TRANSPORT AND TRAFFIC IMPACT ASSESSMENT REPORT

APPENDIX T

Sydney Metro City & Southwest

Pitt Street South Over Station Development

Transport, Traffic and Parking Assessment

Applicable to:	Sydney Metro City & Southwest
Author:	GHD Pty Ltd
Owner	Sydney Metro
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1.0 Purpose of this report

1.1 Background

This report supports a concept State Significant Development Application (concept SSD Application) submitted to the Department of Planning and Environment (DPE) pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The concept SSD Application is made in accordance with Section 4.22 of the EP&A Act.

Sydney Metro is seeking to secure concept approval for a building envelope above the southern portal of Pitt Street Station, otherwise known as the over station development (OSD). The concept SSD Application seeks consent for a building envelope, maximum building height, land use options, pedestrian and vehicular access, circulation arrangements and associated car parking as well as the strategies and design parameters for the future detailed design of development.

Sydney Metro proposes to procure the construction of the OSD as part of an Integrated Station Development package, which would result in the combined delivery of the station, OSD and public domain improvements. The station and public domain elements form part of a separate planning approval for Critical State Significant Infrastructure (CSSI) approved by DPE on 9 January 2017.

As the development is associated with railway infrastructure and is for residential or commercial premises with a Capital Investment Value of more than $30 million, the project is State significant development (SSD) pursuant to Schedule 1, Clause 19(2)(a) of the *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP). The full extent of the proposed development can also be considered to be SSD by virtue of Clause 8(2) of the SRD SEPP.

This report has been prepared to specifically respond to the Secretary's Environmental Assessment Requirements (SEARs) issued for the concept SSD Application for Pitt Street South on 30th November 2017 which state that the Environmental Impact Statement (EIS) is to address the following requirements:

Transport, Traffic, Parking and Access

Specifically, the SEARs require that the EIS include a Transport and Traffic Impact Assessment that provides the following:

- Accurate details of the current daily and peak hour vehicle, public transport, pedestrian and bicycle movements from existing buildings/ uses on the site using the adjacent and surrounding road network.
- Forecast total daily and peak hour trips likely to be generated by the proposed development including vehicle, public transport, pedestrian and bicycle trips, together

with cumulative impacts of existing, proposed and approved developments in the area and any transport / traffic upgrade.

- Assessment of the Public Transport Accessibility Level of the land and consequent recommended development mode split.
- Impacts of the proposed development on the operation of existing and future transport networks, including the public transport capacity and its ability to accommodate the forecast number of trips to and from the development including surrounding footpaths and cycleways.
- Detailed assessment of the existing and future performance of key intersections providing access to the site (including pedestrian access), supported by appropriate modelling and analysis to the satisfaction of RMS and TfNSW.
- Measures to mitigate impacts of the proposed development on the operation of existing and future traffic, public transport, pedestrian and bicycle networks, including any required upgrades.
- Proposed car and bicycle parking provision for residents, staff and visitors, including consideration of the availability of public transport and the requirements of the relevant parking codes and Australian Standards.
- Loading dock and servicing arrangements, including consideration of loading zone hub facilities.
- Measures to be implemented to encourage users of the development to make sustainable travel choices, including walking, cycling, public transport and car sharing, such as provision of adequate bicycle parking and end of trip facilities.

1.2 Overview of the Sydney Metro in its context

The New South Wales (NSW) Government is implementing *Sydney's Rail Future*, a plan to transform and modernise Sydney's rail network so that it can grow with the city's population and meet the needs of customers in the future. Sydney Metro is a new standalone rail network identified in *Sydney's Rail Future*.

Sydney Metro is Australia's biggest public transport project, consisting of Sydney Metro Northwest, which is due for completion in 2019 and Sydney Metro City & Southwest, which is due for completion in 2024.

Sydney Metro West is expected to be operational in the late 2020s (refer to **Figure 1**).

Figure 1: Sydney Metro alignment map

Sydney Metro City & Southwest includes the construction and operation of a new metro rail line from Chatswood, under Sydney Harbour through Sydney's Central Business District (CBD) to Sydenham and on to Bankstown through the conversion of the existing line to metro standards.

The project also involves the delivery of seven new metro stations, including at Pitt Street. Once completed, Sydney Metro will have capacity for 30 trains an hour (one every two minutes) through the CBD in each direction - a level of service never seen before in Sydney.

On 9 January 2017, the Minister for Planning approved the Sydney Metro City & Southwest - Chatswood to Sydenham application lodged as a Critical State Significant Infrastructure project (reference SSI 15_7400), hereafter referred to as the CSSI Approval.

The CSSI Approval includes all physical work required to construct the CSSI, including the demolition of existing buildings and structures on each site. Importantly, the CSSI Approval also includes provision for the construction of below and above-ground structures and other components of the future integrated station development (including building infrastructure and space for future lift cores, plant rooms, access, parking and building services, as relevant to each site). The rationale for this delivery approach, as identified within the CSSI

Application, is to enable the integrated station development to be more efficiently built and appropriately integrated into the metro station structure.

The EIS for the Chatswood to Sydenham component of the Sydney Metro City & Southwest project identified that the OSD would be subject to a separate assessment process.

Since the CSSI Approval was issued, Sydney Metro has lodged four modification applications to amend the CSSI Approval as outlined below:

- Modification 1- Victoria Cross and Artarmon Substation which involves relocation of the Victoria Cross northern services building from 194-196A Miller Street to 50 McLaren Street together with inclusion of a new station entrance at this location referred to as Victoria Cross North. 52 McLaren Street would also be used to support construction of these works. The modification also involves the relocation of the substation at Artarmon from Butchers Lane to 98 – 104 Reserve Road. This modification application was approved on 18 October 2017.
- Modification 2- Central Walk which involves additional works at Central Railway Station including construction of a new eastern concourse, a new eastern entry, and upgrades to suburban platforms. This modification application was approved on 21 December 2017.
- Modification 3 - Martin Place Station which involves changes to the Sydney Metro Martin Place Station to align with the Unsolicited Proposal by Macquarie Group Limited (Macquarie) for the development of the station precinct. The proposed modification involves a larger reconfigured station layout, provision of a new unpaid concourse link and retention of the existing MLC pedestrian link and works to connect into the Sydney Metro Martin Place Station. This modification application was approved on 22 March 2018.
- Modification 4 - Sydenham Station and Sydney Metro Trains Facility South which incorporated Sydenham Station and precinct works, the Sydney Metro Trains Facility South, works to Sydney Water's Sydenham Pit and Drainage Pumping Station and ancillary infrastructure and track and signalling works into the approved project. This modification application was approved on 13 December 2017.

Given the modifications, the CSSI Approval is now approved to operate to Sydenham Station and also includes the upgrade of Sydenham Station.

The remainder of the City & Southwest project (Sydenham to Bankstown) proposes the conversion of the existing heavy rail line and the upgrade of the existing railway stations along this alignment to metro standards. This portion of the project, referred to as the Sydenham to Bankstown Upgrade, is the subject of a separate CSSI Application (No. SSI 17_8256) for which an Environmental Impact Statement was exhibited between September and November 2017 and a Response to Submissions and Preferred Infrastructure Report was submitted to the NSW Department of Planning & Environment (DPE) in June 2018 for further exhibition and assessment.

1.3 Planning relationship between Pitt Street Station and the OSD

While the southern portal of Pitt Street Station and the OSD will form an integrated station development, the planning pathways under the *Environmental Planning and Assessment Act 1979* involve separate approval for each component of the development. In this regard, the approved station works (CSSI Approval) are subject to the provisions of Part 5.1 of the EP&A Act (now referred to as Division 5.2) and the OSD component is subject to the provisions of Part 4 of the EP&A Act.

For clarity, the approved station works under the CSSI Approval included the construction of below and above ground structures necessary for delivering the station and also enabling construction of the integrated OSD. This included but is not limited to:

- demolition of existing development
- excavation
- station structure including concourse and platforms
- lobbies
- retail spaces within the station building
- public domain improvements
- station portal link (between the northern and southern portals of Pitt Street Station)
- access arrangements including vertical transport such as escalators and lifts
- structural and service elements and the relevant space provisioning necessary for constructing OSD, such as columns and beams, space for lift cores, plant rooms, access, parking, retail and building services.

The vertical extent of the approved station works above ground level is defined by the 'transfer slab' level (which for Pitt Street South is defined by RL 58.25), above which would sit the OSD. This delineation is illustrated in **Figure 2**: below.

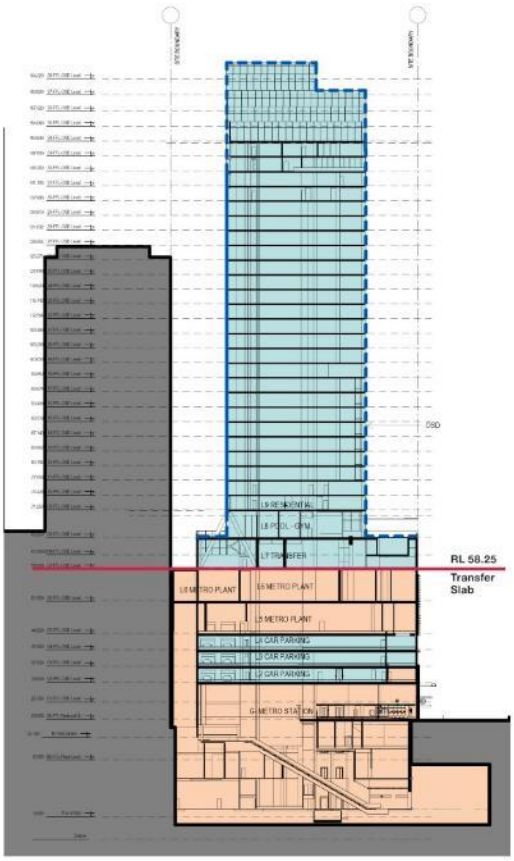


Figure 2: Delineation between station and OSD

The CSSI Approval also establishes the general concept for the ground plane of Pitt Street Station including access strategies for commuters and pedestrians. In this regard, pedestrian access to the station would be from Bathurst Street and the OSD lobby would be accessed from Pitt Street.

Since the issue of the CSSI Approval, Sydney Metro has undertaken sufficient design work to determine the space planning and general layout for the station and identification of those spaces within the station area that would be available for the OSD. In addition, design work has been undertaken to determine the technical requirements for the structural integration of the OSD with the station. This level of design work has informed the concept proposal for the OSD. It is noted that ongoing design development of the works to be delivered under the CSSI Approval would continue with a view to developing an Interchange Access Plan (IAP) and Station Design Precinct Plan (SDPP) for Pitt Street Station to satisfy Conditions E92 and E101 of the CSSI Approval.

The public domain improvement works around the site would be delivered as part of the CSSI Approval.

1.4 The Site

The Pitt Street South OSD site is located near the corner of Pitt Street and Bathurst Street, comprising four individual allotments but excluding the Edinburgh Castle Hotel, above the southern portal of the future Pitt Street Station. The context of the site is demonstrated at **Figure 2** below.

