University of Sydney

Australian Institute of Nanoscience (AIN) Building

Transport Impact Assessment

223982

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Contents

Appendices

1 Introduction

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 Australian Institute of Nanoscience (AIN) in the Camperdown Campus of the University of Sydney.

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

1.1 Director Generals Requirements

This report responds to traffic and transport related issues which are detailed in the Director Generals Requirements (DGRs) attached in Appendix A. Table 1 lists the relevant DGRs and the sections in which the requirement is discussed within this text.

Table 1: Director Generals Requirements – Transport and Accessibility (Construction and Operation)

	Requirement	Section
1.	Analyse the traffic and accessibility impacts of the development including assessment of the construction and operational stages of the project and measures to mitigate these impacts. Provide traffic modelling with details of daily peak vehicle movements including emergency vehicles, proposed access routes, closure of any internal roads and impact on surrounding intersections and infrastructure.	4.1 & 5.2
2.	An assessment of the car parking requirement and compliance with relevant Australian Standards.	4.2
3.	An assessment of how the development will support sustainable non-car travel modes and associated infrastructure including pedestrian and bicycle linkages.	4.3
4.	Provide a Construction Traffic Management Plan.	5
5.	Provide details of the methods of loading areas and site waste collection demonstrating appropriate space for manoeuvring and pick up.	4.2
6.	The Traffic Impact Study should include a review of the existing capacity of the public transport infrastructure and details of the impact the proposed development will have on that capacity.	4.1
7.	The Traffic Impact Study should also review on site waste collection and ensure that there is appropriate space for manoeuvring and pick up.	4.2
8.	The assessment of traffic, transport and accessibility (including emergency access), loading areas, car parking arrangements, pedestrian and bicycle linkages associated with the proposed development. Scope is to include:	4.2
9.	Assessment of the pedestrian and cycle network, demand and linkages. Identify measures, including new or upgraded infrastructure that will facilitate sustainable transport outcomes.	3.5

10.	Transport impacts to include assessment of construction and operational stages of the project, and measures to mitigate these impacts. Assessment must identify proposed access routes and include an outline of the daily and peak traffic movements likely to be generated by the proposed development. Local road network and nearby intersection impacts including the cost and prosed funding of upgrades and road improvement works (if required). The traffic impact assessment should consider base models with future traffic generated by the proposed development and demonstrate a minimum approach to the provision of on-site car parking.	5
11.	Details of the proposed accesses and the parking provisions associated with the proposed development including compliance with the requirements of the relevant Australian Standards (ie:turn paths, sight distance requirements, aisle widths, etc).	4.2
12.	Proposed number of car parking spaces and compliance with the appropriate parking codes.	4.2
13.	Identify and consider any impacts associated with proposed road works, including the closure of any internal roads and impacts on existing vehicle access arrangement (eg.g community transport vehicles, emergency vehicles and other vehicles), and measures to mitigate these impacts.	4.3.1
14.	Details of service vehicle movements (including vehicle type and likely arrival and departure times).	4.2
15.	The EA report is to assess the implications of the proposed development for non-car travel modes (including public transport use, walking and cycling); the potential for implementing a location-specific sustainable travel plan (eg 'Travelsmart' or other travel behaviour change intiative; and the providion of facilities to increase the non-car mode share for travel to and from the site. This will entail an assessment of the accessibility of the development site by public transport including initiatives such as travel awareness campaigns, workplace travel planning, and transport access guides.	4.3
16.	To ensure that the above requirements are fully addressed, traffic modelling is to be undertaken for the proposed site to properly ascertain the traffic impacts associated with development. This traffic modelling shall assess the existing levels of service of surrounding intersections and identify local intersection and road improvements, vehicular access options, the timing and cost of any infrastructure works and the identification of funding responsibilities associated with the development.	4.1
17.	In due course the provision of a Construction Traffic Management Plan will be required for all demolition / construction activities, detailing vehicle routes, number of trucks, hours of operation, access arrangements and traffic control measures.	5

1.2 Structure

The Structure of the study is as follows:

- Chapter 1 Introduction
- Chapter 2 Receiving Environment
- Chapter 3 Development Proposal
- Chapter 4 Transport Impact Assessment
- Chapter 6 Construction Management
- Chapter 6 Conclusions

2 Receiving Environment

2.1 Location

The proposed development site is located within the University of Sydney's Camperdown Campus. Camperdown is bounded by Forest Lodge and Glebe to the north, Chippendale and Darlington to the east, Newtown to the south and Marrickville's Northern Ward to the west. Parramatta Road and City Road are the major roads within the suburb and form the northern and eastern boundaries respectively.

The development site is within the University Campus to the south of the physics building on Physics Road within the campus. The development site is bounded by the Physics Building and Physics Road to the north, Saint Pauls Wesley College to the west, Saint Pauls Oval to the south and Fisher Road to the east. Figure 1 below shows the location of the proposed site.

