

Transport and Accessibility Report

UNSW Science and Engineering Building

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Prepared for UNSW Australia

Taylor Thomson Whitting (NSW) Pty Ltd, Consulting Engineers | ACN 113 578 377 |
48 Chandos Street St Leonards NSW 2065 | 612 9439 7288 | ttw.com.au

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Revision Register

Rev	Date	Prepared By	Approved By	Remarks
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2	30/05/16	AK	PY	Following comments
3	06/07/16	AK	PY	Following comments
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5	29/07/16	AK	PY	Following comments

1.0 Executive Summary

This report provides a review assessment of the proposed UNSW Science and Engineering Building, a part of UNSW Australia's Kensington Campus. The proposed development includes a new laboratory building for research and teaching in the physical sciences, adding capacity to the lower campus Physical Sciences Precinct.

This report covers the existing condition on the site and how the proposed development fits within a transport and traffic framework. As a result of the development, there will be an increase of 33 permanent staff members and no increase in student numbers. The building will also allow for the relocation of existing staff and students from the Chemical Sciences Building.

Main pedestrian access will be via the northern and eastern boundaries of the building on the ground floor. The site will be connected to the Materials Science and Engineering Building to the east of the site by raised pedestrian walkways on levels 1 to 7 and pedestrian access from the basement.

Loading for the proposed building will occur on the ground floor from the southern boundary of the building via Union Road.

This study has been undertaken to evaluate the traffic and accessibility impacts for the UNSW Kensington Lower Campus Project. This report responds to the specific matters listed in the Secretary's Environmental Assessment Requirements (SEARs) dated 8 March 2016.

The main areas of attention of this study relate to:

- Transport and accessibility including active travel and public transport.
- Provision of parking and loading area facilities.
- Traffic generation.
- Preliminary construction activity measures.

2.0 Response to Secretary's Environmental Assessment Requirements

Under application number SSD 7518 we have been provided with Secretary's Environmental Assessment Requirements (SEARs). These have been issued on the 8th of March 2016. Table 1 provides a response to the relevant SEARs.

Table 1: Response to Secretary's Environmental Assessment Requirements

No	Issue	Comments and References
2	Address the relevant planning provisions, goals and strategic planning objectives in the following: ▪ NSW State Priorities; ▪ Rebuilding NSW – State Infrastructure Strategy 2014 ▪ A Plan for Growing Sydney; ▪ NSW Long Term Transport Master Plan 2012; ▪ Sydney's Cycling Future 2013; ▪ Sydney's Walking Future 2013; ▪ Healthy Urban Development Checklist, NSW Health; and ▪ Randwick City Council Development Control Plan 2013.	Documents have been reviewed. UNSW strategies fit within these documents.
5	Include a transport and accessibility assessment, which details, but is not limited to, the following;	See comments below for each item identified in SEAR 5.
	Details of the current daily and peak hour vehicles, public transport, pedestrian and bicycle movements and existing traffic and transport facilities provided on the road network located adjacent to the proposed development;	Current public transport and active travel facilities are discussed in Sections 4.6 and 4.5 respectively.
	An estimate of the total daily and peak hour trips generated by the proposal, including vehicle, public transport, pedestrian and cycle trips;	As a result of the development, there will be an increase of 33 permanent staff members and no increase in student numbers within the Kensington Campus. The building will also allow for the relocation of existing staff and students from the Chemical Sciences Building.

No	Issue	Comments and References
	Assessment of the operation of existing and future transport networks, including the Sydney Light Rail Project and bus networks, and their ability to accommodate the forecast number of trips to and from the development;	Transport for New South Wales (TfNSW) has been consulted as a part of the development. A meeting was held on Friday the 8th of April 2016 with TfNSW and the RMS. TfNSW identified that there were no particular concerns to be addressed in relation to the proposed development's impact on public transport demand. This is discussed in Section 5.4. The existing public transport infrastructure around the site is covered in Section 4.6. The proposed development in the context of public transport is covered in Section 5.4.
	The adequacy of pedestrian and bicycle provisions to meet the likely future demand of the proposed development including suitable end of trip facilities;	Public transport and active travel routes to the campus are readily available. The existing public transport network around the site is covered in Section 4.6; the relation of the development to public transport is covered in Section 5.4. The existing active travel to the development is covered in Section 4.5. The relationship of the development to active travel is covered in Section 5.3.
	The operational impact of the proposed development on existing and future public transport infrastructure within the vicinity of the site (including Sydney Light Rail Project);	A meeting was held on Friday 8 th April 2016 with TfNSW and the RMS. TfNSW identified that there were no particular concerns to be addressed in relation to the proposed development's impact on public transport demand. This is discussed in Section 5.4.
	Details of existing and proposed vehicular access, taxi and car parking arrangements for staff, students and visitors, including compliance with parking codes and Australian Standards;	The development does not propose any car parking. There is a loading dock located on the ground floor of the development. This will be accessed via the existing Union Road.
	Sustainable travel initiatives, that support the achievement of State targets, for	Only a small number of people travel to the campus by private vehicle

No	Issue	Comments and References
	employees, students and visitors, particularly for the provision of end-of-trip facilities, green travel plans and wayfinding strategies;	(18.5%). The majority travel by public transport (57.5%). A large number travel to the University by active travel such as cycling and walking (18.7%). This is a low incidence of car usage.
	The daily and peak vehicle movements impact on nearby intersections, with consideration of the cumulative impacts from other approved developments in the vicinity (including Sydney Light Rail Project and any subsequent altered bus routes), and the need/associated funding for upgrading or road improvement works (if required);	There will be an increase of 33 permanent staff members and no increase in student numbers across the Kensington Campus as a result of the renewal project. As the development does not propose any car parking spaces, and given the completion of the CBD and South East Light Rail in 2019, it is anticipated that minimal private vehicle trips will be generated by the development. No major road improvement works are proposed. Refer to Section 5.5 for more information.
	The proposed access arrangements and measures to mitigate any associated traffic impacts and impacts on public transport (including Sydney Light Rail Project), pedestrian and bicycle networks;	The development will result in an increase of 33 permanent staff members and no increase in student numbers. TfNSW identified that there were no particular concerns to be addressed in relation to the proposed development's impact on public transport demand. This is discussed in Section 5.4. Construction vehicle access is discussed in the Preliminary Construction Traffic Management Plan found in Appendix A.
	Anticipated student and staff numbers and subsequent implications for car and bicycle parking demand;	There will be an increase of 33 permanent staff members and no increase in student numbers across the Kensington Campus as a result of the renewal project. The building will also provide for the relocation of existing staff and students. There will be no car parking provided as part of the development, encouraging active and public transport. Given the construction of the CBD and South East Light Rail, it is anticipated that car parking demand across the Campus will reduce. This is further

No	Issue	Comments and References
		discussed in Section 5.2. The Kensington Campus has sufficient bicycle parking provisions which will be unaffected by the proposed development.
	Details of existing and proposed car and bicycle parking provision, including end of trip facilities and the consideration of the availability of public transport and the requirements of the relevant parking codes and Australian Standards;	The proposed development will not affect any existing bicycle parking within the Kensington Campus. A net increase of 6 showers will be provided by the development. This is discussed in Section 5.3. There is no proposed car parking as part of the development. The 15 parking spaces that were removed as part of the Lower Campus Infrastructure Works will not be reinstated. This shortfall in parking provision is acceptable given the completion of the CBD and South East Light Rail and other factors as discussed in Section 5.2.
	Location of pedestrian and bicycle parking facilities in secure, convenient, accessible areas close to main entries incorporating lighting and passive surveillance;	The proposed development will not impact existing bicycle parking facilities across the Campus. The development will provide a net increase of 6 showers. This is discussed in Section 5.3. Pedestrian access points to the building will be located along the northern and eastern boundaries. Internal pedestrian access will be provided to the adjacent Materials Science and Engineering Building. This is discussed in Section 5.3.
	Service vehicle access, delivery and loading arrangements and estimated service vehicle movements (including vehicle type and the likely arrival and departure times); and	Service vehicles will access the site through a loading facility located on the ground floor of the development. This will be accessed via Union Road. Vehicles servicing the loading dock will be medium rigid and heavy rigid. Turning paths have been conducted for the loading facility and can be found in Appendix B. The frequency of deliveries is not expected to vary as part of the

No	Issue	Comments and References
		proposed development.
	In relation to construction traffic: ▪ Assessment of cumulative impacts associated with other construction activities including the construction of the Sydney Light Rail Project; ▪ Assessment of road safety at key intersections and locations subject to heavy vehicle movements and high pedestrian activity; ▪ Details of anticipated peak hour and daily truck movements to and from the site; ▪ Details of access arrangements for workers to and from the site, emergency vehicles and service vehicle movements; ▪ Details of temporary cycling and pedestrian access arrangements during construction; ▪ Details of construction vehicle access arrangements at all stages of construction; and ▪ Traffic and transport impacts during construction and how these impacts will be mitigated for any associated traffic, bus scheduling and potential delays, pedestrian, cyclists, parking and public transport, including the preparation of a draft Construction Traffic Management Plan to demonstrate the proposed management of the impact.	Prior to construction, a Construction Traffic Management Plan will need to be prepared by the chosen builder. This will need to include access to the site for construction activities. It will also include access around the site for the public including pedestrians and cyclists. A Preliminary Construction Traffic Management Plan has been prepared and is located in Appendix A. This addresses the construction traffic impact of the development. Further details of access arrangements to and from the site can be found in the Preliminary Construction Management Plan prepared by Brookfield Multiplex.
	<i>Relevant Policies and Guidelines:</i> ▪ Guide to Traffic Generating Developments (Roads and Maritime Services) ▪ EIS Guidelines – Road and Related Facilities (DoPI) ▪ NSW Planning Guidelines for	These guidelines have been reviewed as a part of the preparation of this Transport and Accessibility Report.

No	Issue	Comments and References
	Walking and Cycling ▪ Austroads Guide to Traffic Management Part 12: Traffic Impacts of Development ▪ Cycling Aspects of Austroads Guide ▪ Australian Standards AS2890.3 (Bicycle parking facilities) ▪ UNSW Bicycle Master Plan 2014	

3.0 Introduction

3.1 Background

Taylor Thomson Whitting has been engaged by UNSW Australia to give advice regarding the UNSW Science and Engineering Building. The proposed development is a part of UNSW Australia's Kensington Campus.

This study has been undertaken to evaluate the traffic and accessibility impacts for the UNSW Science and Engineering Building. This Report responds to the specific matters listed in the Secretary's Environmental Assessment Requirements (SEARs) dated 8 March 2016.

The main areas of attention of this study relate to

- Transport and accessibility including active travel and public transport.
- Provision of parking and loading facilities.
- Traffic generation.
- Preliminary construction activity measures.

3.2 Scope of the Report

The report is divided into sections:

Section 1.0 gives an overview of the report.

