

University of Sydney
**Abercrombie Precinct
Redevelopment Project**
Transport Impact Assessment

1

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1 Introduction

1.1 Background

This Transport Impact Assessment (TIA) has been carried out by Arup on behalf of The University of Sydney in support of a Project Application for the Abercrombie Precinct Redevelopment Project containing the School of Economics and Business located on Abercrombie Street in Darlington, Sydney.

The fundamental purpose of this TIA is to assess the proposal in terms of accessibility and transport impact on the surrounding network.

The TIA report is based on the following sources of information and industry accepted practices:

1. NSW Environmental Planning and Assessments Act (1979);
2. Planning NSW University of Sydney: Abercrombie Precinct Project and CODCD building requirements and Director Generals Requirements (DGR);
3. Roads Traffic Authority (RTA) Guidelines for traffic generating developments (2002);
4. Australian Standard AS/NZS 2890.1:2004;
5. New South Wales State Environmental Planning Policies (SEPP);
6. RTA Traffic Volume Data 2002 Sydney Region;
7. Draft Sydney Local Environment Plan (LEP) 2010;
8. 2004 Transport Survey Report A survey of students' current modes of transport to and from the University of Sydney Prepared by The University of Sydney Facilities Management Office;
9. Arup technical note University of Sydney Traffic and Parking Strategy 2010 – Stage 1: Technical Note 4, Parking Provision Policy;
10. The Parsons Brinckerhoff TIA North Eveleigh Development April 2008;
11. The Parsons Brinckerhoff Abercrombie Precinct: Parking and Traffic Study December 2007;
12. The Parsons Brinckerhoff Abercrombie Precinct: Traffic and Parking Impacts of revised master plan December 2007;
13. Discussions with representatives of The University of Sydney;
14. Campus 2020 Masterplan; and
15. Observations obtained during site visits.

1.2 Structure

The structure of this study is as follows:

- Chapter 1 Introduction;

Chapter 0

- Existing - Receiving Environment;
- Chapter 3 Development Proposal;
- Chapter 4 Transport Impact Assessment; and
- Chapter 5 Conclusions.

1.3 Director Generals' Requirements

This report takes into account the transport and accessibility issues raised in the Director Generals' Requirements attached in **Appendix C**. These issues and the sections which relate to them throughout the report are shown in Table 1;

Table 1 Transport and Accessibility issues raised in the Director Generals' Requirements

DGR	Issue stated in the Director Generals' Requirements;	Section
i)	Traffic generation including daily and various peak traffic movements and the increase in the level and type of traffic associated with the proposal;	4.2
ii)	Impacts and resultant upgrades to street parking, the road network including laneways, arterial roads, intersections, signage and road capacity resulting from the project;	4.5.5
iii)	Cumulative impacts on the local and subregional area including the future development of the North Eveleigh Site;	4.4.1
iv)	Assessment of the likely impact of truck traffic on nearby residential areas; potential increase in toxicity levels of loads transported (including an incident management strategy) and anticipated route of trucks on major arterial and the local road network including origins and destinations.	4.3.1
v)	Details of public transport accessibility and strategies to encourage public transport patronage including pedestrians and cyclists;	4.2
vi)	Pedestrian and cyclist accessibility; existing peak movements; adequacy of the proposal to meet likely future demand; need for upgrading or improvement works; links to Redfern Railway Station and the future bridge link;	4.2
vii)	Vehicular access, car parking and bicycle arrangements;	3.3, 3.5 and 3.6
viii)	Detail adequate emergency vehicle access.	3.4.3

2 Existing - Receiving Environment

2.1 Location

Darlington is a suburb in South Sydney located 3km south of the Central Business District (CBD). The suburb is bounded by Redfern to the east, Eveleigh to the south, Newtown to the south west, Camperdown to the north west and Chippendale to the north. The arterial route through the suburb is City Road which marks the end of the Princes Highway and connects Sydney to Melbourne. In the Darlington area, City Road is a two-way dual carriageway road with parking on both sides of the street.

The proposed development site is currently existing university property and is adjacent to Darlington Public School. The site is bounded by Darlington Lane to the north, Codrington Street to the east, Abercrombie Street to the south and Darlington Public School to the west. Figure 1 shows the location of the proposed development site.



Figure 1 Site location

The site is located within the Darlington Campus of the University of Sydney. Abercrombie Street is a two way street with street parking on either side. Site details are shown below. A pedestrian crossing is located on Abercrombie Street, east of the intersection with Golden Grove Street. The Abercrombie Street / Golden Grove Street intersection and the Abercrombie Street / Codrington Street intersection have roundabouts facilitating traffic calming throughout the area.

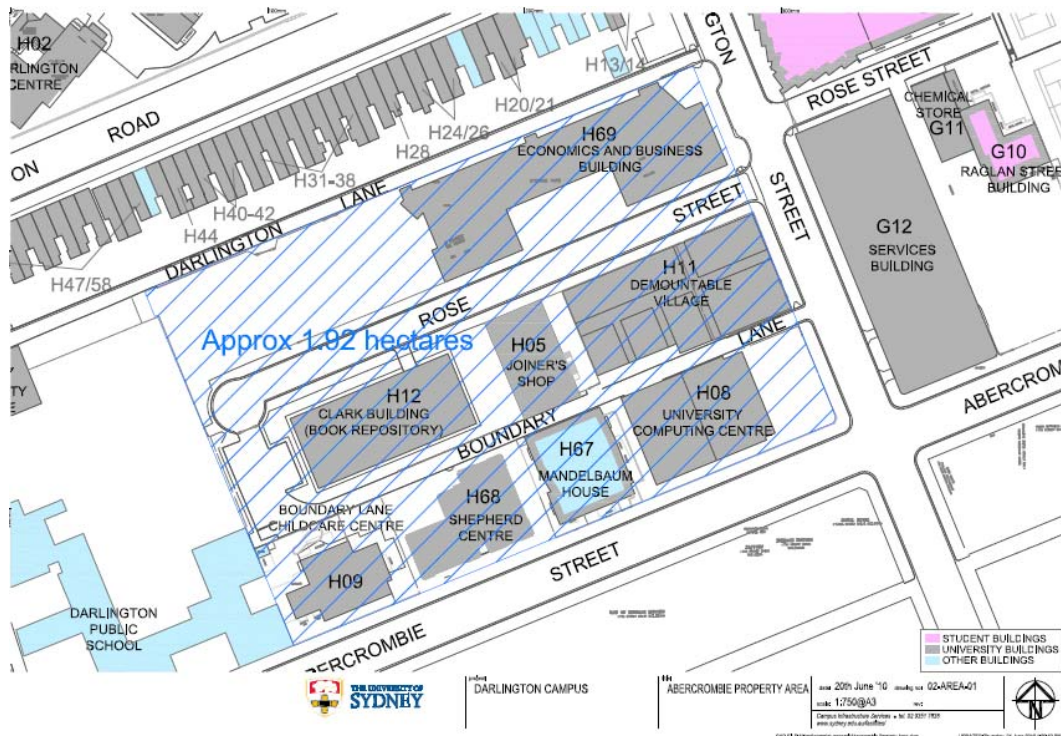


Figure 2 Site details (Source: University of Sydney)

2.2 Rail

The site is approximately 700 metres from Redfern railway station which provides the area with frequent rail links to the surrounding region. Redfern railway station is the ninth busiest railway station in the Sydney area. The station has 12 platforms for the 12 rail lines that serve it. Table 2 details the number of services at the station for each line.

Table 2 Redfern railway station lines

Rail Line	Direction	Trains per weekday	Trains in AM Peak ¹
Eastern Suburbs and Illawarra Line	Waterfall to Cronulla to Bondi Junction	156 trains	17 trains
	Bondi Junction to Cronulla to Waterfall	156 trains	14 trains
Bankstown Line	To Townhall via Bankstown	76 trains	6 trains
	To Liverpool via Regents Park	82 trains	5 trains
Inner West Line	To Museum via Regents Park	189 trains	4 trains
	To Liverpool Via Regents Park	195 trains	3 trains
Airport and East Hills Line	To Town Hall via Airport or Sydenham	12 trains	0 trains
	To Macarthur via Airport or Sydenham	12 trains	3 trains
South Line	To City via Granville	203 trains	3 trains
	To Campbelltown via Granville	197 trains	3 trains
North Shore Line	To Parramatta via Sydney	193 trains	18 trains
	To Berowra via City	206 trains	17 trains

2.3 Bus

The majority of the buses in the Darlington area operate along City Road. Bus stops on City Road are approximately 250 metres away from the proposed development. Table 3 details a list of the existing bus routes in operation along City Road and the daily scheduled number of buses in operation on the route. Photograph 1 shows the bus stop and shelters on City Road.

¹ For the purposes of this table only the trains during the AM peak hour is defined as the trains that depart Redfern Station between 08:00am and 09:00am.

Table 3 Bus routes and two way frequency along City Road

Bus Number	Operator	Route	Total Number of Buses Per Day	Buses in the AM Peak Hour
Metrobus 30	Sydney Buses	Sydenham Station to Spit Junction	128	12
352	Sydney Buses	Bondi to Marrickville Junction	53	6
370	Sydney Buses	Coogee to Leichhardt	112	11
422	Sydney Buses	Circular Quay to Kogarah	156	10
423	Sydney Buses	Kings Grove to Circular Quay	148	11
428	Sydney Buses	Dulwich to Circular Quay	135	10
L23	Sydney Buses	Kingsgrove – Circular Quay	17	5



Photograph 1 Bus stops at City Road / Butlin Avenue

2.4 Pedestrians

Pedestrian connections from the proposed site to Redfern railway station currently exist in the form of unsignalised zebra crossings outside Darlington Public School and at the nearby Abercrombie Street / Codrington Street roundabout. Photograph 2 shows the existing pedestrian crossing near the proposed site on Abercrombie Street. The University and the City of Sydney are currently discussing measures to improve pedestrian access to Redfern station for students.



Photograph 2 Raised pedestrian crossing on Abercrombie Street

Pedestrian links are in place near the City Road bus stops in the form of zebra crossings and signalised crossings along Butlin Avenue. These help provide safer environments for pedestrians and public transport commuters. Photograph 3 and Photograph 4 shows pedestrian crossings along Butlin Avenue.



Photograph 3 Zebra crossing at Codrington Street/ Darlington Road



Photograph 4 Signalised crossing at City Road / Butlin Avenue

2.4.1 Bicycles

Bicycles are a significant mode of travel to and within the University. There are no formal bike paths or parking on the site though there is some informal parking of bikes against railings and sign poles etc. There is substantial bike parking provided close to the site, with dozens of bike racks outside the Sports Centre to the east of the proposed development. The bicycle strategy summarised in the City of Sydney Cycle Strategy Action Plan is shown below.

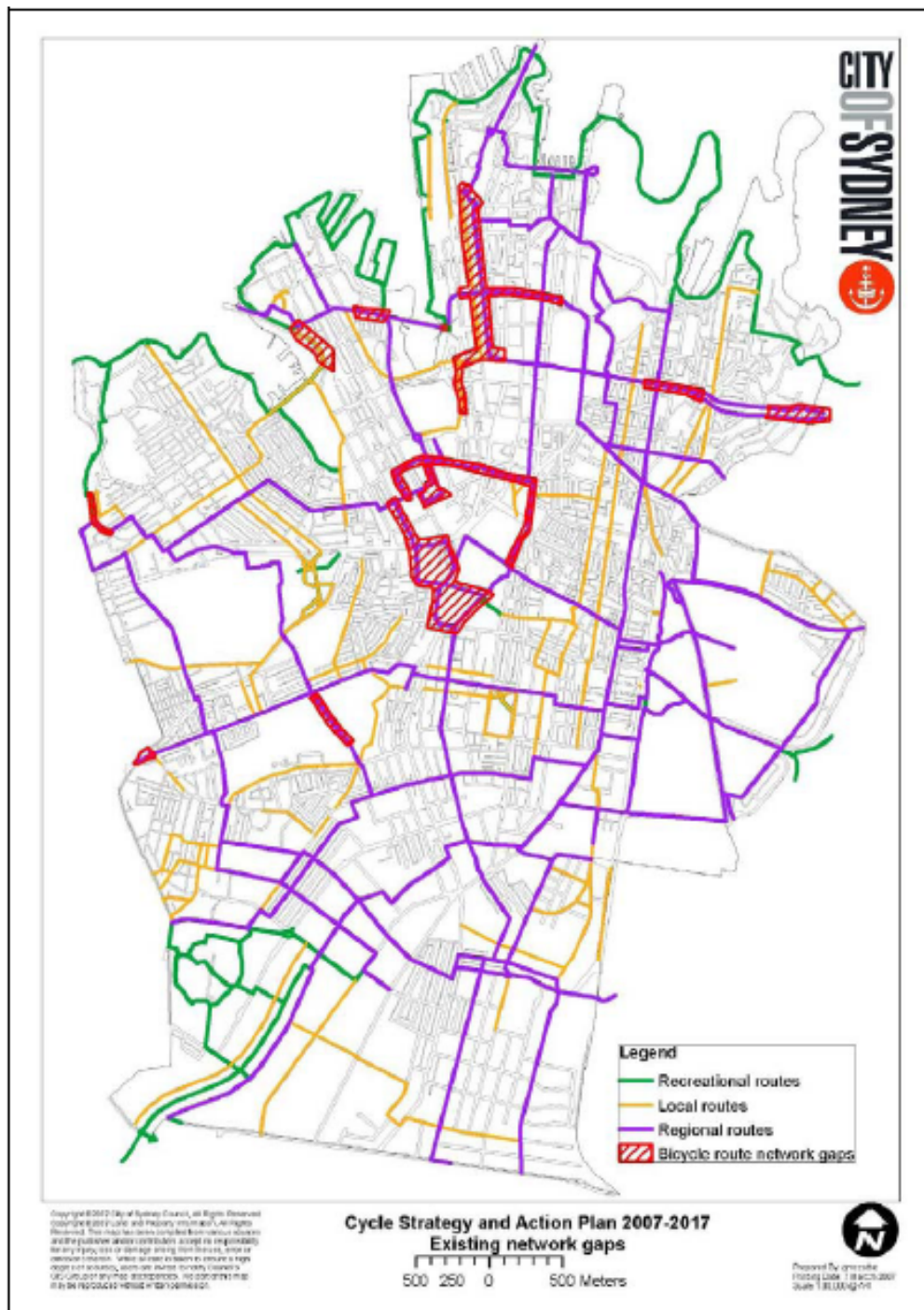


Figure 3 City of Sydney Cycle Strategy and Action Plan Summary (Source: City of Sydney)

2.5 Road Hierarchy

As discussed in section 2.1 above, City Road is a nearby arterial route which continues out of Sydney as the Princes Highway that forms a segment of Australia's Highway 1 that extends from Sydney to Port Augusta. Near the site City Road is a two-way dual carriageway with a central median to separate traffic.