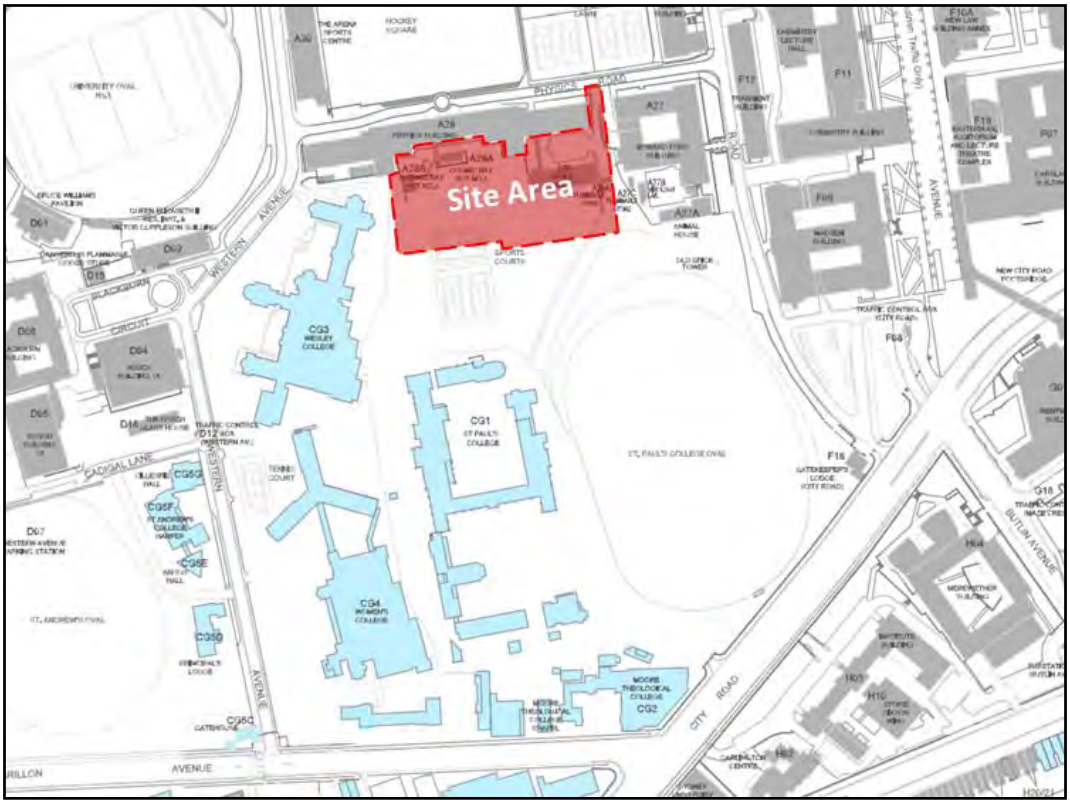


Figure 1: Site Location Diagram

2.2 Bus Links

The site is located within the university campus, an area which facilitates pedestrian activity. The pedestrian routes facilitate access throughout the campus and to public transport nodes. Figure 2 and Figure 3 show the most likely routes for pedestrians from the site to nearby bus stops.

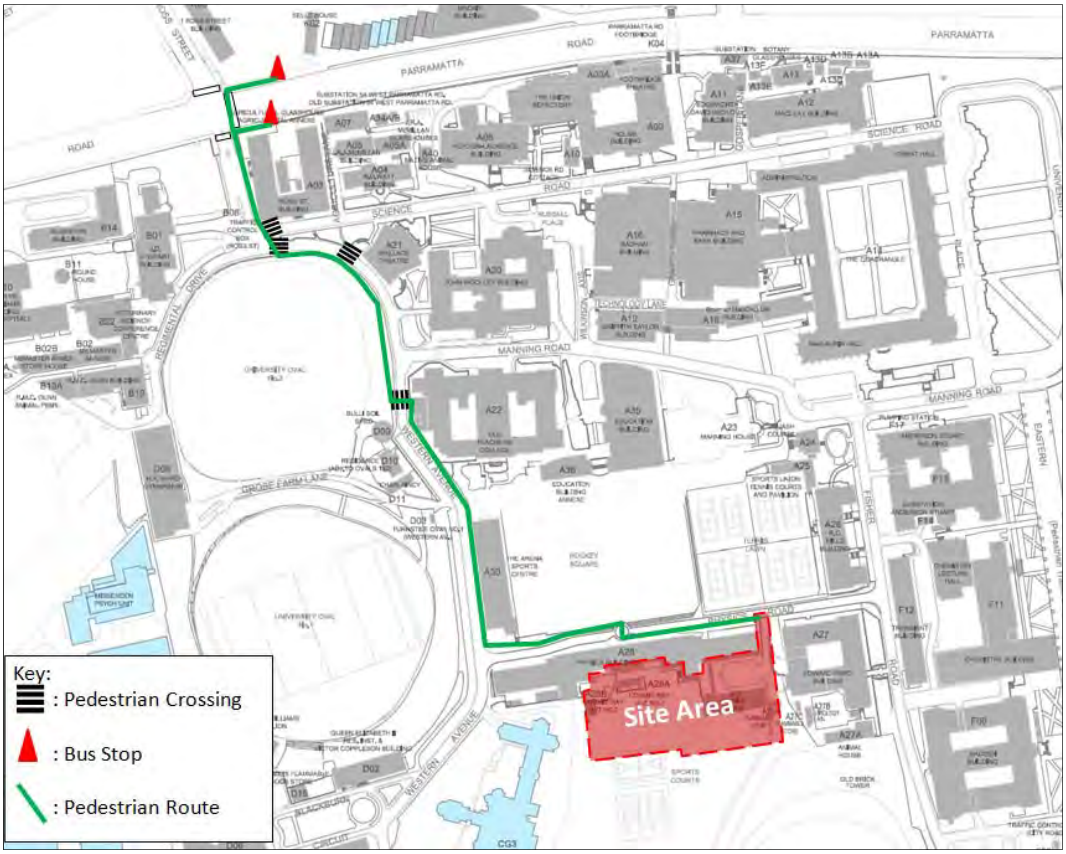


Figure 2: Pedestrian route to Parramatta Road buses

Figure 2 shows the most likely route pedestrians would take from the site to the bus stops on Parramatta Road. Pedestrians would walk along west along Physics Road, crossing at the shared raised surface in front of the Physics Building. Pedestrians would then travel north along Western Avenue using the pedestrian footpaths pram ramps and pedestrian priority crossings to reach Parramatta Road. Pedestrians could then avail of the signalised crossing on Parramatta Road to reach the bus stop on the north side of the road.