Section 2.0 provides a detailed response to each of the project SEARs.

Section 3.0 includes background and the aim of the study.

Section 4.0 covers the existing conditions at the renewal site.

Section 5.0 covers the proposed UNSW Kensington Lower Campus Project within a traffic and transport context.

Section 6.0 provides a summary and conclusions.

3.3 Reference Documents

- NSW Long Term Transport Master Plan 2012
- Sydney's Cycling Future 2013
- Sydney's Walking Future 2013
- Guide to Traffic Generating Developments (Roads and Maritime Services)
- EIS Guidelines – Road and Related Facilities (DoPI)
- NSW Planning Guidelines for Walking and Cycling
- Austroads Guide to Traffic Management Part 12: Traffic Impacts of Development
- Cycling Aspects of Austroads Guide
- Australian Standards AS2890.3 (Bicycle parking facilities)
- UNSW Travel Survey 2015
- UNSW Bicycle Master Plan 2014
- Construction Management Plan prepared by Brookfield Multiplex (May 2016)

4.0 Existing Conditions

4.1 Site Location

The proposed works are a part of UNSW Australia's Kensington Campus. This is the main campus located over 38 hectares. The Kensington Campus is approximately seven kilometres south-east of the Sydney CBD. The Campus is bordered by High Street to the north, Anzac Parade to the west, Barker Street to the south and Botany Street to the east. The site is located to the north-west of the campus (refer to Figure 1).

Parts of the site have been cleared as part of the Lower Campus Infrastructure Works to remove three redundant buildings. Buildings D9 and D10 will be demolished as part of the Science and Engineering Building works. The Science and Engineering Building aims to consolidate the functions of these buildings, provide for 33 new permanent staff members and provide for the relocation of staff and students from the Chemical Sciences Building.

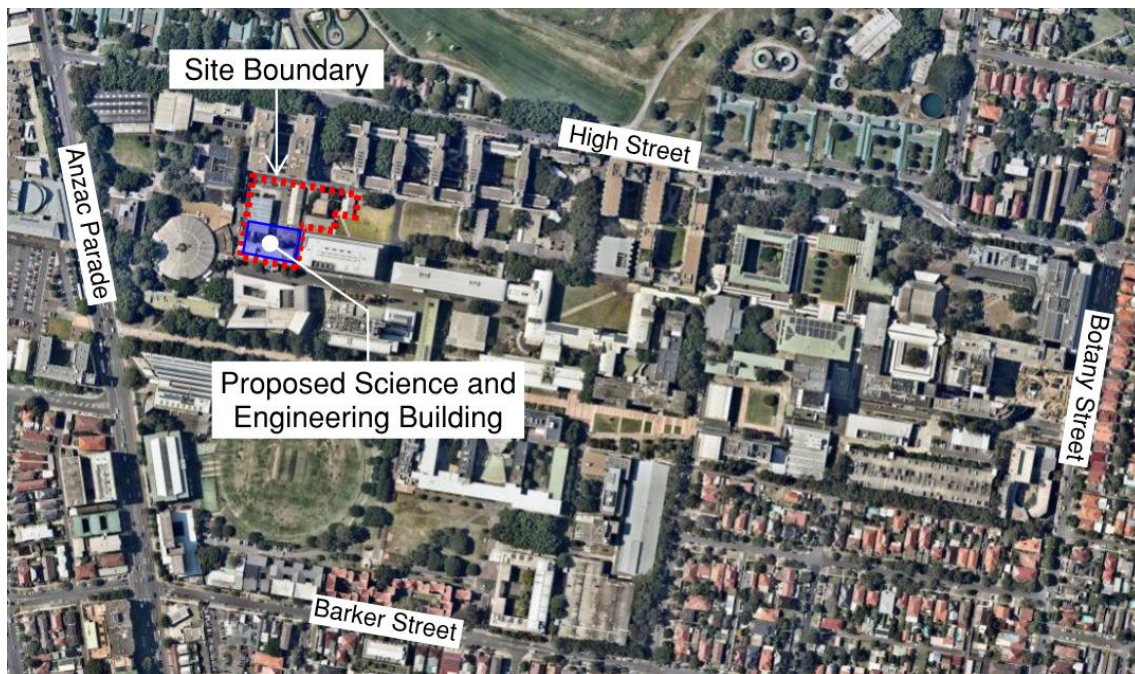


Figure 1: Science and Engineering Building Site Location. UNSW Australia Kensington Campus

4.2 Access to the Site

The site is accessed by vehicle via Gate 2 by Gate 2 Avenue, Third Avenue and International Road.

Among the three buildings previously occupying the site before the Lower Campus Infrastructure Works, there were four pedestrian access points. Building D9 which will be demolished during the works has an additional site access point. This is shown in Figure 2.

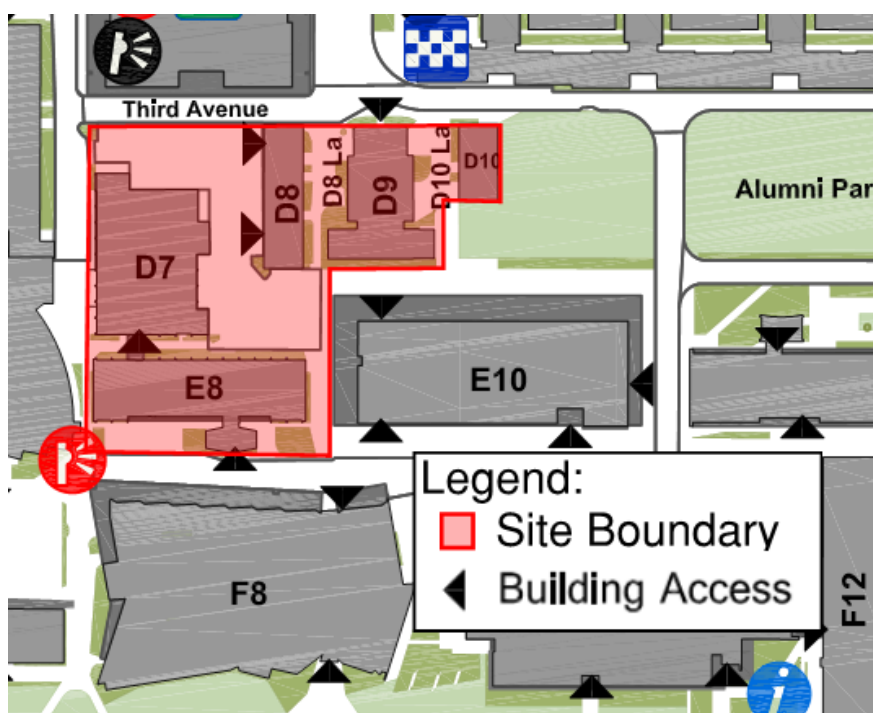


Figure 2: Pedestrian Access to the Site (Source: UNSW Facilities Management)

4.3 Car Parking

Parking areas are located on the perimeter of the campus and are accessed from Gates 2, 5, 8, 9, 11 and 14 and from Day Avenue (for the western campus). They include multi-storey parking stations (Botany Street and Barker Street parking stations), basement parking (University Terraces, UNSW Village, Kensington Colleges) and several on grade parking areas. The closest parking area to the project is the basement parking located beneath the University Terraces, accessed from Gate 2 High Street. A limited number of parking permits are available to staff and then extended to students who study 20 hours a week or more. Parking permits and casual rates are as follows:

- \$4.50 per hour 2P parking near campus entrances and internal campus streets
- \$4.50 per hour 4P parking at the University Terraces
- All day parking at a minimum of \$6 for two hours and then \$3 per hour subsequently for up to 12 hours
- \$21 day permit for staff and visitors
- \$74 weekly permit for staff
- \$555-\$1100 yearly permit for staff (depending on staff salary)

Outside the hours of 7:30am to 7:30pm Monday to Friday, parking on campus is free. Motorcycle parking is also free in designated areas.

Due to limited onsite parking, students generally park in on street spaces around the campus. The 2015 UNSW Travel Survey found 75.7% of students who drove parked within the on street parking spaces, with popular locations shown in Figure 3.



Figure 3: On Street Parking Locations and Popularity (Source: UNSW Travel Survey 2015)

4.4 Loading Zone

There were two loading zones within the site prior to the Lower Campus Infrastructure Works. Access to these loading zones has been affected as a result of these works. One was located to the south-west corner of the site on International Road and one in the north-west of the site. These loading zones were accessed by Gate 2 via Gate 2 Avenue, Third Avenue and International Road.

4.5 Active Travel

4.5.1 Pedestrian Movements

Due to construction works currently occurring as part of the Lower Campus Infrastructure Works within the area of the site, pedestrian amenity has already been reduced. Pedestrian safety during the Lower Campus Infrastructure Works is maintained through the use of traffic controllers.

The site is located adjacent to a shared zone along Union Road.

4.5.2 Cycling Facilities

Cycle ways leading to and around the Kensington campus are shown in Figure 4. There are two cycle paths in the vicinity of the campus, at Wansey Road (shared footpath) and Doncaster Avenue/Day Avenue (separated on-road). According to the UNSW Bicycle Master Plan 2014, there are two connections needed to improve the current network:

- An east-west route connecting the Doncaster Avenue route with the Wansey Road route.
- A north-south route to the east of the campus.

The campus is largely cycle friendly with ramps and small grades to ensure access.