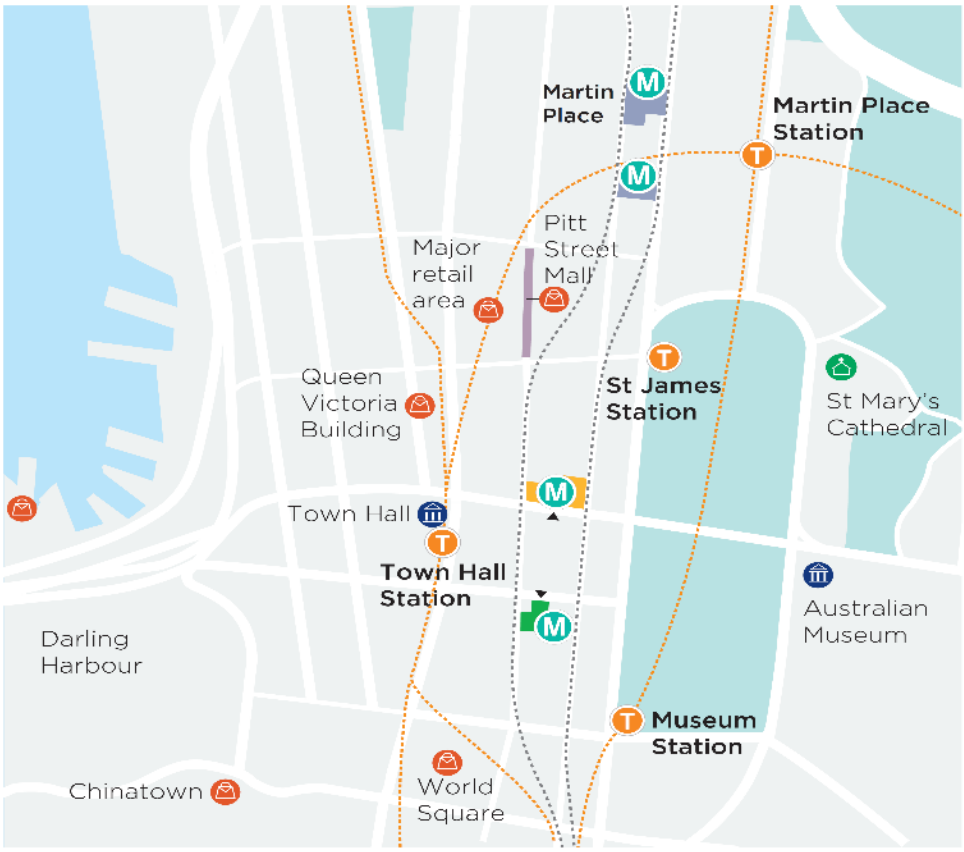


Figure 3: Pitt Street Station location plan

The site is located in the City of Sydney Local Government Area. The site (refer to **Figure 4** below) is irregular in shape, has a total area of approximately 1,708 square metres and has street frontages of approximately 32 metres to Pitt Street and 24 metres to Bathurst Street.

The Pitt Street South site comprises a number of individual properties which front Bathurst Street and Pitt Street. Specifically, the site comprises the following:

- 125-129 Bathurst Street, Sydney (Lot 1 in DP60293)
- 131-135 Bathurst Street, Sydney (Lot 1 in DP59101)
- 296-300 Pitt Street, Sydney (Lot 1 in DP436359)
- 302 Pitt Street, Sydney (Lot 1 in DP62668)

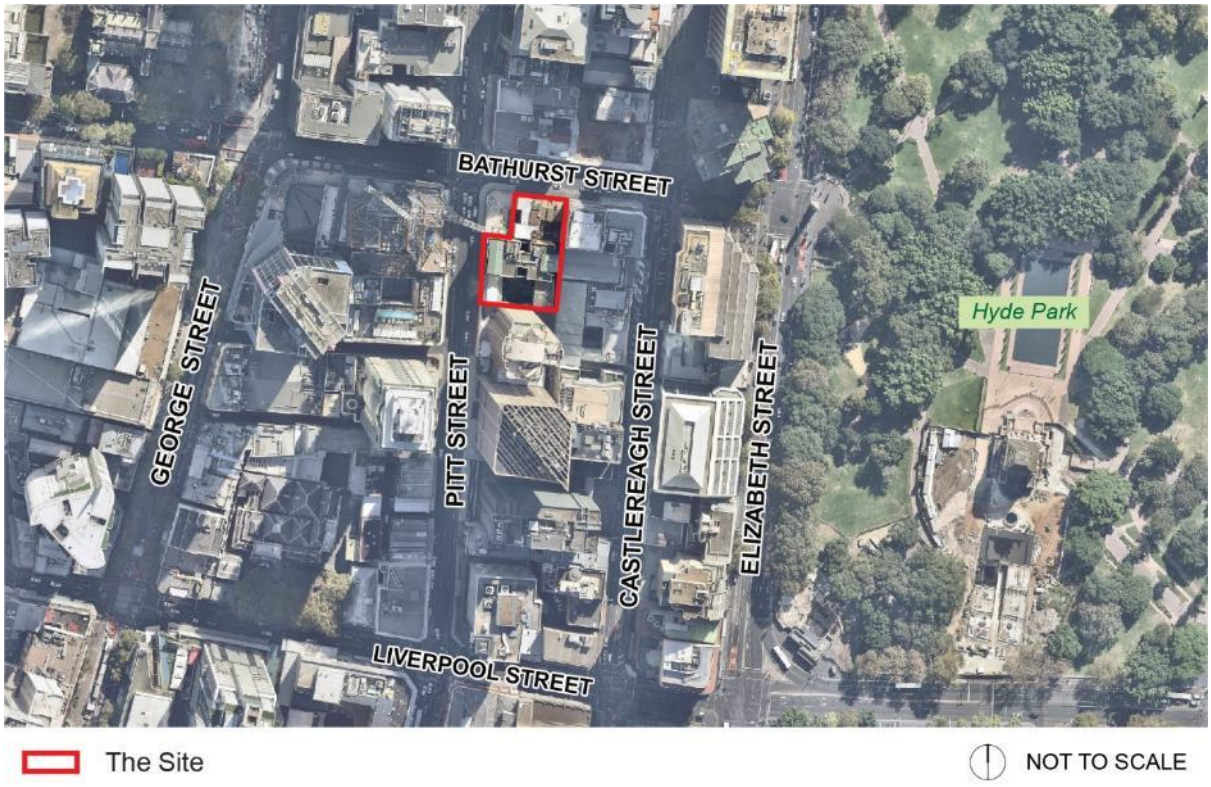


Figure 4: Aerial photo of Pitt Street South

1.5 Overview of the proposed development

This concept SSD Application comprises the first stage of the Pitt Street South OSD project. It will be followed by a detailed SSD Application for the design and construction of the OSD to be lodged by the successful contractor who is awarded the contract to deliver the integrated station development.

This concept SSD Application seeks approval for the planning and development framework and strategies to inform the future detailed design of the OSD. It specifically seeks approval for the following:

- a building envelope
- a maximum envelope height of Relative Level (RL 171.6) which equates to approximately 35 storeys, including the podium height of RL 71.0 which equates to approximately 8 storeys above ground
- use for the OSD component of the development for uses, subject to further detailed applications, which could include:
    - residential accommodation; or
    - commercial premises

- use of the conceptual OSD space provisioning within the footprint of the CSSI Approval (both above and below ground), including the OSD lobby areas, podium car parking, storage facilities, services and back-of-house facilities

- car parking for a maximum of 34 spaces located across three levels of the podium
- loading, vehicular and pedestrian access arrangements from Pitt Street
- strategies for utilities and service provision
- strategies for the management of stormwater and drainage
- a strategy for the achievement of ecologically sustainable development
- indicative future signage
- a strategy for public art
- a design excellence framework
- the future subdivision of parts of the OSD footprint (if required)

As this concept SSD Application is a staged development pursuant to section 4.22 of the EP&A Act, future approval would be sought for detailed design and construction of the OSD. Concept indicative designs showing potential residential and commercial building form outcomes at the site have been provided as part of this concept SSD Application at Appendix E and Appendix F, respectively.

Pitt Street Station is to be a key station on the future Sydney Metro network, providing access to the Sydney CBD. The proposal combines the metro station with an OSD component. The OSD would assist in strengthening the role of Central Sydney as the key centre of business in Australia and would contribute to the diversity, amenity and sustainability of the CBD.

It is noted that Pitt Street Station northern portal OSD is subject to a separate application, and does not form part of this concept SSD Application.

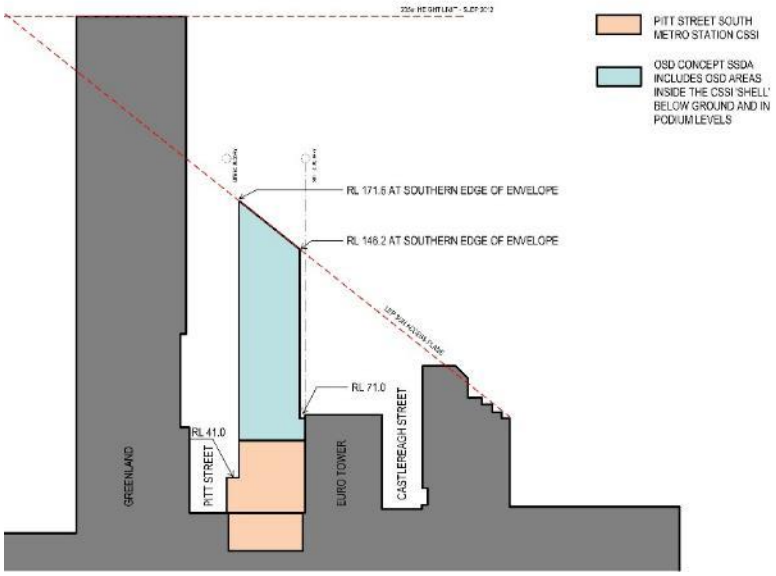


Figure 5: Pitt Street South OSD envelope, including OSD components (Blue) and station box (Orange)

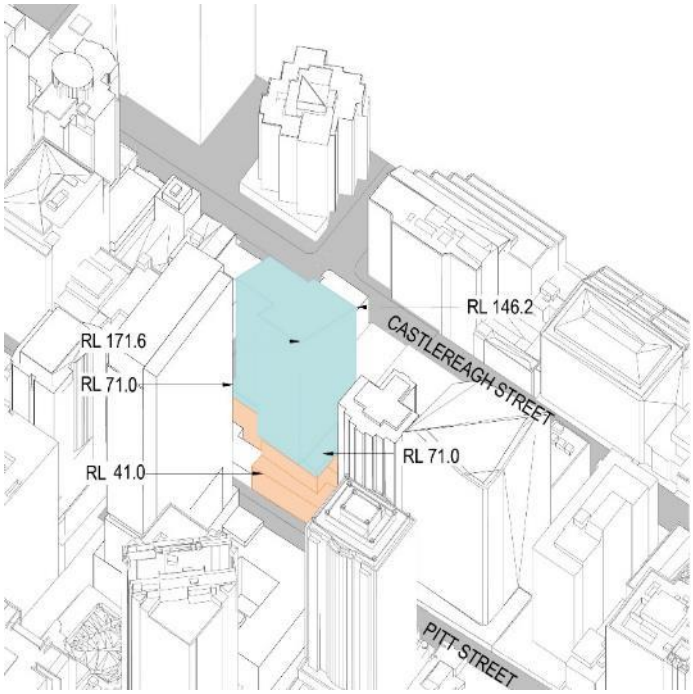


Figure 6: Pitt Street South OSD axonometric diagram, as seen from the south-west

1.6 Staging and framework for managing environmental impacts

Sydney Metro proposes to procure the delivery of the Pitt Street South integrated station development in one single package, which would entail the following works:

- station structure
- station fit-out, including mechanical and electrical
- OSD structure
- OSD fit-out, including mechanical and electrical.

Separate delivery packages are also proposed by Sydney Metro to deliver the excavation of the station boxes/shafts ahead of the integrated station development delivery package, and line-wide systems (e.g. track, power, ventilation) and operational readiness works prior to the Sydney Metro City & Southwest metro system being able to operate.

Three possible staging scenarios have been identified for delivery of the integrated station development:

1. Scenario 1 – the station and OSD are constructed concurrently by constructing the transfer slab first and then building in both directions. Both the station and OSD would be completed in 2024.
2. Scenario 2 – the station is constructed first and ready for operation in 2024. OSD construction may still be incomplete or soon ready to commence after station

construction is completed. This means that some or all OSD construction is likely to still be underway upon opening of the station in 2024.

3. Scenario 3 – the station is constructed first and ready for operation in 2024. The OSD is built at a later stage, with timing yet to be determined. This creates two distinct construction periods for the station and OSD.