Abercrombie Street is a suburban street orientated approximately east to west. It has a single lane of traffic in each direction. On-street parking is available on either side of the street. Traffic calming features are in place along the street in the form of pedestrian priority zebra crossings and mini roundabouts to slow traffic in the area. A primary school located on the road means a 40km/h speed limit exists on the site during school start and finish times, all other times the speed limit on the street is 50km/h. Lane widths on the street are approximately 3.5 metres in width.

Golden Grove Street is a suburban street orientated approximately from north to south. It has a single lane of traffic in each direction and on-street parking is available on either side of the street. Traffic calming features are in place along the street in the form of pedestrian priority zebra crossings and mini roundabout intersections. Golden Grove Street has a 40km/h speed limit during school starting and finishing times and a 50km/h speed limit otherwise. Lane widths are approximately 3.5 metres, however areas of Golden Grove Street have no centre line. Photograph 5 shows a pedestrian crossing on Golden Grove Street.

Codrington Street is a suburban street orientated in an approximately north to south direction. The street has a single lane of traffic in each direction and traffic calming measures in the form of mini roundabouts and pedestrian priority zebra crossings. Codrington Street meets Butlin Avenue to the north which also travels in a north to south direction. The speed limit on Codrington Street is 50 km/h. On-street parking exists intermittently on either side of the street. Lane widths are on average 3.5 metres. The street is classified as a shared cycle way and is equipped with cycle markings along the route. Photograph 6 shows an Abercrombie Street / Codrington Street mini-roundabout looking towards Abercrombie Street and the proposed site frontage.



Photograph 5 Pedestrian crossing on Golden Grove Street



Photograph 6 Mini roundabout at the Abercrombie Street / Codrington Street intersection towards Abercrombie Street.

Butlin Avenue is a suburban street orientated in a north to south direction from City Road to Codrington Street. The speed limit on Butlin Avenue is 50km/h. The

southern section of the road has a single lane in each direction approximately 3.5 metres in width and has a raised pedestrian priority zebra crossing. The northern section of Butlin Avenue has two lanes in each direction, increasing to three lanes on the approach to the City Road / Butlin Avenue intersection. There are two signalised intersections on the avenue at the City Road / Butlin Avenue intersection and the Butlin Avenue / Maze Crescent intersection. Signalised pedestrian crossings are in place at these intersections. Butlin Street and Codrington Street carry significant pedestrian volumes associated with movement between the University of Sydney Darlington and Camperdown campuses.

Darlington Road is a 5 metre wide street with kerbside parking on both sides and one-way traffic flow from east to west. The road meets Codrington Street to the east and Golden Grove Street to the west. The speed limit along Darlington Road is 50km/h.

Rose Street and Boundary Lane are narrow service roads providing a closed internal loop road through the site. They do not provide pedestrian or vehicular access to the school.

Darlington Lane is a narrow road just over 4 metres wide with no footpaths, and provides two-way traffic access to the subject site buildings, a university maintenance depot, university garage building, and the back yards of terrace house properties fronting onto Darlington Road. Darlington Lane traffic is slowed and must give way to oncoming traffic and pedestrians on the roadway.

In order to assess Abercrombie Street in terms of traffic volumes, traffic counts were carried out on Abercrombie Street near the proposed site frontage. A synopsis of the traffic figures is shown in **Appendix D**. The data shows that the average daily peak is during the morning from 08:00 to 09:00 while the PM peak is from 17:00 to 18:00. Weekdays are comparatively similar in terms of traffic flow although the weekday peak occurs on Thursday morning from 08:00 to 09:00.

All of these roads around Darlington Public School are designated as 40km/h school zone speed limit.

The external roads are public roads under the control of City of Sydney or the RTA.

2.6 Parking

The site contains existing car parking, mostly on-street kerbside and dedicated parking areas for the Child Care Centre and the Shepherd Centre. Parking supply is approximately 72 spaces within the precinct, and 318 spaces on the surrounding Abercrombie Street, Golden Grove Street, Codrington Street, Darlington Lane and Darlington Road². Parking occupancy is estimated at above 90% on weekdays for the surrounding roads. Parking occupancy is 60% or lower after hours and on weekends.

Weekend parking is reasonably accessible except when markets and other events are conducted at the Carriage Works at Eveleigh or at the University.

² Section 6.1 of the *Parsons Brinkerhoff Abercrombie Precinct: Parking and Traffic Study*, December 2007

2.7 Road Safety

An assessment of recorded vehicle, pedestrian and cyclist accidents was undertaken. The results are shown in Section 2.7.1 and Section 2.7.2;

2.7.1 Vehicle Accident Assessment

Vehicle accident records are shown from 2005 to 2009 where 2009 is the most recent data available. Figure 4 shows accidents within the assessed area marked in red, where tow-away vehicle accidents are represented by a blue square and injuries as a result of a vehicle accident shown as an orange star. No fatalities were recorded as a result of vehicle accidents within the study area.

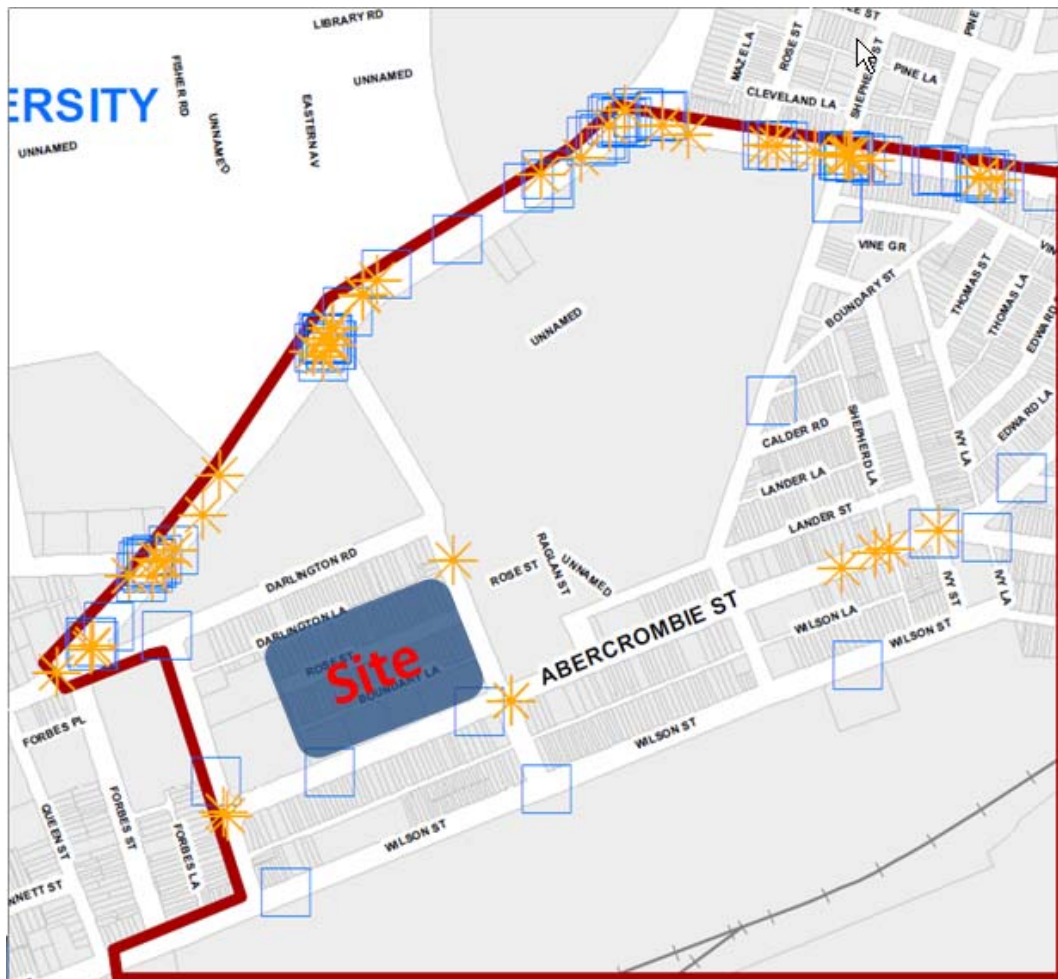


Figure 4 Vehicle accidents from 2005 to 2009

From this data we can see that over the five years assessed, a number of minor accidents have occurred on City Road, which is associated with the higher volume of traffic on this road. Two tow-away accidents and three injuries resulting from vehicle accidents occurred in the five years assessed along the site frontage. It is therefore considered that the area surrounding site does not have significant issues regarding vehicle accidents.

2.7.2 Pedestrian and Cyclist Accident Assessment

Pedestrian and cyclist accident records are shown from 2005 to 2009 where 2009 is the most recent data available. Figure 5 shows accidents within the assessed area marked in red, where pedestrian injuries are marked with a red star and cyclist injuries are marked with a green circle. There were no fatalities in the five years assessed within the study area.

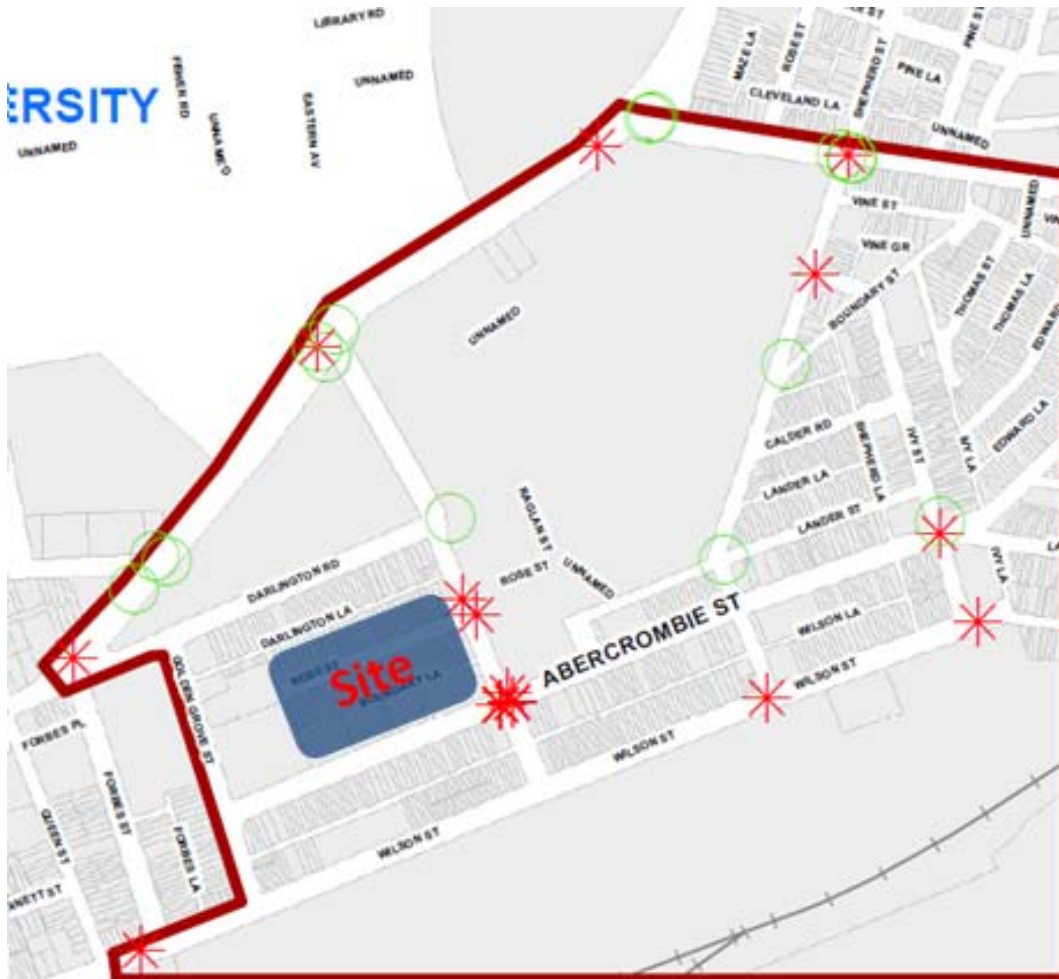


Figure 5 Pedestrian and cyclist accidents from 2005 to 2009

From this data we can see that over the five years assessed six pedestrian injuries have occurred on the nearby Codrington Street and one cyclist injury. Given the relatively low level of accidents in the area it is considered that the area surrounding the site does not have significant issues regarding pedestrian or cyclist accidents.

3 Development Proposal

3.1 Campus 2020 Masterplan

The proposal has been developed in the context of the many issues facing the entire University Campus. The transport issues have been developed within the context of the Masterplan shown below.



Figure 6 Campus 2020 Masterplan (Source: University of Sydney)

3.2 Development Proposal Description

The proposal involves the construction of the Abercrombie Precinct Redevelopment Project containing the School of Economics and Business located on Abercrombie Street in Darlinghurst. The proposed development is a seven story building of approximately 39,287m² gross floor area (GFA) including 4,430 m² GFA for student accommodation and a two level underground car park and associated landscaping.

The development is proposed to be built in two stages. The first stage consists of the main Sydney University Business School with the second stage consisting of the student accommodation section of the development and the proposed extension to the Sydney University Business School. A staging diagram for the development proposal is attached in **Appendix F**.

3.2.1 Works to Darlington Public School

Included in the development works are ancillary upgrades to the adjacent Darlington Public School. These works include:

- New access from Darlington Lane for use by students and staff;
- 2.1 metre fencing on the east side of the public school;
- The provision of a bus drop-off location with turnabout bay on Darlington Lane;
- The provision of a ramp from the bus drop off location to the playground;
- The demolishing of the existing sports equipment shed and the provision of a larger masonry storage shed;
- The provision of a new emergency access to the public school playground;
- The relocation of four parking spaces from Golden Grove Street to Darlington Lane to facilitate the provision of the new emergency access.

An image detailing the proposed ancillary upgrades to Darlington Public School are attached in **Appendix E**.

3.2.2 Staff and Student Numbers

The proposed new school provides replacement accommodation for existing outdated facilities across the University campus, though is not necessarily aimed at increasing student or staff numbers. Overall staff and student numbers will remain as per the existing School enrolments with approximately 7,000 students and approximately 500 staff (i.e. the development will redirect existing trips within the campus, but not generate significant additional new trips to the campus). Table 4 below shows the predicted numbers of students and staff expected at the proposed new facility.

Table 4 Predicted staff and students for School of Economics subject development³

University	People
Students	7,000
Staff	500
Total	7,500

3.3 Pedestrian Access

Pedestrian access to the site is proposed via accesses on Codrington Street and other frontages to facilitate access via bus or train.

³Data provided by University of Sydney email November 2010

A pedestrian crossing currently exists in Golden Grove opposite the Darlington Public School. The proposed development will not interfere with the function of this pedestrian crossing.

3.4 Vehicle Access

The access driveway location for the parking and service vehicles was chosen after extensive consideration of the alternatives; examples of alternate driveway locations are shown in **Appendix B** and are described below.

1. Driveway off Codrington:

This is the pedestrian spine, pedestrian and bike activity focus, and ceremonial 'front door' for non-motorised access to the site.