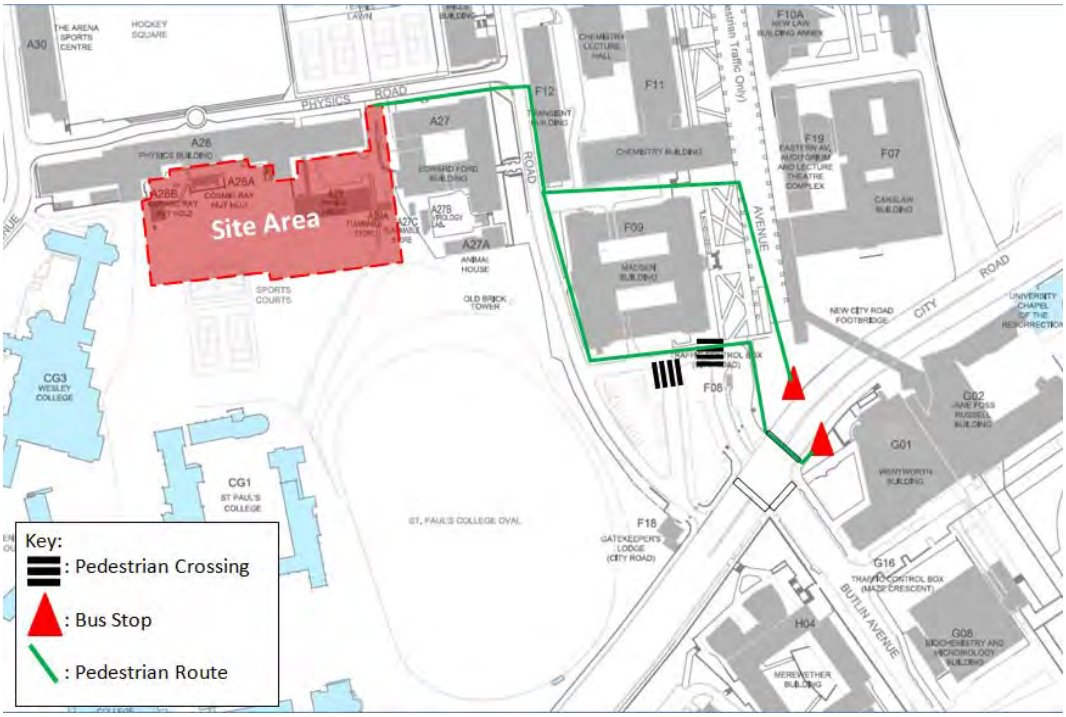


Figure 3: Pedestrian route to City Road buses

To access the buses available on City Road from the site, pedestrians will take the footpath on Physics Road to Fisher Road. Fisher Road is equipped with pedestrian footpaths on east and western sides of the road. From Fisher Road pedestrians can use the pedestrian route between the Chemistry Building and the Madsen Building to reach the Eastern Avenue pedestrian corridor. Alternatively pedestrians would continue on Fisher Road to reach the University main access. A signal controlled pedestrian crossing on City Road facilitates pedestrians crossing to the bus stop for southbound buses. Figure 3 shows the route through the campus to reach the bus stops on City Road.

The majority of the buses in the surrounding area operate along City Road and Parramatta Road. The nearest bus stops to the proposed development on City Road are less than 400 metres away, approximately 5 minutes' walk from the site. Bus stops on Parramatta Road are approximately 600 metres away, less than 10 minutes' walk from the site. Table 2 and Table 3 details a list of the existing bus routes and operation times along City Road and Parramatta Road.

Table 2: Bus routes operating on City Road

Bus Number	Operator	Route	Total Number of Buses per Day in Both Directions	Buses in the AM Peak Hour[1] in Both Directions
Metrobus 30	Sydney Buses	Sydenham Station to Mosman via the CBD	128	12
352	Sydney Buses	Bondi to Marrickville Junction	53	6
370	Sydney Buses	Coogee to Leichhardt	112	11
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
426	Sydney Buses	Dulwich to Circular Quay	135	10
428	Sydney Buses	Canterbury to Circular Quay	141	11
L23	Sydney Buses	Kingsgrove to Circular Quay	17	5
L28	Sydney Buses	Canterbury to Circular Quay	5	8

A free security shuttle bus service operates from Monday to Friday from 16.30 to 21:30 or in accordance with the Fisher library opening times. The bus route operates along Manning road and Physics Road and connects the Camperdown Campus to Redfern Railway Station. A exert of the route map is shown in Figure 4.

[1]For the purpose of this table the AM peak hour is defined as buses stopping on City Road between 8am and 9am.

Figure 4: Security shuttle bus route

Table 3: Buses Routes operating along Parramatta Road

Bus Number	Operator	Route	Total Number of Buses per Day in Both Directions	Buses in the AM Peak Hour[2] in Both Directions
Metrobus 10	Sydney Buses	Leichhardt to Maroubra Junction	128	12
412	Sydney Buses	Campsie to Sydney City	101	7
413	Sydney Buses	Campsie to Sydney City	76	7
436	Sydney Buses	Chiswick to Sydney City	81	4
438	Sydney Buses	Abbotsford to Sydney City	145	11
439	Sydney Buses	Mortlake to Sydney City	45	2
440	Sydney Buses	Leichhardt to Railway Square	173	23
461	Sydney Buses	Burwood to Sydney City	112	11
480	Sydney Buses	Strathfield to Sydney City	60	7
483	Sydney Buses	Strathfield to Sydney City	75	5

2.3 Rail

Redfern Railway Station is approximately 20 minutes' walk from the proposed site and is used by a significant number of students at the university. 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 4 details the number of services at the station for each line.

[2]For the purpose of this table the AM peak hour is defined as buses stopping on Parramatta Road between 8am and 9am.

Table 4: Redfern Railway Station Lines

Rail Line	Direction	Trains per weekday	Trains in AM Peak[3]
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

2.4 Pedestrians

The nature of a University Campus encourages high pedestrian activity. Accessible public transport as previously discussed encourages commuters to walk from the public transport node to their destination. Features surrounding the area encourage pedestrian activity, such as the pedestrian footbridge across City Road and Eastern Avenue, which is a wide pedestrian thoroughfare along the campus. Pedestrian priority crossings are located in areas of high pedestrian to vehicle conflict. The facilities which are near to the development site include:

- A pedestrian priority zebra crossings located at the Manning Road/Fisher Road intersection
- A pedestrian priority area on Physics Road in front of the Physics building
- Pedestrian crossings on Western Avenue, and
- Pedestrian crossings on Fisher Road providing links from the car park at the main gate to Eastern Avenue.

[3] For the purpose of this table the AM peak hour is defined as trains departing Redfern Station between 8am and 9am.

Photograph 1: Physics Road, University of Sydney Camperdown Campus

2.5 Road Hierarchy

As discussed in section 2.1, Parramatta Road and City Road are nearby arterial routes which provide continuing connections beyond Sydney.

City Road is a RMS controlled road which travels along the eastern campus boundary. It is a two-way dual carriageway with a central median to separate traffic. The southern side of the road has a dedicated bus lane. A third lane exists on the northern side of the road which is used as a dedicated turning lane on the approach to intersections and parking in some sections of the road. Each lane is approximately 3.3 metres wide and the road pavement appears to be in good condition. The posted speed limit in the area is 60km/h. There are several intersections on City Road which are signalised with dedicated pedestrian crossings including City Road/Parramatta Road, City Road/Cleveland Street, City Road/Butlin Avenue and City Road/Carillion Road intersections. Smaller intersections such as the City Road/Myrtle Street intersection are left in/left out to accommodate traffic flow. Pedestrian footpaths in the area appear to be generally in good condition.