Scenario 1 represents Sydney Metro's preferred option as it would provide for completion of the full integrated station development and therefore the optimum public benefit at the site at the earliest date possible (i.e. on or near 2024 when the station is operational). However, given the delivery of the OSD could be influenced by property market forces, Scenarios 2 or 3 could also occur, where there is a lag between completion of the station component of the integrated station development (station open and operational), and a subsequent development.

The final staging for the delivery of the OSD would be resolved as part of the detailed SSD Application(s).

For the purposes of providing a high level assessment of the potential environmental impacts associated with construction, the following have been considered:

- Impacts directly associated with the OSD, the subject of this SSD Application
- Cumulative impacts of the construction of the OSD at the same time as the station works (subject of the CSSI Approval)

Given the integration of the delivery of the Sydney Metro City & Southwest metro station with an OSD development, Sydney Metro proposes the framework detailed in **Figure 7** to manage the design and environmental impacts, consistent with the framework adopted for the CSSI Approval.

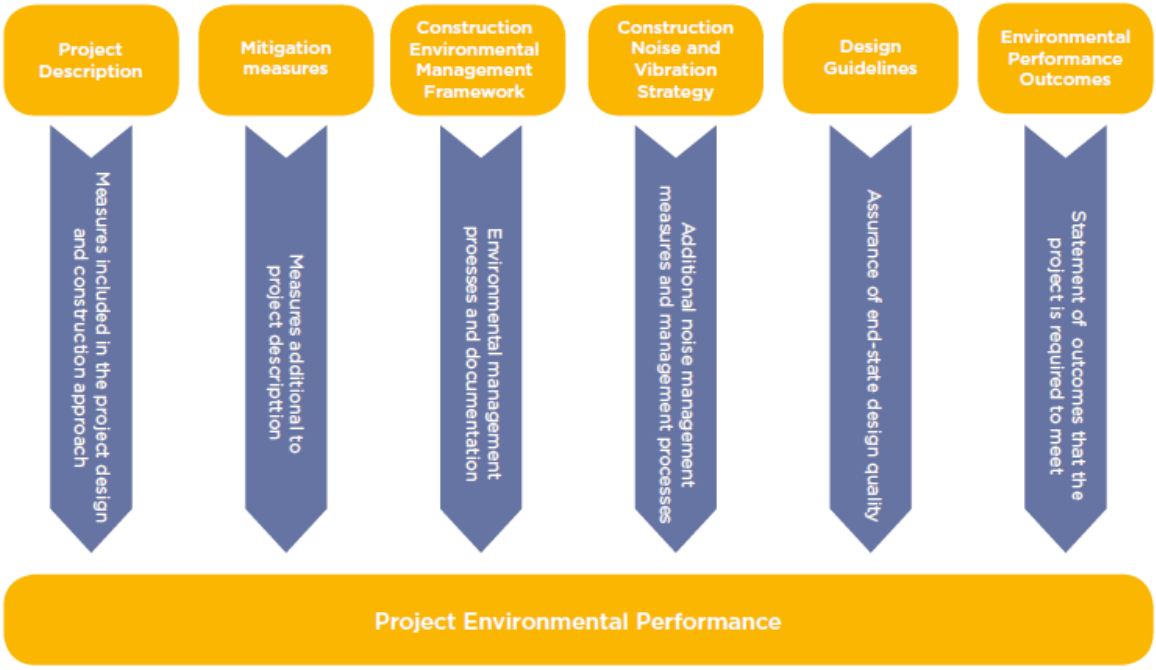


Figure 7: Project approach to environmental mitigation and management

Sydney Metro proposes to implement a similar environmental management framework where the integrated delivery of the CSSI station works and the OSD occur concurrently. This would ensure a consistent approach to management of design interface and construction-related issues.

Sydney Metro proposes this environmental management framework would apply to the OSD until completion of the station and public domain components of the integrated station development delivery contract (i.e. those works under the CSSI Approval). Should the OSD be constructed beyond the practical completion and opening of the station, standard practices for managing construction related environmental impacts would apply in accordance with the relevant guidelines and Conditions of Approval for the detailed SSD Application(s).

1.7 Purpose of the report

GHD has been tasked by Sydney Metro to undertake a transport and traffic impact assessment to support the concept SSD Application for the proposed OSD at Pitt Street South and to address the SEARs (SSD 8876). The proposal includes consideration of options for the construction of a development over the future Pitt Street Metro Station.

- Option 1 – 159 dwelling high-density residential development over 35 storeys; or
- Option 2 – Up to 30 storeys of commercial (office) premises (16,750 m^2 NFA; 19,031 m^2 GFA).

This Traffic and Parking Impact Assessment report discusses the following:

- Existing Conditions – a review of existing road features, surrounding land uses, public and active transport accessibility and crash data;
- Proposed Development Impact – a review of additional traffic generated as a result of the proposed development; and
- Parking Assessment – a preliminary review of the parking provision and layout (suitable for a concept SSD Application) in relation to relevant Australian Standards (AS2890) and Council guidelines.

1.8 Study assumptions and limitations

- This report and assessment for the proposed development has been based upon the *"**Appendix H** Built Form and Urban Design Report"* dated 27 July 18 and produced by GHD Woodhead Pty Ltd;
- Traffic and pedestrian data for this report is based on modelling undertaken by Sydney Metro and detailed in various reports including *"Pitt Street South OSD Modelling Assessment"* memorandum dated 13 December 2017 and "*Pedestrian Modelling Report Pitt Street Station: Stage 1 Design Underground Stations Design & Technical Services"* dated 22 May 2018; and
- The conditions of the surrounding network are based on information from "*Pitt Street South OSD Modelling Assessment", "Pedestrian Modelling Report Pitt Street Station: Stage 1 Design Underground Stations Design & Technical Services"* and Google Maps / Streetview.

1.9 Disclaimer

This report has been prepared by GHD for Sydney Metro and may only be used and relied on for the purpose agreed between GHD and Sydney Metro.

GHD otherwise disclaims responsibility to any person other than Sydney Metro arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Sydney Metro and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

1.10 Report structure

The report is structured as follows:

- Section 2.0 – Existing Conditions;
- Section 3.0 – Proposed Development;
    - Traffic analysis;
    - Pedestrian analysis;
    - Parking analysis; and
- Section 4.0 – Summary and Conclusions.

2.0 Existing conditions

2.1 Existing road network characteristics

This section provides an understanding of the existing road network surrounding the site.

2.1.1 Road hierarchy

Roads are classified (as defined by the Roads Act 1993) based on their importance to the movement of people and goods within NSW (as a primary means of communication).

The classification of a road allows Roads and Maritime Services (RMS) to exercise authority of all or part of the road. Classified roads include Main Roads, State Highways, Tourist Roads, Secondary Roads, Tollways, Freeways and Transit ways.

To manage the extensive network of roads for which council is responsible under the Roads Act 1993, RMS in partnership with local governments established an administrative framework of State, Regional and Local Road categories.

State Roads are managed and financed by RMS whilst Regional and Local Roads are managed and financed by councils. Regional Roads perform an intermediate function between the main arterial network of State Roads and council controlled Local Roads. Due to their network significance, RMS provides financial assistance to councils for the management of their Regional Roads. The Regional Road category comprises two sub-categories: those Regional Roads that are classified pursuant to the Roads Act 1993, and those Regional Roads that are unclassified.

A summary of the key roads in proximity to the subject site is provided below.

2.1.2 Pitt Street

Pitt Street is a local road in a north-south orientation and links Liverpool Street south of the site to Bathurst Street that runs adjacent to the northern site boundary.

Within the vicinity of the site, Pitt Street has the following characteristics:

- Typically, three trafficable lanes providing one-way northbound vehicular access;
- No Parking and Coach parking restrictions along the eastern kerb;
- Period parking, loading and mail zones along eastern kerb;
- 40 km/h (high pedestrian activity) speed zone (throughout the Sydney CBD); and
- Formalised paved pedestrian footpaths adjacent to property lines.

Figure 8 Pitt Street (looking south)

2.1.3 Bathurst Street

Bathurst Street is a regional road in an east-west orientation and links George Street west of the site to Elizabeth Street east of the site.

Within the vicinity of the site, Bathurst Street has the following characteristics:

- Typically, three trafficable lanes providing one-way eastbound vehicular access;
- Loading Zone restriction along the southern kerb;
- Period parking and loading zone along northern kerb;
- 40 km/h (high pedestrian activity) speed zone (throughout the Sydney CBD); and
- Formalised paved pedestrian footpaths adjacent to property lines.

Figure 9 Bathurst Street (looking west)

2.1.4 Castlereagh Street

Castlereagh Street is a local road in a north-south orientation and links Liverpool Street south of the site to Bathurst Street that runs adjacent to the northern site boundary.

Within the vicinity of the site, Castlereagh Street has the following characteristics:

- One trafficable lane providing one-way southbound vehicular access and designated Bus Lane;
- Fire Truck Lane along the eastern kerb (which converts to period parking restriction south of the site);
- No Parking restriction on the western kerb (which converts to period parking restriction south of the site);
- 40 km/h (high pedestrian activity) speed zone (throughout the Sydney CBD); and
- Formalised paved pedestrian footpaths adjacent to property lines.

Figure 10 Castlereagh Street (looking south)

2.1.5 Liverpool Street

Liverpool Street is a local road in an east-west orientation and links George Street west of the site to Elizabeth east of the site.

Within the vicinity of the site, Liverpool Street has the following characteristics:

- Typically, two trafficable lanes providing one-way westbound vehicular access;
- Period parking and Loading Zone restrictions along the southern kerb with No Stopping during peak hours (providing a third traffic lane);
- Two way separated cycle path along northern kerb;
- 40 km/h (high pedestrian activity) speed zone (throughout the Sydney CBD);
- Formalised paved pedestrian footpaths adjacent to property lines.

Figure 11 Liverpool Street (looking east)

2.2 Existing site characteristics

Demolition at the site has commenced for the CSSI Approved project and as such, the site currently does not contain any commercial or operational facilities. Prior to its closure, the site consisted of a hotel and ground floor retail components. The hotel consisted of 136 rooms with storage for up to 9 bicycles and an associated office/reception area. Additionally there was a ground floor café/restaurant that supported the hotel. There were no designated off street drop off/pick up facilities, with all operations associated with the hotel occurring from the adjoining road network on Pitt Street via a “No Parking” restriction along the eastern kerb.

The RMS *Guide to Traffic Generating Developments* outlines that such a facility could generate 3 daily trips per unit and an evening peak of 0.4 trips per unit (based on 100% occupancy). When comparing these rates to the pre-existing site conditions, the

development could have generated approximately 408 vessel trips daily and 55 peak hour trips.

2.3 Movement and place

Movement and place is a relatively new approach to planning and design which recognises that streets are an integral component to the liveability of urban centres, rather than just a way to facilitate the movement of vehicles.

Streets enable the through movement of a variety of transport modes. The key requirement for movement is to provide a linear path that enables connection between destinations.