2. Driveway off Darlington Lane:

Darlington Lane is a narrow carriageway just over 4 metres wide, and therefore unsuited to higher flows of two-way traffic. Oncoming vehicles must carefully give way to each other and the many pedestrians who use this carriageway. Turns to and from the narrow carriageway would be difficult. The considerable cross fall across the site from north to south would mean a long ramp from Darlington Lane down to the basement, or intrusion of the car park and loading dock in to the pedestrianised ground plane level of the building. Additional traffic in Darlington Lane would conflict with the school drop off /bus zone and circulate past the school site.

3. Driveway off Abercrombie Street, mid frontage subject site block:

A midblock driveway would cause major loss of usable areas within the site and basement. The location could still not be more than 20 metres from the school frontage, and would not materially change the effect on the school operations and student dropoff and pedestrian movements. The main school access for students and other pedestrians is the Golden Grove frontage main school gate.

4. Driveway off Abercrombie Street, southwest corner of subject site block:

This driveway is the most efficient location within the site and basement layout, and is located safely between the school accesses and the pedestrian thoroughfare pathway through the subject development from the Abercrombie Street footpath.

5. More than one driveway:

There is no need for more than one driveway to serve the modest number of cars predicted to use the car park. One driveway per 500 car bays is generally considered sufficient. Multiple driveways would only increase the number of conflict points with pedestrians and cyclists.

The preferred vehicle access to the development is proposed off Abercrombie Street near the south western corner of the site (Option Number 4 above).

The existing driveway to the Mandelbaum Centre car park and many other vehicular access points will be removed.

The underground car park is to provide a total of approximately 185 car parking spaces. The car park is a two level underground car park which is proposed to be developed as part of the first stage of development. The driveway will be carefully designed to maximise the safety of pedestrians, especially school children using the footpath.

- Driveway access splays to provide sight distance in accordance with Australian Standards;
- A near-level driveway approach to the property line (six metres at not more than 1:20 grade within the property line);
- Convex mirrors at the driveway exit to assist drivers in the observation of the footpath activity.

3.4.1 Sightlines

As mentioned in Section 3.4 above, a new vehicle access is proposed to be provided off Abercrombie Street. In accordance with standards for a 50km/h speed limit zone, foliage may be cut back to provide clear and unobstructed sightlines 45 metres to the right along the nearside kerb and 45 metres to the left along the centre line of the road to provide adequate sight distance for vehicles exiting the car park.

3.4.2 Waste

Waste collection is to take place in a segregated waste collection area in the loading dock section of the car park. Turning path analysis is attached in **Appendix A** and demonstrates that service vehicles can adequately access the loading area.

3.4.3 Emergency Vehicle Access

It is proposed that emergency vehicles will access the proposed development primarily via the frontage roads. Some access will be provided into the centre of the development generally along the existing Rose Street alignment. Alternatively, access to the development may be gained via the underground car park to which access is provided off Abercrombie Street.

3.5 Parking

The current parking provision controls are established by the 1996 South Sydney City Council Development Control Plan (DCP11) which states that tertiary education developments should provide 0.5 car parking spaces for each member of staff and an additional space per 20 full time students. As approximately 7,000 students and 500 staff are expected as part of the School of Economics this would imply that a total of approximately 600 car parking spaces should be provided.

The DCP11 further states that 2% of all parking should be provided for mobility impaired drivers. As 185 car parking spaces are proposed to be provided, this corresponds to approximately 4 car parking spaces dedicated to mobility impaired drivers.

In addition to this, requirements for the proposed student accommodation are one car parking space for every 15 beds. Given that there are 100 beds in the student accommodation, a provision of approximately 7 additional car parking spaces is implied for the student accommodation. Therefore according to DCP11 a total of approximately 607 spaces are recommended for the entire proposed development.

However, according to the Draft Sydney Local Environment Plan 2010 and other recent work by Arup for the University of Sydney, tertiary education facilities should provide closer to 1 car parking space per 200m² GFA to encourage use of both active and public transport, particularly in locations relatively well served by public transport such as the proposed School of Economics. This correlates to a requirement of approximately 196 car parking spaces for the proposed educational facility and 7 for the student accommodation, totalling 203 car parking spaces.

As part of the development plans, it is proposed to reduce on street parking by 72 spaces from existing site area. The majority of these car parking spaces are used by staff and students attending the university and are proposed to be replaced within the underground car parking for the proposed development.

The development proposals include the provision of 185 car parking spaces within the proposed development. Allowing for the provision of replacement car parking spaces for the spaces removed from the surrounding area, this translates to a net increase of 113 car parking spaces; 90 spaces less than the maximum allowable car parking provision of 203 car parking spaces by the Draft Local Environment Plan 2010. This level of parking is supported as being reasonable in this location, as it generally meets the City of Sydney's new parking rates. The lower car parking rate is aimed to encourage public transport usage whereas a higher car parking rate encourages travel by car. The lower car parking rate is appropriate for the new facility does not seek to expand student and staff numbers from the already existing numbers.

Aside from the parking provided for the proposed development, some on-street parking is proposed to be removed adjacent to the Darlington Public School. The four spaces to be removed are to allow emergency access to Darlington Public School. These spaces are proposed to be relocated onto university land with access off Darlington Lane to ensure no loss of on-street parking occurs as a result of this development. The car park is designed in accordance with Australian Standards.

3.6 Green Buildings of Australia Green Star Rating

The Green Buildings of Australia organisation (www.gbcaus.org), have proposed a pilot spreadsheet tool to assist planners and developers understand what is needed to achieve a rating of the maximum of six green stars based on a points system. A key requirement of the rating is the provision of facilities promoting alternatives to car use. The transport element of the assessment is divided into five sections: car park minimisation, fuel efficient transport, cyclist facilities, commuting mass transport and pedestrian routes.

3.6.1 Parking context for Green Buildings of Australia Green Star Rating

One point is awarded for a 25% reduction of car parking below the maximum allowable car parking provision. Two points are awarded for a 50% reduction in car parking below the maximum allowable car parking provision. The current DCP11 states that 606 car parking spaces are recommended for the proposed development. The development proposals include a provision of 185 car parking spaces, which represents a reduction of approximately 70% of the recommended parking provision.

3.7 Bicycle Parking

The Sydney DCP11 recommends that bicycle parking provision of one bicycle parking space for every 20 students and every 20 staff. An additional one space is required for every six bedrooms in the student accommodation. The proposed development provides for a maximum of 7,000 students and an additional 500 staff members. This corresponds to a provision of 350 bicycle parking spaces plus a further 15 bicycle parking spaces provided for the student accommodation. This results in a total requirement of 375 bicycle parking spaces required.

The proposed development provides 390 bicycle parking spaces as part of the development plans. The bicycle parking will be provided in safe and visible areas at convenient locations to facilitate accessibility.

3.7.1 Cycle Facilities context for Green Buildings of Australia Green Star Rating

Points towards green stars are awarded for the provision of cyclist facilities consisting of:

- Secure bicycle storage;
- One accessible shower for every 10 bicycle spaces;
- Changing facilities adjacent to showers; and
- One secure locker per bicycle space in the changing facilities.

One point is awarded for a provision of cyclist facilities for 5% of building staff. Two points are awarded for a provision of cyclist facilities for 10 % of building staff.

The proposed development provides 50 secure bicycle spaces for an estimated 500 staff, as well as provision of 50 bicycle lockers adjacent to 5 shower facilities. This corresponds to the provision of cyclist facilities for 10% of the staff.

One point is awarded for the provision of secure bicycle storage for 5% of the peak number of students using the building at any one time (with 75% occupancy). Two points are awarded for the provision of secure bicycle storage for 10% of the peak number of students using the building at any one time (with 75% occupancy).

The proposed development provides for 5,250 students at 75% occupancy. The proposed development provides for 390 secure bicycle parking spaces for students, corresponding to over 7% of students.

4 Transport Impact Assessment

Various studies have been carried out in the area of the development including the Parsons Brinckerhoff '*Traffic and Transport Assessment, North Eveleigh Development*' of April 2008, which in part deals with the Abercrombie Precinct Redevelopment Project. The study includes the traffic impact assessment of a school of economics and business with 10,000 students and 800 staff as well as an associated crèche with 30 staff for up to 200 student parents. As the study relates closely to the current assessment it was reviewed as part of the assessment.

4.1 Travel Modes

4.1.1 Mode Split

Given that the adjacent Sydney University is the same land-use as the proposed development and that the development will relocate existing staff and students, it is predicted that with similar land-use and a similar location that the modal split for the School will be comparable with that of the main University campus. The modal split for the existing ABS Census 2006 Journey to Work data for the JTW Travel Zone 240, which contains the eastern section of the University of Sydney, is indicated in Table 5:

Table 5 Observed JTW Modal Split at Sydney University - Workers

Mode	Percentage Split
Train	24%
Bus	18%
Car	40%
Bicycle	4%
Walk	10%
Other	4%
Total	100%

The data shows that approximately 40% of workers drive themselves to work/university in the locality. The other major travel modes are by train, bus and walking all of which range from 24% to 10% of the total modal split.

The 2004 Transport Survey Report which reviewed the mode in which students of the University of Sydney travelled to and from University found that approximately 6% of students arrive to university by car. Table 6 gives approximations of the survey results.

Table 6 University of Sydney Transport Survey Results - Students

Mode	Percentage
Bicycle	15%
Car	6% ⁴
Public Transport	59%
Walk	20%
Total	100%

4.2 Pedestrian, Cyclist and Public Transport Impact

The extensive and conveniently accessible public transport facilities which are present in the area will encourage staff and students in the proposed development to use either train or bus for most commuter trips. This availability of public transport services will help the proposed development to operate with relatively low levels of site traffic generation and parking activity.

The primary pedestrian accesses to the site are positioned to the south and the east to provide the most convenient access towards the public transport facilities nearby. The existing nature of the area provides safe and efficient pedestrian links to the relevant bus and rail links.

The subject development and surrounding areas have been designed with an emphasis on permeability for pedestrians.

Within the subject site, there is a north-south walkway that will be open to the students and public across the site from the Abercrombie Street footpath to Darlington Lane and beyond. The University is contemplating a walkway through one of the terrace houses onto Darlington Road, across Darlington Road, through a gate in the long frontage wall to the Merewether Building precinct, and the City Road and further north. This route would tie together three main buildings of the Faculty with easy walking.

The crossing of Darlington Road will be unlikely to meet the RTA's warrants for installation of a zebra pedestrian crossing or a signalised pedestrian crossing (the numerical warrant is based on the product of peak hourly traffic and pedestrians in the peak hours). Other options would be a median pedestrian refuge to stage the crossing or a local narrowing of the carriageway.

The latter option of local narrowing is preferred in a one-way road. The local narrowing would be in the form of kerb blisters out just beyond the kerbside parking on both sides of the road, with pram ramps included for disabled persons. This will improve safety by reducing the walked width of the carriageway. Less than six on-street car parking bays will be lost. The timing and alignment of the narrowing works will depend on the location and timing of the chosen terrace house link and wall gateway path improvements.

Similar carriageway narrowing could also be considered in Darlington Road on the west leg of the intersection with Codrington Street.

⁴ While the survey found that approximately 6% of students arrive by car the data was split into 'your own car' and 'not your own car'. 4.9% of students drove their own car to university.

4.2.1 Pedestrian Desire Lines to Public Transport

An assessment of pedestrian desire lines was undertaken for pedestrians travelling from the proposed development to the nearby bus stops. Figure 7 details the likely routes that pedestrians will travel. The proposed development will be equipped with pedestrian footpaths on the southern and eastern sides of the development, with Darlington Lane and Darlington Public school to the north and west respectively. Connecting links from the site to the nearby bus stops are equipped with dropped kerbs. Unsignalised crossings exist across Darlington Lane, opposite Darlington Lane and Darlington Road. Signalised crossings exist on all arms of City Road and the Butlin Avenue / Maze Crescent Intersection. Pedestrian priority zebra crossings exist across Butlin Avenue and opposite Darlington Road. The University is currently in discussions with the City of Sydney to look at measures to improve pedestrian access to Redfern Station for students.



Figure 7 Pedestrian Routes from the site to the local bus stops on City Road

An assessment of pedestrian desire lines was undertaken for pedestrians travelling from the proposed development to Redfern Railway Station. Figure 8 details the likely routes that pedestrians will travel.

The proposed development will be equipped with pedestrian footpaths on the southern and eastern sides of the development. Pedestrian priority zebra crossings exist on the northern and eastern side of the Abercrombie Street / Codrington Street roundabout, signalised pedestrian crossings at the Shepherd Street / Abercrombie Street intersection and dropped kerbs on Wilson Lane, Ivy Street and Little Eveleigh Street.

Alternately, pedestrians may choose North Eveleigh Street which has a low volume of traffic and ends in a pedestrian-only link onto Wilson Street. Pedestrians would then continue along the north side of Wilson Street, crossing back onto Abercrombie Street when the signals permit.

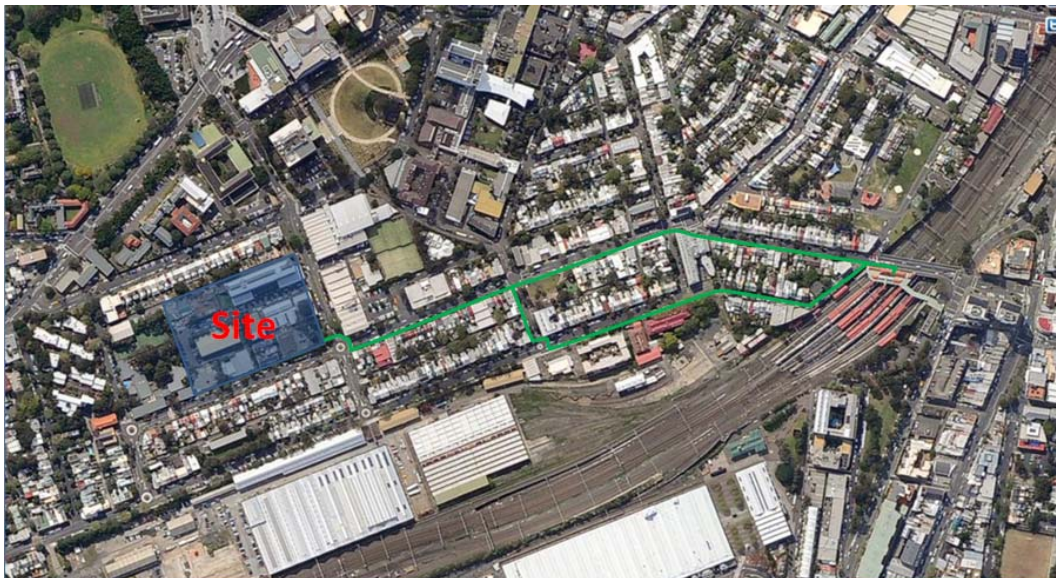


Figure 8 Pedestrian Route from the site to Redfern Railway Station

It is expected that peak pedestrian activity times for the development will coincide with university lecture times. The existing infrastructure is predicted to be able to accommodate the peak pedestrian traffic as a result of the proposed development and will not have any adverse impact on the pedestrian accessibility of the surrounding area as the area already has paved footpaths on both sides of all roads with pedestrian crossings and dropped kerbs along key routes.

