Lend Lease Pty Ltd

Barangaroo South

Public Domain Works Stage 1A Traffic Assessment

Rev H | 23 October 2014

Job number 222061/17

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1 Introduction

This report supports a State Significant Development Application (SSDA) (SSD6303) submitted to the Minister for Planning and Infrastructure pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The SSDA seeks approval for public domain works within Stage 1A at Barangaroo South as described in the Overview of Proposed Development section of this report.

1.1 Overview of Proposed Development

The Public Domain SSDA seeks approval for all public domain works within 'Stage 1A' of the Barangaroo South Site. These works include typical public domain features such as street paving, street furniture, lighting and planting.

Additional items such as shade/weather protection structures, water features and bicycle facilities are also included in the design of the public domain. Various services and infrastructure such as power and water are incorporated into the proposed works where relevant.

1.2 Site Location

Barangaroo is located on the north western edge of the Sydney Central Business District, bounded by Sydney Harbour to the west and north, the historic precinct of Millers Point (for the northern half), The Rocks and the Sydney Harbour Bridge approach to the east; and bounded to the south by a range of new development dominated by large CBD commercial tenants.

The Barangaroo site has been divided into three distinct redevelopment areas (from north to south) – the Headland Park, Barangaroo Central and Barangaroo South.

The Public Domain SSDA Site area is located within Barangaroo South as shown in Figure 1. The SSDA Site extends over land generally known and identified in the approved Concept Plan as Blocks 1, 2, 3, and X and the area of the foreshore between Block X and Darling Harbour.

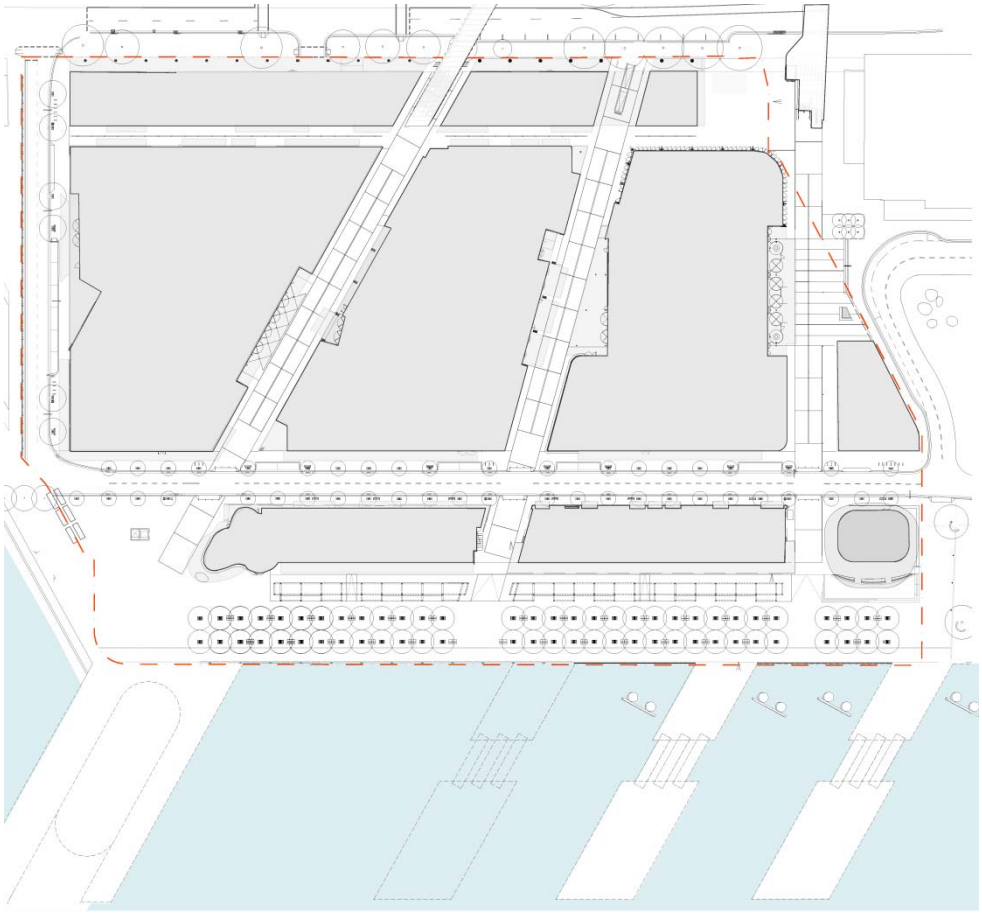


Figure 1: Public Domain Application Site Plan

1.3 Site Access

The site access arrangements for Stage 1A are shown on Figure 2:

- Pedestrians
- Cyclists
- Service vehicles
- Emergency vehicles
- Cars to basement

The key pedestrian routes are focused on Wynyard Walk which provides connection to Wynyard Station for train and bus passengers. City Walk Bridge and Wynyard Walk Bridge provide grade separated access into the Barangaroo South precinct.

Cyclists will access the basement bicycle parking facility via a dedicated bicycle entry on Hickson Road. Cyclists will use Hickson Road, Sussex Street and Napoleon Street for access into the facility.

Service vehicles access the basement loading area from Globe Street and arrive and depart from Hickson Road.

Emergency vehicles gain access within the precinct along Globe Street and Lime Street where they can stop to gain foot access to City Walk, Union Walk and

Transport Place. Emergency vehicles may also traverse Shelley Street and Sussex Street/Hickson Road, as well as the foreshore promenade and walks.

Cars access the basement parking areas via vehicle ramps onto Globe Street and Lime Street with a basement egress available onto Hickson Road opposite *Napoleon Street*.

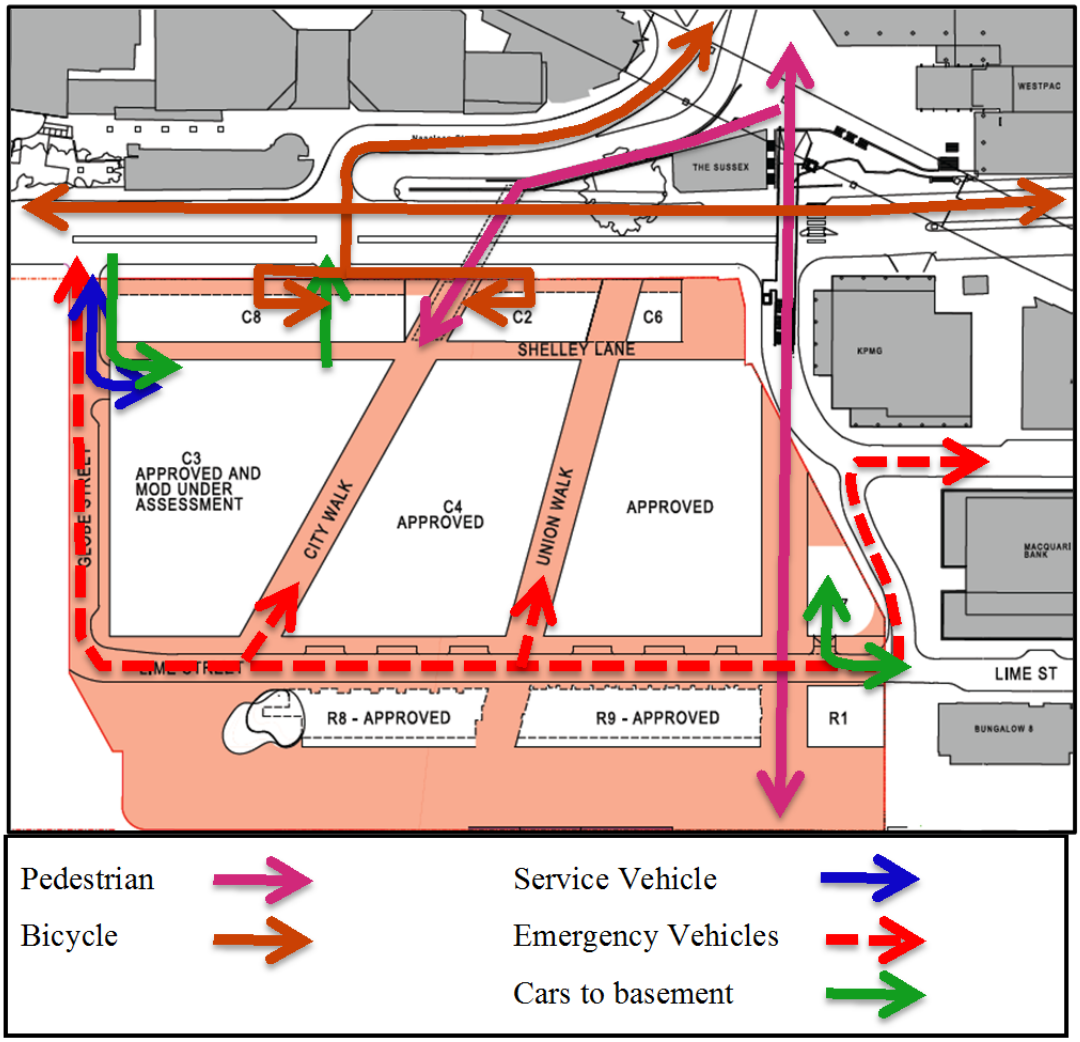


Figure 2 Site Access Arrangements for Stage 1A

2 Description of Public Domain Works

2.1 Road layout

The roads which are contained within 'Stage 1A' of the Barangaroo South Site comprise Lime Street running north-south as an extension of Lime Street from King Street Wharf and Globe Street running east-west to Hickson Road as shown on Figure 3. This road layout is subject to the approval of the Barangaroo Concept Plan MP_0062 MOD 6.

The road cross section dimensions for Lime Street are shown in Figure 4. A 7.0m road carriageway is proposed between kerbs for two-way traffic with indented parking bays on the east side of Lime Street. The overall road reserve between property boundaries is 16m. Globe Street will have a similar configuration during the Stage 1A with a single traffic lane in each direction and indented parking bays on the south side.

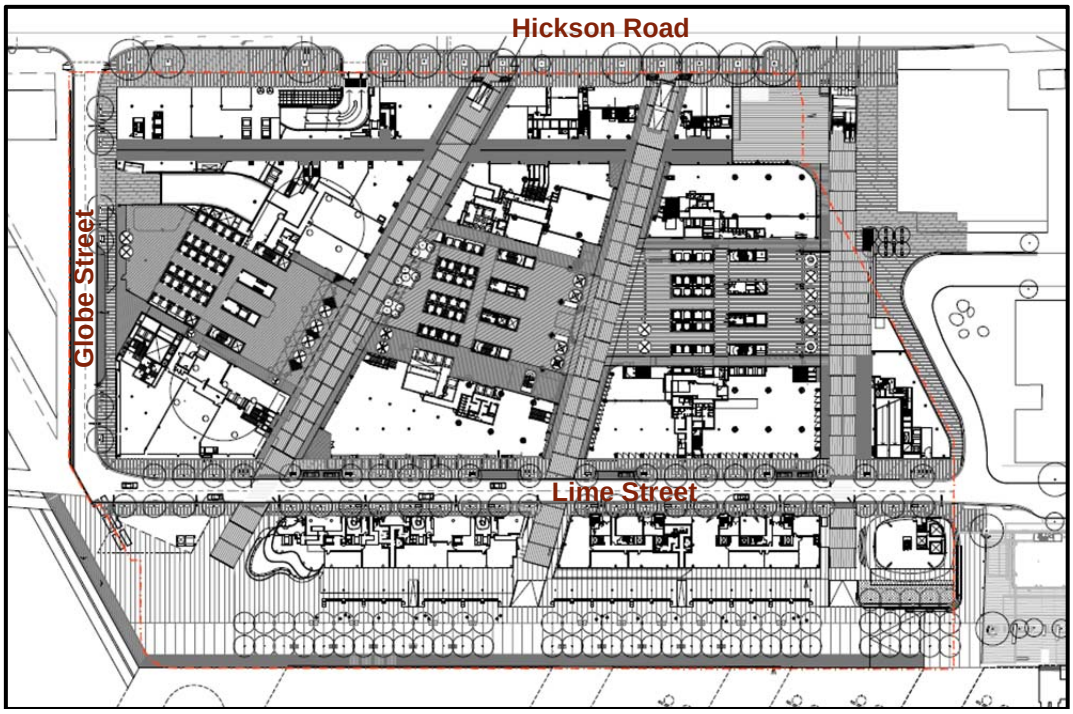


Figure 3: Road layout

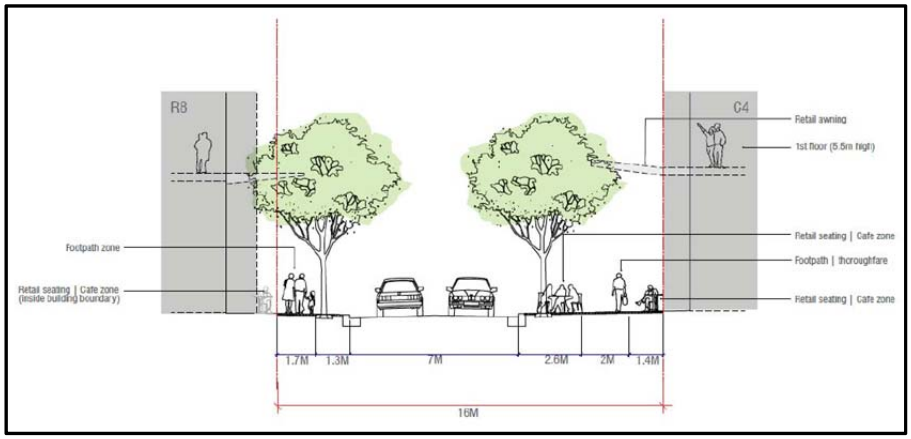


Figure 4: Cross Section of Lime Street in Stage 1A

2.2 Staging

During Stage 1A Lime Street connects into Globe Street which will initially be constructed as a 7.0m wide road for two-way traffic with a wider section at the 90^{o} corner to allow for truck passing requirements. When Stage 1B is implemented, Globe Street is extended north and Globe Street North is widened to create a standard T-intersection arrangement.