The Average Annual Daily Traffic Flow (AADT) is a measure of the total number of vehicles that travel down a road over a day. An average of the total daily traffic is taken over the entire year. The AADT along City Road in 2009 was 39,655 vehicles on average per day.

Parramatta Road is a RMS controlled road to the north of the university campus. The road has three lanes for eastbound traffic and two lanes for west bound traffic. Each way has an additional dedicated bus lane. Each lane is approximately 3.3 metres wide. The road is equipped with footpaths and street lighting lining the road. The footpaths in the area appear to be in good condition with signalised pedestrian crossings at major intersections including Parramatta Road/City Road, Parramatta Road/Glebe Point Road, Parramatta Road/Derwent Street and Parramatta Road/Ross Street intersections. An overpass exists from the university campus to the north side of Parramatta Road adjacent to Seamer Street, facilitating safe pedestrian movements. The posted speed limit in the area is 60km/h. The AADT along Parramatta Road in 2009 was 53,731 vehicles on average per day.

Carillon Avenue is a RMS controlled road to the south of the University Campus and is classified by the RMS as a sub-arterial road. The road is a wide two-way single lane carriageway with parking permitted on both sides of the road. The road is approximately 13 metres wide in total with roughly 6.4 metres per lane. The posted speed limit is 50km/h. There are footpaths and street lighting on either side of the road. A pedestrian priority zebra crossing is located on the south side of the campus on Carillon Avenue. The AADT on Carillon Avenue for 2005 was 38,475.

The roads within the university campus are controlled by the university and provide local access to areas of the campus. The university-controlled Regimental Drive borders the northern edge of University Oval Number 2. The road is approximately 4.5 metres wide with a 25km/h speed limit.

A one-way loop is in operation around the centre of Camperdown Campus. The loop is Manning Road to the north, Western Avenue to the west, Physics Road to the south and Fisher Road to the east.

Physics Road is one-way from west to east connecting Western Avenue with Fisher Road. The road is approximately 5 metres wide with footpaths on the northern and southern sides of the road. A raised pedestrian crossing is located outside the main access to the Physics Building with a pinch point reducing the road to 3 metres wide in order to slow vehicular traffic.

Fisher Road is a two way single lane carriageway connects the University to the main access onto City Road. A car park is located adjacent to Fisher Road at the access to the University. The road connects Physics Road to Manning Road. Three pedestrian crossings are located along the road, at the north of the road at the Manning Road/Fisher Road intersection and from the car park to Eastern Avenue at the south of the road.

Manning Road is a 6.5metre one-way single lane carriageway at the northern side of the Camperdown Campus loop. The road continues to the eastern side of the campus where it is a two-way carriageway connecting the eastern side of the Camperdown Campus to the vehicle access on Parramatta Road and Fisher Road. Intermittent on street parking is available on either side along the road.

Western Avenue is a two-way single lane carriageway road approximately 5metres wide. The road is north south orientated and connects the Parramatta Road University access with the Southern vehicle access on Carillon Avenue. Traffic calming features are in place along the road including speed bumps and pedestrian crossings along the route.

3 Development Proposal

3.1 Campus 2020 Materplan

The Australian Institute of Nanoscience (AIN) building is considered part of an overall campus masterplan strategy. The strategy is focused on providing a better learning environment, design excellence, highest possible environmental sustainability and a more inviting campus to the community.

In order to encourage a more environmentally sustainable environment the Campus 2020 masterplan aims to control traffic flows to reduce congestion in and around the campus and promoting walking, cycling and the use of public transport. The bicycle and pedestrian routes shown in Figure 5 are proposed as part of the campus 2020 Masterplan, and are aimed at encouraging more sustainable travel to and from the University.

Figure 5: Campus 2020 Masterplan (Source: University of Sydney)

3.2 Development Proposal Description

The proposed AIN building consists of clean room laboratories with associated office spaces and meeting room facilities. The development is a four story building of approximately 11,595m^2 Gross Floor Area (GFA).

The proposed development is an addition to the physics faculty and relies on the removal of the existing physics annex building on the site. The development is not considered to result in significant increases in student numbers. The development is to be developed with a focus on sustainable transport, with pedestrians being the main mode of access to the development.

3.3 Vehicle Access

Vehicle access is to be provided off Physics Road, a one-way road allowing movements from west to east. The development will require deliveries to facilitate operations connected with the development. These include waste collection, chlorine and liquid nitrogen. Deliveries are expected to be infrequent less than one delivery per day.

Ambulance vehicles can access the development via the main vehicle access to the site which is adjacent to the pedestrian access. In the event of an emergency fire trucks currently access the fire hydrant booster on Physics Road adjacent to the access to the development. This operation is proposed to remain as existing for the proposed development.

3.4 Parking

As part of the development plans, it is proposed to provide approximately 12 car parking spaces including two spaces for drivers with mobility impairments. The spaces are to be restricted allowing permitted cars to park in the area similar to existing parking spaces within the campus. The low provision of parking spaces is to encourage sustainable transport to the proposed development.

3.5 Bicycle Parking

As part of the development plans it is proposed to provide approximately 16 bicycle parking spaces located in a convenient position adjacent to the access to the development.

4 Transport Impact Assessment

4.1 Traffic Generation and Impacts

The AIN development is an addition to the physics faculty. Users are likely to have other lectures, meetings and classes in different buildings within campus throughout the day. The proposed development is unlikely to result in significant increases in student or staff numbers. Given that there are 12 vehicle car parking spaces proposed, it is considered that 12 vehicle movements are likely to occur in or before the peak hour as a result of the proposed development.

Vehicles travelling to the development have three primary options to enter the University, from Carillon Avenue onto Western Avenue, from Parramatta Road Western Avenue and from City Road to Fisher Road. Given the low number of vehicles and the high number of access routes, it is considered that the development will have negligible effects on the surrounding traffic network.

4.2 Car Park and Loading

A review was undertaken of the proposed car park arrangement. Car parking spaces are 2.5metres width and 5.4metres long as required with a minimum aisle width of over the required 5.8metres. The car park design conforms to Australian Standards AS/NZ 2890.1.2004.

12 car parking spaces are proposed as part of the development works. The Sydney Local Environmental Plan (LEP) 2011 states that the maximum number of car parking spaces for education facilities is 1 space per 200m² of GFA. The proposed AIN development has a GFA of approximately 11,595 m². This corresponds to a maximum car parking provision of 58 car parking spaces. As such the proposed development adheres to the parking requirements set out in the LEP.