Overall the proposed development is likely to have minimal transport or parking impact on the surrounding area. The surrounding access roads are also generally adequately wide with relatively low traffic volumes, allowing for safe use by cyclists.

4.2.2 Cyclists

As discussed in Section 3.6, it is proposed to provide approximately 390 cycle parking spaces within the development. Available, safe and secure parking spaces will encourage cycling as a viable mode of transport to the proposed development.

The University of Sydney provides extensive cycle facilities throughout the campus. Key cycling routes exist on Little Eveleigh Street and on Codrington Street past the proposed development and to City Road.

It is recommended that the provision of a cycle lane along Wilson Street be considered to accommodate the expected growth in cyclist numbers over the coming years. The recommended cycle route would connect in to the existing cycle network at Codrington Street and Golden Grove Street providing improved access links to the university along Wilson Street.

4.3 Trip Generation

Table 7 shows that the proposed development might be expected to result in approximately 543 people using their cars per day as the primary mode of transport if a higher number of car parking spaces were provided.

Table 7 Calculation of Upper limits Predicted Daily Drivers to the Site for higher parking space supply.

Type	Number of People	Modal Split for Drivers	Predicted Drivers
Students	7,000	4.9%	343
Staff	500	40%	200
Total			543

From information used in the *Parsons Brinckerhoff North Eveleigh Development TIA* and from RTA data, it is assumed that the average trips per day by drivers to the proposed development is approximately 2.4 trip ends per driver per day entering or exiting the site, corresponding to 1,303 driver trip ends during the entire day.

The trip generation rates used in the *Parsons Brinckerhoff North Eveleigh Development TIA* have been adopted as part of this study. According to RTA Traffic Volume Data 2002 for the surrounding area, the peak hour traffic volume is on average 13.5% of the AM Peak Hour traffic volume. Therefore it is estimated that the upper limit of peak hour trips to the development will correspond to approximately 176 trips in the peak hour. Table 8 shows the calculation of the predicted upper limit car trip generation.

Table 8 Upper limit Trip Rate Calculation

Total Drivers	Trip Rate	Trips
543	2.4 trip ends per day	1,303 daily trip ends
On Average 13.5% of the daily rate is the peak Hour Trip Rate		
1,140	13.5%	176 Peak Hour Trips

From the above calculations it is predicted that there will be approximately 176 peak hour vehicle arrivals at the university campus. These staff and students are already elsewhere on-campus and so this traffic will not be additional to the existing traffic flows on the wider network.

4.3.1 Heavy Vehicle Generation

Given the nature of the development as a lecture/office/residential environment it is expected that the majority of vehicles driving to the site will be standard cars. There is expected to be no net increase in goods movements to and from the site as a result of the development, as the current uses are more likely to generate truck traffic than the proposed use.

The site is expected to generate approximately one medium rigid vehicle (MRV) per day at non-peak times to cater for stationery and office supplies. The site will also cater for access of a MRV waste and recyclables collection vehicle approximately once per week to collect the waste generated by the site.

It is proposed that the waste collection vehicle will follow its current route through the area. The collection of waste will occur onsite and is discussed in detail in Section 4.6.

There are expected to be no toxic substances delivered to the site, as this is lecture/office/residential use and does not include laboratories, engineering, medicine, animal houses etc.

Should toxic substances be required, standard university procedure relating to the delivery and collection of toxic substances would be followed.

4.3.2 Variations in Traffic Generation

Vehicle traffic generated by university students tends to vary more throughout the day compared to trips generated by employment uses. This variation is dependent on lecture times and class sizes, however it is expected that university staff will adhere more to typical office hours. Peak traffic associated with the development will still occur during background traffic peak times, however the peak may be wider spread than for employment based trips. Figure 9 shows an indicative example of the peak traffic flow for a car park in Macquarie University. While the peak for the Macquarie University car park is 18:00 the car park use is spread throughout the day.

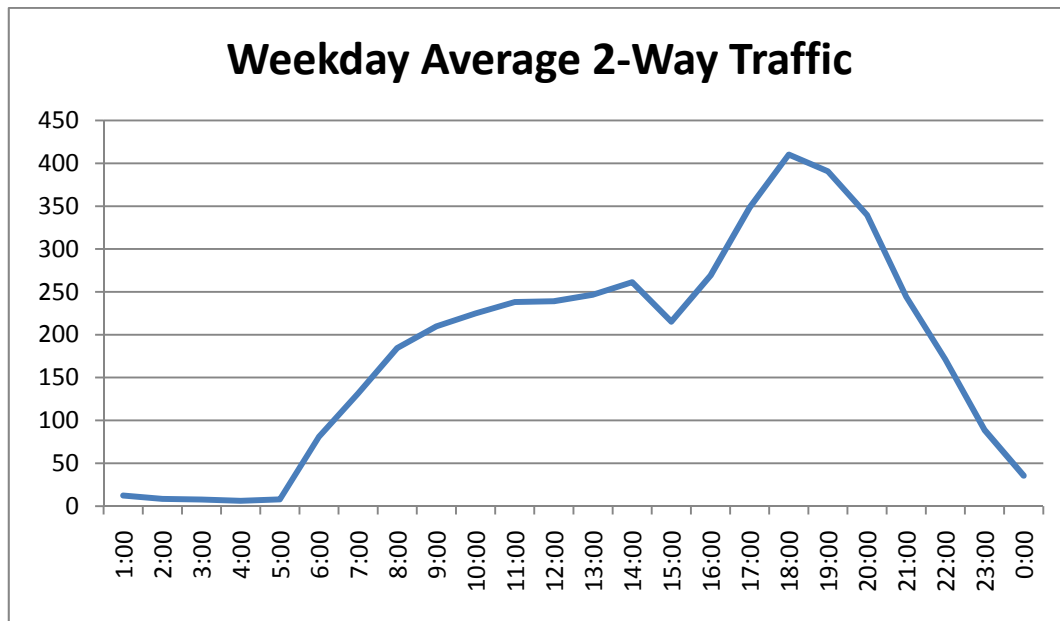


Figure 9 Macquarie University Car Park Flows

To form an onerous and robust assessment for the traffic capacity analysis has been assumed that the peak traffic generation times for the university will coincide with the peak background traffic flow.

4.4 Background Traffic Flows

The traffic flows used in the assessment of the *Parsons Brinkerhoff North Eveleigh Development* are stated in pcu's (Passenger Car Units) achieved from surveys in 2006 as shown below:

Table 9 Parsons Brinckerhoff - Traffic Count Data

Location	Direction	Peak Hr Traffic from 08:00 to 09:00
City Road south of Carillon Ave.	Eastbound	1,574
City Road south of Carillon Ave.	Westbound	755
Abercrombie St, East of Golden Grove St.	Eastbound	376
Abercrombie St, East of Golden Grove St.	Westbound	140
Abercrombie St, East of Shepherd St.	Eastbound	449
Abercrombie East of Shepherd St.	Westbound	363

It should be noted that this background traffic **includes existing traffic generated by the subject site**, including Mandelbaum House, childcare facilities, demountable site sheds, and other local car parking, etc.

To assess the possible growth in traffic in the area surrounding the site since 2006, automatic tube counts were carried out on Abercrombie Street between Golden Grove Street and Codrington Street in October 2010. The average of the eastbound AM peaks throughout the days of the week counted on Abercrombie Street is 408 and the average of the westbound peak is 135 vehicles. This represents an average increase of 5.2% for the traffic at peaks. A summary of the Abercrombie Street Traffic Counts are shown in **Appendix D**.

4.4.1 North Eveleigh Development

Near to the proposed development is the previously assessed North Eveleigh Mixed use Development, referred to in the '*Parsons Brinkerhoff Traffic and Transport Impact Assessment North Eveleigh Development - April 2008*' for the Redfern Waterloo Authority. The development was assessed for 1,258 dwellings, 64,400m² GFA of commercial area and 4,000m² GFA of retail area. The assessment concluded that approximately 2,135 vehicle trips would be generated by the North Eveleigh Development over the morning peak two hours. The assessment of the Abercrombie Precinct Redevelopment Project includes this predicted traffic generated by the North Eveleigh development as background traffic in the capacity analysis.

4.5 Intersection Analysis

As a university has students and staff leaving at different times throughout the day it is expected that the daily peak for vehicle traffic on the assessed intersections will occur during the morning peak hour traffic. City Road / Butlin Avenue intersection, Abercrombie Street / Golden Grove Street roundabout and Abercrombie Street / Codrington Street roundabout are the intersections which are considered relevant for the capacity assessment of the proposed Abercrombie Precinct Redevelopment Project. Details of these intersections are below.

4.5.1 Abercrombie Street / Golden Grove Street Roundabout Intersection

The Abercrombie Street / Golden Grove Street roundabout intersection is a three arm roundabout to the west of the site with a single lane circulatory carriageway. All approaches are single lane with pinch points to prevent road users entering the roundabout at speed. The central island of the roundabout has a small over-trackable section to facilitate larger vehicles using the roundabout.

4.5.2 Abercrombie Street / Codrington Street Roundabout Intersection

The Abercrombie Street / Codrington Street roundabout intersection is a four arm roundabout intersection to the south east of the site. The intersection has a single circulatory carriageway and approaches are single lane with pinch points to prevent road users entering the roundabout at speed. There are signalised pedestrian crossings across the northern Codrington Street arm and the eastern Abercrombie Street arm of the intersection.

4.5.3 City Road / Butlin Avenue Intersection

The City Road / Butlin Avenue Intersection is a four arm signalised intersection to the north east of the site. The major road is City Road which travels from east to west. The minor roads are Butlin Avenue to the south and vehicular access to Eastern Ave in the University of Sydney to the north. City Road has three lanes travelling from west to east with an additional right turn lane at the intersection with Butlin Avenue. City Road has three lanes travelling from east to west, including a bus lane catering for the outbound buses along City Road. Butlin Avenue has three lanes on the approach to the intersection; a dedicated left turn lane, a dedicated straight through lane and a dedicated right turn lane. Butlin Avenue has two exit arms. The access to the University of Sydney is equipped with two entry arms and two exit arms, separated by a central median. Each arm of the intersection has signalised pedestrian crossings.

4.5.4 Performance Criteria

In urban areas, the performance of the major road network is generally a function of the performance of key intersections. This performance is quantified in terms of Level of Service (LOS), which is an index of the operational performance of traffic at an intersection and is based on the average delay per vehicle. LOS ranges from A = very good, to F = highly congested travel conditions, as shown in Table 10 below.

Table 10 Level of Service Definitions

Description	Level of Service (RTA Definition)	Average Delay per Vehicle (s)
Very Good	A	< 14.5
Good	B	$14.5 \leq 28.5$
Satisfactory	C	$28.5 \leq 42.5$
Near Capacity	D	$42.5 \leq 56.5$
At Capacity	E	$56.5 \leq 70.5$
Over Capacity	F	≥ 70.5

(Source: RTA NSW Guide to Traffic Generating Developments)

A Level of Service of C or better is desirable at all major road intersections. However, in practice it is reasonable for some intersections to operate at Level of Service D during peak times. Another common measure of intersection performance is the degree of saturation (DOS), which provides an overall measure of the capability of the intersection to accommodate additional traffic. A DOS of 1.0 indicates that an intersection is operating at capacity. The desirable maximum degree of saturation for an intersection with traffic signals is 0.9.

4.5.5 Results

The *Parsons Brinkerhoff Transport Impact Assessment* assesses the above intersections accounting for increased traffic figures over time until 2016. The background traffic was increased from the time assessed (2007) to 2016 using RTA information from its strategic metro road model based in EMME. EMME is a strategic traffic modelling tool used to predict current and future traffic conditions based on current traffic trends and predicted changes in land use, population and employment. This assessment includes the proposed Abercrombie Precinct Redevelopment Project development as well as the proposed North Eveleigh development. As a result it is considered that the analysis is highly relevant to the assessment of the Abercrombie Precinct Redevelopment Project. The results of the Parsons Brinkerhoff analysis are shown in Table 11.

This assessment therefore includes a cumulative assessment including the development of the North Eveleigh concept plan, as required by the DGRs.

Table 11 Parsons Brinkerhoff results of Intersection Analysis 2016 with developments⁵

Intersection	Level of Service (LoS)	Delay (seconds)
Abercrombie St / Codrington St	A	9.0
Abercrombie St / Golden Grove St	A	3.2
Butlin Ave/City Road	B	18.6

To validate the Parsons Brinkerhoff assessment, traffic counts were carried out on Abercrombie Street adjacent to the proposed site. The results of the traffic counts show that the volume of traffic has increased by approximately 5.2% since the 2006 assessment in the Parsons Brinkerhoff report. However the 2016 assessment in the report assumes an increase of 8% in traffic volume along Abercrombie Street. As the Parsons Brinkerhoff assessment assumes a higher volume of traffic than is currently present in the area it is considered that the assessment is relevant and valid given current traffic conditions. A summary of the Abercrombie Street Traffic Counts are shown in **Appendix D**.

4.6 Swept Path Analysis

A swept path analysis for a Medium Rigid Vehicle (MRV) or standard waste collection unit was undertaken. The analysis shows the MRV accessing the development via Abercrombie Street and turning in the basement level and exiting via the same access. The MRV both enters and exits the site in a forward gear. The swept path analysis is shown on drawing 221019-SKT001-D attached in **Appendix A**.

⁵ Source: PB North Eveleigh Report

5 Conclusions

This Transport Impact Assessment (TIA) has been carried out by Arup on behalf of The University of Sydney in support of a project application for a proposed campus for the School of Economics and Business located on Abercrombie Street in Darlington, Sydney.

This report considers the transport and accessibility issues raised in the Director Generals' Requirements.

The site is on the location of residential and existing university property and is adjacent to the Darlington Public School. The site is bounded by Darlington Road to the north, Codrington Road to the east, Abercrombie Street to the south and Darlington Public School to the west.

The proposed development is a seven story building of approximately 39,287m² gross floor area (GFA) including 4,430 m² GFA for student accommodation, with a two level underground car park and associated landscaping. The development is proposed to be built in two stages. The first stage involves the development of the main Sydney University Business School with the second stage consisting of the student accommodation section of the development and the proposed extension to the Sydney University Business School.

The proposed new school provides replacement accommodation for existing outdated facilities across the University campus, but is not necessarily aimed at increasing student or staff numbers. Overall staff and student numbers will generally remain as per the existing school enrolments with approximately 7,000 students and approximately 500 staff.

Observed travel data indicate that approximately 40% of university staff to drive themselves to work/university in the locality. The other major travel modes are by train, bus and walking which all of which range from 24% to 10% of the total modal split.