2.3 Road connections

There are three intersections that are considered by this planning application as shown in Figure 5:

- Lime Street / Shelley Street
- Globe Street / Hickson Road
- Napoleon Street / Hickson Road

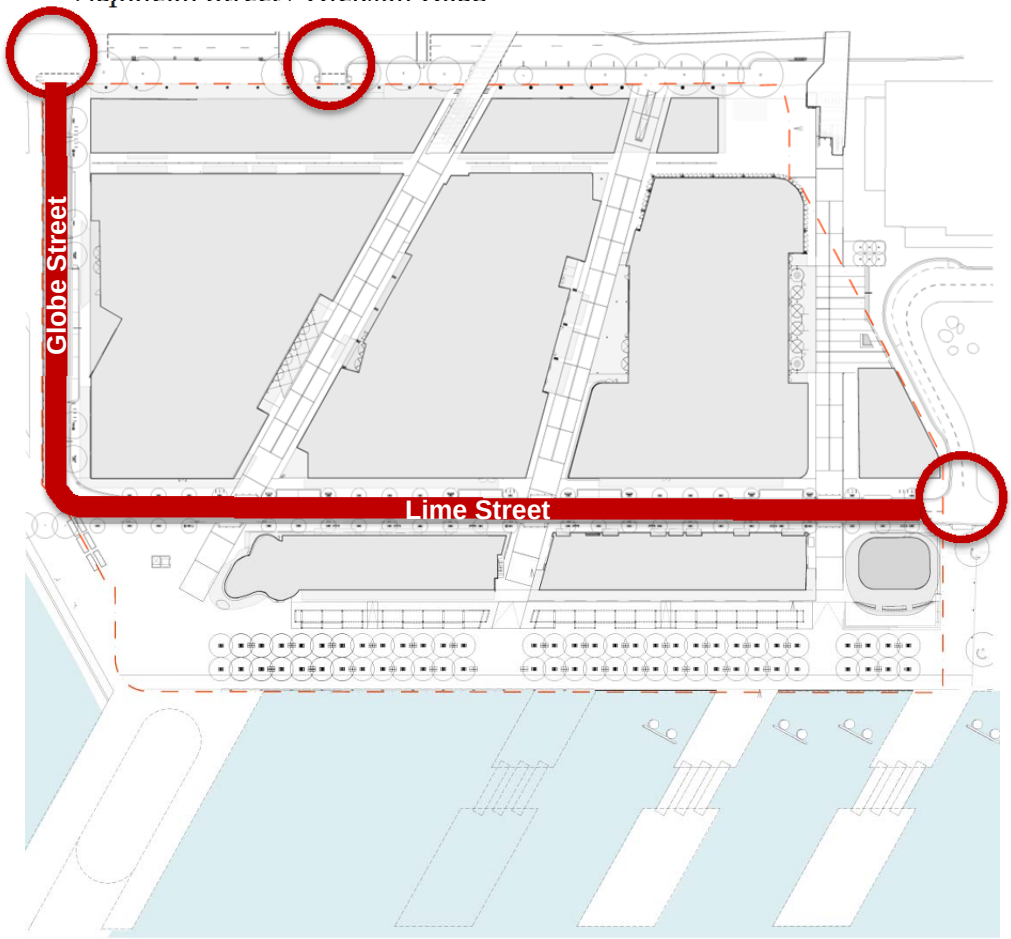


Figure 5: Road connections

2.3.1 Lime Street / Shelley Street

Lime Street connects north of Shelley Street to create a standard T-intersection with priority control as shown in Figure 6. Give-way control will be appropriate at this low volume intersection with minor circulatory traffic using Shelley Street.

The Barangaroo South basement access driveway, used primarily by the residential component of the development, connects with Lime Street just to the north of Shelley Street. The 20m separation between these intersections is acceptable given the anticipated low levels of traffic use at any one time.

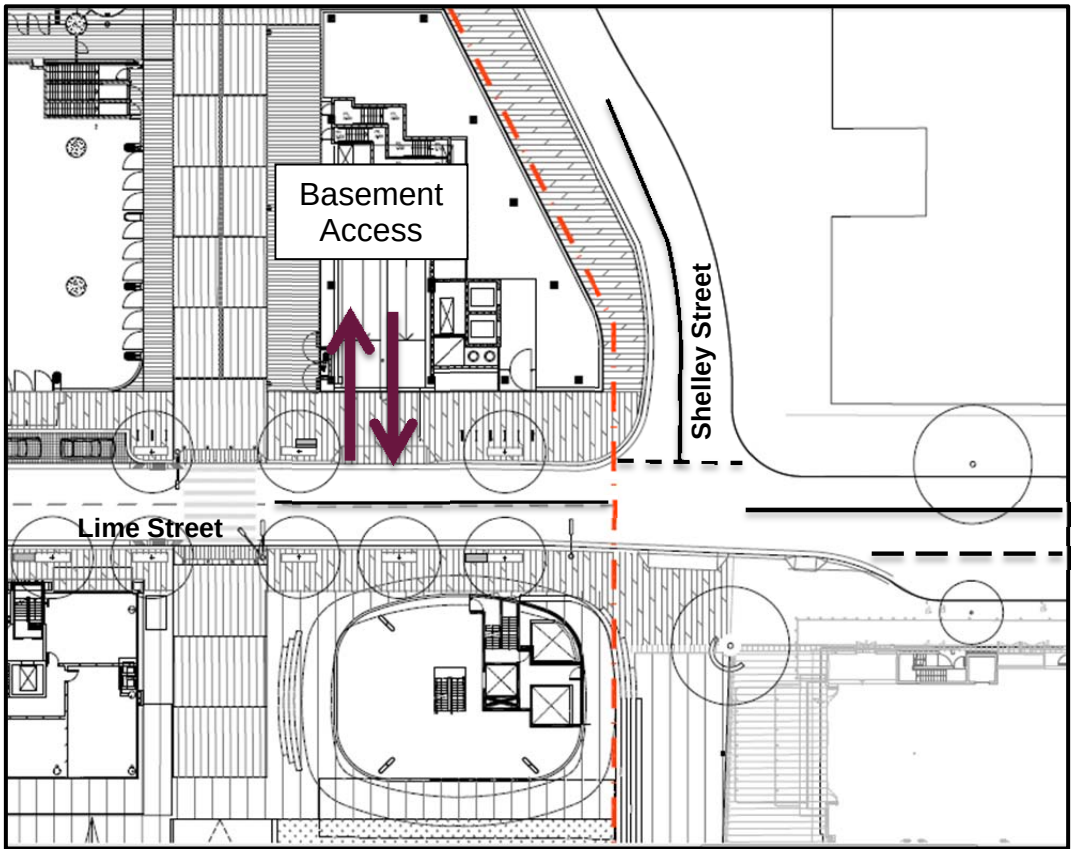


Figure 6: Globe Street / Lime Street intersection

2.3.2 Globe Street / Hickson Road

For Stage 1A of the Barangaroo South development the intersection of Globe Street North with Hickson Road will operate as a priority T-intersection. The intended line marking and kerb arrangements are shown in Figure 7. The majority of traffic will be entering by turning left from the kerbside lane and departing by turning right into Hickson Road as indicated in Figure 7. The left turn entry for 12.5m rigid vehicles will require the truck to turn from the middle of the northbound carriageway. The configuration as shown is suitable for these movements and will provide adequate capacity for the level of development completed during Stage 1A.

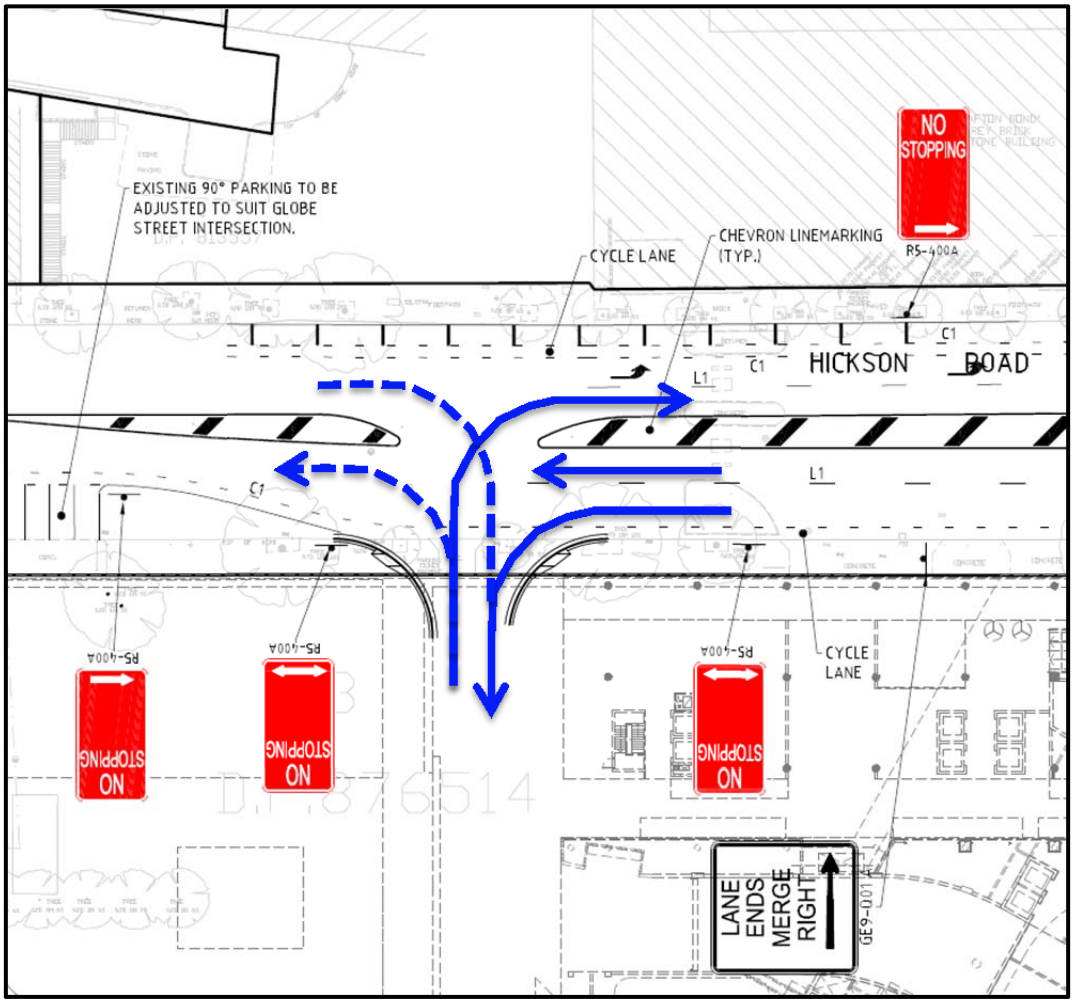


Figure 7: Globe Street North / Hickson Road intersection

2.3.3 Napoleon Street / Hickson Road

Traffic signal control will be installed at the Napoleon Street / Hickson Road intersection with a new exit from the Barangaroo South basement forming the western approach to the intersection as shown in Figure 8. It should be noted the future design of Napoleon Street, including final lane configuration, is presently being developed in conjunction with the road authority.