The largest expected vehicle is a standard MRV which is expected to be the largest garbage collection within the University and accounts for the expected deliveries to the loading area. Waste collection in the area currently occurs prior to the weekday morning peak at approximately 07:30am. A swept path analysis of an MRV accessing and exiting the loading bay is shown in Appendix A.

4.3 Sustainable Transport

The University of Sydney aims to promote more sustainable non-car modes with the provision of low parking provision combined with prominent pedestrian links throughout the campus leading to pedestrian connections such as Redfern Railway Station.

Figure 6: Walkways within the University of Sydney Campus

4.3.1 Security Bus

As mentioned in Section 2.2, a free security shuttle bus service operates from Monday to Friday from 16.30 to 21:30 or in accordance with the Fisher library opening times. The bus route operates along Manning road and Physics Road and connects the Camperdown Campus to Redfern Railway Station. The provision of free and safe connections to public transport is aimed at encouraging more sustainable transport. Way finding information will be supplied to staff, visitors and students, detailing information of the surrounding public transport links and the appropriate walking routes in order to encourage a non-car mode share for travel to and from the site.

5 Construction Management

The University Campus is a low speed environment with low traffic volumes, narrow streets and narrow footpaths in places. The internal road system was not designed for heavy vehicle traffic. Therefore it is important to ensure that the routes to the site utilise the least amount of campus roads.

A Construction Traffic Control Plan will be provided by the contractor prior to commencing construction. The plan will detail the specific arrangements and safety measures for traffic controllers.

5.1.1 Site Access

The primary construction access to the development site is proposed via McLeod Road and Western Avenue within the university. Vehicles up to and including medium rigid vehicles (MRV) will access from Parramatta Road to McLeod Road. A turning area is to be provided within the site so vehicles enter and exit the site travelling forwards.

The Saint Paul's College Masterplan is a neighbouring proposed development which is proposed to be constructed concurrent to the AIN development as a result efficiencies in the construction processes. Saint Paul's College are proposing to provide a construction access off City Road for the duration of construction.

On occasion, vehicles larger than an MRV will be required to access the development site. In this case it is proposed that access will be provided through Saint Paul's College construction access.

In the case of either access, priority will be given to construction vehicles entering the construction access as to minimise the impact of turning vehicles on the traffic flow of City Road. A lay-by area will be designated within the site to allow construction vehicles exiting the site to keep clear of the path of entering vehicles. Vehicle operations at the primary access and the Saint Paul's access will be controlled by designated traffic controllers to ensure safe and efficient movement.

5.1.2 Facilities on Site

The development will provide facilities on site for workers to store their tools in order to reduce reliance on vehicles. A drop off area will be provided on site for workers to access the site. No parking will be provided for workers on or within the construction site.

5.1.3 Heavy Vehicle Routes

The primary construction access is to Parramatta Road. Vehicles leaving the site travelling north would travel along Wattle Street to Victoria Road. Vehicles travelling east will travel along Parramatta Road turning onto King Street and onto Cleveland Street. Vehicles travelling south will travel along Parramatta Road turning onto King Street and continuing south. Vehicles travelling west will turn onto Parramatta Road and continue west. The nominated construction traffic routes to site are shown in Figure 7.

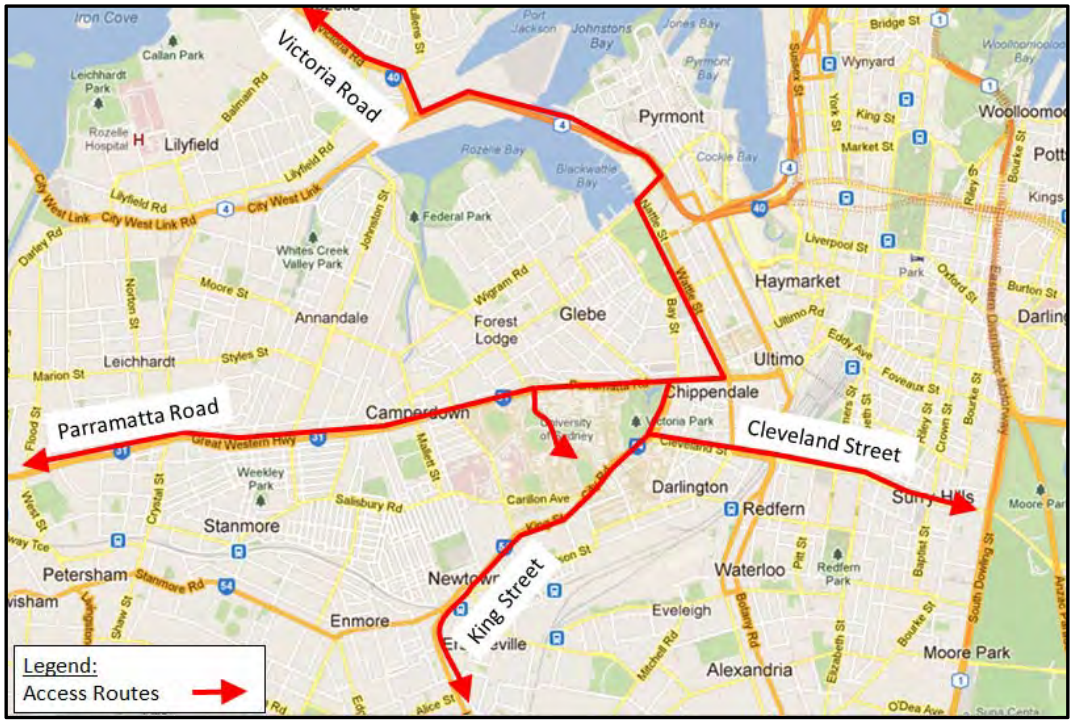


Figure 7: Proposed construction access routes

As discussed at the beginning of Section 5, a detailed construction traffic control plan will be issued by the contractor stating the proposed management strategy within the university and site. The plan will be submitted prior to construction.

5.2 Construction traffic volumes

Construction will generate traffic around the site, ranging from workers making their way to site, to construction material deliveries. The number of trucks needed at each stage has been estimated based on the gross excavation volume, proposed timelines and material delivery requirements. The estimated number of peak hour and daily truck movements, during the phases of construction noted earlier, are shown in Table 5.

