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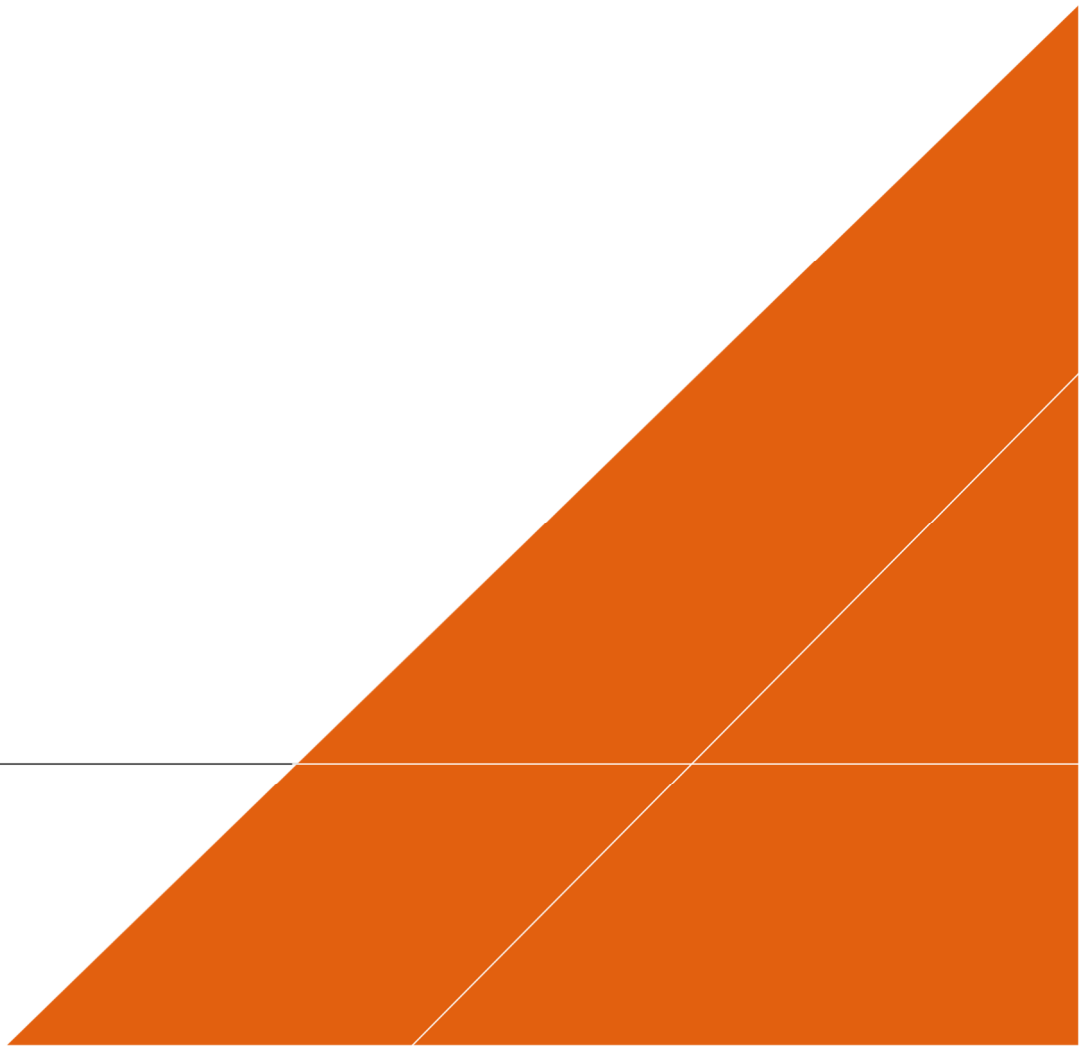
HARBOURSIDE SHOPPING CENTRE

Traffic and Transport Impact Assessment

18 FEBRUARY 2020



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HARBOURSIDE SHOPPING CENTRE

Traffic and Transport Impact Assessment

Stage 1 DA – Amended Concept Proposal

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1 INTRODUCTION

This report provides a response to submissions (as relevant) and assessment of the proposed amended Concept Proposal in relation to the State Significant Development (SSD) Development Application (DA) for the redevelopment of the Harbourside Shopping Centre (Harbourside) (SSD 7874).

The SSD DA was publicly exhibited for a period of 62 days from 15 December 2016 to 14 February 2017. During this time, ten (10) submissions were received from government agencies and City of Sydney Council and over 140 submissions were received from the general public.

This report should be read in conjunction with the original assessment prepared by Arcadis dated 28th September 2016 to support the Harbourside Concept Proposal Square (SSD 7874).

1.1 Background

Mirvac acquired Harbourside, a key location within the Darling Harbour precinct, in November 2013. Harbourside, which was opened in 1988 as part of the Bicentennial Program, has played a key role to the success of Darling Harbour as Australia's premier gathering and entertainment precinct.

Despite its success, with an annual pedestrian visitation of around 13 million people, Harbourside is now outdated and in decline. The building lacks a quality interface to the Darling Harbour public domain and Cockle Bay and does not integrate well with the major transformation projects underway and planned for across Darling Harbour.

Harbourside is at risk of being left behind and undermining the significant investment being made in Darling Harbour that will see it return to the world stage as a destination for events and entertainment.

Accordingly, Mirvac are taking a carefully considered and staged approach to the complete revitalisation of the site and its surrounds.

1.2 Site Description

The Site is located within Darling Harbour. Darling Harbour is a 60-hectare waterfront precinct on the south-western edge of the Sydney CBD that provides a mix of functions including recreational, tourist, entertainment and business.

More generally the site is bound by Pyrmont Bridge to the north, the Sydney International Convention, Exhibition and Entertainment Precinct (SICEEP) to the south, Darling Drive and the alignment of the Light Rail to the west and Cockle Bay to the east.

A locational context area plan and location plan are provided in **Figure 1** and **Figure 2**, respectively.

The Darling Harbour precinct is undergoing significant redevelopment as part of the SICEEP, Darling Square, and IMAX renewal projects. The urban, built form and public transport / pedestrian context for Harbourside will fundamentally change as these developments are progressively completed.

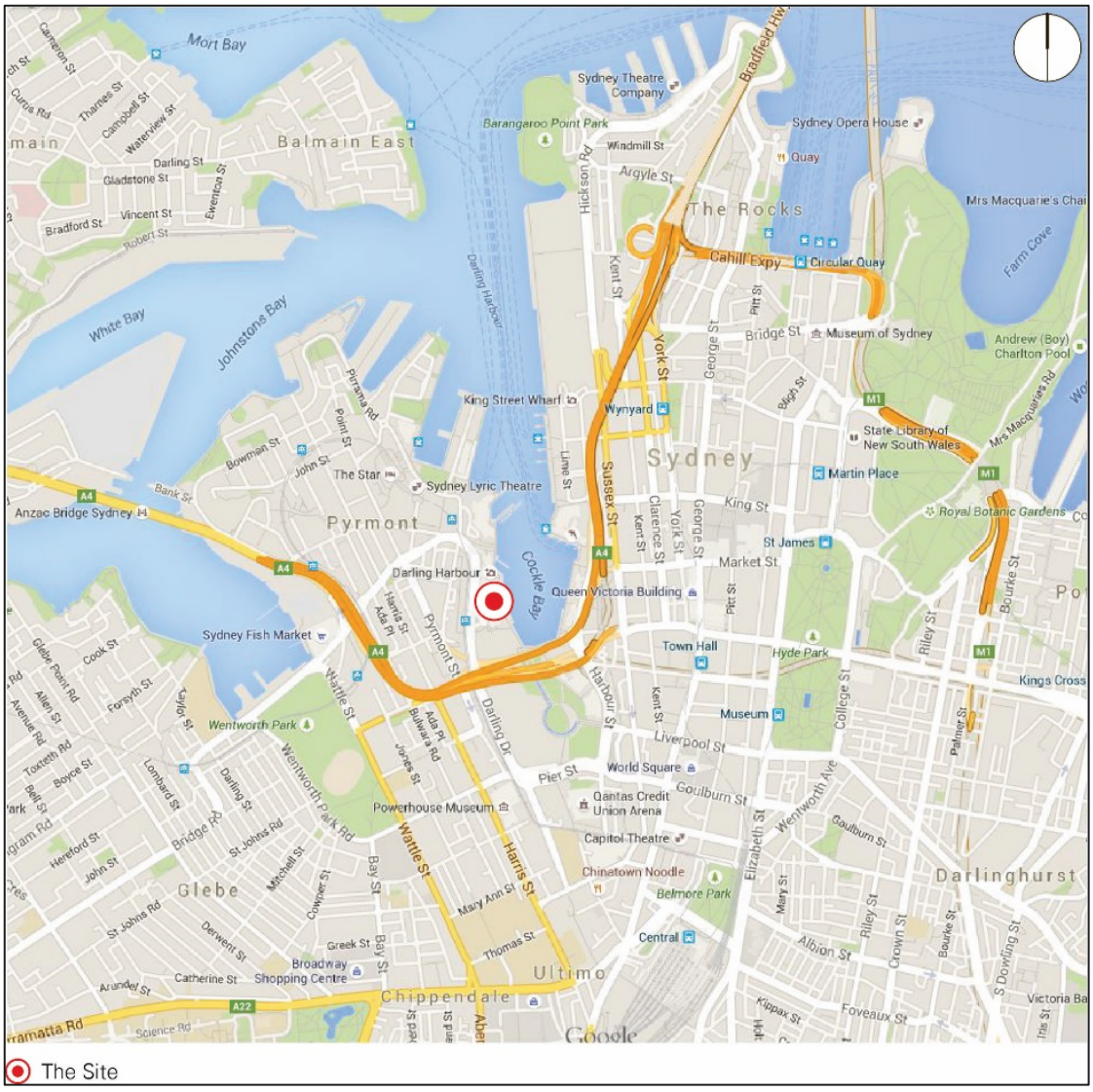


Figure 1 – Location Context Area Plan

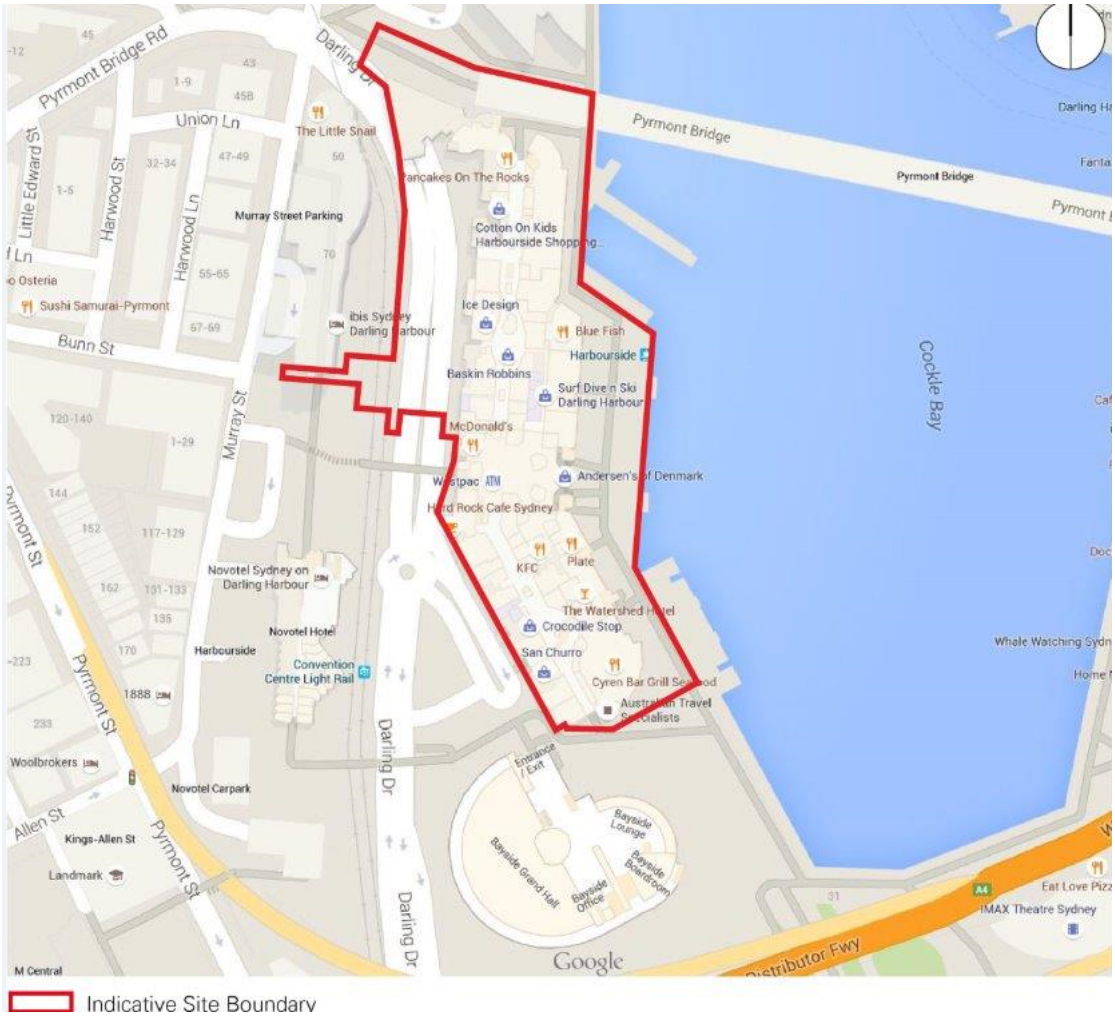


Figure 2 – Site Location Plan

1.3 Planning Approvals Strategy

The Site is located within the Darling Harbour precinct, which is identified as a State Significant Site in Schedule 2 of *State Environmental Planning Policy (State and* Regional Development) 2011. As the proposed development will have a capital investment exceeding $10 million, it is declared to be State Significant Development (SSD) for the purposes of the *Environmental Planning and Assessment Act 1979* (EP&A Act), with the Minister for Planning the consent authority for the project.

This State Significant Development Application (DA) is a staged development application made under section 83B of the EP&A Act. It seeks approval for the concept proposal for the entire site and its surrounds.

More specifically this staged DA includes establishing land uses, gross floor area, building envelopes, public domain concept, pedestrian and vehicle access and circulation arrangements and associated car parking provision.

Detailed development application/s (Stage 2 DAs) will accordingly follow seeking approval for the detailed design and construction of all or specific aspects of the proposal in accordance with the approved staged development application.

The Department of Planning and Environment provided the Secretary's Environmental Assessment Requirements (SEARs) to the applicant for the preparation of an Environmental Impact Statement for the proposed development on 3 August 2016. This report has been prepared having regard to the SEARs as relevant.

2 PURPOSE OF THIS REPORT

This report has been prepared to accompany the Stage 1 DA for Harbourside. It addresses the relevant requirements of the Draft SEARs for the project, issued on the 30 August 2016. A summary of the relevant SEARs is listed below.

Table 1 Secretary's Environmental Assessment Requirements (SEARS)

SEARs Reference	Key Assessment Requirement	Relevant Section in This Report	Comment
6, Transport & Accessibility (Construction and Operation)	Current daily and peak hour vehicle, public transport, pedestrian and bicycle movements, together with the cumulative impacts of existing, proposed and approved developments in the area, and existing traffic and transport infrastructure provided adjacent to the proposed development.	3 & 5	
6, Transport & Accessibility (Construction and Operation)	Operation of existing and future transport networks, including the light rail, ferry and bus networks and the CBD and South East Light Rail (CSELR), and their ability to accommodate the forecast number of trips to and from the development.	3	
6, Transport & Accessibility (Construction and Operation)	Existing and future performance of key intersections providing access to the site and any road/intersection upgrades required to accommodate the development. The assessment needs to be supported by appropriate modelling and analysis to the satisfaction of the Roads and Maritime Services (RMS). Existing and future performance of key intersections providing access to the site and any road/intersection upgrades required to accommodate development, using modelling and analysis supported by RMS	3 & 5	Existing baseline traffic intersection performance was based on original traffic surveys undertaken in March 2016. To support the current development proposal updated traffic surveys were undertaken in January 2020. The updated traffic surveys have allowed for a comparative review of existing traffic conditions for 2016 and current.
6, Transport & Accessibility (Construction and Operation)	Measures to be implemented to encourage users of the development to make sustainable travel choices, including walking, cycling, public transport and car	4 & 5	

SEARs Reference	Key Assessment Requirement	Relevant Section in This Report	Comment
	sharing, such as the provision of end of trip facilities.		
6, Transport & Accessibility (Construction and Operation)	Appropriate provision, design and location of on-site bicycle parking, and how bicycle provision will be integrated with the existing cycle network.	4	
6, Transport & Accessibility (Construction and Operation)	Existing and proposed vehicle access (such as onto Bunn Street and Pyrmont Bridge) and parking arrangements (car, coaches/buses, taxi) for residents, employees and visitors, including compliance with appropriate parking controls.	3	
6, Transport & Accessibility (Construction and Operation)	The proposed loading dock and servicing provisions, including access arrangements to the loading docks.	4	
6, Transport & Accessibility (Construction and Operation)	Detail potential impacts of the development on the capacity and operation of the light rail and ferry network and modelling of the impacts of key pedestrian routes on nearby light rail and ferry stops.	5	
6, Transport & Accessibility (Construction and Operation)	Likely impacts of the proposal during construction.	6	
6, Transport & Accessibility (Construction and Operation)	Likely future service requirements.	4	

This report provides a response to submissions received from Transport for New South Wales (TfNSW) and the Roads and Maritime Services (RMS) in relation to the State Significant Development (SSD) Development Application (DA) for the redevelopment of the Harbourside Shopping Centre (Harbourside) (SSD 7874). A summary of the relevant agency submissions is provided in **Table 2** of this Report. **Appendix A** of this report contains a copy of the received agency submissions relevant to this report.

A meeting was held between the Applicant, traffic consultant (Arcadis), Transport for NSW CBD Coordination Office and the RMS on the 3rd of August 2018 to discuss the development proposal.

Table 2 Agency Response to Submissions

Agency Response to Submission Reference	Agency Response to Submission	Relevant Section in This Report	Comment
1. Sydney Light Rail — Inner West Line (TfNSW)	There are a number of construction and operational issues resulting from the demolition of the existing pedestrian footbridge from the Harbourside car park across the light rail corridor at Convention stop and the construction of the Bunn Street footbridge across the light rail corridor north of Convention stop. It is also noted that the proposed construction activities are likely to interfere with the light rail operation. TfNSW requests that ongoing consultation is required between the applicant, TfNSW, light rail operator, and if required, Sydney Trains during the design and construction of the proposed development.	4.2, 6 & Appendix G	
2. Construction Pedestrian and Traffic Management (TfNSW)	Several construction projects, including the Sydney Light Rail project are likely to occur at the same time at this development within the CBD and Darling Harbour Precinct. The cumulative increase in construction vehicle movements from these projects could impact on bus services in the CBD, and the safety of pedestrians and cyclists within the CBD and Darling Harbour Precinct particularly during commuter peak periods. TfNSW requests that ongoing consultation is required between the applicant and CBD Coordination Office within TfNSW during the design and construction of the proposed development.	6.9 & Appendix G	
3. Vehicular Management (TfNSW)	The proposed development is situated on Darling Drive which is a key route within the CBD. The Traffic and Transport Impact Assessment (Traffic Report) prepared to support the development application does not state the likely demand for the drop-off zone in Darling Drive. The vehicles queuing to access this drop off zone may cause delays and block vehicles on Darling Drive. In addition, any queuing due to vehicles accessing the car park and loading and	4.1 & 4.4	

Agency Response to Submission Reference	Agency Response to Submission	Relevant Section in This Report	Comment
	servicing area may also cause delays and block vehicles on Darling Drive. TfNSW requests that the applicant undertakes a detailed queuing analysis to identify the risks associated with the queuing on public roads and proposes mitigation measures to the satisfaction of the CBD Coordination Office within TfNSW and Roads and Maritime Services.		
4. Coach Parking (TfNSW)	Based on the Traffic Report, the use of the coach parking being installed in Darling Drive as part of the Sydney International Convention, Exhibition and Entertainment Centre (SICEEP) development, as well as the coach parking within the SICEEP site itself, is proposed. The future coach parking demand for both the SICEEP and Harbourside Shopping Centre developments have not been analysed in the Traffic Report. TfNSW requests that the likely cumulative future demand for coach parking be identified and alternative locations for coach parking be identified if required, in consultation with the CBD Coordination Office within TfNSW.	4.4	
5. Pedestrian Network (TfNSW)	The new pedestrian linkage and changes to the existing pedestrian connections that are proposed as part of the development will impact on pedestrian flows in the vicinity of the site. TfNSW requests that an analysis of the pedestrian network within and surrounding the site be undertaken to ensure there is sufficient capacity to accommodate the future demands, including during special events in consultation with the CBD Coordination Office within TfNSW.	4.2	A more detailed response to pedestrian modelling is contained in the Urbis report.
6, Darling Drive Cycleway (TfNSW)	The proposed development has a frontage on Darling Drive, which forms part of the strategic cycleway network in the CBD. TfNSW advises that the design	4.4	

Agency Response to Submission Reference	Agency Response to Submission	Relevant Section in This Report	Comment
	for the vehicular drop-off zone should take into consideration the future use of Darling Drive with the cycleway.		
7. Wayfinding Strategies (TfNSW)	The Traffic Report states that the Harbourside development is expected to introduce additional patronage for the light rail and ferry services adjacent to the development. TfNSW requests that the applicant develops wayfinding strategies and travel access guides to assist with increasing he mode share of walking and cycling.	4.2 & 5.3	A more detailed response to wayfinding is contained in the Urbis report.
8. Conditions of Consent (TfNSW)	A detailed discussion of in relation to the issues that needs to be considered as part of any Stage 2 development application for the subject site is included in TAB A. TfNSW requests that the applicant consults with the CBD Coordination Office within TfNSW and Sydney Trains to address the above issues. TfNSW would be pleased to consider any further material forwarded from the applicant.	4.2 & 6	This will be addressed during the Stage 2 application.
9. Construction Traffic Management Plan (RMS)	A Construction Traffic Management detailing construction vehicle routes, number of trucks, hours of operation, access arrangements and traffic control should be submitted to Council and Sydney Co-ordination Office prior to the issue of a Construction Certificate	6 & Appendix G	

3 EXISTING TRANSPORT CONDITIONS

This section of this Report establishes the existing transport network conditions in the study area around the Harbourside development. An investigation of existing network capacity is being undertaken to identify key issues with regard to network deficiencies at key roads and intersections.

3.1 Background and Project History

Previous traffic and transport reports for the Redevelopment of the Harbourside Shopping Centre were undertaken to support the initial Development Applications in 2016.

This section of this Report outlines the existing baseline traffic conditions based on traffic surveys undertaken in March 2013 for the Sydney International Convention, Exhibition and Entertainment Precinct (SICEEP), and on traffic surveys undertaken in March 2016 specifically in relation to the proposed Harbourside mixed use retail and residential development, and outlined in the traffic report dated 28th September 2016.

A comparison of the traffic count data collected for this project with traffic count data from 2013 SICEEP project revealed that overall the total traffic volume based on 2016 survey counts is approximately 90% of that obtained in 2013.

Following an update of the land use mix at the development to include a new commercial area, Arcadis initiated an updated traffic and transport study highlighting the likely impacts of the development on the road network. To capture the changes of the traffic patterns in the road network surrounding Harbourside, a new set of traffic surveys and classified intersection counts were commissioned in January 2020 at four key intersections expected to be impacted by the development.

3.2 Road Network

The key roads that provide access to the development site include:

1. Pyrmont Street – is a north-south road parallel to Murray Street to the east and Harris Street to the west, running one-way southbound.
2. Pyrmont Bridge Road – is a State Road (west of Harris Street) connecting the Glebe area to Darling Drive near the western end of Pyrmont Bridge.
3. Harris Street - is a 50 km/h State Road (south of Pyrmont Bridge Street) running parallel to Pyrmont Street. Parking is permitted on both sides of the street and regulated through parking ticket meters. During peak hour, no parking zones operate.
4. Darling Drive – is the main arterial road that the development is accessed from; and
5. Harbour Street – is classified as a State Road aligned in the north-south direction, parallel to Darling Drive and to the east of Darling Harbour

Figure 3 below outlines the above five key road locations.

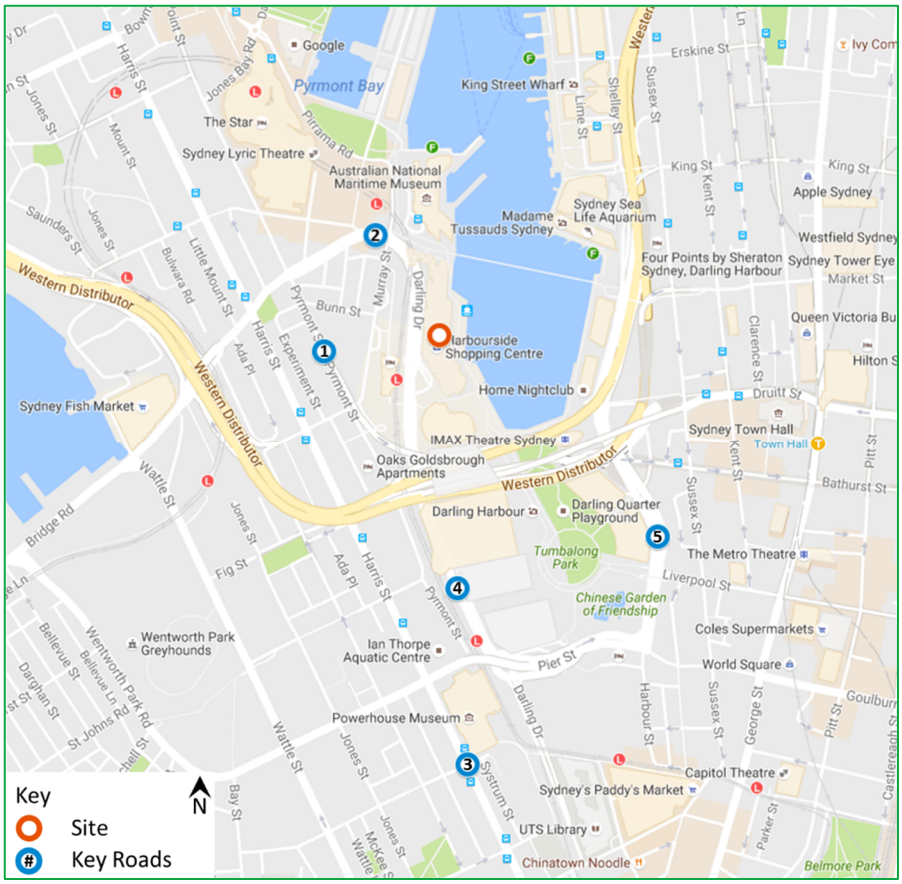


Figure 3 – Key Roads Location Plan

3.3 Traffic and Pedestrian Volumes

Traffic surveys were undertaken to collect new traffic data for key intersections and road corridors in the vicinity of the site. Intersection turning movement counts and mid-block surveys were carried out on the second week of February 2016, which were undertaken for the purpose of the original Harbourside Development Application.

Intersection turning movement counts and pedestrian counts were undertaken at three key intersections for a three-hour AM (6:00-9:00 a.m.) and PM (4:00-7:00 p.m.) period. These intersections are located on the direct access routes to the site. The survey locations include:

- Pyrmont Bridge Road / Darling Drive / Murray Street intersection.
- Harbour Street / Pier Street intersection; and
- Darling Drive / Ultimo Road intersection.

Mid-block counts were also undertaken for a seven-day period (24/7) along key road corridors leading to the site. The locations include:

- Pyrmont Bridge Road (west of Murray Street).
- Harbour Street (north of Pier Street); and
- Darling Drive (south of Pier Street).

It should be noted that surveys along Darling Drive between Pier Street and Murray Street were excluded due to the ongoing construction of the Sydney International Convention Exhibition &

Entertainment Precinct (SICEEP) development, which at the time of undertaking the February 2016 traffic surveys, was still in the construction phase. At the time of the 2016 traffic survey there were road/lane closures north of Pier Street with restricted access to construction zones for construction related traffic. As such, the traffic volumes on that section of Darling Drive were not representative of regular weekday or weekend traffic.

Additional traffic surveys were undertaken in January 2020 to understand current baseline traffic conditions. The SICEEP development is now fully operational and there were no road/lane closures in place during the 2020 traffic surveys.

Traffic surveys were undertaken over three days, from Wednesday 29 January to Friday 31 January 2020 at four key intersections expected to be impacted by the development, including:

- (I-1) Murray Street/ Darling Drive (traffic signals)
- (I-2) Darling Drive/ Pier Street (roundabout)
- (I-3) Harbour Street/ Pier Street/ Goulburn Street (traffic signals)
- (I-4) Darling Drive/ Ultimo Road (traffic signals).

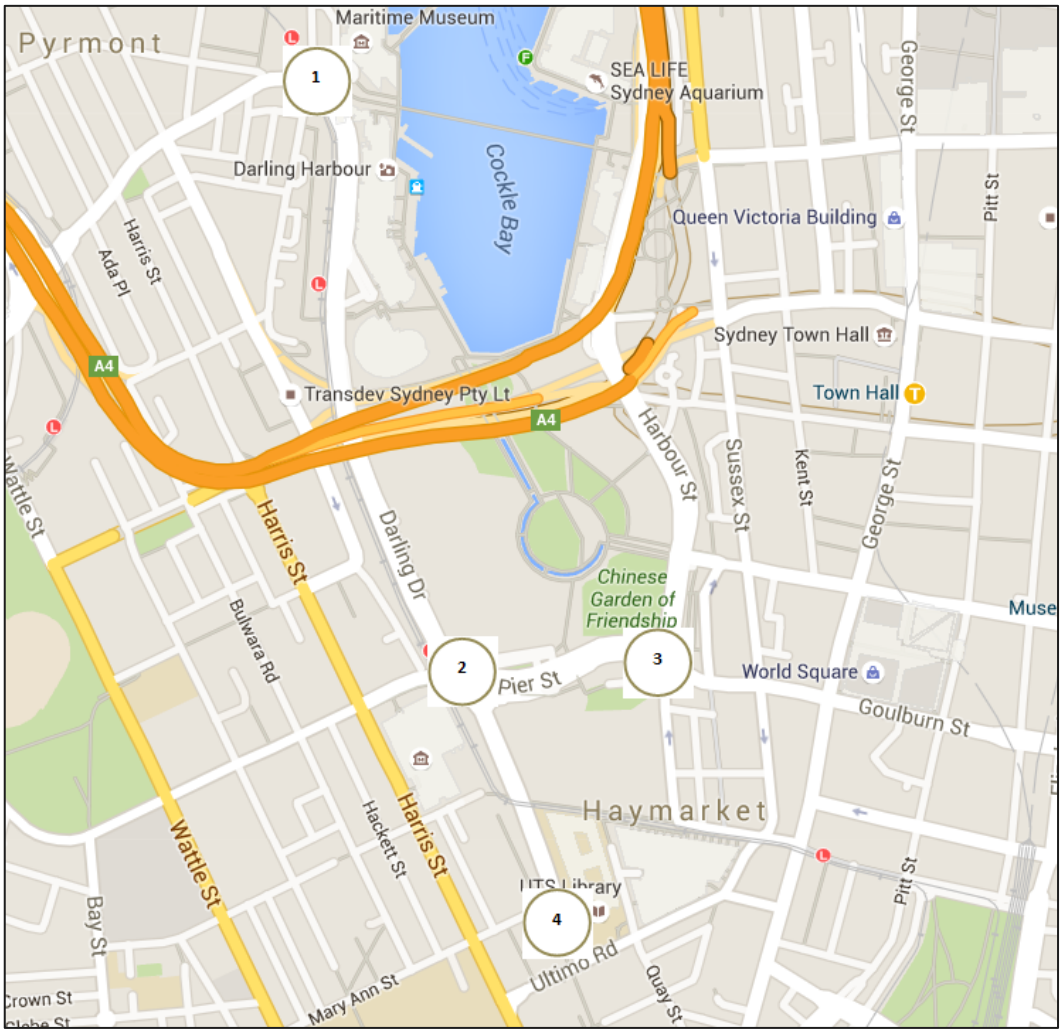


Figure 4 – Jan 2020 Traffic Survey Locations

3.3.1 Observed Peak Periods at Intersections

For each of the three intersections, peak one-hour periods were identified. The intersection turning movement data was used to identify the current capacity problems during the peak hour at key intersections. **Table 3** summarises the highest peak hour observed at each of the surveyed intersections.

Table 3 Observed AM and PM Peak Periods at the Key Intersections

Intersection	Control Type	AM Peak Hour	PM Peak Hour
Pyrmont Bridge Road / Murray Street / Darling Drive	Traffic Signal	8:00 – 9:00	17:45 – 18:45
Harbour Street / Pier Street	Traffic Signal	8:00 – 9:00	17:45 – 18:45
Darling Drive / Ultimo Road	Traffic Signal	8:00 – 9:00	17:00 – 18:00

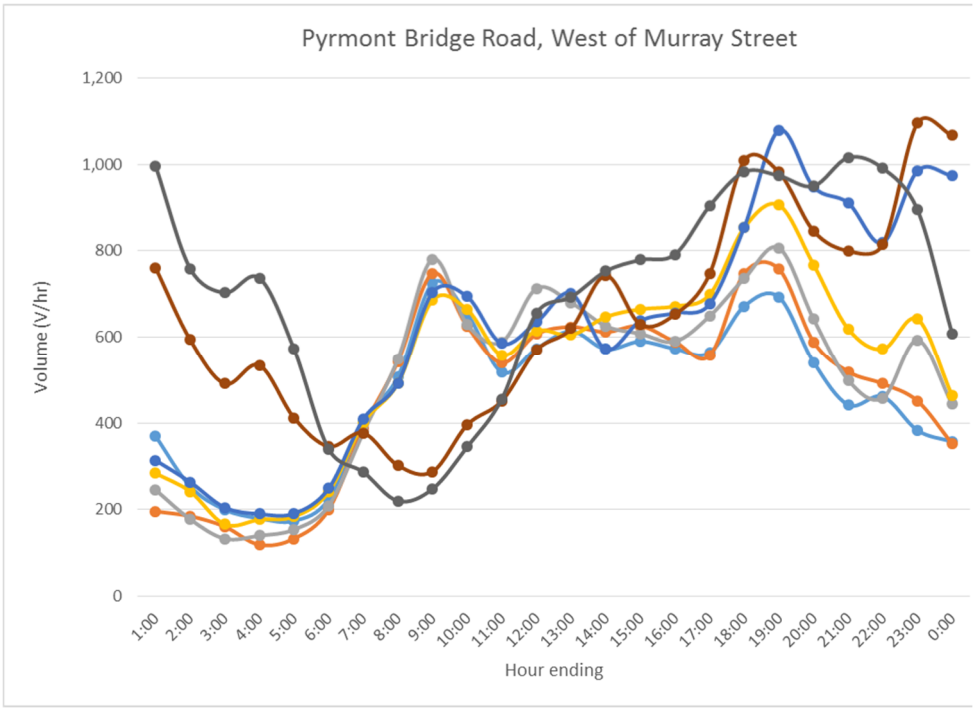
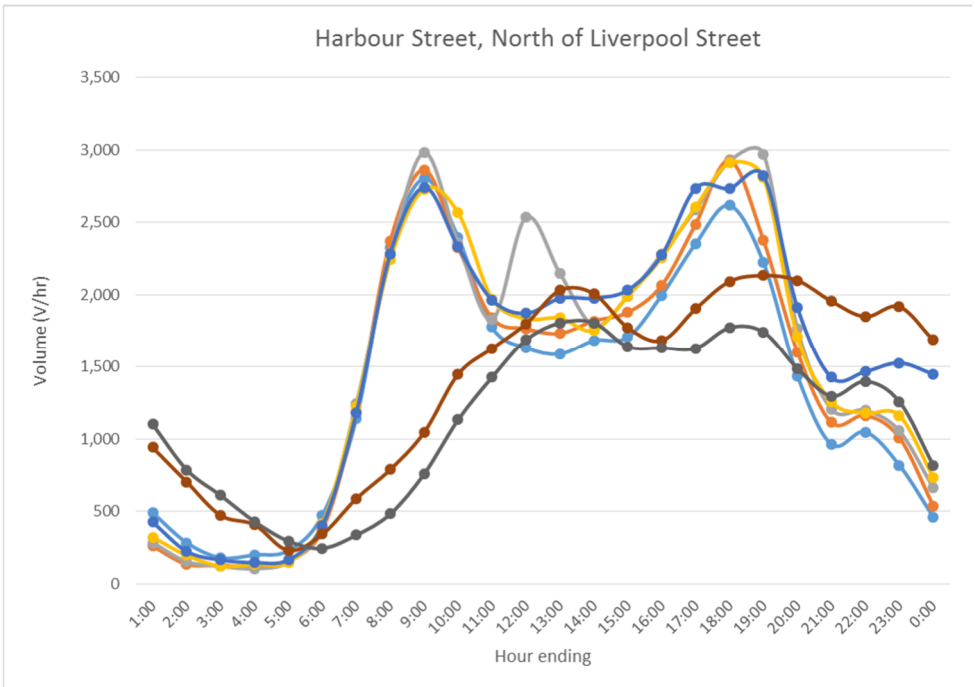
3.3.2 Traffic volume trends

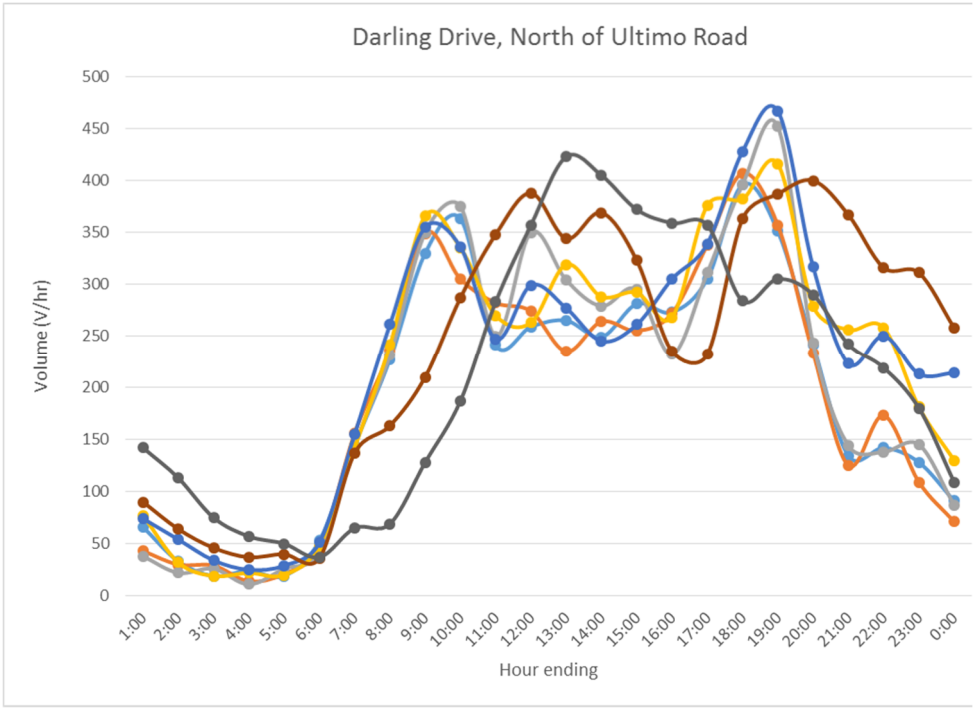
The 2016 mid-block counts showed the following trends:

- Monday to Thursday follow similar trends and volume profiles throughout the day with the Friday afternoon peak manifesting the highest weekday peak volumes at Pyrmont Bridge Road and Darling Drive
- Morning peak hour is generally between 8:00-9:00 a.m.
- The weekday evening peak was observed to generally occur between 6:00-7:00 pm
- Midnight traffic volumes are highest at Pyrmont Bridge Road on a Friday and Saturday
- Weekend traffic volumes have mid-day and evening peaks.

Daily and hourly vehicle profiles at key mid-block Locations (2016 surveys) are outlined in **Figure 5** below.

Figure 5 **Daily and Hourly Vehicle Profile at key Mid-Block Locations (2016 surveys)**

Location	Daily and Hourly Profile – Seven Day Week
M-1 Pyrmont Bridge Road (west of Murray Street)	
M-2 Harbour Street (north of Liverpool Street)	

Location	Daily and Hourly Profile – Seven Day Week
M-3 Darling Drive (north of Ultimo Road)	

3.3.3 Peak Hour Traffic Volumes at Key Roads

The four key intersections identified in **Figure 4** were modelled using SIDRA Intersection (version 8.0.7.7948) for the existing condition in 2020. The data collected over the three days were analysed, and the periods with the highest traffic volumes across the three days formed the basis for the morning and afternoon peak hour models. The results of the traffic surveys are attached in **Appendix B** of this report.

A comparison of the traffic counts undertaken in 2016 and the recent 2020 surveys is shown in **Appendix C**. The results indicate minimal changes to traffic volumes and flows across the four intersections. For the Pier Street/Darling Drive roundabout, the north-east leg of Zollner Crescent was included as part of the 2020 survey and analysed in the SIDRA analysis.

3.4 Parking

There are several public carparks located within walking distance to the Harbourside development. The six carparks listed in the table have a total capacity of approximately 5,373 parking bays.

Table 4 Carpark Availability

Public Carpark	Location	Distance	Bays
1- Wilson Parking - Harbourside	100 Murray Street, Pyrmont	120 metres west	1,387
Harbourside Carpark	117 Murray Street, Pyrmont	180 metres west	
2- Secure Parking - Harris Street	300 Harris Street	350 metres south west	260
3- InterPark – Edward Street	Edward Street	300 metres north west	2,500
4 – ICC Exhibition Centre (SICEEP)	Darling Drive	300m south	719
5 – ICC Theatre (SICEEP)	Darling Drive	650m south	107
6 – Darling Square Haymarket (SICEEP)	Darling Drive	750m south	400
Total			5,373

Although the SICEEP car parks will likely be at capacity during events, there will likely be spare parking capacity during non-event times.

Figure 6 below outlines the location of the above car parks. The dashed circles represent 5 and 10-minute walking distances.