Based on the results of a survey of student modes of travel to and from the University of Sydney in 2004, it is expected that approximately 6% of students will arrive to the school by car, with some 5% driving themselves.

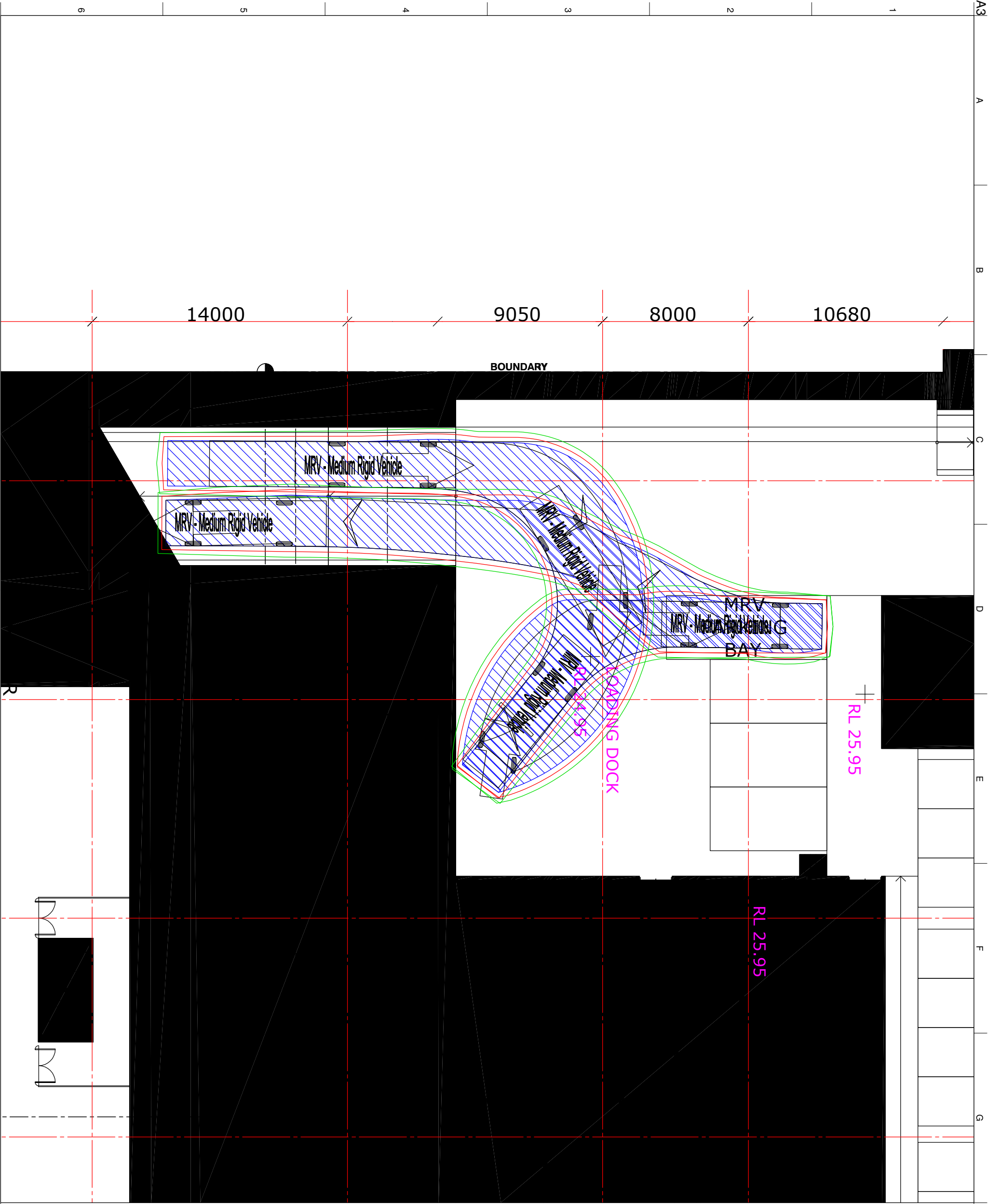
It is predicted that there will be approximately 154 vehicle arrivals to the site during the peak hour for vehicle trips. The majority of this traffic will be existing drivers and not additional to the existing traffic flows on the network.

Given the proposed provision of bicycle parking, the nearby frequent public transport facilities, and the focus of pedestrians and cycling as major means to transport it is concluded that the proposed development encourages public and active transport as the primary means of access to the development.

The existing road network infrastructure has adequate capacity to cater for predicted traffic volumes for the proposed campus, including consideration of the adjacent North Eveleigh development area. Therefore there will be no need for road or intersection upgrades / improvements as a result of the additional traffic movements from the proposed development.

Appendix A

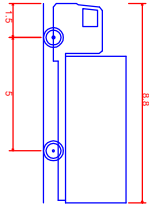
Swept Path Analysis



Legend

- Body Envelope
- 300mm Envelope
- 600mm Envelope
- Wheel Envelope

Design Vehicle(s)



MRV - Medium Rigid Vehicle
Overall Length 8.800m
Overall Width 2.500m
Overall Height 1.500m
Min Body Ground Clearance 0.428m
Track Width 2.500m
Lock to Lock Time 4.00 Sec
Curb to Curb Turning Radius 10.000m

D	03/03/11	MAC	EKC	CCH
Updated Loading Dock Arrangement				
C	03/12/10	MAC	EKC	CCH
Updated Parking Spaces				
B	01/12/10	MAC	EKC	CCH
Updated Loading Dock				
A	11/11/10	MAC	EKC	CCH
For Information				
Issue	Date	By	Chkd	Appd

ARUP

Arup, Level 10, 201 Kent St
Sydney, NSW, 2000
Tel +61 (0)2 9320 9320 Fax +61 (0)2 9320 9321
www.arup.com.au