A street can also be a place and a destination where activities occur and people choose to spend time. As a place, a street is characterised by high volumes of pedestrian activity associated with shopping, socialising and working. Places can be adversely impacted by noise, air pollution and the general severance associated with vehicle activity. A hierarchy matrix is in **Figure 12** and a description of the road network functions outlined in

Table 1**.**

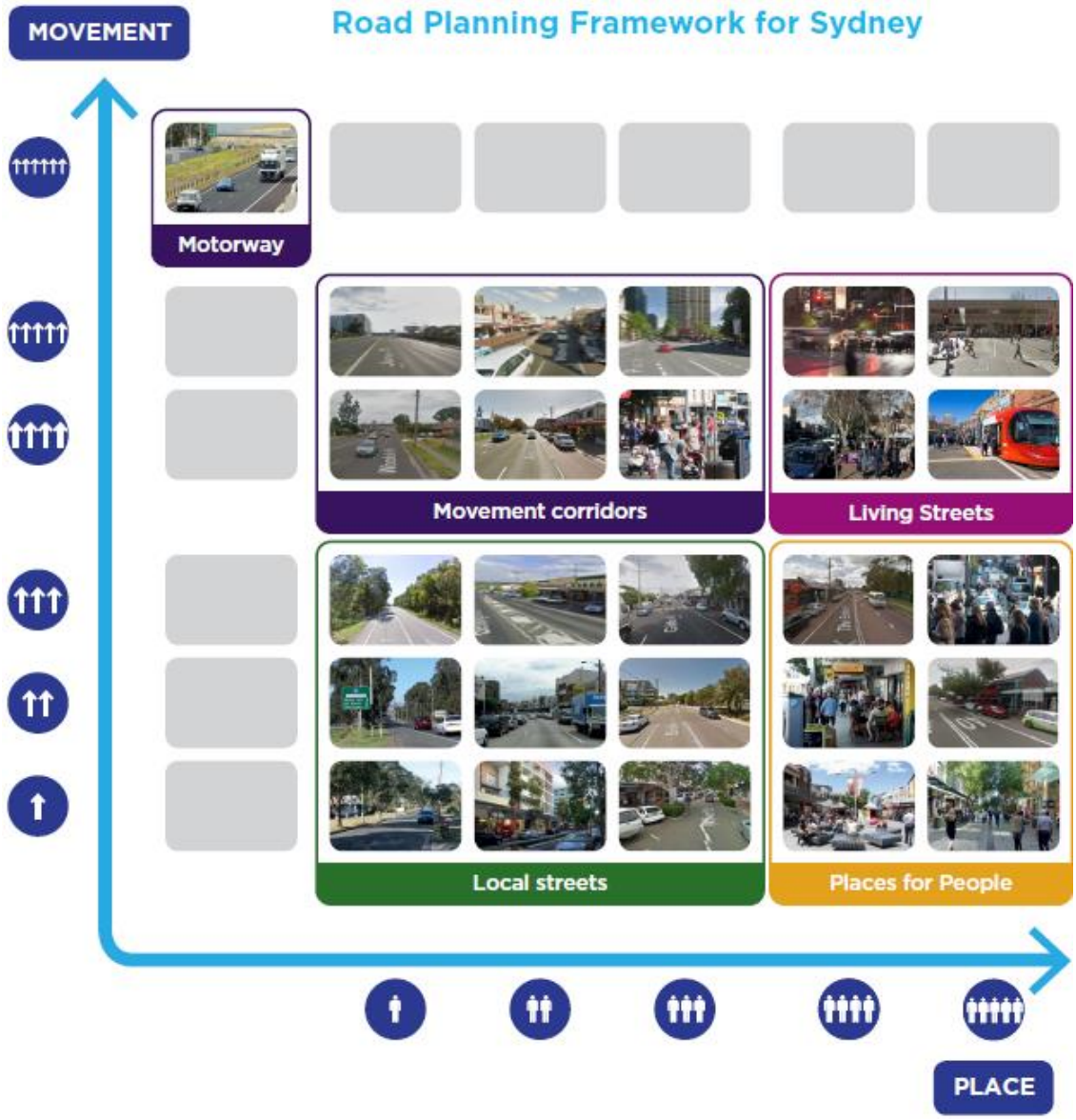


Figure 12 ***Movement and place hierarchy***
Source: Transport for NSW Road Planning Framework (2017)

Table 1 Road network functions

Classification	Description
Motorways	Motorways are **strategically significant** roads that move people and goods over long distances.
Movement corridors	Movement corridors are main roads providing safe, reliable and efficient **movement** between regional centres and within urban areas.
Living streets	Living streets combine high demand for movement and high pedestrian activity with a need to **balance different demands** within often limited road space within urban and regional areas.

Classification	Description
Places for people	Places for people are streets combine high demand for pedestrian activity and lower levels of vehicle movement when compared to living streets. They create places people enjoy, attract visitors and are **places communities value**.
Local streets	Local streets are part of the **fabric of the suburban neighbourhoods** where we live our lives and facilitate local community access.

Source: Transport for NSW Road Planning Framework (2017)

A movement and place review based upon this framework and reference *to Parramatta Road Urban Transformation Planning and Design Guidelines Movement and Place Framework* has been undertaken for Pitt Street and Bathurst Street. These locations have been chosen for inclusion in the movement and place analysis as they provide the preliminary "place" functionality within the vicinity of the site i.e. streets that operate as destinations in their own right, where retail and recreational land uses facilitate an environment where people chose to spend time.

Table 2 Pitt Street and Bathurst Street Movement and Place characteristics

Characteristic	Pitt Street	Bathurst Street
Trip Type	A mix of through and destination trips, although primarily destination within the CBD.	A mix of through and destination trips, although primarily destination within the CBD.
	Places for People	*Places for People*
Speed Limit	40 km/h (High Pedestrian Activity Area)	40 km/h (High Pedestrian Activity Area)
	Places for People	*Places for People*
Intersection Treatment	Signals intersections incorporating pedestrian phases.	Signals intersections incorporating pedestrian phases.
	Places for People	*Places for People*
Clearways / Stopping Zones	No Stopping zones on approach to intersections with taxi pick up exemptions	No Stopping zones on approach to intersections with taxi pick up exemptions
	Places for People	*Places for People*
Kerbside Parking	A mix of No Parking, period parking, loading and mail zones.	A mix of period parking and loading zones.
	Places for People	*Places for People*
Pedestrian Activity	Standard or wider footpath widths with wider footpaths in High Pedestrian Activity Area.	Standard or wider footpath widths with wider footpaths in High Pedestrian Activity Area.
	Places for People	*Places for People*
Cycling Provision	Generally on road providing separation to pedestrians, with the provision of cycle parking infrastructure.	Generally on road providing separation to pedestrians, with the provision of cycle parking infrastructure.
	Places for People	*Places for People*
	Active retail and commercial frontages with restrictions to vehicles to access	Active retail and commercial frontages with restrictions to vehicles to access

Characteristic	Pitt Street	Bathurst Street
Land Use Interface	properties minimising conflicts with pedestrians	properties minimising conflicts with pedestrians.
	Places for People	*Places for People*
Movement Significance		
Place Significance		
Movement / Place type	*Places for People*	*Places for People*

Based upon the framework, both Pitt Street and Bathurst Street function as a vibrant street in the CBD context that require the movement of vehicles and pedestrians, in addition to providing amenity to support retail, commercial and residential facilities.

2.4 Crash data

Crash data has been obtained from Transport for NSW Centre for Road Safety website for the last five years (2013 - 2017) within the vicinity of the site at:

- Pitt Street between (Bathurst and Liverpool Streets);
- Castlereagh Street between (Bathurst and Liverpool Streets);
- Bathurst Street (between Pitt and Castlereagh Street); and
- Liverpool Street (between Pitt Street and Castlereagh Street).

The crash data study area is shown in **Figure 13**, with a summary of the five-year crash data resulting in injuries summarised in

Table 3**.**

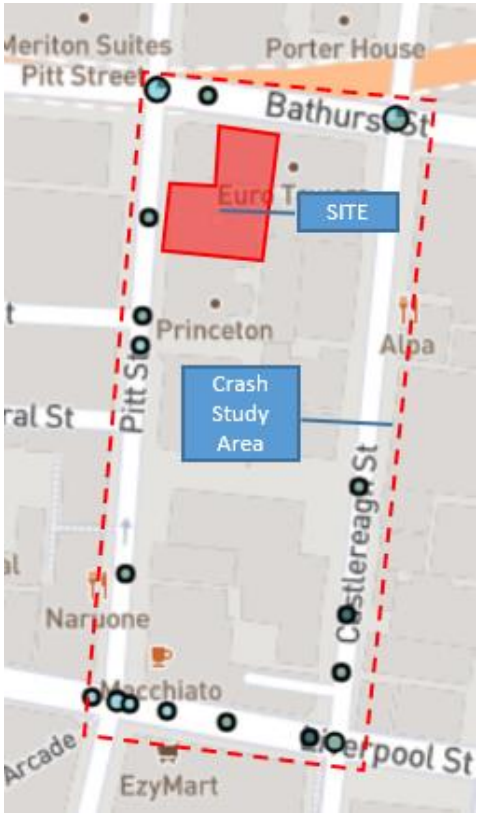


Figure 13 Crash data study area
Source: Transport for NSW Centre for Road Safety website

Table 3 Summary of injury crash data (2013-2017)

Location	Number of injuries			
	Fatal	Serious / Moderate Injury	Minor Injury	Total
Pitt Street between (Bathurst and Liverpool Streets)	0	5	10	15
Castlereagh Street between (Bathurst and Liverpool Streets)	0	10	2	12
Bathurst Street (between Pitt and Castlereagh Street)	0	1	0	1
Liverpool Street (between Pitt Street and Castlereagh Street)	0	1	1	2
Total	**0**	**17**	**13**	**30**

A summary of the predominant crash types recorded at the intersections of Bathurst Street with both Pitt and Castlereagh Streets are shown in

Table 4 The crash data indicates that the most common crash types at these intersections are:

- Crossing traffic while turning at intersections; and
- Rear end type crashes.

Table 4 Predominant crash types at intersections (2013-2017)

Intersection	Predominant crash type	RUM Code	Number of Crashes
Pitt Street / Bathurst Street	Vehicles from adjacent direction	10	1
	Vehicles from same direction	30	1
	Vehicles off path on straight	79	1
	Pedestrian near side	00	1
Castlereagh Street / Bathurst Street	Vehicles from adjacent direction	10	4

2.4.1 Crashes involving pedestrians

A separate review was undertaken in the study area to identify crashes involving pedestrians resulting in injuries between 2013 – 2017.

A summary of the five-year crash data resulting in injuries to pedestrians are summarised in **Table 5**.

Table 5 Summary of crash data involving pedestrians (2013-2017)

Location	Number of crashes			
	Fatal	Serious / Moderate Injury	Minor Injury	Total
Pitt Street between (Bathurst and Liverpool Streets)	0	4	3	7
Castlereagh Street between (Bathurst and Liverpool Streets)	0	6	0	6
Bathurst Street (between Pitt and Castlereagh Street)	0	0	0	0

Liverpool Street (between Pitt and Castlereagh Street)	0	0	0	0
Total	**0**	**14**	**2**	**16**

The crash data indicates that the most common crash type involving pedestrians were located at the intersections.

2.5 Public, active and alternate transport

In reviewing the site and its accessibility to public transport opportunity, reference is made to the *NSW Planning Guidelines for Walking and Cycling* (2004). This document outlines a recommended walkable distance of 400 m to 800 m to public transport and other local amenities or a 1.5 km cycle distance. Details of the accessibility to public transport opportunities are outlined below.

2.5.1 Bus services

The site is located within close proximity (200 m to 300 m) of major bus services servicing the Sydney CBD and surrounding suburbs on Castlereagh Street and Elizabeth Street as shown in **Figure 14**. These bus stops are well serviced at regular intervals during both peak and off-peak periods.

