffic conditions surrounding the site including existing access locations, the proposed access arrangements and the location of additional car parking provided, it is anticipated that additional traffic will be split 50%/50% to the Keene Street / East Street access' respectively.

The anticipated peak traffic generated by the proposed regional cancer centre is illustrated in Figure 20.

A pre-application meeting was held on 23/10/12 between Cardno, Road and Maritime Services and Albury Council to discuss the traffic generation and impact of the site. As a result of this meeting the traffic generation and distributions outlined above where agreed to be appropriate for the site.

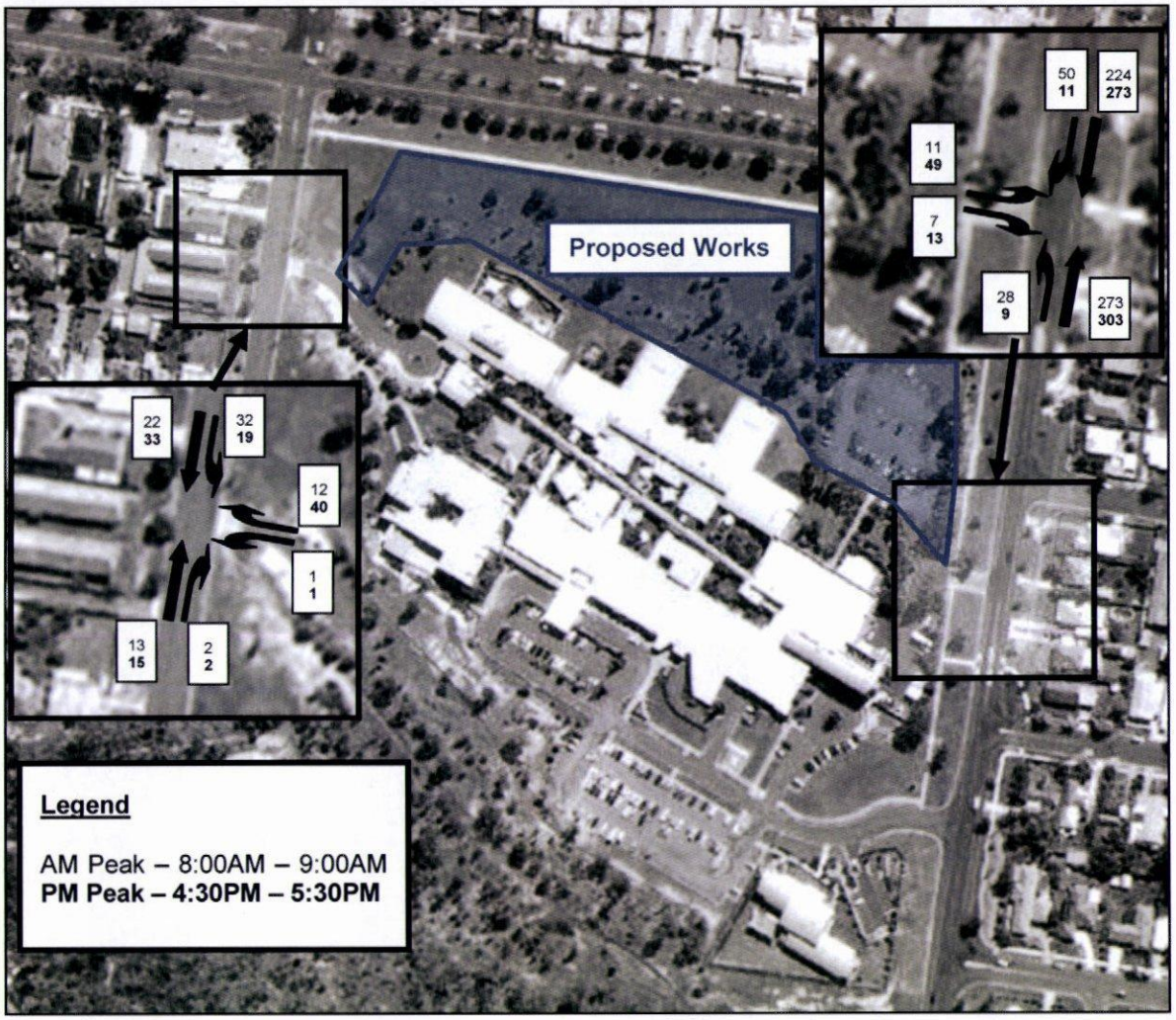
Figure 20: Additional Traffic Generation



8.2 Traffic Impact

By superimposing the expected generated traffic volumes shown in Figure 20 onto the existing volumes previously shown in Section 3.3, the future traffic volumes can be determined.