Client

Woods Bagot

Job Title

University of Sydney
Abercrombie

Drawing Title

Turning Path Loading Dock
8.8m MRV Garbage Truck

Scale at A3 1:200

Discipline

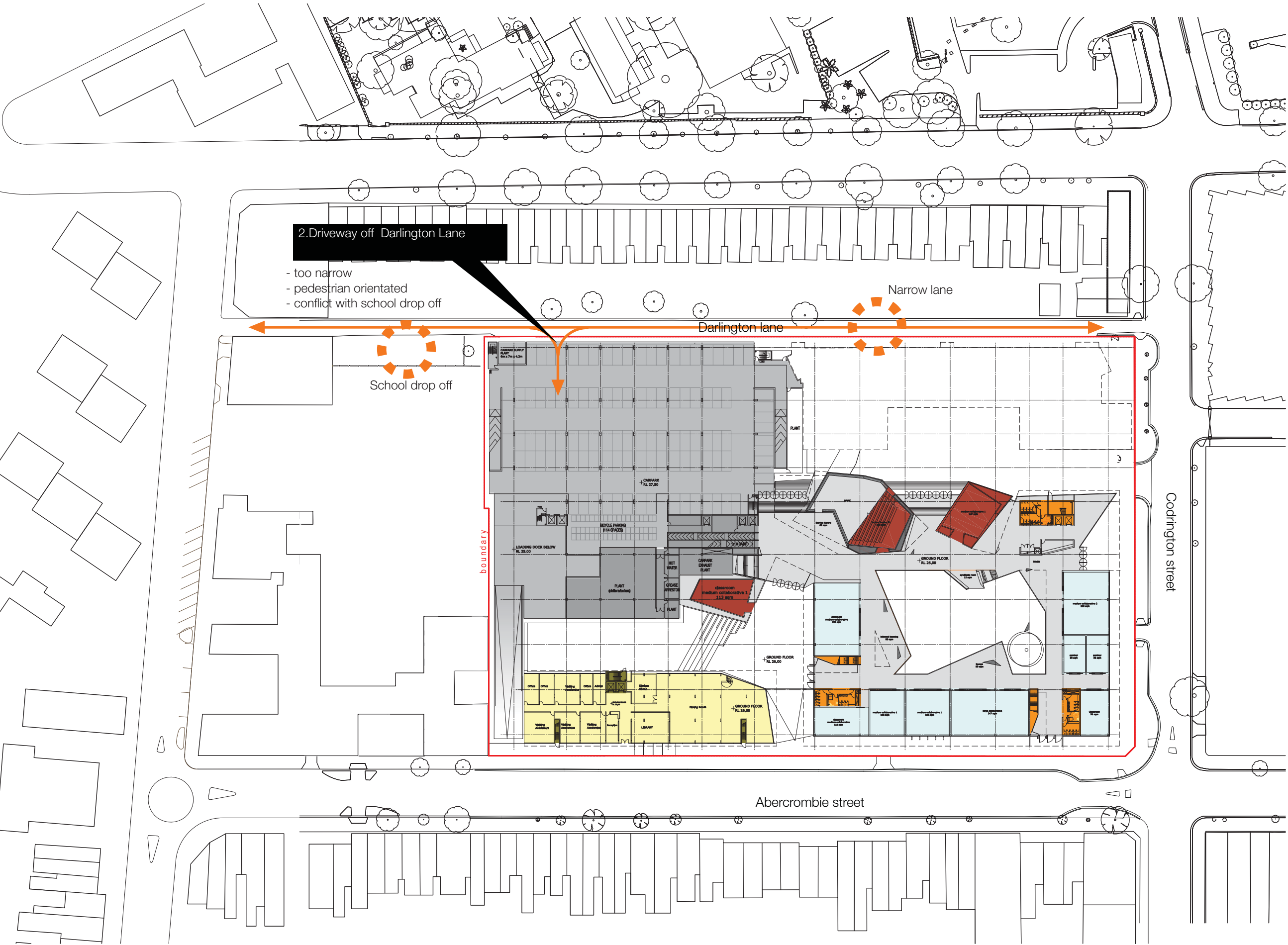
Drawing Status

Sketch

Job No	Drawing No	Issue
221019-00	SKT001	D

Appendix B

Alternative Access Options



P1 PRELIMINARY	16.11.10
Rev Description	Date App'd
Client	
UNIVERSITY OF SYDNEY	

Project
ABERCROMBIE PRECINCT
REDEVELOPMENT

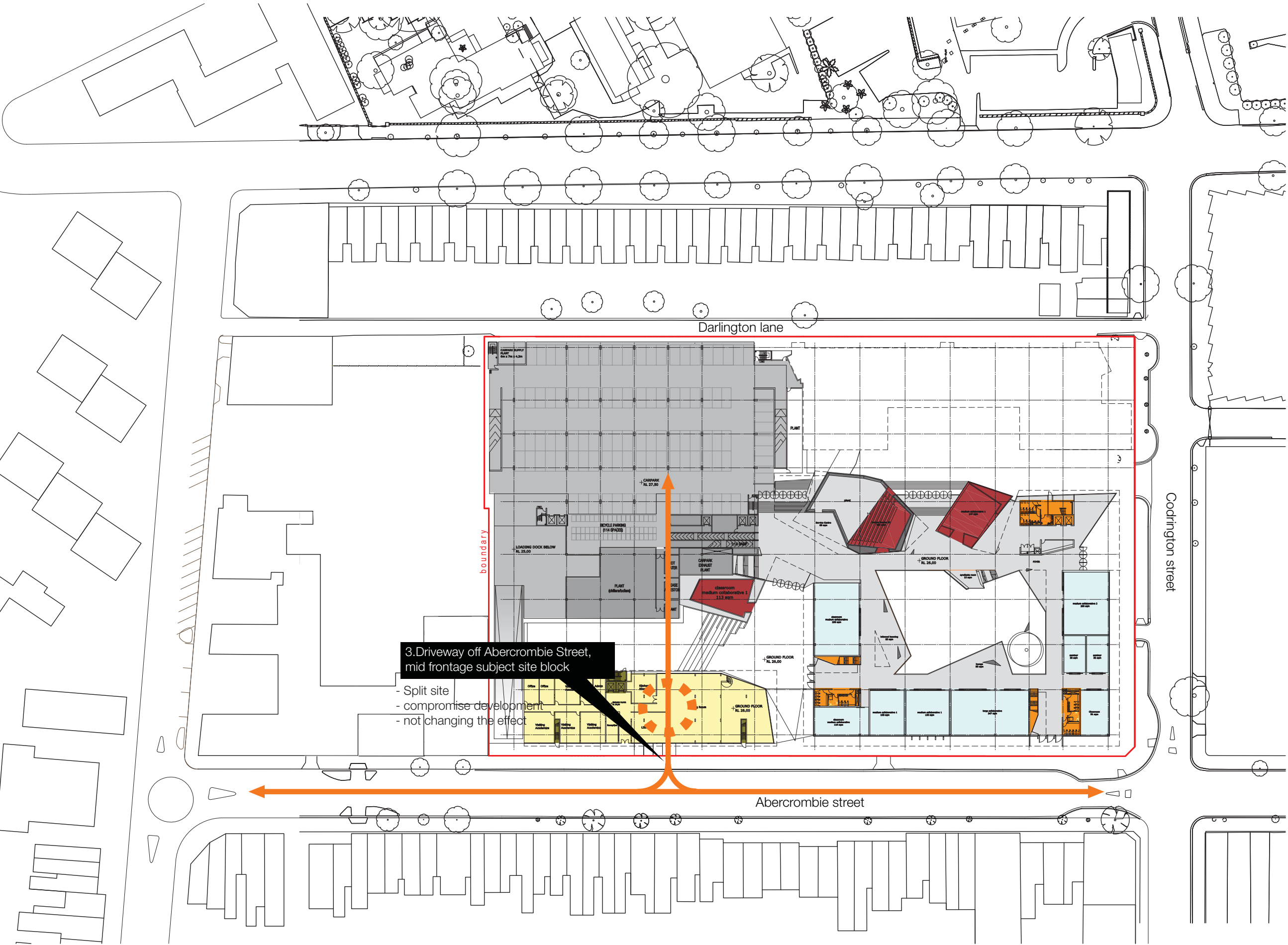
**WOODS
BAGOT** AUSTRALIA
ASIA
MIDDLE EAST
EUROPE
NORTH AMERICA

Drawing title

Site Plan

Date generated Checked Approved
16-11-10 {Not used}{Not used}
Scale
1:1000 @A3

Project number Drawing numberRevision
2-20-1874 A1002 P1
Status
PRELIMINARY



3. Driveway off Abercrombie Street,
mid frontage subject site block

- Split site
- compromise development
- not changing the effect

P1 PRELIMINARY 16.11.10
Rev Description Date App'd
Client UNIVERSITY OF SYDNEY

Project
ABERCROMBIE PRECINCT
REDEVELOPMENT

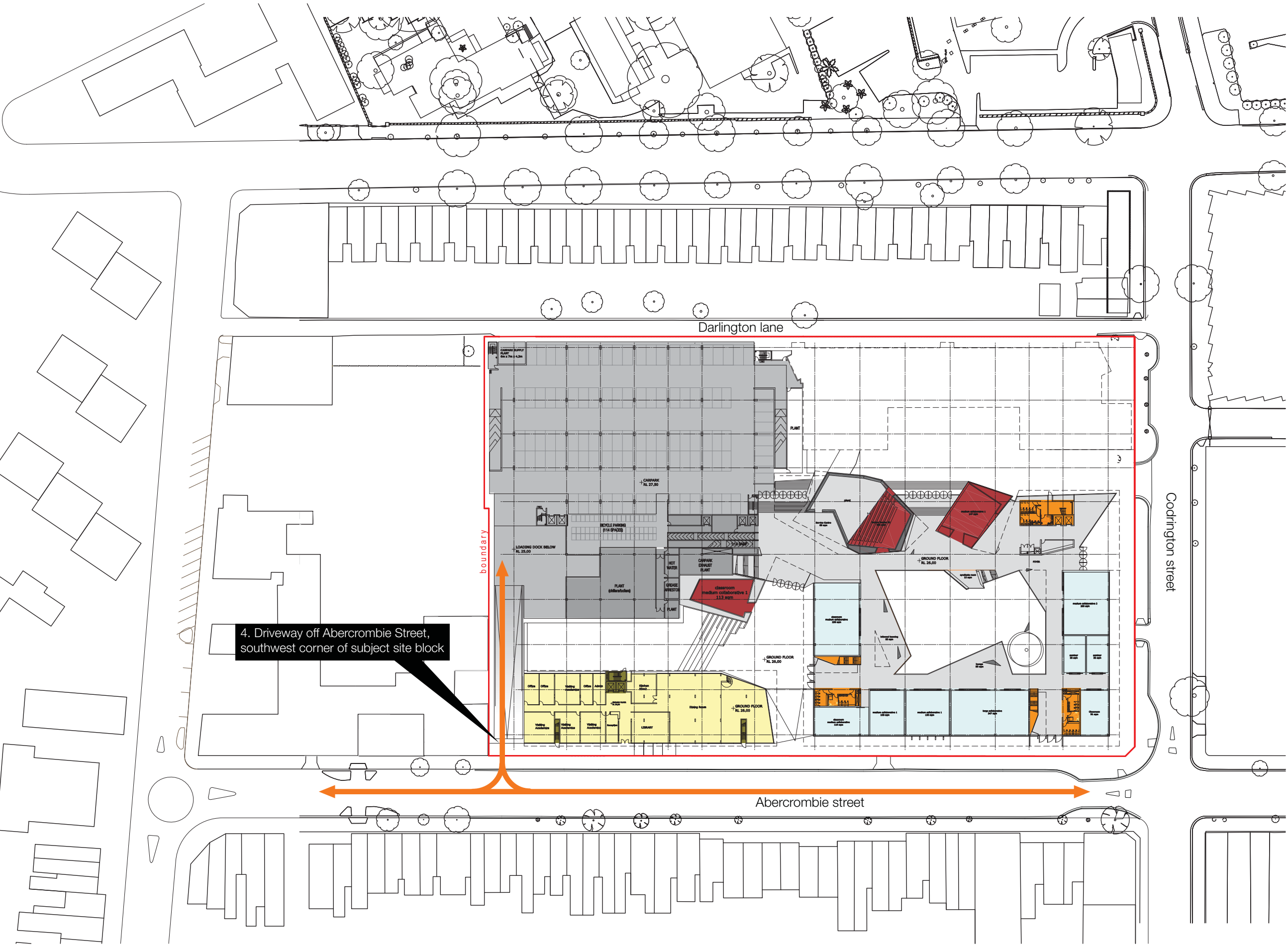
**WOODS
BAGOT** AUSTRALIA
ASIA
MIDDLE EAST
EUROPE
NORTH AMERICA

Drawing title

Site Plan

Date generated 16-11-10 Checked {Not used} Approved {Not used}
Scale 1:1000 @A3

Project number 2-20-1874 Drawing numberRevision A1002 P1
Status PRELIMINARY



P1 PRELIMINARY	16.11.10
Rev Description	Date App'd
Client	
UNIVERSITY OF SYDNEY	

Project
ABERCROMBIE PRECINCT
REDEVELOPMENT

WOODS BAGOT
AUSTRALIA
ASIA
MIDDLE EAST
EUROPE
NORTH AMERICA

Drawing title

Site Plan

Date generated 16-11-10
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Scale 1:1000 @A3

Project number 2-20-1874
Status PRELIMINARY
Drawing numberRevision A1002 P1

Appendix C

Director Generals Requirements



Planning

Mr Colin Rockcliff
Level 2 Services Building, G12
University of Sydney NSW 2006
AUSTRALIA

Dear Mr Rockcliff,

University of Sydney: Abercrombie Precinct Redevelopment Project and CODCD Building proposals.

I refer to your correspondence of 2 October 2009 regarding both the Abercrombie Precinct Redevelopment Project and the CODCD Building proposals.

I have considered your request for both these proposals to be processed as Project Applications rather than Concept Plan applications as previously submitted and authorised. I also note that the CODCD proposal was previously identified as the ARC Precinct Project.

The Department has now agreed to your request and in doing so has revoked the initial DGRs issued for the Abercrombie Precinct proposal and has issued new DGRs.

The DGRs issued for the ARC precinct have been amended to reflect the new title of the proposal and it now being only a Project Application.

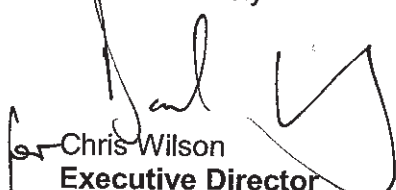
Please find attached copies of the new DGRs for both proposals.

Prior to exhibiting any Environmental Assessments, the Department will review the documents to determine if they adequately address the DGRs. If the Director-General considers that an Environmental Assessment does not adequately address the DGRs, the Director-General may require the proponent to revise the Environmental Assessment to address the matters notified to the proponent.

Following this review period the Environmental Assessment will be made publicly available for a minimum period of 30 days. Please contact the Department at least two weeks before you propose to submit the respective Environmental Assessments to determine the fees applicable to the applications.

If you have any enquiries about these requirements, please contact Mr Cameron Sargent, on 02 9228 6418 or at cameron.sargent@planning.nsw.gov.au.

Yours sincerely

 5/11/09
for Chris Wilson
Executive Director
Major Projects Assessment
(as delegate for the Director-General)

Director-General's Requirements

Section 75F of the *Environmental Planning and Assessment Act 1979*

Application number	07_0158
Project	Project Application for the proposed development of the Abercrombie Street Precinct comprising: • Site layout and 11 new building envelopes, varying from 2-7 storeys in height • A total GFA of 50,000-60,000m² for a broad range of university uses including teaching and research, general purpose theatres, university housing, university services, retail and parking • Proposed open space and a new pedestrian link through the site • Approximately 300 underground car spaces.
Location	Abercrombie Street Precinct (bounded by Darlington Lane to the north, Abercrombie Street to the south, Codrington Street to the east and Golden Grove Street to the west) excluding Darlington Public School.
Proponent	University of Sydney
Date issued	5 November 2009
Expiry date	If the Environmental Assessment (EA) is not exhibited within 2 years after this date, the applicant must consult further with the Director-General in relation to the preparation of the environmental assessment
Key Assessment Requirements	The Environmental Assessment (EA) must address the following key issues: 1. Relevant EPI's and Guidelines to be addressed: • Planning provisions applying to the site, including permissibility and the provisions of all plans and policies including: ◦ SEPP (Building Sustainability Index: BASIX) 2004 ◦ SEPP (Infrastructure) 2007 ◦ SEPP 55 – Remediation of Contaminated Sites ◦ South Sydney LEP 1998 • Nature and extent of any non-compliance with relevant environmental planning instruments, plans and guidelines and justification for any non-compliance. 2. Built Form/Design and Visual Impacts Demonstrate that the proposal is of a high standard of architectural and urban design which addresses: • Density, height, bulk and scale of the proposal within the context of the locality. • Design quality with specific consideration of the siting, massing, setbacks and amenity impacts for adjoining and surrounding development. In particular, the proposal's compatibility with the existing character and built form of the neighbourhood and site, including the Darlington Road heritage items adjacent to the subject site. • Visual impacts upon the public domain • Detail the nature of the links between various buildings which are located above Council's roadways • Consideration of the objectives of the Redfern-Waterloo Built Environment Plan and redevelopment of the North-Eveleigh precinct. 3. Environmental and Residential Amenity Provide details and an assessment of the following issues and outline any mitigation

measures that may be necessary to achieve a high level of amenity:

- *Solar access:* Shadow diagrams are to be submitted demonstrating impacts of the proposal on both public and private open space areas and on adjoining properties.
- *Wind effects:* demonstrate the design achieves appropriate wind speeds for all publicly accessible spaces.
- *Visual Privacy:* ensure the design minimises overlooking into adjoining properties.
- Indicative layouts of proposed student accommodation.
- Protection of views, where relevant.

4. Transport and Accessibility

Prepare a Traffic and Transport Impact Study in accordance with the RTA's Guide to Traffic Generating Developments which addresses the following matters:

- traffic generation including daily and various peak traffic movements and the increase in the level and type of traffic associated with the proposal;
- impacts and resultant upgrades to street parking, the road network including laneways, arterial roads, intersections, signage and road capacity resulting from the project;
- cumulative impacts on the local and subregional area including the future development of the North Eveleigh Site;
- assessment of the likely impact of truck traffic on nearby residential areas; potential increase in toxicity levels of loads transported (including an incident management strategy) and anticipated route of trucks on major arterial and the local road network including origins and destinations.
- Details of public transport accessibility and strategies to encourage public transport patronage including pedestrian and cyclists;
- Pedestrian and cyclists accessibility; existing peak movements; adequacy of the proposal to meet likely future demand; need for upgrading or improvement works; links to Redfern Railway Station and the future bridge link;
- Vehicular access, car parking and bicycle arrangements;
- Detail adequate emergency vehicle access.

5. Heritage

Prepare a Heritage Impact Statement in accordance with the Heritage Manual (NSW Heritage Office) addressing:

- impacts on identified heritage items adjacent to and on the site, any other items of heritage significance and the Golden Grove Conservation Area. In particular, the impacts and proximity of the proposed building envelopes in the rear yards of the Darlington Road heritage items.
- The significance of the IXL factory and Carpentry Workshop to the future Darlington Campus and the impacts of the proposal on these buildings.

An assessment of the sites archaeological significance is also required (note an Archaeological Impact Assessment is required where the site is a potential archaeological site).

6. Safety/Public Domain/Landscaping

Demonstrate how the proposal will:-

- Maximise safety, security, surveillance and activity within the public domain and the basement car park and show consistency with 'Safer by Design' principles.
- Ensure access for people with disabilities.

Consideration of these issues is to include the new pedestrian link and open spaces.

7. Social Impacts

	The EA is to outline the social impacts of the proposal, infrastructure requirements and how it supports the development of a sustainable community within the wider area. The EA is to clarify whether the existing community services are to be retained or relocated. 8. Ecologically Sustainable Development (ESD) Detail how the development will incorporate ESD principles. 9. Stormwater/Flooding The EA is to address drainage and identify localised and downstream flooding issues with the aim to reduce stormwater flows through rainwater harvesting and retention and, where relevant, incorporation of Water Sensitive Urban Design measures. 10. Public Services/ Infrastructure and Utilities • Address provision of public services and infrastructure having regard to the Redfern-Waterloo Authority's Contributions Plans and Redfern-Waterloo Authority's Affordable Housing Contributions Plan. • In consultation with relevant agencies, address the existing capacity and requirements of the development for water and sewerage infrastructure, electricity, waste disposal, telecommunications and gas and detail any augmentation required. • Identify funding arrangements to implement the required works on regional roads in the area. 11. Staging The EA is to detail the proposed staging of the development in the context of the University's overall master plan. 12. Potential On Site Contamination The EA is to demonstrate that the site is suitable to accommodate the proposed uses in accordance with SEPP 55. 13. Dedication Details of any proposed dedication of the open space to Council or other authority are to be provided.
Consultation	Undertake an appropriate and justified level of consultation in accordance with the Department's <i>Major Project Community Consultation Guidelines October 2007</i> including: Public: • Private landowners (of Darlington Road terraces) adjacent to the precinct; and • Any other relevant individuals/groups.
Deemed refusal period	60 days

Attachment 1: Plans and Documents to accompany the Application

General	The Environmental Assessment (EA) must include: 1. an executive summary; 2. a thorough site analysis including site plans, aerial photographs and a description of the existing and surrounding environment; 3. details of the proposed layout, built form, land uses, size and scale of the main components of the development, student numbers and staff accommodated, FSR, height (AHD); 4. an assessment of the key issues specified above and a table outlining how these key issues have been addressed; 5. an assessment against the objects of the Act, (Environmental Planning & Assessment Act 1979 - Section 5). 6. an assessment of the potential impacts of the project and a draft Statement of Commitments, outlining environmental management, mitigation and monitoring measures to be implemented to minimise any potential impacts of the project; 7. the plans and documents outlined below; 8. a signed statement from the author of the EA certifying that the information contained in the report is not false or misleading; 9. a quantity surveyor's cost estimate report to verify the capital investment value of the project, calculated in accordance with the definition of 'CIV' in accordance with SEPP Major Projects (2005) - this definition should be quoted in the QS letter/report; 10. a conclusion justifying the project, taking into consideration the environmental impacts of the proposal, the suitability of the site, and whether or not the project is in the public interest; and 11. landowners' consent for the development site (including City of Sydney).
Plans and Documents	The following plans, architectural drawings and diagrams of your proposal as well as the relevant documents will be required to be submitted for your application: 1. The existing site survey plan is to be drawn to 1:500 scale (or other appropriate scale) and show: • the location of the land, boundary measurements, area (sq. m) and north point; • the existing levels of the land in relation to buildings and roads; • location and height of existing structures on the site; • location and height of adjacent buildings and private open space; • all levels to be to Australian Height Datum; and • location of any trees including street trees within 5m of the site. 2. A Site Analysis Plan must be provided which identifies existing natural elements of the site (including all hazards and constraints), existing vegetation, property boundaries and dimensions, footpath crossing levels and alignments, existing pedestrian and vehicular access points and other facilities, street features, slope and topography, utility services, orientation, view corridors, prevailing winds and all structures on neighbouring properties where relevant to the application (including windows, driveways, private open space etc). 3. A locality/context plan drawn to 1:500 scale (or other appropriate scale) should be submitted indicating: • significant local features such as parks, community facilities and open space and heritage items; • the location and uses of existing buildings, shopping and employment areas; • traffic and road patterns, pedestrian routes and public transport nodes.