Table 5: Estimated number of construction vehicle movements

Stage	Approx daily vehicle trips	Approx peak hour trips
Early Works	10	1-2
Demolition	60	5-8
Excavation	160	8
Construction	60	5-8
Finishing Works	20	2-3
Landscaping	20	2-3

It is expected that the peak expected vehicle movements of 8 vehicles per hour is are unlikely to result in significant traffic impacts on the wider road network.

5.1 Hours of construction

The hours of construction throughout the duration of the project are proposed as per City of Sydney (CoS) standard conditions as follows:

- Monday to Friday: 7:00am to 7:00pm
- Saturday: 7:00am to 5:00pm
- No work on Sundays or NSW public holidays

In order to cause minimal disruption to the University, an effort will be made to carry out the majority of the works outside of term time.

5.2 Parking

On-site car parking will not be provided for site workers, hence there will be minimal traffic impact arising from personal parking use.

Parking on campus is controlled through the issuing of parking permits. No construction related vehicle will be issued this permit; therefore the likelihood of construction vehicles parking onsite is low. Significant numbers of the workforce will travel by train and bus outside the morning and afternoon commuter peak.

Construction vehicles will be provided a separate set down area on site for up to 6 MRVs. This allows for potential delays during a high demand construction phases such as a concrete pour, without interfering with traffic surrounding the site.

5.3 Pedestrians

Pedestrians would be guided around and from the site with appropriate signage and fencing. Hoardings are to be installed along the site boundary. Qualified traffic controllers will control the site access to ensure the safest possible use of the access of the site. The contractor will provide a Traffic Control Plan designating the exact locations and safety measures prior to commencing construction.

5.4 Driver code of conduct

To manage driver conduct the following measures are to be implemented:

- All deliveries are to be pre booked
- All deliveries are to check in at the site office
- Vehicles are to enter and exit the site in a forwards direction along the travel path shown on delivery maps
- Drivers are to give way to pedestrians and plant at all times.

6 Conclusions & Mitigation Measures

The Australian Institute of Nanoscience (AIN) building is considered part of an overall campus masterplan strategy. The proposed AIN building consists of clean room laboratories with associated office spaces and meeting room facilities. The development is a four story building of approximately 11,595m² Gross Floor Area (GFA).

The proposed development is an addition to the physics faculty and is not likely to result in significant increases in student numbers. The development is to be developed with a focus on sustainable transport, with pedestrians being the primary mode of access to the development.

Vehicle access is to be provided off Physics Road, a one-way road allowing movements from west to east. The development will require deliveries to facilitate operations connected with the development. These include waste collection, chlorine and liquid nitrogen. Deliveries are expected to be infrequent less than one delivery per day.

As part of the development plans, it is proposed to provide approximately 12 car parking spaces including two spaces for drivers with mobility impairments in line with the Sydney Local Environment Plan. The spaces are to be restricted allowing permitted cars to park in the area similar to existing parking spaces within the campus. The car park conforms to Australian Standards AS/NZ 2890.1.2004.

The primary construction access to the development site is proposed via McLeod Road and Western Avenue within the university. Vehicles up to and including medium rigid vehicles (MRV) will access from Parramatta Road to McLeod Road. A turning area is to be provided within the site so vehicles enter and exit the site travelling forwards. On occasion, vehicles larger than an MRV will be required to access the development site. In this case it has been agreed with Saint Paul's College, that access will be provided through the Saint Paul's College construction access.

The proposed development is proposed to provide additional facilities to the physics faculty and is not likely to result in a significant increase in students. Low parking provision and a campus that encourages high pedestrian connectivity are expected to result in negligible increases in traffic.