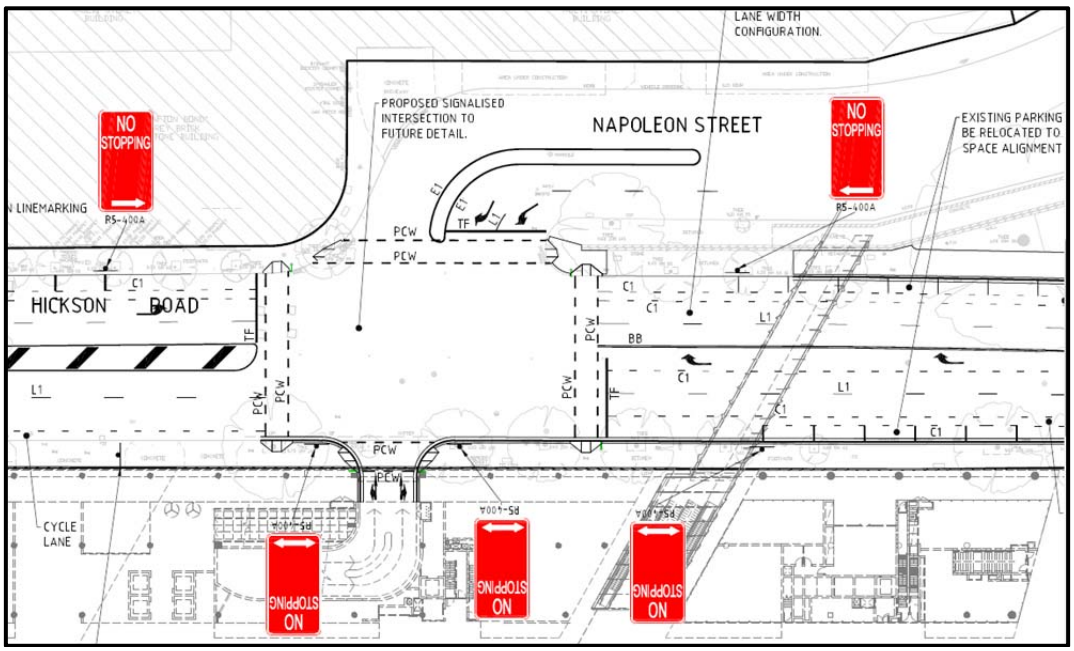


Figure 8: Napoleon Street / Hickson Road intersection

2.4 Pedestrian and Bicycle Connections

The Sydney City Centre Access Strategy was released by Transport for NSW in December 2013. This strategy aims to deliver a fully integrated transport network that prepares Sydney's city centre for the future. The focus is on improving access and circulation by public transport and active transport modes. A key focus is improved legibility and conditions for pedestrians and completing the cycleway network. The strategic cycleway and pedestrian improvements as outlined in the strategy are shown in Figure 9. The Stage 1A Barangaroo South site is well connected to the broader pedestrian and cycleway networks.

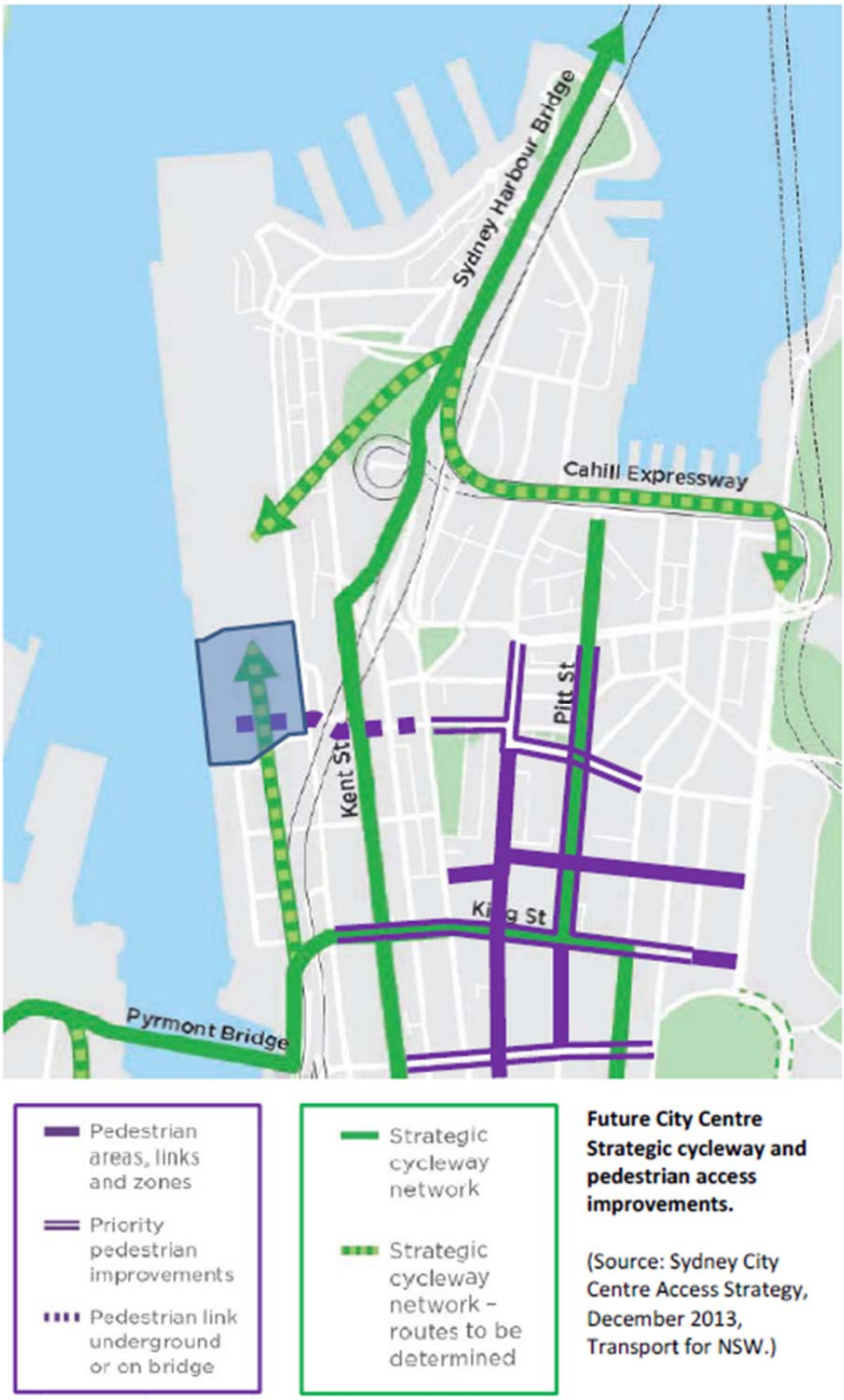


Figure 9 Future City Centre Strategic cycleway and pedestrian access improvements

3 Traffic and transport assessment

3.1 Traffic, pedestrian and bicycle flows

The Stage 1A traffic flows on Lime Street, Globe Street and Hickson Road are shown on Figure 10.

The midblock two-way traffic flow on Lime Street is predicted to be 220 vehicles in the PM peak hour. The daily traffic flow is expected to be 2,000 to 2,500 vehicles/day.

The midblock two-way traffic flow on Globe Street east of the basement access ramp is predicted to be 250 vehicles in the PM peak hour. The daily traffic flow is expected to be 2,300 to 2,800 vehicles/day.

These traffic volume levels are at local road levels predominantly providing access to Barangaroo South and adjacent developments. There may be some through traffic in the morning peak feeding into the precinct from Harbour Street via Wheat Road which has a destination in the northern CBD, although this route will not be very attractive due to the length of the route and availability of an alternative via Erskine Street.

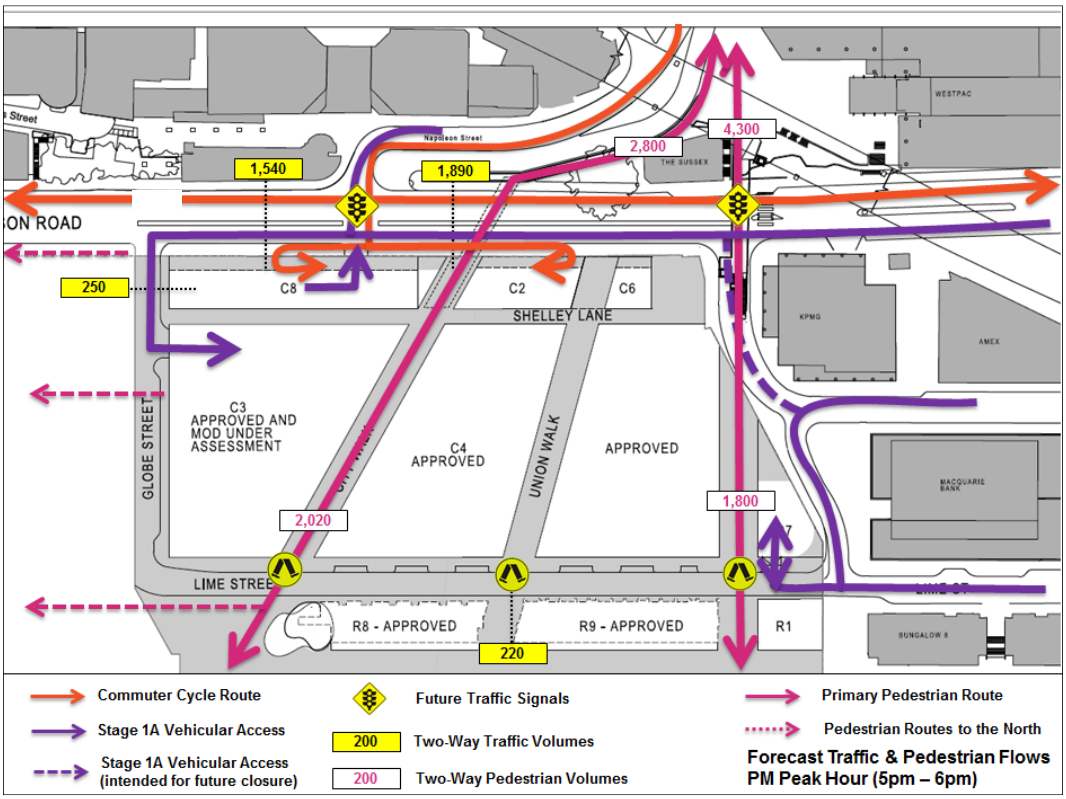


Figure 10 Stage 1A traffic and pedestrian flows

3.2 Vehicle turning paths

3.2.1 Vehicles passing at Lime Street/Globe Street corner

The corner of Globe Street and Lime Street has been configured within the constraints of the Stage 1A boundary to permit a medium sized truck to pass a car in each direction. Turning paths have been prepared by Cardno, the civil road designers. The turning paths for travel in each direction are shown in Figure 11 and Figure 12 indicating good clearance between passing vehicles.

Given that the maximum size vehicle that can pass in each direction is a 9.8m truck, a temporary signage strategy has been developed to limit vehicle access into Globe Street and Lime Street. This is outlined in Section 3.3.

The restriction on vehicle length will require all buses to be excluded from this route during Stage 1A. Bus companies utilising the Macquarie Bank bus layover facility with access from Lime Street will be notified to use Erskine Street for access to the facility. If a bus inadvertently travels along Globe Street or Lime Street to the corner, it will need to proceed with caution around the corner giving way to oncoming vehicles.