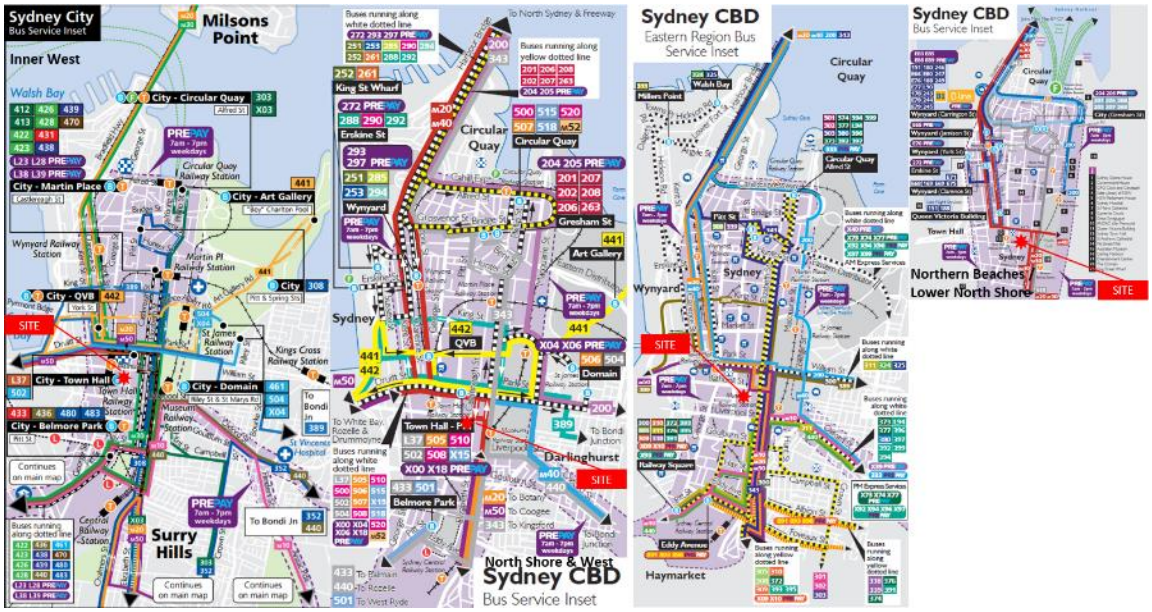


Figure 14 Bus routes and connecting train stations
Source: Transport for NSW – Modified by GHD

2.5.2 Train services

The site is located within proximity of two train stations that service the inner and outer Sydney metropolitan areas. Both stations are located on the city circle line providing a link to

other connecting train, bus and ferry services as shown in **Figure 14**. Train services run at regular intervals through the Sydney CBD.

2.5.2.1 Town Hall Train Station

Town Hall Station is located 200 m west of the site as shown in **Figure 15**. Town Hall station provides interchange between:

- T1 North Shore, Northern and Western Line;
- T2 Inner West and Leppington Line;
- T3 Bankstown Line;
- T4 Eastern suburbs and Illawarra Line; and
- T8 Airport and South Line.

2.5.2.2 Museum Train Station

Museum Station is located 400 m south-east of the site as shown in **Figure 15**. Town Hall station provides interchange between:

- T2 Inner West and Leppington Line;
- T3 Bankstown Line; and
- T8 Airport and South Line.

Figure 15 Sydney train network
Source: Transport for NSW – Modified by GHD

2.5.3 Ferry services

Circular Quay is located 1.5 km north of the site and can be accessed by the Sydney train network or buses. Although it is not anticipated to be within the desirable walking distance of the site, Circular Quay is with desirable cycling distance and also provides opportunity alternate multi-model transport options to other areas within the transport network.

Circular Quay is served by the entire Sydney Ferry network from Manly in the north, Watsons Bay in the east to Parramatta in the west of Sydney.

2.5.4 Bicycle riding

Figure 16 illustrates the current bicycle facilities within proximity of the site as outlined in RMS Cycleway Finder website. The website indicates that there are currently both on and off road bike paths/routes within proximity of the site.

City of Sydney is proactive in implementing future bicycle facilities and currently provides on-street bicycle racks to secure bicycles throughout the Sydney CBD. Within the immediate

proximity of the subject site, there is a total of four bicycle racks to house up to eight bicycle parking spaces. In addition, there is the emerging use of the dockless bike share schemes that are currently available throughout the Sydney CBD and surrounding suburbs.

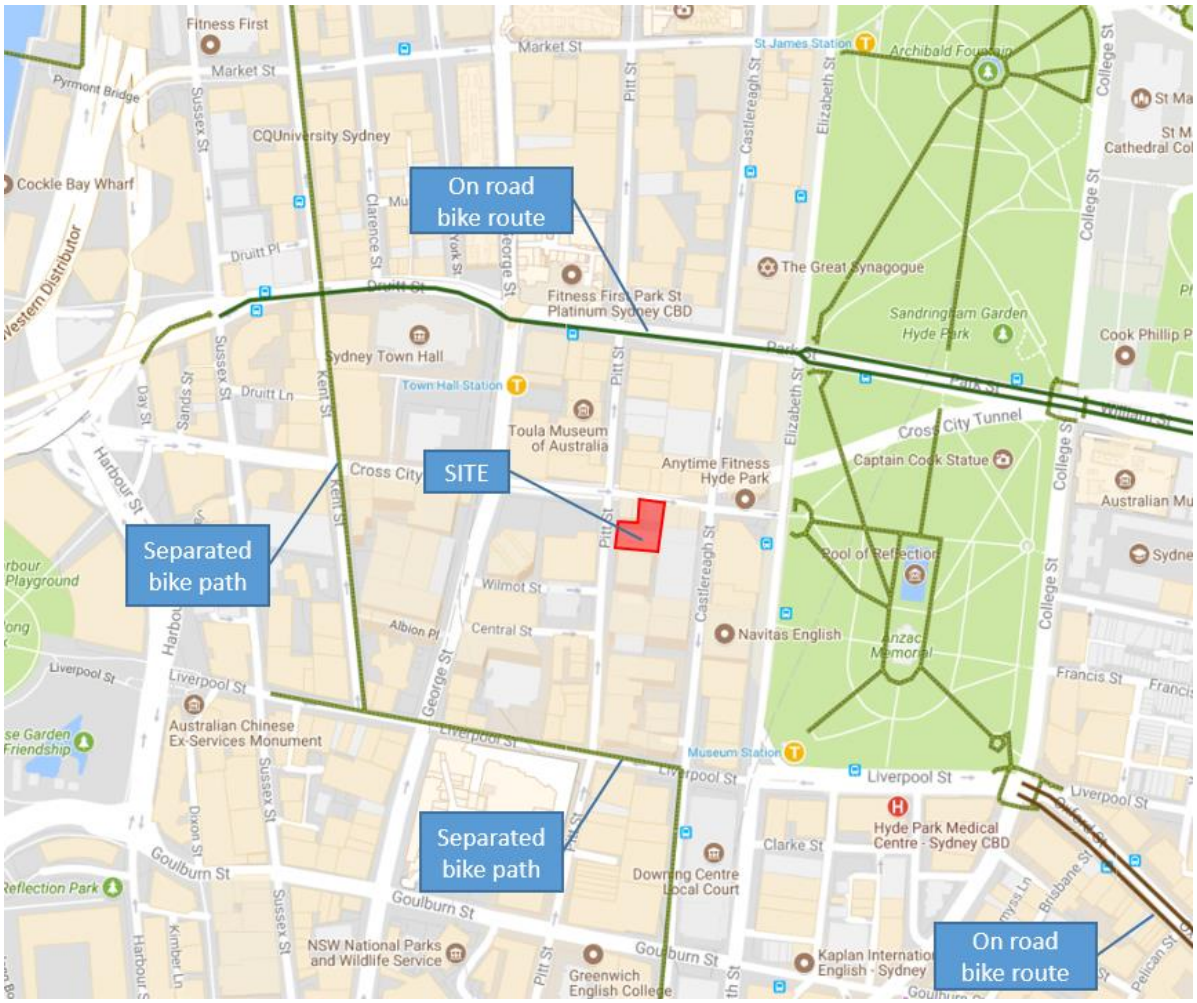


Figure 16 Sydney bike network and on-street parking facilities
Source: Roads and Maritime Services Cycleway Finder and City of Sydney Bicycle Parking Map– Modified by GHD

2.5.5 Walking access

The pedestrian network is well developed, with formed paved footpaths provided on both sides of all roads in the vicinity of the subject site. As with most pedestrian footpaths within the Sydney CBD, high levels of pedestrian activity occurs on the site street frontage of Bathurst, Pitt and Castlereagh Streets. Pedestrian crossing facilities are provided within the signal phasing on all approach arms at the intersections of Bathurst Street with Castlereagh and Pitt Streets. Existing pedestrian activity at these intersections is summarised in **Table 6**, based on the Sydney Metro Report "*Pitt Street South OSD Modelling Assessment*" dated 13 December 2017.

Table 6 Existing pedestrian flows at key intersection crossings

Peak	Approach	Pedestrian Volumes (peds / hr)	
		Bathurst / Pitt Streets	Bathurst / Castlereagh Street
AM	North	1046	1089
	South	1653	1742
	East	1149	1283
	West	1294	999
	Total	***5142***	***5113***
PM	North	1095	1408
	South	1697	2836
	East	1380	1745
	West	1664	2082
	Total	***5836***	***8071***

Source: Sydney Metro Report (December 2017) for "Pitt Street South OSD Modelling Assessment".

2.5.6 Car share

City of Sydney supports car sharing because it is sustainable, practical and popular with city business owners and residents. Almost 31,000 residents and businesses have joined one of the three car share schemes that operate in Sydney[1]. Car share is an efficient use of parking space, with a single car share vehicle replacing up to 12 private vehicles that would otherwise compete for local parking[2].

The increase in car sharing is to support the following objectives:

- Use street parking more efficiently;
- Reduce greenhouse emissions;
- Support the economy;
- Reduce congestion; and
- Slow growth in private vehicle ownership.

[1] *City of Sydney website – Car Share*

[2] *City of Sydney website – Car Share*

It is noted that there are currently three existing car share pods located within 300 m to 550 m walking distance from the site as shown in **Figure 17,** providing the opportunity for the residents of the proposed OSDto utilise this alternative transport option.

Car share pods within the CBD are generally located off-street within parking stations.

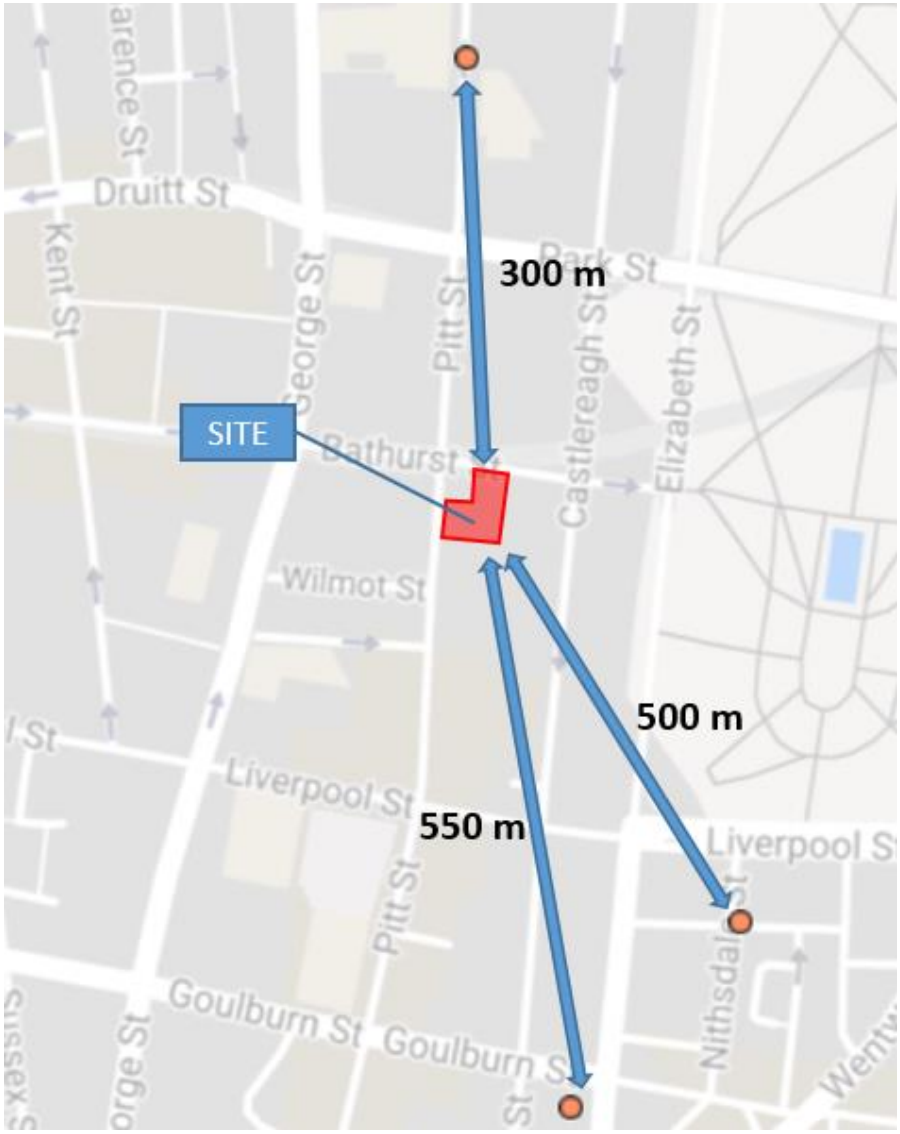


Figure 17 Car share locations
Source: City of Sydney website – Car Share – Modified by GHD

2.5.7 Existing public, active and alternate transport accessibility summary

The bus, train and ferry services operating in proximity to the proposed development provide access to multi-mode transport opportunities to access the majority of Greater Sydney and its key population and economic centres.