Figure 21: Future Traffic – Keene Street and East Street (North) Access



The operation of the hospital access to Keene Street and East Street respectively have been analysed using SIDRA, with the results presented in Table 16. The operation of the intersections of Borella Road / East Street and Borella Road / Keene Street was also analysed using SIDRA, with the results presented in The resultant impact on the intersections of Borella Road / Keene Street and Borella Road / East post development is presented in Table 17 and Table 18.

Table 17 and Table 18.

Table 16: SIDRA Intersection Analysis Summary, Post Development

Period	Approach	Degree of Saturation	95th%ile Queue	Average Delay
Keene Street / Site Access				
AM Peak	Keene Street (North)	0.031	0.0 m	4.9 sec
	Keene Street (South)	0.009	0.3 m	1.3 sec
	Site Access (East)	0.016	0.4 m	9.0 sec
PM Peak	Keene Street (North)	0.029	0.0 m	3.0 sec
	Keene Street (South)	0.010	0.4 m	1.2 sec
	Site Access (East)	0.052	1.5 m	9.1 sec
East Street / Site Access (North)				
AM Peak	East Street (North)	0.175	8.9 m	3.3 sec
	Site Access (West)	0.035	0.9 m	12.7 sec
	East Street (South)	0.168	0.0 m	0.8 sec
PM Peak	East Street (North)	0.163	9.1 m	2.1 sec
	Site Access (West)	0.105	2.7 m	11.9 sec
	East Street (South)	0.173	0.0 m	0.2 sec

The resultant impact on the intersections of Borella Road / Keene Street and Borella Road / East post development is presented in Table 17 and Table 18.

Table 17: SIDRA Intersection Analysis Summary – Borella Road / Keene Street

	Approach	Degree of Saturation	95th%ile Queue	Average Delay
AM Peak	**Keene St (N)**	0.378	9.3 m	27.1 sec
	Borella Rd (W)	0.162	10.1 m	3.5 sec
	Keene St (S)	0.151	3.3 m	20.8 sec
	Borella Rd (E)	0.166	11.1 m	2.1 sec
	Intersection	**0.378**	**11.1 m**	**4.8 sec**
PM Peak	**Keene St (N)**	0.635	17.7 m	36.7 sec
	Borella Rd (W)	0.187	14.0 m	4.0 sec
	Keene St (S)	0.412	10.7 m	28.8 sec
	Borella Rd (E)	0.175	13.5 m	2.8 sec
	Intersection	**0.635**	**17.7 m**	**7.6 sec**

Table 18: SIDRA Intersection Analysis Summary – Borella Road / East Street

	Approach	Degree of Saturation	95th%ile Queue	Average Delay
AM Peak	**East St (N)**	0.160	5.1 m	10.5 sec
	Borella Rd (E)	0.267	9.2 m	9.0 sec
	East St (S)	0.220	7.1 m	9.0 sec
	Borella Rd (W)	0.226	8.0 m	8.2 sec
	Borella Service Rd (NW)	0.060	1.9 m	10.1 sec
	Intersection	**0.267**	**9.2 m**	**9.0 sec**
PM Peak	**East St (N)**	0.285	10.2 m	10.4 sec
	Borella Rd (E)	0.330	12.1 m	9.0 sec
	East St (S)	0.212	6.9 m	9.5 sec
	Borella Rd (W)	0.262	10.0 m	9.0 sec
	Borella Service Rd (NW)	0.086	2.8 m	9.6 sec
	Intersection	**0.330**	**12.1 m**	**9.3 sec**

Review of Table 16 indicates a maximum increase of +0.015 DoS for any given movement as a result of additional traffic generated. This magnitude of increase is considered insignificant, and will be indiscernible to the general motorist.