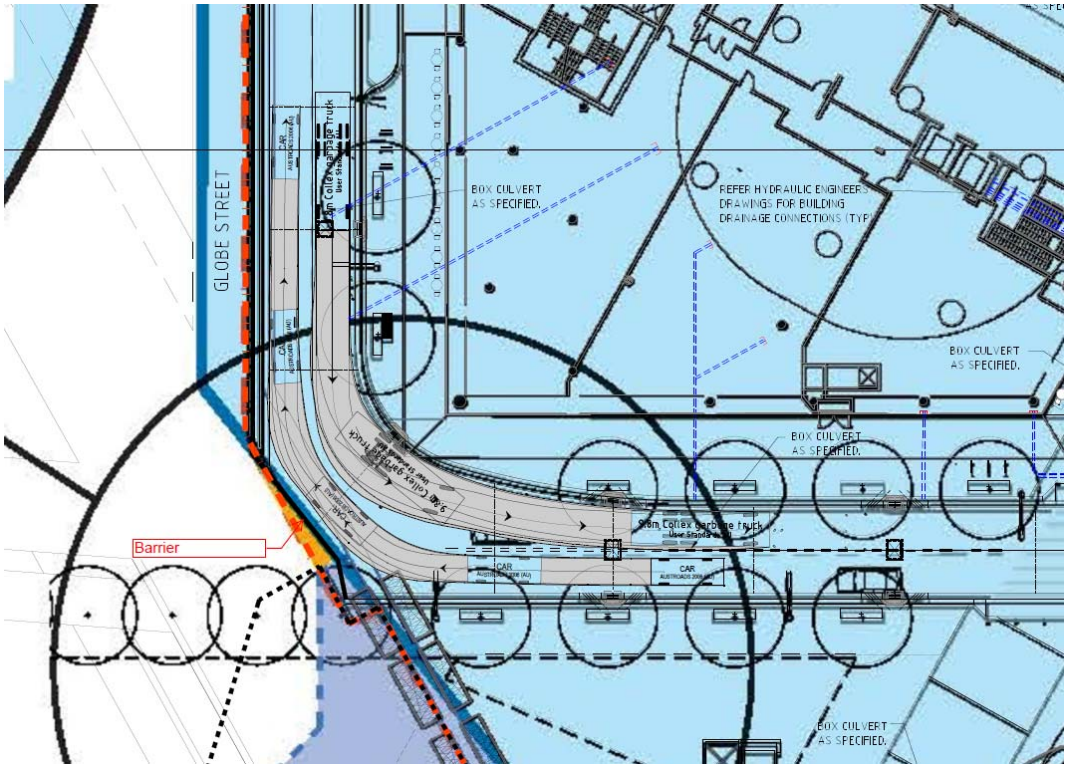


Figure 11 Garbage Truck southbound (9.8m) and Car turning paths

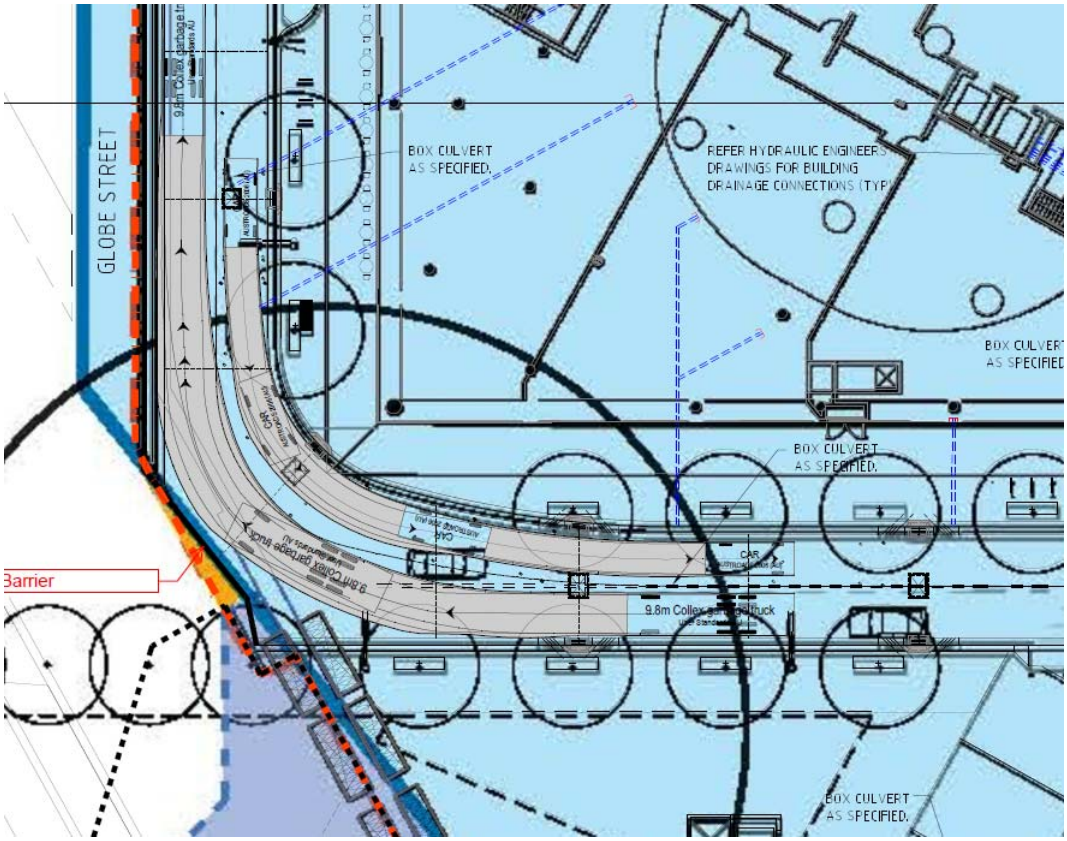
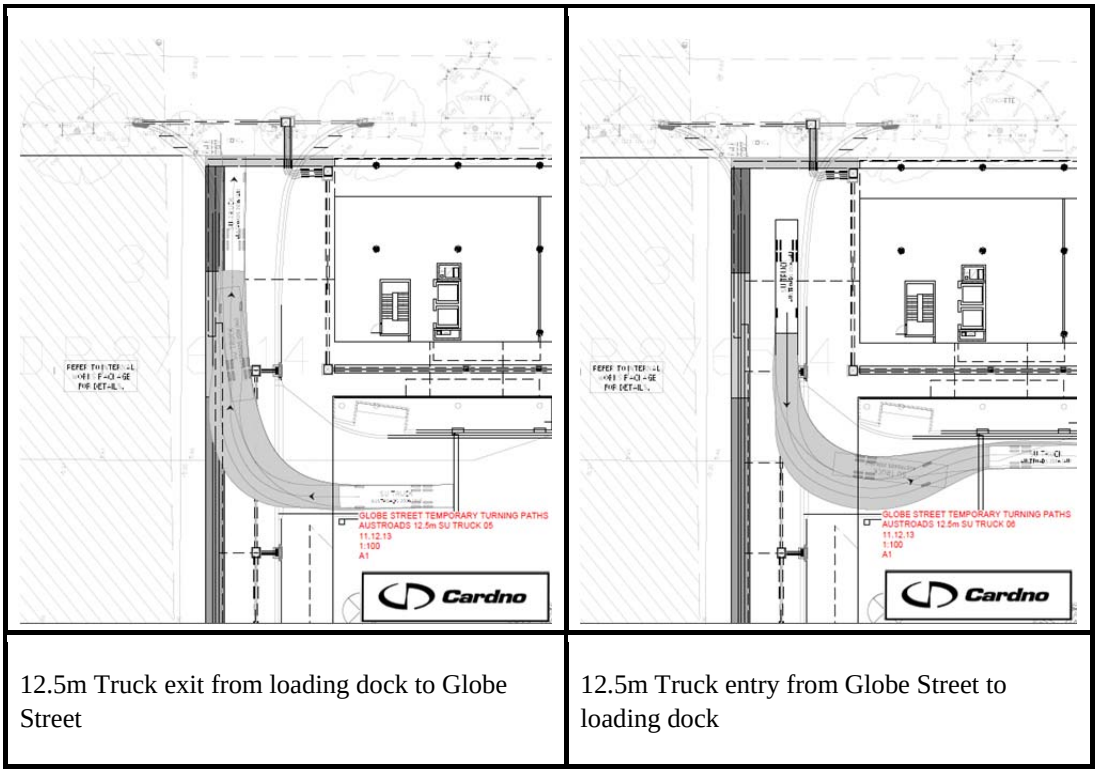


Figure 12 Garbage Truck northbound (9.8m) and Car turning paths

3.2.2 Truck access to loading dock from Globe Street

The loading dock has been design for large rigid 12.5m truck access. The turning paths for entry and exit to Globe Street are shown in Figure 13. These paths show that the driveway width is suitable for turning in both directions for The Stage 1A Globe Street width.



12.5m Truck exit from loading dock to Globe Street

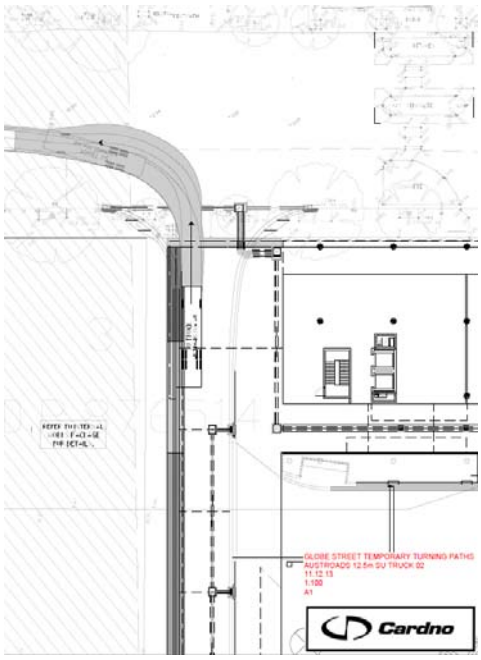
12.5m Truck entry from Globe Street to loading dock

Figure 13 Large truck access to loading dock

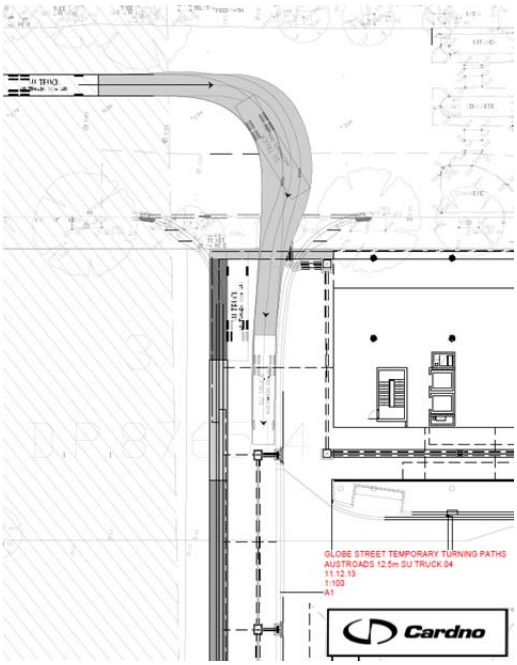
3.2.3 Hickson Road / Globe Street truck turning

The intersection of Hickson Road and Globe Street has been designed to accommodate a large rigid truck for access into the basement loading dock. The turning paths for the 12.5m HRV design vehicle are shown in Figure 14. All movements are able to be executed independently without crossing the path of another vehicle.

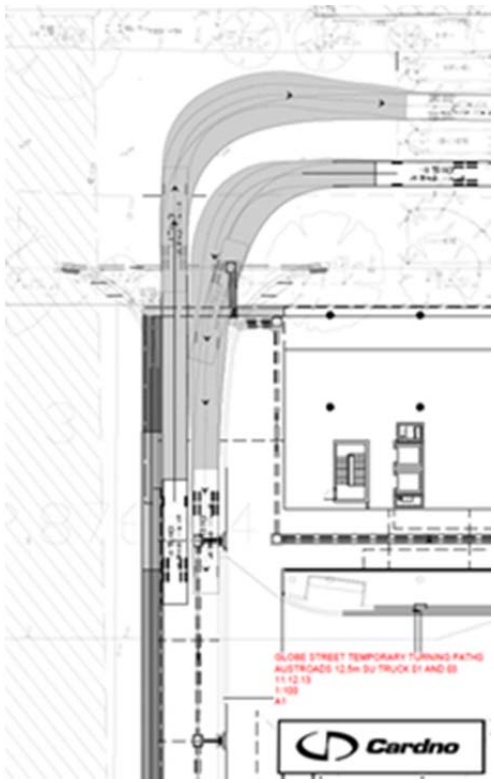
These turning paths are provided at a larger scale in Appendix A.



12.5m truck left turn exit from Globe Street to Hickson Road



12.5m truck right turn entry from Hickson Road to Globe Street



12.5m truck left turn entry and right turn exit - Hickson Road to Globe Street

Figure 14 Hickson Road / Globe Street truck turning

3.3 Proposed Stage 1A traffic signage

During the Stage 1A road operations, the corner of Globe Street and Lime Street will provide restricted two way movement to vehicles under 10m in length. Traffic signage will be required as shown in Figure 15 and described in Table 1 to provide information to drivers. Advance warning will be provided on Hickson Road as well as locational signage with detour information on Lime Street and Globe Street.