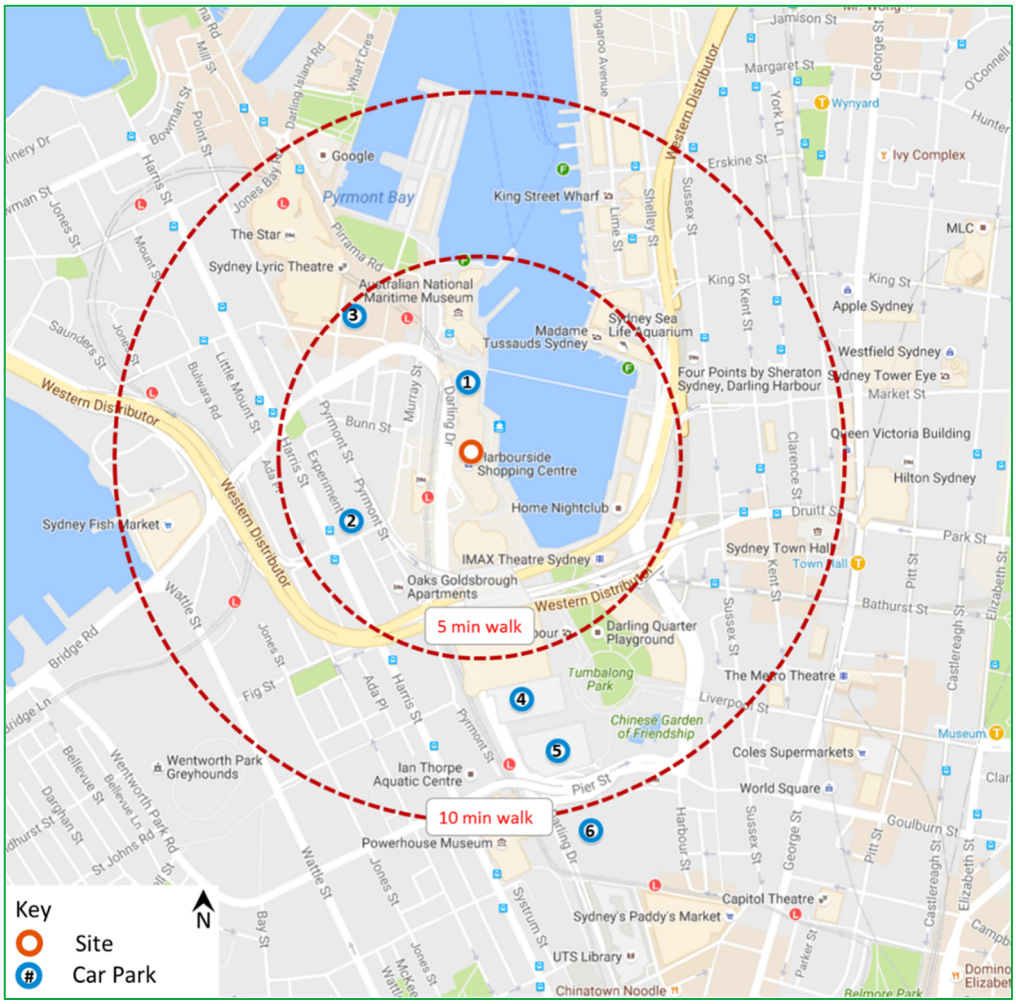


Figure 6 – Locations of Car Parking in the vicinity of the Harbourside Development

3.5 Public Transport

3.5.1 CityRail Suburban Rail Services

The site is within close proximity to public transport and is within walking distance to the rail network serving the Sydney CBD. Town Hall Station (approximately 500 m) is a 15-minute walk via Cockle Bay Wharf and Central Station (approximately 1 km) can be reached in 25 minutes by walking from the site.

3.5.2 Light Rail

The closest public transport service is the light rail station at Convention Centre, which is a two to three-minute walk away, providing a direct connection from both the Inner West and Central railway station to Darling Harbour South. The light rail provides transport solutions for commuters travelling to and from the CBD and the inner southern and eastern suburbs. **Figure 7** contains a map of the Sydney light rail coverage for the development area.

Figure 7: Sydney Light Rail Coverage Map (Source: www.sydneylightrail.transport.nsw.gov.au)

The light rail operates from 6am to 11pm daily between Central Station and Lilyfield with a service frequency of 8 minutes during the peak hour and 15-minute intervals during the off-peak and inter-peak periods. The light rail operates 24hrs daily between Central Station and Star Casino with a night service operating at 30-minute intervals. Extended hours are also observed on the Central Station to Lilyfield route during Fridays and Saturdays.

Both the existing Convention Centre and Exhibition Centre light rail stops were upgraded with longer platforms to accommodate the new longer light rail trains, which has helped to increase capacity at both of these stops.

The ongoing construction of the Sydney CBD and South East Light Rail project (CSELR) will expand the light rail network to Circular Quay along George Street to Central Station, through Surry Hills, Moore Park, Kensington and Kingsford via Anzac Parade and Randwick via Alison Road and High Street. The CSELR is expected to be completed in 2020.

3.5.3 Sydney Metro West

The planned new Sydney Metro West line is proposed to start construction in 2020 and is estimated to be completed in 2024. This new transport facility will link Westmead with the Sydney CBD and infrastructure investment will double the rail capacity of the Parramatta to Sydney CBD corridor with a travel time target between the two centres of about 20 minutes.

A potential Metro station has been identified at Pyrmont. If included in the planning of Sydney Metro West, this future Metro station would be located within a 5-10 minute walking distance to the Harbourside development.

3.5.4 Existing Public Bus Services

The closest bus stop is located at the Maritime Museum approximately a 5 minutes walking distance from the Harbourside site and it is being serviced by bus route 389, which operates between Pyrmont and North Bondi via the City, Paddington and Bondi junction.

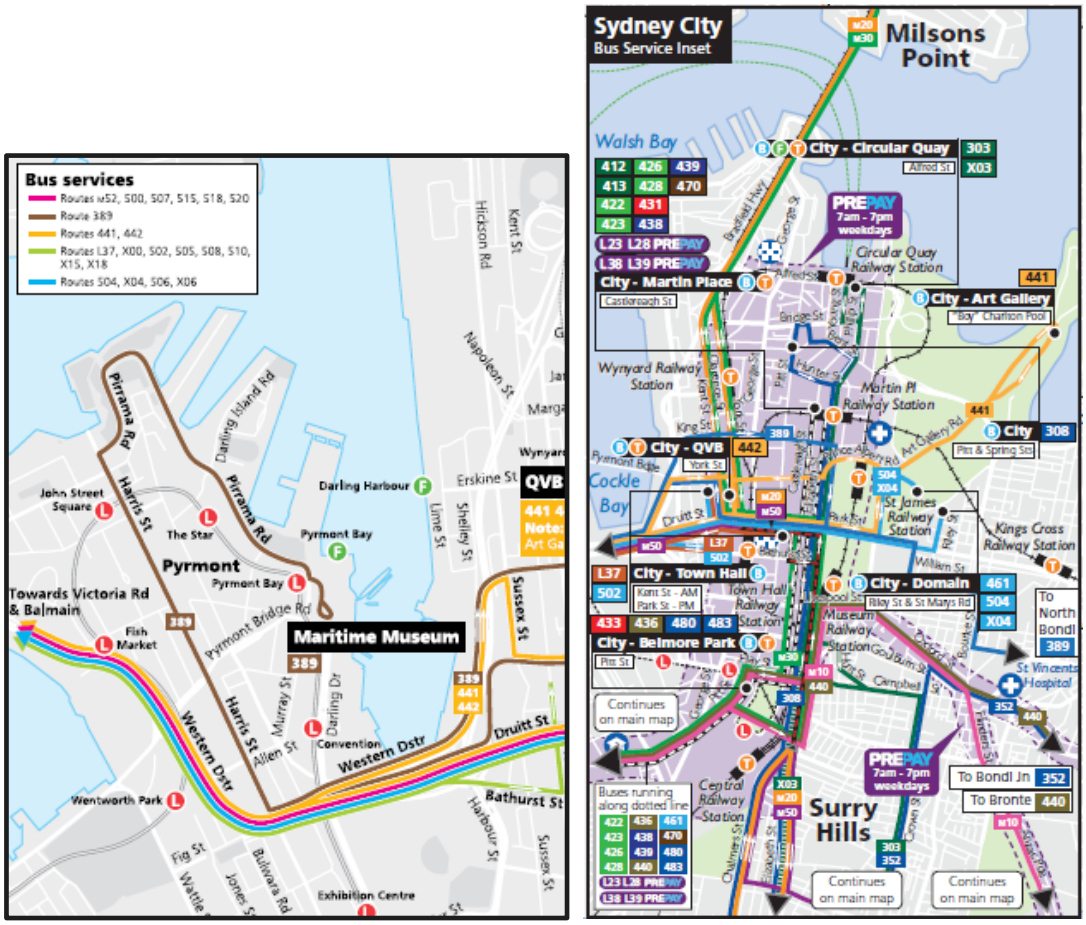


Figure 8: Bus Service Coverage Map adjacent to the site and in Sydney CBD (Source: Sydney Buses)

3.5.5 Ferry Services

Sydney Ferries operates ferry services between Circular Quay and Darling Harbour via Milson Point, McMahons Point, Balmain East and stops at Sydney Aquarium and Pyrmont Bay. Both

stops are approximately 5-10 minutes walking distance to the Harbourside development. The ferry services at Pyrmont Bay Wharf has a service frequency of every 30 minutes and operates from 6:30 AM to 8:00 PM. **Figure 9** below contains a coverage map of ferry services adjacent to the site and in the CDB district.

In addition, water taxis operate in Sydney Harbour and provide pickup or drop off at any accessible wharf or waterfront location.

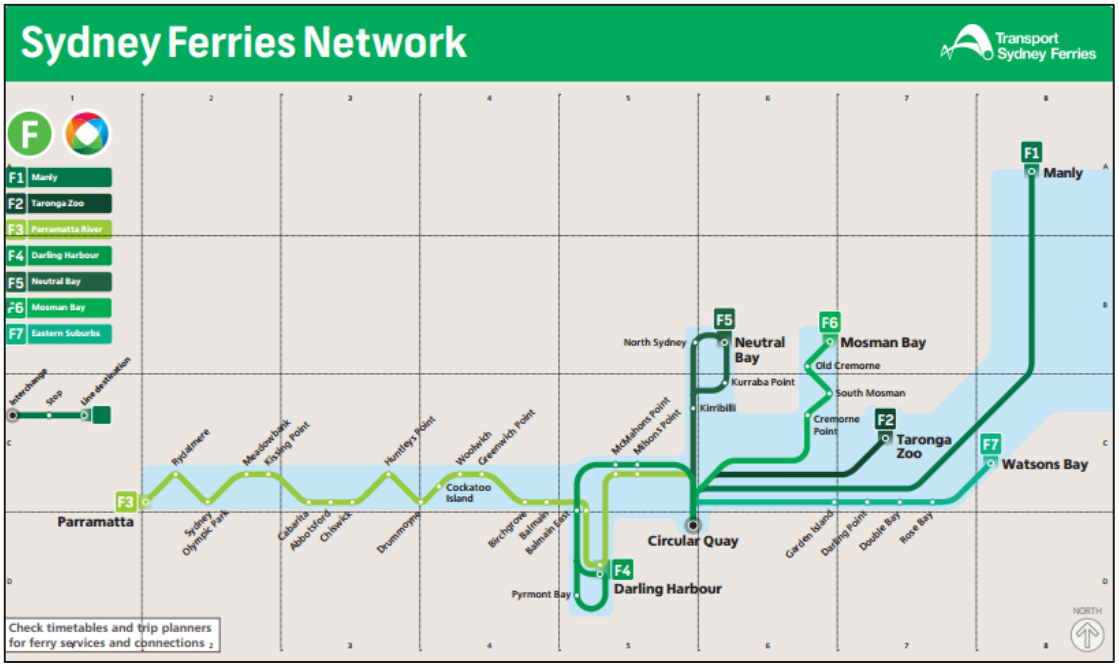


Figure 9: Ferry Service Coverage Map adjacent to the site and in Sydney CBD (Source: Sydney Ferries)

3.6 Pedestrian Network

The area surrounding the site has a well-established pedestrian network and is characterised with high levels of pedestrian activity as a result of the commercial, retail and tourist land uses. The pedestrian network consists of footpaths alongside major roads and multiple road crossings or overhead walkways including steps, ramps or lifts. There are a number of pedestrian access routes to and from the site. These routes are linked to the public domain areas within Tumbalong Park and Darling Harbour and to the various trip attractors within Darling Harbour and surrounding the site.

The major pedestrian links to the Harbourside site include connections to Sydney CBD, Town Hall and Central Station and adjacent areas via Pyrmont Pedestrian Bridge, pedestrian overpasses, footpaths along major roads and at-grade pedestrian crossings. The principal routes to and from Town Hall are Druitt Street and Bathurst Street. From Central Station, a direct route exists along Quay Street and through the Darling Harbour precinct. In addition, the Ultimo Pedestrian Network transformed the Goods Line into an active transport link, connecting cultural and educational institutions, and improving pedestrian access from Central Station and Railway Square through to Pyrmont and Darling Harbour. The Goods Line opened in August 2015.

From Central Station, a direct route exists along Quay Street but is under-utilised as linkages close to Central Station are poor. The Goods Line provides the alternate and improved route linking Central Station to Darling Harbour and Pyrmont.

The SICEEP development also includes a new nominally 20m wide pedestrian Boulevard, linking Chinatown to Darling Harbour, the proposed Harbourside Development and Cockle Bay Wharf.

3.7 Cycle Network

The Sydney CBD Cycleway network consists of on-street marked cycle lanes and separated at-grade cycleways. However, the majority of the routes in the Sydney CBD are shared routes on roads containing medium to high levels of vehicular traffic.

The north-south off road cycle path along Darling Drive provides access to the broader cycling network. North of the Darling Drive / Pier Street roundabout a new dual lane two-way segregated cycleway is provided along the western side of Darling Drive up to a proposed signalised scramble crossing in the northern sector by the ICC and ICC Hotel. At this junction the cycleway utilises the signalised scramble crossing to allow a safe connection to the existing single lane, one-way cycle way network, on the eastern side of Darling Drive.

The improved dual lane two-way segregated cycle path on the west side of Darling Drive ties into a shared space zone, in the southern sector, south of the Darling Drive / Pier Street roundabout. Within this shared space zone, the dual cycle way splits and links into the existing single lane, one-way cycle way network, on either side of Darling Drive.

The enhancement of the cycle network along Darling Drive and provision of end-of-trip facilities in the form of bike racks was part of the SICEEP development and was aimed at encouraging the use of cycling and to increase the cycle mode share in accordance with current targets for sustainable transport.

Figure 10 contains a plan of the existing Sydney CBD cycleway network in the vicinity of the Harbourside development.

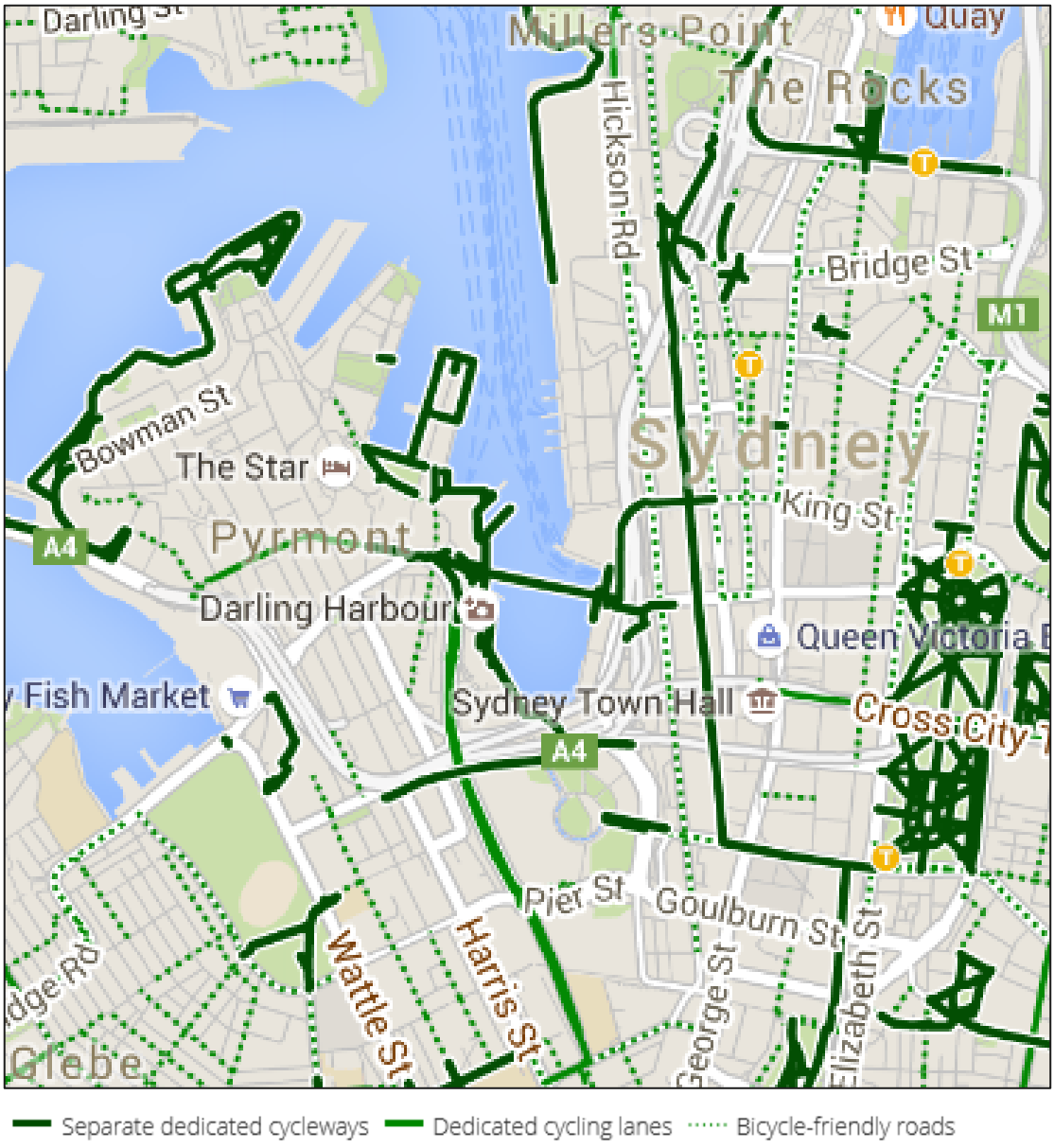


Figure 10: Existing cycle network (www.sydneycycleways.net)

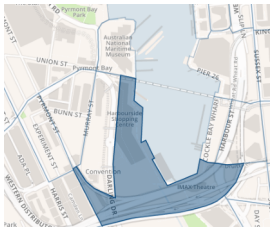
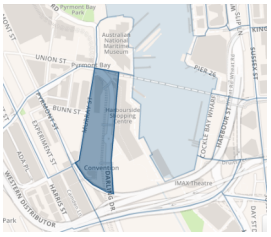
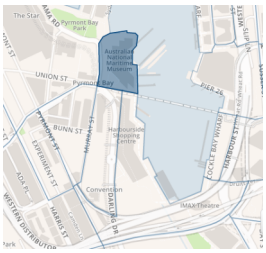
The peak hour traffic count undertaken at the intersection of Pyrmont Bridge Road/Murray Street/Darling Drive revealed there is a heavy influx of cyclists eastbound towards the city along Pyrmont Bridge Road in the AM peak. A total of 727 cyclists were counted over a three-hour period from 6:00 AM to 9:00 AM with 406 cyclists observed during the peak hour. In the PM peak, the opposite flow (westbound) was heavier with 519 cyclists counted over the three-hour period from 4:00 PM to 7:00 PM with 252 cyclists observed during the peak hour.

3.8 Mode Share

The existing mode share distribution within the surrounding road network was analysed by referencing the 2011 Census Journey to Work (JTW) data obtained from the Bureau of Transport Statistics, 2013. The JTW data provides information relating to the origin and destination of journeys to and from work for a travel zone, including modes of travel.

To understand the current mode share for trips to work in the study area, travel to and from the existing Harbourside development and to the adjacent zones were analysed.

Table 5 Travel Modes

Travel Mode	Zone 89	Zone 88	Zone 78
			
Train	35%	43%	40%
Vehicle driver	31%	32%	23%
Walk	15%	9%	7%
Bus	14%	5%	18%
Vehicle passenger	2%	7%	-
Ferry	1%	4%	7%
Other mode	1%	-	4%
Not stated	1%	-	1%

The data revealed that the dominant modes of travel to work on the site and for areas immediately adjacent to the site are train (35-43%), car (23-32%), bus (5-18%) and walk (7-15%). Public transport accounts for approximately 50% of the trips. Walking trips are also observed to be relatively high.

3.9 Private Coach Access

The proposed SICEEP development was completed in September 2016, provided new on-street bus parking drop-off bays, which are located along the southbound lane of Darling Drive, north of the proposed signalised Convention Centre scramble crossing. This zone can accommodate two 14.5m private coaches and is located adjacent to the proposed ICC Hotel and Harbourside development. Another bus bay is provided on the opposite side of Darling Drive on the northbound lane.

Furthermore, the proposed shared space zone that is located within the SICEEP development, between the ICC Convention Centre and the ICC Hotel has been designed to allow access for 14.5m coaches, for pick-up and drop-off purposes. This shared zone area has the capacity to accommodate up to eight 14.5m coaches at any one time, and it is also located adjacent to the Harbourside development.

Figure 11 contains a key plan of adjacent transport facilities to the Harbourside development.

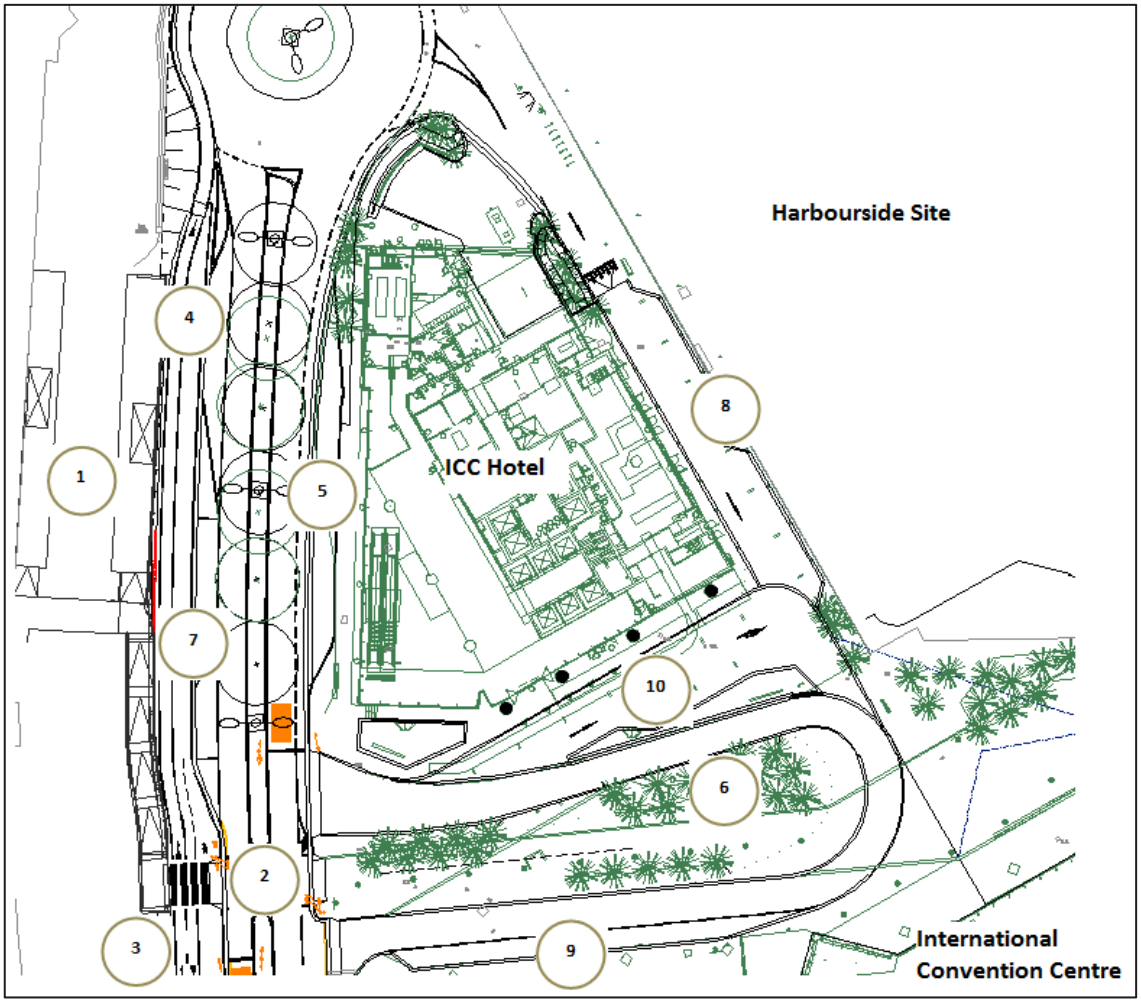


Figure 11: Key plan of adjacent transport facilities

Table 6: Key transport facilities adjacent to Harbourside

Key Reference No.	Transport Facility
1	Improved Convention Light Rail Stop Platforms
2	Signalised Scramble Crossing
3	Dual segregated cycleway
4	1 x 14.5m coach bay
5	2 x 14.5m Coach bays
6	Harbourside Place Shared Zone – Coach drop-off and pick-up
7	Taxi Zone
8	Taxi Zone
9	Taxi drop-off and pick-up
10	Porte Cohere

3.10 Taxi Zones

The SICEEP development contains multiple taxi zones within the development, which are located adjacent to the Harbourside development. These include new taxi zones located.

- Along the northbound lane of Darling Drive (5 spaces).
- Within the shared zone (Harbourside Place) located between the ICC Convention Centre and the ICC hotel – drop-off and pick-up (5 spaces)
- A porte cohere located as part of the ICC Hotel – drop-off and pick-up; and
- Along the access lane located between the ICC Hotel and the Harbourside development – 5 spaces

4 PROPOSED AMENDED DEVELOPMENT

Since exhibition of the proposal and given the nature and range of submissions made from agencies and the pubic, Mirvac has been reviewing the overall approach and elements of the Concept Proposal. This has accordingly led to developing an Amended Concept Proposal. The final Concept Proposal therefore includes substantial amendments made my Mirvac pursuant to Clause 55 of the Environmental Planning & Assessment Regulation, in the main to address matters raised in the submissions and deliver an overall significantly improved outcome on the site and for the broader Darling Harbour precinct.

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The following key amendments have been made to the proposal:

4.1 Relocation of the Tower

The tower element of the Concept Proposal has been relocated from the north of the site to the centre of the site (the widest part of the site) to allow for an increased setback from the heritage listed Pyrmont Bridge, improved relationship to the waterfront and ICC Hotel, to minimise view impacts from 50 Murray Street, together with reducing overshadowing impacts on the public domain and improved solar amenity to the northern end of the retail centre.

4.2 Reduction in Height of the Tower

The height of the tower has also been reduced from RL 166.35 to RL 153.75. The reduction in the height will minimise overshadowing impacts to the public domain as well better relate to the height of the ICC Hotel.

4.3 Reduction in Height of the Podium

A portion of the podium height at its northern extent has been partly reduced from 30.5 RL to RL 25. The reduction in height provides for improved view sharing from 50 Murray Street.

4.4 Removal of Tower 'Tail' element

As part of the relocation of the tower and refinement of the podium, the stepped form of the lower tower element has now been removed. This design move has been made in order to again improve views from adjacent buildings from the west.

4.5 Building Footprint of the Tower

The building footprint of the tower has increased in width, to accommodate the floorspace from the reduction in height of the tower and removal of the 'tail'.

4.6 Gross Floor Area / Land Use Mix

The amended proposal retains the same overall 87,000sqm of GFA, however there is a minor adjustment in the split between non-residential and residential:

- Non-residential uses floor space – 49,000sqm; and
- Residential uses floor space – 38,000sqm

In response to market demand and the focus of local and regional strategic planning policies, it is proposed for the podium to include both retail and commercial land uses. Indicatively, comprising ~23,000sqm net lettable area of commercial and ~15,000sqm gross lettable area of retail.

The podium enables large campus sized commercial floor plates that are favoured by large multinational tech, finance and professional services companies.

4.7 Apartment numbers

As a result of a review of the mix and sizing of apartments, there is a minor reduction in the indicative number of apartments, from 364 to 357. Note, this yield is on the 'Indicative Design' only and will be subject to future design development and a Stage 2 DA. This Stage 1 DA only seeks approval for land uses and the building envelope comprising a total of 87,000sqm GFA.

4.8 Car Parking Spaces

The extent of the basement will remain the same, but there has been a minor increase of 11 car parking spaces from 295 spaces to 306 spaces. As above, this is based on the 'Indicative Design' only.

A more detailed and comprehensive description of the amended proposal is contained in the Response to Submissions and Amended Concept Proposal prepared by Ethos Urban.

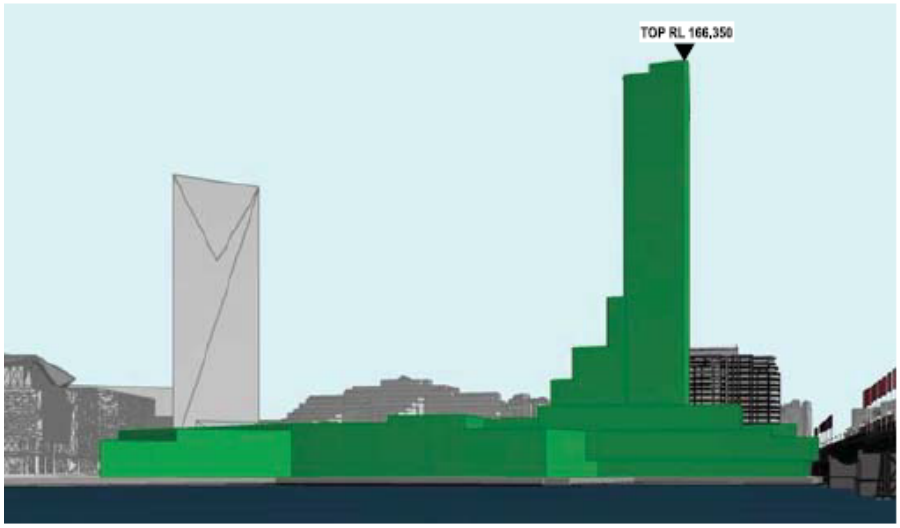


Figure 12: Original Submitted Concept Proposal

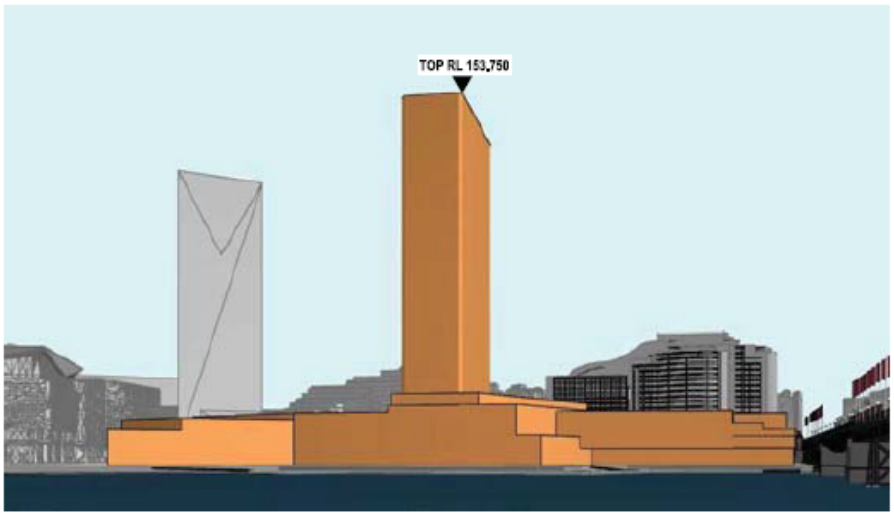


Figure 13: Amended Concept Proposal

4.9 Landscaped Open Space and Public Domain

All of the key concepts and public benefits as originally proposed are retained under the amended Concept Proposal, with the addition of further landscaping opportunities on the northern rooftop extent of the retail podium, further enhancing views and outlook from 50 Murray Street.

The final Concept Proposal seeks approval for the following key components and development parameters:

- Demolition of existing site improvements, including the Harbourside Shopping Centre, pedestrian bridge link across Darling Drive, obsolete monorail infrastructure, and associated tree removal.
- A network of open space areas and links generally as shown within the Public Domain Concept Proposal, to facilitate re-integration of the site into the wider urban context.
- Building envelopes.
- Land uses across the site, non-residential and residential uses.
- A maximum total Gross Floor Area (GFA) across the Harbourside site of 87,000m2 for mixed use development (49,000sqm non-residential and 38,000sqm residential development).
- Basement car parking.
- Car parking rates to be utilised in subsequent detailed (Stage 2) Development Applications).
- Urban Design and Public Realm Guidelines to guide future development and the public domain; and
- Strategies for utilities and services provision, drainage and flooding, and ecological sustainable development.

4.10 Parking Provision

4.10.1 Existing Car Parking

The current Harbourside Shopping Centre operator leases car parking for the existing retail patrons from the Novotel hotel car park. It is proposed that this current retail parking provision arrangement will continue for the proposed development. Patrons will park here and then access the new Harbourside Shopping Centre via the new Bunn St bridge.

4.10.2 Basement Parking

The proposed development will provide approximately 303 car parking spaces in the basement, which will be provided for over three basement levels. Final car parking provision will be determined at the detailed design stage. The three levels of basement car parking are for residential parking only.

The entrance and exit from the proposed basement car park are not directly located along Darling Drive. Vehicles will enter and leave the basement car park via the existing access roads that service the existing Harbourside loading dock, which are located at the existing Darling Drive roundabout by the ICC Hotel. The length of the entry access road to the basement car park is approximately 150m from the car park entry to the interface with Darling Drive.

Table 3.3 of AS:2890.1 Off-Street Car Parking outlines peak hourly in-flow of traffic and queue areas required for car parks with boom gates and ticket issuing devices at entry points. Applying the criteria outlined in that table would require a vehicle queue storage allocation of 19 vehicles. Applying 6m for a vehicle footprint would equate to a queue storage length of 114m, which is less than the 150m provided. This assessment is a robust assessment and detailed modelling would likely reduce this number.

As such, traffic queued entering the basement car park is unlikely to impact the operation of traffic on Darling Drive.

Appendix D of the Report outlines vehicle swept paths using industry standard software (AutoTrack) for vehicle entering and egressing the basement car park.

4.10.3 Bicycle Parking

Bicycle parking facilities are proposed and will be confirmed during the detailed design stage of the proposed development.

4.11 Pedestrian Network

The proposed pedestrian network will link up with the existing pedestrian network and the initiatives developed under the SICEEP development mainly consisting of the main boulevard that will be up to 20m wide and will have sufficient capacity to cater for peak pedestrian demand anticipated during events at the precinct. The main boulevard will provide the main linkage from the south between Chinatown and Darling Square in Haymarket, Darling Central and Bayside within the SICEEP development and the Harbourside development and Cockle Bay, in the north.

Pedestrian linkages to the west of Harbourside will be improved by the relocation of the pedestrian bridge connecting the now closed Convention Centre monorail station to the Novotel Hotel carpark to an improved connection from the Harbourside development with Bunn Street. Connectivity to the Sydney CBD to the east of Harbourside will be maintained via Pyrmont Bridge Road, the existing pedestrian overpasses and at-grade pedestrian crossings. Please refer to **Figure 14** for a location plan of the existing and proposed pedestrian bridge over Darling Drive and the light rail. The new pedestrian bridge will consider all relevant limited in height stratum associated with the light rail catenary infrastructure.

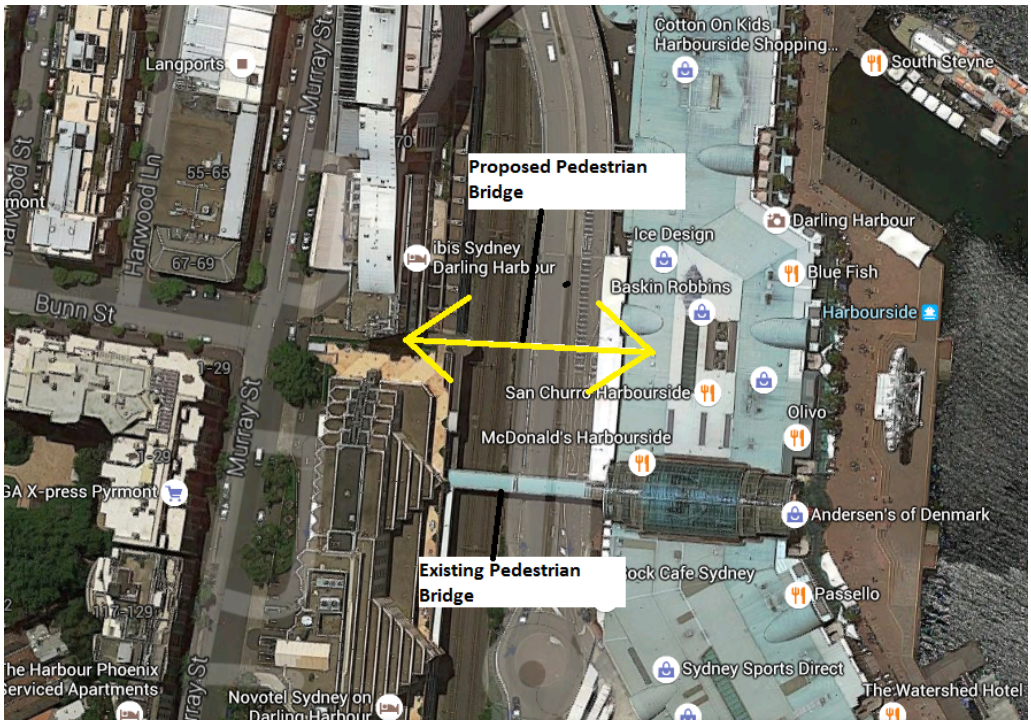


Figure 14: Proposed Pedestrian Bridge Location Plan

Arcadis consulted with TfNSW and the light rail operator (TransDev) in February 2016 and outlined the concept proposal.

Ongoing consultation will be undertaken between the applicant, TfNSW, the light rail operator, and if required, Sydney Trains during the design and construction of the proposed development, with regard to all design elements of the proposed development that interface with the light rail corridor. In particular, this relates to the demolition and construction of the new pedestrian bridge links over the light rail corridor.

Pedestrian modelling will be undertaken during future design stages to ensure that adequate capacity for pedestrian movements is provided at critical locations within the proposed development footprint and surroundings.

Wayfinding strategies and travel access guides to assist with increasing the mode share of walking and cycling will be developed during future design stages of the development.

4.12 Cycle Network

The cycle network will be consistent with the existing cycle network together with the improved network provided with the SICEEP development. The proposed cycle access for the Harbourside development will include the Darling Drive cycle network and the internal cycle route within the Darling Harbour Precinct via Tumbalong Park. Access to the development will be enhanced at key entry points for cyclists with facilities provided where necessary. No new cycle routes will be developed.

4.13 Servicing

4.13.1 Commercial Kiss & Ride Facilities

A new Kiss & Ride drop-off facility is proposed that will provide a car and taxi drop-off facility to the proposed Harbourside development, which will be provided off the existing southbound Darling Drive up-ramp, located approximately 55m south of the Pyrmont Bridge Road intersection. This drop-off facility will be designed in accordance with best practice road design guidelines and it will be DDA compliant, to consider mobility impaired patrons.

Please refer to **Figure 15** for an indicative location of this drop-off facility. This vehicular Kiss and Ride drop-off facility is proposed for the commercial uses of the development only.

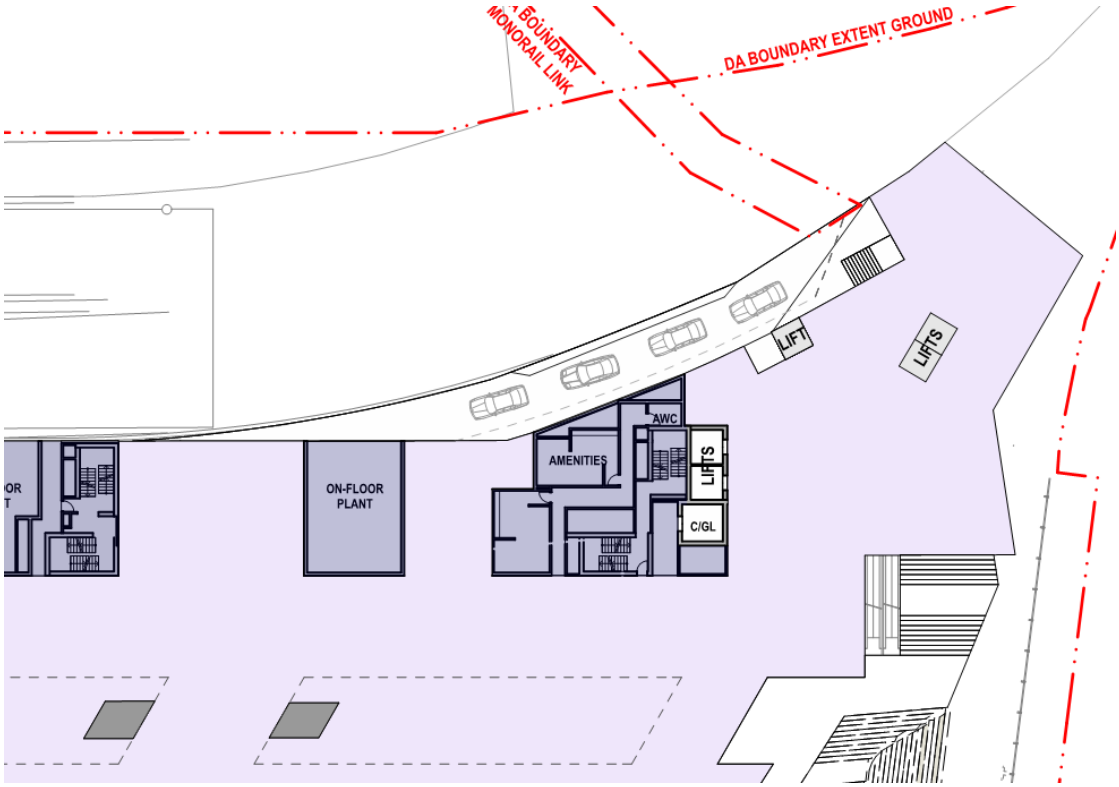


Figure 15: Indicative Plan of Retail Drop-off Facility

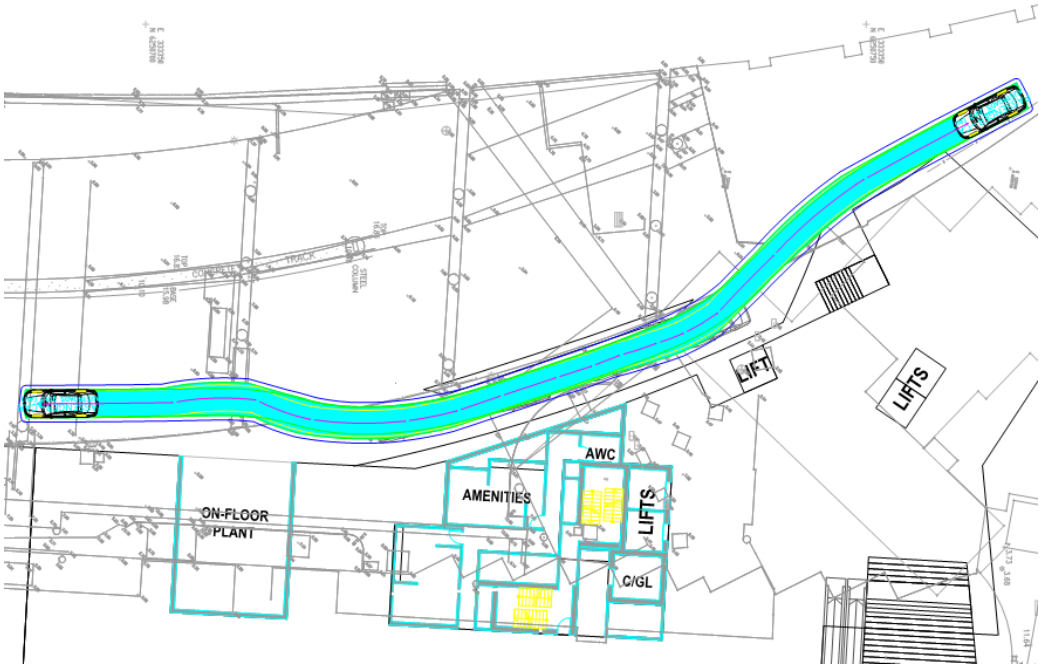


Figure 16: 5.2m Car Swept Path at Indicative Plan of Drop-off facility

Figure 16 outlines the vehicle swept path of a 5.2m car. This swept path demonstrates that the proposed drop-off can accommodate this movement.