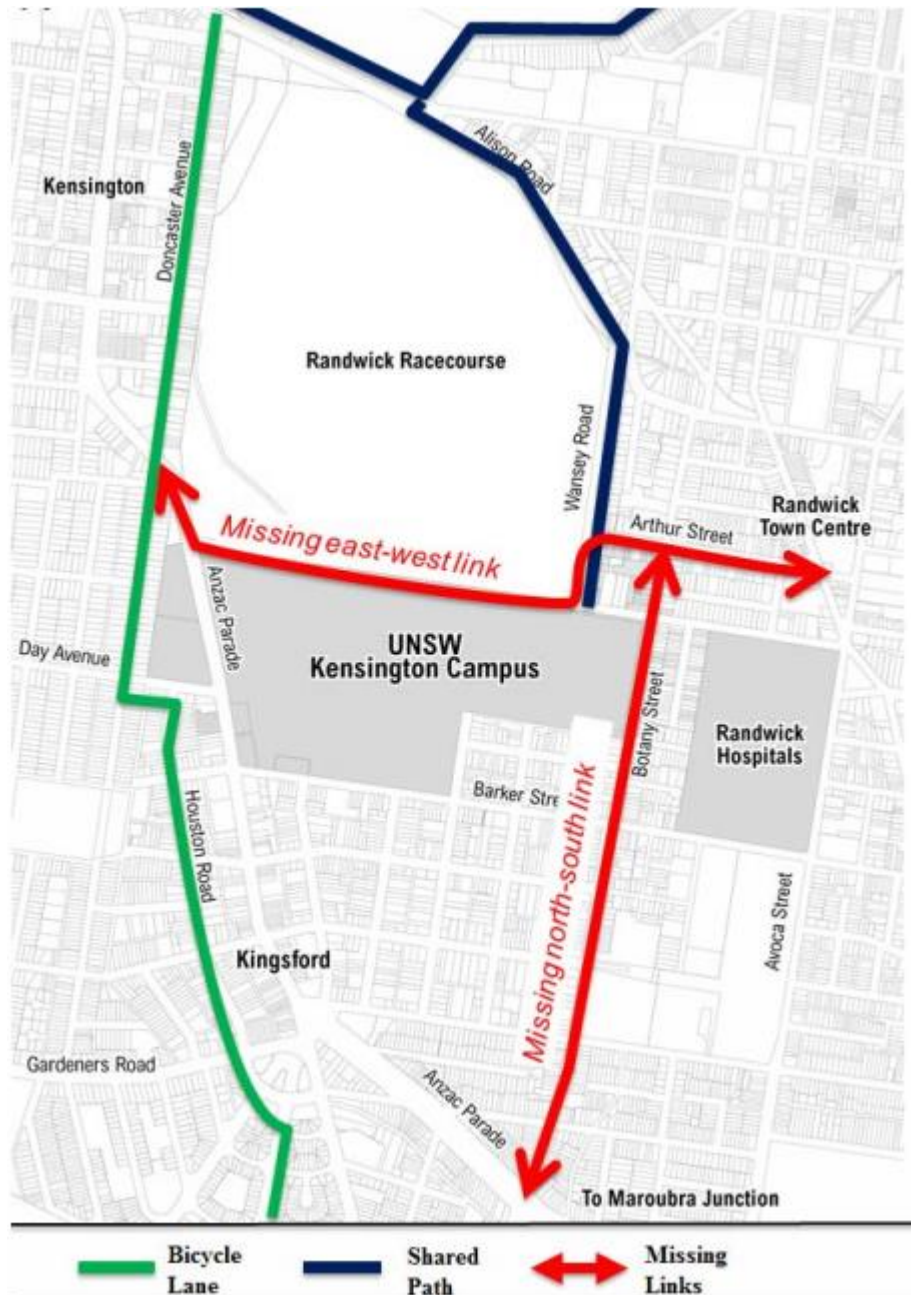


Figure 4: Cycle Ways Surrounding the Kensington campus (Source: UNSW Bicycle Master Plan 2014)

UNSW provides multiple end point cycling services including bicycle pumps, indoor and outdoor bicycle racks, showers and water bubblers. Approximately 800 publicly available bicycle parking spaces are provided on the Kensington Campus. These are detailed in Figure 5, where the site is located at buildings E8 and D7. Within close proximity to the site there are 58 outdoor and 3 indoor bicycle racks as well as shower facilities. Within the site there is one male shower that was affected as part of the Lower Campus Infrastructure Works.

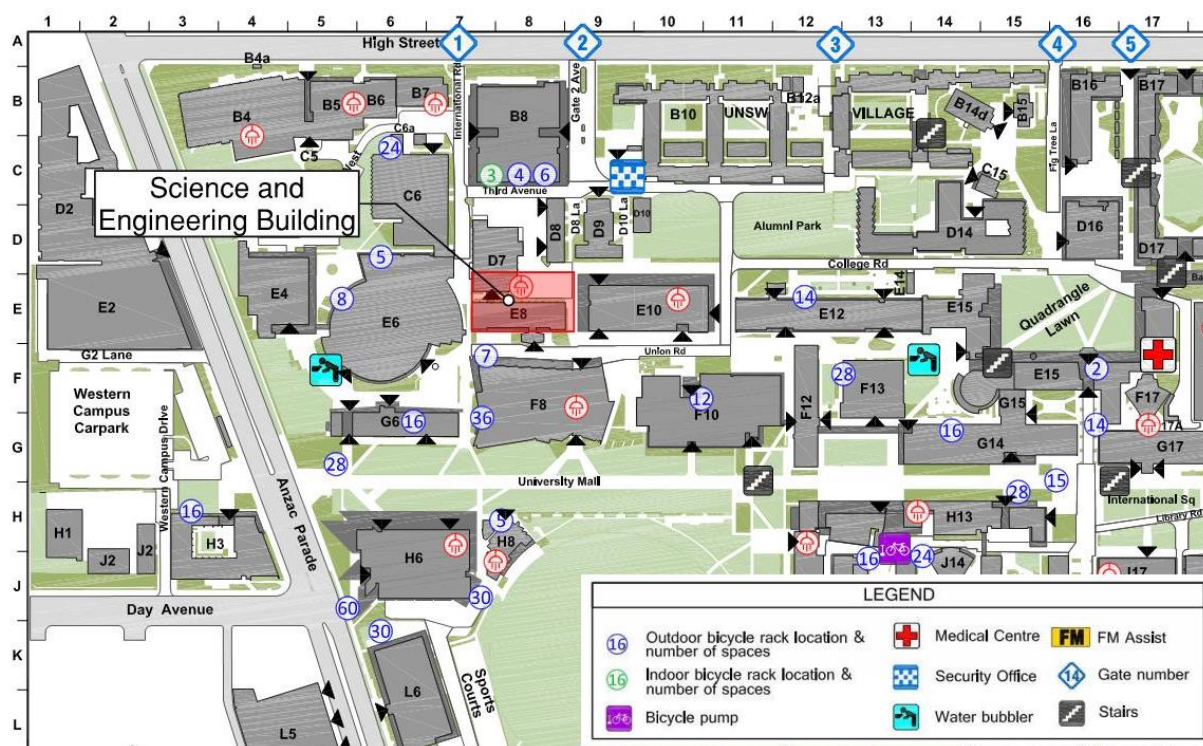


Figure 5: Cycling End of Trip Facilities (Source: UNSW Facilities Management)

4.6 Public Transport

4.6.1 Bus Stops

The three closest stops to the Science and Engineering Building are located at Gate 2 and Gate 9 on High Street and at the University Mall on Anzac Parade. These stops are all under a 10 minute walk from the site.

4.6.2 Bus Services

The Kensington campus is serviced by express services (bus route numbers 890, 891, 892 and 895) to both High Street and Anzac Parade, moving travellers from the University to Central Station and Circular Quay. These services operate at a very high frequency during the academic year Monday to Friday and moderately frequently during UNSW holidays. During exam periods these buses also operate via the Randwick Racecourse.

Additionally, there are non-express buses that service the campus along High Street and Anzac Parade. These routes are detailed in Table 2, Table 3, Table 4 and Figure 6. Please note these services are based on Monday to Friday timetables from Sydney Buses.

There is a courtesy shuttle bus operating between the Paddington Campus (UNSW Art and Design) and the UNSW Kensington Campus during the academic year. This bus stop is located at the Gate 8 entrance on High Street. Capacity and frequency are limited; the shuttle operates approximately every hour. Due to this travellers are encouraged to also use public transport.

High Street Services

The closest bus stop along High Street is approximately a three minute walk from the

Science and Engineering Building.

Table 2: High Street Services

Route Number	Areas of Service	Frequency
890	Circular Quay, Taylor Square	Leaves Circular Quay at 8:10, 8:30 and 8:38 in the AM peak
891	Railway Square, Eddy Avenue	Every 1-3 minutes in the AM peak from Central to every 10-Every 5-10 minutes in the PM peak from UNSW
892	Circular Quay	Every hour in the PM peak from UNSW
370	Leichhardt, Glebe, Newtown, Coogee	Every 10-15 minutes in the AM and PM peak
348	Wolli Creek, Bondi Junction	Every 20-30 minutes in the AM and PM peak
M50	Drummoyne, Park Street, Surry Hills, Coogee	Every 10 minutes during the AM and PM peak

Anzac Parade Services

The bus stop outside the University Mall is approximately a four minute walk from the Science and Engineering Building.

Table 3: Anzac Parade Services

Route Number	Areas of Service	Frequency
391-2, 394, 396-7, 399, L94, X94	La Perouse, Darlinghurst, Moore Park, Circular Quay	Every 5-10 minutes in the AM peak Every 15 minutes in the PM peak
393	Little Bay, Surry Hills, Railway Square	Every 5-15 minutes in the AM peak Every 3-5 minutes in the PM peak
395	Maroubra Beach, Surry Hills, Railway Square	Every 30 minutes in the AM peak Every 20 minutes in the PM peak
895	Express to Central	Every 1-3 minutes in the PM Peak from UNSW
302, 303	Sans Souci, Eastgardens, Circular Quay	Every 30-40 minutes in the AM and PM peak
M10	Leichhardt, Central, Maroubra Junction	Every 10 minutes during the AM and PM peak

High Street and Anzac Parade Services

Table 4: High Street and Anzac Parade Services

Route Number	Areas of Service	Frequency
400	Burwood, Rockdale, Sydney Airport, Eastgardens, Bondi Junction	Every 5-10 minutes in the AM and PM peak
410	Rockdale, Sydney Airport, Eastgardens, Bondi Junction	Every 30 minutes in the AM peak Every 20 minutes in the PM peak



Figure 6: Route Map of Public Transport

4.6.3 Train Services

There are currently no train stations located within walking distance to UNSW. The closest stations are:

- Central which is located 5.4km away from the campus or a 25 minute bus ride;
- Bondi Junction which is located 4.7km away from the campus or a 20 minute

bus ride; and

- Green Square which is located 3.5km away from the campus or a 20 minute bus ride.

Most travellers journey via Central Station due to the high frequency express buses travelling between the Campus and the Station.

4.6.4 Light Rail

Construction is currently underway for the CBD and South East Light Rail network. This will connect the campus to Surry Hills, Central Station, George Street and Circular Quay with a high frequency service. This project will greatly improve connectivity of the Kensington Campus to bus, heavy rail and ferry interchanges. It is scheduled to be completed in 2019.

The proposed layout of stations is detailed in Figure 7. The closest station to the site would be “UNSW Anzac Parade”.