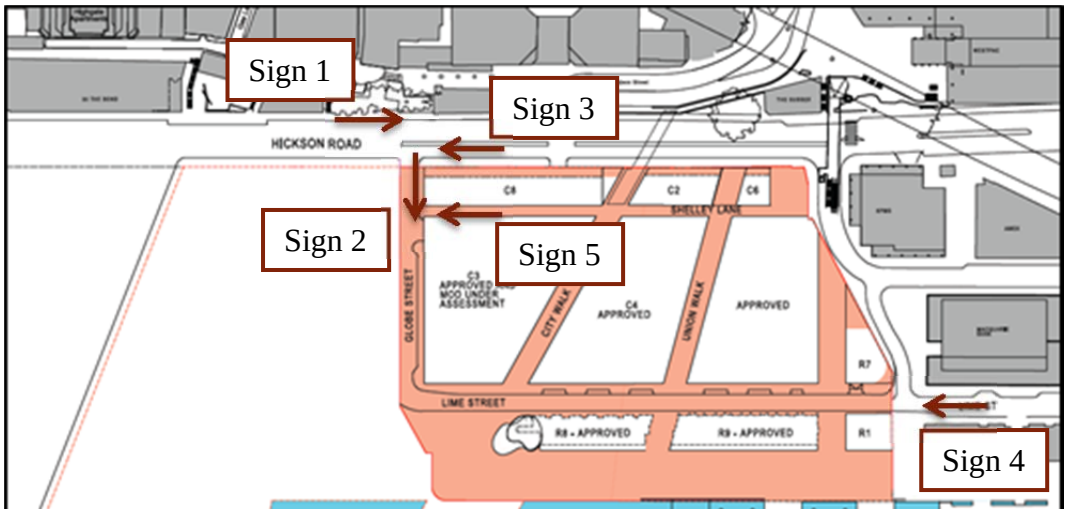


Figure 15 Proposed Stage 1A traffic signage

Table 1 Proposed Stage 1A traffic signage

Stage 1A Signage Location	Text
Sign 1 – Hickson Road southbound	No Right Turn into Globe Street vehicles over 10m Barangaroo Loading Dock Excepted
Sign 2 – Globe Street east of basement access	No Entry vehicles over 10m
Sign 3 – Hickson Road northbound	No Left Turn into Globe Street vehicles over 10m Barangaroo Loading Dock Excepted
Sign 4 – Lime Street northbound	No Entry vehicles over 10m Detour via Shelley Street →
Sign 5 – Loading Dock exit	No left turn vehicles over 10m

3.4 Kerbside use – taxis and set down.

The eastern kerb of Lime Street and the southern kerb of Globe Street contain a number of indented parking bays as shown in Figure 16. The Globe Street bay will be used as a taxi rank during Stage 1A and the Lime Street bays will be designated as “No Parking”, or similar, to allow set-down and pick-up of passengers. The configuration of the indented bays in Lime Street allows two vehicles to pull in as shown in Figure 17.

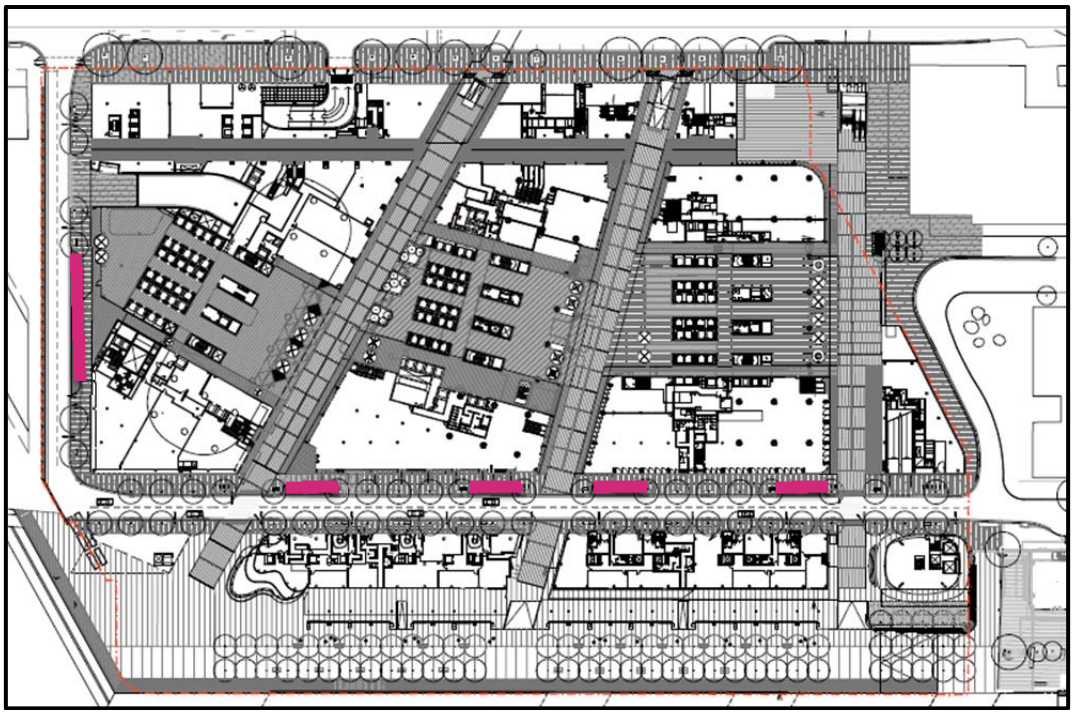


Figure 16 Kerbside use

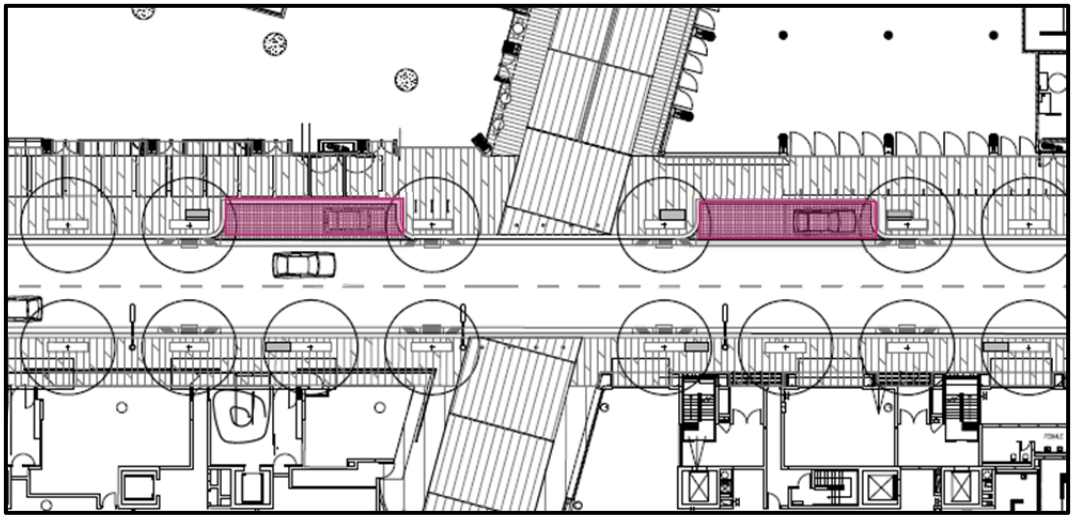
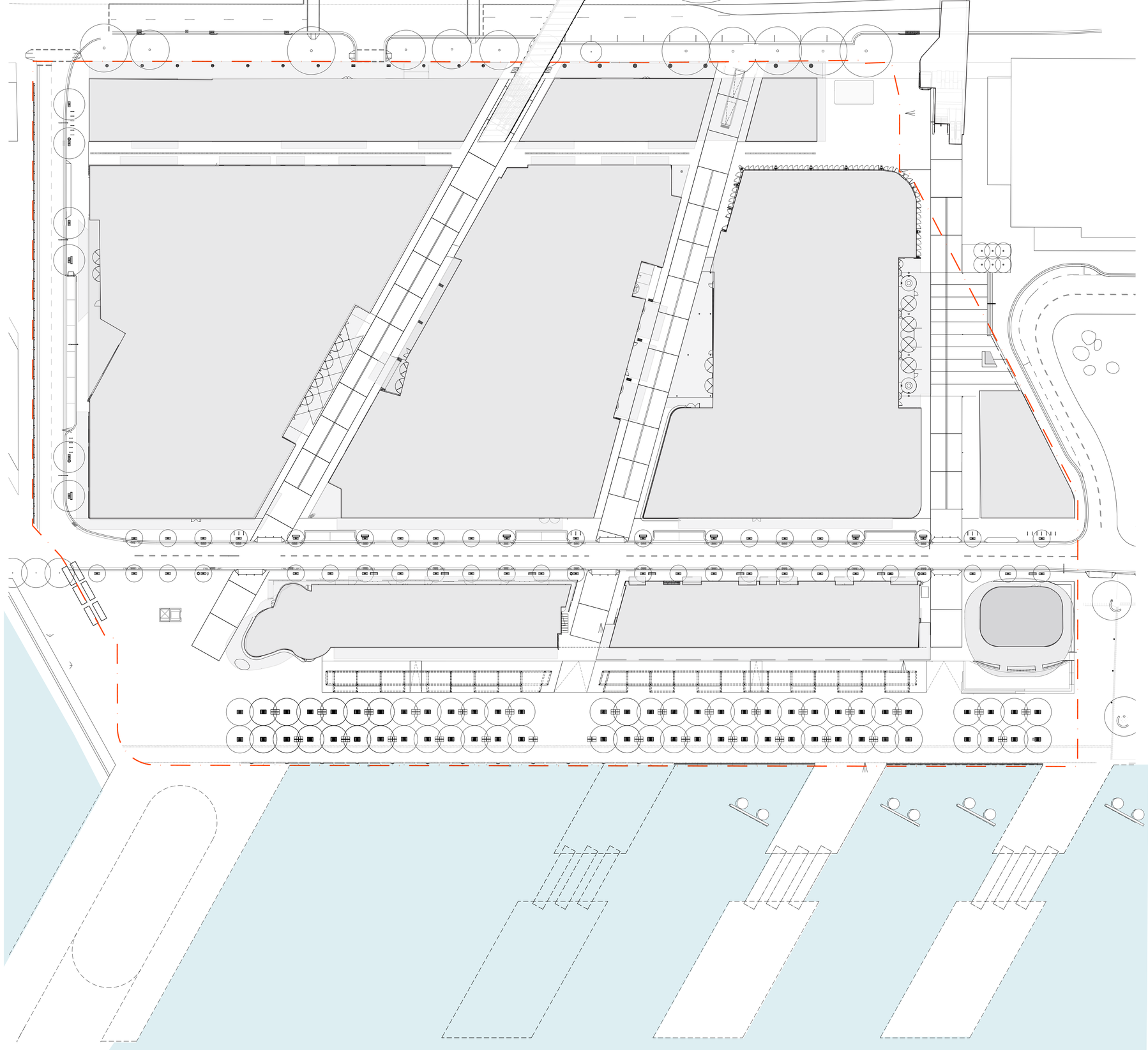


Figure 17 Detail of Lime Street indented parking bays



3.5 Pedestrian crossing arrangements

The primary pedestrian routes that run across the Barangaroo South site from east to west are along City Walk, connecting to City Walk Bridge for access to Wynyard Walk, and Transport Place which is on the Margaret Street alignment and also connects directly to Wynyard Walk. To improve the pedestrian environment adjacent in the precinct, it is intended that the northern section of Shelley Street will be closed to vehicular traffic subject to approval by the road authority and conditions relating to the use of Lime Street and Globe Street.

It is proposed to install zebra crossings on Lime Street at these two routes as shown in Figure 18. The central Union Walk is not proposed to have a formal crossing although pedestrians could choose to cross at this point giving way to traffic flow. The two proposed pedestrian crossing points are separated enough to provide a balance between traffic flow and pedestrian amenity. The crossings will be installed as wide crossings and angled to suit the pedestrian desire line.