	4. A scale model of the proposed development. 5. The Architectural drawings (where relevant) are to be drawn to scale and illustrate the following: - the location of any existing building envelopes or structures on the land in relation to the boundaries of the land, any development on adjoining surrounding land and the proposed buildings on the site; - the proposed building envelopes detailing the footprint and siting of the buildings, bulk and scale and setbacks between existing and proposed buildings; - where relevant, indicative floor plans of the proposed buildings showing the layout, room uses, sizes and orientation; - indicative elevations including sections of levels of the proposed buildings; - where relevant, the location and size of vertical and horizontal circulation of lifts, stairs and corridors including indicative roof plans; - communal facilities and servicing points (where relevant); - the height of the proposed buildings in relation to the land (AHD); - any changes that will be made to the level of the land by excavation, filling or otherwise; - the level of the lowest floor, the level of any unbuilt area and the level of the ground; - parking arrangements, where vehicles will enter and leave the site, and how vehicles will move about the site and an indicative basement plan; - pedestrian access to, through the site and within the site. 6. The shadow diagrams showing solar access to the site and adjacent properties including open space areas and the schools playground at summer solstice (Dec 21), winter solstice (June 21) and the equinox (March 21 and September 21) at 9.00 am, 12.00 midday and 3.00 pm. 7. The Other plans and reports including (where relevant): Arborist Report –detailing all trees on site, street trees within 5m of the site and the height, canopy spread, condition and appropriate tree protection measures. Stormwater Concept Plan - illustrating the concept for stormwater management from the site to the Council drainage system and include a detailed site survey. View Analysis - Visual aids including photomontages, artists impressions of the proposed buildings in the context of the surrounds and key vantage points. Landscape Public Domain Concept Plan – to illustrate the treatment of all communal/public open space areas, surfaces (pavers, lawn) and detail any street furniture, signage, lighting and tree/plant species (numbers, mature height & spread).
Documents to be submitted	1 copy of the EA, plans and documentation for the Test of Adequacy; 12 hard copies of the EA (once the EA has been determined adequate); 12 sets of architectural and landscape plans to scale, including one (1) set at A3 size (to scale); 1 copy of the EA and plans on CD-ROM (PDF format), not exceeding 5Mb in size (see below).
Electronic Documents	Electronic documents presented to the NSW Department of Planning for publication via the Internet must satisfy the following criteria: - Adobe Acrobat PDF files and Microsoft Word documents must be no bigger than 1.5 Mb. Large files of more than 1.5 Mb will need to be broken down and supplied as different files; - File names will need to be logical so that the Department can publish them in the correct order. Avoid sending documents that are broken down in more than 10 files;; - Image files should not be bigger than 2Mb. The file names will need to be clear and

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Alternatively, these electronic documents may be placed on your own web site with a link to the Department of Planning's website.

Director-General's Requirements

Section 75F of the *Environmental Planning and Assessment Act 1979*

Major Project No.	MP09_0051
Project	CODCD Building – Project Application (MP 09_0051): Centre for Obesity, Diabetes & Cardiovascular Diseases with a gross floor area of approximately 55,000sqm including research & teaching facilities, car parking and shared services.
Location	University of Sydney Camperdown Campus
Proponent	University of Sydney
Date issued	5 November 2009
Expiry date	If the Environmental Assessment (EA) is not exhibited within 2 years after this date, the applicant must consult further with the Director-General in relation to the preparation of the environmental assessment
Key Assessment Requirements	1. Relevant EPIs and Guidelines to be addressed • Planning provisions applying to the site, including permissibility and the provisions of all plans and policies including: ◦ All relevant State Environmental Planning Policies ◦ South Sydney LEP 1998 ◦ Metropolitan Strategy 'City of Cities: A Plan for Sydney's Future', and ◦ Sydney City Draft Subregional Strategy • Nature and extent of any non-compliance with relevant environmental planning instruments, plans and guidelines and justification for any non-compliance. 2. Site Analysis • Site analysis plan that identifies the relevant natural and built environmental features within and adjoining the site and the suitability of the site. • Survey Plan including site boundaries, levels, building elements to be retained and identifying any easements or other legal affectations on the title. 3. Land Use • Identify proposed staging and timing for the delivery of the development and land uses and activities to be contained in each stage. • Table listing different land uses, the floor space area, the floor space ratio, the total gross floor area and site coverage as relevant to each stage and with reference to the overall concept plan. 4. Urban Design and Built Form • Demonstrate how the proposed development will achieve design excellence including: ◦ Achieving a high standard of architectural design, materials and detailing appropriate to each building and its location; ◦ The form and external appearance of the proposed built form and how it will improve the quality and amenity of the public domain; ◦ The sustainable design principles incorporated into the development in terms of sunlight, natural ventilation, wind, reflectivity, visual and acoustic privacy, safety and security and resources, water and energy efficiency; and ◦ The design process leading to the proposal. ◦ Detailed plans, elevations and sections. ◦ Photomontages and perspectives of key elements and views of the development from close-up and distant vantage points including from Parramatta Road, Missenden Road and St John's Oval. ◦ A materials/finishes sample board and detailed elevations confirming the application of materials and finishes for the Stage 1 development. ◦ 3D modelling and a physical model of the proposed development in accordance with the City of Sydney requirements.

- Shadow diagrams.

5. Drainage, Stormwater and Groundwater Management

- A Flood Study; and Stormwater and Drainage Assessment
- Details of the extent of any dewatering.

6. Flora and Fauna

- Impact/s of the proposal on any ecological communities and threatened species and proposed measures to mitigate impacts.

7. Traffic and Transport

- Transport and Accessibility Report with particular regard to:
 - transport and traffic management within the overall University precinct including the demonstration of a minimalist approach to car parking provision;
 - pedestrian and cycle access/circulation to meet the likely future demand within the campus and connections to the external networks; and
 - access for emergency vehicles.
- Daily and peak traffic movements likely to be generated by the proposed development including the impact on nearby intersections and the need for funding of or upgrading road improvement works, as relevant.
- Modelling and assessment of the performance of key intersections providing access to the site and any upgrades (road/intersections) required as a consequence of the proposal.
- Identification of Travel Demand Management (TDM) measures that will optimise the opportunity provided by the project site's proximity to public transport including the preparation of a Work Place Travel Plan.

8. Heritage

- A Heritage Impact Statement (HIS) assessing:
 - impacts on heritage items within the site including retaining appropriate view corridors, setbacks and curtilages to St Johns College and Sancta Sophia College;
 - potential impacts on the Aboriginal cultural heritage values; and
 - any archaeological relics.

9. Landscape

- A Landscape Plan showing the integration of the development within the Campus and any public and private domain improvements.
- An Arborist Report assessing the impact of the proposed development if any significant trees in the vicinity are affected.

10. Ecologically Sustainable Development

- Demonstrate how the development will satisfy ESD principles including water sensitive urban design measures, energy efficiency, recycling and waste disposal.

11. Contamination

- Demonstrate compliance with the requirements of SEPP 55 including as a minimum providing a Phase 1 Environmental Site Assessment.
- The identification of activities relevant to each stage that may involve the use of radiation apparatus or substances pursuant to the *Radiation Control Act, 1990*.

12. Utilities and Infrastructure

- Utility and infrastructure servicing, demonstrating development can be adequately serviced for water supply, wastewater, stormwater, electricity, gas and communications.
- Demonstrate appropriate provision of social infrastructure and services to supported expected population increase.

13. Developer Contributions

	• Scope and justification for any developer contributions proposed. 14. Construction • A Construction and Site Management Plan including outlining: community consultation and notification; soil and water management; waste management; noise and vibration management; complaints handling; impact of construction on adjoining development and proposed measures to mitigate construction impacts. • A Waste Management Plan (construction and operational).
Consultation Requirements	Written evidence shall be submitted to demonstrate that an appropriate level of consultation has been undertaken with the following relevant parties during the preparation of the Environmental Assessment having regard to previous consultation: • Council of the City of Sydney; • NSW Ministry of Transport; • NSW Roads and Traffic Authority; • NSW Department of Environment and Climate Change • NSW Department of Water & Energy; • All relevant utility providers; and • Community consultation with Royal Prince Alfred Hospital and University stakeholders.
Landowner's Consent	Landowner's consent (for each land parcel) is to be provided within the EA in accordance with clause 8F of the Environmental Planning & Assessment Regulation 2000.
Deemed refusal period	60 days
Documents to be submitted	Ten hard copies of the EA with plans to be to scale and A3 in size. Ten copies of the EA and plans on CD-ROM (pdf format).

Attachment 1: Plans and Documents to accompany the Application

General	The Environmental Assessment (EA) must include: 1. an executive summary; 2. a thorough site analysis including site plans, aerial photographs and a description of the existing and surrounding environment; 3. details of the proposed layout, built form, land uses, size and scale of the main components of the development, student numbers and staff accommodated, FSR, height (AHD); 4. an assessment of the key issues specified above and a table outlining how these key issues have been addressed; 5. an assessment against the objects of the Act, (Environmental Planning & Assessment Act 1979 - Section 5). 6. an assessment of the potential impacts of the project and a draft Statement of Commitments, outlining environmental management, mitigation and monitoring measures to be implemented to minimise any potential impacts of the project; 7. the plans and documents outlined below; 8. a signed statement from the author of the EA certifying that the information contained in the report is not false or misleading; 9. a quantity surveyor's cost estimate report to verify the capital investment value of the project, calculated in accordance with the definition of 'CIV' in accordance with SEPP Major Projects (2005) - this definition should be quoted in the QS letter/report; 10. a conclusion justifying the project, taking into consideration the environmental impacts of the proposal, the suitability of the site, and whether or not the project is in the public interest; and 11. landowners' consent for the development site (including City of Sydney).
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Appendix D

Traffic Count Synopsis

Count Number **6586** Ref : **ARUP** Lat/Long : **S33 53 33.4 / E151 11 28.7** UBD **14 L-8**
 Street **ABERCROMBIE STREET, McDONALDTOWN : From GOLDEN GROVE STREET to SHEPHERD STREET : EAST BOUND**
 Location **West of Codrington Street roundabout, between Golden Grove Street and Codrington Street, House No.378, 4m sout Carriageway**

Start Date 25-OCT-10
 Start Time 100
 Duration 7 DAYS
 Interval 1 HOUR

Weekly 50th Percentile Speed 36
 Weekly 85th Percentile Speed 44
 Five Day AADT 4290
 Seven Day AADT 4031

TOTAL COUNT MATRIX

	MON 25TH	TUE 26TH	WED 27TH	THU 28TH	FRI 29TH	SAT 30TH	SUN 31ST	5 Day Total Average		7 Day Total Average	
Midnight - 1am	17	17	13	17	31	50	81	95	19	226	32
1am - 2am	9	13	12	14	16	31	55	64	13	150	21
2am - 3am	5	3	3	6	9	29	39	26	5	94	13
3am - 4am	9	7	8	11	9	21	28	44	9	93	13
4am - 5am	10	7	17	14	18	23	12	66	13	101	14
5am - 6am	48	44	43	43	51	35	14	229	46	278	40
6am - 7am	125	137	138	132	127	61	32	659	132	752	107
7am - 8am	300	280	289	286	287	100	40	1442	288	1582	226
8am - 9am	386	416	391	424	422	208	101	2039	408	2348	335
9am - 10am	344	320	357	373	364	332	130	1758	352	2220	317
10am - 11am	261	253	242	260	219	334	160	1235	247	1729	247
11am - Midday	243	274	288	278	259	313	192	1342	268	1847	264
Midday - 1pm	256	285	291	252	241	285	223	1325	265	1833	262
1pm - 2pm	274	262	281	254	239	241	221	1310	262	1772	253
2pm - 3pm	276	280	282	295	260	220	167	1393	279	1780	254
3pm - 4pm	268	237	295	241	267	239	214	1308	262	1761	252
4pm - 5pm	293	292	263	252	248	198	219	1348	270	1765	252
5pm - 6pm	250	300	286	298	237	208	196	1371	274	1775	254
6pm - 7pm	239	253	252	276	244	232	162	1264	253	1658	237
7pm - 8pm	175	230	195	211	255	225	120	1066	213	1411	202
8pm - 9pm	123	133	139	145	173	165	133	713	143	1011	144
9pm - 10pm	91	119	120	138	119	189	95	587	117	871	124
10pm - 11pm	47	83	88	97	130	162	63	445	89	670	96
11pm - Midnight	27	49	49	65	131	133	36	321	64	490	70
Total	4076	4294	4342	4382	4356	4034	2733	21450	4290	28217	4031

Count Number 6586 Ref : ARUP Lat/Long : S33 53 33.4 / E151 11 28.7 UBD 14 L-8
 Street ABERCROMBIE STREET, McDONALDTOWN : From SHEPHERD STREET to GOLDEN GROVE STREET : WEST BOUND
 Location West of Codrington Street roundabout, between Golden Grove Street and Codrington Street, House No.378, 4m sout Carriageway

Start Date 25-OCT-10
 Start Time 100
 Duration 7 DAYS
 Interval 1 HOUR

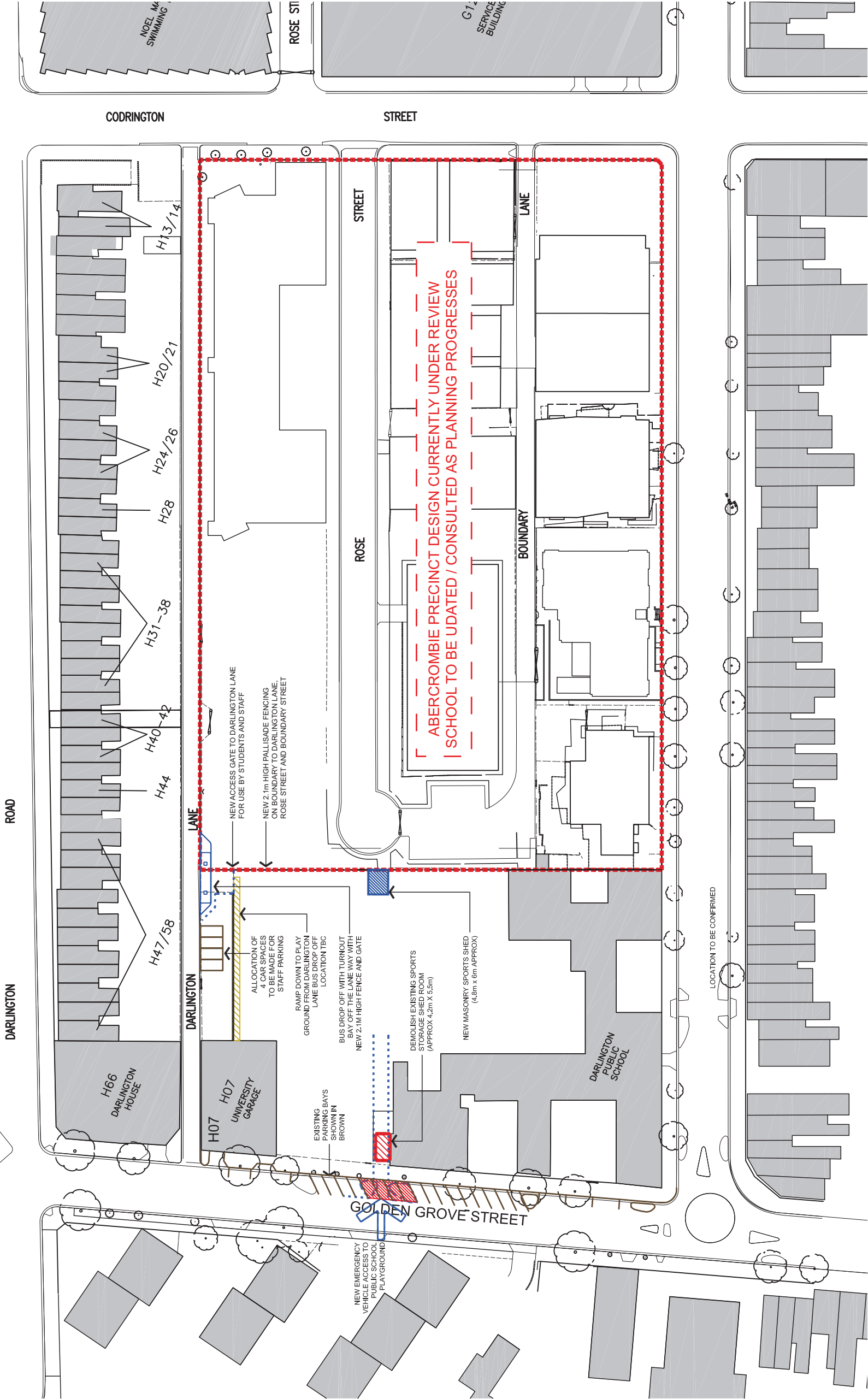
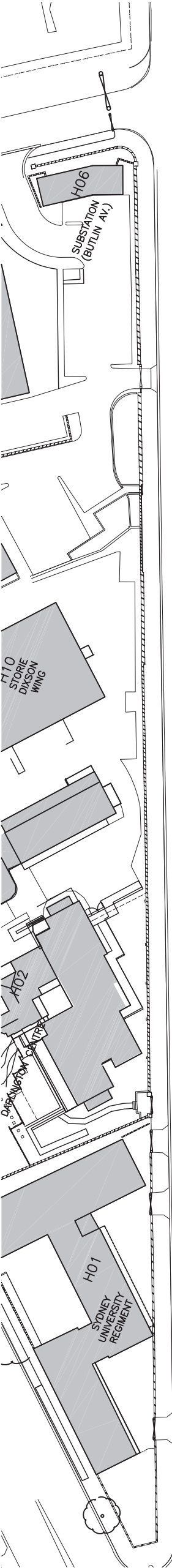
Weekly 50th Percentile Speed 37
 Weekly 85th Percentile Speed 46
 Five Day AADT 2422
 Seven Day AADT 2340