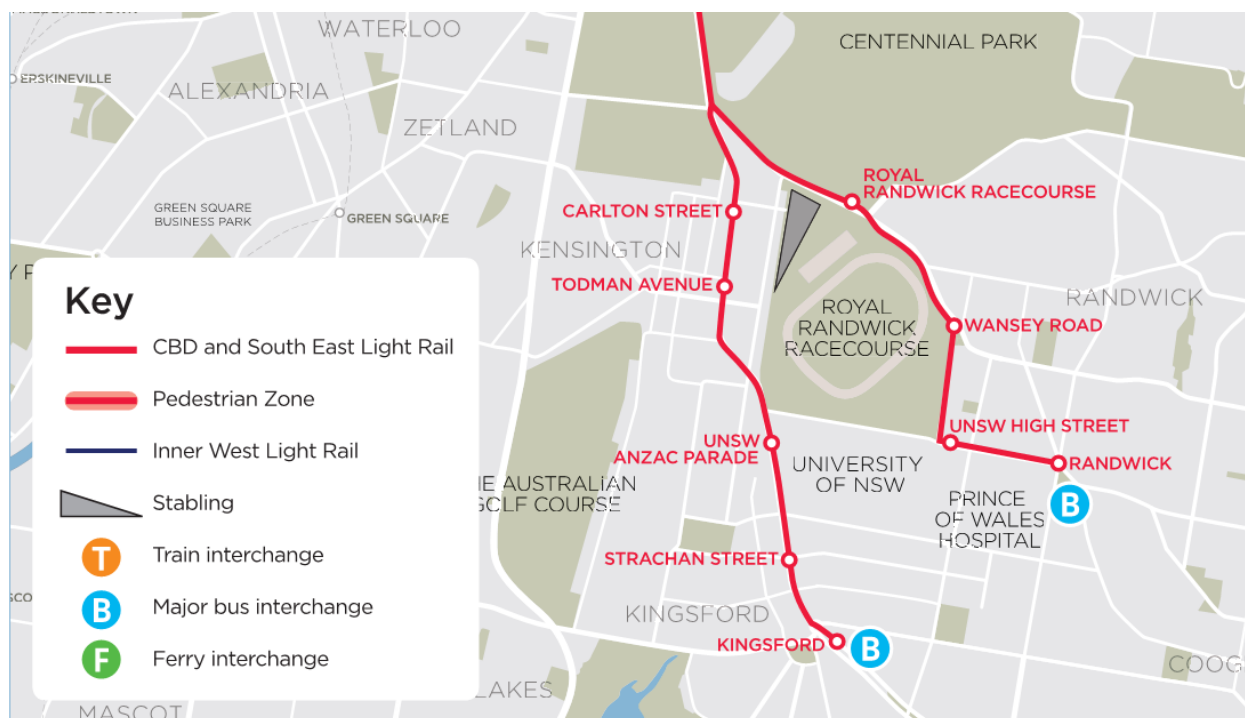


Figure 7: Route Map of CBD and South East Light Rail (Source: Sydney Light Rail)

4.7 UNSW Australia Travel Survey

UNSW has been conducting a comprehensive travel survey yearly since 2007. The aim of this is to determine trends and mode choice of students and staff. The 2015 travel survey received 11,700 responses, representing 22% of total travellers to the campus. Of the respondents 82.2% were students and 17.8% were staff.

As shown in Figure 8 the majority of respondents (57.5%) travelled to the area using public transport, representing 39.4% of staff and 61.5% of students. The majority or 61.2% of those travelling by public transport used UNSW express bus services.

The next popular mode of transport to the area was private vehicle, with 18.5% of travellers choosing this option. However, as shown in Figure 9 private vehicle usage has decreased by 13.6% since 2007. These results reflect the aims of the Randwick

Comprehensive DCP 2013 to improve the sustainability of transport by reducing private car usage and increasing public transport usage.

The travel survey also investigated arrival and departure times of staff and students, finding that 39% arrive within the morning peak (8-9am) and 25% depart in the afternoon peak (5-6pm). This is lower than typical arrival and departure percentages for workers, reducing impacts on public transport.

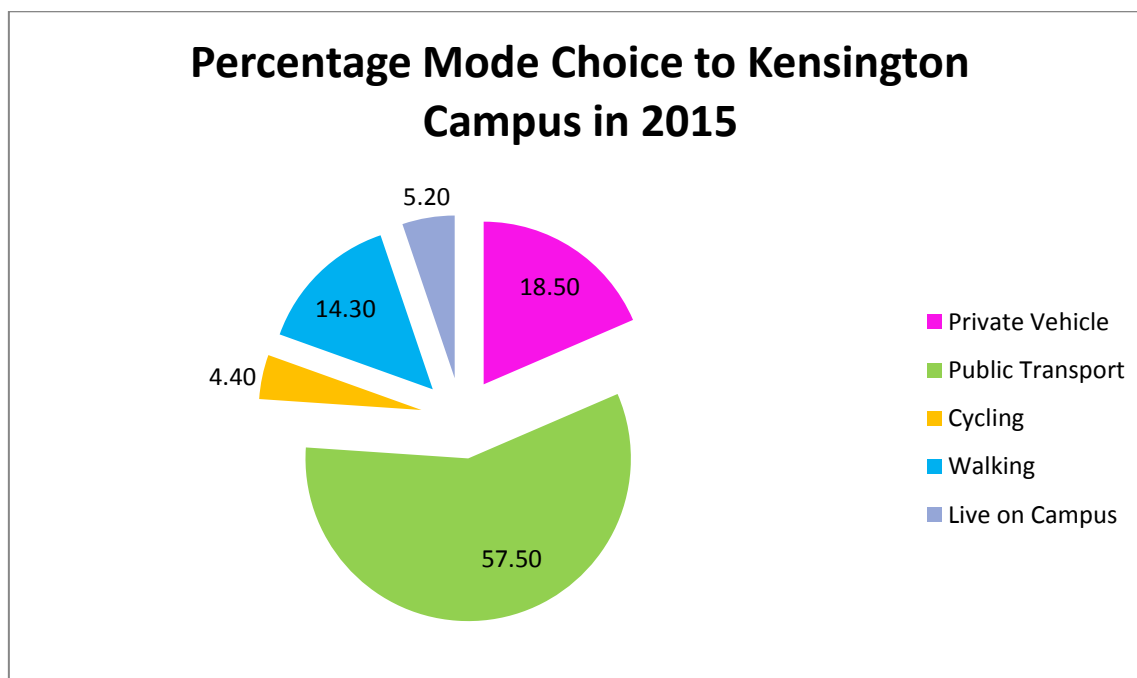


Figure 8: Travel Survey Results 2015 (Source: UNSW Facilities Management)

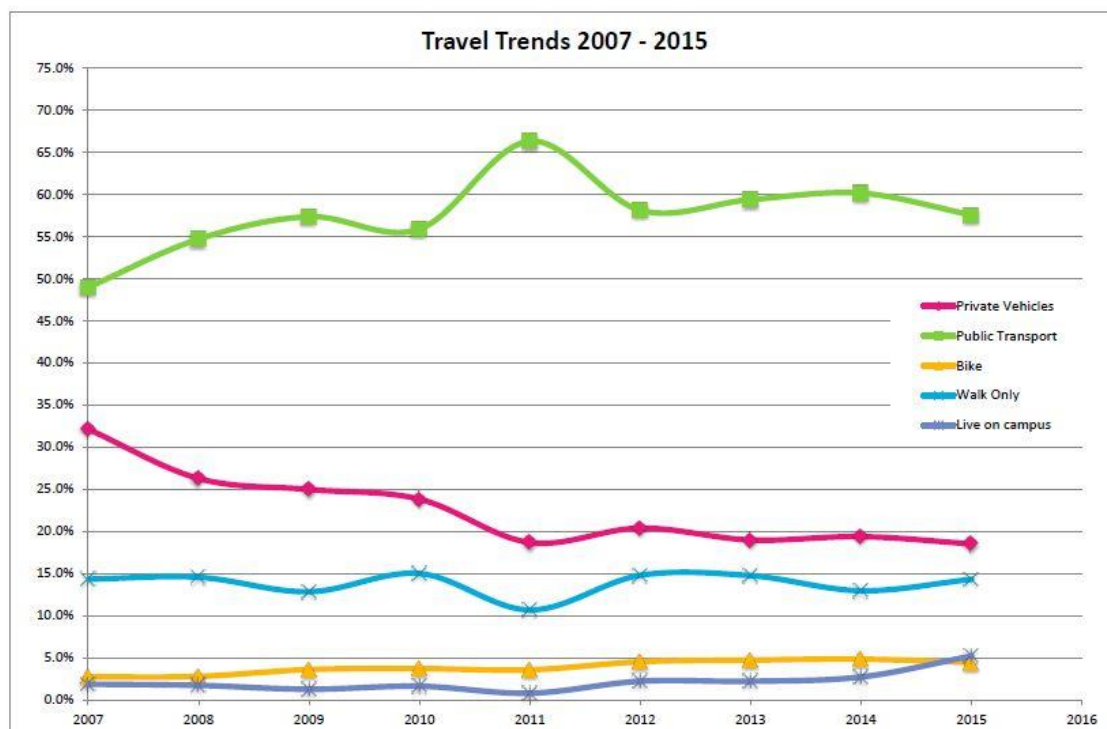


Figure 9: Travel Trends to UNSW (Source: UNSW Facilities Management)

5.0 Proposed Science and Engineering Building

5.1 Scope of Proposed Development

The Science and Engineering Building is a part of Phase 2 of the Materials Science and Engineering Building, which is adjacent and will connect on every laboratory floor via raised pedestrian walkways and through the basement.

The building is proposed to have a gross floor area (GFA) in the order of 18,700 m² of research, teaching and office space. The site was occupied by buildings D7, D8 and E8 and areas of on grade parking. These buildings and parking spaces have been cleared as part of the Lower Campus Infrastructure Works. The site is additionally occupied by buildings D9 and D10 which will be demolished as part of the Science and Engineering Building works. The Science and Engineering Building aims to consolidate facilities that existed in these redundant buildings as well as provide for both the reallocation of existing students and staff currently using the Chemical Sciences Building and an increase of 33 new permanent staff members.

The project will facilitate the creation of an additional main east-west pedestrian link to the campus via the proposed College Walk, which will provide access to the Sydney Light Rail Station being constructed on Anzac Parade.

5.2 Car Parking

As outlined in Section 5.1 there will be an increase of 33 permanent staff members and no increase in student numbers overall at the Campus as a result of the development. Section E – Randwick Education and Health Specialised Centre of the Randwick Comprehensive Development Control Plan 2013 indicates that parking demand rates are related to accommodation on the Campus. As the proposed development will not increase accommodation areas on the Campus, additional car parking spaces will not be included in the development. This aligns with the aims of making the campus more sustainable by discouraging private vehicle use.

According to the 2015 Travel Survey, staff drive private vehicles at a rate of 36.9%. Assuming staff will continue to follow the current travel pattern, a total of 12 spaces would be required for parking for the additional 33 staff.

The 15 on grade parking spaces that were removed as part of the Lower Campus Infrastructure Works will not be reinstated. Combining these removed spaces with the increase in staff results in a shortfall of 27 spaces. However, this shortfall is considered to be acceptable for the following reasons:

- The rate of public transport usage to the Kensington Campus is likely to increase upon completion of the CBD and South East Light Rail Network in 2019. The light rail will provide a dedicated service which will attract high usage levels by students and staff, this will support the long term trend of increasing public transport use to the Kensington Campus. Therefore, the parking demand generated by both the additional 33 staff members and all existing students and staff at the Campus is likely to reduce.
- The Randwick City Council Comprehensive DCP details that a long term goal of the University is to decrease parking provision within the Kensington Campus. The aim of this goal is to favour improved public transport and encourage walking and cycling. The decrease in parking spaces provided aligns with these aims detailed within Randwick City Council's planning documents, as it discourages private vehicle use.