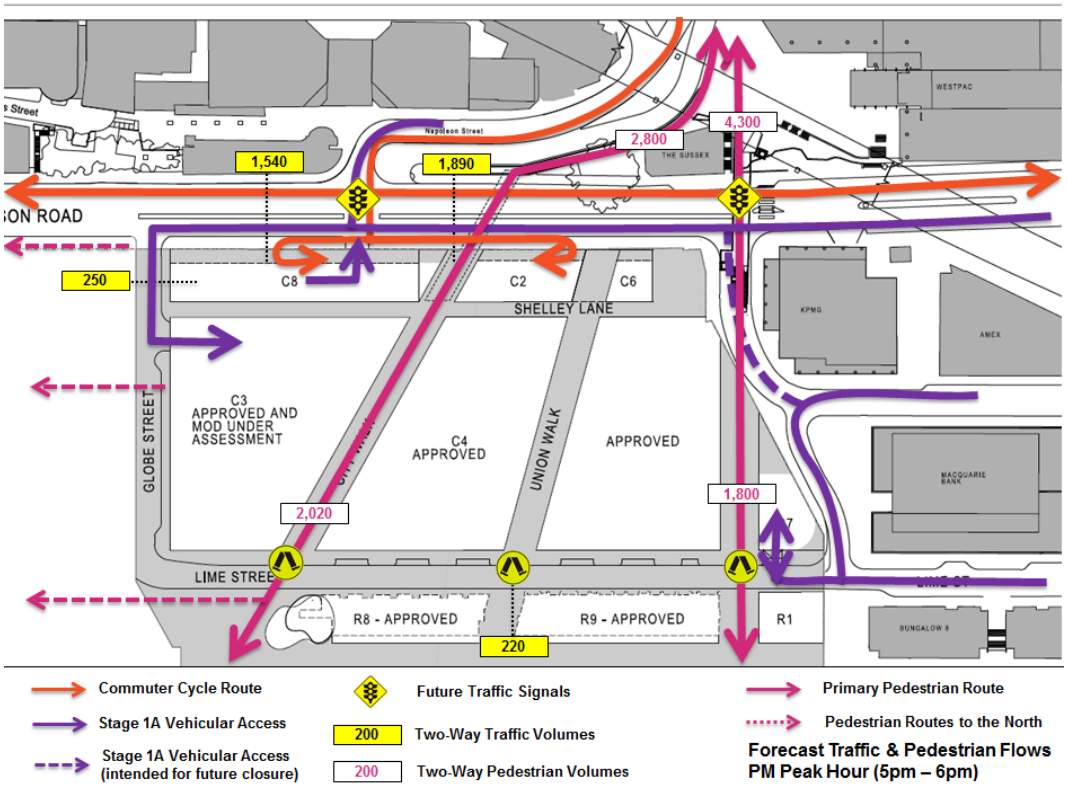


Figure 18 Stage 1A pedestrian crossings

3.5.1 High Pedestrian Activity Areas

The development of the Barangaroo South precinct could facilitate the introduction of 40km/hr High Pedestrian Activity Areas (HPAA) on Lime Street and Globe Street. HPAAs are strongly focused on pedestrian safety, with a 40km/hr maximum speed at all times. The different road environment helps to alert drivers to lower their speed and make them aware of the presence of pedestrians moving about or near the road. This creates a safer road environment for all road users, particularly for pedestrians, cyclists and children. Drivers will be aware they are entering a 40km/hr HPAA through a different street environment including alternate pavement surfacing and kerb extensions.

The Sydney City Centre Access Strategy notes the various benefits of HPAAs:

40km/h high pedestrian activity areas in parts of the city centre have the benefit of improving road safety throughout the day as well as later at night when there are higher rates of pedestrian crashes due to alcohol affected pedestrians and higher than average vehicle speeds.

Figure 19 High Pedestrian Activity Area Signage

3.6 Bicycle access arrangements

The commuter cycle routes for access to the site are shown in Figure 20. Hickson Road and Napoleon Street will be the primary access routes. A bicycle route is intended to be provided on Napoleon Street to service the Barangaroo precinct. This will be considered in a future separate application for the site.

Cyclists will dismount at the Hickson Road / Napoleon Street traffic lights to cross over to gain access to the basement bicycle storage facility. Lime Street and Globe Street will provide for local cyclist access shared with the traffic flow which is of a low volume and travelling slowly.

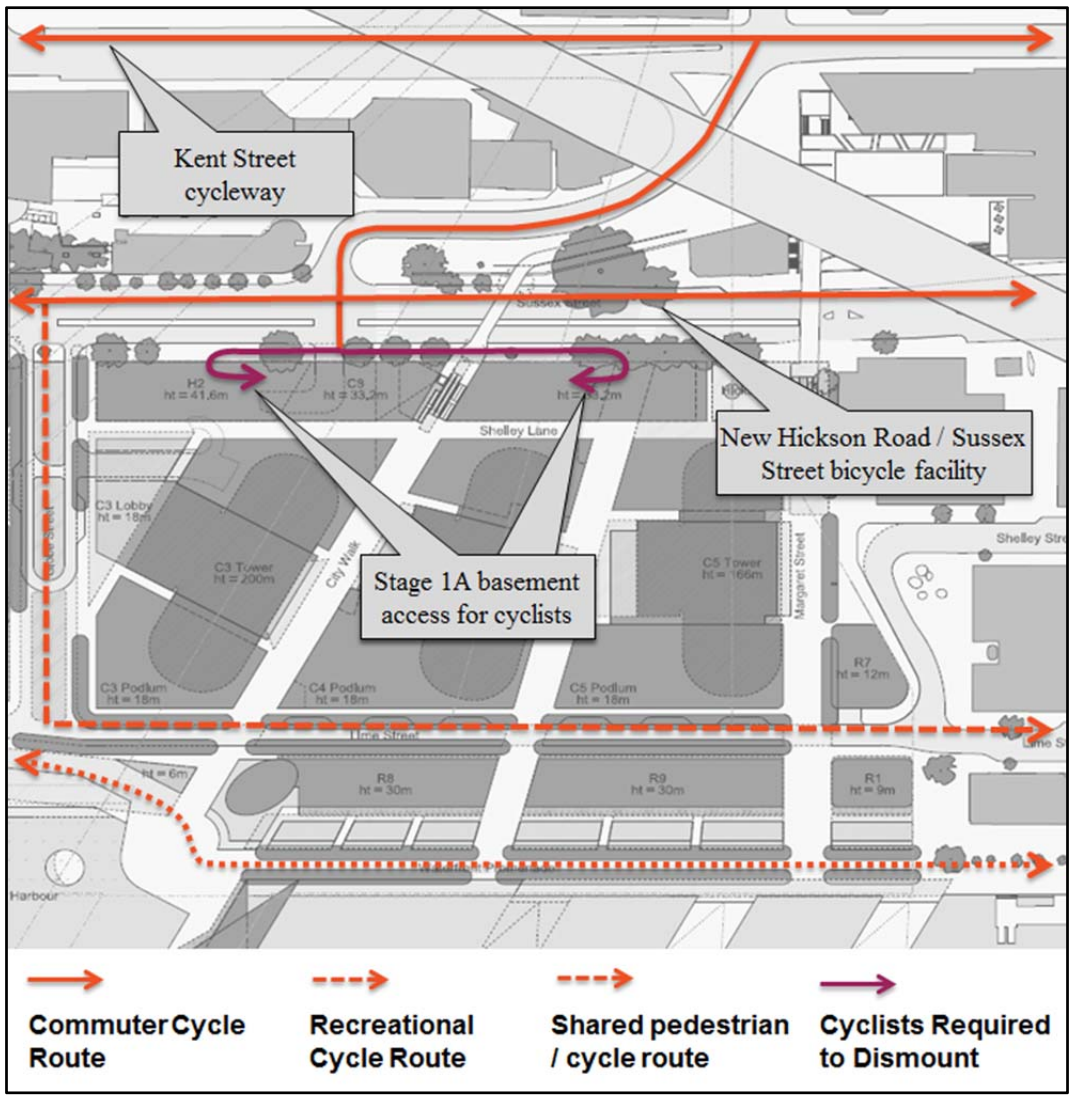


Figure 20 Stage 1A commuter cycle routes and basement access

3.7 Bicycle Parking

Bicycle parking will be provided in the Stage 1A public domain to service visitors to the Barangaroo precinct. The quantum of parking has been determined based on the expected peak population estimates for a typical weekday for the Barangaroo South site. Population estimates were derived from the Barangaroo Pedestrian Precinct Demand Study, developed in September 2013 in conjunction with Lend Lease and the BDA.

Parking has been provided for the following users:

3.7.1 Visitors to the commercial buildings within Stage 1A

Consistent with the mode share targets within the TMAP for the Barangaroo site, bicycle parking has been provided for 4% of visitors to the commercial buildings. There are expected to be a maximum of 634 people visiting the commercial buildings at any one time – equating to a requirement of 25 bicycle parking spaces.

Providing bicycle parking for 4% of visitors is considered a conservative assumption, with most people attending meetings at these buildings likely to walk from nearby offices, catch public transport or arrive via taxi. A more realistic mode share would be in the order of 1%-2%.

3.7.2 Visitors to the remaining uses

It is expected more than 20,000 visitors may be present on the Barangaroo site (i.e. Barangaroo South, Barangaroo Central and Headland Park) at any one time on a typical day. Of these visitors, approximately 6,000 are anticipated to be directly attributable to uses in the Stage 1A and 1B precincts.

It is expected that between 1% and 2% of total visitors to Barangaroo will arrive by bicycle. The majority of visitors will be residents and office workers in nearby CBD buildings and interstate/international tourists – all of which are unlikely to cycle. Based on this mode share range, the required number of bicycle parking spaces to service the visitor population has been estimated (Table 2).

Table 2 Visitor Bicycle Parking

% of visitors arriving by bike	**Number of visitor bike spaces required***	
	Stage 1A/1B	*Entire Site (inclusive of Stage 1A/1B)*
1%	59	217
1.5%	88	325
2%	118	433

* Excludes the 25 spaces servicing visitors of the commercial buildings

The recently approved Darling Harbour Live development, adjacent to the Barangaroo precinct, is providing bicycle parking for 1.5% of visitors in their public domain. This provides a good example of a major urban renewal precinct on the edge of the Sydney CBD with a high daily visitor population – comprising of local residents and office workers, interstate and international tourists.

The Barangaroo development proposes to provide bicycle parking for 2% of the visitor population – at the upper end of the anticipated visitor bicycle mode share range and exceeding the rate to be provided in the adjacent Darling Harbour Live public domain. This equates to 118 spaces, of which half (59) will be provided within the Stage 1A public domain. The remainder will be located within the Stage 1B development.

A further 315 bicycle parking spaces are recommended to be provided within both Headland Park and Barangaroo Central to service the remainder of the visitor population to the site.

3.8 Ferry Access

The Sydney City Centre Access Strategy commits to constructing a new ferry hub at Barangaroo. This new wharf will support the commercial development of the precinct, with new ferry services anticipated from the east and north, as well as the existing western ferry catchments. In May 2014 the NSW Government confirmed the construction of the new ferry hub, with a project team recently engaged to prepare an environmental assessment. The wharf will be operational for customers in 2016.

The Waterfront Promenade has been designed in consultation with Transport for NSW to ensure that it can accommodate the future ferry wharf adjacent to Barangaroo South.

4 Road Network Analysis

4.1 During Construction

4.1.1 Construction Program

Barangaroo South Works

Table 3 below outlines the concurrent developments within the Barangaroo South site, noting the start and finish dates by annual quarters.

Table 3 Construction Details of Barangaroo South Works

Project	**Project Duration***	
	Start	*Finish*
Bulk Excavation and Basement Car Parking	Oct 2011	Sep 2016
T1 Commercial Building	Mar 2014	June 2016
T2 Commercial Building	May 2013	Aug 2015
T3 Commercial Building	Oct 2013	Mar 2016
R8/R9 Residential Buildings	Jan 2014	Aug 2015
Batch Plant Operation	Sep 2013	Jun 2015^
Block 4 Remediation Works	Aug 2014	Nov 2016

* The above dates are indicative only and allow for future tenant fit out works within the individual buildings

^ Use of the Concrete batch plant may be extended to June 2018 to support the construction of Barangaroo Stage 1B development

Works External to Barangaroo South

The construction staging for works external to the Barangaroo South site are outlined in Table 4 below.

Table 4 Construction Details of Works Adjacent to Barangaroo South

Project	**Project Duration***	
	Start	*Finish*
Wynyard Walk	Apr 2013	Jul 2015
Headland Park Main Works	Apr 2013	Jul 2015
Barangaroo Central – Waterfront Promenade	Mar 2014	Apr 2015

* The above dates are indicative only, based on timing outlined in relevant planning documentation

Public Domain Works for Stage 1A

The public domain works will be finished prior to opening of T2 Commercial Building in mid 2015. The works will be undertaken over a 3 – 4 month timeframe.