In reviewing the site and its accessibility to public transport, reference was made to the *NSW Planning Guidelines for Walking and Cycling* (2004). This document outlines a

recommended walkable distance of 400 m to 800 m to public transport and other local amenities or a 1.5 km cycle distance.

In accordance with its central location within the Sydney CBD, the subject site is extremely well served by public transport and is in line with the *NSW Planning Guidelines for Walking and Cycling* (2004).

Additionally, car share facilities were located within walking distance providing opportunity for residents of the proposed development to utilise this alternative transport option.

2.5.8 Future Public Transport Services

2.5.8.1 Light Rail

The Sydney Light Rail is currently under construction and will run from Circular Quay to the eastern suburbs of Randwick and Kingsford via Haymarket, Surry Hills and the University of NSW. It is intended to operate as a “turn up and go” service with frequencies of (approximately) a vehicle every four minutes during peak periods of activity.

A light rail stop will be provided on George Street at Town Hall approximately 200 m to the west of the subject site.

2.5.8.2 Sydney Metro

The Sydney Metro is currently under construction and has two core components:

Sydney Metro Northwest – will comprise eight new stations and a 23 km line. The line will run between Epping and Rouse Hill and upon completion will connect to Chatswood Station and Sydney’s wider metropolitan rail network. Sydney Metro Northwest is expected to commence operation in 2019.

Sydney Metro City and Southwest - will extend from Chatswood Station to new CBD Stations through to Bankstown Station. It will consist of seven new stations, new underground platforms at Central and the upgrading of 11 stations to Metro standards. Sydney Metro City and Southwest is expected to commence operation in 2024.

The metro will have service frequencies of a vehicle (approximately) every two minutes during peak periods and will increase the capacity of trains entering the CBD from 120 per hour to 200 per hour.

The closest station to the site will be the new Pitt Street Metro Station, of which the OSD forms part of the integrated station development..

It is expected that these public transport services will offer significant utility to the residents of the proposed OSD.

3.0 Proposed development

This section outlines the proposed concept development and summarises the traffic and parking impact analysis of the concept proposal.

3.1 Overview of proposed development

The proposed OSD is to consist of either of the following two options located over the Pitt Street Metro Station:

- Option 1 – 159 dwellings high-density residential development over 30 storeys; or
- Option 2 – Up to 30 storeys of commercial (office) premises (16,750 m2 NFA – 19,031 m^2 GFA).

Access to the OSD will be via Pitt Street for residents, visitors, service vehicles and private vehicles, with pedestrian access to the Metro Station via Bathurst Street.

The key features of the concept proposal to be included are outlined in **Table 7**.

Table 7 Land uses in the proposed development

Option 1	
Land use	Provision
Residential dwellings	**159 residential apartments comprising:** 33 studio apartments 33 one-bed apartments 83 two-bed apartments 10 three-bed apartments
Car parking	34 spaces (including one trade parking space and one Metro operational parking space)
Bicycle parking	Communal parking area to store approximately 175 bicycles. Individual storage cage for each residential dwelling that could facilitate the storage of bicycles.
Service vehicles	Two spaces to facilitate small rigid vehicle up to 6.4 m in length located on the ground floor. Mechanical turntable to accommodate waste collection vehicle up to 9.5 m in length. One trade parking space (within the car parking area) for the use of maintenance vehicle (ute/van).
Option 2	

Land use	Provision
Commercial (office)	**Total Commercial (office) NFA = 16,750 m^2.(19,031 m^2 GFA)**
Car parking	11 spaces (including one trade parking space and one Metro operational parking space)
Bicycle parking	Communal parking area estimated to store bicycles over levels 2, 4, 7.
Service vehicles	2 spaces to facilitate small rigid vehicle up to 6.4 m in length on ground floor. Mechanical turntable to accommodate waste collection vehicle up to 9.5 m in length. Potential loading area for up to four x Medium Rigid Vehicles (8.8 m in length) accessed via truck lift and mechanical turntable within level 2. One trade parking space (within the car parking area) for the use of maintenance vehicle (ute/van).

3.2 Mode share analysis

Reference is made to Sydney Metro Report "*Pitt Street South OSD Modelling Assessment*" dated 13 December 2017. This memorandum reviewed the potential mode share split of the OSD based on existing journey to work data obtained for Town Hall Station area that contains 668 residents. An adjustment of 10% car trips transferred to Metro trips to reflect the proximity of the OSD to the proposed Metro station was assumed (over and above the current heavy rail trends).

A summary of the anticipated mode share split determined by Sydney Metro Report (December 2017) is outlined in **Table 8**.

It was identified that with the adjustment of potential occupancy of the OSD (refer to **Table 14**) and alignment with the potential trip generation of 34 vehicle movements (refer Section 3.3.1), the estimated private car use (car driver/passenger) were required to be adjusted. Due to the close proximity of the Metro station and its future network extent, it is estimated that these occupants be transferred to Metro trips.

Table 8 Mode share split

Mode	Work Destination (Adopted for Residential OSD)		
	Existing Town Hall	Assumed Pitt Street OSD (*Sydney Metro Report (December 2017)*)	Assumed Pitt Street OSD *(Adjusted)**
Car Driver	11 %	10 %	8 %
Train Metro	54 %	55 %	58 %
Walked	5 %	5 %	5 %
Bus	22 %	22 %	22 %
Car Passenger	2 %	2 %	2 %
Other	4 %	4 %	4 %
Not Stated	1 %	1 %	1 %

*Source: Pitt Street South OSD Modelling Assessment" dated 13 December 2017 (*Modified by GHD)*

The analysis indicates that it is anticipated that in excess of 50 % of residents would utilise the Train/Metro to travel to work, particularly because of its proximity to such services, when compared to car driver use of up to 10%, which is comparable as a result of the minimised parking provision on site to encourage the alternate transport options.

It is assumed that a similar transport mode share split could be applied for a commercial facility due to its proximity to the alternate public transport services and limited car parking provisions within the concept proposal.

3.3 Traffic impact analysis

3.3.1 Traffic generation

Reference is made to the Sydney Metro Report "*Pitt Street South OSD Modelling Assessment*" (December 2017). This modelling assessment was undertaken to assess the intersection performance of the road network under 2036 AM and PM peak conditions with consideration to the OSD and Pitt Street Metro Station.

This assessment was based on the assumption of 307 residential dwellings and 34 car spaces within OSD. While it is noted that the current concept SSD Application is proposed to consist of 159 dwellings or 19,031 m2 GFA of commercial (office), the Sydney Metro Report (December 2017) traffic analysis was based on parking provision, which remains unchanged in the concept SSD Application, that is 34 spaces for the residential development option and a reduction to 11 spaces for the commercial development option. Therefore the findings outlined in the Sydney Metro Report (December 2017) would correspond with the current SSD Application, or in the case of the commercial (office) option, generate less traffic movement as the car parking provision is reduced.

The Sydney Metro (December 2017) analysis was based on a trip generation of one trip for each car space during each peak hour period (i.e. **34 trips per peak hour**). This traffic generation exceeds the RMS Technical Direction *TD 2013/4a Guide to Traffic Generating Developments: Updated Surveys* which outlines that traffic generation of between 0.09-0.29 trips in the AM peak and 0.05-0.28 trips in the PM peak period per car space for high-density residential dwellings. Based on the RMS trip generation rates, the residential development option would generate up to 10 vehicle trips during the pear hour (0.29 x 34 spaces).

Due to the limited car park provision of 11 spaces in the commercial (office) development option (which would likely be allocated to specific workers), the Sydney Metro (December 2017) analysis assessment undertaken was a worst-case scenario for both development options.

The Sydney Metro Report (December 2017) outlined that this potential traffic generation would increase traffic movements through nearby key intersections by between 0 to 1.1%. A SIDRA intersection analysis was also completed as summarised in Section 3.3.2.

3.3.2 Intersection performance

The performance of the road network is largely dependent on the operating performance of key intersections, which are critical capacity control points on the road network. SIDRA intersection modelling software was used by Sydney Metro (December 2017) assessment to evaluate the proposed peak hour operating performance of intersections on the surrounding road network. The criteria for evaluating the operational performance of intersections is provided by the *Guide to Traffic Generating Developments* (RMS, 2002) and reproduced in **Table 9**. The criteria for evaluating the operational performance of intersections is based on a qualitative measure (i.e. Level of Service), which is applied to each band of average vehicle delay.

Table 9 Level of service criteria for intersections

Level of Service	Average Delay per Vehicle (seconds/veh)	Traffic Signals, Roundabouts	Give Way & Stop Signs
A	< 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays Roundabouts require other control modes	At capacity, requires other control mode
F	> 70	Over Capacity Unstable operation	Over Capacity Unstable operation

Source: Guide to Traffic Generating Developments (Roads and Maritime Services 2002)

The Sydney Metro (December 2017) traffic analysis included assessment of eight intersections within proximity of the site and compared the performance of intersections in the following scenarios:

- 2016 AM and PM peak – Existing;
- 2036 AM and PM peak – No background growth (with and without OSD); and
- 2036 AM and PM peak – Sensitivity analysis with 15% traffic growth (with and without OSD).

Table 10 outlines the Sydney Metro Report (December 2017) intersection performances analysis of results.

Table 10 Intersection performances

Intersection	Existing		2036 No background growth				2036 Incl. 15% background growth			
	AM Peak	PM Peak	AM Peak		PM Peak		AM Peak		PM Peak	
			Without OSD	With OSD	Without OSD	With OSD	Without OSD	With OSD	Without OSD	With OSD
George St / Park St	A	A	A	A	A	A	A	A	A	A
Pitt St / Park St	B	A	B	B	A	A	B	B	A	A
Castlereagh St / Park St	B	B	B	B	B	B	B	B	B	B
Elizabeth St / Park St	C	C	C	C	D	D	D	D	F	F
George St / Bathurst St	B	C	B	B	C	C	B	B	C	C
Pitt St / Bathurst St	A	A	A	A	A	A	A	A	A	A
Castlereagh St / Bathurst St	B	A	B	B	A	A	A	A	A	A
Elizabeth St / Bathurst St	B	C	C	C	C	C	C	C	C	C
George St / Park St	n/a	n/a	A	A	A	A	n/a	n/a	n/a	n/a

Source: Pitt Street South OSD Modelling Assessment" dated 13 December 2017

The analysis completed by Sydney Metro (December 2017) indicates that increase in traffic as a result of the OSD and Metro does not have a significant impact on the intersection performance of the surrounding road network. However, a sensitivity analysis was undertaken by applying a 15 % background growth which impacted the performance of the intersection of Elizabeth Street and Park Street, with the PM peak Level of Service recorded as "F".

The report concluded that despite the background traffic growth sensitivity analysis indicating delays, particularity at the Elizabeth Street and Park Street intersection, the modelling showed relatively minor variations in the level of service due to the OSD traffic and will not have a significant impact on the surrounding road network.

Given the traffic generation is limited by the proposed parking provision, both development options of either the 159 residential dwellings or 19,031 m^2 GFA of commercial (office) is expected to create relatively minor variations in the level of service and will not have a significant impact on the surrounding road network.