- Encouraging sustainable transport modes is one of the key aims of UNSW. This will be achieved by improving access to public transport and reducing private vehicle usage. By reinforcing the east-west pedestrian link to the Sydney Light Rail Station on Anzac Parade and reducing parking spaces across the Campus, the development aligns with this aim.

5.3 Active Travel

The site is located close to a network of cycle paths around the Campus. The proposed building will be connected to the newly completed Material Sciences and Engineering Building located directly to the east of the site by raised pedestrian walkways on levels 1 to 7 and a pathway in the basement.

The proposed building contains seven showers located in the basement of the development; three male, three female and one accessible. This results in a net increase of six showers on the site. The development will not affect current bicycle parking facilities within the Campus.

The development will improve an additional east-west pedestrian link in the Campus, providing greater pedestrian links to the proposed Sydney Light Rail Station on Anzac Parade and buildings to the north-west of the Campus. Additionally, by consolidating multiple buildings into one structure, the development will increase pedestrian amenity by providing additional soft landscaping areas.

Main pedestrian access to the Science and Engineering Building will occur from the northern and eastern sides of the building on the ground floor.

5.4 Public Transport

As discussed in Section 4.5, the site is situated in an area of high frequency public transport which will be unaffected by the proposed works. Well-developed travel plans within UNSW currently exist with aims to discourage private vehicle use and encourage active travel modes. Since university students do not necessarily travel in the morning and afternoon peak periods, impact on public transport infrastructure is reduced.

As part of the implementation of sustainable transport to the Kensington campus, a light rail line will open in 2019 to service UNSW students to Central Station, George Street and Circular Quay. This will greatly improve connectivity of the Kensington Campus to the Sydney CBD. The proposed development improves the pedestrian pathway to the light rail stop along Anzac Parade by improving a pedestrian east-west link across the campus.

A meeting was held with Transport for New South Wales (TfNSW) on Friday 8th of April 2016. TfNSW expressed that there were no particular concerns to be addressed in relation to demand on public transport due to the completed building.

5.5 Traffic Impact of the Development

The proposal will not impact upon the surrounding road network. The reasons for this are as follows:

- The building will be mainly occupied by relocated students and staff already existing on the Campus, therefore the development will have little immediate effect on the current numbers of travellers to the Campus. However, there will be an increase of 33 staff members. As no additional car parking will be provided on the site, the additional staff will need to utilise public transport or active travel modes to access the Campus or will use the existing parking

supply on the Campus. Due to this there will be a minimal change to the traffic generated by the Kensington Campus as a whole.

- The majority of travel to the campus is by public transport. The UNSW Travel Survey stated that 57.5% of staff and students identify it as their chosen transport mode.
- A total of 15 parking spaces removed as part of the Lower Campus Infrastructure Works will not be reinstated; this will discourage private vehicle usage to the Campus. Parking at the Campus is restricted and coordinated between UNSW and Randwick City Council.
- There are no proposed road closures or road changes external to the Kensington Campus as a result of the development.

The traffic impact during construction has been addressed as part of the Preliminary Construction Traffic Management Plan detailed in Appendix A.

5.6 Loading Zone

The proposed building contains a loading dock within the ground floor on the southern side of the building. This loading zone will be accessed via Union Road. The size of service vehicles will be limited to medium and heavy rigid vehicles. A turning circle path check has been conducted for the loading facility and is located in Appendix B.

5.7 Construction Access

A Preliminary Construction Traffic Management Plan has been prepared for the Science and Engineering Building Project and is detailed in Appendix A.

During the meeting held with TfNSW on the 8th of April, 2016, the construction of the project was discussed. Due to the construction of the proposed light rail there may be some reduced access from Anzac Parade and High Street. Construction of the light rail will commence early 2017 and continue until the anticipated opening of the line in March 2019. TfNSW advised that Botany Street will become more congested during the Light Rail construction and that construction vehicles should avoid this area. The contractor will need to give consideration to the construction of the Science and Engineering Building with the Sydney Light Rail Project in respect to vehicle movements.

6.0 Conclusions

This report has outlined the impacts of the UNSW Science and Engineering Building Project within a traffic and transport framework. The development aims to consolidate the functions of buildings that have been demolished as a result of the Lower Campus Infrastructure Works, provide for an increase of 33 permanent staff members and provide for the reallocation of staff and students from the Chemical Sciences Building.

The parking demand across the Kensington Campus is expected to decrease due to the completion of the CBD and South East Light Rail. This will accommodate the increase in staff and decrease in parking provision occurring as a result of the development. This aligns with aims of the Randwick Comprehensive DCP 2013 and UNSW. By reducing car dependence, the proposed development will not generate a significant amount of traffic and therefore the current road network will be sufficient.

The development will improve an east-west pedestrian link within the Campus, providing greater pedestrian links to the proposed Sydney Light Rail Station on Anzac Parade and buildings to the north-west of the Campus. There will be no impact on existing bicycle parking facilities within the Campus and there will be an improvement on end of trip facilities with a net increase of six shower facilities on the site. By improving these links and facilities, the development will encourage active and public transport modes, reducing car parking demand across the Campus.

Loading facilities are proposed within the development that will be accessed by Union Road to the south of the building. Turning circle path checks have been conducted for these facilities and can be found in Appendix B.

A Preliminary Construction Traffic Management Plan has been prepared for the development to address traffic impacts during construction and is detailed in Appendix A. This addresses the construction traffic impact of the development and will be finalised when a builder is engaged and the staging of works is determined.

Prepared by:
**TAYLOR THOMPSON WHITTING
(NSW) PTY LTD**



ALEX KARKI
Senior Traffic Engineer

Authorised by:
**TAYLOR THOMPSON WHITTING
(NSW) PTY LTD**



PAUL YANNOULATOS
Technical Director

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Appendix: A

Preliminary Construction Traffic Management Plan

Preliminary Construction Traffic Management Plan

UNSW Science and Engineering Building

151405 UTA / 06 July, 2016

Prepared for UNSW Australia

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1.0 Existing Site Conditions

1.1 The Site

The objective of this project is to provide a Preliminary Construction Traffic Management Plan assessment of the proposed UNSW Science and Engineering Building, a part of UNSW Australia's Kensington Campus.

The Science and Engineering Building is a part of UNSW Australia's Kensington Campus. This is the main campus of UNSW, located over 38 hectares. The Kensington Campus is approximately seven kilometres southeast of the Sydney CBD. The Campus is bordered by High Street to the north, Anzac Parade to the West, Barker Street to the south and Botany Street to the east. The site is located to the north-west of the Campus.

Gate 2 provides access to the north-west of the Campus. It is currently a two way signalised entry/exit arrangement with a single lane entry and two lane exit. Exit lanes are designated as left or right turn only. A central median divides the entry/exit lanes.

High Street is a local road with two way traffic flow with typical kerb side parking on both sides. It provides an east/west connection to the local road network and runs along the northern boundary of the Kensington Campus. There is a no stopping restriction immediately west and east of the gate at the approach of the intersection on High Street.

High Street intersects with the state road network at Anzac Parade to the west of Gate 2.

The site is located in the suburb of Kensington with the Randwick Local Government Area.

Refer to Figure 1 for Site Location.

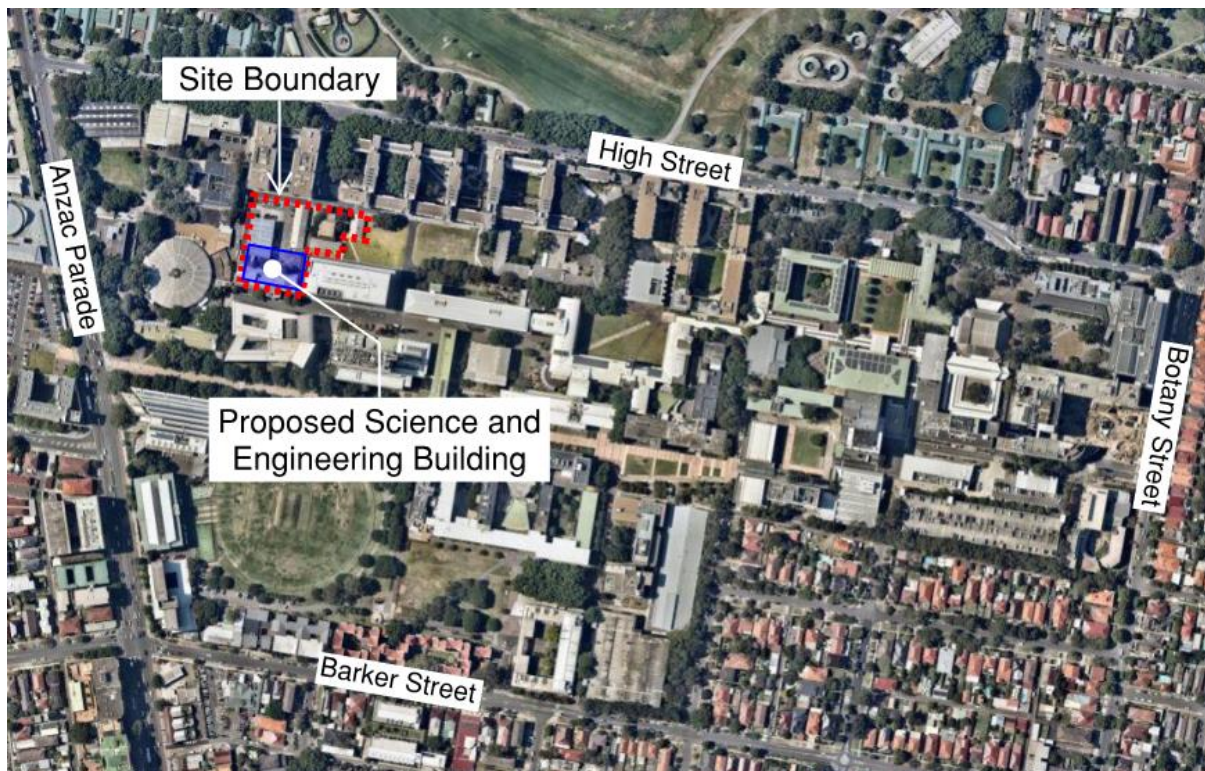


Figure 1: Site Location (Source: www.nearmap.com.au)

1.2 Existing Parking

1.2.1 On Street Parking

There is on street parking on High Street on both the north and south kerb lines with the exception of no stopping restrictions and bus zones.