4.1.2 Construction Vehicle Movements

An assessment has been made of the cumulative impacts of construction activities in the precinct, based on the works described in Section 4.1.1 of this report.

The number of construction vehicles generated by works within the Barangaroo South site is based on recent advice from Lend Lease Project Management and Construction. The number of vehicle movements expected during the peak hours has been determined based on the existing activity profile for the Barangaroo South site. Construction vehicle activity generated by works external to Barangaroo South have been forecast based on the supporting planning documents to each of the project application, as follows:

- **Headland Park**: *Barangaroo Headland Park Early Works – Construction Traffic Management Plan and Impact Assessment, Halcrow (October 2010)*
- **Wynyard Walk**: *Wynyard Walk Review of Environmental Factors (BPL-R-EN-059[A]), April 2012*

  Bridge Works - Traffic Management Plan (BPL-R-GN-053), May 2012
- **Barangaroo Central – Waterfront Promenade:** *Barangaroo Central Waterfront Promenade and Interim Public Domain – Traffic Impact Assessment, Aurecon (Rev 4, 30 Oct 12)*

It is noted that the construction program for the Barangaroo Central Waterfront Promenade has been shortened compared to that outlined in the original planning application. However, it is considered that the original estimate of 40 truck movements in the peak hour (as outlined in the planning report) is overly conservative. Therefore, notwithstanding the shorter construction period, the cumulative analysis has retained the figure of 40 peak hour truck movements.

The highest combined level of construction activity generated by all worksites will be approximately 149 construction vehicle movements per hour, forecast to occur in August 2014. This includes all construction activity including delivery of materials and visits by tradesmen (e.g. plumbers, electricians). Of these peak truck movements however, a significant proportion (in the order of 45%) are attributable to works external to the Barangaroo South site, at Headland Park, Wynyard Walk and Barangaroo Central.

The anticipated level of construction vehicle activity in the Barangaroo South precinct up to 2016 is outlined in Figure 21 on the following page. A detailed breakdown of vehicle movements associated with each construction project is provided in Table 5.

Public Domain Works

The works associated with construction of the public domain including Globe and Lime Streets will be spread over a 3 to 6 months period with truck movements peaking at 8 per hour during high intensity activities. On average a typical hour would involve 4 truck movements. This activity will be occurring at the anticipated peak period in August 2014 and represents a negligible 3% increase in activity. The majority of construction truck movements occur prior to the afternoon peak commuter period, minimising the impact on the local road network. During the morning peak period the access road generally operates satisfactorily and requires no further works to accommodate the levels of construction traffic anticipated.

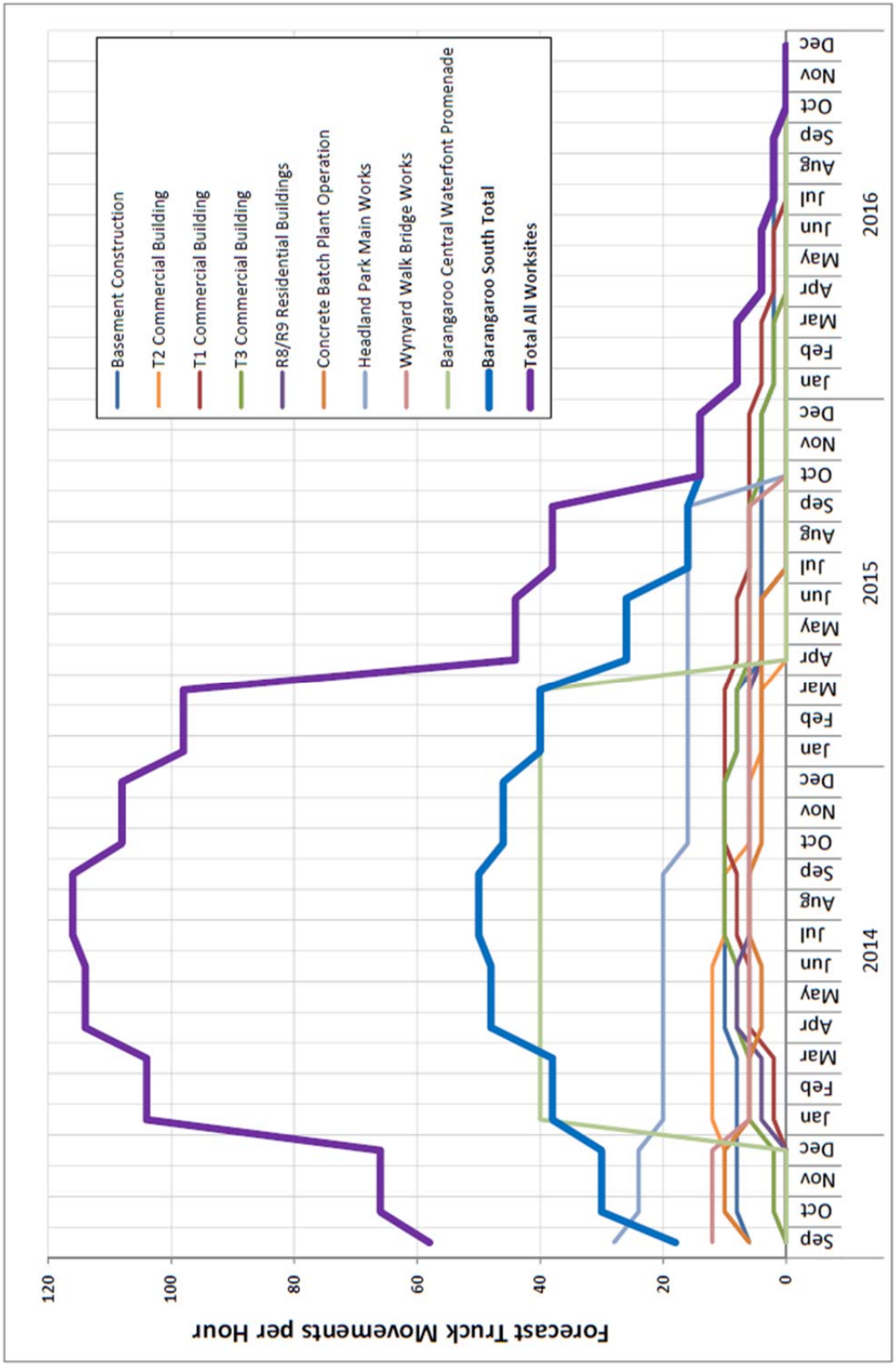


Figure 21 Forecast Peak Hour Cumulative Construction Vehicle Movements

Barangaroo Construction Traffic Management Plan

Forecast Construction Vehicle Activity - Truck Movements per Hour

Project	2013				2014												2015												2016											
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Basement Construction	6	8	8	8	8	8	8	10	10	10	10	10	10	10	10	10	8	8	8	4	4	4	4	4	4	4	4	4	2	2	2	2	2	2	2	2	2	0	0	0
T2 Commercial Building	6	10	10	10	12	12	12	12	12	12	10	10	10	6	6	6	4	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
T1 Commercial Building	0	0	0	0	2	2	2	6	6	6	8	8	8	10	10	10	10	10	10	8	8	8	6	6	6	6	6	6	4	4	4	2	2	2	0	0	0	0	0	0
T3 Commercial Building	0	2	2	2	6	6	6	8	8	8	10	10	10	10	10	10	8	8	8	6	6	6	6	6	6	4	4	4	2	2	2	0	0	0	0	0	0	0	0	0
R8/R9 Residential Buildings	0	0	0	0	4	4	4	8	8	8	6	6	6	6	6	6	6	6	6	4	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Concrete Batch Plant Operation	6	10	10	10	6	6	6	4	4	4	6	6	6	4	4	4	4	4	4	4	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barangaroo South Total	*18*	*30*	*30*	*30*	*38*	*38*	*38*	*48*	*48*	*48*	*50*	*50*	*50*	*46*	*46*	*46*	*40*	*40*	*40*	*26*	*26*	*26*	*16*	*16*	*16*	*14*	*14*	*14*	*8*	*8*	*8*	*4*	*4*	*4*	*2*	*2*	*2*	*0*	*0*	*0*
Headland Park Main Works	28	24	24	24	20	20	20	20	20	20	20	20	20	16	16	16	16	16	16	16	16	16	16	16	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wynyard Walk Bridge Works	12	12	12	12	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barangaroo Central Waterfront Promenade	0	0	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total All Worksites	58	66	66	66	104	104	104	114	114	114	116	116	116	108	108	108	98	98	98	44	44	44	38	38	38	14	14	14	8	8	8	4	4	4	2	2	2	0	0	0

Table 5 Combined Construction Vehicle Movements

4.1.3 Construction vehicle traffic on Lime and Globe Street from July 2015

The construction sequence following the opening of Globe Street and Lime Street will require some construction vehicles to travel along these roads. The volumes are expected to be very low. Typical peak hourly traffic flows are shown in Figure 22 to Figure 27, with a maximum of 3 peak hour vehicle movements anticipated. All vehicles may adequately manoeuvre and turn around within the site.