The capacity of the drop-off zone will be governed by the length of time it takes on average for a vehicle to be presented with a break in traffic along the Darling Drive southbound lane, so that vehicles queuing to depart do not impact the operation of the drop-off facility. Traffic flow on the approach to the drop-off facility exit is governed by the existing traffic signal controls at the Pyrmont Bridge Road intersection. This will allow for controlled egress movements from the drop-off zone, in conjunction with random egress movements in breaks of traffic. Detailed traffic modelling will be undertaken during future development stages to assess the operation of the drop-off facility with regard to queue lengths of departing traffic from the drop off facility. Should this drop-off facility be at capacity, drivers can bypass this facility and continue to the other drop-off zone proposed at ground level, or to the drop off zone at the ICC Hotel Harbourside Place facility. Consultation will be undertaken with the Roads & Maritime Service (RMS) during detailed design to agree the trip rate of assumed vehicles per hour accessing this Kiss and Ride drop-off facility.

There is an existing cycleway that is located on both the northbound and southbound side of Darling Drive. The southbound lane is located along the section of Darling Drive where the proposed vehicular drop-off access and egress location points are proposed. As such, vehicles entering and leaving this drop-off will need to cross the existing cycleway.

This design interface will be considered in the future design development stages to consider cyclist safety. Design measures such as road line markings and road traffic signs will be considered in the future design to inform drivers of the potential presence of cyclists for vehicles entering the drop-off area. Road line marking, road traffic signs and consideration of appropriate sightlines will be considered for vehicles entering and egressing from the Kiss and Ride drop-off area.

The road geometry and layout of this drop-off facility is only at concept design phase. The road geometry and layout of this drop-off facility, and approach road line marking will be developed

during the detailed design stages, to accommodate a drop off facility that is compliant with relevant design codes, and that is safe for drivers both using it and bypassing it.

Consultation with the Roads and Maritime Services (RMS) and City of Sydney is recommended during the design development phase with regard to the drop-off facility.

4.13.2 Residential Vehicular Drop-off

A separate vehicle drop-off is proposed at ground level for residential use. This drop-off would be accessed via the same entry and exit access road as that of the basement car park. The location of the drop-off is outlined in **Figure 17** below.

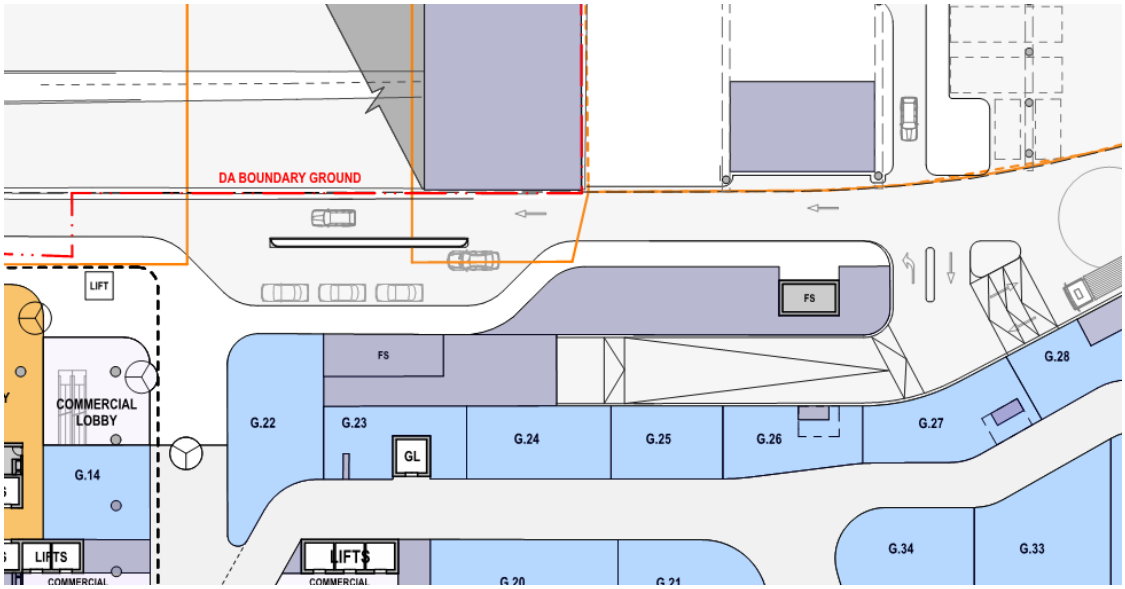


Figure 17: Residential Drop-off Zone and Basement Car Park Entry/Exit at Ground Level

4.13.3 Bus Parking Provision

It is not anticipated that there will be a need for bus parking provision as passengers visiting the shopping centre and surrounding Darling Harbour attractions that are dropped off by bus would likely be picked up later that day, which is similar to the current private bus service to the existing shopping centre. As such, dedicated bus parking is not proposed as part of this development proposal. The cumulative future demand for coach parking for the SICEEP development and the Harbourside development and the identification of alternative locations for coach parking is not required in this report.

4.13.4 Loading Dock

The current Harbourside Shopping Centre development contains the following capacity within its loading dock, which is located to rear of the development under the Darling Drive road ramp.

- 7 x HRV bays
- 3 x MRV bays
- 5 x Small service vehicle bays

The proposed development will contain two separate loading docks:

1. Retail ground level loading dock
2. Basement Level 1 loading dock

Ground Level Loading Dock

The primary use of this loading dock is for the commercial element of the proposed development with some secondary use for the retail element of the development. **Figure 18** below outlines the layout of this loading dock.

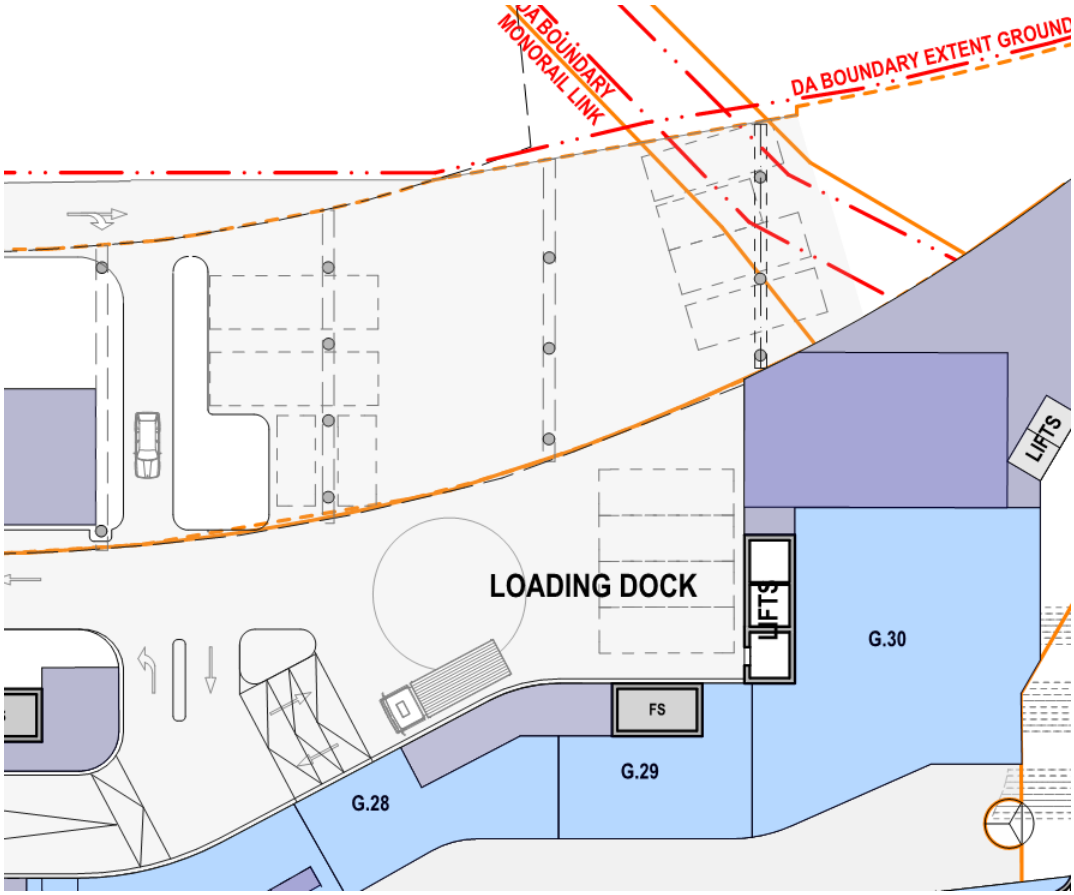


Figure 18: Ground Level Loading Dock Indicative Concept Design

The proposed loading dock will be accessed via the access road from Darling Drive roundabout that is currently used by the existing loading dock.

It is anticipated that the proposed loading dock will cater for the following:

- 2 x HRV bays.
- 7 x MRV bays; and
- 3 x Small service vehicle bays

However, numbers are subject to change in the detailed design stage.

The expected percentage usage of the loading dock is split as follows:

- 20% HRV;
- 60% MRV; and

- 20% SRV

The length of the proposed access road that links Darling Drive to the loading dock is approximately 100m. As such, this access road can accommodate up to seven queued 12.5m HGV on entry to the loading dock. As such, it is unlikely that queued vehicles entering the loading dock will impact on the operation of Darling Drive. It is recommended that a loading dock management plan is developed by the operator at a future date to ensure effective management of staged deliveries so as to not impact the operation of the loading dock or Darling Drive. A swept path assessment was undertaken to demonstrate access to and egress from this loading dock. The swept path diagrams are shown in **Appendix D**.

The final loading dock layout will be confirmed during future detailed design stages of the proposed development.

Basement Level 1 Loading Dock

The primary use of this loading dock is for the retail element of the proposed development with some secondary use for the commercial element of the development. It should be noted that the overall GFA of the retail element will be reduced as result of the proposed development, relative to existing. **Figure 19** below outlines the layout of this loading dock.

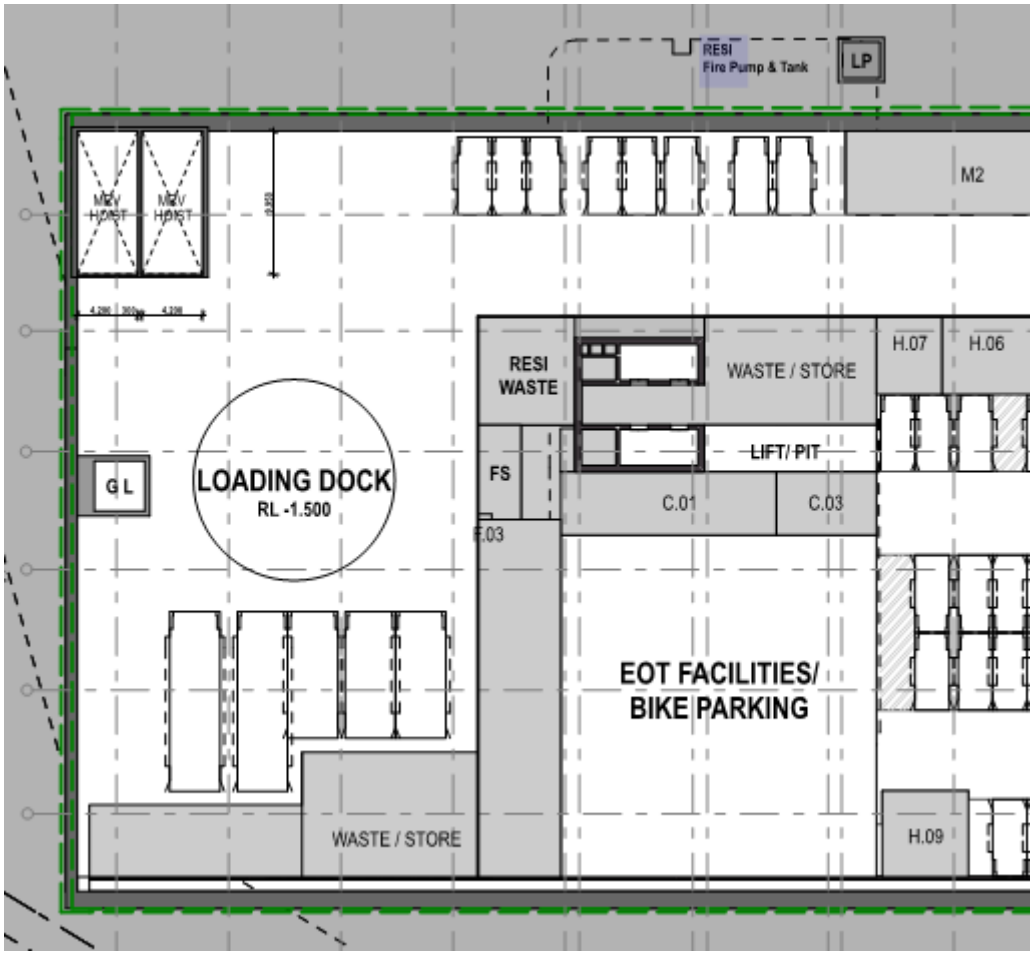


Figure 19: Basement Level 1 Loading Dock Indicative Concept Design

This loading dock will be located in the first basement level of the proposed development. Access to this basement loading dock will be via the same access ramp to the basement car park. The current concept design anticipates that vehicles requiring access to this loading dock will be limited in size to an 8.8m Medium Rigid Vehicle (MRV) and a 9.8m waste collection vehicle. However, swept path analysis has been undertaken that indicates that a 12.5m HGV can access this loading dock via the current basement ramp design. Egress from this loading dock will be via vehicle hoist. Vehicles will egress the building at ground level, in the vicinity of the existing Darling Drive roundabout, via the proposed Harbourside ground level egress roadway. The vehicle hoist would need to be increased in size to accommodate a 12.5m HGV. the final design of the vehicle hoist size will be undertaken in future design development stages.

It is anticipated that the proposed loading dock will cater for the following in the proposed loading dock:

- 5 x MRV bays

However, numbers are subject to change in the detailed design stage. The current concept design allows for two 12.5m HGV parking bays if they were required.

The expected percentage usage of the loading dock is split as follows:

- 80% MRV; and
- 20% SRV

It is recommended that a loading dock management plan is developed by the operator at a future date to ensure effective management of staged deliveries so as to not impact the operation of the loading dock or Darling Drive. A swept path assessment was undertaken to demonstrate access to and egress from this loading dock. The swept path diagrams are shown in **Appendix D**.

4.13.5 Waste Management

The current waste management facility is provided within the service yard located adjacent to the existing loading dock. It is proposed that a similar arrangement will be maintained for the future operation mode of the proposed development, for the retail and commercial uses of the proposed development.

A further waste facility is proposed on the first basement level for residential use. Waste collection vehicles will enter the basement level 1 area via the same access ramp as the car park and loading dock. Waste collection vehicles will need to exit via the MRV hoist and egress the building at ground level, in the vicinity of the existing Darling Drive roundabout, via the proposed Harbourside ground level egress roadway. Consultation will be required in the future with the waste management company, with regard to the size of waste vehicle that needs access to the vehicle hoist facility. the current vehicle hoist concept design can accommodate vehicles up to approximately 9.8m in overall length.

A swept path assessment was undertaken to demonstrate access to and egress from this basement waste facility. The swept path diagrams are shown in **Appendix D**.

4.13.6 Emergency Vehicle Access

Emergency vehicle access will be provided for ambulance and aerial fire trucks to the proposed development, via:

- Darling Drive;

- Harbourside Place;
- the proposed access for the above ground loading dock; and,
- the proposed access lane located between the ICC Hotel and the Harbourside development.

5 TRAFFIC IMPACT ASSESSMENT

This section of this Report provides an assessment of the predicted traffic conditions based on the current proposed Harbourside development.

5.1 Harbourside Development

The proposed Harbourside development will consist of retail, commercial and residential land use and open space.

The updated land use mix for the development includes a 23,000m² commercial area; however, it should be noted that while the land use areas and categories have changed, the overall GFA of the development remains the same. **Table 7** highlights the land use difference between the DA in 2016 and the current land use mix. It is also noted that while the planning application is for an overall total GFA of 87,000m3, that the individual land use category areas are indicative at this stage.

Table 7 Development Components

Land Use Category	Area (2016)	Area (2020)
Residential	28,000 m^2 NSA	29,500 m^2 NSA
Retail	28,000 m^2 GLA	15,000 m^2 GLA
Commercial	0 m^2 GLA	23,000 m^2 GLA
Total	87,000 m^2 GFA	87,000 m^2 GFA
Car Parking	295	306

It should be noted that the site currently consists of an existing retail land use of approximately 21,000 m^2 GLA. The development proposes to reduce the existing retail land use resulting in a net decrease of approximately 6,000 m^2 GFLA. The future retail land use is expected to be similar in purpose and intent.

5.2 Traffic Generation Rates

An indication of the peak hour traffic generation potential of the future development has been

The proposed Harbourside development will consist of residential, retail and commercial land use. A trip generation assessment was performed based on the net development increase indicated by the forecast land use data, which was then used to inform the SIDRA modelling and traffic impact assessment. Depending on the development type, trip generation is informed by the Gross Floor Area (GFA), Gross Leasable Floor Area (GLFA) or number of residential apartments provided.

The trip generation rates adopted for this assessment are based on the following sources:

- Traffic Generating Developments Updated Traffic Surveys (TDT 2018/04a) (Transport for New South Wales, August 2013)

- Harbourside Shopping Centre Traffic and Transport Impact Assessment (Arcadis, 16 August 2018).

5.2.1 Residential Trip Generation

The trip generation rates used in the previous traffic impact assessment undertaken by Arcadis for high density residential dwellings were adopted for this study. These rates are consistent with the *Traffic Generating Developments Updated Traffic Surveys (TDT 2018/04a)* (Transport for New South Wales, August 2013).

The trip generation rates adopted for high density residential land use were:

- AM peak – 0.19 vehicle trips per unit
- PM peak – 0.15 vehicle trips per unit.

A 20% discount is applied to the residential development traffic to further consider the close proximity to the light rail station and enhanced pedestrian and cycle connectivity of the site.

5.2.2 Retail Trip Generation

The trip generation rate adopted for retail developments such as shopping centres was informed by both the previous study of the area and *Traffic Generating Developments Updated Traffic Surveys (TDT 2018/04a)* (Transport for New South Wales, August 2013).

Recommended trip generation rates for shopping centres are based on surveys conducted in ten locations, seven of which are located within the Sydney Metropolitan Area, and three of which are in regional areas.

It is assumed that the traffic generated by a shopping centre in the morning peak hour is about 50 per cent of afternoon peak hour traffic, consistent with the average distribution observed in shopping centres located within the Sydney Metropolitan Area.

The trip generation rates adopted for retail land use were:

- AM peak – 2.8 trips per 100 m^2 GLFA
- PM peak – 5.6 trips per 100 m^2 GLFA.

These trip generation rates assume that each land use is independent of the other and that the activities of the site are not linked to adjacent development. However, in practice, the incidence of linked and multi-purpose trips will reduce the overall trip generation. A linked trip is a trip taken as a side-track from another trip while a multi-purpose trip is where more than one facility is visited. A 25% discount is therefore applied to trip generation rates for retail development, considering that the trips to and from the retail component will generally attract patronage from visitors already within the Darling Harbour precinct.

5.2.3 Commercial Trip Generation

No trip generation was previously undertaken for commercial developments in the 2018 study. The trip generation rate adopted for commercial developments such as office blocks was therefore based on *Traffic Generating Developments Updated Traffic Surveys (TDT 2018/04a)* (Transport for New South Wales, August 2013).

Recommended trip generation rates for the general office building are based on surveys conducted in ten locations. Eight of the surveys were conducted within the Sydney urban area

(two inner ring sites, four middle ring sites and two outer ring sites), and one each in Newcastle and Wollongong.

Due to the location of the proposed Harbourside development being situated within the CBD with close public transport access and limited parking available, and where few people commute to work by the private vehicle, it is expected that the proportion of commuters who choose to drive to work would be lower than the Sydney urban average. Of the areas surveyed, North Sydney, Chatswood and Parramatta represent the most comparative conditions, and an average of those rates were therefore adopted for the Harbourside development.

Table 8 shows the trip generation rates adopted for the Harbourside development for each peak period.

Trips generated per 100 m^2 of GFA				
Peak hour	**North Sydney**	**Chatswood**	**Parramatta**	**Adopted for Darling Harbour**
AM peak	0.17	1.03	0.69	0.63
PM peak	0.14	0.84	0.61	0.53

Table 8 Commercial Trip Generation Rates

5.3 Peak Hour Trip Distribution

The peak hour distribution of trips into and out of the proposed development site are considered separated for each land use type and varies between the morning and afternoon peak periods. Table 9 shows the peak hour distribution of trips.

Development type	AM peak		PM peak	
	Trips in	Trips out	Trips in	Trips out
Residential	25%	75%	60%	40%
Retail	60%	40%	50%	50%
Commercial	75%	25%	25%	75%

Table 9 Peak Hour Distribution

5.4 Peak Hour Vehicle Trips

Application of the traffic generation rates, trip discounts and hourly distributions on the proposed development yields a weekday peak period total traffic generation potential of 542 trips in/ 350 trips out during the morning peak hour, and 440 trips in/ 595 trips out in the afternoon peak hour. Table 10 shows the trip generation potential for each land use type and peak period.

Development type	AM peak		PM peak	
	Trips in	Trips out	Trips in	Trips out
Residential	14	41	26	17
Retail	399	266	333	333
Commercial	129	43	82	245
Total peak hour generation	**543**	**449**	**440**	**595**

Table 10 Trip Generation Potential

5.5 Network Trip Distribution

For the assessment, the following traffic distribution was assumed:

- 30% trips anticipated to arrive from western suburbs via M4 Western Distributor
- 10% trips anticipated to arrive from western suburbs via Great Western Highway
- 30% trips anticipated to arrive from northern suburbs via M4 Western Distributor and then through Harbour Street and Pier Street
- 20% trips anticipated to arrive from southern suburbs by using Eastern Distributor and then through Goulburn Street and Pier Street
- 10% trips anticipated to arrive from southern suburbs by using Great Western Highway and then through Ultimo Road.

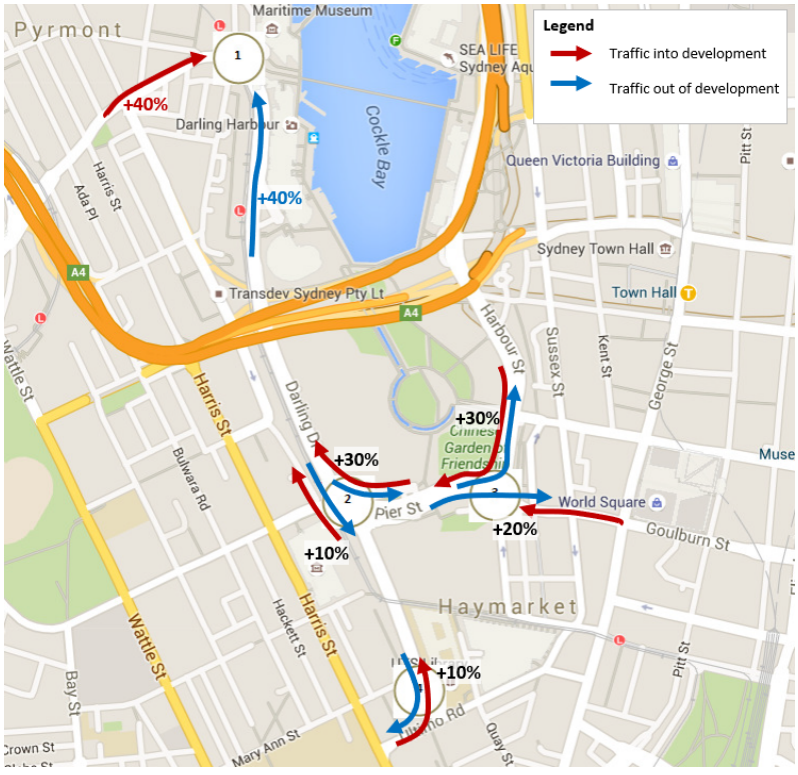


Figure 20: Development Trip Distribution on Surrounding Road Network

These assumptions inform the intersection modelling of the post-development scenario. **Error! Reference source not found.** shows the development trip distribution on the surrounding road network.

5.6 Network Capacity and Level of Service

5.6.1 Traffic Surveys

Traffic surveys were undertaken over three days, from Wednesday 29 January to Friday 31 January 2020 at four key intersections expected to be impacted by the development, including:

- (I-1) Murray Street/ Darling Drive (traffic signals)
- (I-2) Darling Drive/ Pier Street (roundabout)
- (I-3) Harbour Street/ Pier Street/ Goulburn Street (traffic signals)
- (I-4) Darling Drive/ Ultimo Road (traffic signals).

Error! Reference source not found. **21** shows the intersections at which classified intersection turn counts were surveyed.

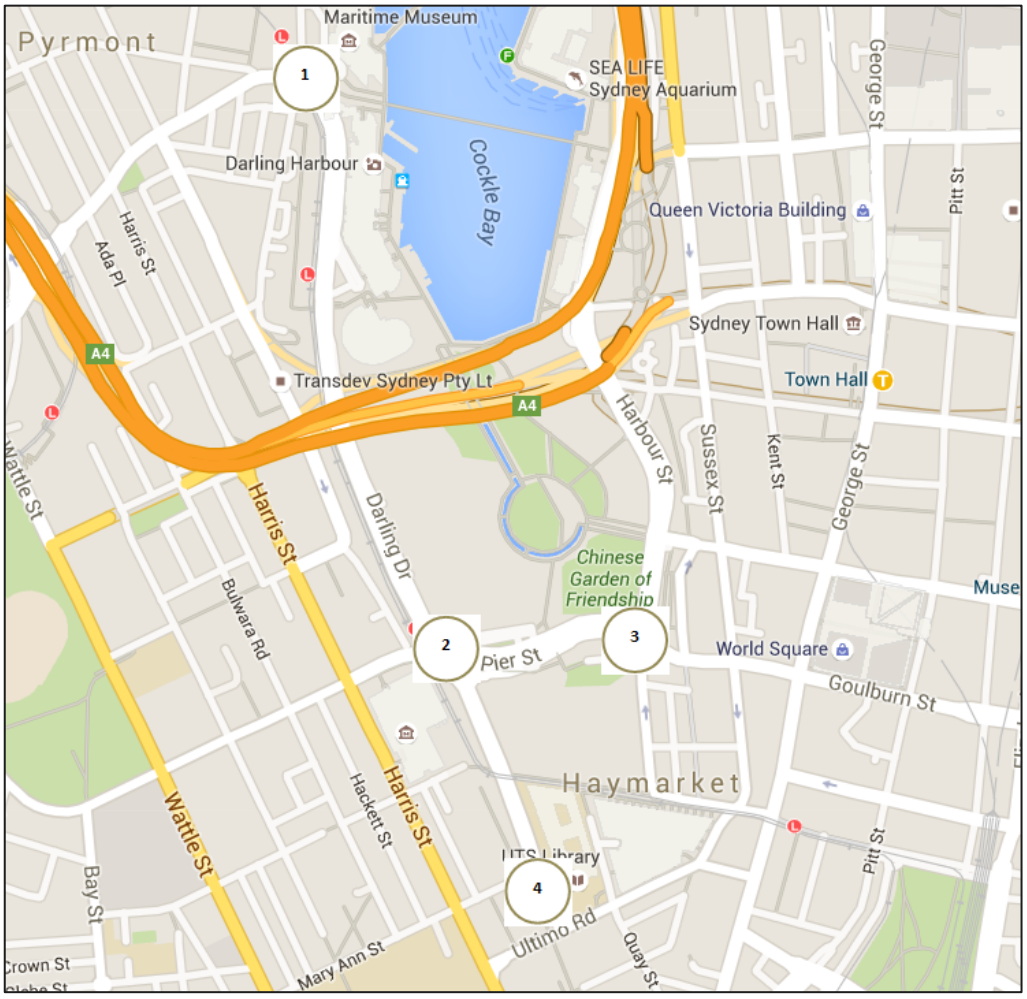


Figure 21: Jan 2020 Traffic Survey Locations

These four key intersections were modelled using SIDRA Intersection (version 8.0.7.7948) for the existing condition in 2020. The data collected over the three days were analysed, and the periods with the highest traffic volumes across the three days formed the basis for the morning and afternoon peak hour models. The results of the traffic surveys are attached in **Appendix B** of this report.

A comparison of the traffic counts undertaken in 2016 and the recent 2020 surveys is shown in **Appendix C**. The results indicate minimal changes to traffic volumes and flows across the four intersections. For the Pier Street/Darling Drive roundabout, the north-east leg of Zollner Crescent was included as part of the 2020 survey and analysed in the SIDRA analysis.

5.6.2 Existing Intersection Operation

Intersection operational performance is evaluated by assessing the intersection turning volumes, vehicle delays and level of services (LOS). LOS is the measure used to determine the effectiveness of intersection operation and is most commonly used to analyse intersections by categorising traffic flow conditions.

LOS for this study is reported in accordance to the Transport for New South Wales (TfNSW) guidelines. It recommends that for priority intersections such as roundabout and sign controlled intersections, the LOS value is determined by the critical movement with the highest delay. With these types of intersection controls (roundabout, stop and give way sign controls), some movements may experience high levels of delay while other movements may experience minimal delay. For a signalised intersection, LOS measures the average intersection delay measured in seconds per vehicle.

Table 11 summarises intersection LoS criteria used to assess the intersection performance.

Table 11 LOS Criteria

Level of Service	Average delay per vehicle (secs/veh)	Performance
A	<14	Good operation
B	15 to 28	Good with acceptable delays & spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Operating near capacity
E	57 to 70	At capacity; at signals, incidents will cause excessive delays. Roundabouts require other control mode
F	>70	Unsatisfactory with excessive queuing

In general, SIDRA predicts intersection performance for the following key parameters:

- Degree of saturation (DoS).
- Average delays to intersection.

- Level of service (LoS) determined from LoS criteria; and
- Queue length.

Intersection analysis of the key intersections adjacent to the site was undertaken. The results of the modelling for existing traffic are shown in **Table 12**, for the AM and PM peak periods, respectively. Modelling results indicate that all key intersections currently perform at an acceptable LoS during typical weekday peak hours. **Appendix E** of this Report contains a copy of the 2020 existing traffic condition SIDRA results.

ID	Intersection	AM peak		PM peak	
		Delay (s)	LOS	Delay (s)	LOS
I-1	Murray Street/ Darling Drive	51	D	50	D
I-2	Darling Drive/ Pier Street	11	A	10	A
I-3	Harbour Street/ Pier Street/ Goulburn Street	38	C	37	C
I-4	Darling Drive/ Ultimo Road	22	B	24	B

Table 12 Existing Level of Service

5.6.3 Future Operational Performance

The future network under the post-development scenario was modelled, based on the trip generation and distribution undertaken. Error! Reference source not found. **13** shows the future LOS results of the intersection with 2020 traffic volumes for both morning and afternoon peak hours. **Appendix F** of this Report contains a copy of the 2020 future development predicted traffic condition SIDRA results.

ID	Intersection	AM peak		PM peak	
		Delay (s)	LOS	Delay (s)	LOS
I-1	Murray Street/ Darling Drive	48	D	49	D
I-2	Darling Drive/ Pier Street	13	A	13	A
I-3	Harbour Street/ Pier Street/ Goulburn Street	60	E	41	C
I-4	Darling Drive/ Ultimo Road	22	B	28	B

Table 13 Future Level of Service

5.6.4 Impact on Intersection Performance

Assessment of the four key intersections in the surrounding road network show that the traffic generated by the proposed development would not produce major traffic impacts on most intersections. Of the assessed sites, the Harbour Street/ Pier Street/ Goulburn Street intersection would experience the greatest impact to operational performance in the morning peak hour, operating at LOS E with 60 seconds of delay. We note that the analysis indicated

right turning southbound movement on Harbour Street is currently operating at a level of service F.

A sensitivity analysis was undertaken to modify the phase time allocated to the movement from 37 seconds to 40 seconds. This analysis was found to improve the overall operation of the intersection from an LOS E to LOS D at 46 seconds of delay.

As such, we recommend monitoring the traffic operations at the intersection upon project completion with TfNSW and modify the signal timing in accordance with the observed traffic flows and volumes.

5.6.5 Conclusion

The analysis above indicates that the baseline conditions between 2016 and 2020, with the operation of SICEEP, have experienced minimal changes across the intersections focused on in this Report.

Moreover, it should be noted that while the land use categories of the proposed development at Harbourside have been amended, the overall traffic impact remains similar to the previous assessment.

5.7 Impact on Light Rail and Ferry Operations

The Harbourside development is expected to introduce additional patronage for the Light Rail and Ferry Services adjacent to the development. The proximity of the Harbourside development to Pyrmont Bay and Convention Centre Light Rail stations and the Pyrmont Bay Wharf is anticipated to further encourage public transport usage among the future staff and visitors to the Harbourside development. Data from the journey to work data set revealed that approximately 60-65% currently use public transport (train, bus and ferry).

With the completion of the construction of the adjacent developments in the SICEEP, service frequency of the light rail was improved to approximately every 8 minutes initially during the peak travel hours but is also forecasted to eventually be operating at this frequency for the whole day. The increased service frequency is expected to provide additional capacity to cater to the increased demand in light rail ridership.

There are planned upgrades for the ferry wharves and ferry services as part of the NSW Government's Transport Access Program. The Pyrmont Bay Wharf is included in the wharf modernisation program. In the Sydney Ferries Future document of the NSW Government, it is also stated that there is an opportunity to link the Rose Bay / Watsons Bay route as part of a cross harbour service to Pyrmont and by extending the service to Manly in the off-peak weekdays and on weekends, as part of the expansion of services to provide for growth.

With the planned upgrade of the Pyrmont Bay Wharf, it is anticipated that additional capacity will be available to cater to any increase in ferry usage and patronage at the wharf. This improvement will benefit the Harbourside development and encourage additional patronage in the future.

Wayfinding strategies and travel access guides to assist with increasing the mode share of walking and cycling will be developed during future design stages of the development, with regard to providing information to passengers arriving by public transport.

6 CONSTRUCTION TRAFFIC IMPACT AND MANAGEMENT

6.1 Background

A Preliminary Construction & Environment Management Plan (CEMP) has been prepared by Mirvac (**Appendix D**). The document outlines the indicative management plans relating to the construction works associated with the Harbourside development.

This section presents excerpts from the above document relevant to Traffic and Pedestrian Management during construction of the Harbourside development, including description and layouts of the planned mitigation arrangements demonstrating how, during the development, the pedestrian and vehicular movements will be addressed to minimise impact.

6.2 Site Boundary

Figure 22 below depicts the various hoarding locations proposed for the Harbourside development site.

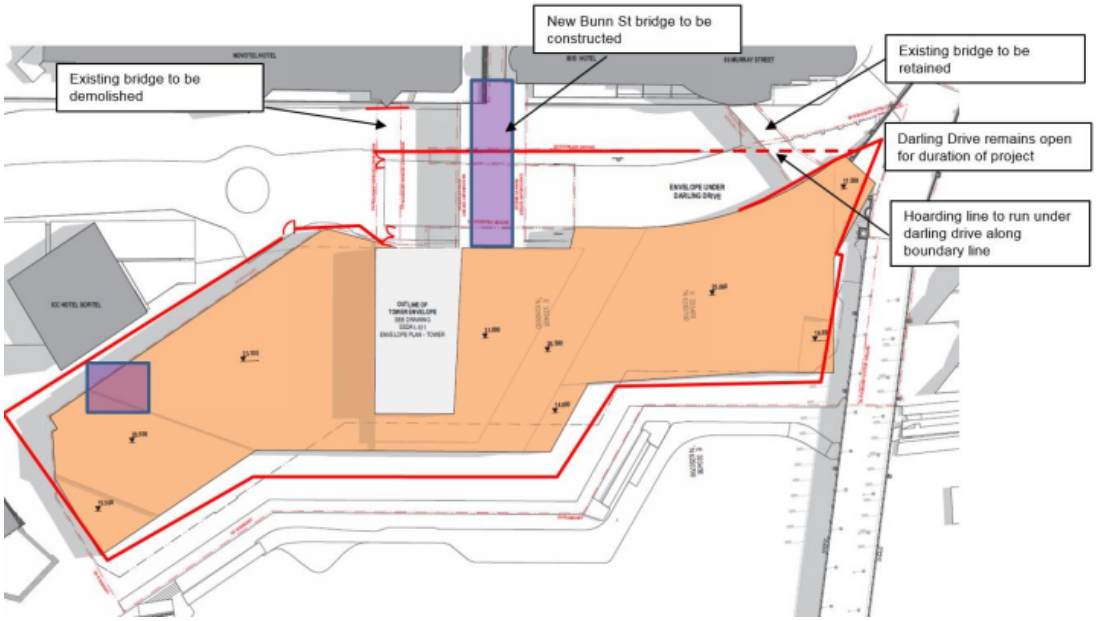


Figure 22: Site Development Plan

6.3 Construction Staging

6.3.1 Site Establishment

To maintain safe public egress between the Maritime Museum and Darling Harbour, a “B” class hoarding will be erected on the eastern perimeter of the site along Cockle Bay. Pedestrians will be able to walk under the hoarding in this location.

Type “A” Hoardings will be erected along the other site boundaries to fully segregate the site from the public.

6.4 Construction Works

For details of the Construction activities refer to the Construction & Environment Management Plan that forms part of the Stage 1 DA submission.

Following site establishment and demolition / removal of existing fixtures or services, the construction sequence will entail retention piling, bulk excavation of basement, trenching and establishment of essential services followed by building construction works, fit-out and external / landscaping works.

6.5 Construction Vehicle Access

The primary construction heavy vehicle access and egress will be via the Darling Drive network to the west of the development. This will involve vehicles accessing Darling Drive from the North using Pyrmont Bridge Road, Pyrmont and vehicles accessing Darling Drive from the South using Ultimo Road and Harris Street, Ultimo.

The main entry for construction materials and vehicles shall be from the north, off Darling Drive, and exit from the southwest corner of the site onto Darling Drive (heading south only).

Figure 23 below depicts the construction access locations.

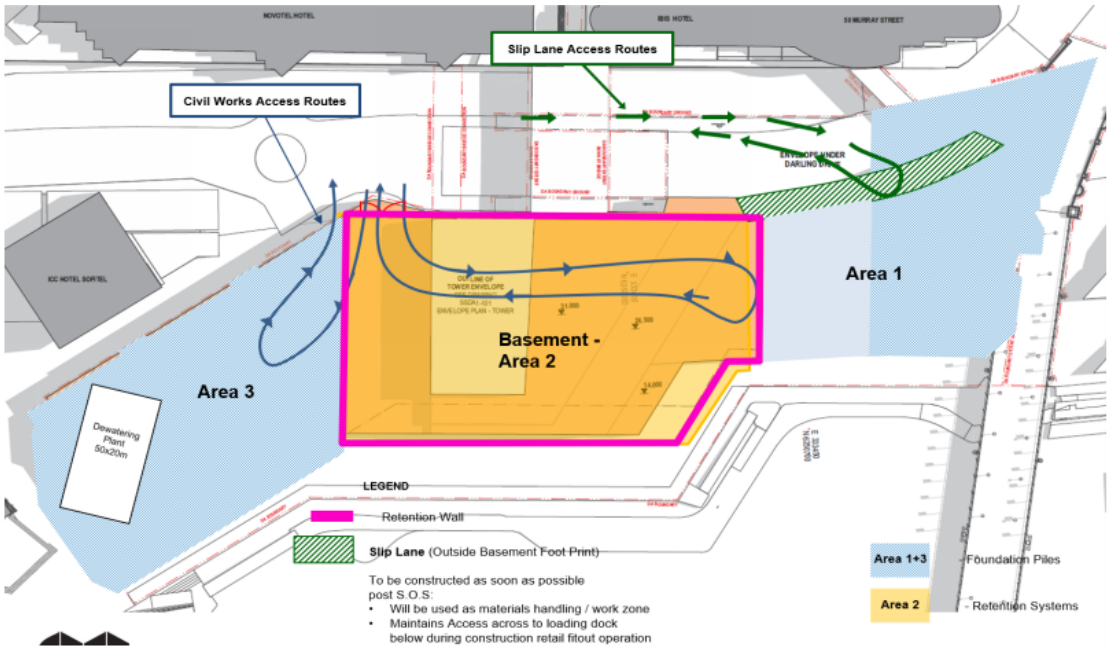


Figure 23: Construction routes and access locations

It is anticipated that the construction works will not prevent Darling Drive from remaining operational at all times during the construction phase of the development.

On site construction access routes will be established, within the construction boundary, to facilitate materials handling for tower/crawler cranes and forklifts. Hoists will transport personnel and lighter materials within the building.

It is advised that traffic to Darling Drive and the surrounding road network as a result of construction activities would be best suited to non-peak hour times. This will be reviewed during further detailed design stages of the project.

All vehicles accessing the site will conform to the "Traffic controls at work sites" manual, and Australian Standard 1742 – Traffic control, and only certified traffic controllers shall be used to direct vehicles outside of the construction boundaries. The main access for construction deliveries shall be the entry and exit gates as illustrated in **Figure 22**.

On site construction access routes will be established within the construction boundaries with hoists transporting personnel and materials within the building.

The truck movements anticipated will be spread evenly throughout the construction programme. During the course of the development we anticipate vehicle movements for such trades as Demolition, Civil, Piling, Detail Excavation, Structure, Facade, Internal Finishes & Public Domain works.

Based on the programme and volume of materials required, it is estimated that approximately 3-4 trucks per hour will access the site for the duration of the development. In such instances such as concrete pours, this volume will increase, but shall be controlled to alleviate any congestion to the surrounding traffic network.

It is noted, however, that the construction vehicle movements will not exceed the recent construction vehicular movements associated from the recent development of the Sydney International Convention Exhibition & Entertainment Precinct (SICEEP), which adopted similar construction access traffic routes and used Darling Drive for access.

The control of vehicle logistics to and from the site shall be managed as follows:

- Traffic Management Plan to form part of tender documents and ultimately part of the Subcontract &/or Supplier Agreements
- Traffic Management Plan will form part of the subcontractor inductions, both on site and in some instances held in the Subcontractor / Supplier place of business.
- Subcontractors / Suppliers will be required to submit a formal delivery booking request 5 business days prior to delivery. All bookings will be registered and controlled by the various manned gates. Predetermined routes and times shall be agreed as part of this process to ensure non congestion of traffic.
- Established holding areas for urgent & emergency vehicles within the development.

6.6 Parking

Onsite parking will not be encouraged during construction. Measures will be implemented to encourage the use of good public transport systems already in place for construction staff and workers. This will be conveyed through all subcontract documentation and site inductions. Timetables shall be provided for all bus routes and the three closest railway stations serviced by bus routes.

6.7 Pedestrian Access

Pedestrian access during construction will generally be adopting the following principles:

- Hoardings will be erected to prevent public entry into constructions areas;
- Public access along existing desire lines around construction areas will maintained where possible;
- Pedestrian access along Darling Drive will be controlled (and may need to be limited periodically) during demolition and services relocation works to ensure public safety;
- Pedestrian movement diversions as detailed shall be in place to ensure that the Public are diverted safely around the site; and,
- “B” Class hoardings shall provide overhead protection where the general public come into close contact with construction activities. Pedestrians will be able to walk under this type of hoarding.

6.8 Traffic Management Measures

Appropriate directional signage and traffic control will be provided to ensure vehicles enter and leave the site with minimal disturbance to other road users and so they are advised of any changes in road conditions.

Temporary road closures, single lane access and relocations during the construction period will be subject to coordination with the appropriate authorities. All traffic related issues and changes shall also be presented to Stakeholders as part of the consultation process. These will, wherever and whenever possible, are carried out in non-peak periods.

The traffic and pedestrian management plan outlined in the Construction and Environment Management Plan is generally aimed at mitigating any potential impacts that may be attributed to the construction works. Risks to the public and the construction crew would be minimised through the implementation of the construction management plans specifically prepared for the Harbourside development. The Plan will be regularly updated to address any new outcomes identified through constant monitoring as the works progress.

6.9 Cumulative Construction Traffic Impacts

The Core Facilities of the SICEEP development are now complete and this development was fully opened to the public in December 2016. The ICC Hotel was also completed and opened in December 2016, and construction of the Darling Square development located in the Haymarket was recently completed.