1.2.2 Off Street Parking

Parking areas are located on the perimeter of the campus and are accessed from Gates 2, 5, 8, 9, 11 and 14 and from Day Avenue (for the western campus). They include multi-storey parking stations (Botany Street and Barker Street parking stations), basement parking (University Terraces, UNSW Village, Kensington Colleges) and several at grade parking areas. The closest parking area to the project is the basement parking located beneath the University Terraces, accessed from Gate 2 High Street. A limited number of parking permits are available to staff and then extended to students who study 20 hours a week or more. Parking permits and casual rates are as follows:

- \$4.50 per hour 2P parking near campus entrances and internal campus streets
- \$4.50 per hour 4P parking at the University Terraces
- All day parking at a minimum of \$6 for two hours and then \$3 per hour subsequently for up to 12 hours
- \$21 day permit for staff and visitors
- \$74 weekly permit for staff
- \$555-\$1100 yearly permit for staff (depending on staff salary)

Outside the hours of 7:30am to 7:30pm Monday to Friday, parking on campus is free. Motorcycle parking is also free in designated areas.

1.3 Pedestrian Movements

There is high pedestrian activity around the work site and public domain areas, particularly during university semester period.

Pedestrian crossing facilities have been provided within the Kensington Campus to aid in pedestrian access around the university grounds. Two pedestrian crossings are located along the access route on Gate 2 Avenue.

The site is located adjacent to a shared zone along Union Road.

The posted speed limit within the university grounds is 10km/h to aid in pedestrian movement.

1.4 Cyclist Facilities

There are two cycle paths in the vicinity of the campus, at Wansey Road (shared footpath) and Doncaster Avenue/Day Avenue (separated on-road). The Campus is largely cycle friendly with ramps and small grades to ensure access.

The Campus provides multiple end point cycling services including bicycle pumps, indoor and outdoor bicycle racks, showers and water bubblers. These are detailed in Figure 2 where the site is located at buildings E8 and D7. Within close proximity to the site there are 58 outdoor and 3 indoor bicycle racks as well as shower facilities.

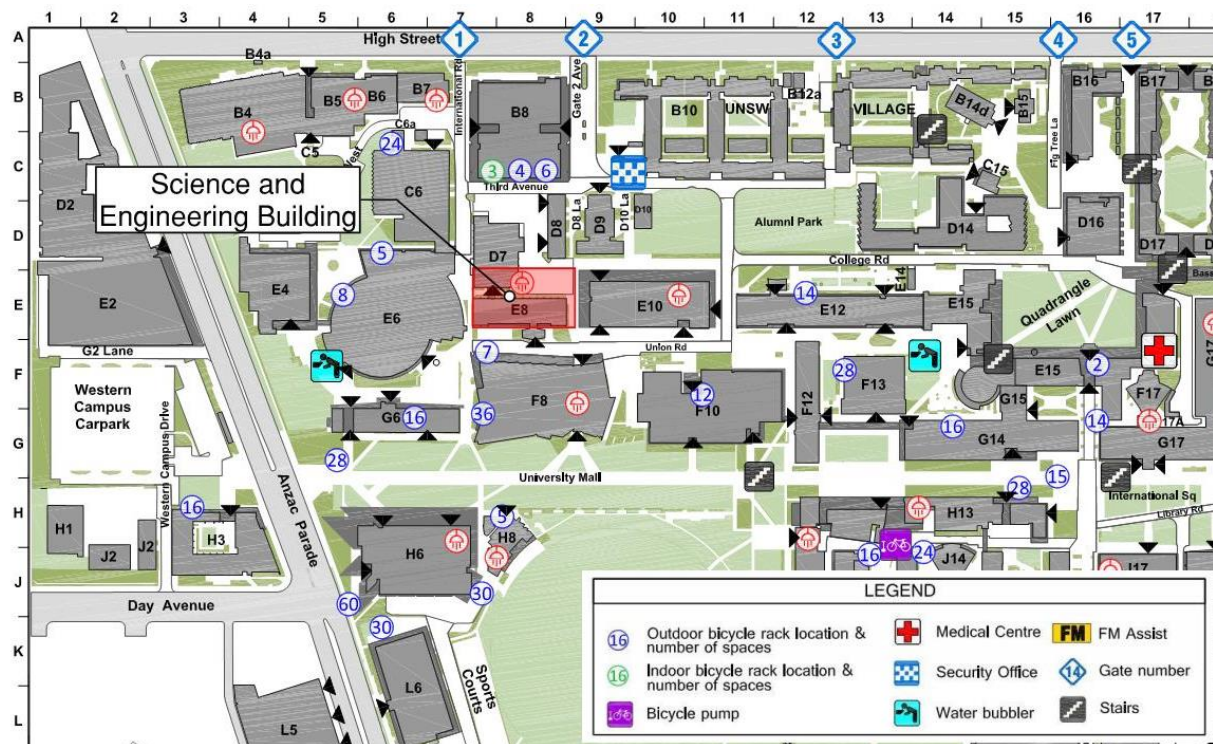


Figure 2: Cycling End Services (Source: UNSW Facilities Management)

1.5 Other Facilities

There are several public transport facilities located within close proximity to the work site. These include:

1.5.1 Bus Stops

The three closest stops to the Electrical Engineering Building are located at Gate 2 and Gate 9 on High Street and at the University Mall on Anzac Parade. These stops are all under a 10 minute walk from the site.

1.5.2 Bus Services

The Kensington Campus is serviced by express services (bus route numbers 890, 891, 892 and 895) to both High Street and Anzac Parade, moving travellers from the university to Central Station and Circular Quay. These services operate at a very high frequency during the academic year Monday to Friday and moderately frequently during UNSW holidays. During exam periods these buses also operate via the Randwick Racecourse.

Additionally, there are non-express buses that service the campus along High Street and Anzac Parade. These routes are detailed in Table 1, Table 2, Table 3 and Figure 3. Please note these services are based on Monday to Friday timetables from Sydney Buses.

There is a courtesy shuttle bus operating between the Paddington Campus (UNSW Art and Design) and the UNSW Kensington Campus during the academic year. This bus stop is located at the gate 8 entrance on High Street. Capacity and frequency are limited; the shuttle operates approximately every hour. Due to this travellers are encouraged to also use public transport.

High Street Services

The closest bus stop along High Street is approximately a three minute walk from the Science and Engineering Building.

Route Number	Areas of Service	Frequency
890	Circular Quay, Taylor Square	Leaves Circular Quay at 8:10, 8:30 and 8:38 in the AM peak
891	Railway Square, Eddy Avenue	Every 1-3 minutes in the AM peak from Central to every 10-Every 5-10 minutes in the PM peak from UNSW
892	Circular Quay	Every hour in the PM peak from UNSW
370	Leichhardt, Glebe, Newtown, Coogee	Every 10-15 minutes in the AM and PM peak
348	Wolli Creek, Bondi Junction	Every 20-30 minutes in the AM and PM peak
M50	Drummoyne, Park Street, Surry Hills, Coogee	Every 10 minutes during the AM and PM peak

Table 1: High Street Services

Anzac Parade Services

The bus stop outside the University Mall is approximately a four minute walk from the Science and Engineering Building.

Route Number	Areas of Service	Frequency
391-2, 394, 396-7, 399, L94, X94	La Perouse, Darlinghurst, Moore Park, Circular Quay	Every 5-10 minutes in the AM peak Every 15 minutes in the PM peak
393	Little Bay, Surry Hills, Railway Square	Every 5-15 minutes in the AM peak Every 3-5 minutes in the PM peak
395	Maroubra Beach, Surry Hills, Railway Square	Every 30 minutes in the AM peak Every 20 minutes in the PM peak
895	Express to Central	Every 1-3 minutes in the PM Peak from UNSW
302, 303	Sans Souci, Eastgardens, Circular Quay	Every 30-40 minutes in the AM and PM peak
M10	Leichhardt, Central, Maroubra Junction	Every 10 minutes during the AM and PM peak

Table 2: Anzac Parade Services

High Street and Anzac Parade Services

Route Number	Areas of Service	Frequency
400	Burwood, Rockdale, Sydney Airport, Eastgardens, Bondi Junction	Every 5-10 minutes in the AM and PM peak
410	Rockdale, Sydney Airport, Eastgardens, Bondi Junction	Every 30 minutes in the AM peak Every 20 minutes in the PM peak

Table 3: High Street and Anzac Parade Services



Figure 3: Route Map of Public Transport

2.0 Proposed Traffic and Associated Works

Construction is due to commence in 2017 and completion is anticipated in early 2019. Works are to be completed in the following stages:

- Excavation
- Structure
- Façade
- Fitout
- External Works
- Relocation of the user groups

Refer to the Construction Management Plan prepared by Brookfield Multiplex for further information about the staging of works.

2.1 Access To/From the Worksite

The primary construction point is expected to be from Gate 2 Avenue. There will be limitations on vehicle access in this area during student hours. These details will be finalised by the contractor.

Access to the site will be via the following designated route (refer Figure 4) and will utilise the regional road network where possible.

From/To the North/South

- Left/Right from Anzac Parade
- Onto High Street
- Right onto Gate 2 Avenue
- Right onto Third Avenue
- Left into Site
- Reverse on site
- Exit site via Third Avenue
- Left onto Gate 2 Avenue
- Left onto High Street
- Left/Right onto Anzac Parade

This proposed route minimises impact on surrounding residential streets, minimises uncontrolled right turn movements and utilises the existing signalised intersection at Gate 2 Avenue and High Street.

There is no proposal to alter the phasing of signals or posted speed limits as a result of the works.

Emergency vehicles will access the site from High Street via Gate 2 Avenue.