TOTAL COUNT MATRIX

	MON 25TH	TUE 26TH	WED 27TH	THU 28TH	FRI 29TH	SAT 30TH	SUN 31ST	5 Day Total Average		7 Day Total Average	
Midnight - 1am	14	20	26	28	25	54	58	113	23	225	32
1am - 2am	9	6	14	16	18	26	50	63	13	139	20
2am - 3am	2	1	2	9	9	29	45	23	5	97	14
3am - 4am	3	3	5	9	11	28	24	31	6	83	12
4am - 5am	8	11	10	11	12	11	16	52	10	79	11
5am - 6am	17	14	13	11	16	22	13	71	14	106	15
6am - 7am	39	46	42	52	41	32	13	220	44	265	38
7am - 8am	77	65	83	63	69	60	20	357	71	437	62
8am - 9am	136	127	144	146	124	124	30	677	135	831	119
9am - 10am	130	122	118	128	136	193	59	634	127	886	127
10am - 11am	108	113	113	127	115	209	119	576	115	904	129
11am - Midday	110	101	147	116	135	186	121	609	122	916	131
Midday - 1pm	138	153	154	144	146	207	123	735	147	1065	152
1pm - 2pm	134	157	144	154	141	181	120	730	146	1031	147
2pm - 3pm	153	153	181	195	164	154	100	846	169	1100	157
3pm - 4pm	159	167	173	178	176	114	98	853	171	1065	152
4pm - 5pm	196	204	180	162	192	134	104	934	187	1172	167
5pm - 6pm	250	249	264	258	266	142	128	1287	257	1557	222
6pm - 7pm	180	215	213	207	213	176	122	1028	206	1326	189
7pm - 8pm	121	147	153	140	164	128	118	725	145	971	139
8pm - 9pm	86	99	94	105	101	110	78	485	97	673	96
9pm - 10pm	80	95	102	101	69	85	72	447	89	604	86
10pm - 11pm	64	69	76	76	90	85	44	375	75	504	72
11pm - Midnight	43	31	42	60	64	79	27	240	48	346	49
Total	2257	2368	2493	2496	2497	2569	1702	12111	2422	16382	2340

Appendix E

Proposed Upgrades to Darlington Public School



- notes:
1. All work areas to be made good post construction / demolition
 2. Gardens to be re-instated post construction / demolition
 3. Signage to be provided to fences and gates regarding access to the site
 3. Lighting to be provided as required

Copyright
WOODS BAGOT

Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE
BEFORE COMMENCING WORK OR PREPARING SHOP
DRAWINGS. DO NOT SCALE DRAWING.

01	Issue for approval by public school	17/09/10
Rev	Description	Date
Client		



Project
UNIVERSITY OF SYDNEY
ABERCROMBIE PRECINCT
REDEVELOPMENT

**WOODS
BAGOT™**

Drawing title
IMPROVEMENT WORKS TO
DARLINGTON PUBLIC SCHOOL

Checked
TH
Approved
GS
Scale
1:1000
30mm on A3 original

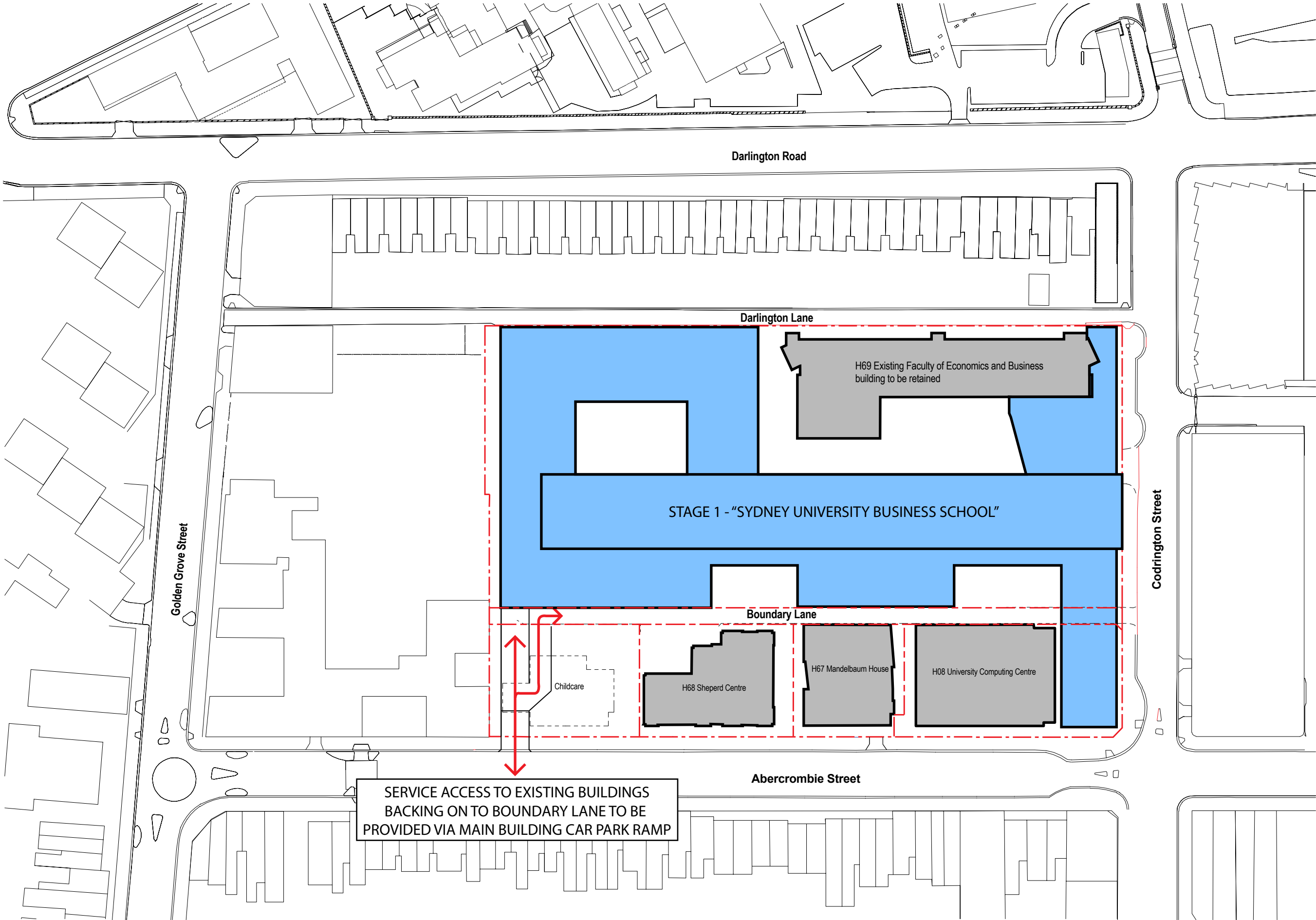
Project number
2-20-1874
Drawing number
SK0101
Revision
01

Status
PRELIMINARY

Appendix F

Development Staging Diagram

- Existing buildings to be retained
- Stage 1 Development
- Stage 2 Development



2	AMENDED PART 3A APPLICATION	02.03.11
1	TEST OF ADEQUACY APPLICATION	13.12.10
Rev	Description	Date pp'd
Client	UNIVERSITY OF SYDNEY	

Project
ABERCROMBIE PRECINCT
REDEVELOPMENT

WOODS BAGOT
AUSTRALIA
ASIA
MIDDLE EAST
EUROPE
NORTH AMERICA

Drawing title

STAGE 1 PLAN

Date generated 02-03-11 TH
Checked TH
Approved GS
Scale 1:500
@ A1 sheet size 50mm on original

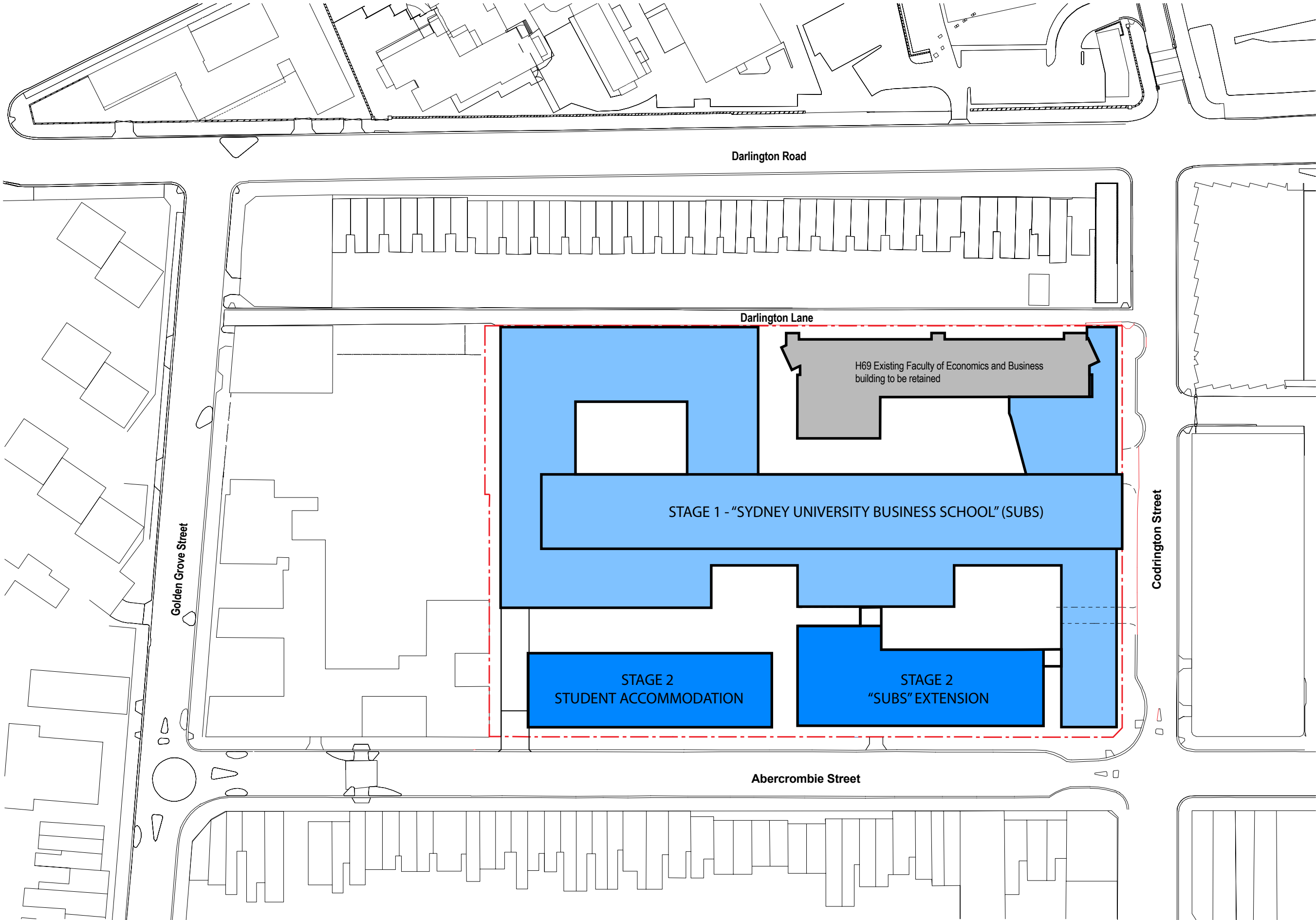
Project number 2-20-1874
Drawing number A1002
Status
PART 3A SUBMISSION



PRELIMINARY

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WOODS BAGOT PTY LTD ABN 41 007 762 174
Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING
WORK OR PREPARING SHOP DRAWINGS. DO NOT SCALE DRAWING.

- Existing buildings to be retained
- Stage 1 Development
- Stage 2 Development



2	AMENDED PART 3A APPLICATION	02.03.11
1	TEST OF ADEQUACY APPLICATION	13.12.10
Rev	Description	Date pp'd
Client	UNIVERSITY OF SYDNEY	

Project
ABERCROMBIE PRECINCT
REDEVELOPMENT

WOODS BAGOT
AUSTRALIA
ASIA
MIDDLE EAST
EUROPE
NORTH AMERICA

Drawing title

STAGE 2 PLAN

Date generated
02-03-11 TH
Checked
TH
Approved
GS
Scale
1:500
@ A1 sheet size 50mm on original



Project number
2-20-1874
Drawing number
A1004
Status
PART 3A SUBMISSION
Revision
2

NOTE: STAGES SHOWN ARE INDICATIVE ONLY AND MAY VARY TO INCLUDE MULTIPLE SMALLER STAGES.