

WALSH BAY ARTS AND CULTURAL PRECINCT

STATE SIGNIFICANT DEVELOPMENT APPLICATION

SSDA 8671

APPENDIX 15:

TRANSPORT IMPACT ASSESSMENT



Walsh Bay Arts and Cultural Precinct State Significant Development Application Transport Impact Assessment

Client // Infrastructure NSW
Office // NSW
Reference // N133680
Date // 10/10/17

Walsh Bay Arts and Cultural Precinct

State Significant Development Application

Transport Impact Assessment

Issue: C 10/10/17

Client: Infrastructure NSW
Reference: N133680
GTA Consultants Office: NSW

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1. Introduction

1.1 The Project

The NSW Government is committed to development of a public arts and cultural precinct at Walsh Bay. Infrastructure NSW is acting on behalf of the client, Arts, Screen and Culture Division in preparing this State Significant Development Application for the Walsh Bay project.

This State Significant Development Application (SSDA) will seek approval for the construction and operation of Pier 2/3 and Wharf 4/5 for arts and cultural uses with complementary commercial and retail offerings to activate the precinct.

The site generally comprises Pier 2/3, Wharf 4/5, and Wharf 4/5 Shore Sheds. The site has a street frontage to Hickson Road as shown in Figure 1.1. The site is part of the Walsh Bay area, which is located adjacent to Sydney Harbour within the suburb of Dawes Point.

Figure 1.1: The site



Source: Provided

The scope of the Walsh Bay Arts and Cultural Precinct (WBACP) project is described in the following subsections.

Pier 2/3

The works proposed for Pier 2/3 will include:

- The adaptive re-use providing for new arts facilities including performance venues for the Australian Chamber Orchestra (ACO), Bell Shakespeare and Australian Theatre for Young People (ATYP).
- Retaining a large heritage commercial events/art space for events such as Sydney Writers Festival, Biennale of Sydney and a wide range of commercial and artistic events.
- A series of stairs, external lift and balconies designed as a contemporary interpretation of the original gantries reflecting the precinct's former industrial heritage.
- Modifications to the roof.

Wharf 4/5 (including Shore Sheds)

The works proposed for Wharf 4/5 include:

- Refurbishment of the ground floor arts facilities and its associated Shore Sheds for Bangarra Dance Theatre, Sydney Dance Company (SDC), Sydney Philharmonia, Gondwana and Song Company.
- New commercial retail opportunities.
- A series of stairs, external lifts and balconies designed as a contemporary interpretation of the original gantries reflecting the precinct's former industrial heritage.
- Modifications to the roof.

1.2 Purpose of this Report

This report sets out an assessment of the anticipated transport implications of the proposed development, including consideration of the following:

- i Existing traffic and parking conditions surrounding the site
- ii Suitability of the proposed parking in terms of supply (quantity) and layout
- iii Service vehicle requirements
- iv Pedestrian and bicycle requirements
- v Traffic generating characteristics of the proposed development
- vi Suitability of the proposed access arrangements for the site
- vii Transport impact of the development proposal on the surrounding road network.

This study has been prepared by GTA Consultants (GTA) in response to the Secretary's Environmental Assessment Requirements (SEARs) issued on 1 September 2017 (SSD 8671) for the WBACP. The construction impact of the proposed development has been addressed in a separate Construction Pedestrian and Traffic Management Plan (CPTMP) report, which was also prepared by GTA as part of this SSDA. A Green Travel Plan has also been prepared by GTA, which details the sustainable travel initiatives for the proposed development.

The operational transport requirements set out in the SEARs are detailed in Table 1.1.

Table 1.1: Transport SEARs (operation) requirements

Consent description	Relevant sections of this report
<p>Provide accurate details of the daily and peak hour vehicle, public transport, pedestrian and bicycle movements, existing traffic and transport facilities and assess the impacts of anticipated traffic generation on:</p> <ul style="list-style-type: none"> ○ The local road network and intersection capacity ○ The operation of existing and future transport networks including the metro, train, light rail, ferry, bus, cyclist and pedestrian networks ○ Planned and approved developments in the area including Barangaroo. 	Sections 5 and 7 of this report
<p>Detail the provision of vehicle (including point to point transport), pedestrian, bicycle, motor cycle, taxi, bus access and parking, integration with existing transport networks and assess the adequacy of public transport to meet the future demand of the proposed development.</p>	Section 4, 1.1, 5.3, 5.1 and 7.2 of this report
<p>Details of existing and proposed vehicular access, taxi and car parking arrangements for workers and visitors (cars, point to point transport, coaches/ buses and taxi ranks), including compliance with parking codes and the Australian Standards.</p>	Section 7 of this report
<p>Demonstrate appropriate provision, design and location of on-site bicycle parking and detail how it would be integrated with the existing bicycle network.</p>	Section 6 of this report
<p>Details of vehicle management to minimise impacts on the road network and ensure pedestrian safety.</p>	Section 5 of this report
<p>Ensure safe, sufficient and efficient access to loading, deliveries and servicing of the development.</p>	Section 6 of this report
<p>Details of sustainable travel initiatives for workers and visitors, particularly end-of-trip facilities and pedestrian and cyclist facilities located in secure, convenient and accessible areas, incorporating lighting and passive surveillance.</p>	Sections 5 of this report
<p>Proposals to encourage employees and visitors to make sustainable travel choices such as walking, cycling and using public transport, including wayfinding strategies and preparation of a Green Travel Plan.</p>	Sections 5 of this report
<p>Detail any expected improvements in public transport, pedestrian and bicycle accessibility to Walsh Bay in the near future, including the anticipated frequency of future services.</p>	Section 5 of this report
<p>Address the following policies and guidelines:</p> <ul style="list-style-type: none"> ○ Guide to Traffic Generating Developments (Roads and Maritime Services) ○ Sydney City Centre Access Strategy ○ Environment Impact Statement Guidelines - Road and Related Facilities (Department of Planning and Environment) ○ NSW Planning Guidelines for Walking and Cycling ○ Guide to Traffic Management - Part 12: Traffic Impacts of Development (AUSTRROADS). 	Referenced throughout the report and used as the basis for this assessment.

1.3 References

In preparing this report, reference has been made to the following:

- An inspection of the site and its surrounds
- *Traffic Management and Accessibility Plan* (GTA, 14 January 2015)
- *Sydney City Centre Access Strategy* (Transport for NSW [TfNSW], 19 December 2013)
- *Sustainable Sydney 2030* (City of Sydney, 2017)
- *Walsh Bay Arts Precinct Master Plan* (Arts NSW, 6 August 2013)
- City of Sydney 2012 Local Environment Plan (LEP)/ Development Control Plan (DCP)
- *Guide to Traffic Generating Developments* (Roads and Maritime Services, 2002)

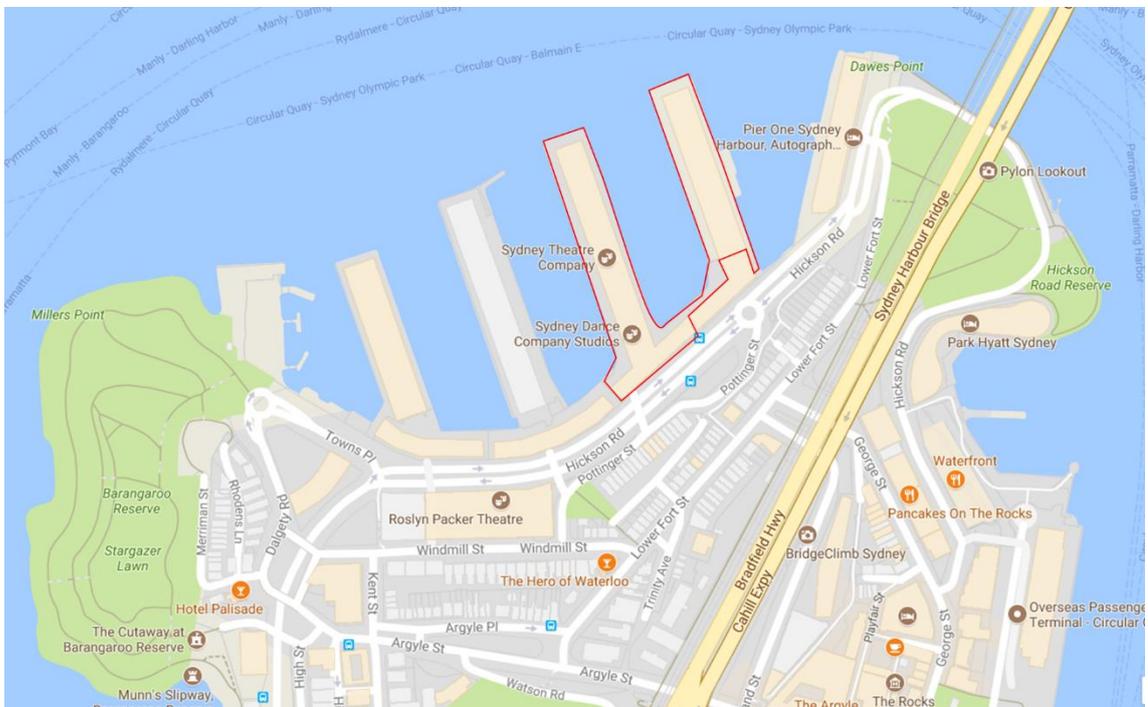
- Environment Impact Statement Guidelines - Road and Related Facilities (Department of Planning and Environment)
- NSW Planning Guidelines for Walking and Cycling
- Guide to Traffic Management - Part 12: Traffic Impacts of Development (AUSTROADS)
- Traffic and car parking surveys undertaken by Matrix as referenced in the context of this report
- Plans for the proposed development prepared by Tonkin Zulaikha Greer (TZG) Architects, drawing numbers A00.100 to 105, dated 24 August 2017
- Other documents and data as referenced in this report.

2. Existing Conditions

The Walsh Bay Arts and Cultural Precinct (WBACP, referred to as the site) generally comprises Pier 2/3, Pier 4/5 and its shore sheds (Wharf 4/5). The site has a street frontage to Hickson Road, as shown in Figure 2.1 and Figure 2.2. The site is part of the Walsh Bay area, which is located adjacent to Sydney Harbour within the suburb of Dawes Point. The site is located within the City of Sydney Local Government Area.

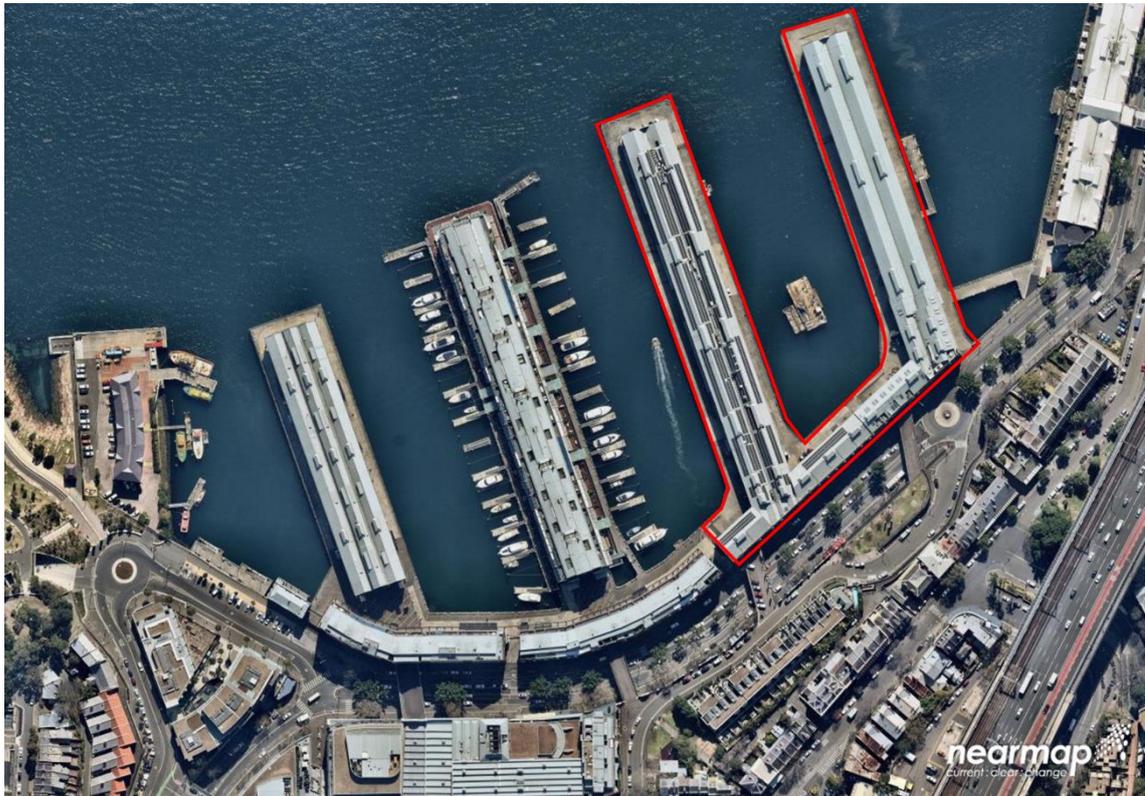
Walsh Bay is located to the north of Sydney’s CBD near major tourist destinations including the Sydney Harbour Bridge, the historic areas of Millers Point and The Rocks, Circular Quay and the Sydney Opera House. The Barangaroo redevelopment precinct is located immediately to the south-west of the site.

Figure 2.1: Site location



Source: Google Maps

Figure 2.2: Aerial view



Source: Nearmap

Pier 2/3 is officially described as Lot 11 in DP 1138931 and Wharf 4/5 is officially described as Lot 65 in DP 1048377. The total area for these lots is 18,090 square metres.

The land owner of the site is the Roads and Maritime Services (Roads and Maritime). Both Pier 2/3 and Wharf 4/5 are occupied under various lease arrangements with Arts NSW, Department of Justice, primarily for arts and cultural uses.

Walsh Bay comprises 10 berths constructed between 1908 and 1922 for international and interstate shipping. These are collectively known as the Walsh Bay Wharves. The Walsh Bay Wharves Precinct is listed as an item on the State Heritage Register.

The Walsh Bay Wharves comprise the following:

- Pier One which contains the Sebel Pier One Sydney Hotel
- Pier 2/3 the last remaining undeveloped pier (it has previously received approval for cultural uses, temporary arts events and some commercial events)
- Wharf 4/5 which is occupied by the Sydney Theatre Company (STC), ATYP, SDC, Bangarra Dance Theatre and the choirs comprising Gondwana, the Song Company and Sydney Philharmonia
- Pier 6/7 which has been redeveloped for residential apartments and associated marina
- Pier 8/9 which has been redeveloped for office uses
- Shore sheds aligning Hickson Road which contain a range of commercial activities, including restaurants, bars, shops and offices.