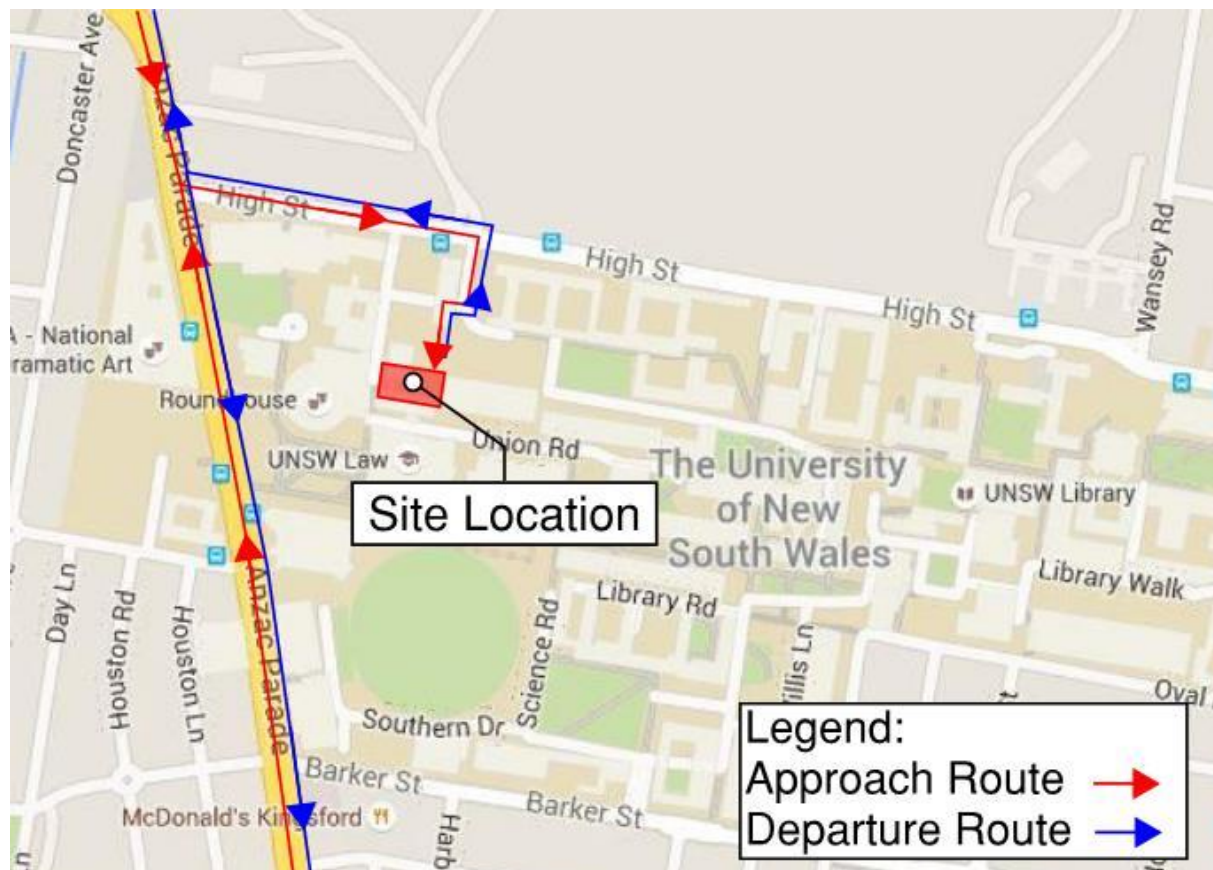


Figure 4: Construction Vehicle Routes (Source: www.google.com.au)

2.1.1 CBD and South East Light Rail Project (CBDSELR)

Transport for NSW (TfNSW) was consulted on Friday the 8th of April, 2016 in regards to the impact of construction of the CBDSELR on the project. It was identified that Botany Street shall become more congested during construction of the CBDSELR and that this should be avoided by construction vehicle traffic.

There are a number of road closures and modifications to intersections near the Campus occurring as a part of the construction of the CBDSELR. On-going consultation between the contractor and TfNSW will need to occur to ensure that any restrictions to access during scheduled works are coordinated effectively.

2.2 Traffic Movements within and around the Worksite

Trucks will access the site via the designated route outlined in Section 2.1. These trucks will be accompanied by traffic marshals within the campus. All construction vehicles will enter and exit the site in a forward direction.

2.3 Truck and Vehicle Volumes and Queuing Arrangements

The proposed site has sufficient space for concurrent queuing of up to 4 truck and trailers or 6 concrete trucks. Contractors will be required to book their deliveries to ensure there is adequate queuing space within the site. If there are additional truck deliveries that cannot be contained within the site they will be queued on High Street within a construction zone. These deliveries will be coordinated by traffic control when there is space within the site.

Proposed truck types to be used during the refurbishment include trucks, trailers, concrete pumps, concrete trucks and various delivery trucks.

Deliveries of materials to the site will be staggered to maintain the queuing of vehicles to be within the work site. Vehicles are not to queue in the restricted parking areas and in locations to impede traffic flow.

It is anticipated that the site works would typically generate truck movements per day as shown in Table 4 for given works. During the days of higher estimated vehicle movements, communication between the site, concrete batching plant and/or truck deliveries will be maintained to stagger the arrival of vehicles in order for them to be accommodated within the designated works and minimise traffic disruptions.

Type of Works	Timeline	Maximum Anticipated Vehicle Quantity
Initial Establishment	Months 0-1	6 trucks per day
Basement Construction	Months 1-7	20 trucks per day (pouring)
Suspended Structure	Months 7-12	40 trucks per day (pouring)
Façade and Internal Finishes	Months 9-20	10 trucks per day
External Landscaping	Months 21-23	10 trucks per day
FF&E and Specialist Equipment Install	Months 16-26	15 trucks per day

Table 4: Anticipated Maximum Vehicle Volumes (Source: Brookfield Multiplex via email 11th May, 2016)

All deliveries will be within the approved work hours, with emphasis made on deliveries to be outside heavy traffic periods where possible in order to reduce impact on traffic flows. Should work need to occur outside of the approved hours, the contractor will consult and gain approval from UNSW Australia. These works will then need to be coordinated with Facilities Management to minimise disruption to normal Campus operations.

It is anticipated that the above truck vehicle movements can be accommodated within the road network.

2.4 Work Zone

Subject to Council approval, the site may require the implementation of a work zone on High Street to allow for queuing of construction vehicles.

2.5 Pedestrian/Cycle Movements

Pedestrian access to surrounding Campus buildings will be from High Street via Gate 2 Avenue. During construction of the structure and façade, pedestrians will be protected by a Class “B” Hoarding along international Road. Traffic controllers will direct construction vehicle traffic into and out of the site to maintain pedestrian safety during the works. Refer to the Construction Management Plan prepared by Brookfield Multiplex for hoarding details.

Truck movements within the Kensington Campus will be escorted by traffic marshals into and out of the site to maintain pedestrian safety.

2.6 Road Closures

The proposed works will not require any full road closure. Vehicle and pedestrian access to the UNSW through Gate 2 will be maintained through the works.

2.7 Tower Crane

The site will require use of a crane as part of the works.

2.8 Construction Employee Traffic Generation

It is anticipated that at peak times approximately 325 staff will be required to complete the works. It is unlikely that there will be provided car parking within the Kensington Campus. After discussion with UNSW FM Assist, a number of offsite parking locations were identified (as shown in Figure 5) that could be of use for workers, these include:

- Centennial Park/Entertainment Quarter (Location A) – Located roughly 20 minutes via public transport to the north of the site.
- David Phillips Field and Rowland Park (Location B) – Located a 20 minute walk south of the site.
- Anzac Parade Parking opposite South Sydney Juniors Club (Location C) – Located a 15 minute walk south of the site.



Figure 5: Offsite Parking Available for Workers

To minimise the required parking, contractors will be encouraged to assist in the transportation of workers to the site.

Workers will access the site from High Street via Gate 2 avenue. Refer to the Construction Management Plan prepared by Brookfield Multiplex for hoarding details.

As part of site induction the site employees will be advised of the public transport options as outlined in Section 1.5 and encouraged to use these facilities or carpooling arrangements to decrease the number of employee vehicles.

2.9 Signposting

Temporary construction traffic related signposting is to be developed in accordance with AS 1742.3 – Traffic Control Devices for Works on Roads.

2.10 Methods of Communicating Traffic Changes

During the works signs are to be erected warning motorists of construction traffic exiting and entering the site.

Traffic Control advance warning signage in accordance with Roads and Maritime Services (RMS) guidelines is to be in place to notify motorists of roadworks and when traffic controllers are present.

Sign size is to be size “A” and is to be monitored throughout the works to ensure they are clearly visible.

As part of the Site Induction procedures all contractors will be made aware of the Construction Traffic Management Plan and their responsibility to adhere to the plan.

2.11 Environmental Control

Vehicles are not to transport dust, dirt, or gravel from the worksite onto the sealed road networks. Vehicle wash areas in accordance with industry standards will be applied. Loads are to be covered.

Materials and spoil storage areas will be within the site for collection.

2.12 Monitoring of Traffic Control Plans (TCPs)

During construction the contractor shall each morning, prior to work commencing, ensure all signage is erected in accordance with the TCP and clearly visible. Each evening, upon completion of work, the contractor is to ensure signage is either covered or removed as required.

Any variation to the layout of the TCP on site is to be recorded and certified by authorised RMS accredited personnel.

A review of TCP's can be undertaken as required in order to determine any potential need for future amendments.

2.13 Certificates and Approvals

Approval is to be obtained from Randwick City Council and other relevant authorities.

Approval needs to be obtained for items such as but not limited to:

- Road Occupancy Approvals
- Traffic Control Plan Approvals
- Hoarding Approvals

Coordination need to be undertaken with neighbouring properties to maintain access.

Only certified personnel will be used on site to implement, monitor and carryout the Traffic Control Plan.

2.14 Hours of Work

The site works will be undertaken during the times as specified in the conditions of consent for the works. According to the Construction Management Plan prepared by Brookfield Multiplex, these hours will be restricted to:

- 7:00am to 6:00pm Monday to Friday
- 8:00am to 5:00pm Saturday

Works outside the specified times will need approval by the relevant authorities.

No works outside the Conditions will occur, except in accordance with the Conditions of Approval.

2.15 Contact of Emergency Services

In an emergency related to a construction traffic incident on the public road network it will be the responsibility of the Site Manager to ensure that Emergency Services are notified. The emergency services include but are not limited to:

- Fire
- Ambulance
- Police

Phone “000” in cases of emergency.

Furthermore, it is the responsibility of the Site Manager to advise the Emergency Services of any restriction of vehicular access to the public and private areas (1) one week prior to its implementation.