3.4 Parking analysis

3.4.1 Car parking

The parking provision for the concept OSD has been established with reference to the requirements presented in Sydney Local Environmental Plan (LEP) 2012. A development consent must not be granted to developments if the total number of car spaces provided on the site is greater than the maximum set out in the LEP.

The LEP reference to Land Use and Transportation Integration maps and Public Transport Accessibility maps h sets out categories for land use and transportation and assigns maximum parking provision for developments.

The subject site is located in the following category:

- Land Use and Transportation Integration (LUTI): Category A.
- Public Transport Accessibility Level (PTAL): Category D.

Based on the above category, **Table 11** outlines the maximum parking rates that are applicable to the proposed OSD.

Table 11 Maximum car parking rates

Land use	Maximum parking rate
Residential Multi-Dwelling Housing	Residential Parking (LEP 2012): • for each studio dwelling—0.1 spaces, and • for each 1 bedroom dwelling—0.3 spaces, and • for each 2 bedroom dwelling—0.7 spaces, and • for each 3 or more bedroom dwelling—1 space, and Accessible Parking (DCP 2012; Schedule 7.8.5): • 1 accessible space for each accessible dwelling.
Commercial (office)	• 1 space per 175 m^2 of GFA

In accordance with these rates the proposed development requires a **maximum** of 81 parking bays for the residential option and 93 spaces for the commercial (office) option.

The concept SSD Application outlines the provision of 34 spaces including (three accessible spaces) for the residential development option and 11 spaces (including one accessible space) for the commercial development option. As the OSD is proposed to be constructed above the completed Pitt Street Metro Station, it has great accessibility to alternate transport means. The provision of proposed on-site parking spaces is consistent with the permissible maximum parking rates in the LEP.

A preliminary review (suitable for a concept SSD Application) of the car parking has been undertaken using *AS2890.1 – Off Street Car Parking*. Table 1.1 of AS2890.1 presents a

number of car park classifications applicable to different land-uses. According to the Table, the car park will comprise a Class 1A facility, which is suitable for the use of residential dwellings and employee parking. The parking space dimensions and associated aisle widths for a Class 1A facility classification are presented in AS2890.1: Table 2.2 include:

- Spaces: 2.4 m x 5.4 m; and
- Aisle Width: 5.8 m

A review of the architectural plans indicates the parking area provides parking spaces with dimensions of 2.6 m x 5.4 m and aisle width of 6.3 m to meet the requirements of AS2890.1. It has been identified that the proposed column locations encroach on the parking design envelope outlined in AS2890.1 for one side of the parking space splay as illustrated in **Figure 18.** The location of such columns may marginally affect some vehicles accessing the adjoining space. However, when considering the additional aisle and parking space width, slow moving vehicles and anticipated low turnover of private vehicles, it is considered the columns are not a significant constraint for car space access and may only require some additional turning movement for larger private vehicles to enter or exit the car spaces. However, the future design should consider an adjustment to avoid encroachment of the parking design envelope.

The car park design complies with Section 2.2 of *AS2890.6 – Off-street parking for people with disabilities*. This requires parking space with dimensions of 2.4 m x 5.4 m, with an access aisle width of 5.8 m and a shared area of 2.4 m x 5.4 m between spaces. The proposed car park design exceeds the minimum requirements with an accessible car space layout of 2.6 m x 5.4 m. Provision of a bollard in the shared spaces should be incorporated during the detailed design process.

The future building design will need to incorporate a minimum height clearance of 2.2 m throughout the car parking areas with increase height clearance to 2.5 m over accessible spaces and associated shared area in line with AS2890.1 and AS2890.6.

Vehicle turn path plans have been provided in **Appendix B** outlining the vehicle clearance provided and access to the vehicle lifts.

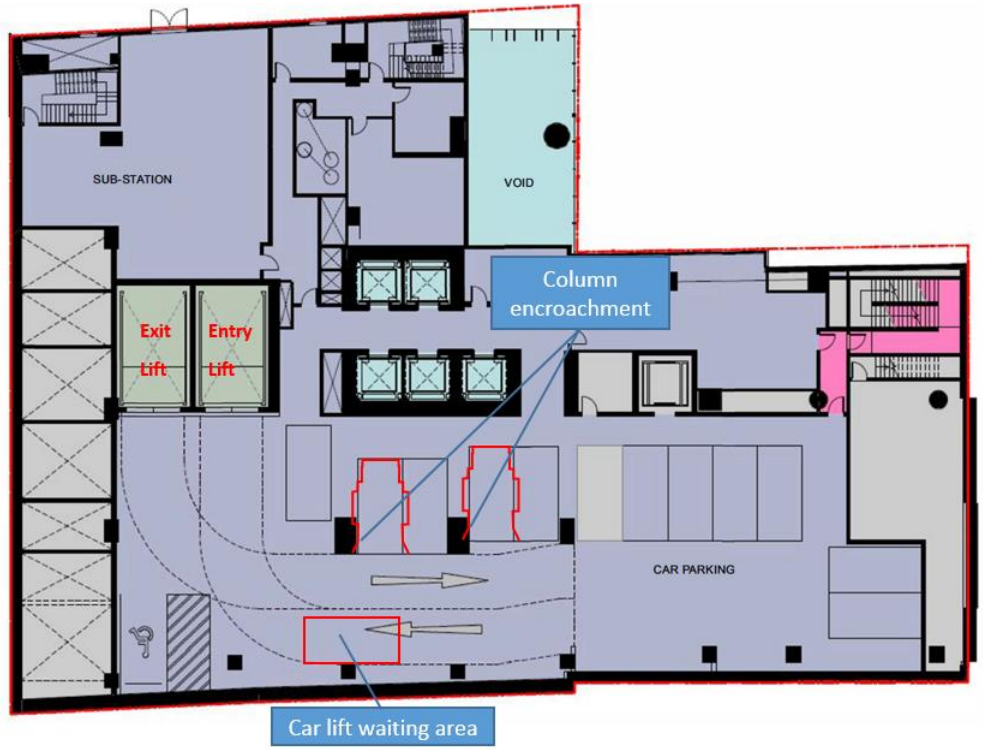


Figure 18 Car space design envelope and car lift waiting area

3.4.2 Car/truck lift access

For the residential development option, two car lifts have been provided which could typically be utilised as one lift for entry and one for exit or if required (such as during lift maintenance period) a combined lift for entry and exit. To minimise conflicts upon entry and exit, a designated lift waiting area should be allocated. Such location is shown in **Figure 18**.

For the commercial (office) development option, it is anticipated that the car lifts can be modified to incorporate truck lifts to provide access to additional loading areas on Level 2. The concept design floor plate for the commercial option could accommodate the larger lift structure, with a turn table provided to assist in manoeuvrability of the trucks.

The Level 2 truck parking area will be utilised by small rigid vehicles up to 6.4 m in length. As outlined in AS2890.2 Parking Facilities: Off-street commercial vehicle facilities, height clearance for such vehicles is to be minimum of 3.5 m for the lift, parking and manoeuvring areas).

Vehicle turn paths for both the residential and commercial option are attached in **Appendix B**.

3.4.3 Lift access queue analysis

A lift queue analysis has been undertaken for both the residential and office development operation, based upon a Steady State theory. Analysis of steady state queues incorporate randomly distributed arrivals and services time provides suitable guidance to design. The

steady theory provides the probability of demand / number in queue. The following sections summaries the findings for each development option. The analysis is based on the queuing area available when the loading dock is not in operation and vehicles are able to queue within the loading dock. As shown in **Figure 19** the queue area available is 2 to 3 vehicles on approach to the lifts.

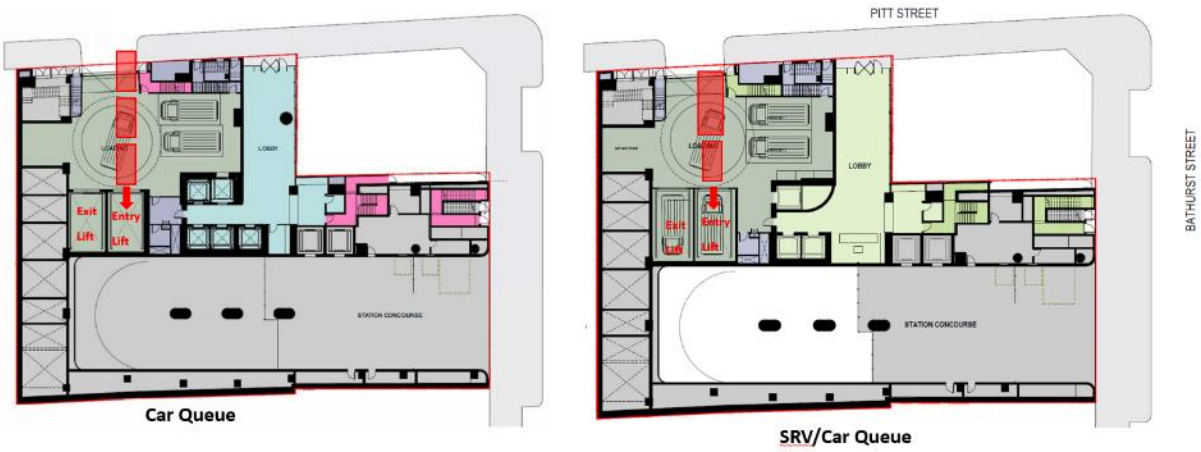


Figure 19 Indicative vehicle lift queue area

3.4.3.1 Residential development option queue analysis

The analysis has been based the service rate information by Vertrans Consultants Pty Ltd *Verticals Transportation for Car Lifts* report dated 20 November 2017. This report outlined the average cycle time for a single car lift would be 120 seconds, thereby each lift could service 30 cars per hour (based on a lift travel speed of 0.8 m/second).

The steady state queuing theory and the service rate applied, included the following assumptions:

- 10 vehicle trips in the peak hour (i.e. based on the RMS trip generation guidelines for residential developments)
- 80% arrivals in the PM peak hour = 8 inbound trips per hour

The potential forecast probabilities for an estimated queue with a demand of 8 vehicles arriving within the peak hour are as follows:

- 0 vehicle in queue = 74%
- 1 vehicle in queue = 7%
- 2 vehicle in queue = 2%

The proposed access arrangement is sufficient to cater for the anticipated vehicle arrivals during the peak hour period, mitigating adverse queuing implications on the adjoining public road network for the residential development option. A Delivery Service Plan (also known as a Loading Dock Management Plan) should be established for the future development. This plan can include programing the lifts to prioritise inbound movements and deliveries during

peak hours to further reduce potential queues within the loading dock. A Preliminary Delivery Service Plan is outlined in **Appendix C**.

3.4.3.2 Commercial development option queue analysis

The analysis has been based on the service rate information by Vertrans Consultants Pty Ltd *Verticals Transportation for SRV Truck Lifts* report dated 9 July 2018. This report outlined that an average cycle time for a single truck lift would be 143 seconds, thereby each lift could service 25 cars/trucks per hour (based on a lift travel speed of 0.5 m/second).

The application of the steady state queuing theory and the service rate provided, included the following assumptions:

- 11 vehicle trips in the peak hour (i.e. based on all car spaces provided turning over within the one hour period.
- 80% arrivals in the AM peak hour = 9 inbound trips per hour
- Allowance for up to 2 trucks arriving within the peak hour to utilise the lift
- Total inbound vehicles = 11

The potential forecast probabilities for an estimated queue with a demand of 8 vehicles arriving within the peak hour are as follows:

- 0 vehicle in queue = 56%
- 1 vehicle in queue = 20%
- 2 vehicle in queue = 8%
- 3 vehicle in queue = 4%

The proposed access arrangement is anticipated to be sufficient to cater for the assumed vehicle arrivals during the peak hour period, with further mitigations to adverse queuing implications on the adjoining public road network made available through the controls outlined in a Delivery Service Plan (also known as a Loading Dock Management Plan). This plan can include programing the lifts to prioritise inbound movements and deliveries during peak hours. A Preliminary Delivery Service Plan is outlined in **Appendix C**.