The redevelopment of the IMAX site commenced in 2017, and it is anticipated to reopen in 2020. As such, works are anticipated to be completed prior to construction commencing at the Harbourside development.

The Star Casino in Pyrmont is proposed to be redeveloped and this development is currently in the planning stages of the development. It is understood that the proposed construction traffic route proposed for that development is via the A4, Pyrmont Bridge Road, Edward Street, Pirrama Road and Jones Bay Road. As such, it is not anticipated that the cumulative construction traffic impact will be significant from this development and the Harbourside development should the construction phases overlap each other.

Ongoing consultation will be undertaken between the applicant and the CBD Coordination Office within TfNSW during the design and construction of the proposed development with

regard to an assessment of other potential cumulative construction activities that may be relevant at the time of the Harbourside development construction program.

7 SUMMARY

7.1 Conclusions

This transport assessment of the Harbourside development focusses on access and the connectivity of the site with the external network for all modes of transport and cites the key features of the development that will contribute to this. Key elements of the proposal include:

Public Transport

- The location of the Harbourside site is accessible by public transport (particularly the light rail) via the pedestrian linkages between the public transport nodes and the development
- The design generally provides enhanced access to the public transport services through the creation of more direct pedestrian access walkways.

Parking Provision

- Parking provision for residential use within Harbourside will be provided within a two-level basement carpark. The existing retail parking at the Novotel hotel will be retained for the proposed retail use of the development.

Road Network/Intersection Operational Performance

- The traffic analysis indicates that the baseline conditions between 2016 and 2020, with the operation of SICEEP, have experienced minimal changes across the intersections focused on in this Report.
- Moreover, it should be noted that while the land use categories of the proposed development at Harbourside have been amended, the overall traffic impact remains similar to the previous assessment.
- The operational performances of the intersections relevant to the Harbourside development have been demonstrated to be satisfactory
- The results of modelling indicate that the impact of the Harbourside development does not impose conditions on the intersections worse than what would have otherwise occurred through existing traffic and modelled future traffic.

Pedestrian

- The development will provide improved pedestrian linkages within the Public Realm linking the development to the Darling Harbour Live precinct to the south and Sydney CBD to the east.
- The improved pedestrian linkages via the shared zone and the signalised pedestrian crossing on Darling Drive cater for pedestrian desire lines from the west of Darling Drive.

Cycleway

- Cycle connections are available to Harbourside via the existing cycleways on Darling Drive, the improved new cycleway on the west side of Darling Drive, new east-west

linkages and completion of the new boulevard running north-south through the precinct, developed as part of the SICEEP.

SEARs

- The requirements of the SEARs have been adequately assessed in the overall Transport and Traffic Impact Assessments for the Harbourside development.

APPENDIX A– AGENCY RESPONSE TO SUBMISSIONS

14 February 2017

RMS Ref: SYD16/01009/02 (A16081283)
Your Ref: SSD 7874

Brendon Roberts
Key Sites Assessments
GPO Box 39
Sydney NSW 2001

Attention: Michele Nettlefold

ENVIRONMENTAL IMPACT STATEMENT FOR REDEVELOPMENT OF HARBOURSIDE SHOPPING CENTRE, DARLING HABOUR (SSD 7874)

Dear Sir/Madam,

Reference is made to Departments letter dated 14 December 2016 with regard to the abovementioned development proposal, which was referred to Roads and Maritime Services (Roads and Maritime) for comment.

Roads and Maritime has reviewed the submitted application and provides the following comments to be included in the determination of the application:

1. A Construction Traffic Management detailing construction vehicle routes, number of trucks, hours of operation, access arrangements and traffic control should be submitted to Council and Sydney Co-ordination Office prior to the issue of a Construction Certificate.

In addition to the above, it is noted that Roads and Maritime will be consulted regarding the drop-off facility for the proposed Harbourside development in due course.

Any inquiries can be directed to Jana Jegathesan by telephone on 8849 2313 or by email at development.sydney@rms.nsw.gov.au

Yours sincerely

Angela Frew
Senior Land Use Planner
Network Sydney

Transport for NSW

Mr Brendon Roberts
Team Leader
Key Sites Assessments
Department of Planning and Environment
GPO Box 39
Sydney NSW 2001

Attention: Michele Nettlefold

Dear Mr Roberts

Redevelopment of Harbourside Shopping Centre, Darling Harbour
Notice of Exhibition (SSD 7874)

Thank you for your letter dated 12 December 2016 requesting Transport for NSW (TfNSW) comment on the above.

TfNSW understands that the proposal relates to a staged development application and the development application seeks approval for the concept proposal for the above. Comments on the concept proposal are provided below.

Sydney Light Rail – Inner West Line

There are a number of construction and operational issues resulting from the demolition existing pedestrian footbridge from the Harbourside car park across the light rail corridor at Convention stop and the construction of the Bunn Street footbridge across the light rail corridor north of Convention stop. It is also noted that the proposed construction activities are likely to interfere with the light rail operation. TfNSW requests that ongoing consultation is required between the applicant, TfNSW, light rail operator, and if required, Sydney Trains during the design and construction of the proposed development.

Construction Pedestrian and Traffic Management

Several construction projects, including the Sydney Light Rail project are likely to occur at the same time at this development within the CBD and Darling Harbour Precinct. The cumulative increase in construction vehicle movements from these projects could impact on bus services in the CBD, and the safety of pedestrians and cyclists within the CBD and Darling Harbour Precinct particularly during commuter peak periods. TfNSW requests that ongoing consultation is required between the applicant and CBD Coordination Office within TfNSW during the design and construction of the proposed development.

Transport for NSW
18 Lee Street, Chippendale NSW 2008 | PO Box K659, Haymarket NSW 1240
T 02 8202 2200 | **F** 02 8202 2209 | **W** transport.nsw.gov.au | ABN 18 804 239 602

Vehicular Management

The proposed development is situated on Darling Drive which is a key route within the CBD. The Traffic and Transport Impact Assessment (Traffic Report) prepared to support the development application does not state the likely demand for the drop-off zone in Darling Drive. The vehicles queuing to access this drop off zone may cause delays and block vehicles on Darling Drive. In addition, any queuing due to vehicles accessing the car park and loading and servicing area may also cause delays and block vehicles on Darling Drive.

TfNSW requests that the applicant undertakes a detailed queuing analysis to identify the risks associated with the queuing on public roads and proposes mitigation measures to the satisfaction of the CBD Coordination Office within TfNSW and Roads and Maritime Services.

Coach Parking

Based on the Traffic Report, the use of the coach parking being installed in Darling Drive as part of the Sydney International Convention, Exhibition and Entertainment Centre (SICEEP) development, as well as the coach parking within the SICEEP site itself, is proposed. The future coach parking demand for both the SICEEP and Harbourside Shopping Centre developments have not been analysed in the Traffic Report.

TfNSW requests that the likely cumulative future demand for coach parking be identified and alternative locations for coach parking be identified if required, in consultation with the CBD Coordination Office within TfNSW.

Pedestrian Network

The new pedestrian linkage and changes to the existing pedestrian connections that are proposed as part of the development will impact on pedestrian flows in the vicinity of the site. TfNSW requests that an analysis of the pedestrian network within and surrounding the site be undertaken to ensure there is sufficient capacity to accommodate the future demands, including during special events in consultation with the CBD Coordination Office within TfNSW.

Darling Drive Cycleway

The proposed development has a frontage on Darling Drive, which forms part of the strategic cycleway network in the CBD. TfNSW advises that the design for the vehicular drop-off zone should take into consideration the future use of Darling Drive with the cycleway.

Wayfinding Strategies

The Traffic Report states that the Harbourside development is expected to introduce additional patronage for the light rail and ferry services adjacent to the development. TfNSW requests that the applicant develops wayfinding strategies and travel access guides to assist with increasing the mode share of walking and cycling.

Conditions of Consent

A detailed discussion of in relation to the issues that needs to be considered as part of any Stage 2 development application for the subject site is included in **TAB A**.

TfNSW requests that the applicant consults with the CBD Coordination Office within TfNSW and Sydney Trains to address the above issues. TfNSW would be pleased to consider any further material forwarded from the applicant.

Thank you again for the opportunity of providing advice for the above development application. If you require clarification of any issue raised, please don't hesitate to contact Mark Ozinga, Principal Manager Land Use Planning and Development on 8202 2198.

Yours sincerely

M Prendergast 23.2.17

Margaret Prendergast
Coordinator General
CBD Coordination Office

Objective Number - CD16/17588

Comments for Stage 2 Development Proposal

Comments on any Stage 2 development proposal will include the following items.

Light Rail Safety Interface Agreement

There are a number of construction and operational issues resulting from the close proximity of buildings to the light rail corridor and above the corridor (eg. craning over the corridor). These issues are related to noise and vibration, transport and access, safety, property, creation of easements and protection of services for light rail. To address these issues, TfNSW requests a Rail Safety Interface Agreement and relevant Conditions of Consent are in place prior to the commencement of works.

Interference with Light Rail Operation

The proposed construction activities are likely to interfere with the light rail operation. Therefore, the applicant shall enter into an Agreement(s) with TfNSW, the light rail operator, and if required, Sydney Trains as the land owner to protect assets, services etc. and to recover costs that TfNSW, Sydney Trains and the light rail operator incurs in the development.

Prior to the Issue of the Construction Certificate

TfNSW requests that the Agreement(s) and other requirements shall include, but not be limited to, the following:

- Pre-construction dilapidation reports in the vicinity of the project (especially the new Bunn Street footbridge), including joint inspection with the representatives from TfNSW, the light rail operator and Sydney Trains;
- Protection of TfNSW land, easements and infrastructure – the applicant must ascertain our reasonable requirements in relation to protection of TfNSW land, easements and infrastructure and submit all relevant documentation;
- Requirement for safety interface agreement with the light rail operator;
- Risk assessment workshop with TfNSW, light rail operator and Sydney Trains to identify the likelihood and risks of light rail vehicle derailment and mitigation measures and any mitigation measures – e.g. derailment barriers - to be endorsed by ASA. If ASA does not endorse the proposed mitigation measures then any structure (like the Bunn Street footbridge across the light rail corridor) must comply with AS 5100;
- Design, installation and use of light, signs and reflective material must limit glare and reflectivity to the satisfaction of TfNSW and light rail operator;
- Craneage operation must comply with ASA standard (e.g. no slewing over the light rail corridor under load etc) - If a crane is to be used at any stage of the proposed works, the applicant is to submit to Sydney Trains a plan showing all craneage and other aerial operations for the development and must comply with all Sydney Trains and Light Rail Operator's requirements;
- Interference with light rail operations – The applicant needs to enter into an agreement with TfNSW, Sydney Trains and light rail operator (enter into a Works Deed providing for, but not be limited to, provision of design, reports, drawings, as builts, requirement for track monitoring, Light Rail Operator rules and procedures; cost recovery; insurances with certain provisions regarding the policy must not contain any exclusion in relation to work on or near the rail corridor, rail infrastructure; indemnities and liabilities; requirements for shutdowns etc.);

- It is advised that demolition of the existing of the existing footbridge from the Harbourside car park and the construction of the new bridge will invariably require shutdowns. TfNSW requires information on timing and construction methodology of these structures in particular in situ or pre-cast construction; and
- The design and construction of the development must comply with ASA standard relating to external developments (T HR CI 12080 ST).

During Construction:

TfNSW requests the building works adjacent to or above the light rail corridor shall include, but not be limited to, the following:

- No metal ladders, tapes and plant/machinery, or conductive material are to be used within 6 horizontal metres of any live electrical equipment. This applies to the train pantographs and 1500V catenary, contact and pull-off wires of the adjacent tracks, and to any high voltage aerial supplies within or adjacent to the rail corridor.
- All piling and excavation within 25m of the light rail corridor are to be supervised by a geotechnical engineer, experienced with such excavation projects;
- Not rock anchors/bolts to be installed on the land or in the light rail corridor; and
- During all stages of the development extreme care taken to prevent any form of pollution entering into the light rail corridor.

Prior to Occupancy

TfNSW requests the applicant shall provide, but not be limited to, the following prior to the occupation of the development:

- Post-construction dilapidation reports in the vicinity of the project (especially the new Bunn Street footbridge), including joint inspection with the representatives from TfNSW, light rail operator and Sydney Trains;
- A maintenance plan for any structures that interface with light rail corridor (e.g. footbridges) to TfNSW; and
- As built drawings.

Information Required from the Applicant

TfNSW requests that the applicant provide the information for TfNSW and Sydney Trains approval prior to issuing the relevant construction certificate, not limited to, the following:

- Final geo-technical and structural drawings;
- Final construction methodology;
- Final cross sectional drawings;
- Detailed survey plan;
- Electrolysis report prepared by electrolysis expert on the electrolysis risk to the development from stray currents;
- Acoustic assessment demonstrating how this development will comply with DP&E document titled "*Development Near Rail Corridors and Busy Roads- Interim Guidelines*";
- Risk assessment associated with possible light rail vehicle derailment;
- Assessment on use of lights, signs and reflective materials which are visible from the rail corridor; and
- Details of insurances.

Consultation with TfNSW

TfNSW requests that the applicant engages in ongoing consultation with TfNSW, the light rail operator and Sydney Trains throughout the detailed design and construction of the Project and that relevant designs and management plans be submitted to TfNSW for approval prior works commencing.

Relocation of Sydney Trains Services/Infrastructure

The relocation of any Sydney Trains services or infrastructure are to be at the applicants cost and to Sydney Trains Requirements and Standards.

Protection of Sydney Trains' Land, Easements and TfNSW's Infrastructure

Prior to the issuing of a Construction Certificate or the commencement of works (whichever occurs first) the applicant need to liaise with Sydney Trains to ascertain its requirements in relation to the protection of Sydney Trains' land, easements and TfNSW's infrastructure. The applicant is to submit to Sydney Trains all relevant documentation as requested by Sydney Trains and obtain Sydney Trains' written endorsement.

Construction Pedestrian and Traffic Management Plan

Several construction projects, including the Sydney Light Rail Project are likely to occur at the same time as this development within the within the CBD and Darling Harbour Precinct. The cumulative increase in construction vehicle movements from these projects could have the potential to impact on general traffic and bus operations within the within the CBD and Darling Harbour Precinct, as well as the safety of pedestrians and cyclists particularly during commuter peak periods.

TfNSW requests that the applicant be conditioned to the following:

- Prepare a Construction Pedestrian and Traffic Management Plan (CPTMP) in consultation with the CBD Coordination Office, light rail operator and the Sydney Light Rail Team within TfNSW. The CPTMP needs to specify, but not limited to, the following:
    - Location of the proposed work zone;
    - Location of the crane;
    - Haulage routes;
    - Construction vehicle access arrangements;
    - Proposed construction hours;
    - Estimated number of construction vehicle movements;
    - Construction program;
    - Consultation strategy for liaison with surrounding stakeholders;
    - Any potential impacts to general traffic, cyclists, pedestrians and bus services within the vicinity of the site from construction vehicles during the construction of the proposed works;
    - Cumulative construction impacts of projects including Sydney Light Rail Project. Existing CPTMPs for developments within or around the development site should be referenced in the CPTMP to ensure that coordination of work activities are managed to minimise impacts on the road network; and
    - Should any impacts be identified, the duration of the impacts and measures

proposed to mitigate any associated general traffic, public transport, pedestrian and cyclist impacts should be clearly identified and included in the CPTMP.

- Submit a copy of the final plan to the Coordinator General, CBD Coordination Office for endorsement, prior to the commencement of any work.

Vehicular Management

The vehicles queuing to access this drop off zone may cause delays and block vehicles on Darling Drive. In addition, any queuing due to vehicles accessing the car park and loading and servicing area may also cause delays and block vehicles on Darling Drive.

TfNSW requests that the applicant be conditioned to the following:

- A drop off zone management plan to manage vehicles accessing the site; and
- A car park and loading dock management plan.

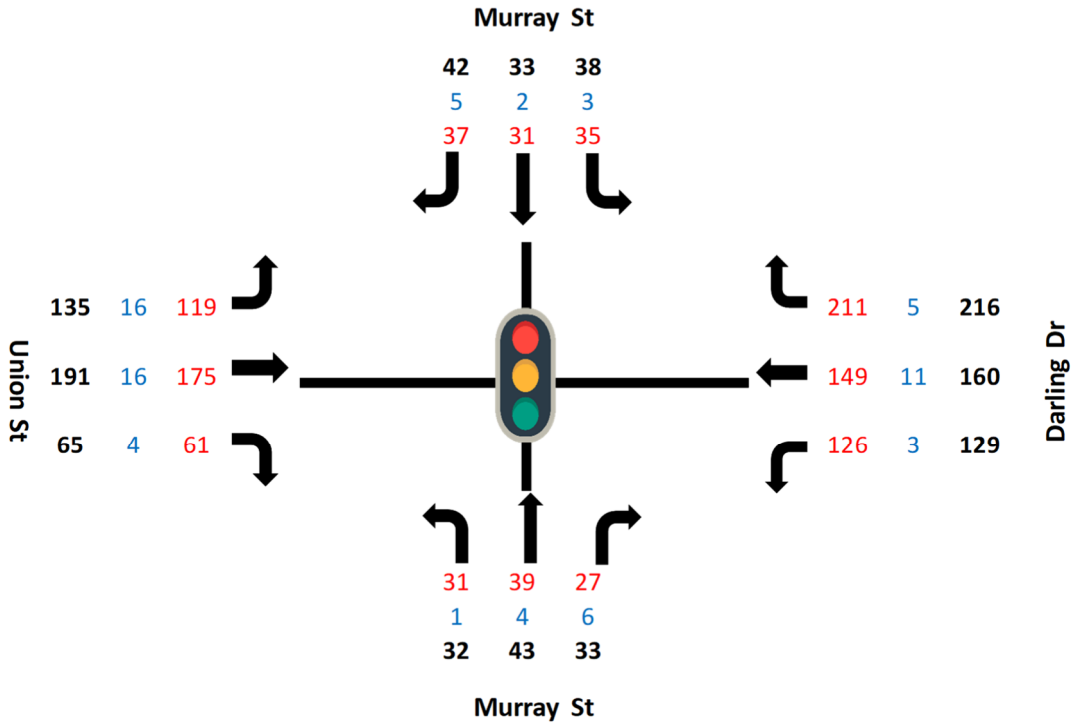
Cost of Works and Signage

All works/regulatory signage associated with the proposed development are to be at no cost to TfNSW/Roads and Maritime Services

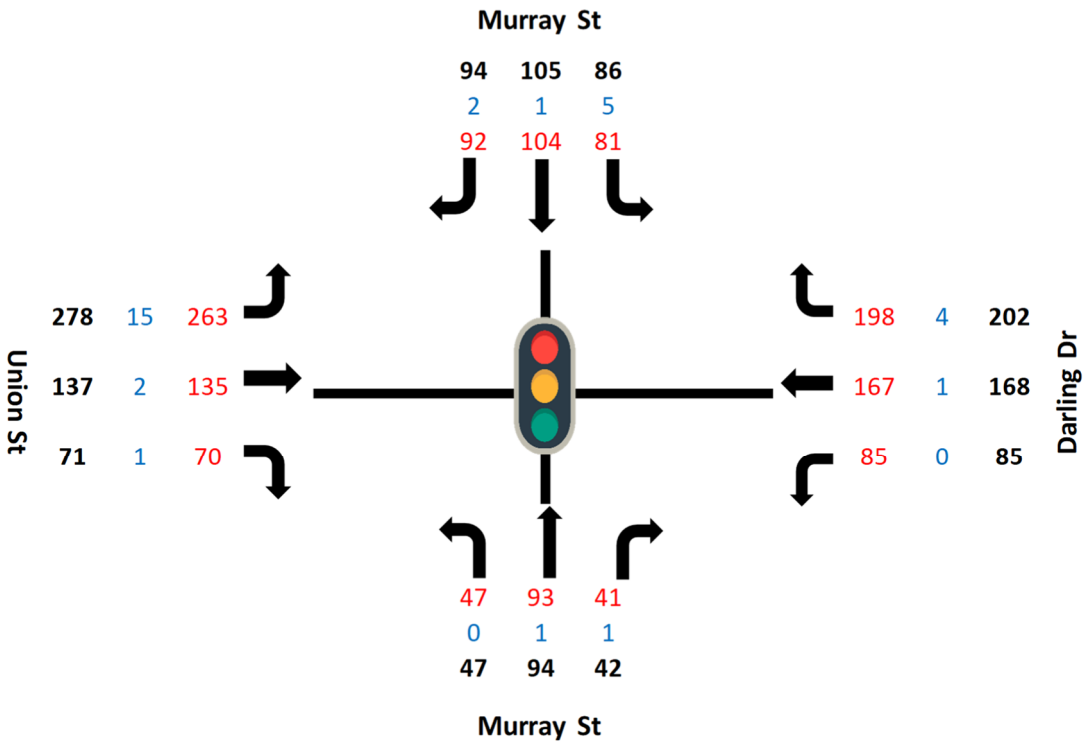
APPENDIX B – JANUARY 2020 TRAFIC SURVEY VOLUMES

Appendix B – Traffic volumes

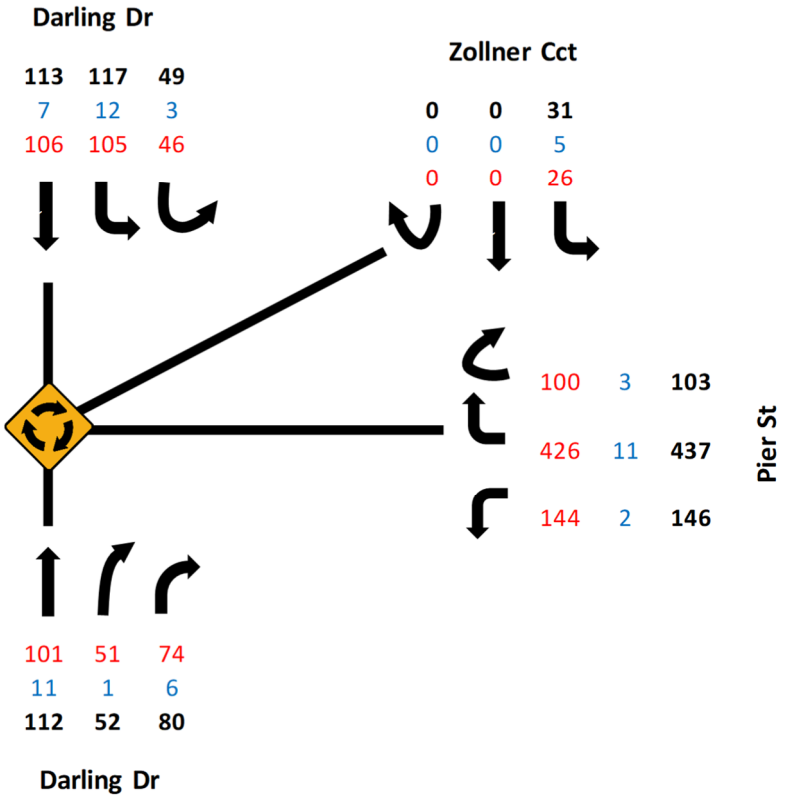
2020 Existing AM Peak
(I-1) Murray Street/ Darling Drive



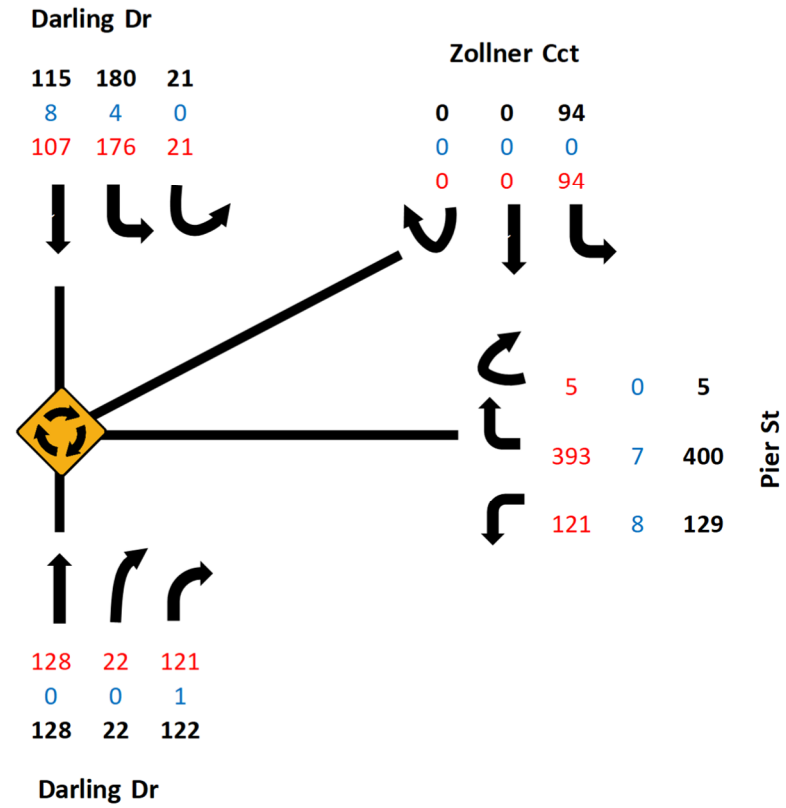
2020 Existing PM Peak
(I-1) Murray Street/ Darling Drive



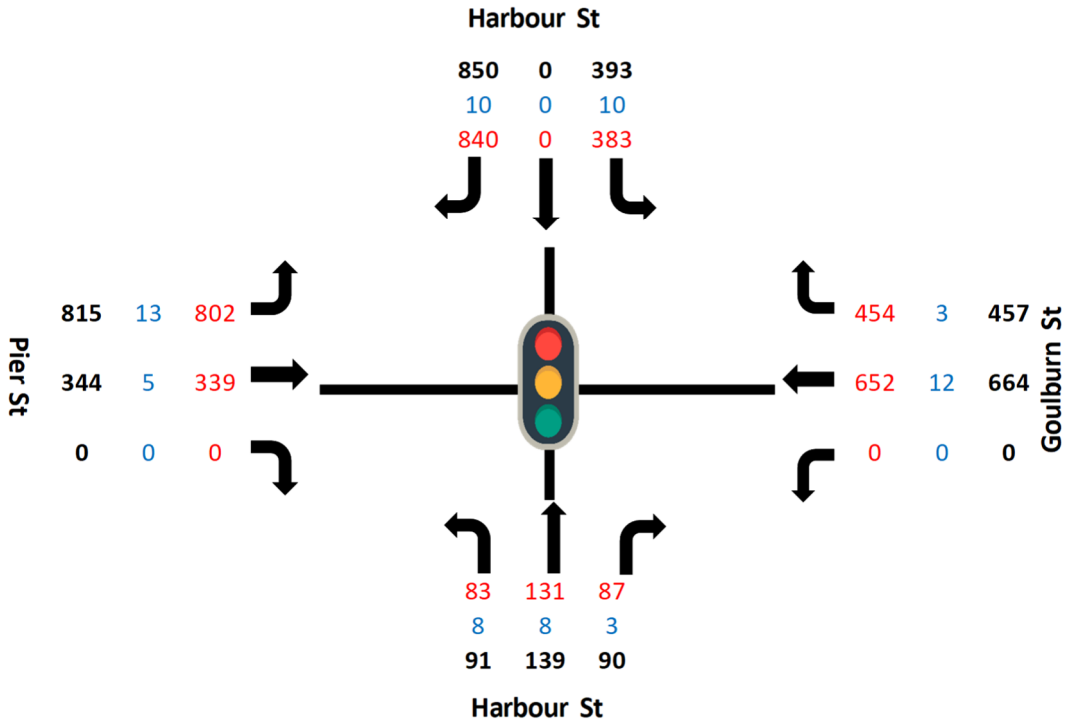
2020 Existing AM Peak
(I-2) Darling Drive/ Pier Street



2020 Existing PM Peak
(I-2) Darling Drive/ Pier Street



2020 Existing PM Peak
(I-3) Harbour Street/ Pier Street/ Goulburn Street



2020 Existing AM Peak
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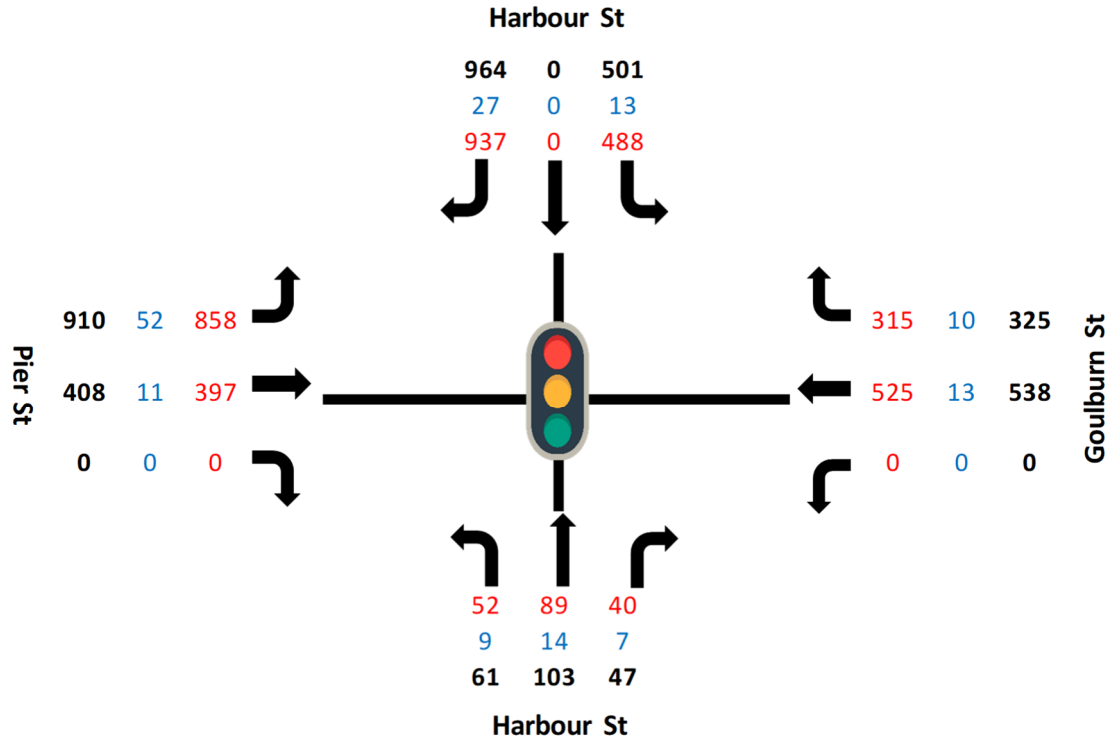
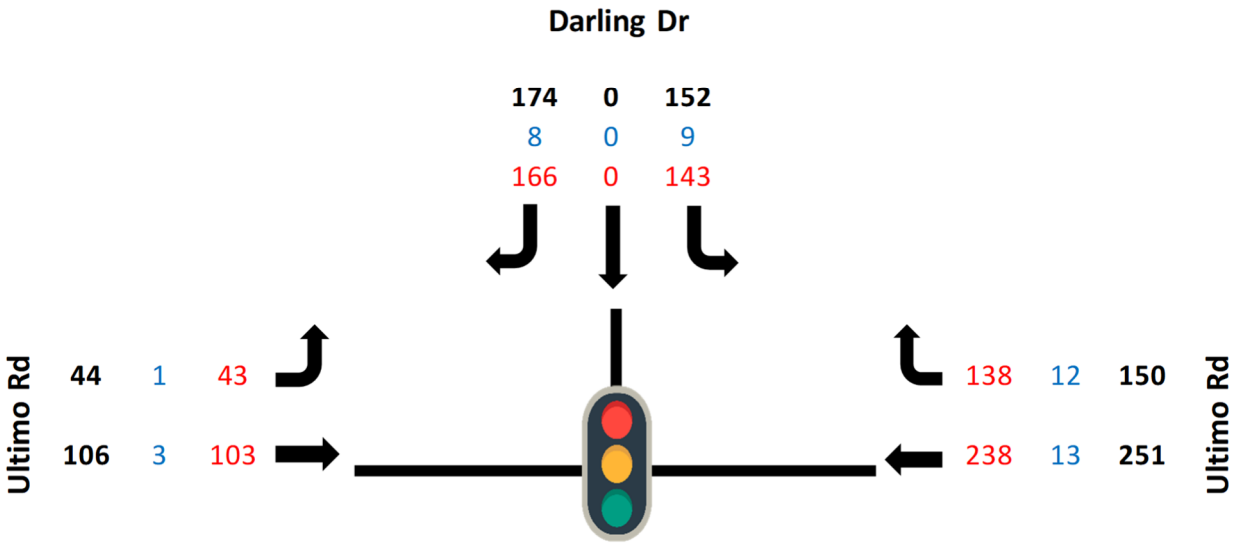
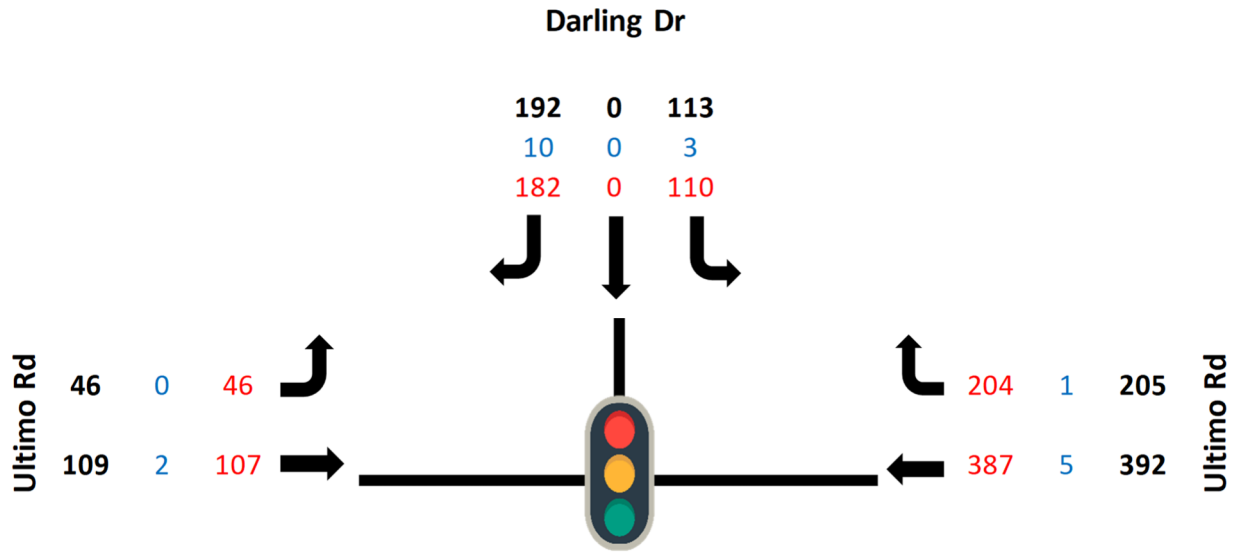


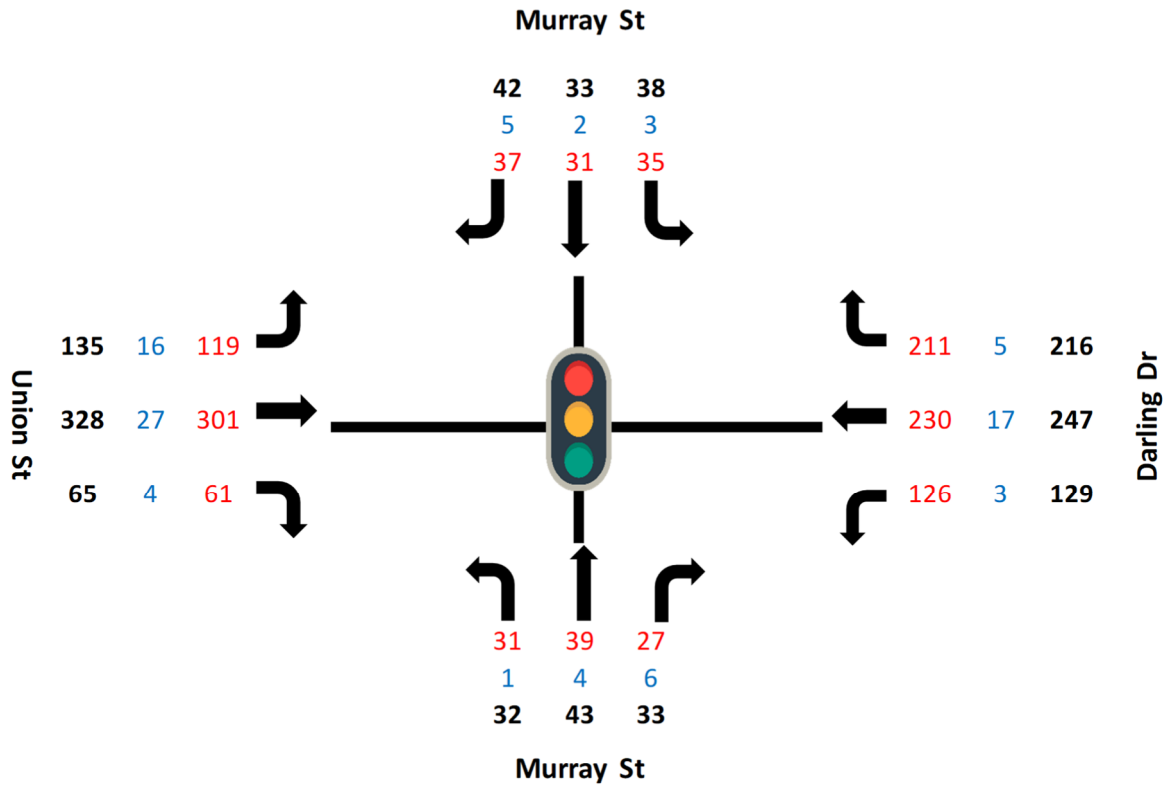
2020 Existing AM Peak
(I-4) Darling Drive/ Ultimo Road



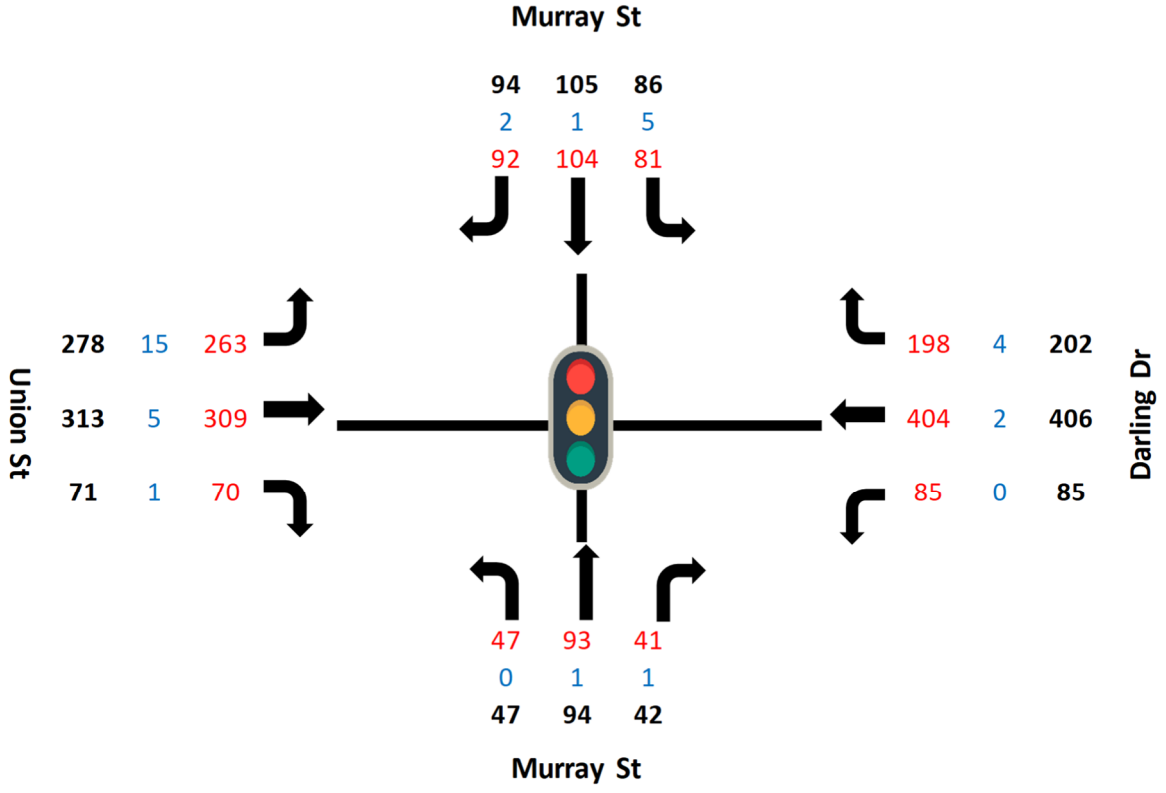
2020 Existing PM Peak
(I-4) Darling Drive/ Ultimo Road



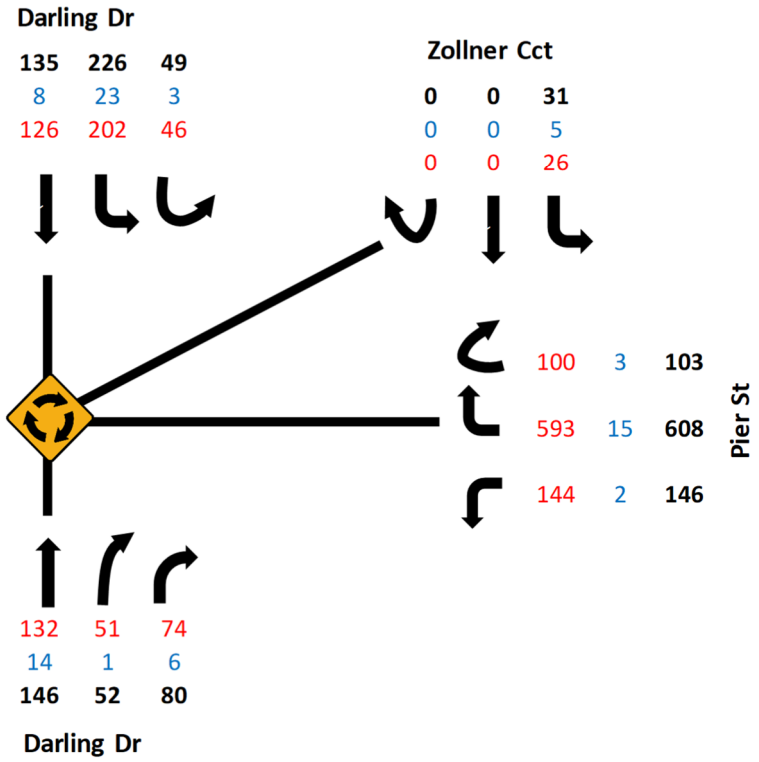
Post-Development AM Peak
(I-1) Murray Street/ Darling Drive