2.1 Road Network

2.1.1 Adjoining Roads

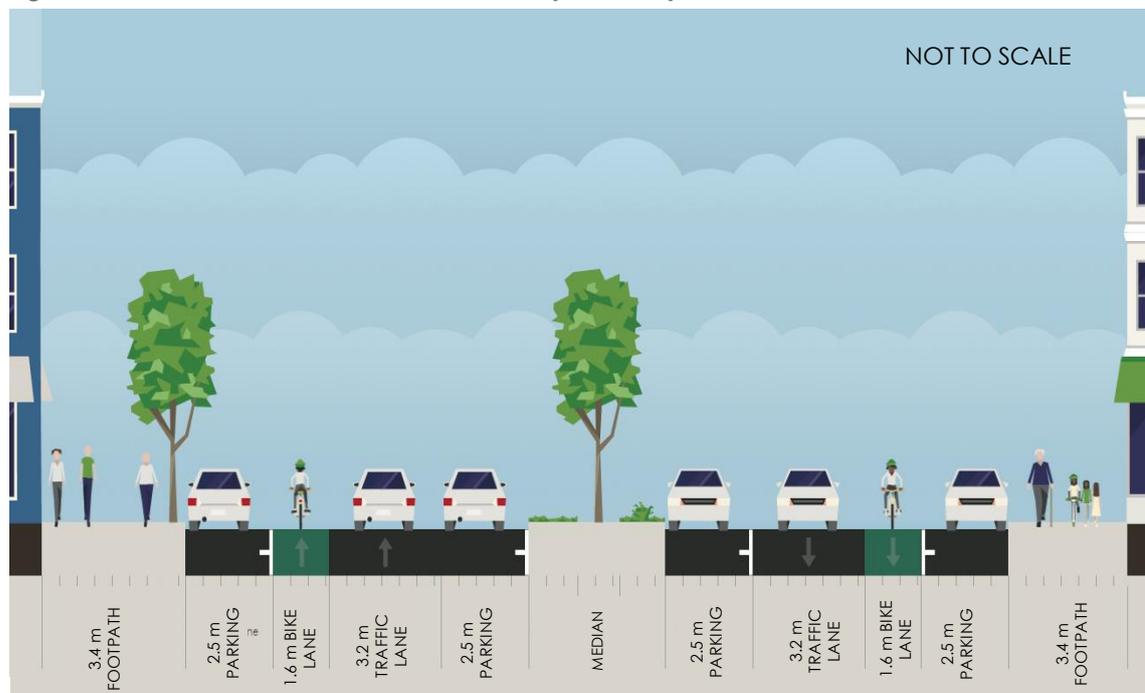
Hickson Road

Hickson Road is designated as a regional route (7312) and is classified to its intersection with Lower Fort Street adjacent to Pier 1. Hickson Road carries approximately 6,500 vehicles per day¹.

Hickson Road is closed between Pottinger Street and Alfred Street (adjacent to Circular Quay) between 10pm and 3am on Friday and Saturday, with local access only for residents within The Rocks and Dawes Point.

Near the site, Hickson Road is a dual carriageway road with a central median and three lanes in each direction. There are parking lanes either side of a single traffic lane. From boundary to boundary, there is a corridor of approximately 31 metres. The indicative configuration of Hickson Road is shown in Figure 2.3.

Figure 2.3: Hickson Road cross section near site (indicative)



Source: <http://streetmix.net/-/419497>, accessed 31 August 2016

There are varying parking restrictions along Hickson Road, and these have been fully recorded in a parking survey attached in Appendix C.

2.1.2 Surrounding Intersections

The following intersections are the major intersections near the precinct:

- Hickson Road and Pottinger Street (roundabout)
- Hickson Road and Lower Fort Street (unsignalised)
- Hickson Road and Towns Place (unsignalised).

¹ Based on 24-hour surveys undertaken for the week of 27 August to 2 September 2016.

2.2 Transport Volumes and Data Collection

GTA commissioned a range of traffic movement surveys on Hickson Road near the site on during the week beginning 22 August 2016.

The following survey data was collected:

- i An automatic tube count, which recorded traffic volumes for seven consecutive days adjacent to Pier 4 commencing 27 August 2016.
- ii An hourly parking occupancy survey was undertaken on Hickson Road between 10am and 9pm on Saturday 27 August 2016 and Wednesday 31 August 2016 between the extents of Hickson Road where there is dual carriageway (approximately between Pier 1 and Pier 9). Results of the parking occupancy survey are presented Section 2.3.
- iii The usage of the two vehicular accesses to the Wharf 4/5 loading dock (on Hickson Road and the overpass bridge from Pottinger Street) was counted from 7am to 10am on Wednesday 31 August 2016.
- iv Pedestrian access to the Pier 2/3 and Wharf 4/5 site was monitored on Friday 25 August 2017 between 5:30pm and 9pm, as well as Saturday 2 September 2017 between 6:30pm and 9:30pm.

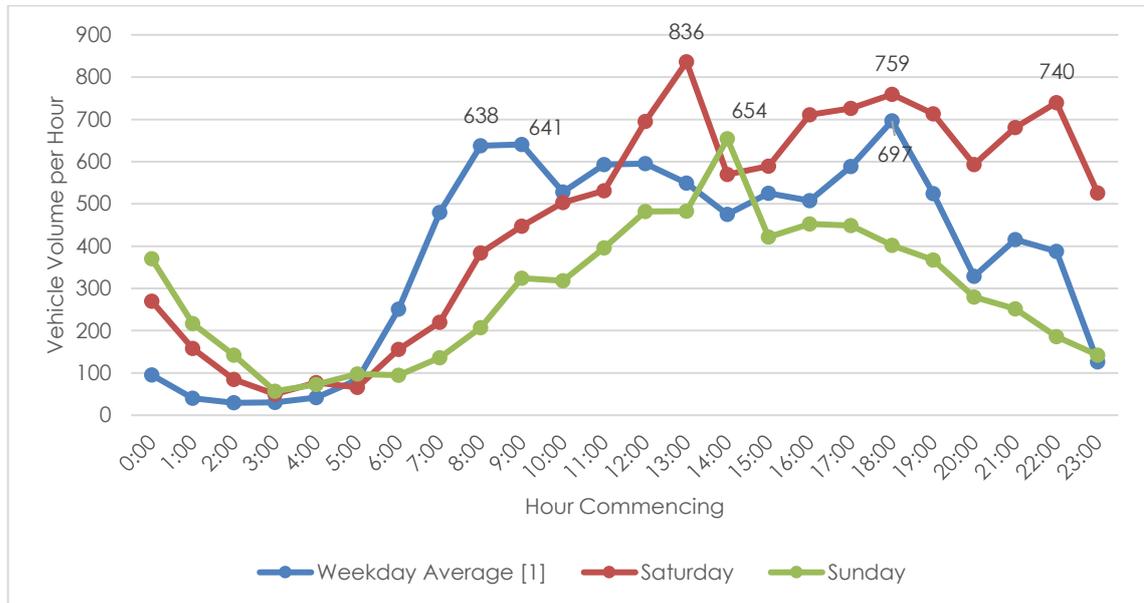
It is noted that components of items iii and iv are specific to the STC tenancy, but given the site makes up part of the broader precinct, it is considered appropriate to report on its traffic generation.

On the Saturday survey period, pedestrian activity was also surveyed for the Roslyn Packer Theatre to obtain an appreciation of the pedestrian movements for the wider precinct to enable an assessment of the cumulative impact of pedestrian movements within the surrounding area. It is to be noted, that survey was not conducted at the Roslyn Packer Theatre on Friday, since there was no scheduled event on that day.

2.2.1 Traffic Volumes

The results of the seven-day automatic tube count survey are summarised in Figure 2.4, with full results contained in Appendix A. Figure 2.4 presents two-way vehicle movement data on Hickson Road, adjacent to Wharf 4/5. The result indicates a road peak period of 8am to 10am and 6pm to 7pm on weekdays and 1pm to 3pm on a weekend. Peak vehicle volumes were observed on the Saturday with a peak of 836 vehicle movements per hour along Hickson Road at 1pm.

Figure 2.4: Existing traffic volumes by hour

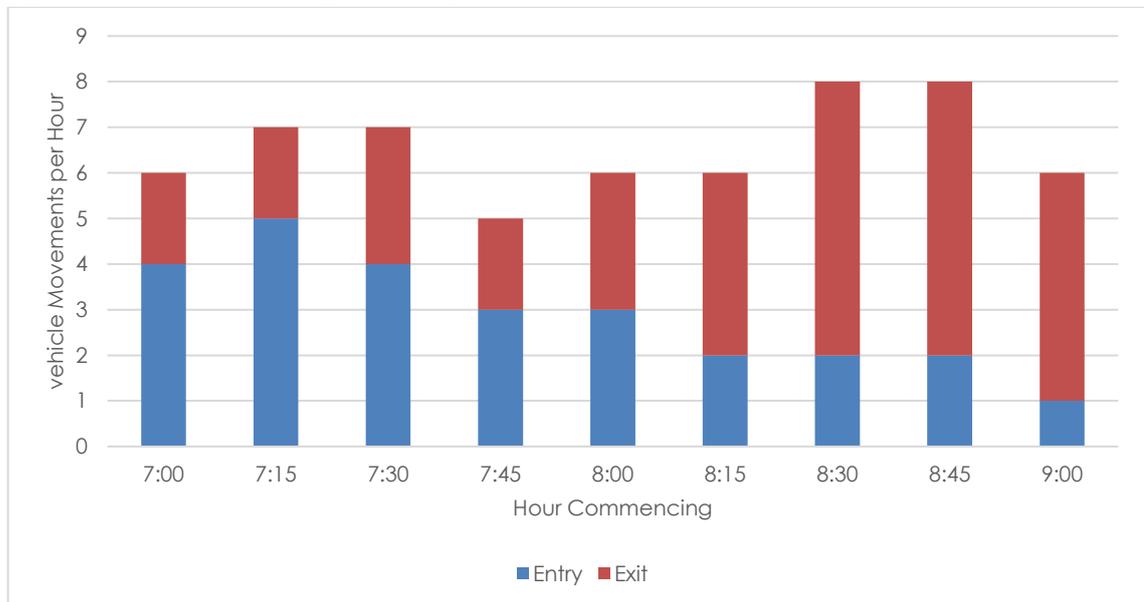


[1] The weekday average includes only days Monday to Wednesday due to data errors present on the Thursday and Friday.

2.2.2 Vehicular Access to Wharf 4/5 Loading Area

The results of the vehicle entry and exit counts into the Wharf 4/5 loading areas from Hickson Road and the Pottinger Street overpass are summarised in Figure 2.5, with full results provided in Appendix B.

Figure 2.5: Wharf 4/5 loading dock entry/ exit movements



2.2.3 Pedestrian Volumes

As noted, pedestrian movements were recorded on Saturday 2 September 2017 between 6:30pm and 9:30pm and Friday 25 August 2017 between 5:30pm and 9:00pm.

During the three-hour period on the Saturday, a total of 504 pedestrian movements were recorded into and out of Wharf 4/5, similarly a total of 101 and 723 pedestrian movements were

recorded into and out of Pier 2/3 and Roslyn Packer Theatre, respectively. The peak period at Wharf 4/5 and Pier 2/3 was recorded between 7pm and 8pm with 328 and 35 total movements per hour, respectively. Broader to the subject precinct, the Roslyn Packer Theatre was observed to have a peak period between 6:30pm and 7pm with 313 total movements.

During the 3.5-hour period on the Friday, a total of 892 and 537 pedestrian movements were recorded in and out of Wharf 4/5 and Pier 2/3, respectively. The peak pedestrian movements at Wharf 4/5 was observed to occur between 7:15pm and 8:15pm, with 304 pedestrian movements per hour. The peak pedestrian movements for Pier 2/3 were observed to occur between 7:30pm and 8:30pm, with 230 pedestrian movements per hour.

The survey results indicate that the peak usage is on a Saturday evening.

A summary diagram of pedestrian movements on Friday is shown in Figure 2.6 and Figure 2.7, and for Saturday is shown in Figure 2.8 and Figure 2.9.