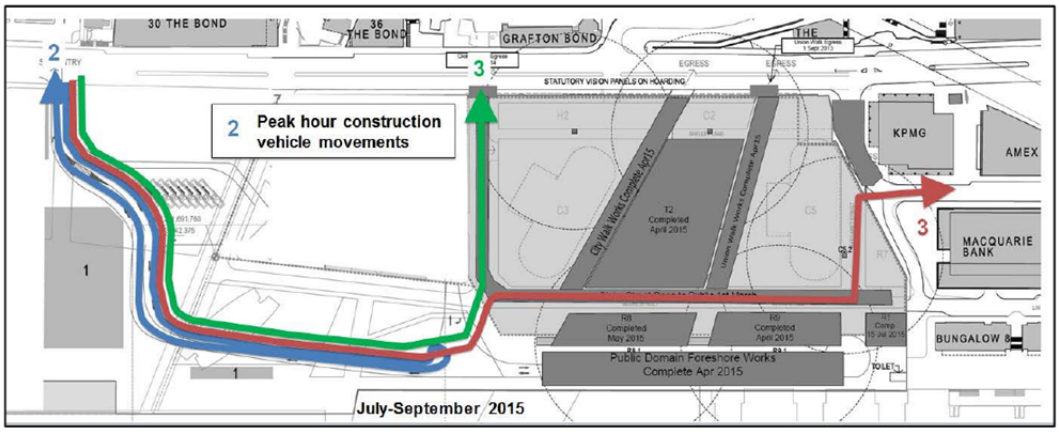


Figure 22 Peak hour construction vehicles July - September 2015

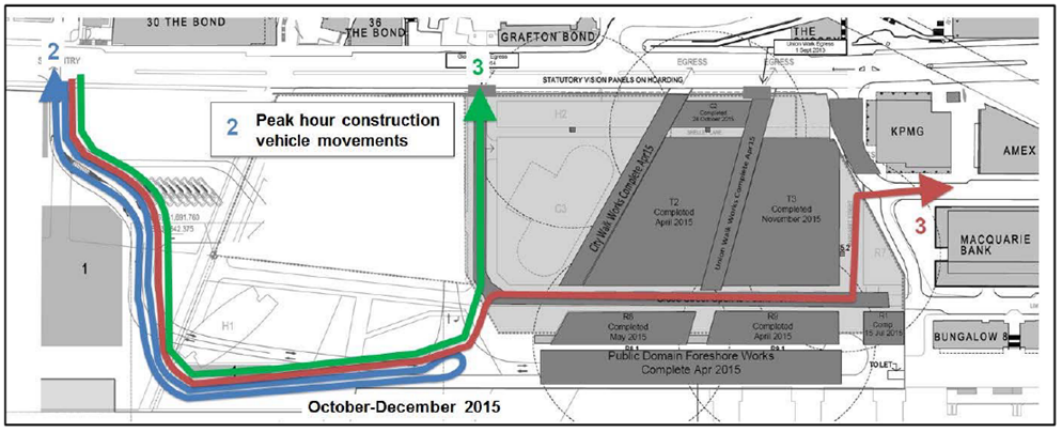


Figure 23 Peak hour construction vehicles October - December 2015

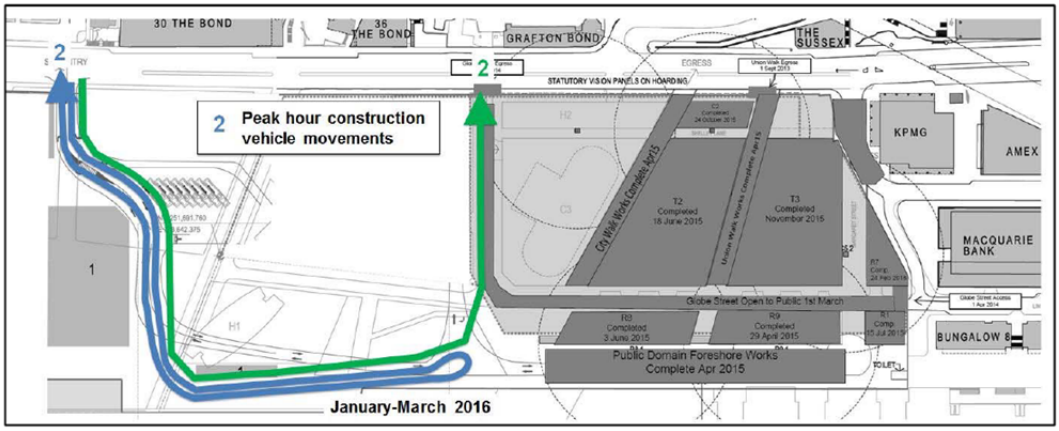


Figure 24 Peak hour construction vehicles January - March 2016

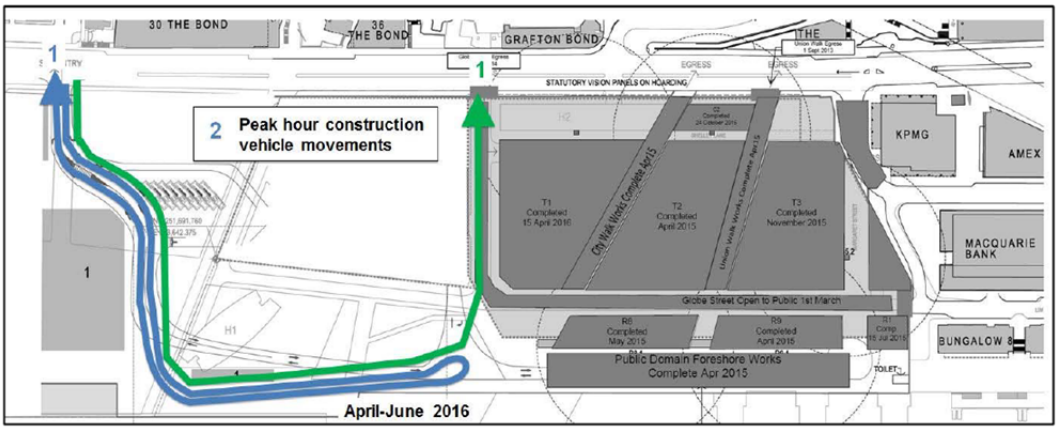


Figure 25 Peak hour construction vehicles April - June 2016

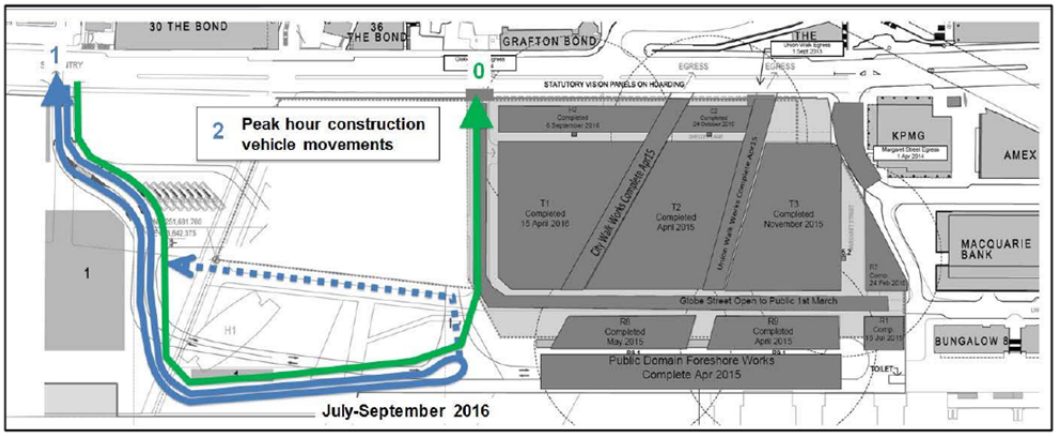


Figure 26 Peak hour construction vehicles July - September 2016

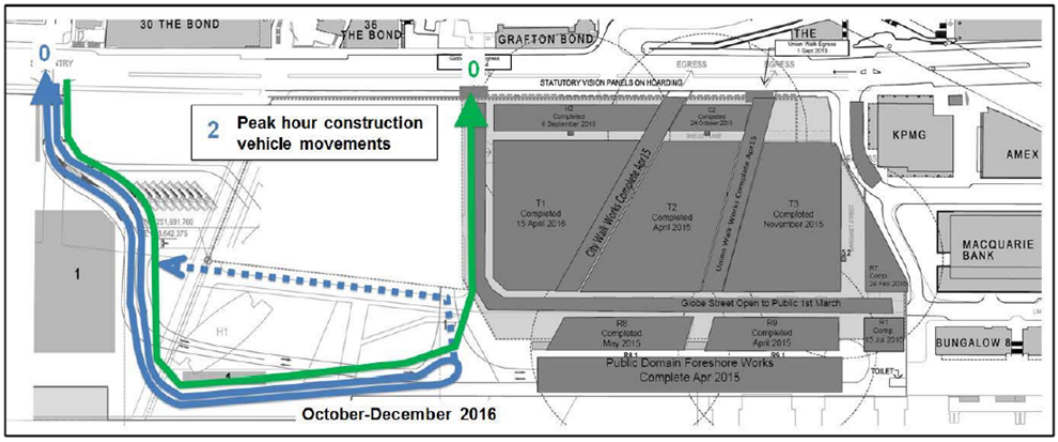


Figure 27 Peak hour construction vehicles October - December 2016

4.2 During Operation

4.2.1 Globe Street / Hickson Road

For Stage 1A of the Barangaroo South development the intersection of Globe Street North with Hickson Road will operate as a priority T-intersection. The intended line marking and kerb arrangements are shown in Figure 7.

The traffic volumes exiting Globe Street associated with the Stage 1A components of Barangaroo South can be accommodated in the single exit lane with the majority turning right onto Hickson Road to depart the precinct travelling south on Hickson Road or north and east on Napoleon Street.

4.2.2 Napoleon Street / Hickson Road

Traffic signal control will be installed at the Napoleon Street / Hickson Road intersection with a new exit from the Barangaroo South basement forming the western approach to the intersection as shown in Figure 8.

The operation of the road network following the introduction of the proposed traffic signals at the Napoleon Street / Hickson Road intersection has previously been analysed for the Basement and Bulk Excavation (MP10_0023 Mod5) project approvals. A LinSig traffic model was developed which considered the future closure of Shelley Street to vehicle movement following the completion of the Wynyard Walk development.

The results of the intersection analysis forecast minor changes in the operation of key intersections surrounding the site. The LinSig modelling does forecast an increase in vehicle delays at the Napoleon Street / Hickson Road intersection with the provision of traffic signals. This is largely associated with the diamond phasing arrangement to accommodate right turns out of the car park onto Sussex Street, and right turns from Napoleon Street onto Hickson Road.

It is recognised that significant vehicle queuing currently occurs in the southbound direction on Sussex Street in the PM Peak hour as a result of more congested traffic operating conditions in the vicinity of the cross traffic movements at the King Street and Market Street intersections. The operation of the future signalised intersection at Napoleon Street / Hickson Road will be dependent on the operating conditions of intersections further downstream on Sussex Street. Essentially it will act as a ‘slave’ in the Sussex Street road network, with intersections at King Street and Market Street acting as the ‘masters’. In this context, the impacts of the proposed basement exit at Hickson Road / Napoleon Street are considered modest, with the exit to facilitate improved egress movement for Barangaroo site users.

5 Conclusions

The Public Domain SSDA seeks approval for all public domain works within 'Stage 1A' of the Barangaroo South Site. These works include typical public domain features such as street paving, street furniture, lighting and planting.

During Stage 1A Lime Street connects into Globe Street which will initially be constructed as a 7.0m wide road for two-way traffic with a wider section at the 90^{o} corner to allow for truck passing requirements. When Stage 1B is implemented, Globe Street is extended north and Globe Street North is widened to create a standard T-intersection arrangement.

The intersection of Globe Street at Hickson Road will operate as a priority controlled T-intersection which meets the operational requirements for vehicle access into the Barangaroo South basement for car parking and loading.

Traffic signal control will be installed at the Napoleon Street / Hickson Road intersection with a new exit from the Barangaroo South basement forming the western approach to the intersection. The operation of the road network following the introduction of the proposed traffic signals at the Napoleon Street / Hickson Road intersection has previously been analysed for the Basement and Bulk Excavation (MP10_0023 Mod5) project approvals.

During the Stage 1A road operations, the corner of Lime Street and Hickson Road will provide restricted two way movement to vehicles under 10m in length. Advance warning will be provided on Hickson Road as well as locational signage with detour information on Lime Street and Globe Street.

The works associated with construction of the public domain including Globe and Lime Streets will be spread over a 3 to 6 months period with truck movements peaking at 8 trucks per hour during high intensity activities. On average a typical hour would involve 4 truck movements. This activity will be occurring at the anticipated peak period of August 2014 and represents a negligible 3% increase in activity. The majority of construction truck movements occur prior to the afternoon peak commuter period. During the morning peak period the access road generally operates satisfactorily and requires no further works to accommodate the levels of construction traffic anticipated.

The two primary pedestrian routes that run across the Barangaroo South site from east to west are along City Walk, connecting to City Walk Bridge for access to Wynyard Walk, and Transport Place which is on the Margaret Street alignment and also connects directly to Wynyard Walk. It is proposed to install zebra crossings on Lime Street at these two locations. The development of the Barangaroo South precinct could facilitate the introduction of 40km/hr High Pedestrian Activity Areas (HPAA) on Lime Street and Globe Street.

Indented parking bays on Globe Street and Lime Street will be designated as "No Parking", or similar, to allow set-down and pick-up of passengers.

Hickson Road and Napoleon Street will be the primary commuter cycle access routes. Cyclists will dismount at the Hickson Road / Napoleon Street traffic lights to cross over to gain access to the basement bicycle storage facility. Lime Street and Globe Street will provide for local cyclist access shared with the traffic flow which is of a low volume and travelling slowly.

Appendix A

Vehicle Turning Paths

SU TRUCK
AUSTROADS 2006 (AU)

SU TRUCK
AUSTROADS 2006 (AU)

REFER TO INTERNAL
WORKS PACKAGE
FOR DETAILS.

GLOBE STREET TEMPORARY TURNING PATHS
AUSTROADS 12.5m SU TRUCK 02
11.12.13
1:100
A1

Cardno

813557

SU TRUCK
AUSTROADS 2006 (AU)

SU TRUCK
AUSTROADS 2006 (AU)

SU TRUCK
AUSTROADS 2006 (AU)

GLOBE STREET TEMPORARY TURNING PATHS
AUSTROADS 12.5m SU TRUCK 04
11.12.13
1:100
A1

Cardno

813557

SU TRUCK
AUSTROADS 2006 (AU)

SU TRUCK
AUSTROADS 2006 (AU)

SU TRUCK
AUSTROADS 2006 (AU)

SU TRUCK
AUSTROADS 2006 (AU)

SU TRUCK
AUSTROADS 2006 (AU)

GLOBE STREET TEMPORARY TURNING PATHS
AUSTROADS 12.5m SU TRUCK 01 AND 03
11.12.13
1:100
A1

Cardno

eal Reject
ets

GLOBE STREET

9.8m Collex garbage truck
User Standards.AU

CAR
AUSTROADS 2006 (AU)

BOX CULVERT
AS SPECIFIED.

REFER HYDRAULIC ENGINEERS
DRAWINGS FOR BUILDING
DRAINAGE CONNECTIONS (TYP)

BOX CULVERT
AS SPECIFIED.

BOX CULVERT
AS SPECIFIED.

BOX CULVERT
AS SPECIFIED.

Barrier

eal Reject
ets

GLOBE STREET

9.8m Collex garbage truck
User Standards (AU)

CAR
AUSTROADS 2006 (AU)

BOX CULVERT
AS SPECIFIED.

REFER HYDRAULIC ENGINEERS
DRAWINGS FOR BUILDING
DRAINAGE CONNECTIONS (TYP)

BOX CULVERT
AS SPECIFIED.

BOX CULVERT
AS SPECIFIED.

BOX CULVERT
AS SPECIFIED.

Barrier