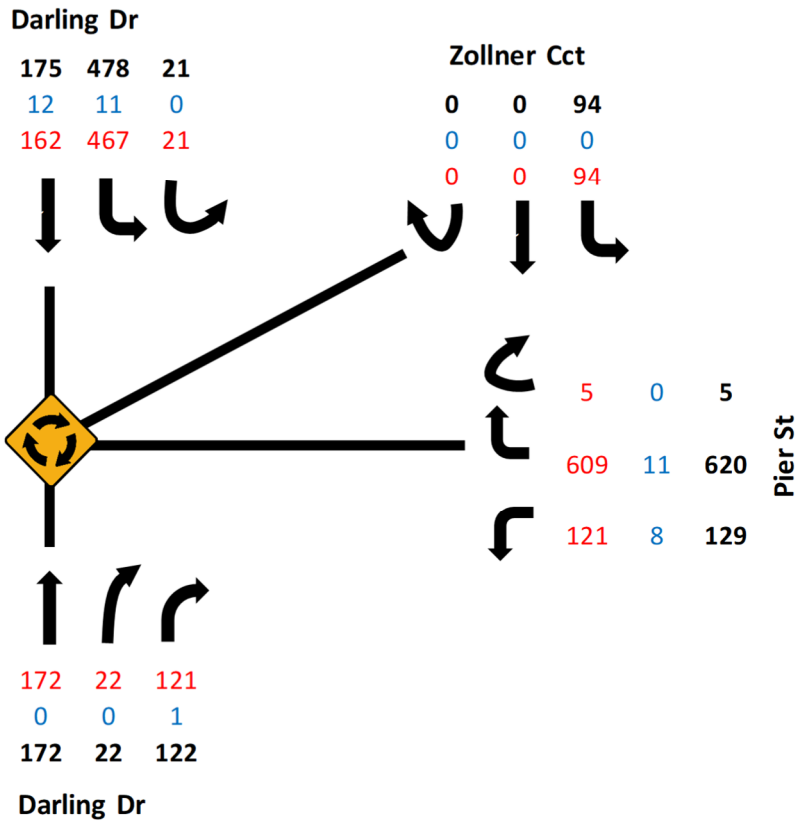
Post-Development PM Peak
(I-1) Murray Street/ Darling Drive



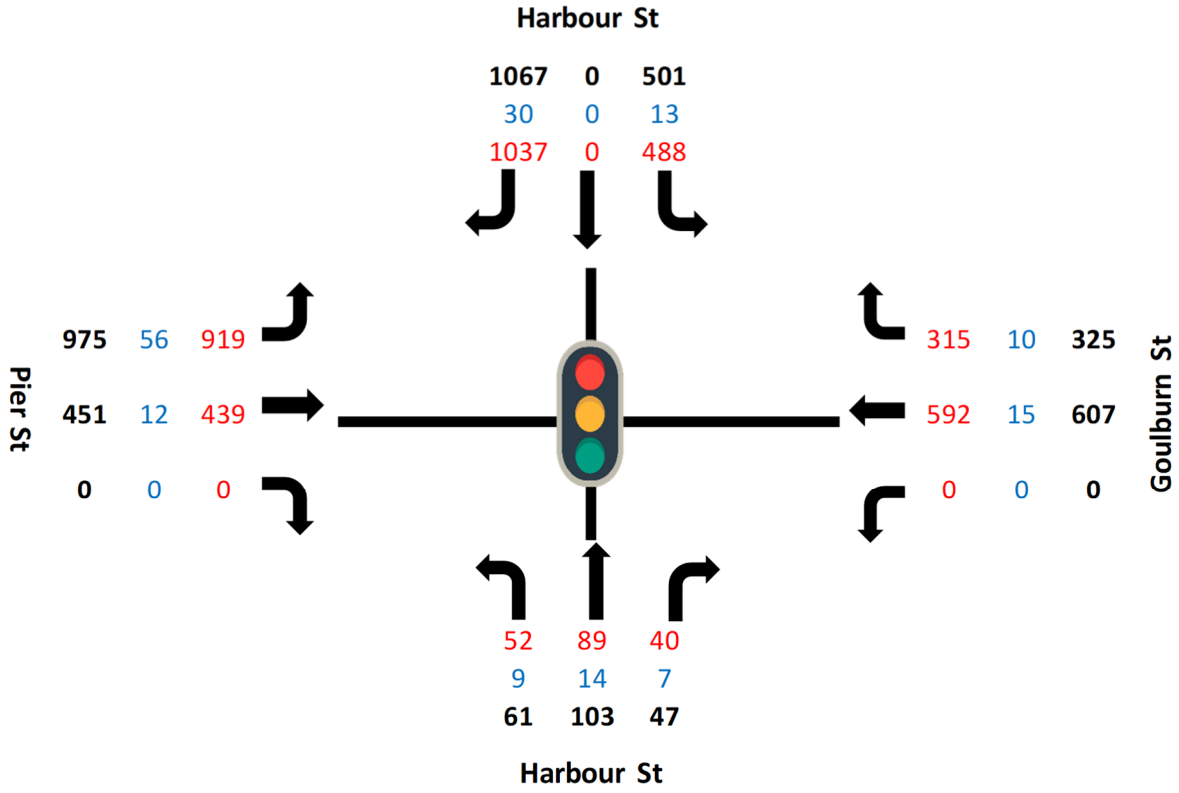
Post-Development AM Peak
(I-2) Darling Drive/ Pier Street



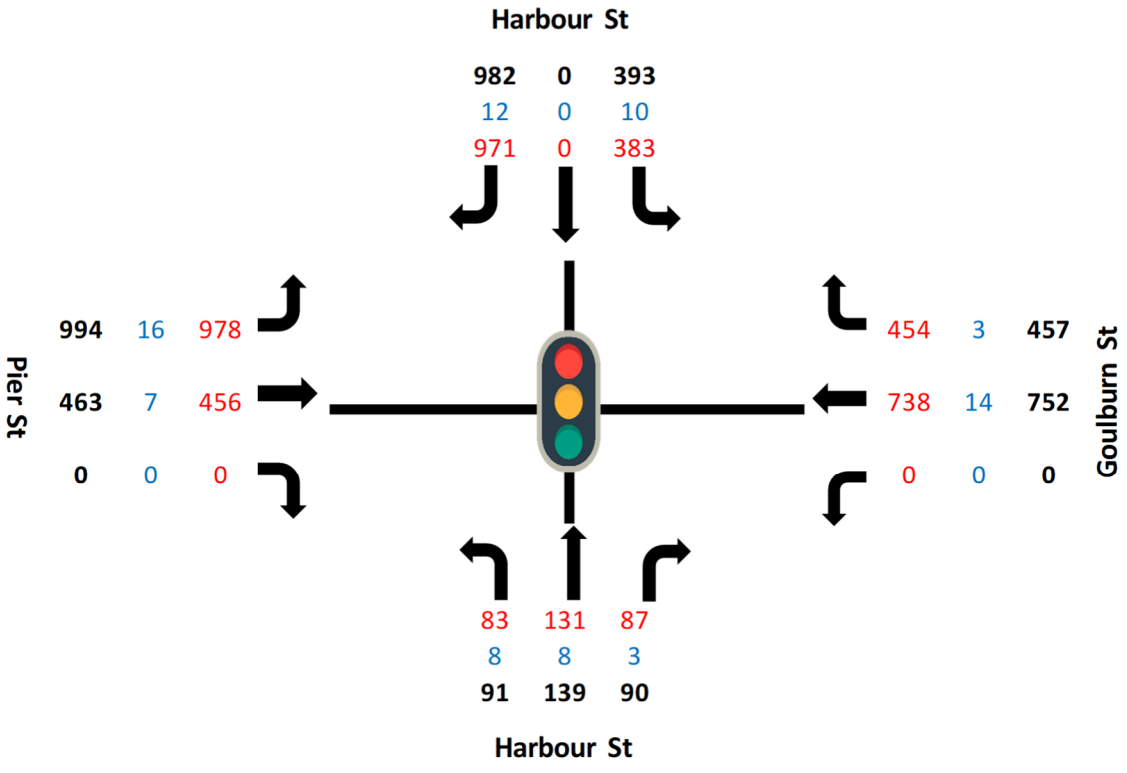
Post-Development PM Peak
(I-2) Darling Drive/ Pier Street



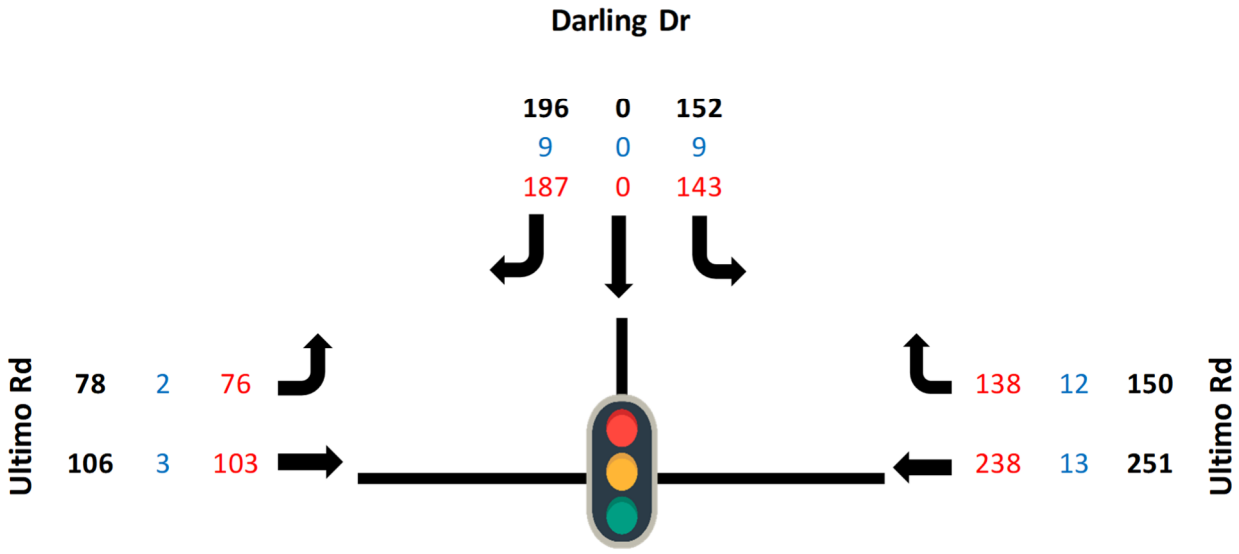
Post-Development AM Peak
(I-3) Harbour Street/ Pier Street/ Goulburn Street



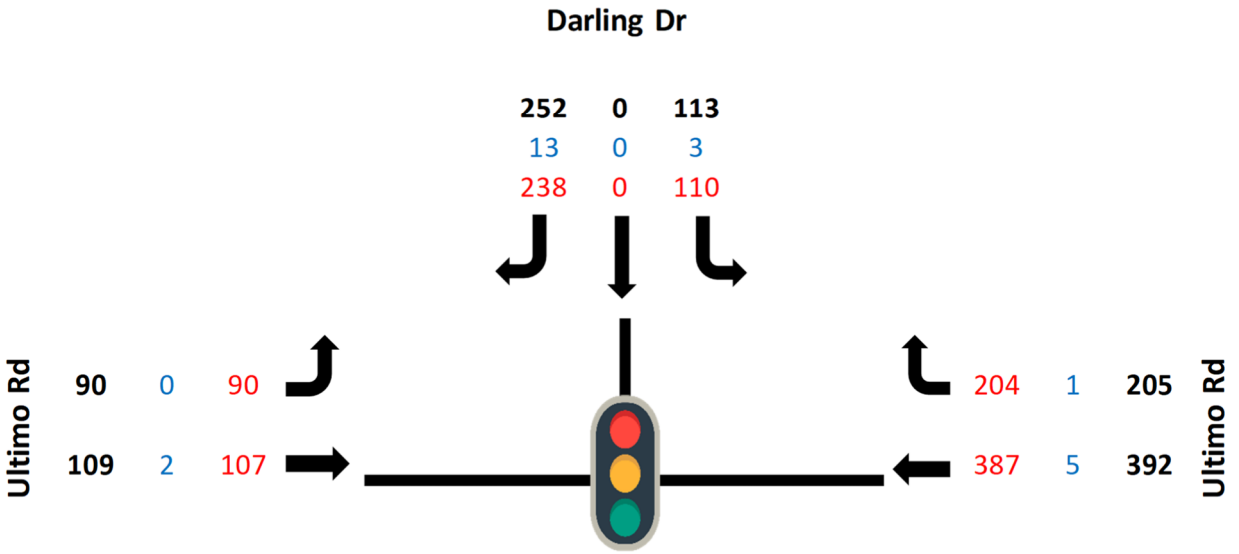
Post-Development PM Peak
(I-3) Harbour Street/ Pier Street/ Goulburn Street



Post-Development AM Peak
(I-4) Darling Drive/ Ultimo Road

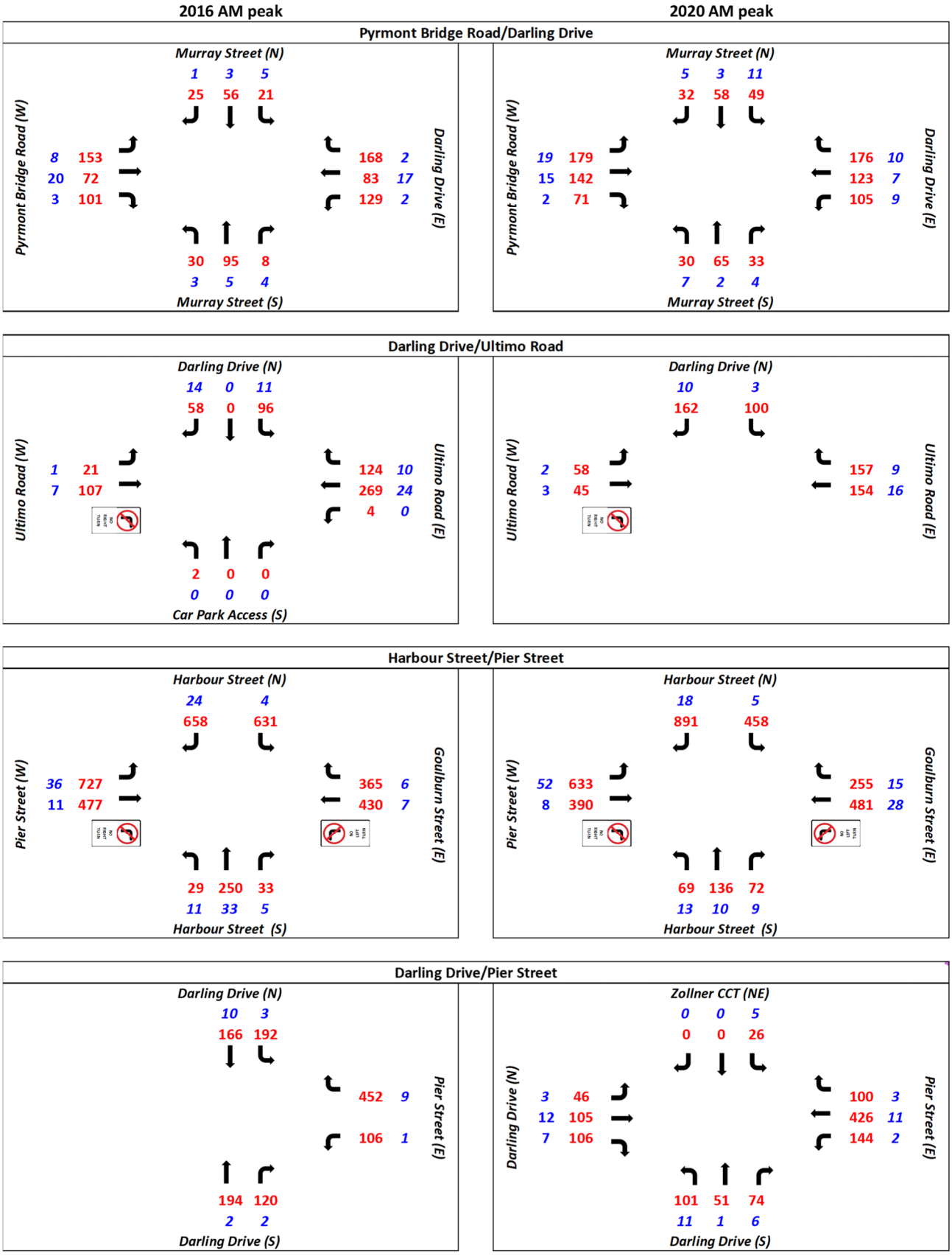


Post-Development PM Peak
(I-4) Darling Drive/ Ultimo Road



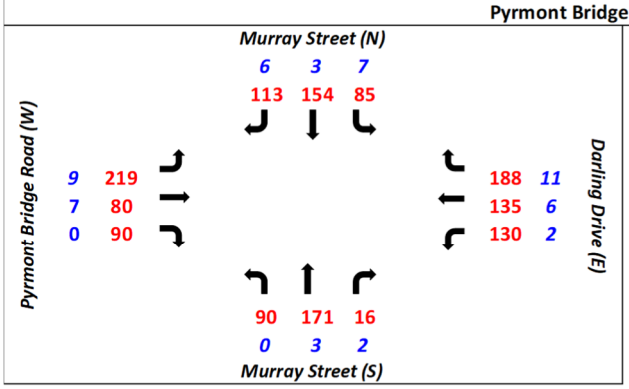
APPENDIX C – VEHICLE SURVEY COMPARISON (FEBRUARY 2016 VS JANUARY 2020)

Appendix C – Volume comparisons

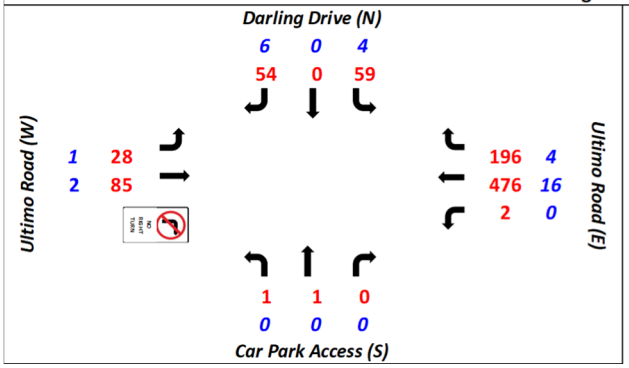


2016 PM peak

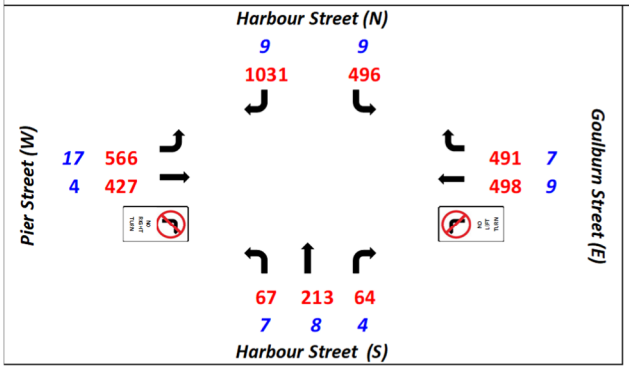
Pyrmont Bridge Road/Darling Drive



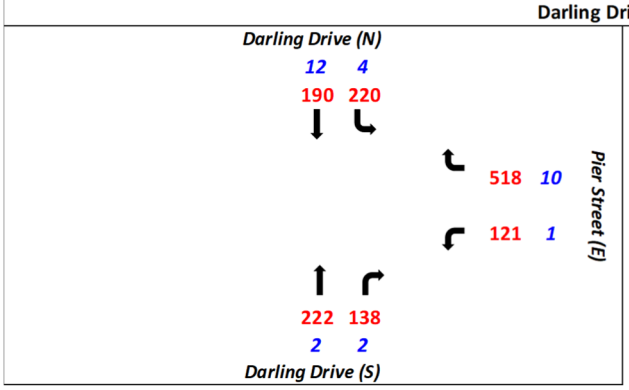
Darling Drive/Ultimo Road



Harbour Street/Pier Street

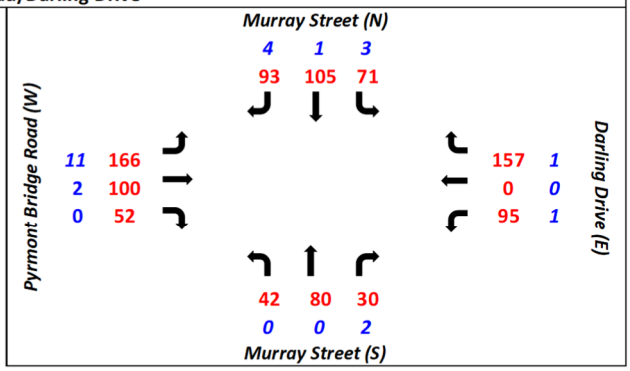


Darling Drive/Pier Street

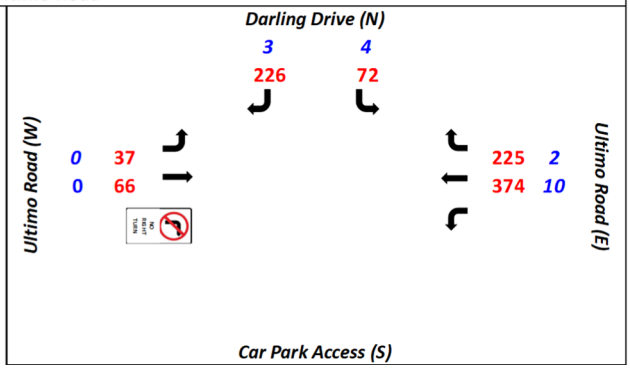


2020 PM peak

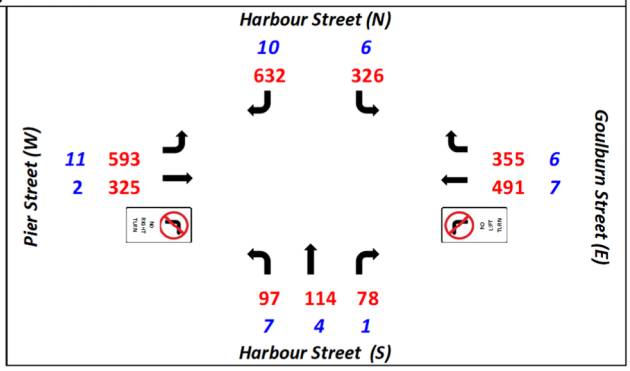
Pyrmont Bridge Road/Darling Drive



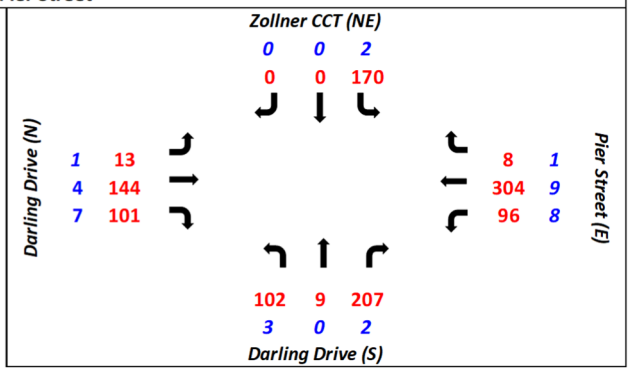
Darling Drive/Ultimo Road



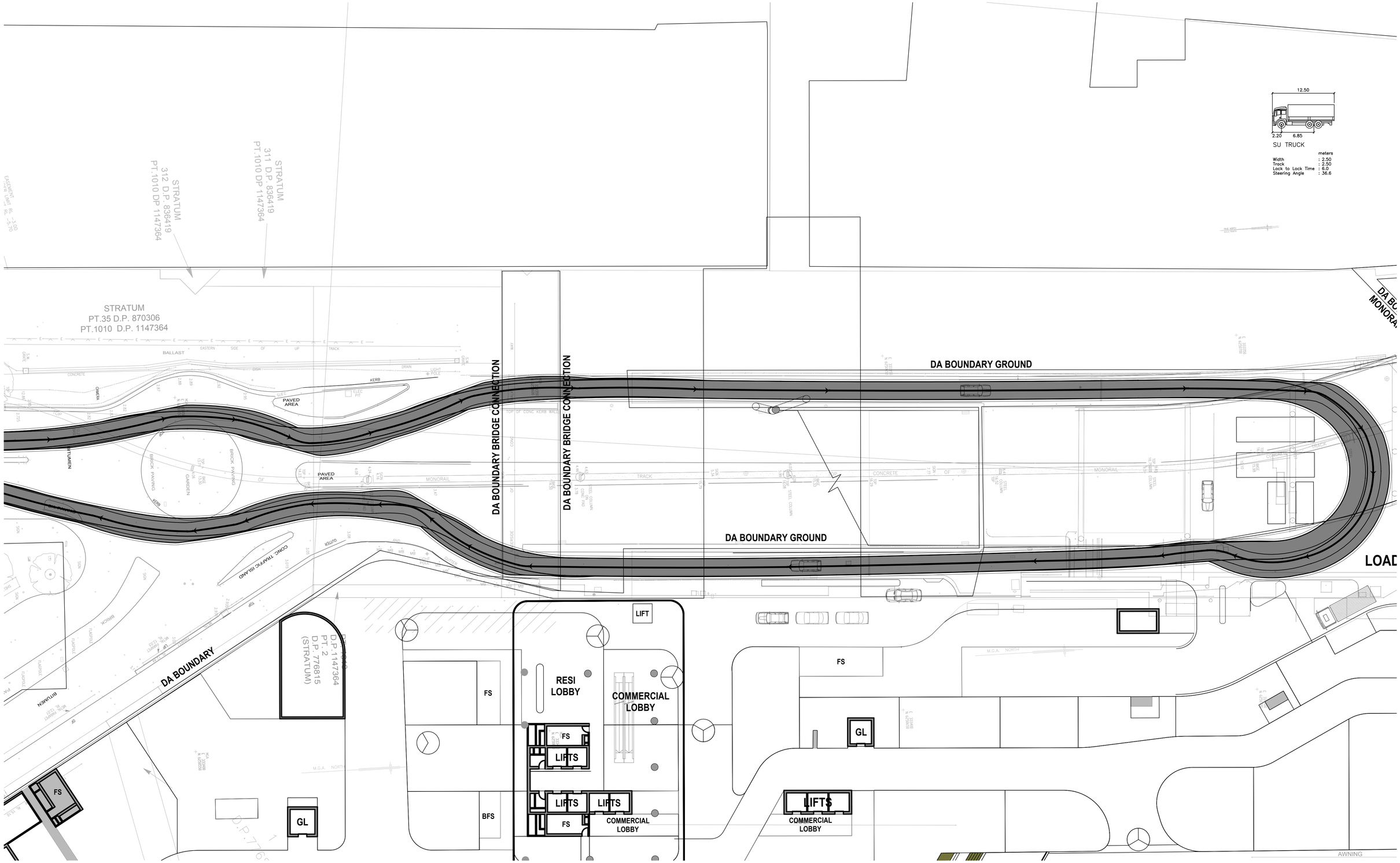
Harbour Street/Pier Street



Darling Drive/Pier Street



APPENDIX D - VEHICLE SWEPT PATHS



Issue	Description	Date
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100mm on Original

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1 : 250

Client

mirvac

Status
PRELIMINARY ONLY
NOT TO BE USED FOR CONSTRUCTION

Scales	1 : 250	Current Issue Signatures	
		Drawn K.MCAREAVEY	
Original Size	A1	Designed	
Height Datum	AHD	Checked J.HEYDON	
Grid	MGA	Approved	

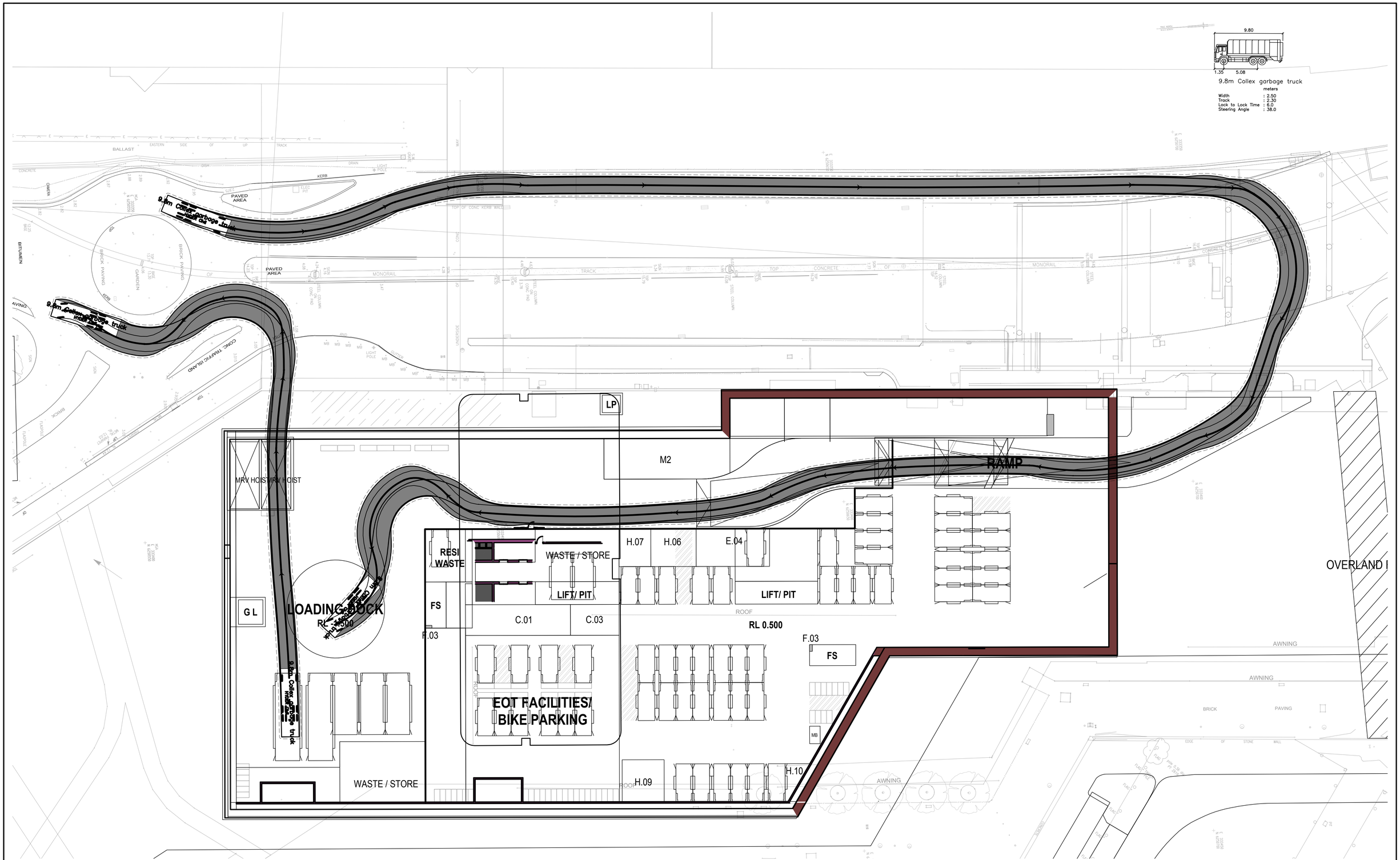
Filename: Skc-00-011-aa008883-LoadingDockTurningPaths.dwg

Project
HARBOURSIDE SHOPPING CENTRE

Title
12.5m HRV LOADING DOCK ACCESS TURNING PATHS

ARCADIS
Arcadis Australia Pacific Pty Limited
Level 5, 141 Walker St
NORTH SYDNEY NSW 2060
ABN 76 104 485 289
Tel No: +61 2 8907 9000
Fax No: +61 2 8907 9001
arcadis.com

Drawing No.	Project No.	Issue
SKC-00-010	AA008883	01



Issue	Description	Date
01	ISSUE FOR INFORMATION	13/02/20

0 5 10 15 20 25m

1 : 250

Client: mirvac

Status: PRELIMINARY ONLY
NOT TO BE USED FOR CONSTRUCTION

Scales	1 : 250	Current Issue Signatures	
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Original Size	A1	Designed	
Height Datum	AHD	Checked J.HEYDON	
Grid	MGA	Approved	

Filename: Skc-00-012-aa008883-LoadingDockTurningPaths.dwg

Project: HARBOURSIDE SHOPPING CENTRE

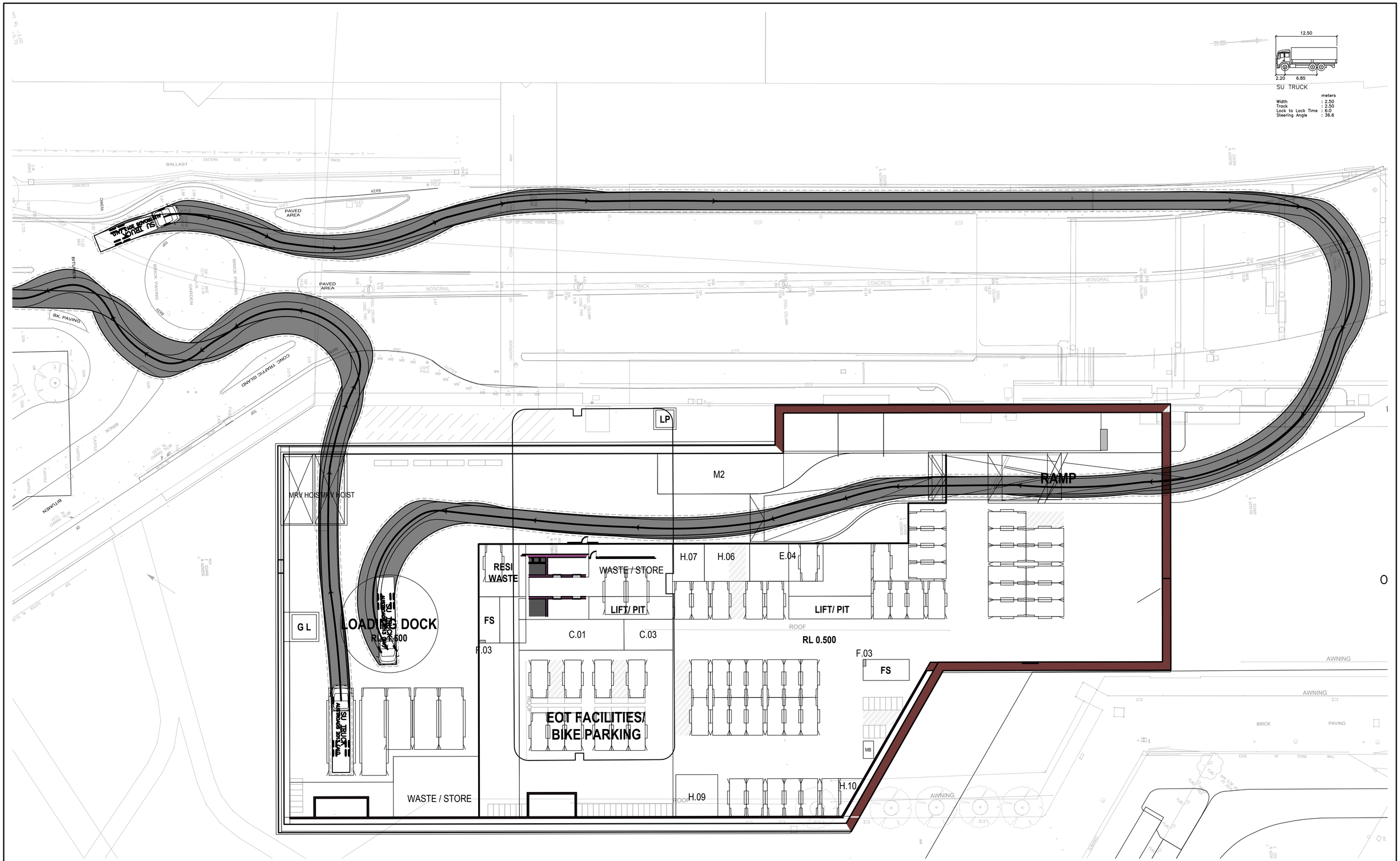
Title: 9.8m WASTE COLLECTION VEHICLE TURNING PATH

ARCADIS
Arcadis Australia Pacific Pty Limited
Level 5, 141 Walker St
NORTH SYDNEY NSW 2060
ABN 76 104 485 289
Tel No: +61 2 8907 9000
Fax No: +61 2 8907 9001
arcadis.com

Drawing No.	Project No.	Issue
SKC-00-012	AA008883	01

100mm on Original

Date Plotted: 14 Feb 2020 - 03:05PM File Name: \\HC-AUS-NS-FS-01\jobs\AA008883\E-CAD\C-Civil\B-Sketches\skc-00-012-aa008883-LoadingDockTurningPaths.dwg V1



01	ISSUE FOR INFORMATION	13/02/20
Issue	Description	Date

0 5 10 15 20 25m

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Client: mirvac

Status: PRELIMINARY ONLY
NOT TO BE USED FOR CONSTRUCTION

Scales	1 : 250	Current Issue Signatures	
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Original Size	A1	Designed	
Height Datum	AHD	Checked J.HEYDON	
Grid	MGA	Approved	

Filename: Skc-00-013-aa008883-LoadingDockTurningPaths.dwg

Project: HARBOURSIDE SHOPPING CENTRE

Title: 12.5m HGV VEHICLE TURNING PATH

ARCADIS
Arcadis Australia Pacific Pty Limited
Level 5, 141 Walker St
NORTH SYDNEY NSW 2060
ABN 76 104 485 289
Tel No: +61 2 8907 9000
Fax No: +61 2 8907 9001
arcadis.com

Drawing No.	Project No.	Issue
SKC-00-013	AA008883	01

100mm on Original

Date Plotted: 14 Feb 2020 - 03:05PM File Name: \\HC-AUS-NS-FS-01\jobs\AA008883\E-CAD\C-Civil\B-Sketches\skc-00-013-aa008883-LoadingDockTurningPaths.dwg V1

APPENDIX E – 2020 EXISTING BASELINE TRAFFIC SIDRA RESULTS

LANE SUMMARY

Site: 1 [Murray Street / Darling Drive - AM Peak_2020]

Murray Street / Darling Drive - AM Peak_2020
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 119 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Murray Street South													
Lane 1	34	3.1	504	0.067	100	38.3	LOS C	1.4	10.2	Full	500	0.0	0.0
Lane 2	80	13.2	279	0.287	100	50.3	LOS D	4.2	32.5	Full	500	0.0	0.0
Approach	114	10.2		0.287		46.8	LOS D	4.2	32.5				
East: Darling Drive													
Lane 1	136	2.3	1502	0.090	100	5.4	LOS A	0.9	6.1	Full	500	0.0	0.0
Lane 2	168	6.9	753	0.224	100	24.7	LOS B	6.3	47.0	Full	500	0.0	0.0
Lane 3	227	2.3	214[1]	1.064	100	143.3	LOS F	22.4	160.2	Short	50	0.0	NA
Lane 4	1	0.0	521	0.002	100	51.9	LOS D	0.1	0.1	Full	500	0.0	0.0
Approach	533	3.8		1.064		70.5	LOS E	22.4	160.2				
North: Murray Street North													
Lane 1	40	7.9	369	0.108	100	28.9	LOS C	1.3	10.1	Full	500	0.0	0.0
Lane 2	79	9.3	239	0.330	100	54.1	LOS D	4.3	32.2	Full	500	0.0	0.0
Approach	119	8.8		0.330		45.6	LOS D	4.3	32.2				
West: Pyrmont Bridge Road													
Lane 1	1	0.0	521	0.002	100	51.9	LOS D	0.1	0.1	Full	500	0.0	0.0
Lane 2	178	11.1	808	0.221	100	23.5	LOS B	6.0	46.3	Full	500	0.0	0.0
Lane 3	165	8.4	746	0.221	100	24.7	LOS B	6.2	46.4	Full	500	0.0	0.0
Lane 4	68	6.2	209	0.327	100	58.1	LOS E	3.8	27.7	Short	40	0.0	NA
Approach	413	9.2		0.327		29.8	LOS C	6.2	46.4				
Intersection	1178	6.8		1.064		51.4	LOS D	22.4	160.2				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

MOVEMENT SUMMARY

Site: 1 [Murray Street / Darling Drive - AM Peak_2020]

Murray Street / Darling Drive - AM Peak_2020
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 119 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Murray Street South												
1	L2	34	3.1	0.067	38.3	LOS C	1.4	10.2	0.77	0.70	0.77	32.6
2	T1	45	9.3	0.287	48.3	LOS D	4.2	32.5	0.92	0.74	0.92	29.7
3	R2	35	18.2	0.287	53.0	LOS D	4.2	32.5	0.92	0.74	0.92	29.6
Approach		114	10.2	0.287	46.8	LOS D	4.2	32.5	0.88	0.73	0.88	30.5
East: Darling Drive												
4	L2	136	2.3	0.090	5.4	LOS A	0.9	6.1	0.17	0.55	0.17	46.6
5	T1	169	6.8	0.224	24.9	LOS B	6.3	47.0	0.70	0.58	0.70	37.3
6	R2	227	2.3	1.064	143.3	LOS F	22.4	160.2	1.00	1.32	2.02	16.6
Approach		533	3.8	1.064	70.5	LOS E	22.4	160.2	0.69	0.89	1.13	25.2
North: Murray Street North												
7	L2	40	7.9	0.108	28.9	LOS C	1.3	10.1	0.84	0.71	0.84	35.5
8	T1	35	6.1	0.330	51.5	LOS D	4.3	32.2	0.95	0.75	0.95	28.8
9	R2	44	11.9	0.330	56.1	LOS D	4.3	32.2	0.95	0.75	0.95	28.7
Approach		119	8.8	0.330	45.6	LOS D	4.3	32.2	0.91	0.74	0.91	30.7
West: Pyrmont Bridge Road												
10	L2	142	11.9	0.221	24.4	LOS B	6.0	46.3	0.63	0.68	0.63	37.5
11	T1	202	8.3	0.221	24.0	LOS B	6.2	46.4	0.68	0.60	0.68	37.4
12	R2	68	6.2	0.327	58.1	LOS E	3.8	27.7	0.96	0.76	0.96	27.8
Approach		413	9.2	0.327	29.8	LOS C	6.2	46.4	0.71	0.65	0.71	35.4
All Vehicles		1178	6.8	1.064	51.4	LOS D	22.4	160.2	0.74	0.77	0.93	29.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	261	27.9	LOS C	0.6	0.6	0.69	0.69
P2	East Full Crossing	475	54.7	LOS E	1.6	1.6	0.97	0.97
P3	North Full Crossing	1943	27.8	LOS C	4.7	4.7	0.71	0.71
P4	West Full Crossing	239	54.2	LOS E	0.8	0.8	0.96	0.96
All Pedestrians		2918	34.4	LOS D			0.77	0.77

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

LANE SUMMARY

Site: 1 [Murray Street / Darling Drive - PM Peak _2020]

Murray Street / Darling Drive - PM Peak _2020
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Murray Street South													
Lane 1	49	0.0	495	0.100	100	40.0	LOS C	2.2	15.2	Full	30	0.0	0.0
Lane 2	143	1.5	301	0.476	100	51.9	LOS D	7.8	55.1	Full	500	0.0	0.0
Approach	193	1.1		0.476		48.8	LOS D	7.8	55.1				
East: Darling Drive													
Lane 1	89	0.0	1446	0.062	100	5.9	LOS A	0.7	5.1	Full	500	0.0	0.0
Lane 2	177	0.6	712	0.248	100	28.2	LOS B	7.1	50.2	Full	500	0.0	0.0
Lane 3	213	2.0	198	1.072	100	149.1	LOS F	21.5	152.9	Short	50	0.0	NA
Lane 4	1	0.0	465	0.002	100	53.5	LOS D	0.1	0.1	Full	500	0.0	0.0
Approach	480	1.1		1.072		77.6	LOS F	21.5	152.9				
North: Murray Street North													
Lane 1	91	5.8	431	0.210	100	27.1	LOS B	2.9	21.4	Full	500	0.0	0.0
Lane 2	209	1.5	330	0.635	100	52.5	LOS D	11.6	82.3	Full	500	0.0	0.0
Approach	300	2.8		0.635		44.9	LOS D	11.6	82.3				
West: Pyrmont Bridge Road													
Lane 1	1	0.0	465	0.002	100	53.5	LOS D	0.1	0.1	Full	500	0.0	0.0
Lane 2	293	5.4	1058	0.277	100	17.2	LOS B	8.2	60.1	Full	500	0.0	0.0
Lane 3	144	1.5	708	0.204	74[5]	27.7	LOS B	5.7	40.5	Full	500	0.0	0.0
Lane 4	75	1.4	199	0.375	100	59.9	LOS E	4.2	29.8	Short	40	0.0	NA
Approach	513	3.7		0.375		26.5	LOS B	8.2	60.1				
Intersection	1485	2.3		1.072		49.6	LOS D	21.5	152.9				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program