Figure 2.6: Friday rolling hourly pedestrian observations at Wharf 4/5

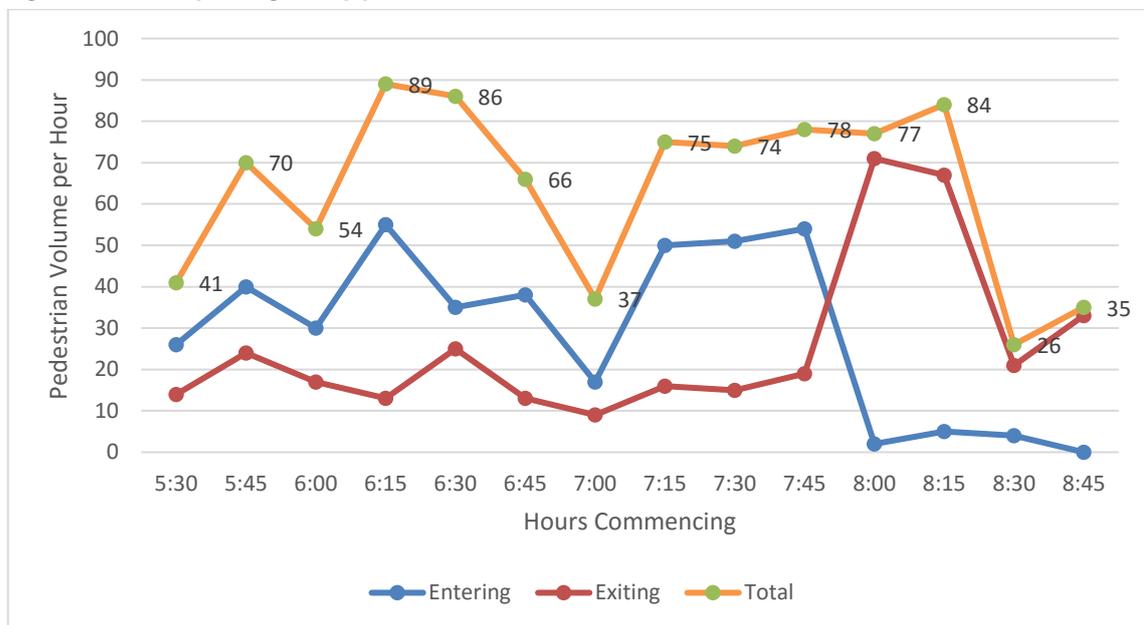


Figure 2.7: Friday rolling hourly pedestrian observations at Pier 2/3

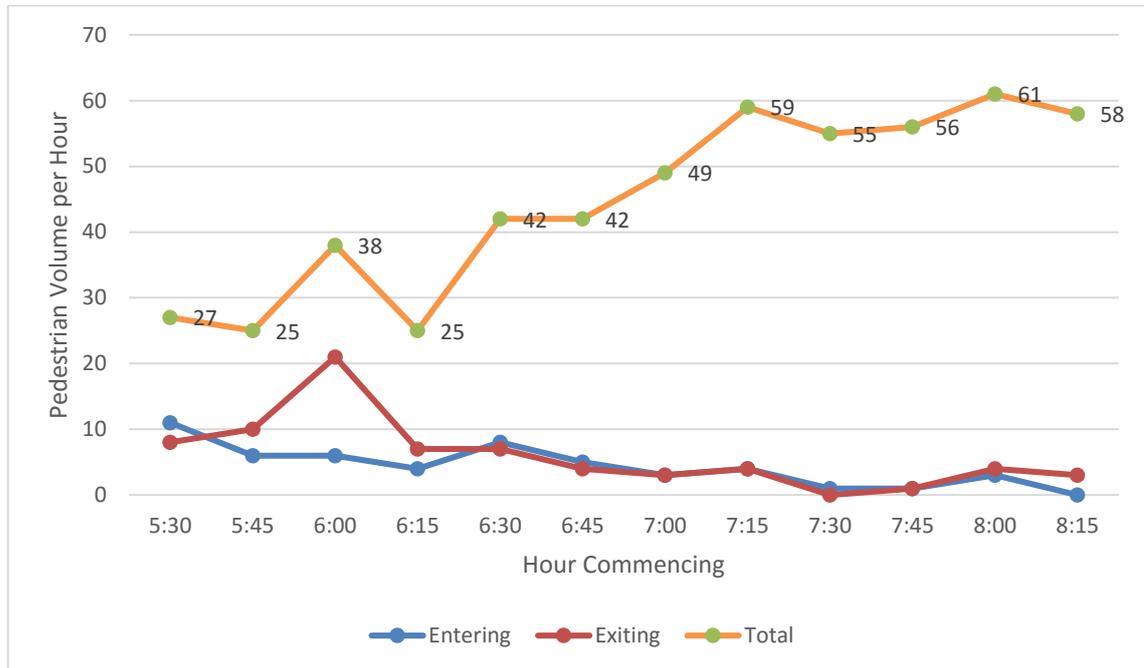


Figure 2.8: Saturday rolling hourly pedestrian observations at Wharf 4/5

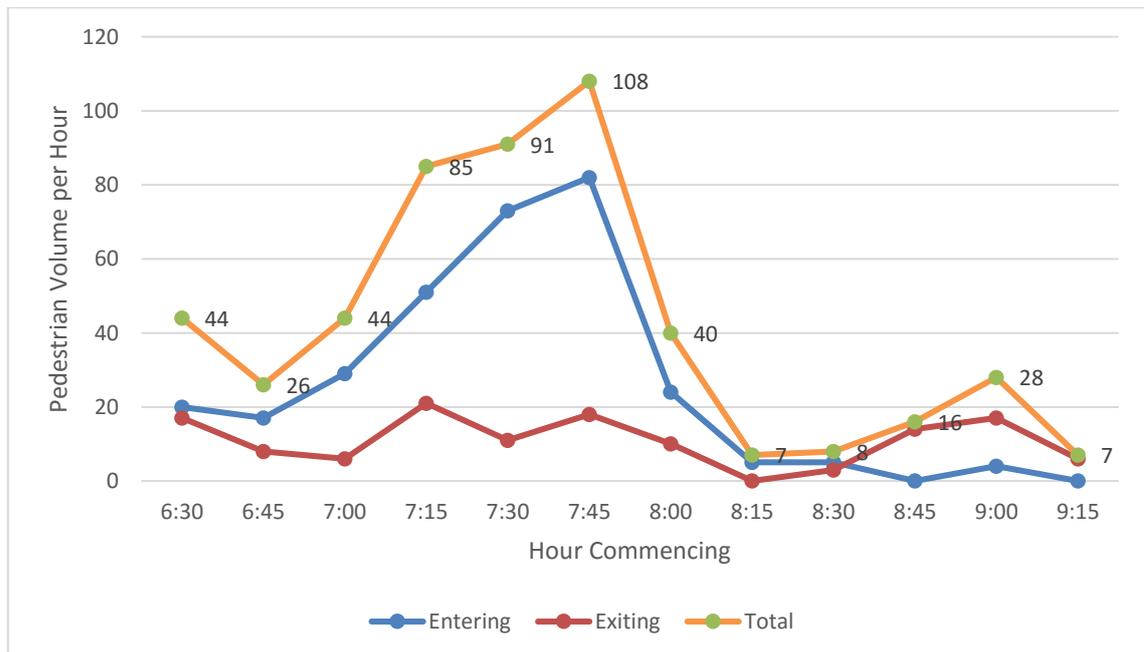
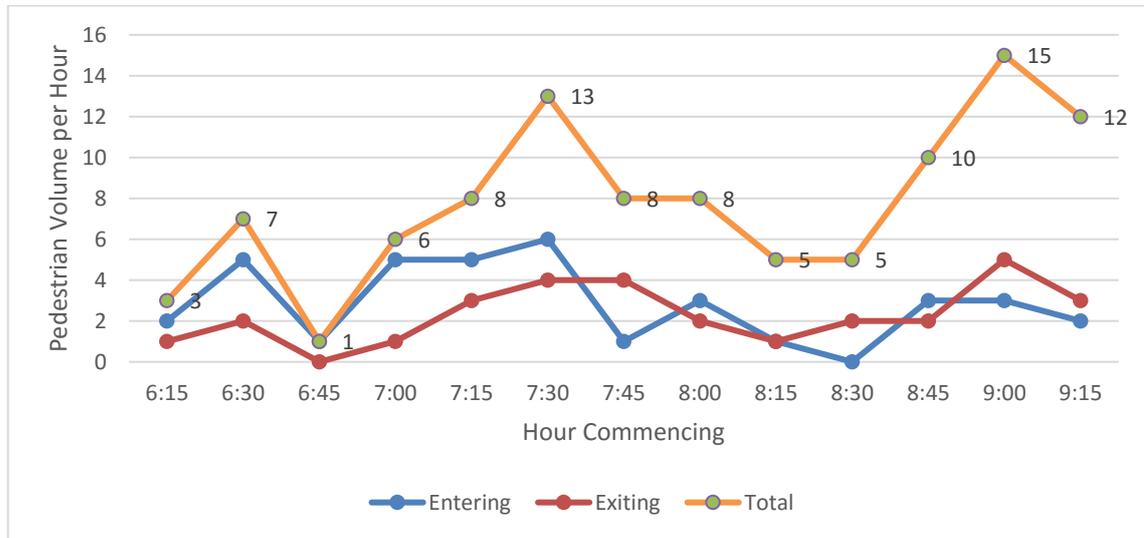


Figure 2.9: Saturday rolling hourly pedestrian observations at Pier 2/3



2.3 Car Parking

2.3.1 Supply

GTA commissioned parking demand surveys (and subsequently obtained overall supply numbers) which compiled an inventory of publicly available on-street and off-street car parking within approximately 250 metres east and west of the subject site.

Where surveys were undertaken, Hickson Road is somewhat atypical with its street configuration, with three lanes in each direction, with a parking lane either side of a traffic lane. This substantially increases the parking availability compared to more typical road layouts.

The inventory identified a total of 227 on-street spaces (233 on Wednesday) distributed as follows:

- Northbound lane kerbside – 52 spaces
- Southbound lane kerbside – 30 spaces
- Northbound lane median – 75 spaces
- Southbound land median – 70 spaces (76 on Wednesday).

A parking study was commissioned along Hickson Road between 10am and 9pm on Saturday 27 August 2016 and between 10am and 9pm on Wednesday 31 August 2016. A total of 227 on-street spaces was counted between Towns Place and Pier 1 where there is parking in the median and on the outside kerb.

Immediately adjacent to the site, there is primarily the presence of service vehicle parking, with extensive loading zones and taxi zones. Opposite the site (noting the presence of the 'inside' parking lanes), parking generally varies between two and four-hour paid parking.

The full inventory is presented in Appendix C of this report.

2.3.2 Demand

Parking demand surveys were commissioned by GTA within the nominated area during the following periods:

- An hourly parking occupancy survey was undertaken on Hickson Road Saturday 27 August 2016 and between 10am and 9pm on Wednesday 31 August 2016 along the

extent of Hickson Road where there is dual carriageway (approximately between Pier 1 and Pier 9).

The results of the parking occupancy survey are summarised in Figure 2.10 and Figure 2.11, with full results provided in Appendix C.

As a general comment, parking occupancy gradually rose throughout the day to a peak of 79 per cent and 60 per cent in the Saturday and Wednesday mid-afternoon respectively before declining. There was a large influx of demand in the evening (8pm) of near 90 per cent on the Saturday and up to 76 per cent on the Wednesday.

The peak in the evening parking survey corresponds with the evening peak of pedestrian movements, which coincides with the peak periods for STC's performances.

Figure 2.10: Hourly parking demand

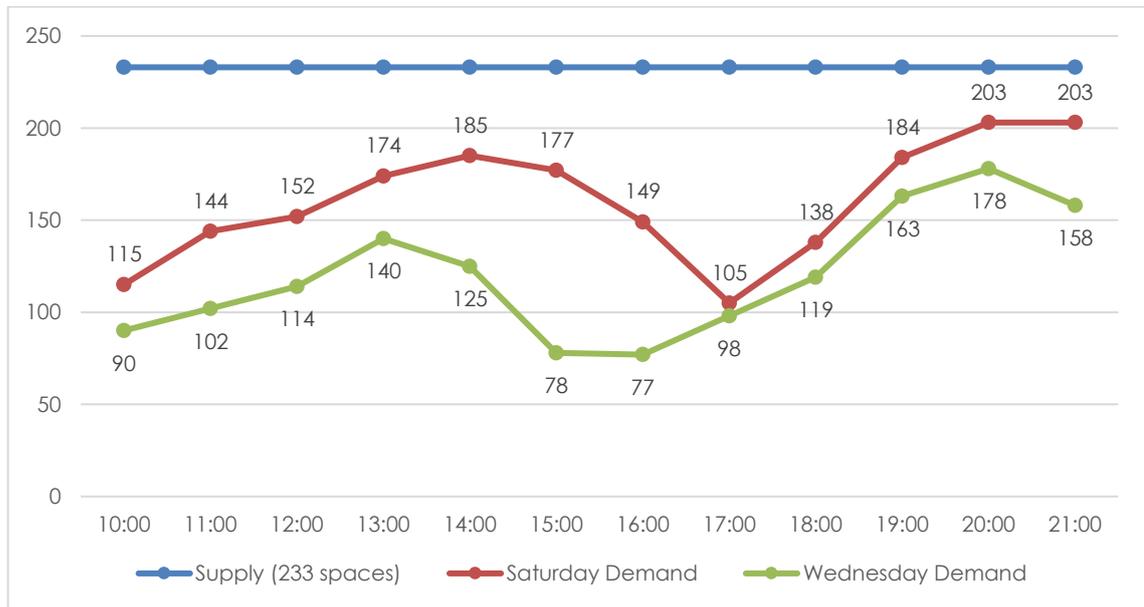
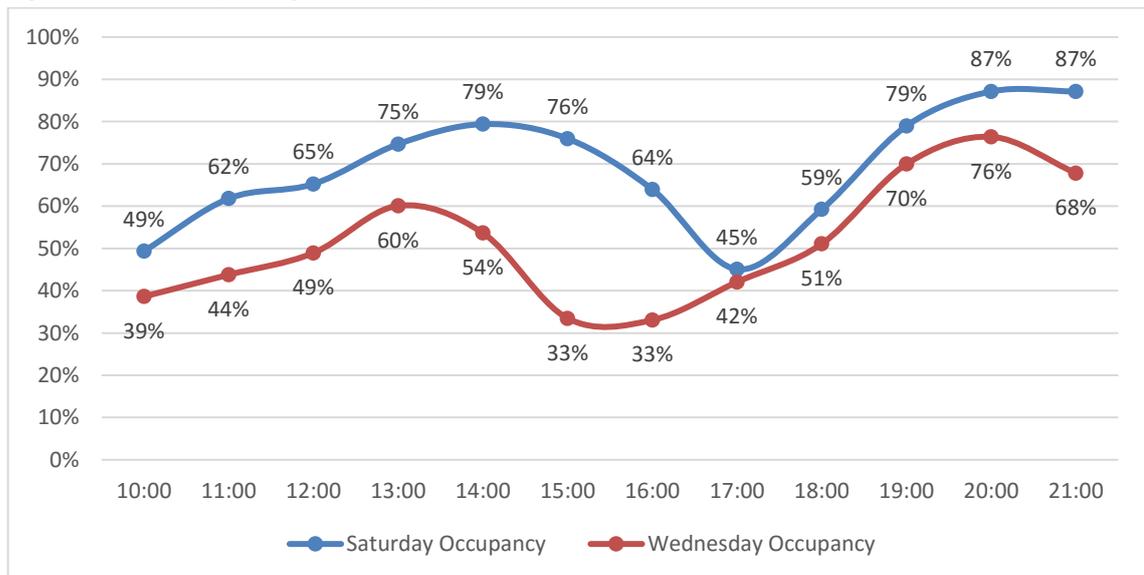


Figure 2.11: Hourly parking occupancy



2.3.3 Commercial Car Parks

Currently three existing commercial car parks exist near the site, including:

- Barangaroo Point car park, accessed from Hickson Road south of Pier 8
- Barangaroo Reserve car park, located under the Headland Park at Towns Place
- Bond Store One car park, adjacent to the Roslyn Packer Theatre.

All three car parks are located along Hickson Road within 200 metres of the WBACP.

Most notably, the Bond Store One building is located across the road from Wharf 4/5, which contains 175 car parking spaces and provides 10 per cent discount to STC patrons on weekdays after 5pm and on weekends.

A parking occupancy spot check was undertaken by GTA on Saturday 22 October 2016 between 8:00pm and 8:30pm, of the above car parks. The results of the occupancy survey are detailed in Table 2.1.

Table 2.1: Commercial car park occupancy (Saturday 8:00pm to 8:30pm)

Car park	Supply	Spaces occupied	Occupancy
Barangaroo Point car park	217	43	20%
Barangaroo Reserve car park	300	41	14%
Bond Store One car park	175	165	94%
Total	692	249	36%

As indicated in Table 2.1, the overall demand for parking in the surrounding area is low relative to supply, on a typical Saturday evening.

Notably, the Bond Store One car park had a high parking demand of 94 per cent of parking spaces occupied. This demand was generated by the adjacent Roslyn Packer Theatre where an event was being held at the time of the survey. The results record a typical Saturday evening as events at the Roslyn Packer Theatre is a regular occurrence.

2.4 Transport Studies

There are some key transport studies that inform the future planning of the transport network for Sydney. The following documents have specific influence on how people currently travel and will be likely to travel to the WBACP in the future:

- *Sydney Centre Access Strategy* (TfNSW, December 2013)
- *Sydney's Bus Future* (TfNSW, December 2013)
- *Sydney's Cycling Future* (TfNSW, December 2013)
- *Sydney's Walking Future* (TfNSW, December 2013).

A summary of these documents is provided in this subsection.

The *Sydney City Centre Access Strategy* (TfNSW, December 2013) outlines transport principles for the Sydney CBD area over the coming years, including the redesign of transport networks following the commencement of the light rail construction in October 2015.

The access strategy considers all transport modes and their networks. The integrated transport system aims to:

- Make interchange between modes easier
- Improve reliability of surface public transport (buses, light rail and taxis)
- Improve safety for all users
- Reduce conflict between modes.

Key features of the access strategy that are relevant to the WBACP include:

- Improved pedestrian connections throughout the Sydney CBD, including the opening of Wynyard Walk in September 2016
- A new ferry wharf at Barangaroo, which was recently commissioned
- New interchange precincts at various locations, including Wynyard and Circular Quay
- Light rail on George Street between Central and Circular Quay
- A new railway line and train stations for the city centre.

These features would contribute to improved access to the WBACP. Additionally, the access strategy identifies Hickson Road as a key bus corridor, which would service the WBACP in the future.

Sydney's Bus Future (TfNSW, December 2013) reviewed the existing bus network and identified ways to deliver simpler, faster and better bus services within Sydney. This plan identified strategic bus corridors for Sydney, including a corridor along Hickson Road. The implementation of strategic bus corridors involves provision of more direct routes and rationalised stops to make it easier for passengers to understand the bus network.

Sydney's Cycling Future (TfNSW, December 2013) provides a plan for implementing cycling facilities within Sydney. This plan identifies strategic cycleways within the Sydney CBD, including a connection between the existing strategic cycleways and Barangaroo, which is located immediately south-west of the site.

Sydney's Walking Future (TfNSW, December 2013) provides a plan for promoting walking within Sydney. The following projects support this plan:

- The Sydney Harbour foreshore walk was improved with the creation of Headland Park in Barangaroo, which provides a link from the Botanic Gardens to the Anzac Bridge.
- Wynyard Walk was under construction at the time this plan was released and has subsequently opened. This link is a key connection for the pedestrian network within the Sydney CBD.

2.5 Public Transport

A review of the public transport available near the site is summarised in Table 2.2. Public transport to the site was altered as a consequence of the rerouting of buses in the Sydney CBD following the commencement of the construction of the CBD light rail in October 2015. The following is a summary of existing public transport, noting that substantial changes will occur in the coming years.

Table 2.2: Public transport provision

Service	Route number	Route description	Location of stop	Distance to nearest stop	Frequency on/ off peak
Bus	324, 325	Watsons Bay to Walsh Bay (different routes)	Hickson Rd opposite Wharf Theatres (2000130)	20 metres	10-15 mins/ 15-30 mins
Bus	311	Railway Square to Millers Point via Woolloomooloo	Barangaroo Reserve, Hickson Road (2000439)	250 metres	15 mins/ 30-45 mins
Train	T1 (Wynyard Only), T2, T3	Services to Hornsby, Richmond and Penrith (Wynyard Only), as well as Liverpool, Lidcombe via Bankstown, and Campbelltown via Clyde or East Hills	Circular Quay/ Wynyard	1.5 kilometres	2 mins (combined)/ 10 mins (combined)
Ferry	All	All	Circular Quay	1.5 kilometres	

The nearest bus stop to the site providing services to all bus routes passing the site is the Hickson Road opposite Barangaroo Reserve (#2000439) stop. Figure 2.12 and Figure 2.13 illustrates the extent of regional access from the subject bus stop (without interchanges).