Furthermore the proposed development is anticipated to generate up 87 vehicle movements during the PM peak hour, and when split between access points, equates to less than 2 vehicle movements every three minutes at either end of the site. This magnitude of increase is not considered significant in traffic engineering terms and is expected to be adequately accommodated by the existing access arrangements.

Reference to The resultant impact on the intersections of Borella Road / Keene Street and Borella Road / East post development is presented in Table 17 and Table 18.

Table 17 indicates that the intersection of Borella Road / Keene Street will operate with a 'very good' level of service post development during the PM peak hour. This represents a decrease in the level of service for the period from 'excellent' to 'very good' however the intersection will continue to operate with minimal delays and queues.

A review of Table 18 indicates that the roundabout intersection of Borella Road / East Street will continue to operate with an 'excellent' level of service post development.

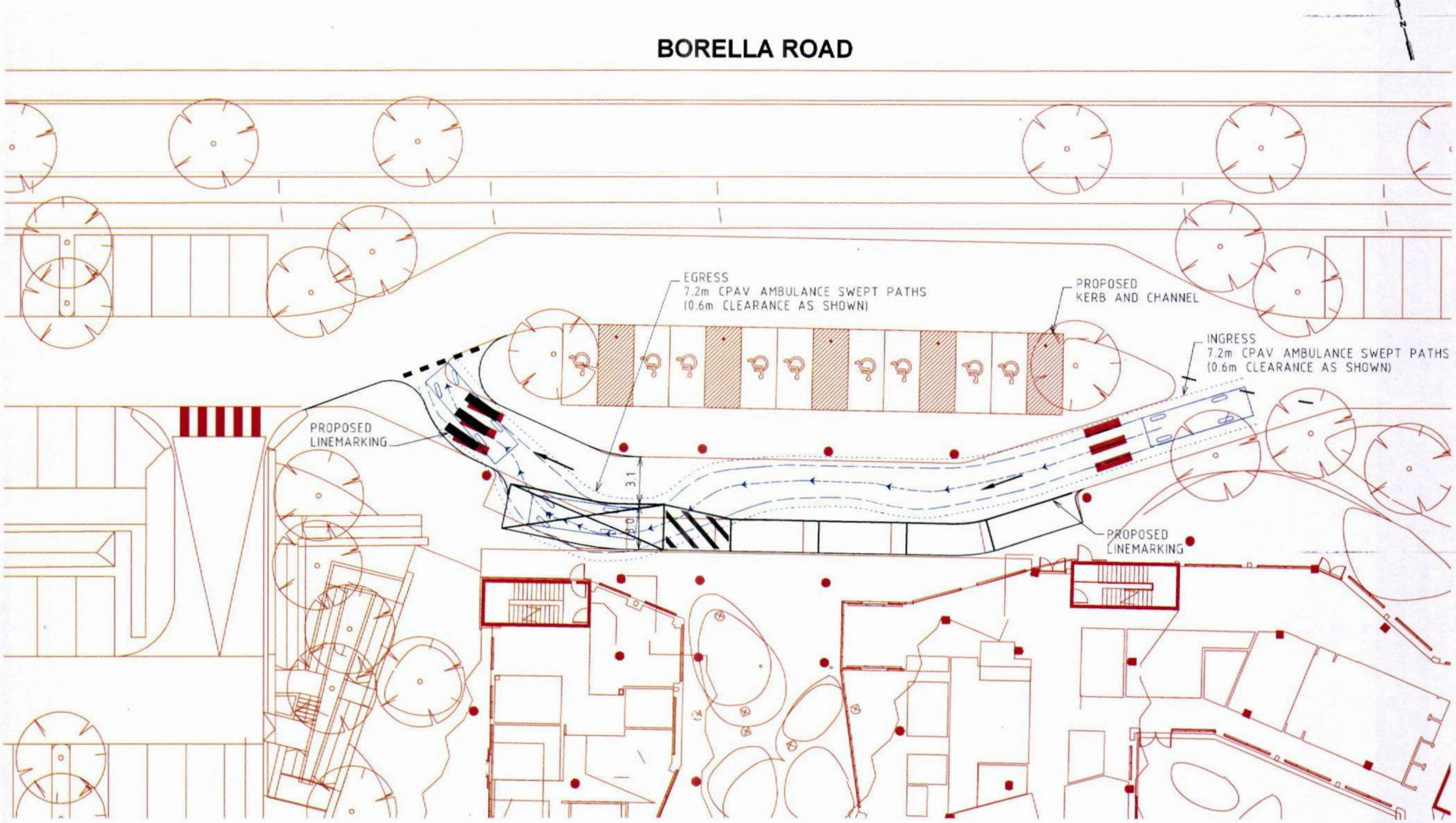
Additionally it is noted that traffic generation, distributions and impact pre-application meeting was between Cardno, Road and Maritime Services and Albury Council, at which it was agreed that the site would have no significant impact on the operation of the surrounding road network.