MOVEMENT SUMMARY

Site: 1 [Murray Street / Darling Drive - PM Peak _2020]

Murray Street / Darling Drive - PM Peak _2020
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Murray Street South												
1	L2	49	0.0	0.100	40.0	LOS C	2.2	15.2	0.79	0.72	0.79	32.1
2	T1	99	1.1	0.476	50.4	LOS D	7.8	55.1	0.96	0.78	0.96	29.3
3	R2	44	2.4	0.476	55.0	LOS D	7.8	55.1	0.96	0.78	0.96	29.3
Approach		193	1.1	0.476	48.8	LOS D	7.8	55.1	0.91	0.76	0.91	30.0
East: Darling Drive												
4	L2	89	0.0	0.062	5.9	LOS A	0.7	5.1	0.20	0.56	0.20	46.4
5	T1	178	0.6	0.248	28.3	LOS B	7.1	50.2	0.74	0.61	0.74	36.1
6	R2	213	2.0	1.072	149.1	LOS F	21.5	152.9	1.00	1.33	2.06	16.1
Approach		480	1.1	1.072	77.6	LOS F	21.5	152.9	0.75	0.92	1.22	24.0
North: Murray Street North												
7	L2	91	5.8	0.210	27.1	LOS B	2.9	21.4	0.84	0.74	0.84	36.2
8	T1	111	1.0	0.635	50.4	LOS D	11.6	82.3	0.98	0.82	0.98	29.2
9	R2	99	2.1	0.635	55.0	LOS D	11.6	82.3	0.98	0.82	0.98	29.1
Approach		300	2.8	0.635	44.9	LOS D	11.6	82.3	0.94	0.79	0.94	30.9
West: Pyrmont Bridge Road												
10	L2	293	5.4	0.277	17.2	LOS B	8.2	60.1	0.52	0.70	0.52	40.1
11	T1	145	1.4	0.204	27.8	LOS B	5.7	40.5	0.73	0.59	0.73	36.2
12	R2	75	1.4	0.375	59.9	LOS E	4.2	29.8	0.97	0.76	0.97	27.4
Approach		513	3.7	0.375	26.5	LOS B	8.2	60.1	0.65	0.68	0.65	36.5
All Vehicles		1485	2.3	1.072	49.6	LOS D	21.5	152.9	0.77	0.79	0.93	29.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	173	31.0	LOS D	0.4	0.4	0.72	0.72
P2	East Full Crossing	388	55.0	LOS E	1.3	1.3	0.97	0.97
P3	North Full Crossing	1847	31.1	LOS D	4.7	4.7	0.75	0.75
P4	West Full Crossing	207	54.6	LOS E	0.7	0.7	0.96	0.96
All Pedestrians		2616	36.5	LOS D			0.80	0.80

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

LANE SUMMARY

Site: 2 [Darling Drive / Pier Street - AM Peak_2020]

Darling Drive / Pier Street - AM Peak_2020
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Darling Drive South													
Lane 1[d]	257	7.4	863	0.298	100	8.5	LOS A	1.9	14.2	Full	500	0.0	0.0
Approach	257	7.4		0.298		8.5	LOS A	1.9	14.2				
East: Pier Street													
Lane 1	154	1.4	1528	0.101	100	2.9	LOS A	0.6	4.0	Short	30	0.0	NA
Lane 2[d]	568	2.6	1563	0.364	100	8.1	LOS A	2.7	19.0	Full	500	0.0	0.0
Approach	722	2.3		0.364		7.0	LOS A	2.7	19.0				
NorthEast: Zollner Circuit													
Lane 1[d]	35	15.2	907	0.038	100	4.4	LOS A	0.2	1.3	Full	75	0.0	0.0
Approach	35	15.2		0.038		4.4	LOS A	0.2	1.3				
North: Darling Drive North													
Lane 1[d]	294	7.9	1110	0.265	100	4.0	LOS A	1.6	12.1	Full	500	0.0	0.0
Approach	294	7.9		0.265		4.0	LOS A	1.6	12.1				
Intersection	1307	4.9		0.364		6.6	LOS A	2.7	19.0				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

MOVEMENT SUMMARY

Site: 2 [Darling Drive / Pier Street - AM Peak_2020]

Darling Drive / Pier Street - AM Peak_2020
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Darling Drive South												
2	T1	118	9.8	0.298	6.1	LOS A	1.9	14.2	0.70	0.75	0.70	46.0
3a	R1	55	1.9	0.298	9.9	LOS A	1.9	14.2	0.70	0.75	0.70	29.2
3	R2	84	7.5	0.298	11.1	LOS A	1.9	14.2	0.70	0.75	0.70	46.3
Approach		257	7.4	0.298	8.5	LOS A	1.9	14.2	0.70	0.75	0.70	42.7
East: Pier Street												
4	L2	154	1.4	0.101	2.9	LOS A	0.6	4.0	0.28	0.39	0.28	47.8
6	R2	460	2.5	0.364	8.0	LOS A	2.7	19.0	0.36	0.58	0.36	46.2
6b	R3	108	2.9	0.364	8.9	LOS A	2.7	19.0	0.36	0.58	0.36	40.6
Approach		722	2.3	0.364	7.0	LOS A	2.7	19.0	0.34	0.54	0.34	45.9
NorthEast: Zollner Circuit												
24b	L3	33	16.1	0.038	4.3	LOS A	0.2	1.3	0.43	0.52	0.43	44.6
24a	L1	1	0.0	0.038	3.5	LOS A	0.2	1.3	0.43	0.52	0.43	46.9
26b	R3	1	0.0	0.038	9.7	LOS A	0.2	1.3	0.43	0.52	0.43	49.4
Approach		35	15.2	0.038	4.4	LOS A	0.2	1.3	0.43	0.52	0.43	44.8
North: Darling Drive North												
7b	L3	52	6.1	0.265	4.3	LOS A	1.6	12.1	0.48	0.49	0.48	44.3
7	L2	123	10.3	0.265	4.1	LOS A	1.6	12.1	0.48	0.49	0.48	47.0
8	T1	119	6.2	0.265	3.8	LOS A	1.6	12.1	0.48	0.49	0.48	48.3
Approach		294	7.9	0.265	4.0	LOS A	1.6	12.1	0.48	0.49	0.48	47.3
All Vehicles		1307	4.9	0.364	6.6	LOS A	2.7	19.0	0.45	0.57	0.45	45.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2 [Darling Drive / Pier Street - PM Peak_2020]

Darling Drive / Pier Street - PM Peak_2020
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Darling Drive South													
Lane 1[d]	286	0.4	1018	0.281	100	7.4	LOS A	1.8	12.3	Full	500	0.0	0.0
Approach	286	0.4		0.281		7.4	LOS A	1.8	12.3				
East: Pier Street													
Lane 1	136	6.2	1487	0.091	100	2.9	LOS A	0.5	3.7	Short	30	0.0	NA
Lane 2[d]	426	1.7	1561	0.273	100	7.9	LOS A	1.8	12.6	Full	500	0.0	0.0
Approach	562	2.8		0.273		6.7	LOS A	1.8	12.6				
NorthEast: Zollner Circuit													
Lane 1[d]	101	0.0	927	0.109	100	4.8	LOS A	0.5	3.6	Full	75	0.0	0.0
Approach	101	0.0		0.109		4.8	LOS A	0.5	3.6				
North: Darling Drive North													
Lane 1[d]	333	3.8	1254	0.265	100	3.3	LOS A	1.7	12.5	Full	500	0.0	0.0
Approach	333	3.8		0.265		3.3	LOS A	1.7	12.5				
Intersection	1282	2.3		0.281		5.8	LOS A	1.8	12.6				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

MOVEMENT SUMMARY

Site: 2 [Darling Drive / Pier Street - PM Peak_2020]

Darling Drive / Pier Street - PM Peak_2020
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Darling Drive South												
2	T1	135	0.0	0.281	4.8	LOS A	1.8	12.3	0.61	0.66	0.61	46.5
3a	R1	23	0.0	0.281	8.8	LOS A	1.8	12.3	0.61	0.66	0.61	29.5
3	R2	128	0.8	0.281	9.8	LOS A	1.8	12.3	0.61	0.66	0.61	46.9
Approach		286	0.4	0.281	7.4	LOS A	1.8	12.3	0.61	0.66	0.61	45.4
East: Pier Street												
4	L2	136	6.2	0.091	2.9	LOS A	0.5	3.7	0.28	0.39	0.28	47.8
6	R2	421	1.8	0.273	7.9	LOS A	1.8	12.6	0.32	0.58	0.32	46.4
6b	R3	5	0.0	0.273	8.8	LOS A	1.8	12.6	0.32	0.58	0.32	40.8
Approach		562	2.8	0.273	6.7	LOS A	1.8	12.6	0.31	0.53	0.31	46.7
NorthEast: Zollner Circuit												
24b	L3	99	0.0	0.109	4.7	LOS A	0.5	3.6	0.49	0.59	0.49	44.6
24a	L1	1	0.0	0.109	4.1	LOS A	0.5	3.6	0.49	0.59	0.49	46.7
26b	R3	1	0.0	0.109	10.3	LOS A	0.5	3.6	0.49	0.59	0.49	49.1
Approach		101	0.0	0.109	4.8	LOS A	0.5	3.6	0.49	0.59	0.49	44.7
North: Darling Drive North												
7b	L3	22	0.0	0.265	3.6	LOS A	1.7	12.5	0.40	0.42	0.40	44.9
7	L2	189	2.2	0.265	3.4	LOS A	1.7	12.5	0.40	0.42	0.40	47.4
8	T1	121	7.0	0.265	3.3	LOS A	1.7	12.5	0.40	0.42	0.40	48.6
Approach		333	3.8	0.265	3.3	LOS A	1.7	12.5	0.40	0.42	0.40	47.7
All Vehicles		1282	2.3	0.281	5.8	LOS A	1.8	12.6	0.42	0.54	0.42	46.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 3 [Harbour Street / Pier Street / Goulburn Street - AM Peak_2020]

Harbour Street / Pier Street / Goulburn Street - AM Peak_2020
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 112 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Harbour Street South													
Lane 1	64	14.8	255	0.252	100	49.7	LOS D	3.2	25.0	Full	500	0.0	0.0
Lane 2	54	13.6	272	0.199	79[5]	45.6	LOS D	2.6	20.6	Full	500	0.0	0.0
Lane 3	54	13.6	272	0.199	79[5]	45.6	LOS D	2.6	20.6	Full	500	0.0	0.0
Lane 4	49	14.9	255	0.194	100	49.1	LOS D	2.4	19.1	Short	32	0.0	NA
Approach	222	14.2		0.252		47.5	LOS D	3.2	25.0				
East: Goulburn Street													
Lane 1	315	2.4	789	0.400	100	24.8	LOS B	12.0	86.0	Full	500	0.0	0.0
Lane 2	251	2.4	629[1]	0.400	100	23.8	LOS B	9.2	65.9	Full	500	0.0	0.0
Lane 3	163	3.1	214[1]	0.763	100	54.7	LOS D	8.9	63.8	Short	30	0.0	NA
Lane 4	179	3.1	235[1]	0.763	100	54.9	LOS D	9.8	70.5	Short	28	0.0	NA
Approach	908	2.7		0.763		35.8	LOS C	12.0	86.0				
North: Harbour Street North													
Lane 1	527	2.6	842	0.627	100	23.1	LOS B	19.4	138.7	Full	500	0.0	0.0
Lane 2	517	0.0	514	1.007	100	59.2	LOS E	36.4	254.5	Full	500	0.0	0.0
Lane 3	497	5.7	494	1.007	100	59.6	LOS E	35.0	257.3	Full	500	0.0	0.0
Approach	1542	2.7		1.007		47.0	LOS D	36.4	257.3				
West: Pier Street													
Lane 1	319	5.7	940	0.340	100	20.8	LOS B	9.9	72.9	Full	500	0.0	0.0
Lane 2	319	5.7	940	0.340	100	20.8	LOS B	9.9	72.9	Short	90	0.0	NA
Lane 3	319	5.7	940	0.340	100	20.8	LOS B	9.9	72.9	Full	500	0.0	0.0
Lane 4	215	2.7	376	0.570	100	45.9	LOS D	10.8	77.3	Full	500	0.0	0.0
Lane 5	215	2.7	376	0.570	100	45.9	LOS D	10.8	77.3	Short	110	0.0	NA
Approach	1387	4.8		0.570		28.6	LOS C	10.8	77.3				
Intersection	4060	4.0		1.007		38.2	LOS C	36.4	257.3				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.
5 Lane under-utilisation found by the program

MOVEMENT SUMMARY

Site: 3 [Harbour Street / Pier Street / Goulburn Street - AM Peak_2020]

Harbour Street / Pier Street / Goulburn Street - AM Peak_2020
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 112 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Harbour Street South												
1	L2	64	14.8	0.252	49.7	LOS D	3.2	25.0	0.92	0.75	0.92	27.5
2	T1	108	13.6	0.199	45.6	LOS D	2.6	20.6	0.91	0.69	0.91	29.0
3	R2	49	14.9	0.194	49.1	LOS D	2.4	19.1	0.91	0.73	0.91	26.2
Approach		222	14.2	0.252	47.5	LOS D	3.2	25.0	0.91	0.72	0.91	27.9
East: Goulburn Street												
5	T1	566	2.4	0.400	24.4	LOS B	12.0	86.0	0.74	0.63	0.74	34.7
6	R2	342	3.1	0.763	54.8	LOS D	9.8	70.5	0.98	0.90	1.14	26.6
Approach		908	2.7	0.763	35.8	LOS C	12.0	86.0	0.83	0.73	0.89	31.1
North: Harbour Street North												
7	L2	527	2.6	0.627	23.1	LOS B	19.4	138.7	0.81	0.81	0.81	35.3
9	R2	1015	2.8	1.007	59.4	LOS E	36.4	254.5	1.00	1.07	1.34	27.8
Approach		1542	2.7	1.007	47.0	LOS D	36.4	257.3	0.93	0.98	1.16	29.9
West: Pier Street												
10	L2	958	5.7	0.340	20.8	LOS B	9.9	72.9	0.62	0.72	0.62	39.1
11	T1	429	2.7	0.570	45.9	LOS D	10.8	77.3	0.96	0.80	0.96	28.6
Approach		1387	4.8	0.570	28.6	LOS C	10.8	77.3	0.72	0.75	0.72	35.1
All Vehicles		4060	4.0	1.007	38.2	LOS C	36.4	257.3	0.84	0.83	0.94	31.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	222	6.9	LOS A	0.2	0.2	0.35	0.35
P2	East Full Crossing	29	42.1	LOS E	0.1	0.1	0.87	0.87
P3	North Full Crossing	7	48.3	LOS E	0.0	0.0	0.93	0.93
P4	West Full Crossing	5	49.2	LOS E	0.0	0.0	0.94	0.94
P4S	West Slip/Bypass Lane Crossing	5	27.2	LOS C	0.0	0.0	0.70	0.70
All Pedestrians		269	13.1	LOS B			0.44	0.44

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

LANE SUMMARY

Site: 3 [Harbour Street / Pier Street / Goulburn Street - PM Peak_2020]

Harbour Street / Pier Street / Goulburn Street - PM Peak_2020
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 107 seconds (Site User-Given Cycle Time)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Harbour Street South													
Lane 1	96	8.8	131	0.733	100	61.1	LOS E	5.4	40.4	Full	500	0.0	0.0
Lane 2	73	5.8	193	0.379	52[5]	50.2	LOS D	3.7	27.3	Full	500	0.0	0.0
Lane 3	73	5.8	193	0.379	52[5]	50.2	LOS D	3.7	27.3	Full	500	0.0	0.0
Lane 4	95	3.3	186	0.508	100	54.5	LOS D	4.9	35.3	Short	32	0.0	NA
Approach	337	5.9		0.733		54.5	LOS D	5.4	40.4				
East: Goulburn Street													
Lane 1	399	1.8	811	0.492	100	24.2	LOS B	15.1	107.5	Full	500	0.0	0.0
Lane 2	300	1.8	609[1]	0.492	100	22.7	LOS B	10.7	75.8	Full	500	0.0	0.0
Lane 3	234	0.7	304[1]	0.768	100	45.5	LOS D	11.5	80.6	Short	30	0.0	NA
Lane 4	247	0.7	322[1]	0.768	100	45.6	LOS D	12.2	85.7	Short	28	0.0	NA
Approach	1180	1.3		0.768		32.5	LOS C	15.1	107.5				
North: Harbour Street North													
Lane 1	414	2.5	663	0.624	100	32.9	LOS C	14.8	106.0	Full	500	0.0	0.0
Lane 2	451	0.0	573	0.788	100	43.8	LOS D	22.7	159.1	Full	500	0.0	0.0
Lane 3	444	2.4	563	0.788	100	43.9	LOS D	22.4	160.0	Full	500	0.0	0.0
Approach	1308	1.6		0.788		40.4	LOS C	22.7	160.0				
West: Pier Street													
Lane 1	286	1.6	892	0.320	100	22.3	LOS B	9.0	63.8	Full	500	0.0	0.0
Lane 2	286	1.6	892	0.320	100	22.3	LOS B	9.0	63.8	Short	90	0.0	NA
Lane 3	286	1.6	892	0.320	100	22.3	LOS B	9.0	63.8	Full	500	0.0	0.0
Lane 4	181	1.5	235	0.771	100	55.1	LOS D	9.9	70.2	Full	500	0.0	0.0
Lane 5	181	1.5	235	0.771	100	55.1	LOS D	9.9	70.2	Short	110	0.0	NA
Approach	1220	1.6		0.771		32.0	LOS C	9.9	70.2				
Intersection	4045	1.9		0.788		36.8	LOS C	22.7	160.0				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.
5 Lane under-utilisation found by the program

MOVEMENT SUMMARY

Site: 3 [Harbour Street / Pier Street / Goulburn Street - PM Peak_2020]

Harbour Street / Pier Street / Goulburn Street - PM Peak_2020
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 107 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Harbour Street South												
1	L2	96	8.8	0.733	61.1	LOS E	5.4	40.4	1.00	0.89	1.20	25.3
2	T1	146	5.8	0.379	50.2	LOS D	3.7	27.3	0.97	0.75	0.97	28.0
3	R2	95	3.3	0.508	54.5	LOS D	4.9	35.3	0.99	0.78	0.99	25.2
Approach		337	5.9	0.733	54.5	LOS D	5.4	40.4	0.99	0.80	1.04	26.4
East: Goulburn Street												
5	T1	699	1.8	0.492	23.6	LOS B	15.1	107.5	0.76	0.66	0.76	35.0
6	R2	481	0.7	0.768	45.6	LOS D	12.2	85.7	0.92	0.88	1.06	28.5
Approach		1180	1.3	0.768	32.5	LOS C	15.1	107.5	0.83	0.75	0.88	32.0
North: Harbour Street North												
7	L2	414	2.5	0.624	32.9	LOS C	14.8	106.0	0.88	0.95	1.14	32.3
9	R2	895	1.2	0.788	43.9	LOS D	22.7	159.1	0.98	0.91	1.05	31.5
Approach		1308	1.6	0.788	40.4	LOS C	22.7	160.0	0.95	0.92	1.08	31.7
West: Pier Street												
10	L2	858	1.6	0.320	22.3	LOS B	9.0	63.8	0.65	0.73	0.65	38.4
11	T1	362	1.5	0.771	55.1	LOS D	9.9	70.2	1.00	0.91	1.17	26.7
Approach		1220	1.6	0.771	32.0	LOS C	9.9	70.2	0.75	0.79	0.80	34.0
All Vehicles		4045	1.9	0.788	36.8	LOS C	22.7	160.0	0.86	0.82	0.93	31.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	464	5.2	LOS A	0.4	0.4	0.31	0.31
P2	East Full Crossing	56	37.9	LOS D	0.1	0.1	0.84	0.84
P3	North Full Crossing	41	47.7	LOS E	0.1	0.1	0.95	0.95
P4	West Full Crossing	48	47.8	LOS E	0.1	0.1	0.95	0.95
P4S	West Slip/Bypass Lane Crossing	48	23.6	LOS C	0.1	0.1	0.66	0.66
All Pedestrians		658	15.1	LOS B			0.47	0.47

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

LANE SUMMARY

Site: 4 [Darling Drive / Ultimo Road - AM Peak_2020]

Darling Drive / Ultimo Road - AM Peak_2020
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 64 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Car Park Access													
Lane 1	4	0.0	382	0.011	100	23.8	LOS B	0.1	0.7	Full	500	0.0	0.0
Approach	4	0.0		0.011		23.8	LOS B	0.1	0.7				
East: Ultimo Road East													
Lane 1	133	5.1	1149	0.115	100	5.6	LOS A	1.7	12.6	Full	500	0.0	0.0
Lane 2	133	5.2	1150	0.115	100	5.6	LOS A	1.7	12.6	Full	500	0.0	0.0
Lane 3	158	8.0	275	0.575	100	32.2	LOS C	4.9	36.4	Short	24	0.0	NA
Approach	423	6.2		0.575		15.5	LOS B	4.9	36.4				
North: Darling Drive North													
Lane 1	160	5.9	278	0.575	100	33.3	LOS C	4.9	36.3	Full	500	0.0	0.0
Lane 2	184	4.6	352	0.523	100	29.5	LOS C	5.3	38.7	Full	500	0.0	0.0
Approach	344	5.2		0.575		31.3	LOS C	5.3	38.7				
West: Ultimo Road West													
Lane 1	70	2.5	549	0.128	100	20.2	LOS B	1.6	11.6	Full	500	0.0	0.0
Lane 2	88	2.8	688	0.128	100	14.9	LOS B	1.9	13.3	Full	500	0.0	0.0
Approach	158	2.7		0.128		17.3	LOS B	1.9	13.3				
Intersection	929	5.2		0.575		21.7	LOS B	5.3	38.7				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 4 [Darling Drive / Ultimo Road - AM Peak_2020]

Darling Drive / Ultimo Road - AM Peak_2020
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 64 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Car Park Access												
1	L2	2	0.0	0.011	24.6	LOS B	0.1	0.7	0.80	0.59	0.80	31.8
2	T1	1	0.0	0.011	21.2	LOS B	0.1	0.7	0.80	0.59	0.80	34.8
3	R2	1	0.0	0.011	24.6	LOS B	0.1	0.7	0.80	0.59	0.80	31.9
Approach		4	0.0	0.011	23.8	LOS B	0.1	0.7	0.80	0.59	0.80	32.5
East: Ultimo Road East												
4	L2	1	0.0	0.115	9.0	LOS A	1.7	12.6	0.44	0.36	0.44	37.8
5	T1	264	5.2	0.115	5.6	LOS A	1.7	12.6	0.44	0.36	0.44	37.7
6	R2	158	8.0	0.575	32.2	LOS C	4.9	36.4	0.97	0.81	0.99	31.7
Approach		423	6.2	0.575	15.5	LOS B	4.9	36.4	0.64	0.53	0.65	35.2
North: Darling Drive North												
7	L2	160	5.9	0.575	33.3	LOS C	4.9	36.3	0.97	0.81	0.99	31.8
8	T1	1	0.0	0.523	26.2	LOS B	5.3	38.7	0.93	0.80	0.93	32.8
9	R2	183	4.6	0.523	29.5	LOS C	5.3	38.7	0.93	0.80	0.93	32.9
Approach		344	5.2	0.575	31.3	LOS C	5.3	38.7	0.95	0.80	0.96	32.3
West: Ultimo Road West												
10	L2	46	2.3	0.128	21.4	LOS B	1.6	11.6	0.76	0.66	0.76	35.4
11	T1	112	2.8	0.128	15.6	LOS B	1.9	13.3	0.72	0.58	0.72	34.0
Approach		158	2.7	0.128	17.3	LOS B	1.9	13.3	0.73	0.60	0.73	34.4
All Vehicles		929	5.2	0.575	21.7	LOS B	5.3	38.7	0.77	0.64	0.78	33.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	1	7.0	LOS A	0.0	0.0	0.47	0.47
P2	East Full Crossing	45	26.3	LOS C	0.1	0.1	0.91	0.91
P3	North Full Crossing	171	20.5	LOS C	0.2	0.2	0.80	0.80
All Pedestrians		217	21.6	LOS C			0.82	0.82

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

LANE SUMMARY

Site: 4 [Darling Drive / Ultimo Road - PM Peak_2020]

Darling Drive / Ultimo Road - PM Peak_2020
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 82 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Car Park Access													
Lane 1	3	0.0	315	0.010	100	31.9	LOS C	0.1	0.7	Full	500	0.0	0.0
Approach	3	0.0		0.010		31.9	LOS C	0.1	0.7				
East: Ultimo Road East													
Lane 1	207	1.3	1320	0.157	100	4.9	LOS A	2.9	20.4	Full	500	0.0	0.0
Lane 2	207	1.3	1321	0.157	100	4.9	LOS A	2.9	20.4	Full	500	0.0	0.0
Lane 3	216	0.5	281[1]	0.768	100	39.3	LOS C	8.6	60.3	Short	24	0.0	NA
Approach	629	1.0		0.768		16.7	LOS B	8.6	60.3				
North: Darling Drive North													
Lane 1	119	2.7	378	0.315	100	35.0	LOS C	4.1	29.6	Full	500	0.0	0.0
Lane 2	203	5.2	291	0.699	100	41.3	LOS C	8.2	60.0	Full	500	0.0	0.0
Approach	322	4.2		0.699		39.0	LOS C	8.2	60.0				
West: Ultimo Road West													
Lane 1	72	0.6	617	0.117	100	22.9	LOS B	2.0	14.2	Full	500	0.0	0.0
Lane 2	91	1.8	776	0.117	100	16.4	LOS B	2.3	16.1	Full	500	0.0	0.0
Approach	163	1.3		0.117		19.3	LOS B	2.3	16.1				
Intersection	1118	2.0		0.768		23.5	LOS B	8.6	60.3				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

MOVEMENT SUMMARY

Site: 4 [Darling Drive / Ultimo Road - PM Peak_2020]

Darling Drive / Ultimo Road - PM Peak_2020
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 82 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Car Park Access												
1	L2	1	0.0	0.010	33.0	LOS C	0.1	0.7	0.84	0.59	0.84	29.8
2	T1	1	0.0	0.010	29.6	LOS C	0.1	0.7	0.84	0.59	0.84	32.3
3	R2	1	0.0	0.010	33.0	LOS C	0.1	0.7	0.84	0.59	0.84	29.8
Approach		3	0.0	0.010	31.9	LOS C	0.1	0.7	0.84	0.59	0.84	30.6
East: Ultimo Road East												
4	L2	1	0.0	0.157	8.3	LOS A	2.9	20.4	0.38	0.32	0.38	38.1
5	T1	413	1.3	0.157	4.9	LOS A	2.9	20.4	0.38	0.32	0.38	38.0
6	R2	216	0.5	0.768	39.3	LOS C	8.6	60.3	0.95	0.91	1.14	29.8
Approach		629	1.0	0.768	16.7	LOS B	8.6	60.3	0.57	0.52	0.64	34.7
North: Darling Drive North												
7	L2	119	2.7	0.315	35.0	LOS C	4.1	29.6	0.89	0.77	0.89	31.3
8	T1	1	0.0	0.699	38.1	LOS C	8.2	60.0	0.99	0.87	1.09	29.6
9	R2	202	5.2	0.699	41.3	LOS C	8.2	60.0	0.99	0.87	1.09	29.7
Approach		322	4.2	0.699	39.0	LOS C	8.2	60.0	0.95	0.83	1.02	30.3
West: Ultimo Road West												
10	L2	48	0.0	0.117	24.1	LOS B	2.0	14.2	0.73	0.65	0.73	34.5
11	T1	115	1.8	0.117	17.3	LOS B	2.3	16.1	0.67	0.55	0.67	33.5
Approach		163	1.3	0.117	19.3	LOS B	2.3	16.1	0.69	0.58	0.69	33.8
All Vehicles		1118	2.0	0.768	23.5	LOS B	8.6	60.3	0.70	0.62	0.76	33.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	1	5.9	LOS A	0.0	0.0	0.38	0.38
P2	East Full Crossing	55	35.3	LOS D	0.1	0.1	0.93	0.93
P3	North Full Crossing	167	21.4	LOS C	0.3	0.3	0.72	0.72
All Pedestrians		223	24.7	LOS C			0.77	0.77

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

APPENDIX F – 2020 WITH DEVELOPMENT PREDICTED TRAFFIC SIDRA RESULTS

LANE SUMMARY

Site: 1 [Murray Street / Darling Drive - AM Peak_2020]

Murray Street / Darling Drive - AM Peak_2020
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 119 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows Total veh/h	Demand Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Murray Street South													
Lane 1	34	3.1	504	0.067	100	38.3	LOS C	1.4	10.2	Full	500	0.0	0.0
Lane 2	80	13.2	279	0.287	100	50.3	LOS D	4.2	32.5	Full	500	0.0	0.0
Approach	114	10.2		0.287		46.8	LOS D	4.2	32.5				
East: Darling Drive													
Lane 1	136	2.3	1502	0.090	100	5.4	LOS A	0.9	6.1	Full	500	0.0	0.0
Lane 2	260	6.9	753	0.345	100	26.2	LOS B	10.4	76.8	Full	500	0.0	0.0
Lane 3	227	2.3	213[1]	1.066	100	144.5	LOS F	22.5	161.0	Short	50	0.0	NA
Lane 4	1	0.0	521	0.002	100	51.9	LOS D	0.1	0.1	Full	500	0.0	0.0
Approach	624	4.2		1.066		64.8	LOS E	22.5	161.0				
North: Murray Street North													
Lane 1	40	7.9	369	0.108	100	28.9	LOS C	1.3	10.1	Full	500	0.0	0.0
Lane 2	79	9.3	239	0.330	100	54.1	LOS D	4.3	32.2	Full	500	0.0	0.0
Approach	119	8.8		0.330		45.6	LOS D	4.3	32.2				
West: Pyrmont Bridge Road													
Lane 1	1	0.0	521	0.002	100	51.9	LOS D	0.1	0.1	Full	500	0.0	0.0
Lane 2	247	10.3	754	0.328	100	26.8	LOS B	9.4	71.9	Full	500	0.0	0.0
Lane 3	240	8.2	734[1]	0.328	100	25.9	LOS B	9.5	71.0	Full	500	0.0	0.0
Lane 4	68	6.2	209	0.327	100	58.1	LOS E	3.8	27.7	Short	40	0.0	NA
Approach	557	8.9		0.328		30.3	LOS C	9.5	71.9				
Intersection	1414	6.9		1.066		48.2	LOS D	22.5	161.0				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

MOVEMENT SUMMARY

Site: 1 [Murray Street / Darling Drive - AM Peak_2020]

Murray Street / Darling Drive - AM Peak_2020
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 119 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Murray Street South												
1	L2	34	3.1	0.067	38.3	LOS C	1.4	10.2	0.77	0.70	0.77	32.6
2	T1	45	9.3	0.287	48.3	LOS D	4.2	32.5	0.92	0.74	0.92	29.7
3	R2	35	18.2	0.287	53.0	LOS D	4.2	32.5	0.92	0.74	0.92	29.6
Approach		114	10.2	0.287	46.8	LOS D	4.2	32.5	0.88	0.73	0.88	30.5
East: Darling Drive												
4	L2	136	2.3	0.090	5.4	LOS A	0.9	6.1	0.17	0.55	0.17	46.6
5	T1	261	6.9	0.345	26.3	LOS B	10.4	76.8	0.74	0.63	0.74	36.8
6	R2	227	2.3	1.066	144.5	LOS F	22.5	161.0	1.00	1.32	2.03	16.5
Approach		624	4.2	1.066	64.8	LOS E	22.5	161.0	0.71	0.86	1.08	26.2
North: Murray Street North												
7	L2	40	7.9	0.108	28.9	LOS C	1.3	10.1	0.84	0.71	0.84	35.5
8	T1	35	6.1	0.330	51.5	LOS D	4.3	32.2	0.95	0.75	0.95	28.8
9	R2	44	11.9	0.330	56.1	LOS D	4.3	32.2	0.95	0.75	0.95	28.7
Approach		119	8.8	0.330	45.6	LOS D	4.3	32.2	0.91	0.74	0.91	30.7
West: Pyrmont Bridge Road												
10	L2	142	11.9	0.328	28.8	LOS C	9.4	71.9	0.71	0.69	0.71	36.3
11	T1	346	8.2	0.328	25.5	LOS B	9.5	71.0	0.72	0.64	0.72	36.8
12	R2	68	6.2	0.327	58.1	LOS E	3.8	27.7	0.96	0.76	0.96	27.8
Approach		557	8.9	0.328	30.3	LOS C	9.5	71.9	0.75	0.67	0.75	35.3
All Vehicles		1414	6.9	1.066	48.2	LOS D	22.5	161.0	0.76	0.77	0.92	30.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	261	27.9	LOS C	0.6	0.6	0.69	0.69
P2	East Full Crossing	475	54.7	LOS E	1.6	1.6	0.97	0.97
P3	North Full Crossing	1943	27.8	LOS C	4.7	4.7	0.71	0.71
P4	West Full Crossing	239	54.2	LOS E	0.8	0.8	0.96	0.96
All Pedestrians		2918	34.4	LOS D			0.77	0.77

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

LANE SUMMARY

Site: 1 [Murray Street / Darling Drive - PM Peak _2020]

Murray Street / Darling Drive - PM Peak _2020
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Murray Street South													
Lane 1	49	0.0	495	0.100	100	40.0	LOS C	2.2	15.2	Full	30	0.0	0.0
Lane 2	143	1.5	301	0.476	100	51.9	LOS D	7.8	55.1	Full	500	0.0	0.0
Approach	193	1.1		0.476		48.8	LOS D	7.8	55.1				
East: Darling Drive													
Lane 1	89	0.0	1446	0.062	100	5.9	LOS A	0.7	5.1	Full	500	0.0	0.0
Lane 2	427	0.5	540[1]	0.791	100	36.4	LOS C	21.5	151.0	Full	500	0.0	0.0
Lane 3	213	2.0	198	1.072	100	149.1	LOS F	21.5	152.9	Short	50	0.0	NA
Lane 4	1	0.0	465	0.002	100	53.5	LOS D	0.1	0.1	Full	500	0.0	0.0
Approach	731	0.9		1.072		65.5	LOS E	21.5	152.9				
North: Murray Street North													
Lane 1	91	5.8	431	0.210	100	27.1	LOS B	2.9	21.4	Full	500	0.0	0.0
Lane 2	209	1.5	330	0.635	100	52.5	LOS D	11.6	82.3	Full	500	0.0	0.0
Approach	300	2.8		0.635		44.9	LOS D	11.6	82.3				
West: Pyrmont Bridge Road													
Lane 1	1	0.0	465	0.002	100	53.5	LOS D	0.1	0.1	Full	500	0.0	0.0
Lane 2	351	4.8	802	0.437	100	27.9	LOS B	13.9	101.4	Full	500	0.0	0.0
Lane 3	273	1.6	624[1]	0.437	100	29.9	LOS C	11.7	82.8	Full	500	0.0	0.0
Lane 4	75	1.4	199	0.375	100	59.9	LOS E	4.2	29.8	Short	40	0.0	NA
Approach	699	3.2		0.437		32.2	LOS C	13.9	101.4				
Intersection	1922	2.0		1.072		48.5	LOS D	21.5	152.9				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

MOVEMENT SUMMARY

Site: 1 [Murray Street / Darling Drive - PM Peak _2020]

Murray Street / Darling Drive - PM Peak _2020
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Murray Street South												
1	L2	49	0.0	0.100	40.0	LOS C	2.2	15.2	0.79	0.72	0.79	32.1
2	T1	99	1.1	0.476	50.4	LOS D	7.8	55.1	0.96	0.78	0.96	29.3
3	R2	44	2.4	0.476	55.0	LOS D	7.8	55.1	0.96	0.78	0.96	29.3
Approach		193	1.1	0.476	48.8	LOS D	7.8	55.1	0.91	0.76	0.91	30.0
East: Darling Drive												
4	L2	89	0.0	0.062	5.9	LOS A	0.7	5.1	0.20	0.56	0.20	46.4
5	T1	428	0.5	0.791	36.5	LOS C	21.5	151.0	0.87	0.81	0.94	33.4
6	R2	213	2.0	1.072	149.1	LOS F	21.5	152.9	1.00	1.33	2.06	16.1
Approach		731	0.9	1.072	65.5	LOS E	21.5	152.9	0.83	0.93	1.17	26.1
North: Murray Street North												
7	L2	91	5.8	0.210	27.1	LOS B	2.9	21.4	0.84	0.74	0.84	36.2
8	T1	111	1.0	0.635	50.4	LOS D	11.6	82.3	0.98	0.82	0.98	29.2
9	R2	99	2.1	0.635	55.0	LOS D	11.6	82.3	0.98	0.82	0.98	29.1
Approach		300	2.8	0.635	44.9	LOS D	11.6	82.3	0.94	0.79	0.94	30.9
West: Pyrmont Bridge Road												
10	L2	293	5.4	0.437	28.7	LOS C	13.9	101.4	0.73	0.76	0.73	35.9
11	T1	332	1.6	0.437	29.0	LOS C	13.9	101.4	0.78	0.68	0.78	35.6
12	R2	75	1.4	0.375	59.9	LOS E	4.2	29.8	0.97	0.76	0.97	27.4
Approach		699	3.2	0.437	32.2	LOS C	13.9	101.4	0.78	0.72	0.78	34.6
All Vehicles		1922	2.0	1.072	48.5	LOS D	21.5	152.9	0.84	0.82	0.97	29.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	173	31.0	LOS D	0.4	0.4	0.72	0.72
P2	East Full Crossing	388	55.0	LOS E	1.3	1.3	0.97	0.97
P3	North Full Crossing	1847	31.1	LOS D	4.7	4.7	0.75	0.75
P4	West Full Crossing	207	54.6	LOS E	0.7	0.7	0.96	0.96
All Pedestrians		2616	36.5	LOS D			0.80	0.80

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

LANE SUMMARY

Site: 2 [Darling Drive / Pier Street - AM Peak_2020]

Darling Drive / Pier Street - AM Peak_2020
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	Demand Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Darling Drive South													
Lane 1[d]	293	7.6	711	0.412	100	10.5	LOS A	3.0	22.6	Full	500	0.0	0.0
Approach	293	7.6		0.412		10.5	LOS A	3.0	22.6				
East: Pier Street													
Lane 1	154	1.4	1495	0.103	100	3.0	LOS A	0.6	4.2	Short	30	0.0	NA
Lane 2[d]	748	2.5	1535	0.487	100	8.3	LOS A	4.1	29.6	Full	500	0.0	0.0
Approach	902	2.3		0.487		7.4	LOS A	4.1	29.6				
NorthEast: Zollner Circuit													
Lane 1[d]	35	15.2	803	0.043	100	5.2	LOS A	0.2	1.6	Full	75	0.0	0.0
Approach	35	15.2		0.043		5.2	LOS A	0.2	1.6				
North: Darling Drive North													
Lane 1[d]	429	8.3	1119	0.384	100	4.2	LOS A	2.7	19.9	Full	500	0.0	0.0
Approach	429	8.3		0.384		4.2	LOS A	2.7	19.9				
Intersection	1659	5.1		0.487		7.1	LOS A	4.1	29.6				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

MOVEMENT SUMMARY

Site: 2 [Darling Drive / Pier Street - AM Peak_2020]

Darling Drive / Pier Street - AM Peak_2020
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Darling Drive South												
2	T1	154	9.6	0.412	8.4	LOS A	3.0	22.6	0.85	0.89	0.88	45.1
3a	R1	55	1.9	0.412	12.1	LOS A	3.0	22.6	0.85	0.89	0.88	28.6
3	R2	84	7.5	0.412	13.3	LOS A	3.0	22.6	0.85	0.89	0.88	45.4
Approach		293	7.6	0.412	10.5	LOS A	3.0	22.6	0.85	0.89	0.88	42.3
East: Pier Street												
4	L2	154	1.4	0.103	3.0	LOS A	0.6	4.2	0.32	0.40	0.32	47.7
6	R2	640	2.5	0.487	8.2	LOS A	4.1	29.6	0.45	0.59	0.45	46.0
6b	R3	108	2.9	0.487	9.2	LOS A	4.1	29.6	0.45	0.59	0.45	40.3
Approach		902	2.3	0.487	7.4	LOS A	4.1	29.6	0.43	0.56	0.43	45.8
NorthEast: Zollner Circuit												
24b	L3	33	16.1	0.043	5.1	LOS A	0.2	1.6	0.52	0.58	0.52	44.0
24a	L1	1	0.0	0.043	4.1	LOS A	0.2	1.6	0.52	0.58	0.52	46.2
26b	R3	1	0.0	0.043	10.4	LOS A	0.2	1.6	0.52	0.58	0.52	48.6
Approach		35	15.2	0.043	5.2	LOS A	0.2	1.6	0.52	0.58	0.52	44.2
North: Darling Drive North												
7b	L3	52	6.1	0.384	4.4	LOS A	2.7	19.9	0.54	0.52	0.54	44.1
7	L2	237	10.2	0.384	4.2	LOS A	2.7	19.9	0.54	0.52	0.54	46.9
8	T1	141	6.0	0.384	4.0	LOS A	2.7	19.9	0.54	0.52	0.54	48.2
Approach		429	8.3	0.384	4.2	LOS A	2.7	19.9	0.54	0.52	0.54	47.1
All Vehicles		1659	5.1	0.487	7.1	LOS A	4.1	29.6	0.54	0.61	0.54	45.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2 [Darling Drive / Pier Street - PM Peak_2020]

Darling Drive / Pier Street - PM Peak_2020
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Darling Drive South													
Lane 1[d]	336	0.3	810	0.415	100	9.1	LOS A	3.0	21.1	Full	500	0.0	0.0
Approach	336	0.3		0.415		9.1	LOS A	3.0	21.1				
East: Pier Street													
Lane 1	136	6.2	1408	0.096	100	3.2	LOS A	0.6	4.1	Short	30	0.0	NA
Lane 2[d]	658	1.8	1476	0.446	100	8.4	LOS A	3.6	25.3	Full	500	0.0	0.0
Approach	794	2.5		0.446		7.5	LOS A	3.6	25.3				
NorthEast: Zollner Circuit													
Lane 1[d]	101	0.0	635	0.159	100	7.7	LOS A	0.9	6.4	Full	75	0.0	0.0
Approach	101	0.0		0.159		7.7	LOS A	0.9	6.4				
North: Darling Drive North													
Lane 1[d]	708	3.4	1288	0.550	100	3.7	LOS A	5.2	37.2	Full	500	0.0	0.0
Approach	708	3.4		0.550		3.7	LOS A	5.2	37.2				
Intersection	1939	2.3		0.550		6.4	LOS A	5.2	37.2				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

MOVEMENT SUMMARY

Site: 2 [Darling Drive / Pier Street - PM Peak_2020]