Figure 2.12: Sydney Buses region guide

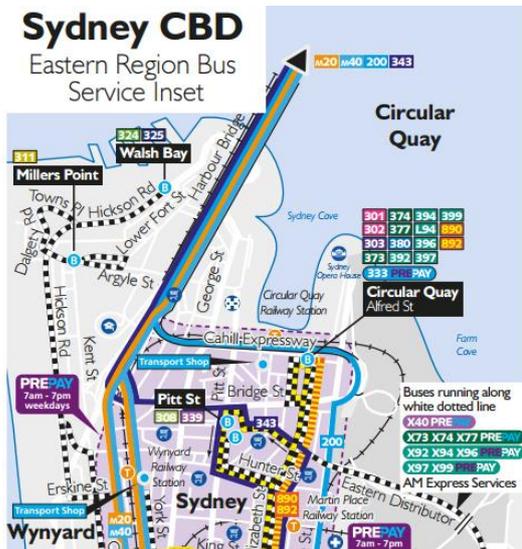


Figure 2.13: Bus access from stop #2000439 near site

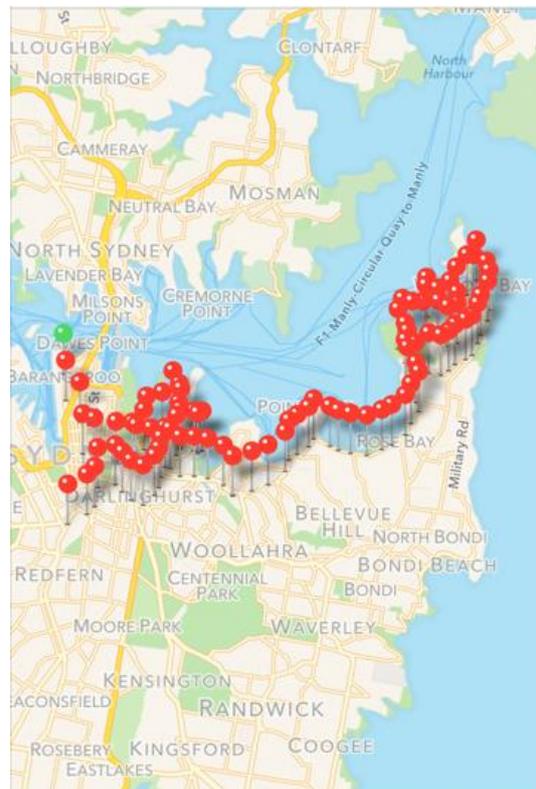


Figure 2.12 source: http://www.sydneybuses.info/routes/15326_STA_region_web_map_east_20160801.pdf, accessed 6 September 2017

Figure 2.13 source: iOS Tripview app, accessed 6 September 2017

2.6 Pedestrian and Cyclist Infrastructure

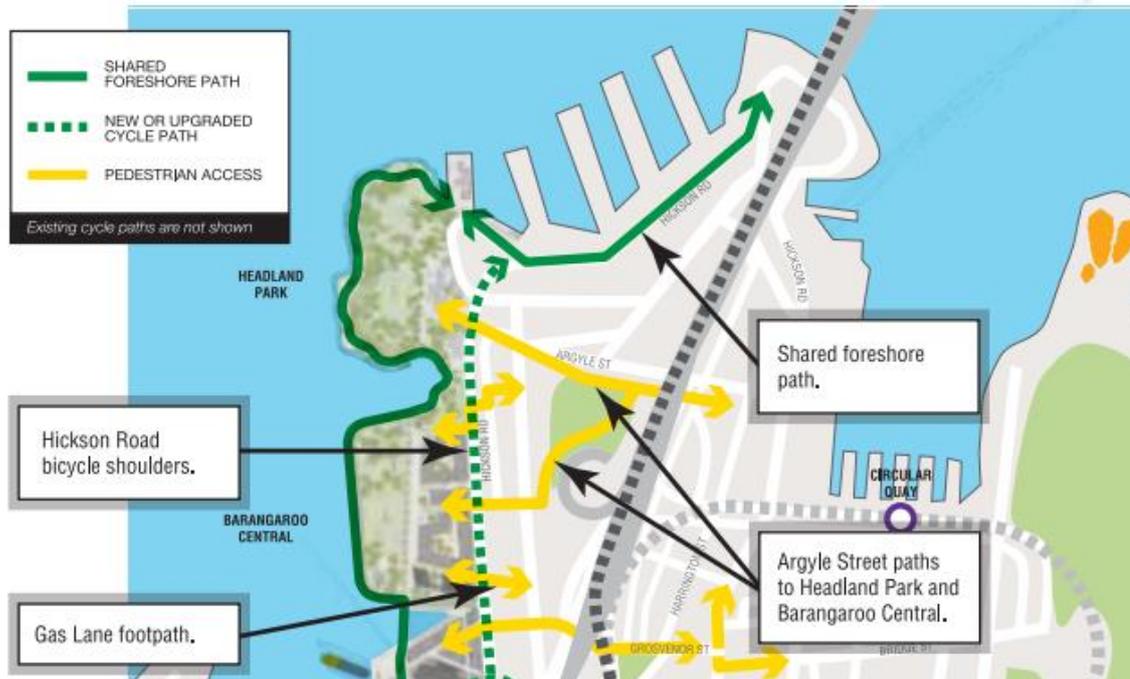
As a result of the isolated nature of the site from the city centre and significant grade changes, topographically, the WBACP is currently somewhat difficult to navigate and access by foot. Improved wayfinding and repeater signage from key nodes surrounding the site is essential for encouraging pedestrian access to the WBACP. It is envisaged that the majority of walking trips to the site will be from the CBD and the Wynyard and Circular Quay transport hubs. In this regard, the primary pedestrian links to and from the site will be via George Street towards the core of the CBD and Circular Quay and Hickson Road towards Barangaroo and Wynyard Walk (providing access to the railway station). An alternative route is also available via Observatory Hill.

George Street between Lower Fort Street and Circular Quay forms a pedestrian friendly environment, with low vehicle speeds and relatively generous footpath widths. The pedestrian route from the end of George Street to the site itself is somewhat circuitous and includes a number of sets of stairs (i.e. non-Disability Discrimination Act [DDA] compliant) as the path negotiates the significant grade difference between Hickson Road and the areas further inland.

The Barangaroo Integrated Transport Plan outlines an objective of high levels of public transport use, high walking and cycling mode share and low levels of private vehicle usage. In terms of walking actions, upgrades and widening improvement works are outlined for Margaret Street,

Gas Lane, Argyle Street, Napoleon Street and Erskine Street. Potential improvement works highlighted in the plan are shown in Figure 2.14.

Figure 2.14: Cycling and pedestrian upgrades

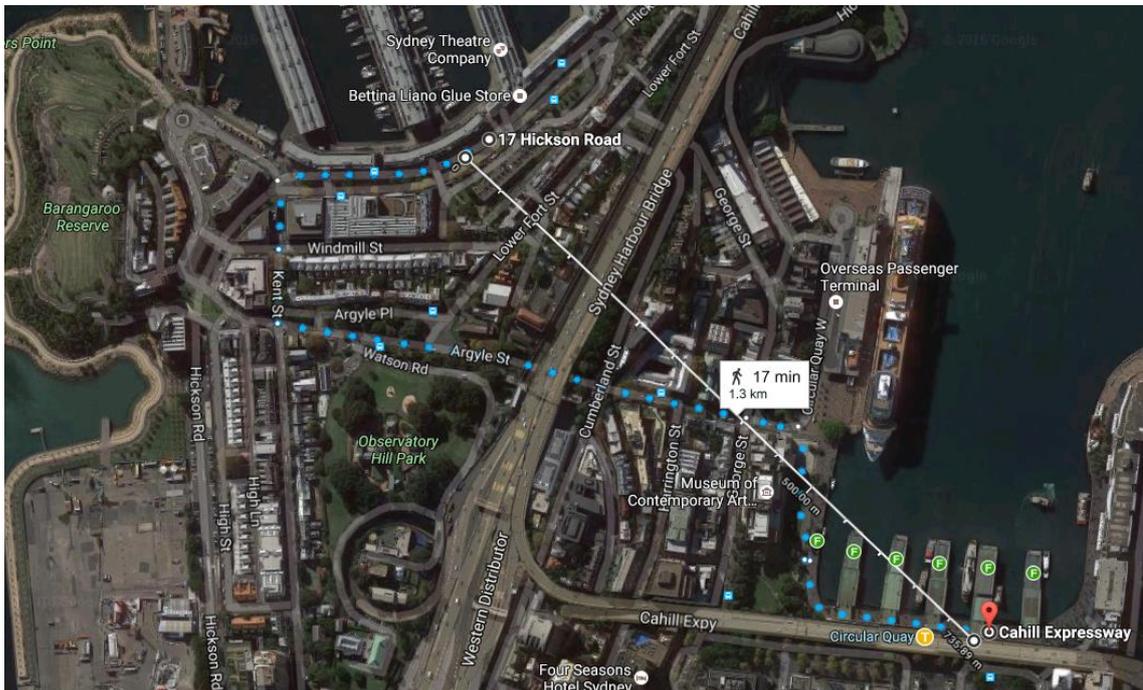


Source: Barangaroo Integrated Transport Plan, pg. 23

The current pedestrian route south along Hickson Road towards Wynyard station is not an ideal pedestrian environment; however, the north-south section of Hickson Road will be upgraded to form a more pedestrian friendly environment as part of the works associated with the Barangaroo development.

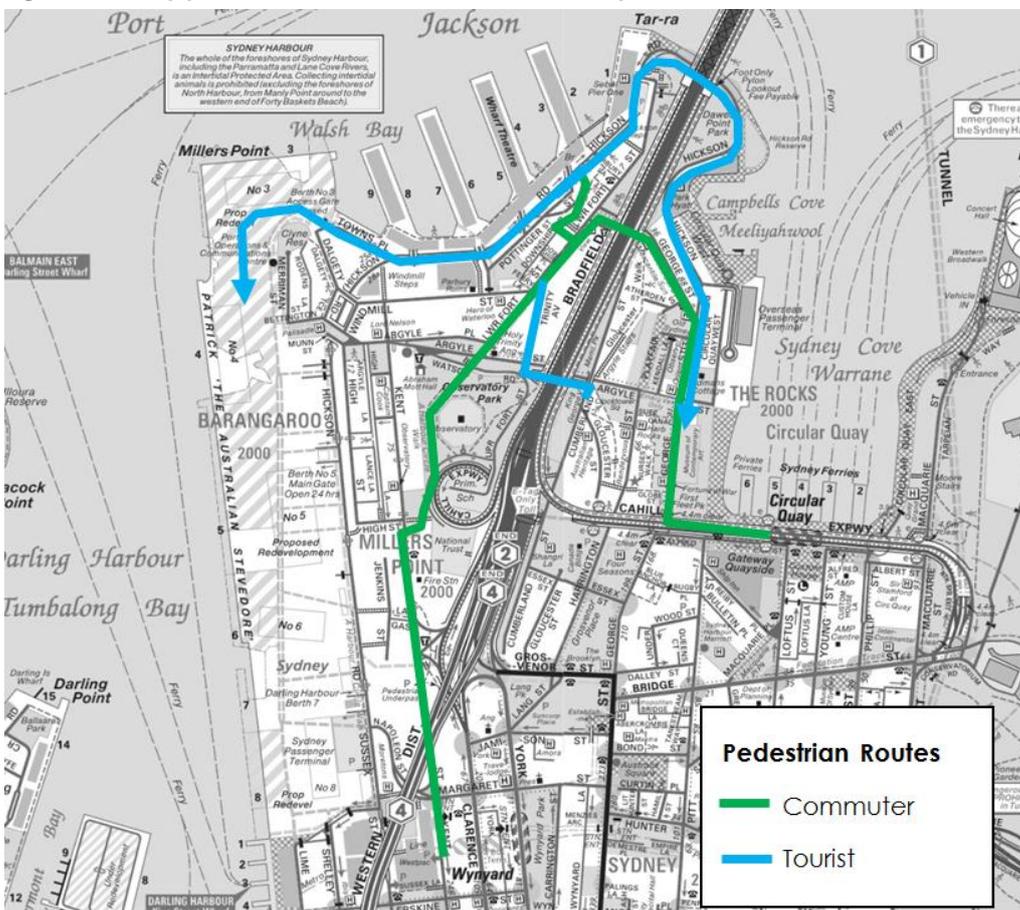
As a general overarching comment, pedestrian paths are provided on all streets surrounding the site. There remain some challenges in providing direct links to various points of interest. For example, as the crow flies, Wharf 4/5 is 700 metres from Circular Quay. However, when a walking network distance is considered, it increases to approximately 1.3 kilometres, which is indicative of a substantial distance penalty (Figure 2.15).

Figure 2.15: Pedestrian detour



Source: [Google Maps](https://www.google.com/maps), accessed 06 September 2017

Figure 2.16: Key pedestrian routes to and from Walsh Bay



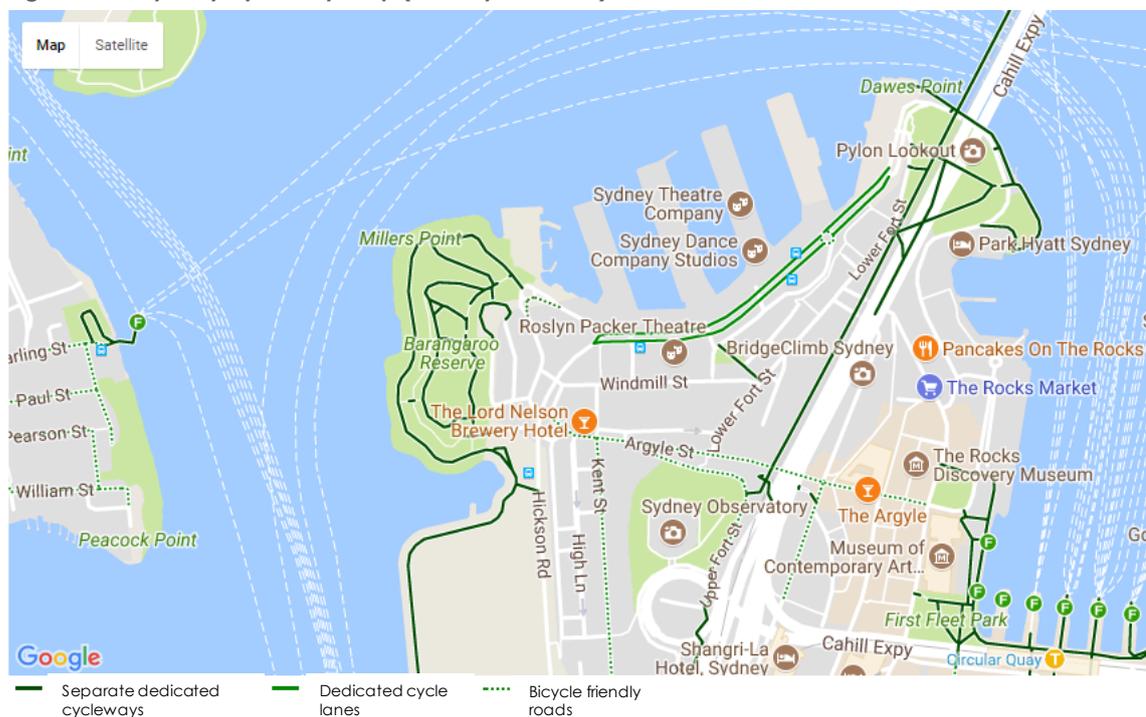
Source: Modified from Sydway

Notwithstanding the directness of pedestrian infrastructure, the Dawes Point region (the northern area bound between WBACP and the Cahill Expressway) has a number of zebra crossings to facilitate the safe movement of pedestrians across the road corridor. Such safe crossing points near the site include the following pedestrian crossings:

- Zebra crossing across Hickson Road adjacent to Pier 7
- An unmarked crossing point immediately adjacent to the site
- Zebra crossings across Hickson Road and Pottinger Street at the roundabout to the east of the site.