9 Conclusions

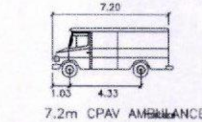
Based on the foregoing analysis it is concluded that;

- It is proposed to develop the existing Albury Hospital campus to provide a regional cancer centre comprised of an additional 60 hospital beds and additional 23 consulting suites (including 3 radiation bunkers);
- A background study for the existing hospital site was undertaken to determine a parking generations rate of 2.30 spaces per bed;
- The background study also identified a traffic generation rate of 0.54 and 0.58 movements / space for the AM and PM peaks respectively;
- As a result the overall car parking supply of the site is proposed to increase by 148 spaces, resulting in a total of 586 spaces to be supplied on-site;
- The car park and access design has been provided in accordance with the requirements of the Australian Standard AS/NZS 2890.1:2004;
- The proposed development generates a statutory requirement for 15 bicycle parking spaces and 5 motorcycle parking spaces under the Albury DCP 2010;
- The proposed development generates a statutory requirement for an additional 140 car parking space under the Albury DCP 2010, which is confirmed by an empirical assessment of the proposed development indicating a demand for an additional 138 car spaces;
- The proposed provision of 149 parking spaces is considered appropriate to accommodate the anticipated future car parking requirement of 140 spaces;
- The proposed provision of 16 bicycle parking spaces is in excess of the Albury DCP rates and is considered appropriate;
- It is recommended that motorcycle parking be provided in accordance with the Albury DCP specifications.
- The level of traffic expected to be generated by the proposed development is minimal and expected to have minimal impact on the surrounding road network.