Darling Drive / Pier Street - PM Peak_2020
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Darling Drive South												
2	T1	184	0.0	0.415	6.8	LOS A	3.0	21.1	0.82	0.83	0.82	45.7
3a	R1	23	0.0	0.415	10.9	LOS A	3.0	21.1	0.82	0.83	0.82	29.0
3	R2	128	0.8	0.415	11.9	LOS A	3.0	21.1	0.82	0.83	0.82	46.1
Approach		336	0.3	0.415	9.1	LOS A	3.0	21.1	0.82	0.83	0.82	44.8
East: Pier Street												
4	L2	136	6.2	0.096	3.2	LOS A	0.6	4.1	0.36	0.42	0.36	47.6
6	R2	653	1.8	0.446	8.3	LOS A	3.6	25.3	0.49	0.61	0.49	46.0
6b	R3	5	0.0	0.446	9.3	LOS A	3.6	25.3	0.49	0.61	0.49	40.3
Approach		794	2.5	0.446	7.5	LOS A	3.6	25.3	0.47	0.58	0.47	46.2
NorthEast: Zollner Circuit												
24b	L3	99	0.0	0.159	7.6	LOS A	0.9	6.4	0.75	0.78	0.75	42.0
24a	L1	1	0.0	0.159	7.0	LOS A	0.9	6.4	0.75	0.78	0.75	43.8
26b	R3	1	0.0	0.159	13.3	LOS A	0.9	6.4	0.75	0.78	0.75	46.0
Approach		101	0.0	0.159	7.7	LOS A	0.9	6.4	0.75	0.78	0.75	42.1
North: Darling Drive North												
7b	L3	22	0.0	0.550	3.9	LOS A	5.2	37.2	0.56	0.48	0.56	44.2
7	L2	503	2.3	0.550	3.7	LOS A	5.2	37.2	0.56	0.48	0.56	46.9
8	T1	183	6.9	0.550	3.6	LOS A	5.2	37.2	0.56	0.48	0.56	48.1
Approach		708	3.4	0.550	3.7	LOS A	5.2	37.2	0.56	0.48	0.56	47.2
All Vehicles		1939	2.3	0.550	6.4	LOS A	5.2	37.2	0.58	0.60	0.58	46.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 3 [Harbour Street / Pier Street / Goulburn Street - AM Peak_2020]

Harbour Street / Pier Street / Goulburn Street - AM Peak_2020
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 112 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Harbour Street South													
Lane 1	64	14.8	255	0.252	100	49.7	LOS D	3.2	25.0	Full	500	0.0	0.0
Lane 2	54	13.6	272	0.199	79[5]	45.6	LOS D	2.6	20.6	Full	500	0.0	0.0
Lane 3	54	13.6	272	0.199	79[5]	45.6	LOS D	2.6	20.6	Full	500	0.0	0.0
Lane 4	49	14.9	255	0.194	100	49.1	LOS D	2.4	19.1	Short	32	0.0	NA
Approach	222	14.2		0.252		47.5	LOS D	3.2	25.0				
East: Goulburn Street													
Lane 1	359	2.5	788	0.456	100	25.6	LOS B	14.1	101.0	Full	500	0.0	0.0
Lane 2	280	2.5	614[1]	0.456	100	24.3	LOS B	10.5	74.7	Full	500	0.0	0.0
Lane 3	160	3.1	206[1]	0.777	100	55.3	LOS D	8.8	63.1	Short	30	0.0	NA
Lane 4	182	3.1	234[1]	0.777	100	55.5	LOS D	10.0	72.2	Short	28	0.0	NA
Approach	981	2.7		0.777		35.6	LOS C	14.1	101.0				
North: Harbour Street North													
Lane 1	527	2.6	823	0.641	100	24.0	LOS B	19.9	142.2	Full	500	0.0	0.0
Lane 2	573	0.0	514	1.114	100	139.9	LOS F	58.4	408.7	Full	500	0.0	0.0
Lane 3	550	5.7	494	1.114	100	140.1	LOS F	56.2	412.6	Full	500	0.0	0.0
Approach	1651	2.7		1.114		102.9	LOS F	58.4	412.6				
West: Pier Street													
Lane 1	342	5.7	940	0.364	100	21.0	LOS B	10.8	79.4	Full	500	0.0	0.0
Lane 2	342	5.7	940	0.364	100	21.0	LOS B	10.8	79.4	Short	90	0.0	NA
Lane 3	342	5.7	940	0.364	100	21.0	LOS B	10.8	79.4	Full	500	0.0	0.0
Lane 4	237	2.7	377	0.630	100	46.6	LOS D	12.1	86.6	Full	500	0.0	0.0
Lane 5	237	2.7	377	0.630	100	46.6	LOS D	12.1	86.6	Short	110	0.0	NA
Approach	1501	4.8		0.630		29.1	LOS C	12.1	86.6				
Intersection	4355	4.0		1.114		59.5	LOS E	58.4	412.6				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.
5 Lane under-utilisation found by the program

MOVEMENT SUMMARY

Site: 3 [Harbour Street / Pier Street / Goulburn Street - AM Peak_2020]

Harbour Street / Pier Street / Goulburn Street - AM Peak_2020
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 112 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Harbour Street South												
1	L2	64	14.8	0.252	49.7	LOS D	3.2	25.0	0.92	0.75	0.92	27.5
2	T1	108	13.6	0.199	45.6	LOS D	2.6	20.6	0.91	0.69	0.91	29.0
3	R2	49	14.9	0.194	49.1	LOS D	2.4	19.1	0.91	0.73	0.91	26.2
Approach		222	14.2	0.252	47.5	LOS D	3.2	25.0	0.91	0.72	0.91	27.9
East: Goulburn Street												
5	T1	639	2.5	0.456	25.0	LOS B	14.1	101.0	0.76	0.65	0.76	34.5
6	R2	342	3.1	0.777	55.4	LOS D	10.0	72.2	0.98	0.91	1.16	26.5
Approach		981	2.7	0.777	35.6	LOS C	14.1	101.0	0.83	0.74	0.90	31.2
North: Harbour Street North												
7	L2	527	2.6	0.641	24.0	LOS B	19.9	142.2	0.83	0.82	0.83	35.0
9	R2	1123	2.8	1.114	140.0	LOS F	58.4	408.7	1.00	1.41	1.94	17.1
Approach		1651	2.7	1.114	102.9	LOS F	58.4	412.6	0.94	1.22	1.59	20.4
West: Pier Street												
10	L2	1026	5.7	0.364	21.0	LOS B	10.8	79.4	0.63	0.73	0.63	39.0
11	T1	475	2.7	0.630	46.6	LOS D	12.1	86.6	0.97	0.82	0.97	28.5
Approach		1501	4.8	0.630	29.1	LOS C	12.1	86.6	0.74	0.76	0.74	34.9
All Vehicles		4355	4.0	1.114	59.5	LOS E	58.4	412.6	0.85	0.93	1.10	26.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	222	6.9	LOS A	0.2	0.2	0.35	0.35
P2	East Full Crossing	29	42.1	LOS E	0.1	0.1	0.87	0.87
P3	North Full Crossing	7	48.3	LOS E	0.0	0.0	0.93	0.93
P4	West Full Crossing	5	49.2	LOS E	0.0	0.0	0.94	0.94
P4S	West Slip/Bypass Lane Crossing	5	27.2	LOS C	0.0	0.0	0.70	0.70
All Pedestrians		269	13.1	LOS B			0.44	0.44

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

LANE SUMMARY

Site: 3 [Harbour Street / Pier Street / Goulburn Street - PM Peak_2020]

Harbour Street / Pier Street / Goulburn Street - PM Peak_2020
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 107 seconds (Site User-Given Cycle Time)

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Harbour Street South													
Lane 1	96	8.8	131	0.733	100	61.1	LOS E	5.4	40.4	Full	500	0.0	0.0
Lane 2	73	5.8	193	0.379	52[5]	50.2	LOS D	3.7	27.3	Full	500	0.0	0.0
Lane 3	73	5.8	193	0.379	52[5]	50.2	LOS D	3.7	27.3	Full	500	0.0	0.0
Lane 4	95	3.3	186	0.508	100	54.5	LOS D	4.9	35.3	Short	32	0.0	NA
Approach	337	5.9		0.733		54.5	LOS D	5.4	40.4				
East: Goulburn Street													
Lane 1	457	1.9	792	0.577	100	26.1	LOS B	18.4	130.5	Full	500	0.0	0.0
Lane 2	334	1.9	579[1]	0.577	100	24.0	LOS B	12.3	87.8	Full	500	0.0	0.0
Lane 3	226	0.7	249[1]	0.905	100	62.9	LOS E	13.4	94.4	Short	30	0.0	NA
Lane 4	255	0.7	282[1]	0.905	100	62.5	LOS E	15.2	107.3	Short	28	0.0	NA
Approach	1273	1.4		0.905		39.4	LOS C	18.4	130.5				
North: Harbour Street North													
Lane 1	414	2.5	663	0.624	100	33.4	LOS C	14.7	105.4	Full	500	0.0	0.0
Lane 2	522	0.0	590	0.884	100	53.1	LOS D	30.4	212.7	Full	500	0.0	0.0
Lane 3	513	2.5	580	0.884	100	53.3	LOS D	29.9	214.0	Full	500	0.0	0.0
Approach	1448	1.6		0.884		47.5	LOS D	30.4	214.0				
West: Pier Street													
Lane 1	349	1.6	944	0.370	100	21.1	LOS B	10.8	76.6	Full	500	0.0	0.0
Lane 2	349	1.6	944	0.370	100	21.1	LOS B	10.8	76.6	Short	90	0.0	NA
Lane 3	349	1.6	944	0.370	100	21.1	LOS B	10.8	76.6	Full	500	0.0	0.0
Lane 4	244	1.5	271	0.900	100	63.3	LOS E	14.8	105.1	Full	500	0.0	0.0
Lane 5	244	1.5	271	0.900	100	63.3	LOS E	14.8	105.1	Short	110	0.0	NA
Approach	1534	1.6		0.900		34.5	LOS C	14.8	105.1				
Intersection	4592	1.9		0.905		41.4	LOS C	30.4	214.0				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.
5 Lane under-utilisation found by the program

MOVEMENT SUMMARY

Site: 3 [Harbour Street / Pier Street / Goulburn Street - PM Peak_2020]

Harbour Street / Pier Street / Goulburn Street - PM Peak_2020
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 107 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Harbour Street South												
1	L2	96	8.8	0.733	61.1	LOS E	5.4	40.4	1.00	0.89	1.20	25.3
2	T1	146	5.8	0.379	50.2	LOS D	3.7	27.3	0.97	0.75	0.97	28.0
3	R2	95	3.3	0.508	54.5	LOS D	4.9	35.3	0.99	0.78	0.99	25.2
Approach		337	5.9	0.733	54.5	LOS D	5.4	40.4	0.99	0.80	1.04	26.4
East: Goulburn Street												
5	T1	792	1.9	0.577	25.2	LOS B	18.4	130.5	0.80	0.70	0.80	34.5
6	R2	481	0.7	0.905	62.7	LOS E	15.2	107.3	0.96	1.07	1.40	25.1
Approach		1273	1.4	0.905	39.4	LOS C	18.4	130.5	0.86	0.84	1.03	30.2
North: Harbour Street North												
7	L2	414	2.5	0.624	33.4	LOS C	14.7	105.4	0.88	0.96	1.18	32.1
9	R2	1035	1.2	0.884	53.2	LOS D	30.4	212.7	1.00	1.00	1.21	29.2
Approach		1448	1.6	0.884	47.5	LOS D	30.4	214.0	0.96	0.99	1.20	30.0
West: Pier Street												
10	L2	1046	1.6	0.370	21.1	LOS B	10.8	76.6	0.64	0.74	0.64	38.9
11	T1	487	1.5	0.900	63.3	LOS E	14.8	105.1	1.00	1.08	1.39	25.2
Approach		1534	1.6	0.900	34.5	LOS C	14.8	105.1	0.76	0.85	0.88	33.2
All Vehicles		4592	1.9	0.905	41.4	LOS C	30.4	214.0	0.87	0.89	1.03	30.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	464	5.2	LOS A	0.4	0.4	0.31	0.31
P2	East Full Crossing	56	37.1	LOS D	0.1	0.1	0.83	0.83
P3	North Full Crossing	41	47.7	LOS E	0.1	0.1	0.95	0.95
P4	West Full Crossing	48	47.8	LOS E	0.1	0.1	0.95	0.95
P4S	West Slip/Bypass Lane Crossing	48	25.6	LOS C	0.1	0.1	0.69	0.69
All Pedestrians		658	15.2	LOS B			0.47	0.47

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

LANE SUMMARY

Site: 4 [Darling Drive / Ultimo Road - AM Peak_2020]

Darling Drive / Ultimo Road - AM Peak_2020
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 64 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Car Park Access													
Lane 1	4	0.0	382	0.011	100	23.8	LOS B	0.1	0.7	Full	500	0.0	0.0
Approach	4	0.0		0.011		23.8	LOS B	0.1	0.7				
East: Ultimo Road East													
Lane 1	133	5.1	1149	0.115	100	5.6	LOS A	1.7	12.6	Full	500	0.0	0.0
Lane 2	133	5.2	1150	0.115	100	5.6	LOS A	1.7	12.6	Full	500	0.0	0.0
Lane 3	158	8.0	275	0.575	100	32.2	LOS C	4.9	36.4	Short	24	0.0	NA
Approach	423	6.2		0.575		15.5	LOS B	4.9	36.4				
North: Darling Drive North													
Lane 1	160	5.9	278	0.575	100	33.3	LOS C	4.9	36.3	Full	500	0.0	0.0
Lane 2	207	4.6	352	0.589	100	30.0	LOS C	6.1	44.5	Full	500	0.0	0.0
Approach	367	5.2		0.589		31.4	LOS C	6.1	44.5				
West: Ultimo Road West													
Lane 1	83	2.6	514	0.161	100	21.6	LOS B	1.9	13.9	Full	500	0.0	0.0
Lane 2	111	2.8	688	0.161	100	15.1	LOS B	2.4	17.0	Full	500	0.0	0.0
Approach	194	2.7		0.161		17.9	LOS B	2.4	17.0				
Intersection	988	5.1		0.589		21.9	LOS B	6.1	44.5				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 4 [Darling Drive / Ultimo Road - PM Peak_2020]

Darling Drive / Ultimo Road - PM Peak_2020
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 82 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Car Park Access												
1	L2	1	0.0	0.010	33.0	LOS C	0.1	0.7	0.84	0.59	0.84	29.8
2	T1	1	0.0	0.010	29.6	LOS C	0.1	0.7	0.84	0.59	0.84	32.3
3	R2	1	0.0	0.010	33.0	LOS C	0.1	0.7	0.84	0.59	0.84	29.8
Approach		3	0.0	0.010	31.9	LOS C	0.1	0.7	0.84	0.59	0.84	30.6
East: Ultimo Road East												
4	L2	1	0.0	0.157	8.3	LOS A	2.9	20.4	0.38	0.32	0.38	38.1
5	T1	413	1.3	0.157	4.9	LOS A	2.9	20.4	0.38	0.32	0.38	38.0
6	R2	216	0.5	0.768	39.3	LOS C	8.6	60.3	0.95	0.91	1.14	29.8
Approach		629	1.0	0.768	16.7	LOS B	8.6	60.3	0.57	0.52	0.64	34.7
North: Darling Drive North												
7	L2	119	2.7	0.315	35.0	LOS C	4.1	29.6	0.89	0.77	0.89	31.3
8	T1	1	0.0	0.912	53.2	LOS D	13.4	98.0	1.00	1.09	1.54	26.4
9	R2	264	5.2	0.912	56.5	LOS E	13.4	98.0	1.00	1.09	1.54	26.4
Approach		384	4.4	0.912	49.8	LOS D	13.4	98.0	0.97	0.99	1.34	27.8
West: Ultimo Road West												
10	L2	95	0.0	0.161	25.2	LOS B	2.7	19.2	0.76	0.71	0.76	33.8
11	T1	115	1.8	0.148	16.7	LOS B	2.9	20.7	0.67	0.54	0.67	33.8
Approach		209	1.0	0.161	20.5	LOS B	2.9	20.7	0.71	0.62	0.71	33.8
All Vehicles		1226	2.1	0.912	27.8	LOS B	13.4	98.0	0.72	0.69	0.87	32.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	1	5.9	LOS A	0.0	0.0	0.38	0.38
P2	East Full Crossing	55	35.3	LOS D	0.1	0.1	0.93	0.93
P3	North Full Crossing	167	21.4	LOS C	0.3	0.3	0.72	0.72
All Pedestrians		223	24.7	LOS C			0.77	0.77

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

LANE SUMMARY

Site: 4 [Darling Drive / Ultimo Road - PM Peak_2020]

Darling Drive / Ultimo Road - PM Peak_2020
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 82 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Car Park Access													
Lane 1	3	0.0	315	0.010	100	31.9	LOS C	0.1	0.7	Full	500	0.0	0.0
Approach	3	0.0		0.010		31.9	LOS C	0.1	0.7				
East: Ultimo Road East													
Lane 1	207	1.3	1320	0.157	100	4.9	LOS A	2.9	20.4	Full	500	0.0	0.0
Lane 2	207	1.3	1321	0.157	100	4.9	LOS A	2.9	20.4	Full	500	0.0	0.0
Lane 3	216	0.5	281[1]	0.768	100	39.3	LOS C	8.6	60.3	Short	24	0.0	NA
Approach	629	1.0		0.768		16.7	LOS B	8.6	60.3				
North: Darling Drive North													
Lane 1	119	2.7	378	0.315	100	35.0	LOS C	4.1	29.6	Full	500	0.0	0.0
Lane 2	265	5.2	291	0.912	100	56.5	LOS E	13.4	98.0	Full	500	0.0	0.0
Approach	384	4.4		0.912		49.8	LOS D	13.4	98.0				
West: Ultimo Road West													
Lane 1	95	0.0	589	0.161	100	25.2	LOS B	2.7	19.2	Full	500	0.0	0.0
Lane 2	115	1.8	776	0.148	92[5]	16.7	LOS B	2.9	20.7	Full	500	0.0	0.0
Approach	209	1.0		0.161		20.5	LOS B	2.9	20.7				
Intersection	1226	2.1		0.912		27.8	LOS B	13.4	98.0				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.
5 Lane under-utilisation found by the program

MOVEMENT SUMMARY

Site: 4 [Darling Drive / Ultimo Road - AM Peak_2020]

Darling Drive / Ultimo Road - AM Peak_2020
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 64 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Car Park Access												
1	L2	2	0.0	0.011	24.6	LOS B	0.1	0.7	0.80	0.59	0.80	31.8
2	T1	1	0.0	0.011	21.2	LOS B	0.1	0.7	0.80	0.59	0.80	34.8
3	R2	1	0.0	0.011	24.6	LOS B	0.1	0.7	0.80	0.59	0.80	31.9
Approach		4	0.0	0.011	23.8	LOS B	0.1	0.7	0.80	0.59	0.80	32.5
East: Ultimo Road East												
4	L2	1	0.0	0.115	9.0	LOS A	1.7	12.6	0.44	0.36	0.44	37.8
5	T1	264	5.2	0.115	5.6	LOS A	1.7	12.6	0.44	0.36	0.44	37.7
6	R2	158	8.0	0.575	32.2	LOS C	4.9	36.4	0.97	0.81	0.99	31.7
Approach		423	6.2	0.575	15.5	LOS B	4.9	36.4	0.64	0.53	0.65	35.2
North: Darling Drive North												
7	L2	160	5.9	0.575	33.3	LOS C	4.9	36.3	0.97	0.81	0.99	31.8
8	T1	1	0.0	0.589	26.8	LOS B	6.1	44.5	0.95	0.81	0.96	32.6
9	R2	206	4.6	0.589	30.0	LOS C	6.1	44.5	0.95	0.81	0.96	32.7
Approach		367	5.2	0.589	31.4	LOS C	6.1	44.5	0.96	0.81	0.97	32.3
West: Ultimo Road West												
10	L2	82	2.6	0.161	21.7	LOS B	1.9	13.9	0.77	0.71	0.77	34.9
11	T1	112	2.8	0.161	15.2	LOS B	2.4	17.0	0.71	0.57	0.71	34.3
Approach		194	2.7	0.161	17.9	LOS B	2.4	17.0	0.74	0.63	0.74	34.6
All Vehicles		988	5.1	0.589	21.9	LOS B	6.1	44.5	0.78	0.65	0.79	33.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	1	7.0	LOS A	0.0	0.0	0.47	0.47
P2	East Full Crossing	45	26.3	LOS C	0.1	0.1	0.91	0.91
P3	North Full Crossing	171	20.5	LOS C	0.2	0.2	0.80	0.80
All Pedestrians		217	21.6	LOS C			0.82	0.82

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

APPENDIX G - CONSTRUCTION TRAFFIC MANAGEMENT PLAN

Construction & Environmental Management Plan

Harbourside, Darling Drive, Sydney

Revision	Status	Date
1	FINAL	November 2016
2	Response to Submissions and Amended Proposal	August 2018
3	Updated Final	January 2020

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2.	CEMP 'Action List'
3.	Traffic Management Plan
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	Appendix B: Site Staging Plans
	Appendix C: Access and Egress Plan
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Issue Register

Employee Name	Employee Signature	Date

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1. Introduction

This Construction & Environmental Management Plan (CEMP) has been developed for inclusion in the State Significant Development Application (SSDA) to address the construction items related to the proposed development at Harbourside, Darling Drive, Sydney. In due course, the CEMP will address the Development Consent conditions in relation to construction and development works at Harbourside.

In addition, the CEMP outlines the actions and staging of construction deemed necessary to address the concerns of neighbouring properties, authorities and any other requirements, whilst maintaining a safe and productive construction site.

The CEMP is a commitment by Mirvac to ensure that the statuary obligations are fulfilled and that the project is delivered to the highest quality, safety and environmental standards.

The responsibility for the management of this document and the actions contained therein lies with the Construction Manager for the Project (name to be provided in due course). The CEMP will be monitored throughout the project construction phase until such time as all actions on the CEMP Action List are completed.

Since exhibition of the proposal and given the nature and range of submissions made from agencies and the pubic, Mirvac has been reviewing the overall approach and elements of the Concept Proposal. This has accordingly led to developing an Amended Concept Proposal. The final Concept Proposal therefore includes substantial amendments made my Mirvac pursuant to Clause 55 of the *Environmental Planning & Assessment Regulation*, in the main to address matters raised in the submissions and deliver an overall significantly improved outcome on the site and for the broader Darling Harbour precinct.

The following key amendments have been made to the proposal:

Relocation of the Tower
The tower element of the Concept Proposal has been relocated from the north of the site to the centre of the site (the widest part of the site) to allow for an increased setback from the heritage listed Pyrmont Bridge, improved relationship to the waterfront and ICC Hotel, to minimise view impacts from 50 Murray Street, together with reducing overshadowing impacts on the public domain and improved solar amenity to the northern end of the retail centre.

Reduction in Height of the Tower
The height of the tower has also been reduced from RL 166.35 to RL 153.75. The reduction in the height will minimise overshadowing impacts to the public domain as well better relate to the height of the ICC Hotel.

Reduction in Height of the Podium
A portion of the podium height at its northern extent has been partly reduced from 30.5 RL to RL 25. The reduction in height provides for improved view sharing from 50 Murray Street.

Removal of Tower 'Tail' element
As part of the relocation of the tower and refinement of the podium, the stepped form of the lower tower element has now been removed. This design move has been made in order to again improve views from adjacent buildings from the west.

Building Footprint of the Tower
The building footprint of the tower has increased in width, to accommodate the floorspace from the reduction in height of the tower and removal of the 'tail'.

Gross Floor Area / Land Use Mix
The amended proposal retains the same overall 87,000sqm of GFA, however there is a minor adjustment in the split between non-residential and residential:
Non-residential uses floor space – 49,000sqm; and
Residential uses floor space – 38,000sqm

In response to market demand and the focus of local and regional strategic planning policies, it is proposed for the podium to include both retail and commercial land uses. Indicatively, comprising ~23,000,000sqm lettable area of commercial and ~21,000sqm gross lettable area of retail.

The podium enables large campus sized commercial floor plates that are favoured by large multinational tech, finance and professional services companies.

Apartment numbers
As a result of a review of the mix and sizing of apartments, there is a minor reduction in the indicative number of apartments, from 364 to 357. Note, this yield is on the 'Indicative Design' only and will be subject to future design development and a Stage 2 DA. This Stage 1 DA only seeks approval for land uses and the building envelope comprising a total of 87,000sqm GFA.

Car Parking Spaces
The extent of the basement will remain the same, but there has been a minor increase of 11 car parking spaces from 295 spaces to 306 spaces. As above, this is based on the 'Indicative Design' only.

Landscaped Open Space and Public Domain
All of the key concepts and public benefits as originally proposed are retained under the amended Concept Proposal, with the addition of further landscaping opportunities on the northern rooftop extent of the retail podium, further enhancing views and outlook from 50 Murray Street.

The final Concept Proposal seeks approval for the following key components and development parameters:

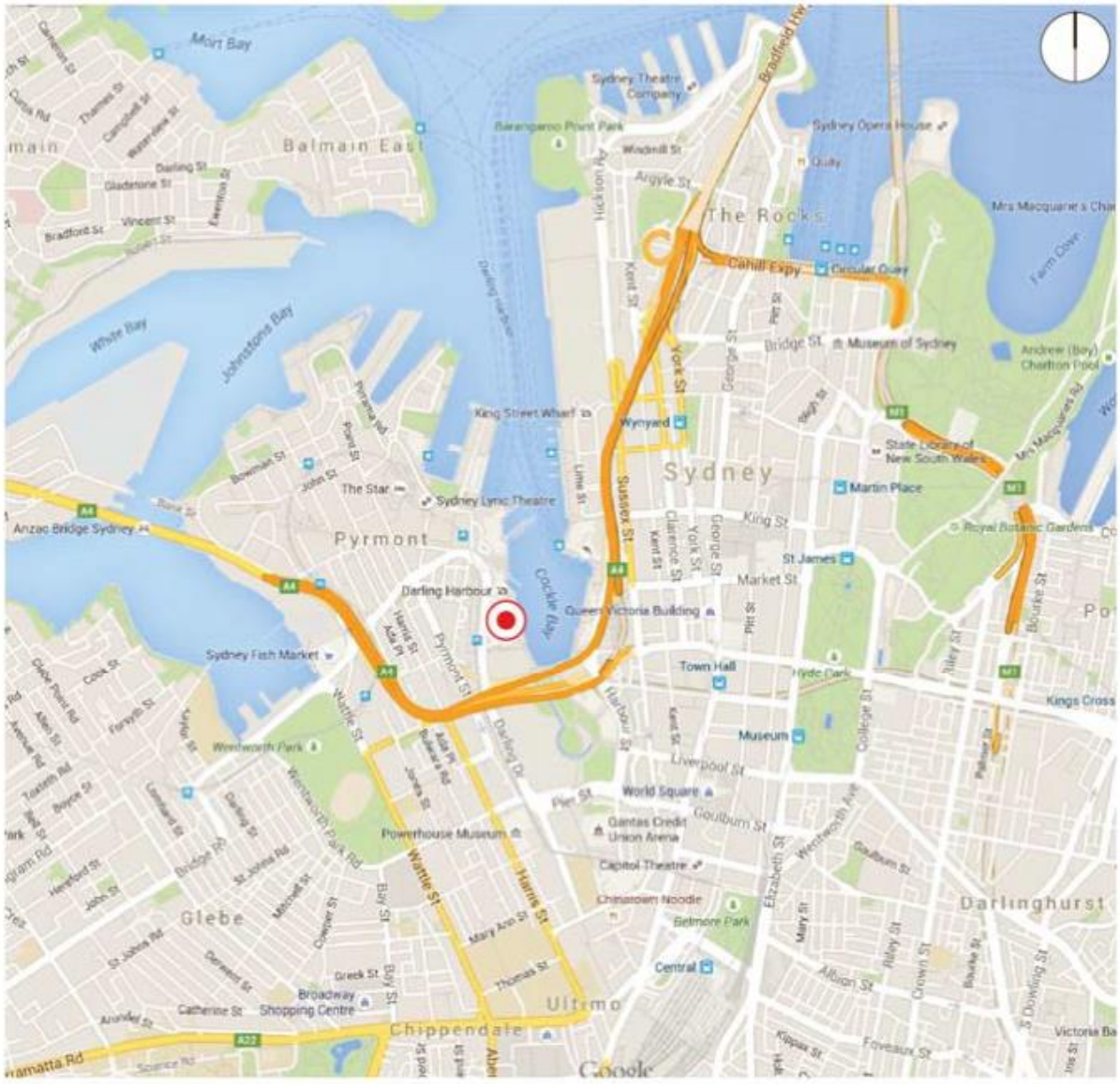
- Demolition of existing site improvements, including the Harbourside Shopping Centre, pedestrian bridge link across Darling Drive, obsolete monorail infrastructure, and associated tree removal;
- A network of open space areas and links generally as shown within the Public Domain Concept Proposal, to facilitate re-integration of the site into the wider urban context;
- Building envelopes;
- Land uses across the site, non-residential and residential uses;
- A maximum total Gross Floor Area (GFA) across the Harbourside site of 87,000sqm for mixed use development (49,000sqm non-residential and 38,000sqm residential development);
- Basement car parking;
- Car parking rates to be utilised in subsequent detailed (Stage 2) Development Applications);
- Urban Design and Public Realm Guidelines to guide future development and the public domain; and
- Strategies for utilities and services provision, drainage and flooding, and ecological sustainable development.

1.1 Project Overview

Harbourside is a Sydney shopping centre with a strong tourist and food catering focus, occupying a strategic harbour front location with unparalleled views east to Sydney CBD. The site is located within the Sydney CBD on the western side of the Darling Harbour precinct. It is located to the immediate south of Pyrmont Bridge and north of the Sydney International Convention, Entertainment and Exhibition Centre/ Sydney Sofitel Hotel. The site is bounded by Darling Harbour Drive and the alignment of the Light Rail to the west, and the waterfront promenade to Darling Harbour to the east.

The Site is located within the City of Sydney local government area (LGA). A locational context area plan and location plan are provided at Figures 1 and 2 below.

The Darling Harbour precinct is undergoing significant redevelopment as part of the SICEEP and Darling Square renewal project. The urban, built form and public transport / pedestrian context for Harbourside will fundamentally change as these developments are progressively completed.



The Site

Figure 1. Locational Context Area Plan.

The Land is contained in Auto Consol 8663-98 (comprising Lots 1-10, 12-15 and 17 in Deposited Plan 776815). The Deposited Plans indicate the site comprises 15 adjoining lots which form an irregular shaped site with a frontage to Cockle Bay of approx. 270 metres and a total area of 20,542 square metres (2.054 hectares). The ground floor land footprint comprises around 18,425 square metres.

The site is generally inclusive of the shopping centre land itself, the loading dock area and associated driveways, the overhead vehicular bridge from level 3 of the centre to the car park, part of the entry area off Pyrmont Bridge and the former Monorail station (but not including the pedestrian bridge to the Ibis/Novotel Hotels). Figure 2 provides an aerial image identifying the Harbourside site.

A summary of the proposed development is detailed as follows:

- Demolition of existing Monorail Station
- Demolition of Novotel Bridge Link
- Retention of Ibis/ 50 Murray Street Bridge Link
- Demolition of existing Shopping Centre
- Construction of Bunn Street Bridge
- Construction of Basement Levels to suit 306 Car Parking spaces
- Construction of a Retail/ Commercial Podium comprising of approximately 49,000sqm of GFA.
- Construction of a Residential Tower comprising of approximately 38,000Ssqm of GFA.
- Public domain works that integrates with the Sofitel Sydney Darling Harbour and adjoining SICEEP facilities, revitalises the pedestrian interface to Darling Harbour and provides for new connections between Darling Harbour and both Pyrmont and the Sydney CBD (via Pyrmont Bridge)

Figure 2: Aerial View of the site

1.2 Hours of Work

The anticipated hours of work pending approval for construction works, including the delivery of materials to and from the sites within the precinct, are as follows:

- Between 7:00 am and 6:00 pm, Mondays to Fridays inclusive.
- Between 7:00 am and 5:00 pm, Saturdays.
- No work will be carried out on Sundays and Public Holidays.

Works outside these times are subject to agreement and approval by Council or the relevant approving authority, however noting that it is anticipated that the demolition of the Monorail Station and Novotel and IBIS bridges will require out of hours working.

1.3 Contact Details

The Construction Manager for the Project will be confirmed in due course.

2 CEMP 'Action List'

The "CEMP Action List" forms the basis of the Harbourside CEMP. The Action List responds to a series of anticipated DA conditions that are to be addressed prior to and during the construction phase of the project. They further address any Authority requirements as well as taking into consideration the concerns of neighbouring building occupiers.

The Action List provides a means by which responsibilities of the project team can be readily identified and monitored.

In addition to the Action List are a series of attachments which contain more detailed information in the form of checklists, registers, templates and reports. The attachments contain the information and tools that must be implemented during the construction phase in order to close out the specific items and ultimately satisfy the DA conditions associated with the project.

3 Traffic Management Plan

3.1 Introduction

Mirvac have engaged Arcadis as the traffic management consultant for Stage 1 of the DA submission. Arcadis produced an initial high level report measuring the existing traffic flows and the anticipated increased traffic volumes as a result of the proposed redeveloped Harbourside. Pending the approval of the Stage 1 DA, Mirvac will prepare and issue a Stage 2 DA. A Traffic Management Consultant will be commissioned to develop a detailed Traffic Management Plan (TMP) for the Harbourside project – This will be contained within Appendix D.

The traffic management plan for the project shall deal with the issues of construction traffic, their effect on the surrounding environment and be prepared prior to the issue of the Construction Certificate.

3.2 Access and Egress to site

Vehicles

During mobilisation, demolition, earthworks and construction the construction related traffic will enter the site off a road via Darling Drive. The temporary construction access route runs adjacent to the light rail line then under darling drive. By implementing this access system Darling Drive will remain open for the duration of the project (except potentially for the demolition of the Monorail Station and bridges).

Exit points on each site will be manned by qualified Traffic Controllers who will be responsible for managing both vehicular and pedestrian traffic movements.

A hoarding will be erected around the perimeter of the site and will be capable of having graphics installed.

Public Transport Access

All site workers and visitors to site shall be actively encouraged to take public transport to and from the Harbourside Site. Town Hall train station is located within 900 metres of the site and will enable the majority of site workers to travel by train. There are also bus services which run regularly from surrounding areas.

Pedestrians

All site workers and visitors shall enter and exit the sites via one of the following entry/exit points:

- Secured door on eastern side of darling drive adjacent to light rail line
- Secured door on western side of darling drive adjacent to current shopping centre site

3.3 Loading and Unloading of Materials

There will be several designated areas for deliveries and the loading / unloading of materials on the sites. These will be further developed and detailed in an Access and Egress Plan which will form Appendix C. As a principal it is anticipated that the main unloading area will be under and adjacent to Darling Drive within the existing loading dock and traffic routes of the shopping centre. Other key principles will be as follows;

- All loading and unloading operations are to comply with statutory requirements;
- No materials will be stored on public footpaths or roads;
- All entering and exiting of vehicles to work zones shall be supervised by a Traffic Controller. Flow to all lanes of Traffic shall remain mostly unimpeded in accordance with Council and DA requirements.
- Should any lane closures be required, a relevant traffic management plan will be compiled along with any required permits and stakeholders / residents notified where required.
- As noted above, these points are all subject to Council and Authority approval and, these proposals may require amendment prior to the works being undertaken.

3.4 Truck and Vehicle Routes:

The routes for all trucks and vehicles proceeding to and exiting from the site will be identified in Appendix B, construction staging plans and the TMP.

All major deliveries will enter and exit the Harbourside site via Darling Drive. Signage will be installed within the precinct to direct all deliveries to the correct sites. All vehicles upon entry to the precinct for the first time must complete a truck driver's declaration or complete a site induction to ensure compliance with the site rules.

3.5 Disruption to Traffic Flows

The primary goal of the TMP will be to mitigate any disruptions to traffic flow around the Harbourside site and in the surrounding areas. Trucks and vehicles using Darling Drive must be marshalled within the site boundaries and will not be permitted to stop or wait in Darling Drive prior to entering site.

All non-critical deliveries will be scheduled outside peak traffic periods where possible.

3.6 Pedestrian and Traffic Management

Signage will be established at the precinct entry and exit points to alert pedestrians and other drivers to the movement of construction traffic. Where required, traffic control personnel will control the movement of large vehicles to and from the sites.

Visitors to the sites will be escorted at all times by Mirvac Site Staff and will be provided with a defined entry path from the point of entry.

3.7 Site Safety Plan

A Mirvac Site Specific Workplace Risk Management Plan (WRMP), will be implemented prior to the commencement of construction and be updated from time to time to reflect the current stage of site works.

All works throughout the construction process will be required to comply with the TMP, statutory requirements, and the Mirvac WRMP.

3.8 Site Specific Issues

3.8.1 Public Pedestrian Access

Pedestrian access and movement around the Harbourside site will be of high importance during all stages of construction, and is anticipated to change as surrounding construction works are completed i.e. ICC. Detailed pedestrian access routes will be identified and highlighted in the TMP, which will form Appendix B. All pedestrian routes shall be clearly defined with signage and delineated from vehicular traffic routes where required. Pedestrian access to adjacent buildings and sites will be maintained for the duration of construction works.

3.9 Construction Staging, Description and Duration

The following is a summary of the proposed construction staging and estimated durations for the project;

Element	Description	Duration
1. Site Establishment	Set up hoardings and site amenities	TBC, pending final Stage 2 DA approved design
2. Demolition	Demolition of Monorail Station, Novotel Bridge Link and Ibis Bridge Link and existing shopping centre	TBC, pending final Stage 2 DA approved design
3. Earthworks	Foundation Piling, bulk excavation, detailed excavation and in-ground services	TBC, pending final Stage 2 DA approved design
4. Construction	Substructure	TBC, pending final Stage 2 DA approved design
	Superstructure	TBC, pending final Stage 2 DA approved design
	Façade, Services, Finishes and Finalisation	19 M TBC, pending final Stage 2 DA approved design

3.10 Plant & Equipment

The following is a summary of the types of plant and equipment that will be utilized on the project:

- Articulated flatbed truck for delivery of site sheds and hoarding materials.
- Articulated float / low loader for delivery of earth moving equipment such as excavators, dozers, dump trucks and piling rigs.
- Truck and trailers for the exportation of excavated material off site.
- Concrete trucks for delivery of ready mix concrete.
- Mobile cranes, of various size, for erection of site amenities, tower cranes and miscellaneous lifting.
- Prime mover and enclosed flatbed trailer for delivery of materials.
- Medium rigid vehicles, small rigid vehicles, vans and couriers to deliver smaller materials.
- Multiple tower cranes erected during the detailed excavation phase and early structure phase. Man / material hoists to be erected during the tower structure works.

3.11 Truck Movements

A detailed analysis of truck movements will be established with numbers (at Stage 2 DA) to be finalised around the following activities;

- Demolition Waste – trucks per day
- Export off site of m3 / day by truck and trailer.
- Concrete trucks for piling
- Construction of foundation & sheet piles.
- Number of trucks per day during busiest concrete pour days

4 Noise and Vibration Management Plan

4.1 Introduction

Renzo Tonin & Associates have been engaged to provide a high level acoustic report for the Stage 1 DA. For the Stage 2 DA an Acoustic Consultant will be engaged to prepare a detailed Construction Noise and Vibration Management Plan (NVMP) for the project, which will form Appendix E of this CEMP. The management plan provides guidelines to reduce noise and vibration impacts to nearby affected tenants, residents and asset owners during construction works. The NVMP primarily deals with the issues of vibration and noise generating activities and their locations.

The NVMP has been compiled in accordance with the NSW Interim Construction Noise Guideline (ICNG, 2009) and through consultation with neighbouring landowners.

Mirvac will comply with the obligations provided in the NVMP and also commits to the Noise and Vibration Control Measures detailed within this section of the CEMP.

4.2 Project Objective

The principal objectives of the NVMP:

- Identification of the noise and vibration standards which will be applicable to this project.
- Formulation of a strategy for construction to comply with the standards identified in the NVMP.
- Development of a monitoring programme to measure and regulate noise and vibration at potentially affected locations if required.
- Liase with neighbouring building owners.

4.3 Noise Criteria

The criteria for noise from construction activities on this project will maintain reasonable levels within the site and surrounding buildings. The noise criteria is outlined in the NVMP.

Further to this, specific noise criteria relating to noise limits, the time and extent of works and monitoring shall be agreed between Mirvac and the adjacent landowners. This specific criteria shall be included within the Noise and Vibration Monitoring Plan.

4.4 Vibration Criteria

The criteria for vibration from construction activities on this project will maintain reasonable levels within the site and surrounding buildings. The vibration criteria is outlined in the NVMP.

4.5 Control of Construction Noise and Vibration

As part of the NVMP, a review will be undertaken of each of the proposed activities which will occur as a part of the construction works on this project. The execution of this work will confirm the effectiveness of ongoing noise control strategies for this project. In addition, the site working hours will be enforced and all works carried out in accordance with regulatory codes, practices and legislation.

4.6 Noise and Vibration Control Methods

The following Noise Management Measures to reduce the impact of construction noise and vibration shall be implemented:

- Carry out community consultation;
- Noise barriers such as site hoarding to be erected as soon as practical;Establish background noise and vibration levels prior to any construction works commencing;
- Include relavent noise and vibration components within site inductions and pre-start meetings;
- Monitor behavioural practices;
- Carry out short-term attended noise and vibration measurement of key activities during works to evaluate emissions, the effectivenss of work practices and identify opportunities for additonal mitigation measures;
- Establish and implement appropriate complaints handling procedures;
- Manage approved construction working hours;
- Where possible, select low noise and vibration emmitting plant and equipment.
- Where possible, use silencing devices to reduce sound emission from plant and equipment that exceed noise criteria.
- Establish regular maintenance of plant and machinary to ensure operating at optimum levels.

Further details regarding the proposed noise controls and management measures will be contained within the Noise and Vibration Monitoring Plan in Appendix E.

4.7 Establishment of Direct Communication with Affected Parties

Continual communication is required between all parties that may be affected by the development. A Community Liaison Officer shall form part of the project team and shall co-ordinate / communicate with all parties, stakeholders and residents. This establishes a dynamic response process which allows for the adjustment of control methods and criteria for the benefit of all parties.

Informing local residents is typically a critical aspect in reducing complaints regarding construction noise. The objective in undertaking a consultation process is to:

- Inform and educate the groups about the project and the noise controls being implemented.
- Increase understanding of all acoustic issues related to the project and options available.
- Identify group concerns generated by the project, so that they can be addressed.
- Provide advice about the time and duration of potential noisy activities.

4.8 Noise Complaint Procedure

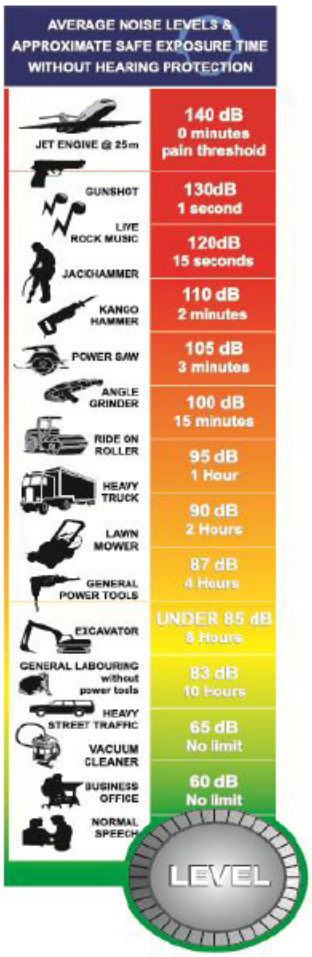
Mirvac has in place a specific procedure in relation to the handling of noise related issues. When a noise related complaint is brought forward, the specific details will be recorded on the Mirvac community contact register form. The details will then be reviewed by the site manager. The site manager then makes an assessment of the complaint against our construction guidelines in relation to approved working hours, development consent conditions, noise levels and any other relevant items relating to the matter. Mirvac will close out accordingly within 48 hours.

If a breach of the guidelines and restrictions is found then further action will be taken to resolve the issue. If a suitable outcome cannot be achieved then a suitable acoustic and vibration engineer will be consulted to review and respond to the noise complaint. Further notification will then be provided to the complainant of the course of action to be taken to resolve the matter. A copy of Mirvac's noise control policy can be found below.

NOISE CONTROL POLICY

Mirvac is committed to ensuring that its workplaces are free from noise and vibration levels which have the potential to adversely affect human health. This includes the monitoring of noise exposure and peak noise levels at temporary, new or existing workplaces, where noise is identified as a risk and the implementation of noise control measures where adverse levels are identified.