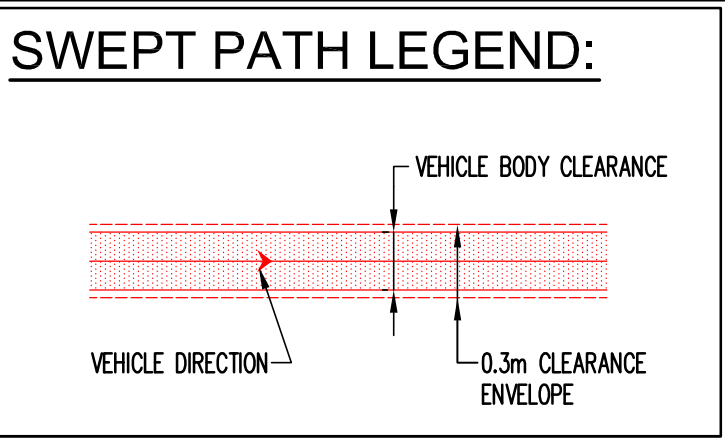
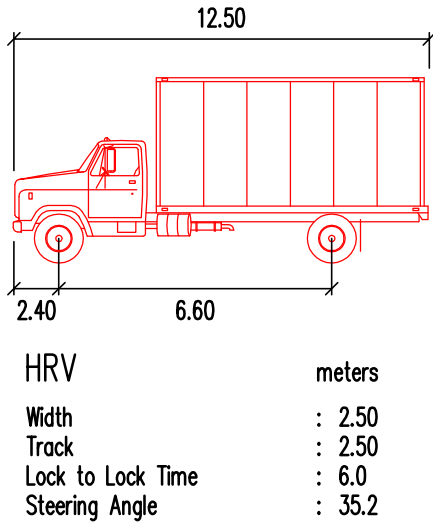
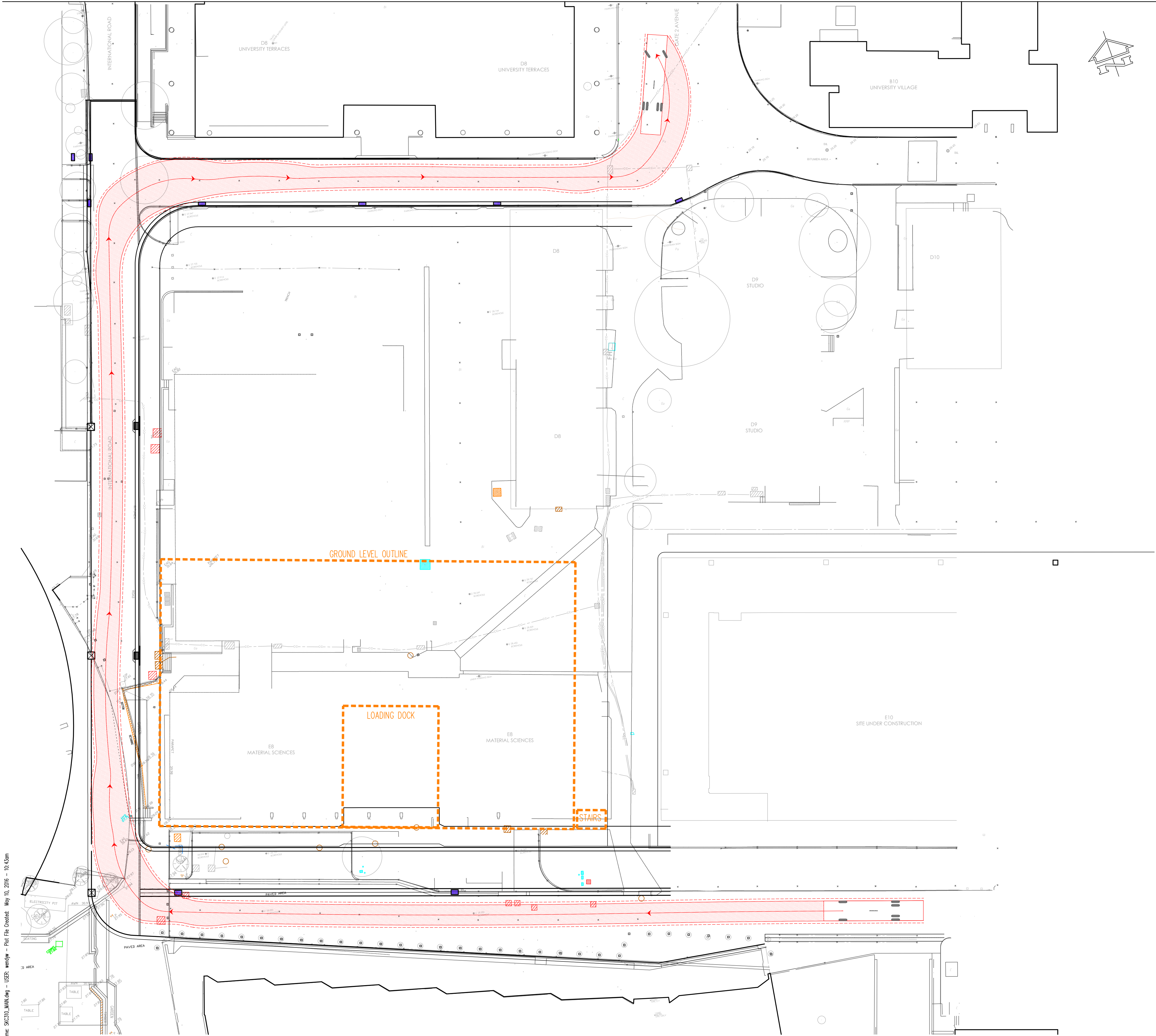
2.16 Responsibilities

The Site Manager is responsible for, but not limited to:

- Implementing the Traffic and Pedestrian Management Plan and TCP's
- Informing contractors of the requirements of the Traffic and Pedestrian Management Plan
- Undertaking site inspections to ensure all signage is clearly visible and not damaged
- Monitoring the Traffic and Pedestrian Management Plan
- Report on incidents
- Obtaining permits

Appendix: B

Turning Circle Path Checks



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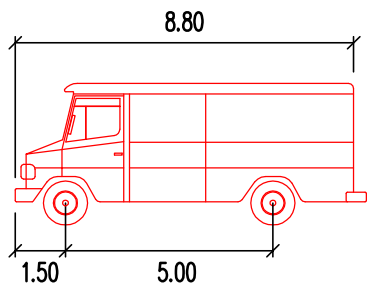
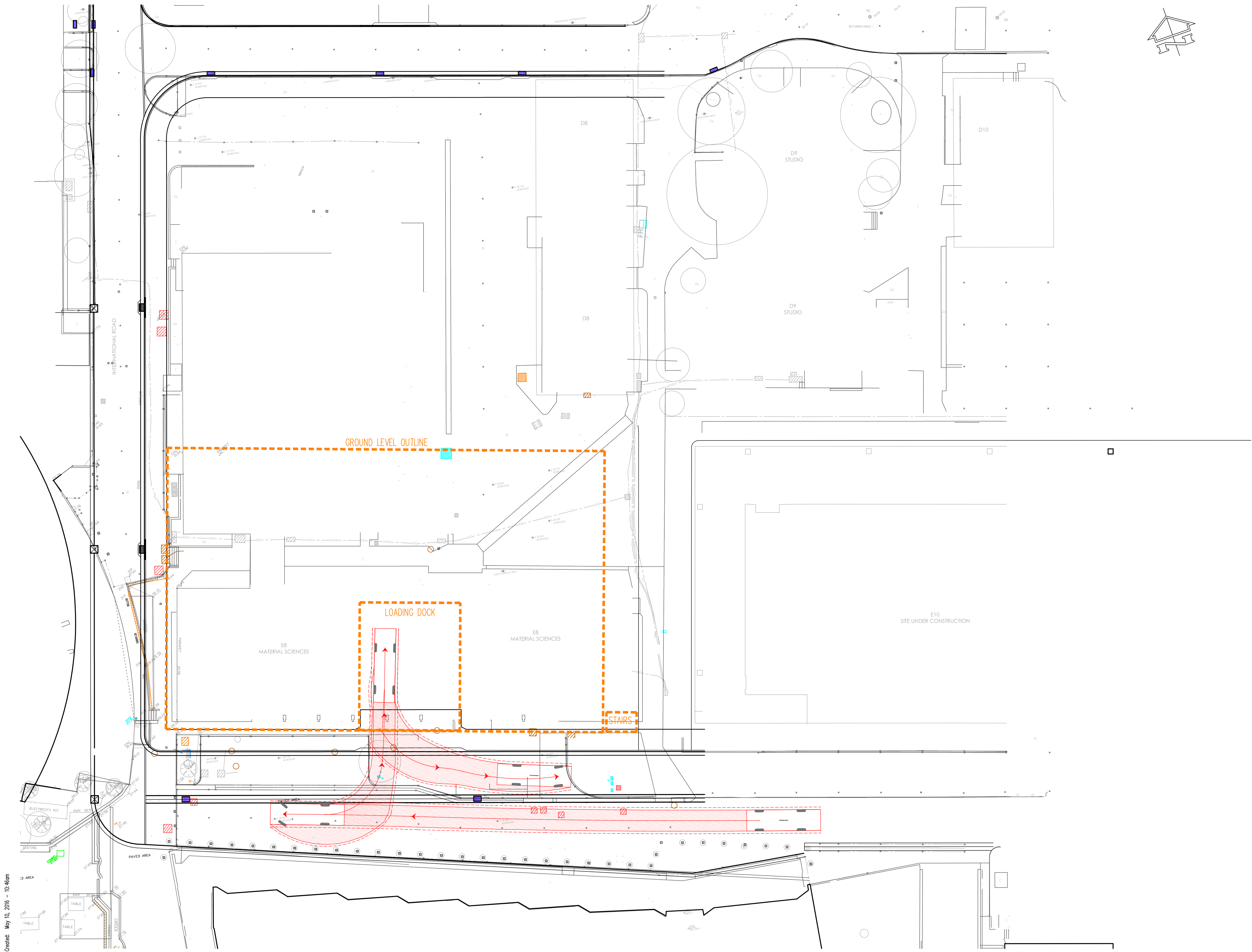
GRIMSHAW
Level 3, 24 Hickson Road
SYDNEY NSW 2000 Australia
Ph: (02) 9253 0200

TaylorThomsonWhitting
Consulting Engineers
48 Chandos Street St Leonards NSW 2085
T: +61 2 9439 7288 F: +61 2 9439 3146 ttwsyd@ttw.com.au
Taylor Thomson Whitting (NSW) Pty Ltd A/CN 113 576 377

Project
UNIVERSITY OF NEW SOUTH WALES - LOWER CAMPUS DEVELOPMENT MAIN WORKS

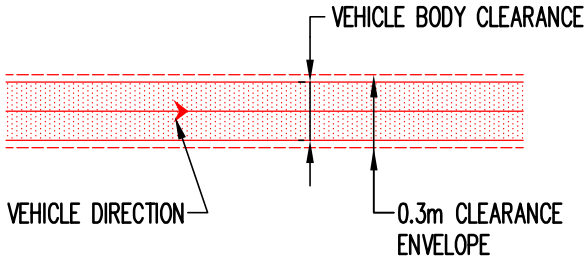
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SCHEMATIC DESIGN

A1

Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date
P1	ISSUE FOR INFORMATION	HS	WW	10.05.16										

Architect

GRIMSHAW
Level 3, 24 Hickson Road
SYDNEY NSW 2000 Australia
Ph: (02) 9253 0200



TaylorThomsonWhitting
Consulting Engineers
48 Chandos Street St Leonards NSW 2065
T: +61 2 9439 7288 F: +61 2 9439 3146 ttwsyd@ttw.com.au
Taylor Thomson Whitting (NSW) Pty Ltd A/CN 113 576 377

Project

UNIVERSITY OF NEW SOUTH WALES - LOWER CAMPUS DEVELOPMENT MAIN WORKS

Sheet Subject

TURNING PATH - MRV

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John

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Drawing No

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Revision

P1

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