Annex 1:
Swept Path Analysis



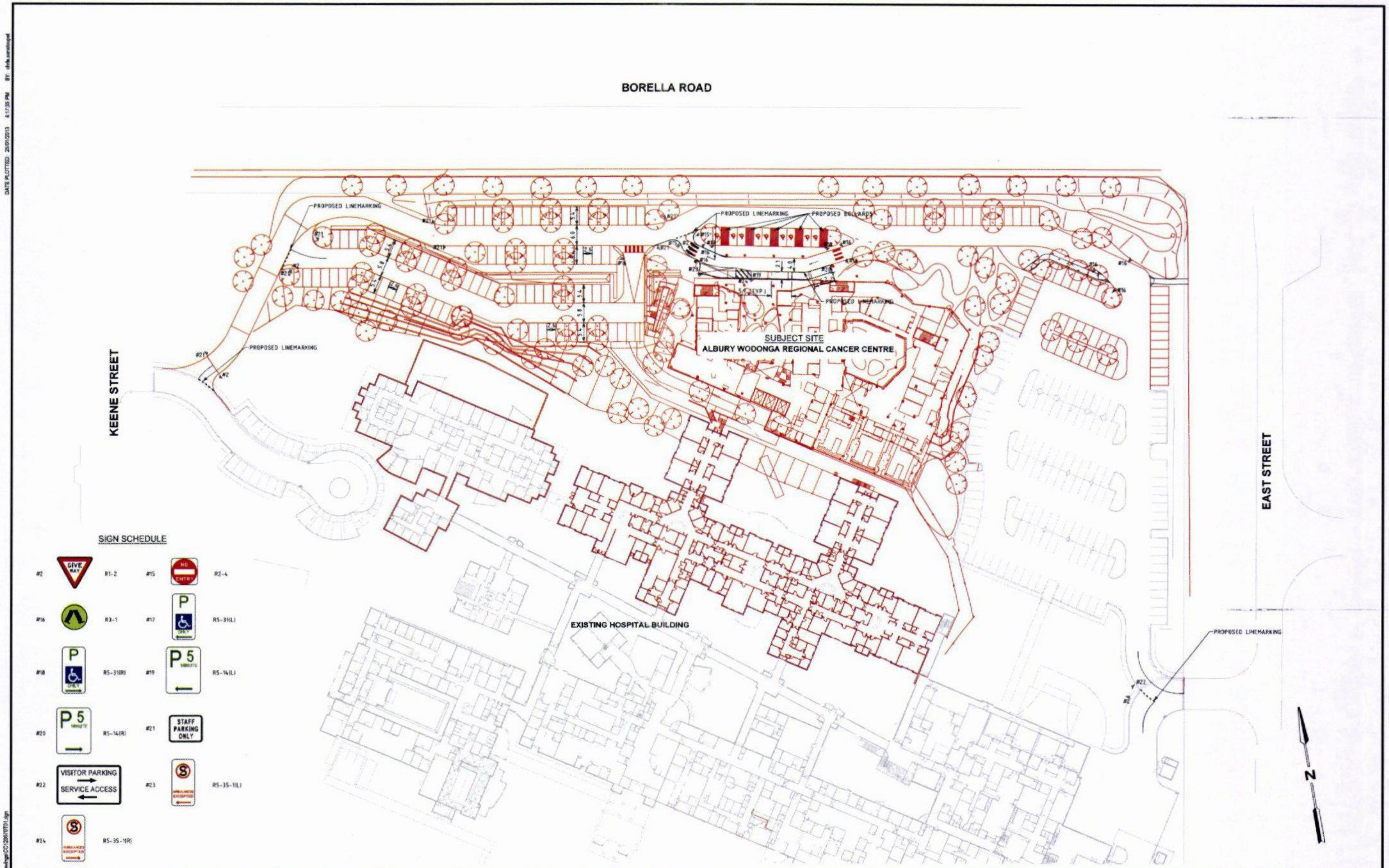
CG120070SK11 P02: ALBURY WODONGA HEALTH CANCER CENTRE
PROPOSED AMBULANCE BAY
SCALE - 1:250 @ A3 DATE - 27-08-2012



7.2m CPAV AMBULANCE

Width	:	2.00
Track	:	1.71
Lock to Lock Time	:	6.0
Steering Angle	:	37.5

Annex 2:
Signage and Linemarking Plan



Rev	Date	Description	Drawn	Appr.
P2	25.01.13	GENERAL AMENDMENTS	JCS	AL
P1	09.11.12	ISSUED FOR INFORMATION	KS	AL

0 5.0 10.0 20.0
1:500 @ A1

WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES SHOWN ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE.

1. BASE INFORMATION SUPPLIED BY CLIENT. REF No. AB03-0001-DWG-E.DWG
2. ALL DIMENSIONS TO FACE OF KERB AND CHANNEL U.N.O
3. DECLARED ROAD - BORELLA ROAD (SPEED ZONE 60KM/H)
   LOCAL ROAD - EAST STREET (SPEED ZONE 60KM/H)
   LOCAL ROAD - KEENE STREET (SPEED ZONE 50KM/H)
4. INSTALL ALL SIGNS IN ACCORDANCE WITH AUSTRLIAN STANDARD AS 1742.1-2003. AS 1742.11-1999 AND REMOVE ALL REDUNDANT SIGNS.
5. LINE MARK IN ACCORDANCE WITH AUSTRALIAN STANDARD AS 1742.10-2009. AS 1742.11-1999. AS 1742.13-2009 AND REMOVE ALL REDUNDANT LINEMARKING.

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Drawn	KS
Designed	KS
Checked	AL
Authorised	

Client: BILLARD LEECE PARTNERSHIP

Project: ALBURY WODONGA REGIONAL CANCER CENTRE
TRAFFIC AND CAR PARKING
BORELLA ROAD, ALBURY

Title: FUNCTIONAL LAYOUT PLAN
SIGNAGE AND LINEMARKING PLAN

Status: **PRELIMINARY**
NOT TO BE USED FOR CONSTRUCTION PURPOSES

Date	Scale	Size
09.11.12	1:500	A1

Project Number	Sheet Number	Revision
CG120070	T 01	P2