Noise can result in hearing loss based on either the intensity of the noise level, i.e. a peak of more than 140dB(C); or noise levels which exceed an 8 hour noise level equivalent of 85dB(A). As an employer or controller at workplaces where these levels may be exceeded, Mirvac will instigate noise control measures that include:



- the identification of actual and potential exposure to noise in the workplace by conducting noise assessments or monitoring where identified as a risk
- assessment of the risks to health and safety of potential or actual exposure to noise
- the potential impact of noisy works on nearby neighbours or the surrounding community, strict adherence to any hours of operation imposed by local government or other development condition
- outline of the responsibilities for noise control and information on the risk of noise exposure in workplace inductions
- procurement of plant and equipment which does not adversely impact on noise levels
- wherever practicable the implementation of control measures such as encapsulation or isolation of noisy works or plant and equipment to minimise reliance on personal protective equipment and the impact of noise on surrounding workers or others
- use of personal protective equipment by employees, workers, service providers, visitors, surrounding workers or others who undertake, or are situated close to noisy work
- the identification of noisy areas or plant and equipment with warning signage to alert personnel of the requirement for the use of personal protective equipment
- display of the Mirvac Sound Advice Poster at all workplaces where noise is identified in risk and opportunity planning
- employees or other workers frequently required to use personal protective equipment to protect against the risk of hearing loss associated with noise that exceeds the exposure standard will be monitored by their employer through audiometric testing

Mirvac is committed to assisting industry sectors in which it operates to reduce the instance of noise related hearing loss through ongoing implementation of the Mirvac Group Noise Management Procedure at all Mirvac workplaces. Implementation of this policy and the Mirvac Group Noise Management Procedure by Mirvac personnel is unconditional.

Susan Lloyd-Hurwitz

Susan Lloyd-Hurwitz
CEO and Managing Director

Policy Authorised by: Executive Leadership Team	Date last amended: 23.01.2013 To be reviewed within three years of this date
Policy Maintained by: Corporate Services HSE Department	MG-CS-HSEPOL7.2-E 0113

5 Construction Waste Management Plan

A Waste Management Plan will be developed by a fully licensed Waste Contractor, for the removal of waste generated by construction works on site. Periodic review of this waste management plan will be undertaken to ensure continual compliance with environmental regulations and standards. Waste types likely to be generated on the site include the following:

- General Waste;
- Putrescible waste (lunch room waste from site personnel);
- Cardboard & White Paper (amended plans & drawings);
- Bottles, Cans & Plastics;
- Steel / Concrete / Bricks / Tiles / Timber & Gyprock.

The waste subcontractor will supply builder's waste bins for the onsite collection and storage of general waste material. It is required that the waste facility will recycle a minimum of 95% of the material brought to their recycling depot.

Upon arrival at the facility, the waste is sorted into various categories. Once the product has been sorted into its various categories, the facility then processes the individual recyclable waste streams into reusable products available for re-sale to the public as described below:

- Concrete is crushed, pulverized and sold as recycled aggregate;
- Bricks are also crushed, pulverized and sold as recycled road base;
- Timber is chipped and sold as mulch for garden beds and ground cover;
- Steel is sent to either Metalcorp or Simsmetal for recycling;
- Plasterboard is broken down to a gypsum product and sold to farmers as a soil additive;
- Cardboard & White Paper Recycling to Amcor for recycling;
- Bottles, Cans & Plastics Recycling to Visy for recycling.

Waste generated at the workplace shall be avoided or recycled wherever practical. Mirvac have implemented a Waste Management Plan and it is described as follows:

- material is reused wherever practicable, in particular top soil
- the establishment of a workplace waste management area(s) for sorting and segregating waste where available space allows;
- participation in waste minimisation training for all workplace personnel;
- recyclable materials are reprocessed wherever practicable, e.g. plasterboard off cuts, steel reinforcement and concrete;
- contractors identify areas where they can reduce waste and reuse materials in their respective trades (waste avoidance initiatives to be provided by each Service Provider in the JSEA);
- prescribed waste, e.g. hazardous or contaminated material, asbestos, aqueous waste (paint washout residue/sludge), shall be removed by a licensed contractor and dockets retained at the workplace for audit verification purposes;
- pollution and damage to the environment is prevented; and
- The safety and health of employees, Service Providers and the public is protected.

The figure below details the general principles for prevention of waste.

Figure 3: Waste prevention principles

6 Erosion, Sediment Control and Soil Pollution

An Erosion and Sediment Control Plan will be implemented on the project. Below are items that as a minimum will be included in the Erosion and Sediment Control Plan:

- All stormwater pits around the perimeter of the site will be covered using filter fabric and sand bags.
- Filter fabric and sand bags shall also be installed around piling activities which are adjacent to public roadways or pedestrian footpaths in order to contain spoil arisings. These shall be regularly maintained to ensure no spoil or concrete migration onto public areas.
- During excavation, a wash down facility will be installed to wash down the tyres and wheel arches of any trucks exiting the excavation zone.
- All construction work zones and loading areas that are trafficked by vehicles are to be regularly swept / washed-down to maintain a clean surface and keep surrounding roads clean.
- Stockpiling of excavated material shall be carried out in a manner to limit sediment migration and water run-off. Stockpiled material to be appropriately covered where deemed necessary to prevent erosion and / or odour migration.
- The use of temporary sediment / silt fencing to ensure erosion and sediment particles do not enter public access ways or surrounding waterways.
- Vehicles leaving the site will secure and cover their loads. All trucks will be inspected prior to leaving the site (where applicable)
- All roads and pedestrian footways surrounding the site will be swept clean as required to remove any debris associated with the works on the site.
- A Dewatering Management Plan shall be compiled to outline the requirements for dewatering and any water treatment that may be required. Following any required treatment of water and verification testing, it shall be pumped to sewer and/or stormwater in accordance with Office of Water and Sydney Water requirements.

7 Water Quality

General Water Quality inc; Groundwater Seepage

- During excavation, a wash down facility will be installed to wash down the tyres and wheel arches of any trucks exiting the excavation zone.
- A Dewatering Management Plan shall be compiled to outline the requirements for dewatering and any water treatment that may be required. Following any required treatment of water and verification testing, it shall be pumped to sewer and/or stormwater in accordance with Office of Water and Sydney Water requirements.
- Due to the location of Harbourside a detailed Dewatering Management Plan shall be prepared and implemented by a suitably qualified and experienced person (s) and include but not limited to addressing the following elements;
    1. Dewatering technique
    2. Profile and radius of the water table
    3. Quality of dewatering liquid
    4. Evaluation of the need for treatment of the extracted water and its viability before release to the environment
    5. Risks of disturbing acid sulfate soils
    6. Discharge consent conditions
    7. Results of consultation with any local residents and business affected.

Stormwater Runoff

- Where required a Surface Water Quality Monitoring Program (SWQMP) shall be prepared and implemented to monitor impacts on surface water quality and resources during construction and operation. It shall be prepared by a suitably qualified and experienced person (s) and include but not limited to:
    - Identification of works and activities during construction which may have the highest risk of impacts on water quality (e.g. exposure of soils during earthworks, accidental leaks or spills of chemicals, disturbance of contaminated land, stormwater runoff).
- All stormwater pits around the perimeter of the site will be covered using filter fabric and sand bags.
- Management strategies will be put in place to address any environmental issues arising during the operation of the dewatering project. This should include design measures to minimise the impact of local stormwater on the dewatering operation.
- All construction work zones and loading areas that are trafficked by vehicles are to be regularly swept / washed-down to maintain a clean surface and keep surrounding roads clean.
- The use of temporary sediment / silt fencing to ensure erosion and sediment particles do not enter public access ways or surrounding waterways.

8 Air Quality and Odour Impacts

Air quality monitoring will be carried out throughout the excavation phase of the Project. This will be limited to excavation phases of the Project with additional monitoring required being assessed on a monthly basis.

Dust created by construction related activities, typically becomes more prominent during windy conditions, and will be dealt with by way of water suppression. Other measures for dust suppression include:

- Stockpiles of spoil to be covered and/or emulsion spray added to stockpile;
- In windy conditions, the frequency of water suppression will be increased;
- The construction site will be maintained and kept clean. Where suitable, the use of mechanical sweepers and covered waste bins will be utilised;
- Completed surfaces will be kept clean;
- Controlled site access will be maintained with vehicle wash down / clean down facilities to be established to maintain access roads;
- All materials transported from site in trucks will be appropriately covered.

Air quality monitoring devices will be installed to neighbouring buildings, or in sensitive areas, if required following consultation with stakeholders and assessment by suitably qualified professionals.

Odour Impacts

Stockpiling of excavated material shall be carried out in a manner to limit sediment migration and water run-off. Stockpiled material to be appropriately covered where deemed necessary to prevent erosion and / or odour migration

9 Hazardous Materials

9.1 Existing Site Survey

A hazardous material inspection survey and report shall be completed for all areas within the project boundary.

The survey shall involve a visual inspection of representative construction materials, on-site testing of suspected materials and the collection and analysis of additional unidentified suspected asbestos-containing materials (ACM) in order to update the hazardous materials register for the site.

9.2 Hazardous Materials Controls and Monitoring

Prior to commencement, asbestos monitoring devices will be established to adjacent properties, in locations to be agreed with the building owner / manager.

Removal of any hazardous materials will be in strict accordance with Codes of Practice for the safe removal of the relevant hazardous materials. All hazardous materials removal works will be completed by licensed contractors.

All hazardous materials disposal will be recorded. All records will include vehicle details, material type, when it was removed, and where it was disposed.

9.3 Dust Emission's Monitoring

Dust monitoring devices will be established to adjacent properties, in locations to be agreed with the building owner / manager.

9.4 Hazardous Materials Clearance

Air monitoring results and clearance certificates shall be provided at regular intervals (minimum weekly) by Mirvac during any hazardous materials and remediation phases.

All certification shall be provided by a NATA accredited consultant.

Construction works will not commence until hazardous materials clearance has been received.

9.5 Ground Contamination

Mirvac shall implement a Remedial Action Plan (RAP) to identify and manage the remediation process on site, obtain a Remediation and Validation Report and Site Auditor sign off prior to completion.

9.6 Goods Stored on Site During Construction

During construction, Mirvac will implement as part of the Work Risk Management Plans and audit procedures, a hazardous materials register which will include the following materials / procedures:

- Fuels required for running of plant and equipment, these fuels will include: unleaded petrol, diesel and gas. All fuel will be contained and bounded as required under EPA guidelines, Department of Environment Climate Change and Work Cover requirements.
- Refuelling procedures and designated areas will be implemented and allocated to eliminate risks associated with spills and also identify procedures to contain spills.
- Spill kits and adequate training will be provided to relevant construction staff and at locations identified as storage and refuelling.

Dangerous goods to be stored on site will also include; oxyacetylene, bonding agents etc and as per the fuels listed above, these will also be stored as required under relevant Australian Standards, EPA guidelines, Department of Environment Climate Change and Water, Work Cover requirements and Industry codes of practice.

Hazardous substances and dangerous goods will be stored in secure well ventilated areas. At all times, Mirvac will have regard to the storage and hazardous materials and their proximity of neighbouring properties.

Mixed class gas cylinders, e.g. oxy and acetylene, will be separated from other hazardous substances or flammable goods by a minimum distance of 3 metres as detailed in AS4332 Storage and Handling of Gases in Cylinders. The exception to this requirement is minor storage situations (a total capacity of all cylinders in the store of less than 2,000 litres) where both oxygen and acetylene can be stored together.

Storage of dangerous goods that 'exceed' the amounts outlined in the Mirvac Group Dangerous Goods Storage Guidelines require the premises (workplace) to be licensed under dangerous goods legislation and associated regulations. To minimise workplace risk and eliminate the need for licensing, except in exceptional circumstances, it is a Mirvac Group requirement that maximum volumes of Dangerous Goods do not exceed those quantities outlined in the abovementioned guidelines.

The storage area for hazardous substances and dangerous goods shall be constructed with an impervious floor and bunded with a minimum capacity of 110% of the largest container in the store, e.g. a store consisting of a 20 litre substance container requires a bunding capacity of 22 litres.

Mirvac will maintain a dangerous goods register and material safety data sheets for each product listed as well as having a procedure to deal with spills.

All relevant firefighting equipment, first aid facilities and relevant authority contact details i.e. Fire, EPA will be displayed at prominent locations and included at site inductions.

10 SUSTAINABILITY

10.1INTRODUCTION

Mirvac's target is to achieve a consistent level of environmental and social outcomes throughout the project by committing to establishing new initiatives where possible. Exploring alternative sustainable options outside of the legislative requirements and implementing them will make a significant contribution to the physical environment and the local community.

By exercising the sustainability values depicted in Figure 4 and recognising the benefits of social, environmental and economic sustainability, Harbourside will promote a balanced lifestyle for its future occupants and wider community which will be reflected in the development and throughout the construction phase.

Figure 4 – Mirvac's Sustainability Values

10.2COMPANY STRATEGY

Adherent with Mirvac's commitment to sustainability, an integrated approach "This Changes Everything" is focused on the responsibility Mirvac has to the environment, wider community and to its investors. With the engagement from relevant stakeholders Mirvac seeks to deliver a culture that fosters sustainability and having a lasting impact. The four aspects of this strategy include:

- **Reimagining resources**: Mirvac aims to generate more water and energy than we consume and to find ways to capture and reduce waste beyond that we create. Through efficient use of resources, Mirvac will reduce consumption of natural resources and operate in a manner which will achieve a minimum 95% recycling. In management practices, Mirvac will invest in opportunities such as renewable energy onsite and assess suppliers in their involvement to sustainability.

- **Shaping the Future of Place**: To create a place where we live, work, shop and play utilising feedback from the community on past projects. Ongoing community engagement is necessary to predict future challenges while accepting information and boundaries will change over time. Implementation of utilities and infrastructures will be made in the design and construction to promote a sense of place.

- **Enriching Communities**: To improve the health and wellbeing within a community as well as strengthen social inclusion. Mirvac recognises "beyond boundaries" are what supports society as a whole and improves the places we create. Active participation from external stakeholders on sustainability issues will result in refining business operations and investing in the community.

- **Smarter Thinking**: Investing in assets designed to improve its own performance and ease of operation over its cycle. Financing in smart technology to become more efficient and effective in the delivery of the project while educating and informing the importance of sustainability.

10.3PROJECT SPECIFIC STRATEGY

The following criteria will be monitored during construction to measure overall performance in addressing sustainability targets:

10.3.1 Environmental Management System

Implement a Workplace Risk Management Plan that is certified to AS/NZS ISO 14001, which establishes clear environmental objectives & targets for the site works.

10.3.2 Community / Schools

Provide opportunities for students and the local community to learn about the projects and the impact on the wider community. As well as this, hold information sessions on the health and safety programs to engage and build a rapport with the relevant agencies. Have email updates on the progress and any other media coverages.

10.3.3 Energy

Examine opportunities to reduce electricity and water consumption and the use of alternative systems implemented for site amenities.

10.3.4 Sustainability Induction

Construction staff will be educated on the sustainability initiatives planned for the project and encouraged to innovate and find sustainable solutions through site induction and tool box talk's process.

10.3.5 Innovation

Review project planning and development to explore innovative options to promote sustainability on the project.

11 Workplace Risk Management

11.1 Introduction

Mirvac is fully committed to providing a safe working environment. Each Work Place Risk Management Plan (WRMP) requires that equipment, workplaces and practices comply with relevant regulations and standards. Regular and ongoing reviews of these standards will be conducted and where higher standards are practical and desirable, they will be adopted. In addition the company will:

- Provide adequate resources to satisfy this policy.
- Identify, control and reduce work-related hazards and risks that may produce injury, illness or asset damage.
- Identify, quantify and control to safe levels, those chemicals and physical agents in the workplace capable of causing ill health.
- Promote environmental, health, safety and the welfare of employees and sub-contractors while respecting the privacy of individuals.
- Provide information, instruction and training for employees to increase their personal understanding of workplace hazards, promote safe working practices and ensure contractors are aware of and satisfy the Groups HSE expectations.
- Consult employees and contractors in environmental, health and safety to reduce workplace hazards and risks.
- Consult with clients, industry bodies and others in the development of appropriate standards, control strategies and monitoring techniques, which comply, with the requirements of statutory authorities.
- Set short and long term goals in occupational health and safety management, and review performance against these goals.

Mirvac Management is responsible for raising the awareness of the responsibilities of all workers on the site in regards to workplace safety and the role they play in achieving a safe and healthy work environment. Mirvac employees and all other workers on the premises or site are responsible for working towards achieving and maintaining a healthy and safe workplace. The intent of this policy is to foster a culture within Mirvac employees and its subcontractors, raising health and safety awareness, and promoting active participation in the Health Safety and Environment (HSE) program.

11.2 Workplace Risk Management Plans (WRMP) and Job Safety & Environment Analysis (JSEA)

A key tool in the management of HSE on the project will be the continued improvement of both Mirvac's WRMP and each individual Job Safety & Environment Analysis (JSEA). This plan as a minimum includes the following:

- A description of the work to be undertaken;
- An identification of the foreseeable hazards associated with the works; and
- A description of the hazard control measures to be used.

A detailed site specific Workplace Risk Management Plan shall be developed and implemented by Mirvac prior to commencement of works and shall be updated as / when required.

12 Site Management Plan

12.1 Introduction

A Site Management Plan will be developed to outline the proposed phases of the construction work on site, outline the order of works, and assess Mirvac's impact and interaction with the surrounding community.

12.2 Construction Phases

The works have been broadly divided into the following phases:

a. Site establishment;
b. Demolition of Monorail Station and existing Bridges
c. Demolition of existing shopping centre
d. Civil – basement diameter wall, excavation, piling and ground retention works;
e. Remediation works to site;
f. Structure;
g. Façade & atrium roof works;
h. Building fit out and finishes;
i. Commissioning & handover works;
j. Landscaping and public domain works.

12.3 Construction Staging

Proposed summary staging plans will be included within Appendix B of this document and will identify the key project stages and proposed phased handovers. Other construction staging items as follows:

- The demolition of the monorail station, and the footbridge to the Novotel will be undertaken on the weekends only.
- The demolition and removal of the shopping centre in one phase
- Basement Construction and Excavation and treatment of all associated material
- Construction adjacent to Pyrmont Bridge
- Construction staging around the shopping centre and commercial tower

12.4 Interaction with Surrounding Community

The following actions will be implemented, which focus on minimising the impacts of construction activity to the community surrounding the Harbourside project.

- Hoarding around site;
- Monitor compliance of the Traffic Management Plan and Noise and Vibration Management Plan;
- Clear display of contact details on the hoarding for community information and contact in case of emergency;
- Make arrangements for the notification to surrounding properties of activities which may affect their amenity, including the provision of a 24-hour contact point;
- Close community liaison with neighbours
- Monthly Newsletter updating surrounding residents on construction works and upcoming activities or interactions;
- Monthly meetings to discuss the progress of works and to address any concerns raised by the surrounding community.

12.5 Dispute Resolution

Mirvac acknowledges the potential for disruption as a result of the development, and proposes that the following measures be established:

- Complaint procedure / complaint register to be developed. Should a complaint or infringement occur, the following procedures are to be adopted:
    - All complaints and infringements are to be brought to the attention of the Mirvac Site Manager immediately upon receipt;
      The Mirvac Site Manager shall investigate the complaint and ensure appropriate action is taken to address the complaint or infringement within the time frame outlined in "HSE Objectives and Targets for Community Contact Issues". This is detailed within the Mirvac Construction HSE Management Systems Manual;
    - A Community Contact Notification form shall also be completed for all complaints and enquiries (refer to following pages for this template);
    - A copy of this documentation is to be filed within the site office.

The contact details of the Site Manager will be permanently shown on the site notice to be displayed in a prominent location at site entries as an emergency 24 hour contact.

12.6 Fire Protection Measures During Construction

Mirvac will comply with the requirements of the BCA and Australian standards during excavation and construction.

Specifically, E1.9 of the BCA requires the following:

- not less than one fire extinguisher to suit Class A, B and C fires and electrical fires must be provided at all times on each *storey* adjacent to each *required exit* or temporary stairway or *exit*; and
- after the building has reached an *effective height* of 12 m—
    - the *required* fire hydrants and fire hose reels must be operational in at least every *storey* that is covered by the roof or the floor structure above, except the 2 uppermost *storeys*.

12.7 Site Specific Issues

12.7.1 Contamination

Mirvac shall implement the (RAP) to identify and manage the remediation process on site, obtain a Remediation and Validation Report and Site Auditor sign off prior to completion.

12.7.2 Heritage

A heritage consultant will be engaged by Mirvac to produce a report for the project as well as assist in the development and monitoring of design and construction works adjacent to the Pyrmont Bridge.

12.7.3 Infrastructure Assets

A number of existing services are present within the precinct. Mirvac shall liaise with the relevant Utility Providers throughout the design process and prior to construction for approval of the design and proposed construction methodology to ensure compliance with Health, Safety and Environmental requirements, Network Standards and Codes of Practice.

A detailed Risk and Opportunity Register and work method statements shall be completed following acceptance of the design principles.

mirvac

COMMUNITY CONTACT NOTIFICATION

PURPOSE

Contact with the community is a means by which Mirvac can positively engage stakeholders and potential clients or customers by demonstrating sound management practices in resolving any concerns raised in a timely manner.
Community members that interface with Mirvac business undertakings present the opportunity for feedback and a positive response by Mirvac.
Any response shall be commensurate with Mirvac's high regard and sensitivity to social amenity and the lifestyle impacts of its business undertakings.

The details outlined below must be completed for all 'formal' (oral or written) representations to any Mirvac representative by a community member or on being directly informed of a concern by a third party and corrective (follow up) action undertaken within 48 hours of notification where required.

WORKPLACE: _____

CONTACT DETAIL:

(1) How was the contact made?:

Telephone: ☐ Personal Contact: ☐ Written Letter: ☐ Email: ☐ Fax: ☐
Other [specify]: _____

(2) Date of contact: _____ Time of contact: _____ am ☐ or pm ☐

(3) Contact made by: [who made the contact?]

Name	Address	Phone

(4) Outline concerns/issues raised:

_____

(5) Notification details recorded in the HSE Incident Reporting System by:

Name	Mirvac Division	Date recorded	Phone

(6) Has the contact been referred to another person? Yes ☐ No ☐

(7) If 'Yes' list the name and contact details of the person:

List Name	Mirvac Division	Time Referred	Phone

(8) Has the contact been 'formally' acknowledged to the complainant? Yes ☐ No ☐
[Note: mandatory within 48 hours of contact]

(9) How was the contact formally acknowledged?

Telephone: ☐ Personal Contact: ☐ Other: [specify] _____

(10) Is follow-up action required? Yes ☐ No ☐

(11) Outline follow-up action undertaken:

[Note: mandatory within 48 hours of contact]

_____

(12) Date of follow-up action: _____ Time of action _____ am ☐ or pm ☐

(13) Date complainant was advised of the outcome/action undertaken as a result of the contact: Date _____ Time of action _____ am ☐ or pm ☐

[Note: mandatory within 48 hours of first contact]

(14) What were the 'Contributing Factors' and the 'Root cause' of the issue?
(Action/ inaction by persons, failure of tools/ machines or procedures not followed) *(QUESTION THE CAUSE 5 TIMES)*
e.g. (the issue) Slurry on public road, splashing on passing cars. ***Q. 1 Where** did the slurry come from?* – From concrete cutting adjacent to road. ***Q. 2 How** did it get on the road?* – No effective barrier in place. ***Q. 3 Why** was there no barrier?* – Hazard of slurry splashing on cars not identified. ***Q. 4 Why** was this hazard/ control not identified?* – Location/task specific risk assessment not reviewed for location. ***Q. 5 Why** was the risk assessment not reviewed?* – Risk assessment not maintained or checked prior to activity or during daily pre-start meeting.
Insert main issue description

Q.1?

Q. 2?

Q. 3?

Q. 4?

Q. 5?

(15) Identified 'long term' corrective action(s) required to prevent the issue re-occurring

_____

(16) Date 'long term' corrective action(s) implemented and R & O Register reviewed:

_____

(17) Date the corrective action(s) were monitored by a Mirvac representative and confirmed as having been effective:

_____

(18) Completion:

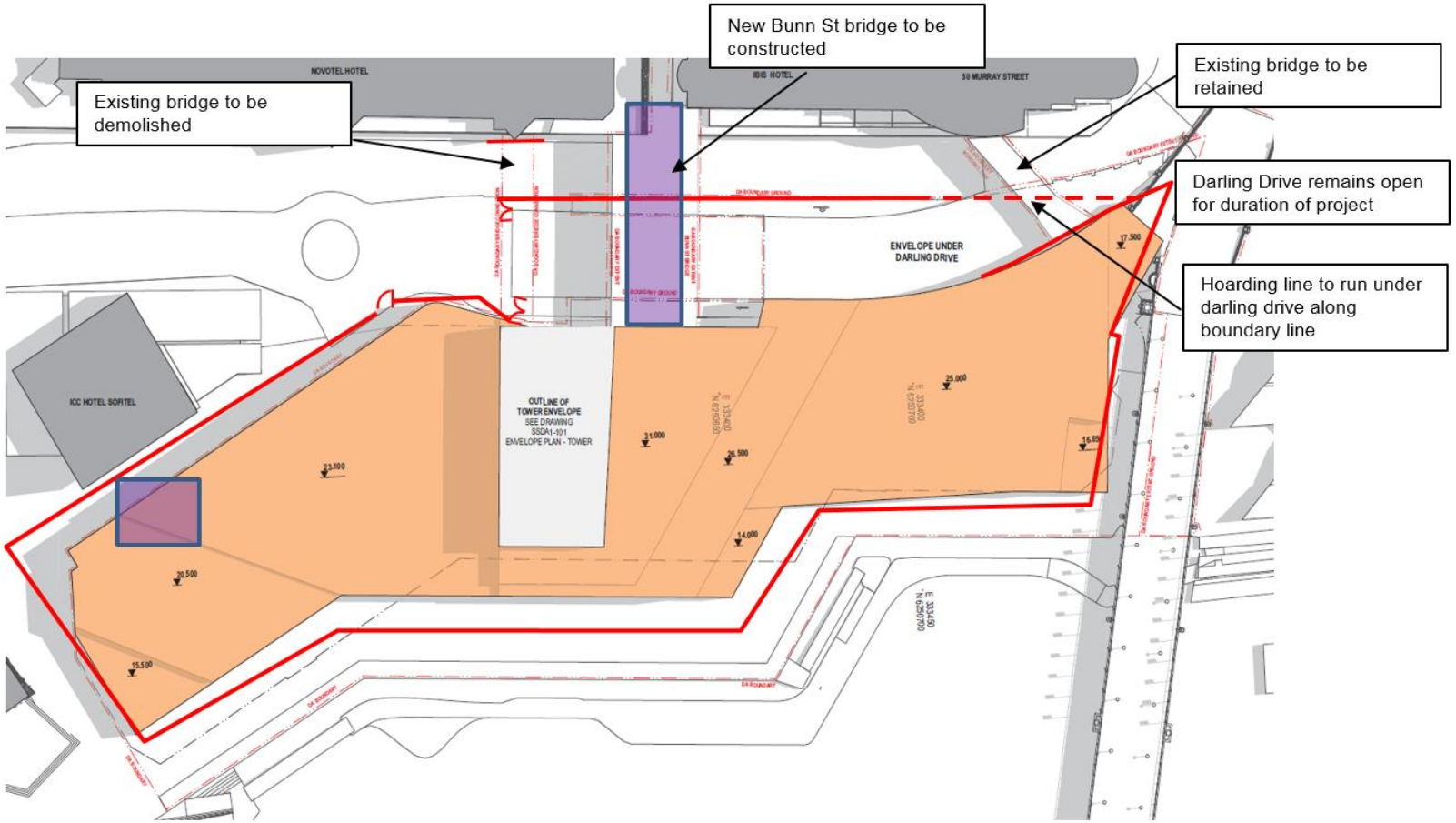
Person completing this report:

Name: _____ Signature: Date: _____

Manager of person completing this report:

Name: _____ Signature: Date: _____

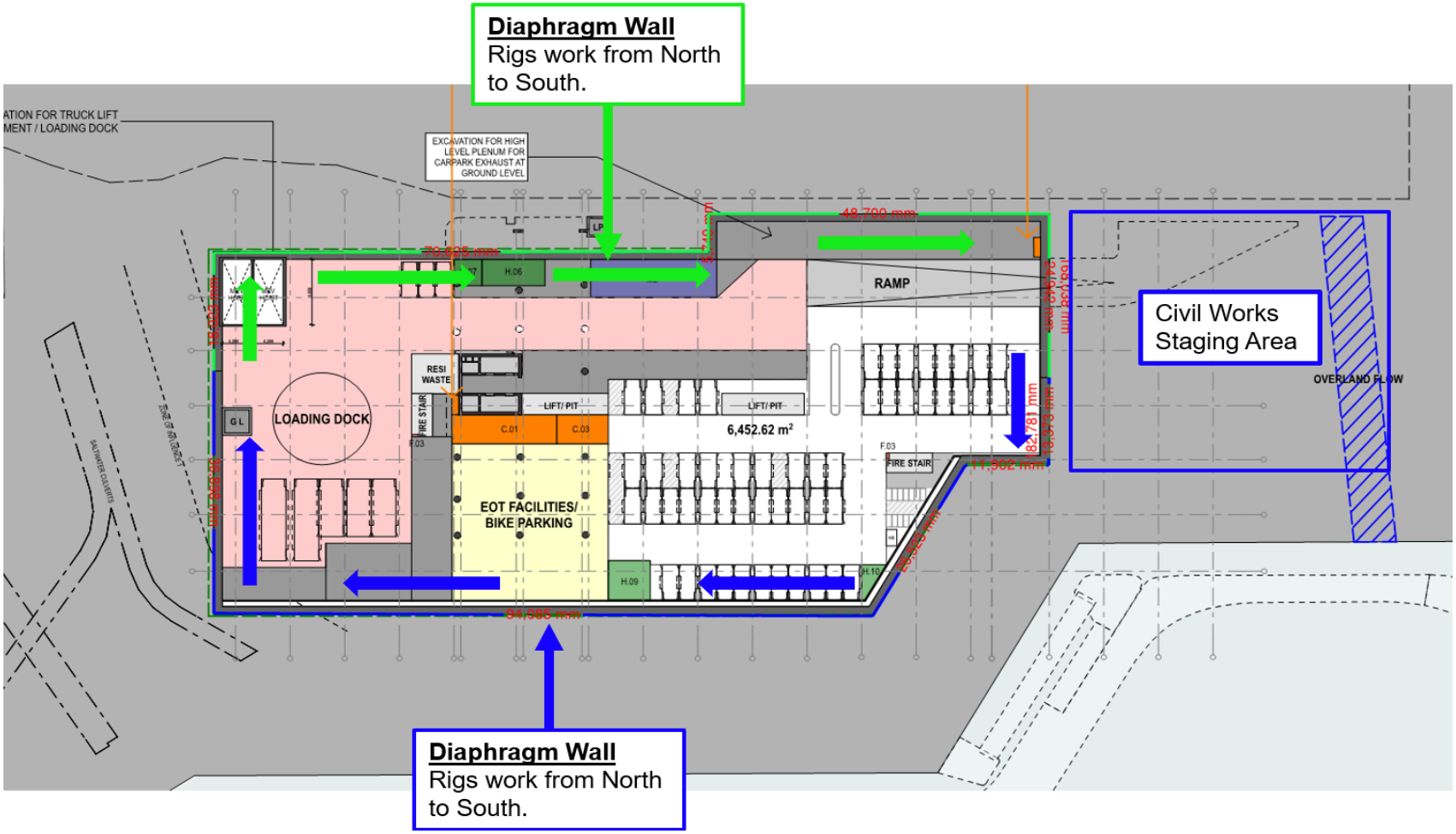
Appendix A:
Location Plan



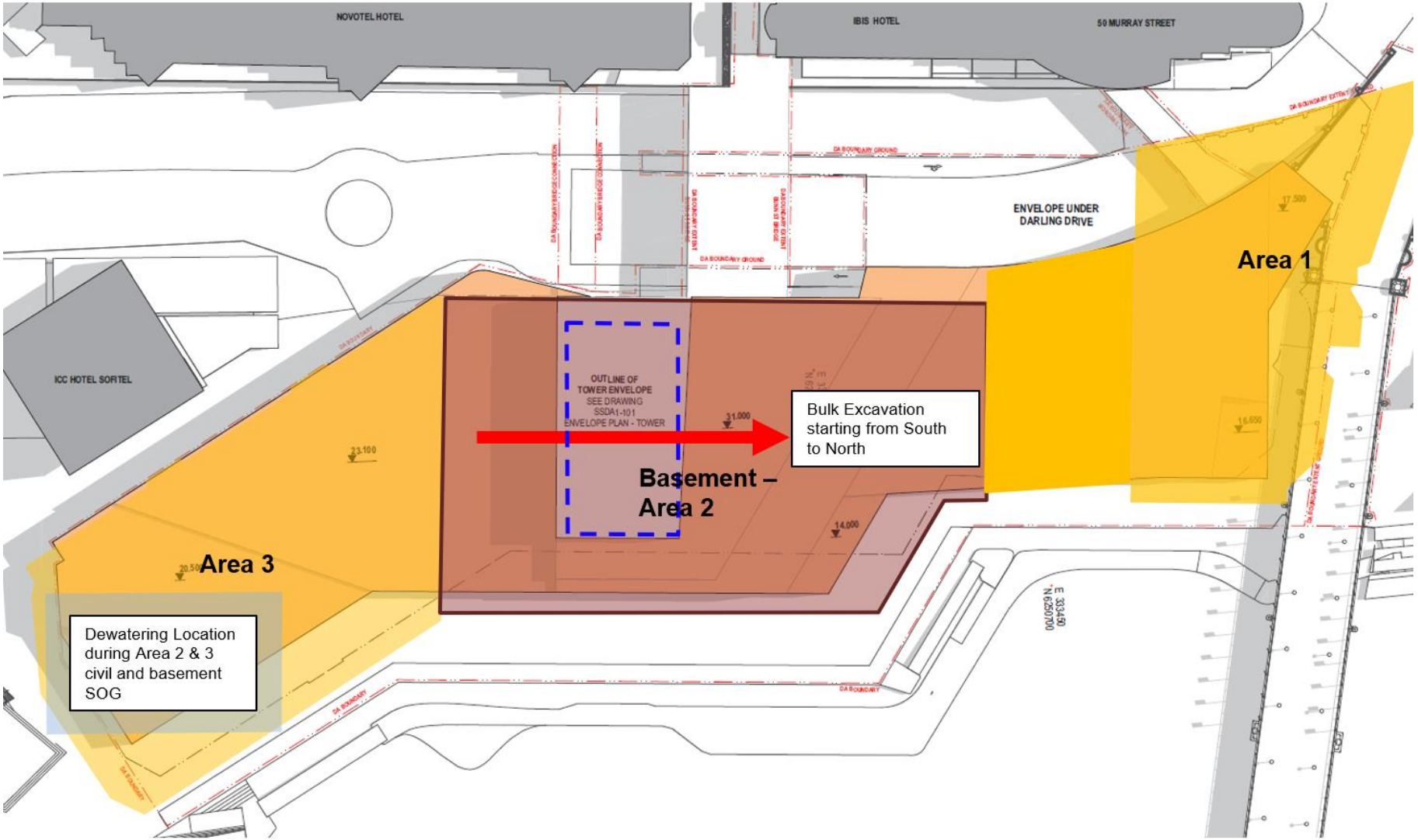
Appendix B:
Site Staging Plans

Prepared by: Mirvac

Basement Excavation – Retention Wall Sequence

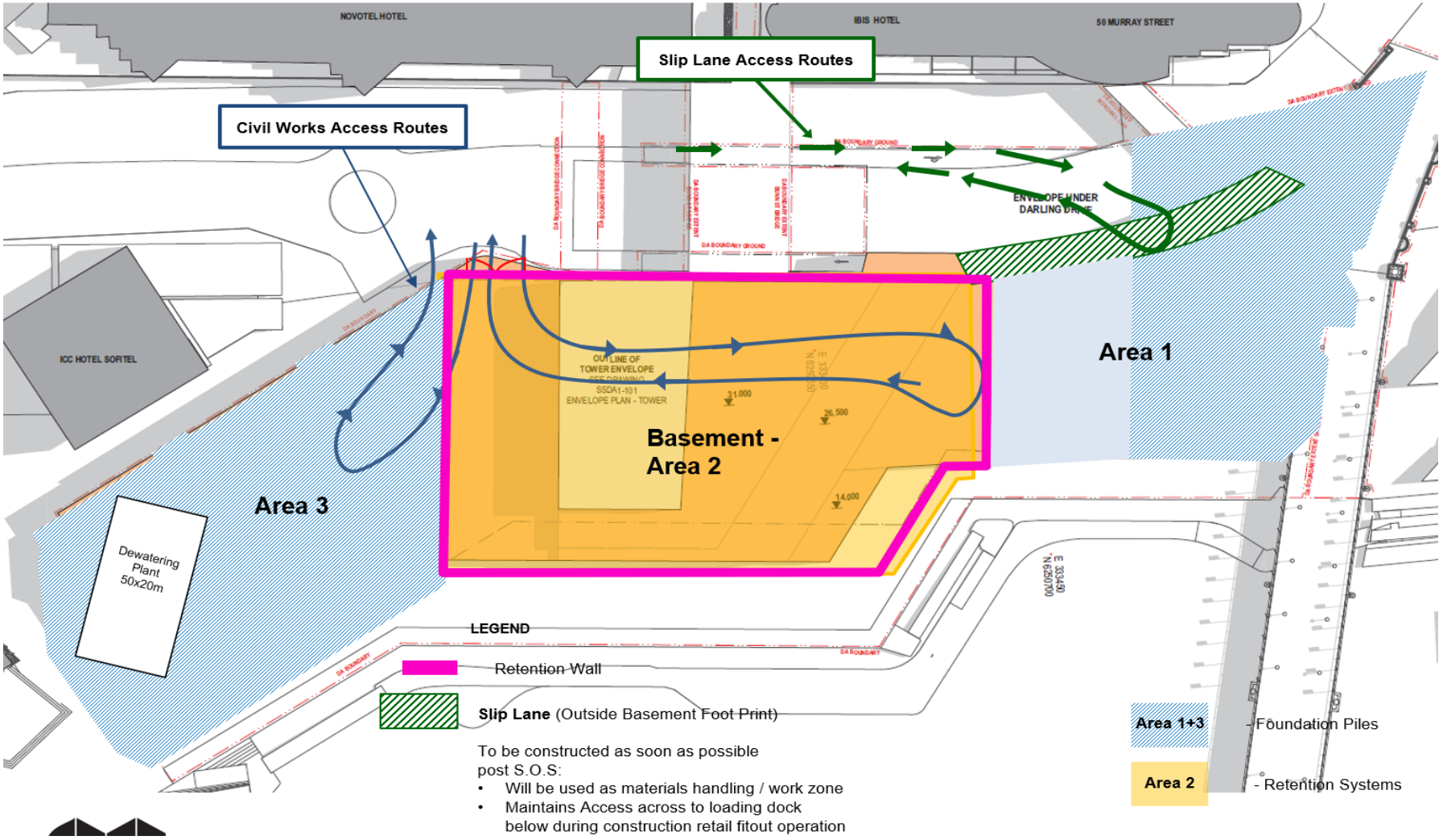


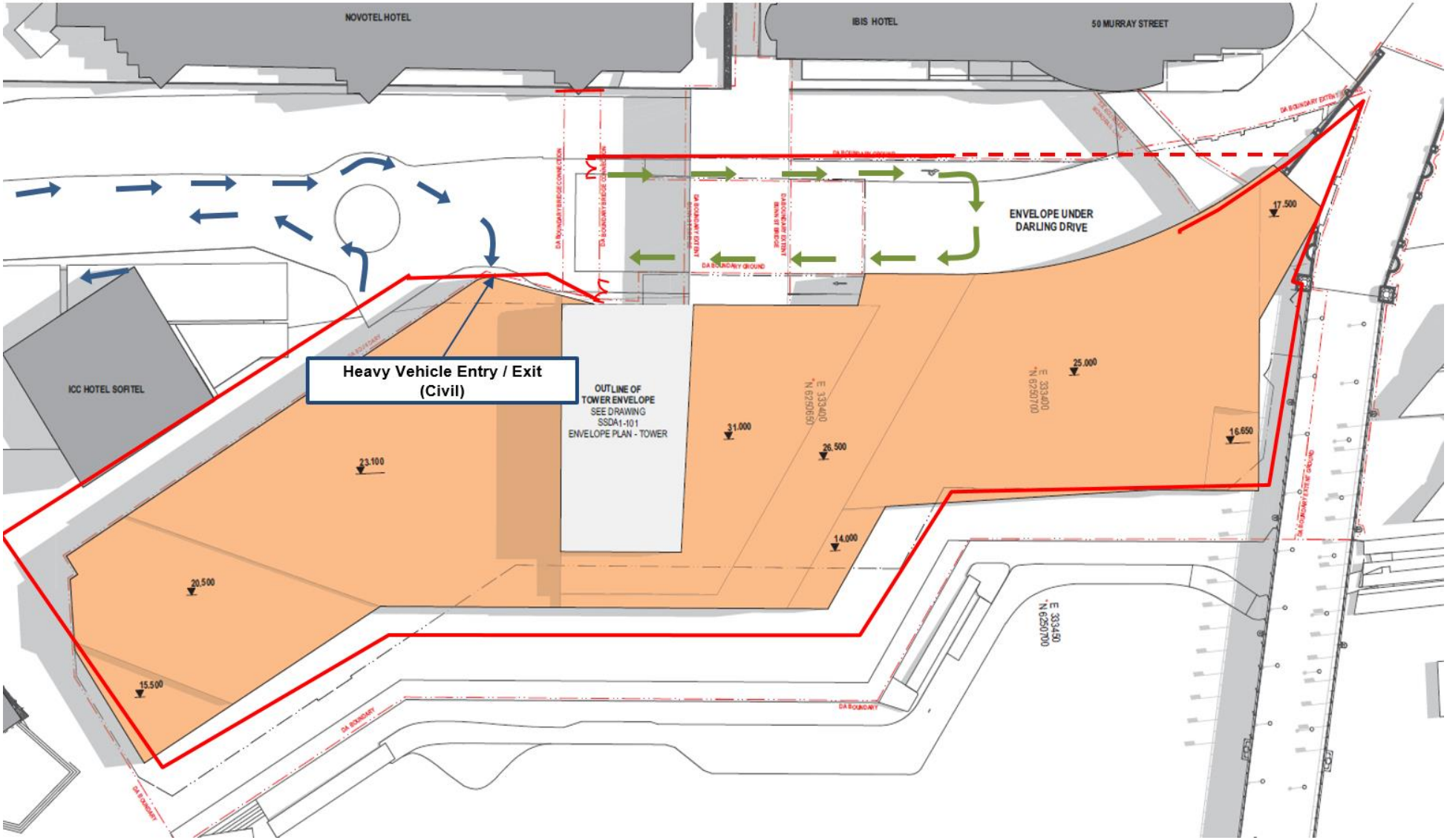
Bulk Excavation



Appendix C:
Access and Egress Plan

Prepared by: Mirvac




NOVOTEL HOTEL
IBIS HOTEL
50 MURRAY STREET
ENVELOPE UNDER DARLING DRIVE
ICC HOTEL SOFITEL
Heavy Vehicle Entry / Exit (Civil)
OUTLINE OF TOWER ENVELOPE SEE DRAWING SSDA1-101 ENVELOPE PLAN - TOWER
17.500
25.000
31.000
26.500
23.100
16.650
14.000
20.500
15.500
E 333400 N 6250700
E 333450 N 6250700
DA BOUNDARY

Appendix D:
Traffic Management Plan (TMP)

Appendix E:
Noise & Vibration Management Plan (NVMP)

Appendix F:
Construction Waste Management Plan (WMP)