On-street cycle lanes are provided on both sides of Hickson Road as indicated in the Sydney cycleway map. The relevant area in the Sydney cycleway map is shown in Figure 2.17.

Figure 2.17: Sydney cycleway map (not fully inclusive)



Source: <http://www.sydneycycleways.net/map/>, accessed 14 September 2017

A walk score is provided by [walkscore.com](https://www.walkscore.com/) (<https://www.walkscore.com/>). Whilst there is no official recognition of the walk score and transit score by any transportation authority, the score gives insight into how accessible an area is for people travelling without a car. The score lies on a scale between zero and 100. The site gives the following description on what each score means:

Table 2.3: Walk score

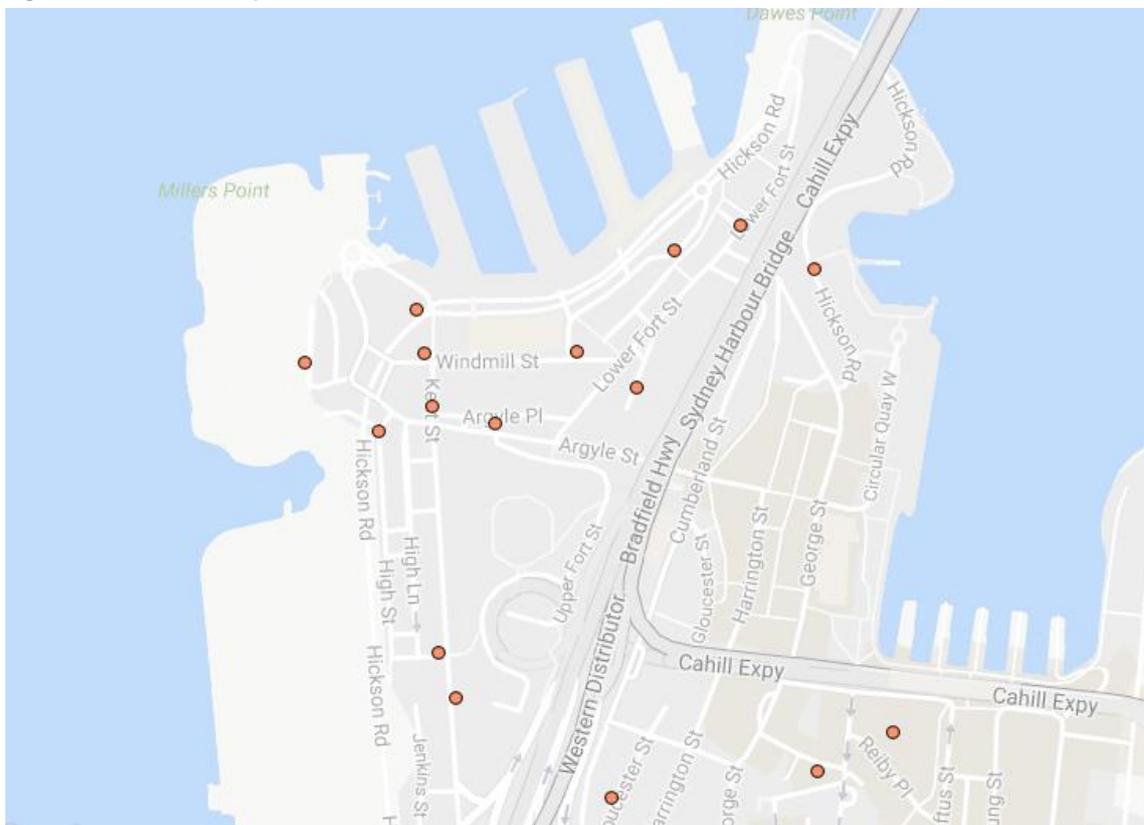
Score	Walk score meaning
90 – 100	Walker's Paradise Daily errands do not require a car
70 – 89	Very Walkable Most errands can be accomplished on foot
50 – 69	Somewhat Walkable Some errands can be accomplished on foot
25 – 49	Car-Dependent Most errands require a car
0 – 24	Car-Dependent Almost all errands require a car

Dawes Point has a designated walk score of 92 and is ranked at number 26 for the most walkable community in Sydney, and for comparative purposes, is ranked alongside suburbs such as Glebe, North Sydney and Milsons Point. Such a score is indicative that the site is well suited for residents and employees to carry out tasks either by walking or via public transportation, and is consistent with an environment which car use can be largely avoided. No bike score or transit score is provided for Dawes Point.

2.7 Local Car Sharing Initiatives

Car share initiatives such as GoGet aim to promote a reduction in private vehicle ownership. GoGet maintains a number of pods within Dawes Point. A map showing vehicle locations is shown below in Figure 2.18. It shows the presence of 16 pods within approximately one kilometre of the site, with 11 of these located north of Argyle Place.

Figure 2.18: Car share pods



Source: <http://www.cityofsydney.nsw.gov.au/live/residents/car-sharing>, accessed 27 September 2017

2.7.1 Existing Transport Use

The 2011 Census Journey to Work (JTW) data generally provides the most robust picture of existing travel patterns to and from the development and Greater Sydney. The smallest geographical area for which JTW data is available is known as a travel zone (TZ).

The WBACP occupies the travel zones 6, 7, 8, 9 and 10 as shown in Figure 2.19. JTW data for this travel zone from the 2011 census was to be reviewed to understand the current mode of travel to work for people living within the zone and determine changes in travel patterns over the two periods. The result of the data is shown in Table 2.4.

Figure 2.19: Travel zone boundary



Source: <http://visual.bts.nsw.gov.au/jtwbasic/#9,6,7,8,10>, accessed 06 September 2017

Table 2.4: Census JTW data

Travel mode	2011 Census – TZ6, TZ7, TZ8 TZ9 and TZ10 (n=443 residents)	2011 Census – TZ6, TZ7, TZ8 TZ9 and TZ10 (n=2,089 workers)
Vehicle Driver	38%	30%
Walked Only	32%	5%
Bus	10%	19%
Train	8%	30%
Other Mode (Incl. Cycling)	7%	6%
Vehicle Passenger	3%	3%
Ferry/ Tram	1%	5%
Not Stated	1%	1%

Source: <http://visual.bts.nsw.gov.au/jtwbasic/#9,6,7,8,10>, accessed 06 September 2017

Table 2.4 shows that for residents of the area, there is generally a higher reliance on private vehicles than for employees of the area. For residents, there is a significantly higher proportion of people who walk to work, and for workers, there is a significantly higher proportion of people who catch the train to the area.

Employment Patterns

In travel zones 6, 7, 8, 9 and 10 as reported above, of the 443 people who lived within the area and commuted to work, 293 (66 per cent) work in the Sydney Inner City SA3. Other areas of employment are relatively small in proportional and absolute terms.

For workers within the area of the WBACP, in the 2011 census, there were 2,089 workers and these workers can be assessed by access mode and from the SA3 they commuted from. The assessment is shown below in Table 2.5 and includes SA3s with at least 80 origin trips.

Table 2.5: Commute patterns for employees of travel zones 6, 7, 8, 9 and 10

Origin SA3 (number of trips)	Vehicle driver	Bus	Train	Vehicle passenger	Walk only	Other	Ferry	Not stated
Sydney Inner City (421)	19%	18%	23%	5%	23%	11%	N/A	1%
Eastern Suburbs – North (230)	35%	21%	22%	1%	N/A	8%	11%	1%
North Sydney – Mosman (143)	24%	37%	5%	2%	9%	4%	14%	4%
Eastern Suburbs – South (107)	32%	54%	4%	N/A	N/A	10%	N/A	N/A
Strathfield – Burwood – Ashfield (97)	26%	N/A	67%	3%	N/A	4%	N/A	N/A
Leichhardt (85)	32%	43%	N/A	4%	N/A	14%	8%	N/A
Overall (2,089)	30%	19%	30%	3%	5%	6%	5%	1%

Source: <http://visual.bts.nsw.gov.au/jtwbasic/#9.6.7.8.10>, accessed 06 September 2017

The following comments can be made about the results presented in Table 2.5:

- There are 80 people who work at the area of the Walsh Bay Arts Precinct, live within the Sydney Inner City SA3 and elect to drive to work at the precinct. In contrast, 97 people walk.
- Given the proximity to Circular Quay, a five per cent overall mode share for the ferry is not unexpected, representing approximately 100 people.
- 67 per cent of people who live in the Strathfield – Burwood – Ashfield SA3 elect to commute to work at the precinct by train.
- An 'other' mode of six per cent is consistent with the cycling links provided on Kent Street and the Sydney Harbour Bridge which provides largely separated cycling access to areas such as Leichhardt and North Sydney.
- Overall, vehicle driver proportion may be higher than expected, but is significantly lower than the overall rate for Sydney. Train, bus and ferry services support a high public transport access rate to the precinct and a significant proportion of people elect to transport to work by 'other' mode (cycling).
- Where there are visitors to the site, an assumption is made that the visitors will adopt comparable mode splits as the employees of the site.

3. Development Proposal

3.1 Proposal

The proposal for development application includes:

- A series of new stairs and balconies on Pier 2/3 and Wharf 4/5 and modification to the roof of Pier 2/3
- Relocation of the plant room from waterfront Square to 'Commercial 5' tenancy
- Modification of the roof profile to account for internal space reconfigurations
- The inclusion of new tenancy spaces in Pier 2/3 and Wharf 4/5 for arts and cultural activities
- The use of the precinct for arts festivals, events and pop-ups and associated uses, including restaurants, cafes and bars.

The SSDA seeks consent for construction works for the above to realise the WBACP project, as well as the proposed external alterations and additions to all of Wharf 4/5. It also seeks consent for new commercial and event uses in the precinct. Key aspects of the proposed development are outlined below:

Early works

Early construction works include infrastructure upgrades, demolition, hazmat removal and sub structure works associated with the proposed development.

Pier 2/3

Internal alterations and reconfiguration is proposed for Pier 2/3 to provide for the following:

- Performance venues
- Rehearsal rooms, production workshops, back of house facilities and offices
- Function spaces, bars, cafes and foyer spaces extending onto external gantry platforms (balconies) providing breakout space for internal foyers and allowing views of outdoor performances
- Mezzanine spaces for offices and back of house facilities
- Upgrades to meet compliance with current Building Code of Australia (BCA), DDA and fire codes
- Creation of new commercial tenancies and public toilets
- Removal of some storey posts and beams to facilitate internal reconfiguration and new uses
- Retention of a large proportion of the ground floor in its existing 'raw' heritage state for events and festivals including Sydney Writers' Festival and Biennale including venue and commercial hire.

External alterations and additions for Pier 2/3 include:

- Raised roofs within central valley of Pier 2/3
- New balconies and external stairs for fire egress
- New external lift western side of Pier 2/3
- Installation of glazing in existing cargo sliding door openings and other solid panels on the eastern, western and northern elevations to allow for views into and out of the building

- Roof penetrations within the central valley at the southern and northern end to accommodate new performance spaces and associated structural modifications including truss strengthening
- Installation of photovoltaic panels to roof
- Raising of the external floor level on the eastern side by introducing a new raised deck and continuous set of stairs beyond the existing column line.

Wharf 4/5

The proposed works within Wharf 4/5 include:

- Internal alterations and reconfiguration to the Bangarra Dance Theatre tenancy to provide for the following:
 - Upgrade of the main rehearsal and performance spaces
 - Upgraded foyer and exhibition space along the eastern frontage
 - Improved office space at mezzanine level including a new lift
 - Provision of a function space at ground level of the northern end of wharf
 - New entrance to Bangarra Dance Theatre and new glazing in bays of sliding cargo doors, opening up the foyer and main studio to the Wharf 4 apron
 - New offices for Choirs located between Bangarra Dance Theatre and Sydney Dance Company.
- Minor internal alterations and additions to the Sydney Dance Company tenancy comprising:
 - Reducing the existing workshop space to create a fifth dance studio
 - Upgrading office and reception areas.
- External alterations and additions to Sydney Dance Company tenancy comprising:
 - Raising of the timber wharf deck adjoining the Sydney Dance Company café and opening of the façade with new glazing.
- External fabric alterations around the STC tenancy comprising:
 - Improved street entry at Hickson Road involving relocation of the stairs to allow for an improved landing and point of arrival to the STC
 - New gantry balconies, stairs and lifts mid-wharf and at the end of the wharf to provide for improved accessibility and compliance with fire engineering solutions
 - Minor amendments to the existing façade to accommodate new entries and exits along the wharf
 - Lifting the roof valley above the workshop roof to allow for flexibility in set design and above Wharf 1 theatre to improve the audience viewing experience.

Wharf 4/5 Shore Sheds

The proposed works within Wharf 4/5 Shore Sheds include:

- Relocation of choir rehearsal spaces
- Creation of new commercial tenancies at ground and mezzanine levels
- Creation of a plant and services room and switch room
- Provision of office space at ground level.

New Uses

The SSDA includes the proposal to use the pier and wharf aprons for arts festivals, events and pop ups associated with the internal use of facilities.

3.2 Population and Patronage

The proposal will consist of a mixed-use development incorporating approximately 16,500 square metres of entertainment floor space and associated facilities. The precinct is expected to support a workforce of approximately 650 staff and up to approximately 2,200 visitors on a typical day.

To estimate the expected population and patronage within the WBACP, four different scenarios are considered to assess the impact of the proposed development. The following text provides a summary of expected visitor numbers dependent on the event profile. These scenarios have been used to inform the traffic impact assessment in Section 7 of this report.

Scenario 1 – Peak Population

This scenario represents the potential for the most concurrent events to occur within tenancies within the precinct. As such, a level of concurrence will be rare, the peak populations have been normalised to account for periods without performances. This scenario does not represent a regular occurrence; rather it demonstrates the most probable upper limit of the population that would be within the tenancies at any one time.

Scenario 2 – Everyday Population

This scenario identifies the population on everyday basis expected to be present within the precinct. The scenario reflects the peak population in terms of timing for peaks and further reduce it by 50 per cent, keeping in consideration of different aspects, which contribute in attracting population to the precinct. The assumptions considered for this scenario include:

- Different event profiles within Commercial 1, where the maximum population is 1,300 for a cocktail event but only 650 for a dinner event
- Reduction in capacities for Commercial 3 and 4 (i.e. the restaurant/ bar is not full)
- Tenants that would be touring throughout the year
- Performances that may not attract capacity crowds
- A lack of concurrent performances amongst tenancies
- Differences in scheduling times and days for performances amongst the tenancies.

Scenario 3 – Cumulative

This scenario reflects the worst-case scenario, where peak scenario population will appear concurrently and all venues are at full capacity. This scenario considers the expected population from other activities in venues surrounding the WBACP, including:

- Roselyn Packer Theatre
- Event space within Pier 2/3
- Pier 1 function spaces.

It is highly unlikely that the cumulative scenario would ever occur, since it relies on almost every venue within and surrounding the precinct to be at capacity concurrently.

Scenario 4 – Event

This scenario is based on the Sydney Writer's Festival and Biennale events. These events would utilise portions of the tenancies as well as the public domain as part of a programmed event. The maximum populations have been augmented by an additional 70 per cent to allow for changeover between various events, i.e. where one event is clearing and another is queuing to enter.

Table 3.1 presents the population determined under each scenario as discussed above.