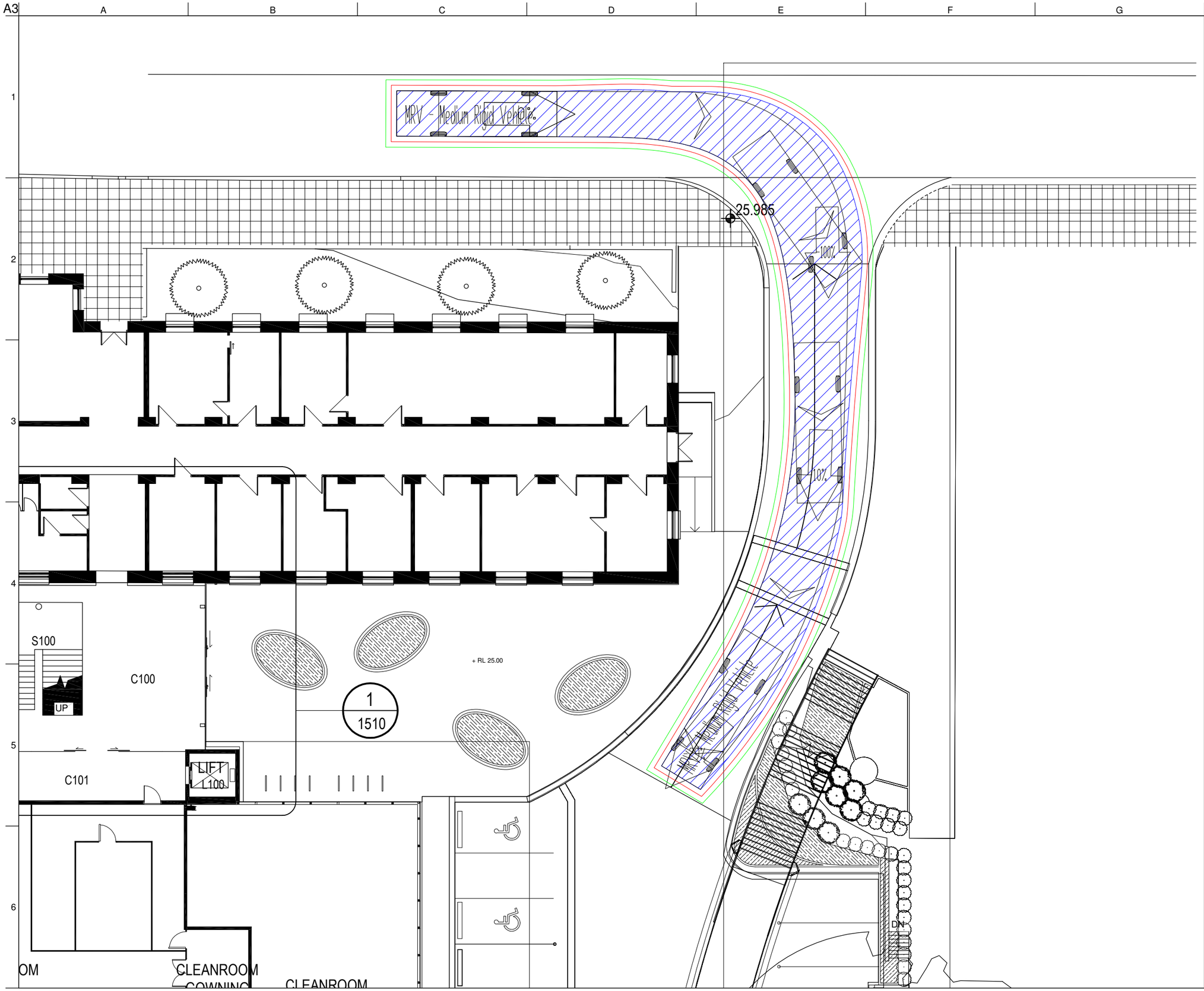
Appendix A

Swept Path Analyses

A3

A B C D E F G

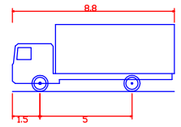
1 2 3 4 5 6



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 Body Height	3.633m
Min Body Ground Clearance	0.428m
Track Width	2.500m
Lock to Lock Time	4.00 sec
Curb to Curb Turning Radius	10.000m

Issue	Date	By	Chkd	Appd
D	21/11/12	EKC	MAC	MAC
C	20/11/12	EKC	MAC	MAC
A	16/11/12	EKC	MAC	MAC

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www.arup.com.au

Client
University of Sydney

Job Title
Australian Institute of Nanoscience (AIN) building

Drawing Title
Vehicle Swept Path
8.8m Delivery Vehicle
Access Entry

Scale at A3 1:200

Discipline Transport

Drawing Status
Draft

Job No	Drawing No	Issue
223982-00	**SKT037**	**D**

Do not scale

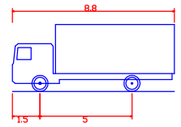
A3

S100
C100
UP
+ RL 25.00
1
1510
LIFT
L100
C101
OOM
CLEANROOM
GOWNING
AREA
116-B
CLEANROOM
STORAGE
116-C
PRE
GOWNING
AREA
116-A
C106
C107
CHEM.
STORE
109F
PENSE
109G
09GE
TELC
109E
CONTROL
109D
DI
109C
WATER
109A
GAS
109B
PLANT
109
109HE
RE PUMP
109H
CDA
109I
GARBAGE
109J
25.000
S101
N2
154
DN
MRV - Medium Rigid Vehicle
MRV - Medium Rigid Vehicle
51°
22°
53°
29°

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 Body Height	3.633m
Min Body Ground Clearance	0.428m
Track Width	2.500m
Lock to Lock Time	4.00 sec
Curb to Curb Turning Radius	10.000m

Issue	Date	By	Chkd	Appd
D	21/11/12	EKC	MAC	MAC
	For Information			
C	20/11/12	EKC	MAC	MAC
	For Information			
B	16/11/12	EKC	MAC	MAC
	For Information			

ARUP

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Australian Institute of Nanoscience (AIN) building

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Vehicle Swept Path
8.8m Delivery Vehicle
Loading Entry