Table 3.1: Scenario summary

Scenario	Weekday population	Weekend population	Period of day
Peak	4,441	4,151	Evening (6pm-10pm)
Everyday (50% of peak)	2,221	2,076	Evening (6pm-10pm)
Cumulative	4,441 +2,506 (surrounding WBACP)	4,151 +2,506 (surrounding WBACP)	Evening (6pm-10pm)
Event	N/A	4,250	Afternoon (12pm-6pm)

3.3 Loading Areas

A new loading facility is to be provided on Pier 2/3. To maintain the heritage values of the site, the provision of a traditional recessed loading dock was not considered appropriate. As such, the provision of a loading dock contained within the existing apron was identified as the preferred loading solution.

The existing loading facility on Wharf 4/5 will continue to operate as per its existing arrangement.

The suitability of the proposed loading arrangements is discussed in Section 6 of this report.

4. Car Parking

4.1 Car Parking Requirements

The car parking provision requirements for different development types are set out within the City of Sydney's 2012 LEP, noting that the site does not strictly fall within the City of Sydney's planning control. A review of the car parking requirement rates and the floor area schedule results in a statutory parking requirement for the proposed development is summarised in Table 4.1.

Table 4.1: Statutory car parking requirements

Description	Use	Size	Statutory parking rate	Statutory parking requirement
Entertainment	Commercial uses and function centres	16,500 m ²	1 space/ 30 m ²	550 spaces (max)
Total				550 spaces (max)

Based on the above, the proposed development could provide a maximum of 550 car parking spaces, noting that this calculation does not acknowledge the administrative functions and other ancillary uses expected within the tenancies.

4.2 Adequacy of Parking Supply

Despite falling outside of the City of Sydney's planning control, the rates from the City of Sydney's LEP has been considered as part of this development proposal. The LEP outlines parking provision at a maximum of one space per 30 square metres for 'entertainment' purposes.

As the parking provision is a maximum, no parking is proposed and this is consistent with the City of Sydney's and Transport for NSW objectives for the area in promoting sustainable transport options.

Notwithstanding zero supply of car parking, it is expected that the site will still have some private vehicle traffic demand. In the previously commissioned Traffic Management and Accessibility² report, GTA estimated that such demand might be expected to be 84 spaces on a typical weekday and 68 spaces on a typical Saturday.

With consideration of the surrounding existing on-street and off-street supply (approximately 690 spaces), the demand is modest and able to be accommodated.

In the short term after the development, if there is a parking supply shortfall, then drivers will notice that parking is in short supply and in the medium-to-long term, this will likely support mode shift to other transport modes.

It might be considered appropriate that some provision of disabled parking is provided on Hickson Road to support precinct access for less mobile individuals. Any disabled parking provision would be designed in accordance with Australian Standards.

4.3 Vehicle Access

Vehicle access to the precinct at Hickson Road level would be altered such that service vehicles access via the perimeter only during typical operation (see Figure 4.1), with up to 8.8-metre

² GTA Consultants, *Traffic Management and Accessibility Report*, 23 June 2014

Medium Rigid Vehicles (MRV) able to access Pier 2 and 6.4-metre Small Rigid Vehicles (SRV) able to access Wharf 5. Vehicle size restrictions are largely determined by the available manoeuvring area at the northern end for vehicles to be able to enter/ exit in a forward direction. Occasional access to allow vehicles to enter in front of the Shore Shed and to the inside aprons of Pier 2/3 and Wharf 4 for maintenance and/ or approved bump-in/ bump-out activities would be permitted (see Figure 4.2).

Figure 4.1: Service vehicle access summary – typical operation

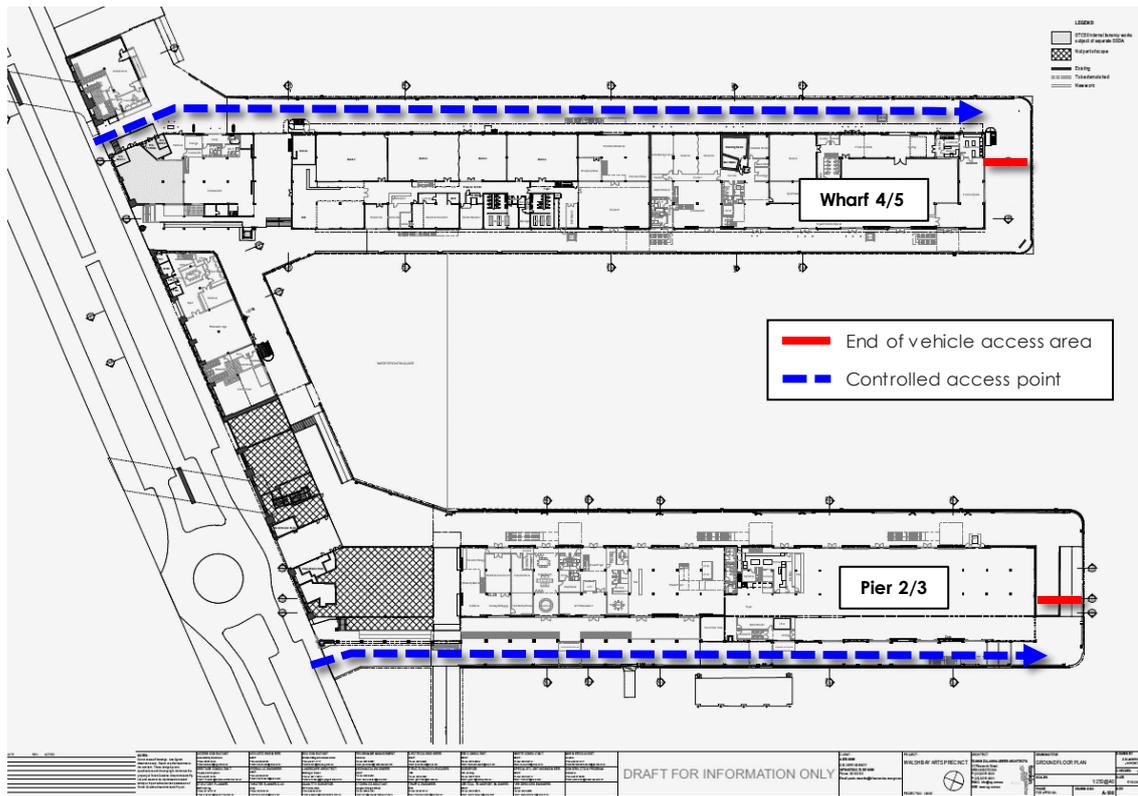
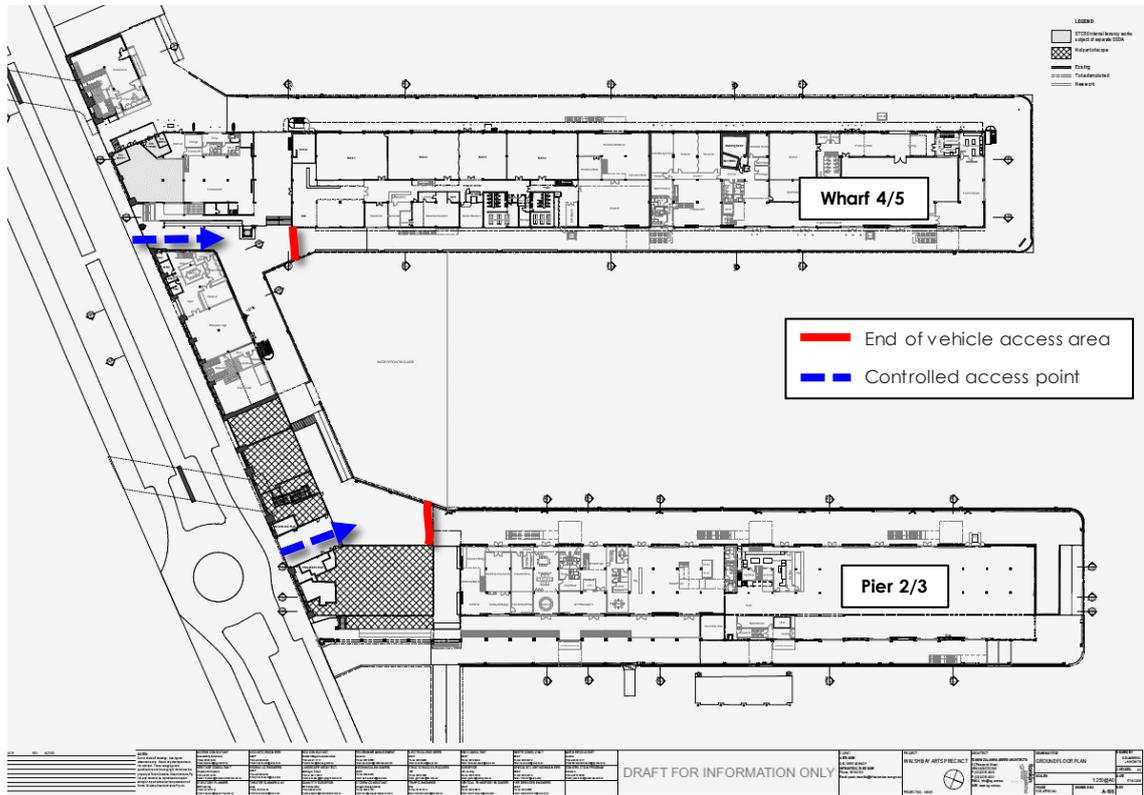


Figure 4.2: Service vehicle access summary – event mode



5. Sustainable Transport Infrastructure

There is substantial transformation occurring in the northern Sydney CBD precinct inclusive of the WBACP. This transformation includes the Barangaroo redevelopment site, which is located immediately south-west of the WBACP. Barangaroo will facilitate a high quality commercial and mixed-use precinct, including the establishment of a headland park and other public domain. Barangaroo will include a major transport hub to service the northern Sydney CBD, that includes a new metro station, ferry wharf and the Wynyard Walk link to Wynyard Station.

Due to this proximity, the *Barangaroo Integrated Transport Plan* is considered appropriate to inform the future planned public and active transport provisions for the WBACP. This plan outlines a target of 85 per cent mode share by public transport, 10 per cent access by walking and cycling (excluding access/ egress linked trips) and five per cent by private vehicle. A number of transport initiatives identified by the *Sydney Centre Access Strategy* will contribute to supporting this target for Barangaroo and will support the use of sustainable transport modes for the WBACP.

5.1 Public Transport

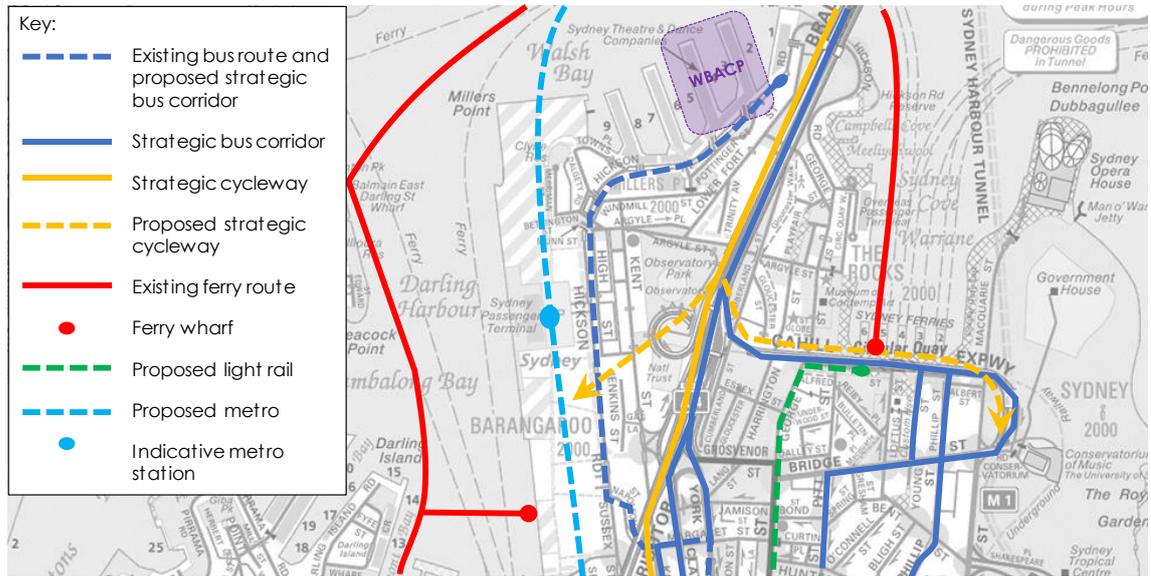
The site is broadly accessible by public transport with bus, train and ferry stops located within 1.5 kilometres of the site.

There will be a substantial increase in the provision of public transport further into the future. There are major public transport initiatives that will change the way people access the northern section of Sydney's CBD and improve accessibility to the precinct. These initiatives are:

- Sydney Metro, which will provide frequent train services to Barangaroo and will connect with the broader heavy rail network. The proposed station will be within 800 metres of the WBACP. Operation is anticipated to commence in 2024 with services provided every four minutes during the peak periods. The proposed station at Barangaroo is shown in Figure 5.2.
- The CBD and South East Light Rail will provide additional high capacity public transport services between Sydney's south east and Circular Quay, which is a key transport hub currently serving the WBACP. Light rail is proposed to provide a "turn up and go" service operating up to every four minutes during the peak periods.
- Barangaroo ferry wharf, which is now operational and provides services every 30 minutes to and from Sydney's CBD. These services run every day, between 6am and 11:30pm Mondays to Friday and between 8am and 11:30pm on weekends.
- A strategic bus corridor along Hickson Road, which will improve the existing bus network in the Sydney CBD, to support significant developments such as Barangaroo and new transport networks including the light rail and Sydney Metro projects. This involves provision of more direct routes and rationalised stops, making it easier for passengers to understand the bus network.
- New cyclist connections to link Barangaroo with the broader cyclist network, including the Sydney Harbour Bridge, Pyrmont Bridge and Kent Street cycleways. This will provide additional cyclist connections for the WBACP.

Figure 5.1 illustrates the proposed and existing transport facilities servicing the WBACP.

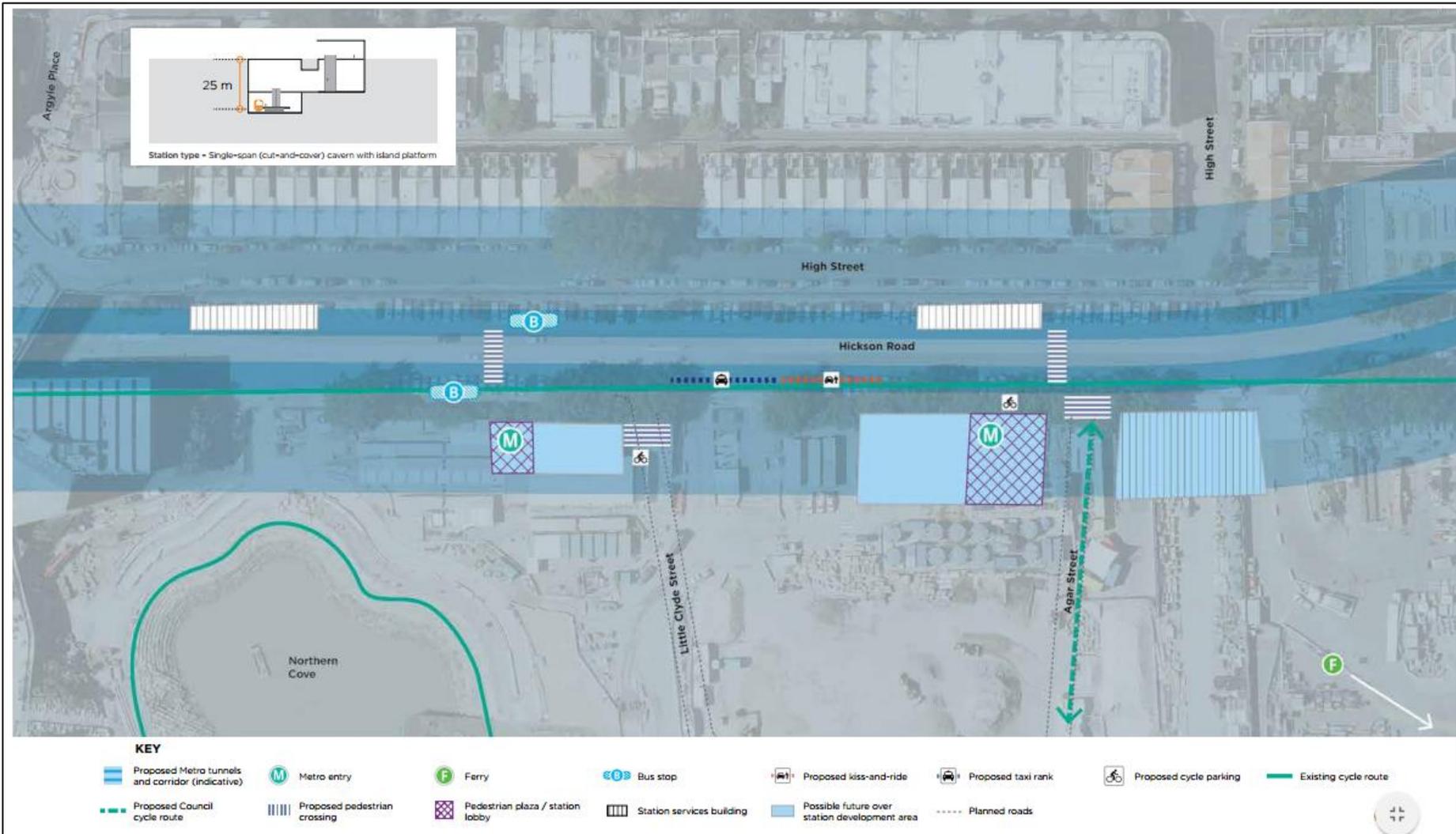
Figure 5.1: Existing and proposed public transport facilities



Source: Modified from Sydney

The following subsections provide additional details on the existing and proposed public transport provisions.

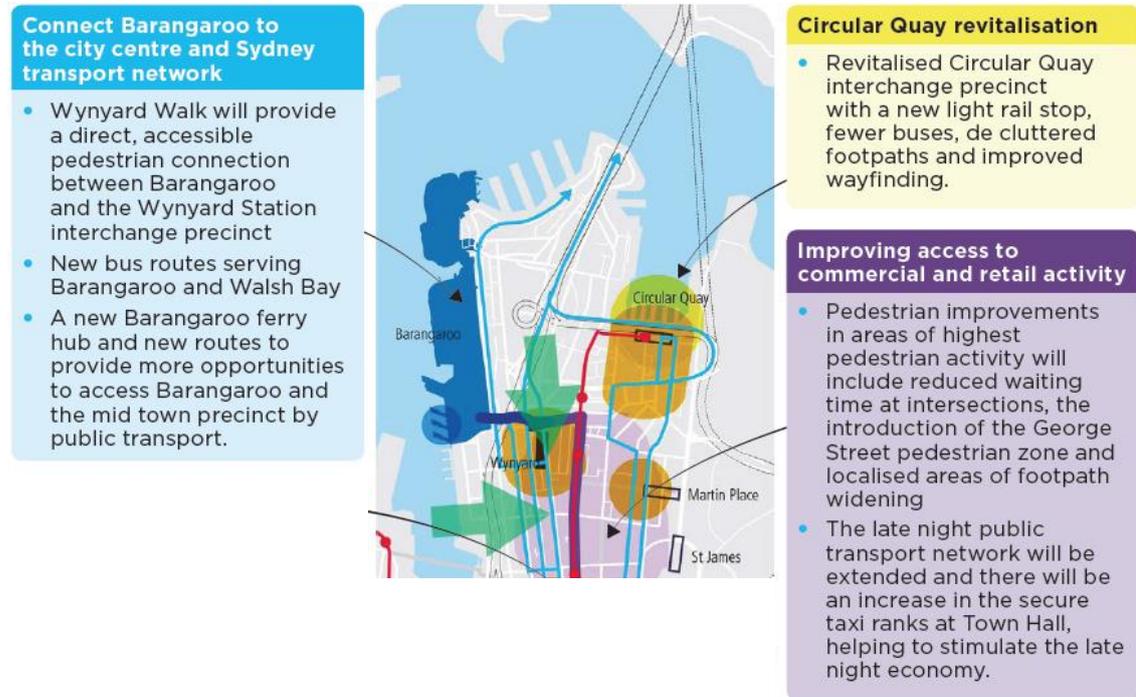
Figure 5.2: Indicative Sydney Metro Barangaroo station location



Source: <http://www.sydneymetro.info/sites/default/files/document-library/Sydney%20Metro%20Southwest%20Chatswood%20to%20Sydenham%20summary.pdf>, pg. 69, accessed 06 September 2017

The Sydney City Centre Access strategy defines new strategic bus corridors and a ferry wharf, which was recently commissioned to service the Barangaroo site. Circular Quay is also set to undergo a broader revitalisation project. This is shown in Figure 5.3.

Figure 5.3: Public transport access summary



Source: <http://www.transport.nsw.gov.au/sites/default/files/b2b/publications/sydney-city-centre-access-strategy-final-web.pdf>, pg. 7, accessed 06 September 2017

The Barangaroo ferry wharf has recently been commissioned, providing a public transport option for the WBACP. The ferry wharf is on the F4 Darling Harbour route, which services Circular Quay, Jeffrey Street Wharf (Kirribilli), McMahons Point Wharf, Balmain East Wharf and Pyrmont Bay Wharf.

Ferries service Barangaroo Wharf every 30 minutes during the following periods:

- Monday to Friday: 6am to 11:30pm
- Weekends and public holidays: 8am to 11:30pm.

Special city-wide events such as New Year's Eve are likely to have extended operating hours for ferry services to the Barangaroo ferry wharf.

Wynyard Walk was opened in October 2016, providing a direct and key pedestrian connection between the new ferry wharf at Barangaroo, and existing rail/ bus services and proposed light rail services in the CBD.

Figure 5.4 shows that three new taxi ranks are currently being investigated for implementation surrounding the precinct. Given that taxis are likely to be a well utilised access mode to the site for patrons, this is considered appropriate. In the short term, these facilities would be provided through changes to existing signage, but in the longer term, higher quality facilities might be incorporated into the streetscape design as recommended by the Harbour Village North Public Domain Study (City of Sydney, 2012). Any provisions implemented for taxis would be designed in accordance with Australian Standards and Council's parking requirements.

Figure 5.4: Taxi rank access



Source: <http://www.transport.nsw.gov.au/sites/default/files/b2b/publications/sydney-city-centre-access-strategy-final-web.pdf>, pg. 31, accessed 06 September 2017

Sydney's *Bus Future* identifies strategic bus corridors proposed within the Sydney CBD. Figure 5.5 shows that Hickson Road is to be a key bus corridor, such a corridor would be expected to further develop as light rail construction progresses (and is ultimately completed), as well as the development of Barangaroo and the construction of the Sydney Metro.

Figure 5.5: Strategic bus corridors



Source: extracted from <http://www.transport.nsw.gov.au/sites/default/files/b2b/publications/sydney-city-centre-access-strategy-final-web.pdf>, pg. 39, accessed 6 September 2017

5.2 Bicycle End of Trip Facilities

Various NSW bicycle planning guidelines typically outline that bicycle parking provision should be approximately three to five per cent of capacity and/ or staff numbers. Accordingly, with a

workforce of 650 staff and up to 2,200 visitors, up to 110 spaces would be provided. Whilst this remains indicative, the anticipated clientele of the precinct (with consideration of time and function type) would not be typically expected to access the precinct by bicycle.

Accordingly, GTA has adopted a bicycle parking provision of approximately three per cent and considers that 66 bicycle parking spaces be provided on-site for staff and visitors (this allows for a two per cent mode share as per Table 2.5, with a 50 per cent contingency), with shower and locker facilities. Future opportunities to provide end of trip facilities will be investigated within the precinct should demand arise.

The concept plan of the WBACP has provided 35 bicycle parking facilities on site for staff and 40 visitor bicycle parking racks within the public domain. Bicycle parking provision will meet five per cent of the staff population and one per cent of the visitor population. End of trip facilities are provided in each tenancy. The proposed end of trip facility provisions will adequately accommodate the expected demand for the WBACP and contribute to promoting cycling to the site, particularly for staff.

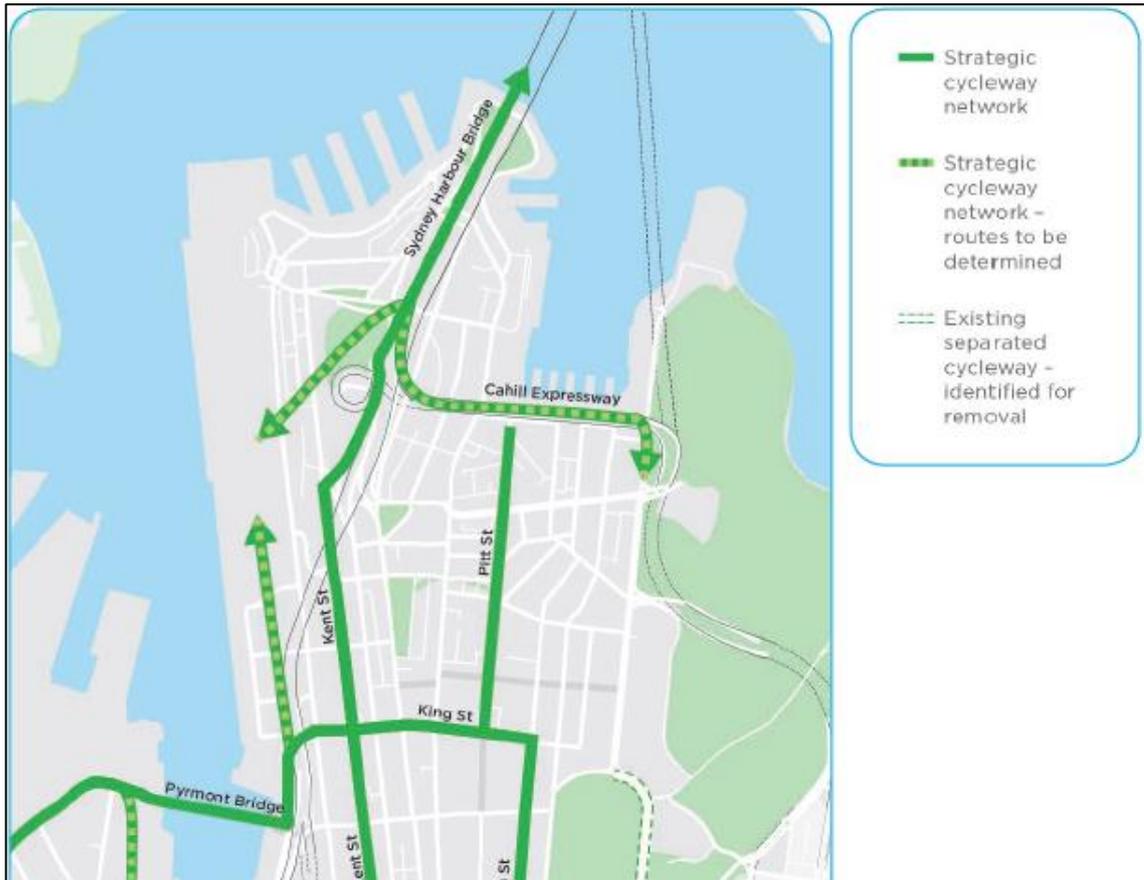
The bicycle share schemes that have commenced in Sydney do not require secure parking might be suited to trips to the WBACP. These bicycles are self-locking and do not require specific parking facilities.

5.3 Walking and Cycling Network

There are existing bicycle lanes along Hickson Road providing connection to the wider cycleway network within the Sydney CBD. As part of the *Sydney City Centre Access Strategy* and *Sydney's Cycling Future*, a cycleway will be developed to integrate with Barangaroo. Figure 5.6 shows the strategic cycle network near the site.

These existing and proposed cycling facilities provide access for the WBACP to key cycling links such as the Sydney Harbour Bridge, Kent Street and Pyrmont Bridge. Separated cycling infrastructure is not considered to be required due to the lower volumes of traffic on the peninsular.

Figure 5.6: Strategic cycle network



Source: extracted from <http://www.transport.nsw.gov.au/sites/default/files/b2b/publications/sydney-city-centre-access-strategy-final-web.pdf>, pg. 45, accessed 14 September 2017

5.4 Coaches

The demand for coach pick-up and set-down is not anticipated to increase with the proposed redevelopment. However, an operational traffic management plan would be developed for the WBACP and would consider coach parking requirements and management of coaches to minimise impact on all other road users.

5.5 Summary

In summary, a high frequency metro service within 800 metres, improved bus services near the site, additional connections to strategic cycleways, the recently commissioned ferry wharf and the new light rail to Circular Quay will improve the public transport offering and access for the WBACP.

Based on the existing and proposed public transport facilities near the WBACP public transport provision is considered sufficient to accommodate increased future demand associated with the proposed development.

6. Loading Facilities

6.1 Loading Requirements

The City of Sydney provided the most relevant comparison for requirements for loading for the proposed development. DCP 2012 sets out rates for loading facilities for different development types. A review of these rates and the floor area schedule results in a requirement as summarised in Table 6.1.

Table 6.1: Loading requirements

Use	Size (gross floor area [GFA])	Loading rate	Loading requirement
Commercial	16,500 m ²	1 space per 3,300 m ² GFA, or part thereof	5

To support the calculation for loading requirements, a detailed estimation is done by considering the current and future loading requirements for each tenancy.

6.2 Proposed Loading Arrangements

The proposed land uses in the site is expected to be accessed by up to eight SRVs, eight MRVs and four Small Service Vehicles (SSV) on a typical weekday and weekend from 7am to 10pm. Table 6.2 shows the total number of expected service vehicles required to access the site.

Table 6.2: Cumulative loading trips

Loading vehicle type	Morning 7am-12pm	Afternoon 12pm-6pm	Evening 6pm-10pm
SRV	18	9	2
MRV	14	6	2
SSV	17	13	5

These trips largely consist of existing loading and unloading trips, which can be accommodated within the existing facilities.

It is anticipated that between the new loading dock on Pier 2/3, the existing loading dock on Wharf 4/5 and the on-street loading provisions, there will be adequate loading capacity to cater for the demands generated by the additional uses. In addition, a loading dock management system would be implemented to ensure efficient use of the available space.

6.3 Vehicle Swept Paths

GTA has reviewed the proposed loading provisions. In this regard, the existing loading arrangements for Wharf 4/5 will be maintained and as such, this assessment only considers the loading requirements for Pier 2/3.

A loading platform and/ or leveller would be constructed on the east side of Pier 2/3. The arrangement would require the loading vehicle to drive past the platform and reverse adjacent to the building. The loading vehicle would then travel to the northern end of the pier where it would turn around and then travel back along the pier to Hickson Road.

The existing apron is generally 5.8 metres wide and whilst not strictly in accordance with Australian Standard AS2890.2- 2002 (which requires 6.2 metres for two medium rigid vehicles [MRVs] to pass), would allow two SRVs to physically pass, noting some localised constraints

associated with existing services (e.g. fire hydrant). Any passing movements would need to be undertaken with one vehicle parked hard up against the building or edge of the wharf and the other vehicle at low speed. However, it is noted that at the colonnade, the apron width reduces to approximately four metres wide, with vehicles not able to pass at this location. The width of the apron precludes two MRVs being able to pass each other (or one SRV and one MRV). The available facilities and associated heritage-related constraints are expected to be appropriate for the low service vehicle activity levels.

A swept path assessment of the proposed loading arrangement for Pier 2/3 has been undertaken using AutoTURN (a computer package designed to simulate vehicle swept paths in a CAD environment). The assessment indicates:

- SRVs (6.4 metres) are able to turn around at the end of Wharf 4/5 with a three-point turn
- MRVs (8.8 metres) are able to turn around at the end of Pier 2/3 with a five-point turn.

This manoeuvring is consistent with current operation of the loading facilities.