Scale at A3 1:200

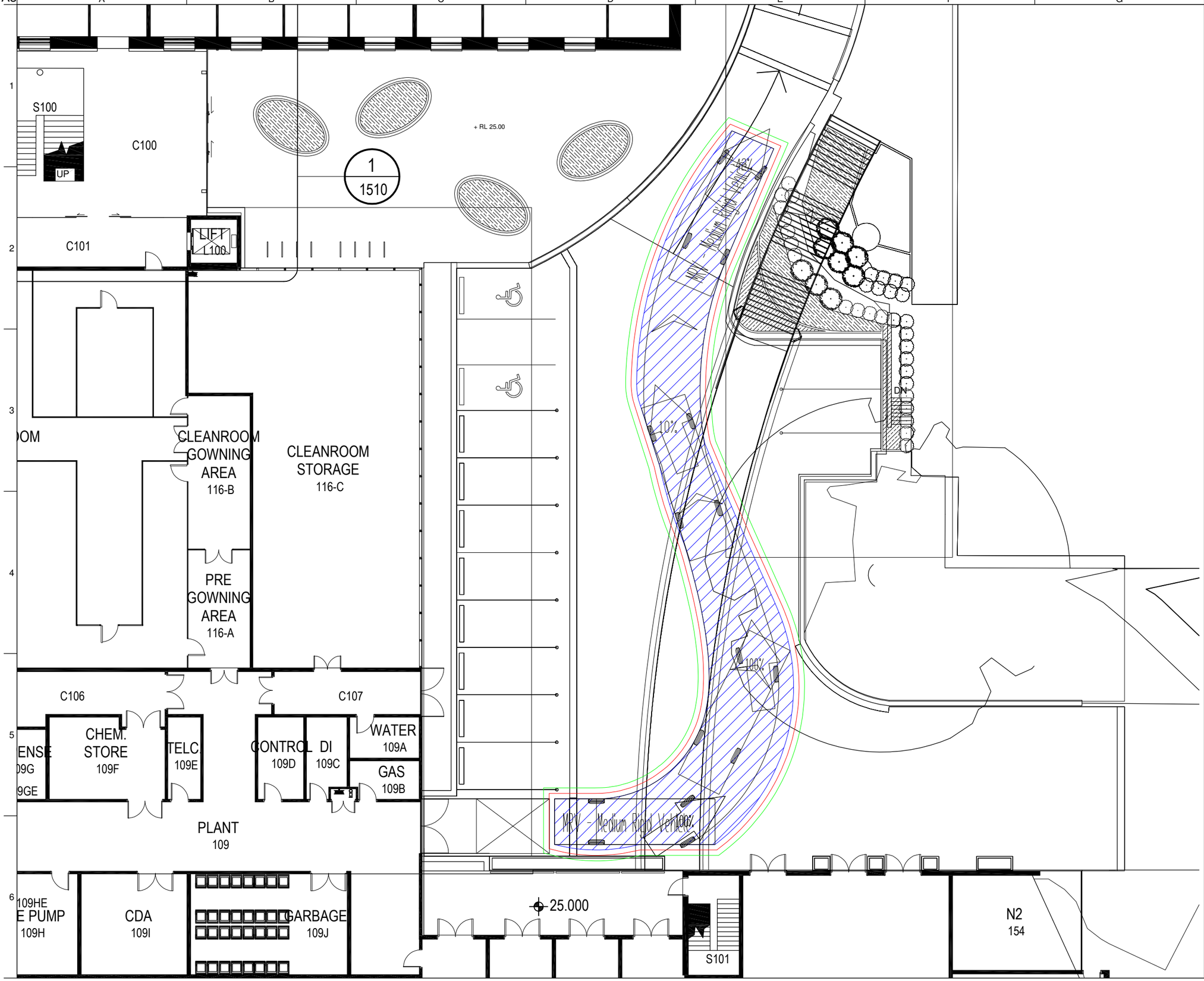
Discipline Transport

Drawing Status
Draft

Job No	Drawing No	Issue
223982-00	**SKT038**	**D**

Do not scale

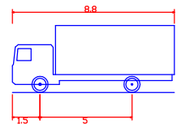
A3



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 Body Height	3.633m
Min Body Ground Clearance	0.428m
Track Width	2.500m
Lock to Lock Time	4.00 sec
Curb to Curb Turning Radius	10.000m

Issue	Date	By	Chkd	Appd
D	21/11/12	EKC	MAC	MAC
	For Information			
C	20/11/12	EKC	MAC	MAC
	For Information			
B	16/11/12	EKC	MAC	MAC
	For Information			

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Australian Institute of Nanoscience (AIN) building

Drawing Title
Vehicle Swept Path
8.8m Delivery Vehicle
Loading Egress

Scale at A3 1:200

Discipline Transport

Drawing Status **Draft**

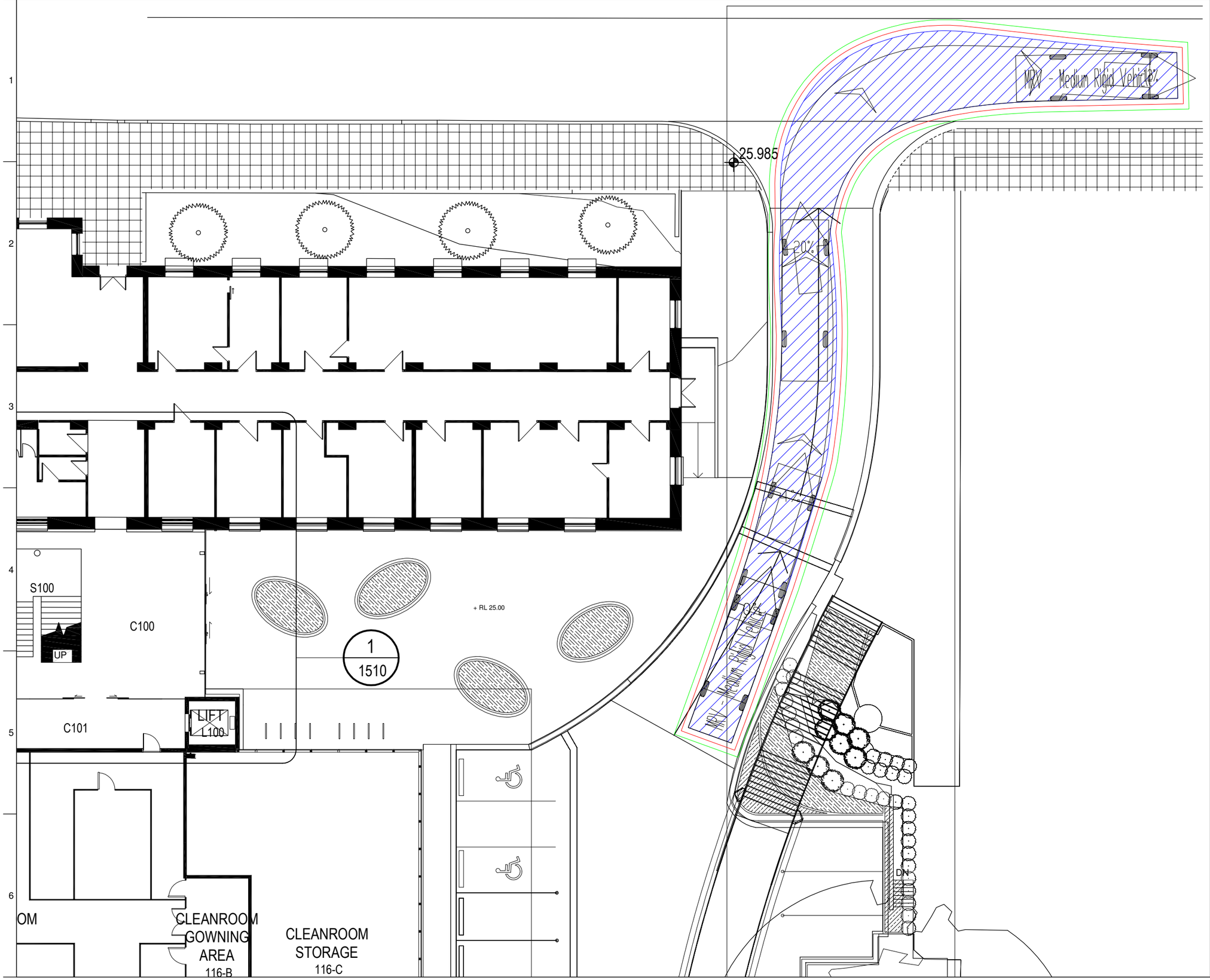
Job No	Drawing No	Issue
223982-00	**SKT039**	**D**

Do not scale

A3

A B C D E F G

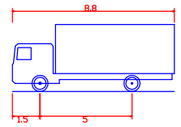
1 2 3 4 5 6



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 Body Height	3.633m
Min Body Ground Clearance	0.428m
Track Width	2.500m
Lock to Lock Time	4.00 sec
Curb to Curb Turning Radius	10.000m

Issue	Date	By	Chkd	Appd
D	21/11/12	EKC	MAC	MAC
	For Information			
C	20/11/12	EKC	MAC	MAC
	For Information			
B	16/11/12	EKC	MAC	MAC
	For Information			

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Australian Institute of Nanoscience (AIN) building

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Vehicle Swept Path
8.8m Delivery Vehicle
Site Egress

Scale at A3
1:200

Discipline
Transport

Drawing Status
Draft

Job No	Drawing No	Issue
223982-00	**SKT040**	**D**

Do not scale