7. Traffic Impact Assessment

7.1 Traffic Generation

The ability of the site to generate traffic is restricted by the zero, on-site car parking provision, however, the redevelopment of the site will still generate traffic movements as a result of the following:

- Loading vehicle trips to the site
- Taxi trips to the site
- Pick up and drop off trips to the site
- Private vehicle trips to the site utilising nearby on- and off-street car parking within the precinct.

Traffic generation for the proposal has been estimated with regards to the Barangaroo Integrated Transport Plan. This is considered appropriate given the proximity of the WBACP to Barangaroo. The plan outlines an intention of 85 per cent access to Barangaroo by public transport, 10 per cent by walking and cycling, and five per cent by private vehicle.

Extrapolating estimated staff and visitor numbers for the site, with the mode share estimates outlined above, and with consideration of existing Australian Bureau of Statistics (ABS) JTW data, Table 7.1 has been developed to identify the likely number of people travelling by each mode under each scenario as discussed in Section 3.2 of this report.

Table 7.1: Future transport demands

Mode	Share	Scenarios			
		Peak population	Everyday population	Cumulative population	Event population
Train	33%	1,466	726	2,293	1,403
Bus	33%	1,466	726	2,293	1,403
Walk	17%	755	374	1,181	723
Car	8%	355	176	556	340
Bicycle	2%	89	44	139	85
Ferry	3%	133	66	208	127
Taxi	4%	177	88	277	169
Total	100%	4,441	2,200	6,947	4,250

With consideration of the above estimates of future transport demands, Table 7.2 shows anticipated trips under different scenarios with regards to traffic impact for trips associated with the WBACP development.

Table 7.2: Traffic generation estimation

Mode	Average vehicle occupancy	Trip generation			
		Peak scenario	Everyday scenario	Cumulative scenario	Event scenario
Taxi	1.5	118	59	185	113
Private vehicle (including pick up/drop off)	2	178	88	278	170
Loading vehicle	-		<5		
Total		296	152	463	283

As shown in Figure 2.4, at the weekday site peak period of 6pm to 7pm, Hickson Road has a peak volume of 697 vehicles per hour. During the Saturday peak hour between 1pm and 2pm, the traffic volume on Hickson Road is around 836 vehicles per hour. The arrivals and departures to the WBACP would vary according to the start times of rehearsals, shows and functions and would be unlikely to be condensed into one hour. Based on the surveys carried out by GTA on Friday 25 August and Saturday 2 September, the arrivals are generally spread across two hours prior to the start of shows within the precinct under current operations. On the Friday, around 44 per cent of people arrived at the precinct two hours before the show and around 56 per cent arrived within the hour before the show. On the Saturday, arrivals to the precinct were around 27 per cent two hours before the show and 73 per cent within the hour before the show. These arrival profiles have been applied to the traffic generation for the weekday and weekend peak periods, taking the one-hour before the scheduled event as the peak generation for the WBACP. The estimated traffic volume (existing traffic plus WBACP traffic) for Hickson Road in the weekday and weekend peaks and the percentage increase for each event scenario is summarised in Table 7.3:.

Table 7.3: Percentage increase in traffic volume on Hickson Road

Scenario	Weekday peak		Weekend peak	
	Traffic volume ^[1]	Percentage increase	Traffic volume ^[2]	Percentage increase
Peak	863	24%	1,052	26%
Everyday	782	12%	947	13%
Cumulative	956	37%	1,174	40%
Event	855	23%	1,043	25%

[1] Existing weekday peak traffic volumes plus 56 per cent of WBACP traffic generation estimate for the scenario.

[2] Existing weekend peak traffic volumes plus 73 per cent of WBACP traffic generation estimate for the scenario.

The everyday scenario, which represents daily operation of the WBACP, is expected to result in an increase in traffic volumes on Hickson Road of 12 to 13 per cent for weekday and weekend peaks, respectively. This represents less than two additional vehicles per minute, which is unlikely to have a substantial impact on existing operation of the road network.

For less likely scenarios such as the peak and event scenarios, the increase in traffic volumes would be between 23 and 26 per cent. This represents about three additional vehicles per minute, which is unlikely to have a substantial impact on existing operation of the road network. However, for these scenarios, event specific traffic management plans would be prepared to manage arrivals and departures for the WBACP to ensure pedestrian safety and access is maintained and kerbside allocation (public transport and pick-up/ set-down) can accommodate the demand associated with these scenarios.

The cumulative scenario, which is considered highly unlikely, would result in an increase of 40 per cent in traffic on Hickson Road. This represents less than five additional vehicles per minute, which is likely to have a noticeable impact on the existing operation of the road network. Events falling into the cumulative scenario would require an event specific traffic management plan, which would detail how arrivals and departures to the precinct would be managed. The event specific traffic management plans for such events would be developed and approved in consultation with TfNSW, Roads and Maritime, the Transport Management Centre and the Sydney Coordination Office.

7.2 Pick-up and Set-down

A portion of the private vehicle trips would be associated with kerbside pick-up and set-down with the remainder of private vehicles parking primarily within the off-street car parks west of the

site and a relatively small portion parking on-street near the WBACP. Pick-up and set-down activities include point-to-point transport services. Determining the existing and anticipated proportion of pick-up and set-down activities associated with point-to-point transport (for example, Uber services) is difficult and there are limited valid methods for assessing this mode.

Based on the surveys carried out by GTA on Friday 25 August and Saturday 2 September the proportion of pedestrians accessing the precinct that were dropped off or picked up at the kerbside by a vehicle other than a taxi, was observed to be between six and 12 per cent. To assess the impact of pick-up and set-down for the proposed development, it is assumed that 12 per cent of the private vehicle trips would be picking patrons up or dropping patrons off near the WBACP.

The everyday scenario would generate about 11 additional vehicles for pick-up or set-down of passengers. This equates to about an additional one vehicle every five minutes. Based on the survey observations, the existing kerbside short-stay parking allocation is near capacity and reallocation of kerbside space would be required to accommodate this additional demand. For the everyday scenario two additional short-stay or pick-up/ set-down spaces would be required to accommodate the increased demand. This would result in the displacement of two existing on-street parking spaces near the WBACP. Based on the utilisation of the existing on- and off-street parking provision within acceptable walking distance to the WBACP, the loss of the two on-street parking spaces could be absorbed by the surrounding off-street car park provisions.

For the less likely peak and event scenarios about 20 to 21 vehicles would pick-up or set-down passengers. This equates to one vehicle every three minutes. For the peak and event scenarios about three additional short-stay or pick-up/ set-down spaces would be required to accommodate the increased demand. This would result in the displacement of three existing on-street parking spaces near the WBACP. Based on the utilisation of the existing on- and off-street parking provision within acceptable walking distance to the WBACP, the loss of the three on-street parking spaces could be absorbed by the surrounding off-street car park provisions. However, the kerbside parking allocation would be considered in the development of an operational traffic management plans for these scenarios. The operational traffic management plan would be implemented by the appointed Precinct Manager.

For the cumulative scenario, which is highly unlikely to occur, it is estimated that about 33 vehicles would pick-up or set-down passengers. Based on the survey observations, the existing kerbside short-stay parking allocation is near capacity and reallocation of kerbside space would be required to accommodate this additional demand. This would need to be managed by an operational traffic management plan, which could include kerbside marshalling. The operational traffic management plan would be implemented by the appointed Precinct Manager.

In summary, based on the assessment of the pick-up and set-down requirements for the proposed development, it is recommended that the existing kerbside space is reallocated to provide an additional three short-stay or pick-up/ set-down spaces near the WBACP to accommodate the increase in demand for the proposed redevelopment for peak and event scenarios. Any modifications to the kerbside parking would be carried out in consultation with City of Sydney Council and would be designed in accordance with Australian Standards and Council requirements.

To allow for future point-to-point transport requirements, it is recommended that following the opening of the proposed development, pick-up and set-down activities are monitored and detailed interview surveys are carried out to identify whether the kerbside provisions are adequate to support the point-to-point transport demand.

8. Conclusion

Based on the analysis and discussions presented within this report, the following conclusions are made:

- i The proposed development is permitted a maximum statutory parking requirement of 550 spaces. The development meets statutory requirements with no on-site parking provision proposed for the site.
- ii Sufficient on-street and off-street parking is available within the precinct, noting the focus on promoting non-car based travel modes. A preliminary Green Travel Plan has been prepared as part of the SSDA requirements.
- iii The Barangaroo redevelopment will include a major transport hub to service the northern Sydney CBD. The proposed high frequency metro service within 800 metres, improved bus services near the site, additional connections to strategic cycleways, the recently commissioned ferry wharf and the new light rail to Circular Quay will improve the public transport offering and access for the WBACP. Based on the existing and proposed public transport facilities near the WBACP public transport provision is considered sufficient to accommodate increased future demand associated with the proposed development.
- iv 35 secure bicycle parking facilities will be provided on site for staff with visitor bicycle parking racks provided in the public domain (with capacity for approximately 40 bicycles). End of trip facilities are provided within each tenancy.
- v The proposed development has statutory requirement for five loading bays. It is proposed to accommodate this loading requirement within the existing and proposed loading facilities and on-street loading bays through appropriate loading dock management.
- vi The anticipated everyday operation of the site is expected to increase traffic volumes on Hickson Road by up to 13 per cent. Under this scenario, there is adequate capacity in the surrounding road network to accommodate the traffic generated by the proposed development.
- vii The peak and event scenarios for the site estimate an increase of up to 26 per cent in traffic volumes on Hickson Road. This is not considered to have a substantial impact on the operation of the existing road network. However, it is recommended that an operational traffic management plan is developed to manage arrivals and departures for the WBACP to ensure pedestrian safety and access is maintained and kerbside allocation (public transport and pick-up/ set-down) effectively accommodates the demand. The operational traffic management plan would be implemented by the appointed Precinct Manager.
- viii To accommodate additional demand associated with pick-up and set-down for the everyday, peak and event scenarios, it is recommended that the existing kerbside space is reallocated to provide an additional three short-stay or pick-up/ set-down spaces near the WBACP. This would result in the displacement of three on-street parking spaces, which could be absorbed by the surrounding off-street parking provisions near the WBACP.
- ix The cumulative scenario is considered highly unlikely to occur. Under this scenario it is estimated that traffic volumes on Hickson Road could increase by 40 per cent. The operational traffic management plans for such events would be developed and approved in consultation with TfNSW, Roads and Maritime, the Transport Management Centre and the Sydney Coordination Office.

- x There are no valid methods for assessing the existing and anticipated point-to-point transport demands. To allow for future point-to-point transport requirements, it is recommended that following the opening of the proposed development, pick-up and set-down activities are monitored and detailed interview surveys are carried out to identify whether the kerbside provisions are adequate to support the point-to-point transport demand.
- xi The existing site access arrangements would be altered to create more pedestrian-friendly environment, responding appropriately to operational needs.

Appendix A

Automatic Tube Count Survey

Job No N2600
Client GTA
Site Hickson Road (adj. Pier 4)
Location DAWES POINT
Site No 1
Start Date 27-Aug-16
Description Volume Summary
Direction EB



Hour Starting	Day of Week							W'Day Ave	7 Day Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	29-Aug	30-Aug	31-Aug	01-Sep	02-Sep	27-Aug	28-Aug		
AM Peak	370	394	371	0	0	300	210	3243	3847
PM Peak	377	451	443	0	0	494	385		
00:00	53	51	69	0	0	195	192	35	80
01:00	20	14	30	0	0	119	150	13	48
02:00	14	22	17	0	0	64	89	11	29
03:00	20	25	17	0	0	40	36	12	20
04:00	31	26	28	0	0	47	54	17	27
05:00	52	62	52	0	0	45	60	33	39
06:00	122	181	152	0	0	101	57	91	88
07:00	278	270	282	0	0	114	81	166	146
08:00	370	394	345	0	0	223	118	222	207
09:00	348	389	371	0	0	255	166	222	218
10:00	273	332	306	0	0	267	177	182	194
11:00	286	382	345	0	0	300	210	203	218
12:00	309	340	383	0	0	409	255	206	242
13:00	271	317	352	0	0	494	278	188	245
14:00	244	256	301	0	0	341	385	160	218
15:00	271	295	328	0	0	330	239	179	209
16:00	276	292	324	0	0	397	253	178	220
17:00	371	337	335	0	0	437	283	209	252
18:00	377	451	443	0	0	493	255	254	288
19:00	233	343	355	0	0	437	239	186	230
20:00	274	189	238	0	0	375	164	140	177
21:00	201	265	302	0	0	415	164	154	192
22:00	132	269	285	0	0	416	105	137	172
23:00	105	124	0	0	0	306	81	46	88
Total	4931	5626	5660	0	0	6620	4091	3243	3847

7-19	3674	4055	4115	0	0	4060	2700	2369	2658
6-22	4504	5033	5162	0	0	5388	3324	2940	3344
6-24	4741	5426	5447	0	0	6110	3510	3123	3605
0-24	4931	5626	5660	0	0	6620	4091	3243	3847

Appendix B

Pier 4 Loading Dock Access Survey

Job No. : N2600
Client : GTA
Suburb : Dawes Point
Location : Pier 4 (Sydney Theatre Company) Loading Docks

Day/Date : Wed, 31st August 2016
Weather : Fine
Description : Classified Loading Dock Utilisation Counts
: 15 mins Data



	Class 1	Class 2
Classifications	Lights	Heavies

Approach	Access 1 (Hickson Road)						Access 2 (Pottinger Street)					
	IN			OUT			IN			OUT		
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total
07:00 to 07:15	0	0	0	0	0	0	0	1	1	0	1	1
07:15 to 07:30	0	0	0	0	0	0	1	0	1	0	0	0
07:30 to 07:45	0	0	0	0	0	0	1	0	1	1	0	1
07:45 to 08:00	0	0	0	0	0	0	0	1	1	0	0	0
08:00 to 08:15	2	0	2	0	0	0	0	0	0	1	0	1
08:15 to 08:30	0	0	0	1	0	1	0	0	0	0	0	0
08:30 to 08:45	0	0	0	0	0	0	0	0	0	0	0	0
08:45 to 09:00	0	0	0	1	0	1	0	1	1	0	0	0
09:00 to 09:15	0	0	0	1	0	1	1	0	1	0	1	1
09:15 to 09:30	0	0	0	1	0	1	0	0	0	1	1	2
09:30 to 09:45	0	0	0	0	0	0	0	0	0	0	0	0
09:45 to 10:00	0	0	0	0	0	0	0	0	0	0	0	0
3hr Totals	2	0	2	4	0	4	3	3	6	3	3	6

Appendix C

Parking Demand Survey

Client GTA
Location Hickson Road, Dawes Point
Date Saturday, 27th August 2016
Description Parking Occupancy Survey



Area	Spaces	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00
North Side (KERB)	52	28	37	39	43	42	39	38	29	34	43	47	47
South Side (KERB)	30	10	10	12	11	17	20	15	4	8	17	24	24
North Side (MEDIAN)	75	49	54	59	68	70	63	59	44	60	67	67	67
South Side (MEDIAN)	76	28	43	42	52	56	55	37	28	36	57	65	65
Total	233	115	144	152	174	185	177	149	105	138	184	203	203
% Capacity		49%	62%	65%	75%	79%	76%	64%	45%	59%	79%	87%	87%

Client GTA
Location Hickson Road, Dawes Point
Date Wednesday, 31st August 2016
Description Parking Occupancy Survey



Area	Spaces	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00
North Side (KERB)	52	24	24	31	29	28	18	18	18	26	36	47	43
South Side (KERB)	30	8	7	7	11	12	11	7	12	14	15	18	13
North Side (MEDIAN)	75	32	40	42	52	41	22	25	32	39	64	63	55
South Side (MEDIAN)	76	26	31	34	48	44	27	27	36	40	48	50	47
Total	233	90	102	114	140	125	78	77	98	119	163	178	158
% Capacity		39%	44%	49%	60%	54%	33%	33%	42%	51%	70%	76%	68%

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