3.4.4 Bicycle parking

City of Sydney Council strongly encourages the use of bicycles as a contribution to more environmentally sustainable transport options. New developments must make adequate provision for bicycles to ensure this sustainable mode of transport can be easily used. Section 3.11.3 of DCP 2012 outlines the minimum provision for bicycle parking as:

- Residential:
    - One space per dwelling for occupants;
    - One space per 10 dwellings for visitors
- Commercial (office):
    - One space per 150 m^2 GFA for employees

- One space per 400 m^2 GFA for visitors

In accordance with these rates, **Table 12** outlines the minimum bicycle parking provision for each development option. It is noted however, in accordance with Clause 11 of the State Environmental Planning Policy (State and Regional Development) 2011, Councils DCP does not apply to State Significant Developments, however the DCP can provide guidance on bicycle parking facilities to encourage alternative transport options.

Table 12 Minimum bicycle parking provision

Development Option	Minimum Bicycle Parking Provision		
	Residential / Employee	Visitor	Total
Option 1 - Residential Multi-Dwelling Housing	159	16	175
Option 2 - Commercial (office)	127	48	175

The concept SSD Application design for the residential development option has provisioned an area on Level 3 to store bicycles. A preliminary layout review has been undertaken by the architects and determined the space on level 3 is suitable to store in excess of 175 bicycle spaces (which could be utilised as communal bicycle storage) with the remainder of the allocation on level 7 in suitable sized storage cages.

Investigations for the commercial (office) development option of available floor space indicates that bicycle parking can be provided within levels 2 and 4 and accommodate approximately 150 bicycles. These areas should incorporate communal/individual storage cages for the employees of the commercial (office) development and designated area for visitors. End of trip facilities are provided on Level 4 to encourage bicycle use as an alternate transport option. Additionally, a visitor bicycle parking area should be allocated. These bicycle parking facilities also should be designed to facilitate the storage of bicycles as outlined in *AS2890.3 Parking Facilities – Bicycle Parking (2015)*.

Consideration within the future design is required on the allocation of the communal bicycle parking area for the use of residents, employees and visitors with the attention given to how visitors are to access the area (i.e. access through security) and wayfinding signage to such facilities. The bicycle facilities are to be provided in accordance with *AS2890.3 Parking Facilities – Bicycle Parking (2015).*

Figure 20 outlines the bicycle and residential storage areas proposed on level 3 and 7 respectively for the residential development option with **Figure 21** showing the bicycle storage areas and end of trip facilities for the commercial (office) development option.

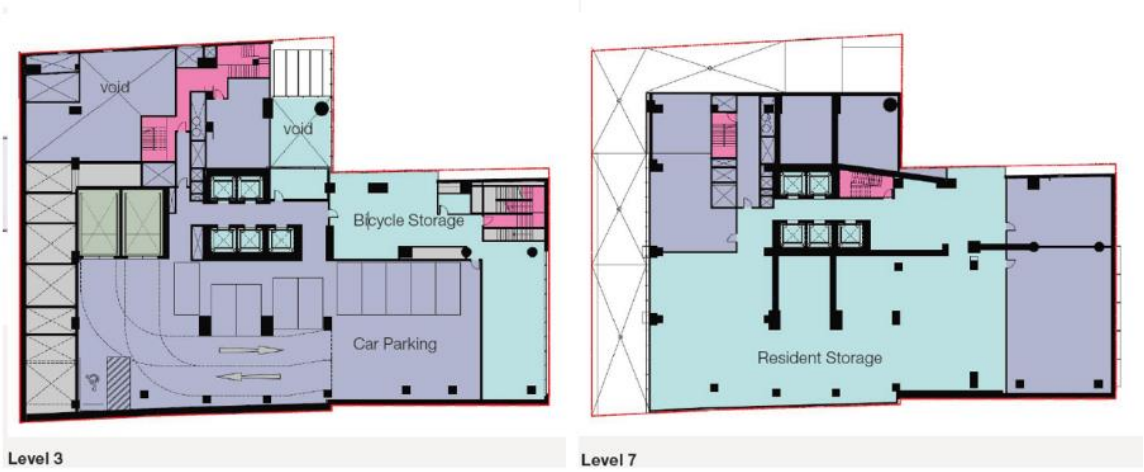


Figure 20 Bicycle and residential storage areas – Residential option

Figure 21 Bicycle and end of trip facilities – Commercial option

3.4.5 Service vehicle

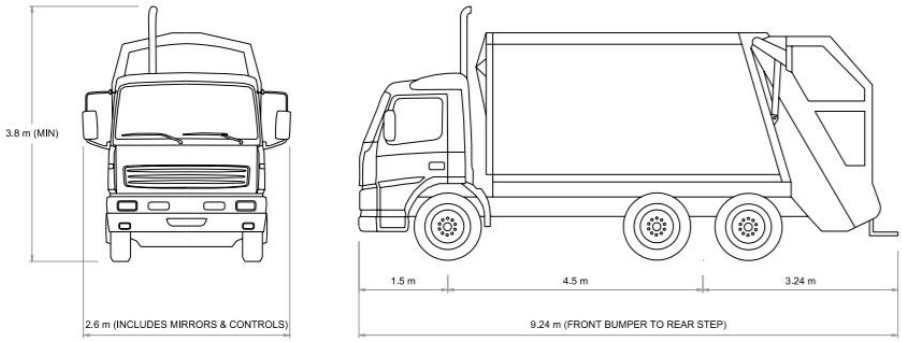
City of Sydney DCP Schedule 7.8.1 outlines that service vehicle parking is required for developments at the following rates:

- Residential:
  - 1 Space for the first 50 dwellings; plus
  - 0.5 spaces for every 50 dwellings or part thereafter
- Commercial (office):
  - 1 space per 3,300 m^2 GFA, or part thereof, for the first 50,000 m^2

Application of these rates for the proposed development will require the provision of three service vehicle spaces for the residential development option and six spaces for the commercial option.

Application of the RMS *Guide to Traffic Garneting Development*, requires a mix use of service vehicle parking for such developments with a minimum of 50% of the spaces suitable for accommodating trucks.

Both development options include the provision of two service vehicle spaces within the designated loading dock located off Pitt Street. The service vehicle bays are suitable to accommodate small rigid vehicles (SRV) of up to 6.4 m in length. Provision of a waste collection vehicle can be facilitated by occupying of the service vehicle spaces and partial encroachment of the loading dock access area. Height clearance within the loading dock is 4 m. AS2890.2 Parking Facilities – Off-street commercial vehicle facilities outlines a height clearance of 4.5 m for MRV and 3.5 m for SRV, however typical waste collection vehicles are less than 4 m in height (excluding overheating loading vehicles). Selection of suitable waste collection vehicles of less than 4 m in height will be required, refer to **Figure 22**.



Rear loading collection vehicle for MGBs	
Length overall	9.54 m
Width overall	2.6 m
Operational height	4 m
Travel height	3.8 m
Weight (payload)	26 tonnes

Figure 22 City of Sydney waste collection vehicle

Source: City of Sydney Policy for Waste Minimisation in new developments

In addition to the above, the commercial (office) development option has implemented an additional loading dock on level 2. This is to be accessed via a truck lift system and a mechanical turntable to assist in manoeuvrability into the designated three service vehicle parking spaces suitable to accommodate 6.4 m (SRV) trucks. These additional spaces within level 2 further support of the service vehicle parking provision. Turing paths of the SRV are included in **Appendix B**, which indicate that vehicles are able access and egress the site in a forward direction. Additionally, there is an area available within the ground floor loading dock area to accommodate courier motorbike for short term deliveries.

Both development options propose to facilitate a car space for the use of maintenance and trade vehicles within the general parking are on level 4. Such spaces could accommodate van/utes suitable for such uses.

The proposed provision of three service vehicle bays (two trucks plus one trade space) for the residential development option and six bays (five trucks plus one trade space) for the commercial (office) option meets the requirements outlined in City of Sydney DCP.

It is considered a Delivery Service Plan (also known as loading dock management plan) would be in place to manage the use of the loading dock and would also incorporate a loading dock manager. A Preliminary Delivery Service Plan is included in **Appendix C**.

The management plan will outline the use of the loading dock and provide an opportunity to pre-arrange vehicular access to the loading dock, such as removalist, deliveries or waste vehicles. Within the ground floor loading dock, designated parking areas can accommodate a vehicle up to 6.4 m in length (SRV) without obstruction to the lifts. During the periods when larger vehicles are to utilise the loading dock (such as the waste collection vehicle), traffic management will need to be in place directing drivers to utilise one of the two lifts to allow access to the parking levels above or to instruct drivers not to queue to obstruct the public roadway, requiring them to return when the loading dock is not in use. To minimise the impact, consideration should be given to the use of larger vehicles outside peak operational hours. A mechanical turntable is also provided to facilitate forward movements in and out of the integrated station development for vehicles up to 9.5 m in length.

The service vehicle loading dock for the residential and commercial (office) options are shown in **Figure 23** to **Figure 25.**

A turning plan review of the ground level loading dock has been undertaken based on an SRV in the event of the mechanical turntable not being operational (i.e. during maintenance periods). The turn path plans in **Appendix B** outline that there is available space within the loading dock for a SRV to enter and exit the site in a forward direction, without the use of the turntable.

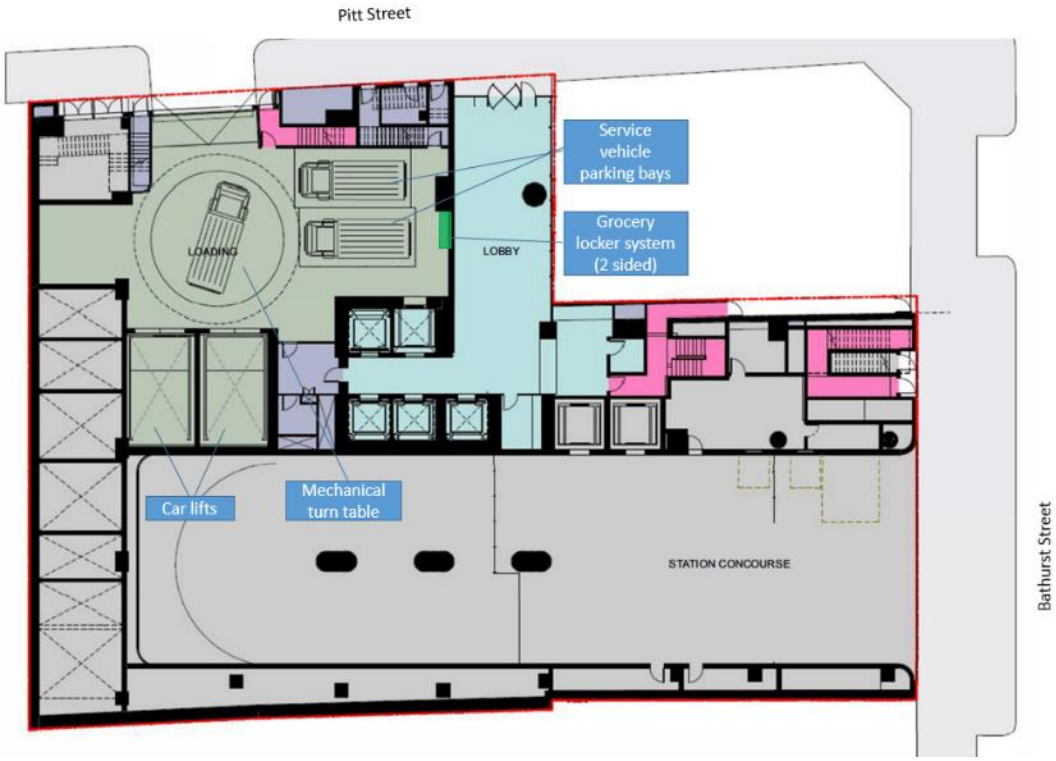


Figure 23 Service vehicle loading dock – Ground Floor (Residential Option)

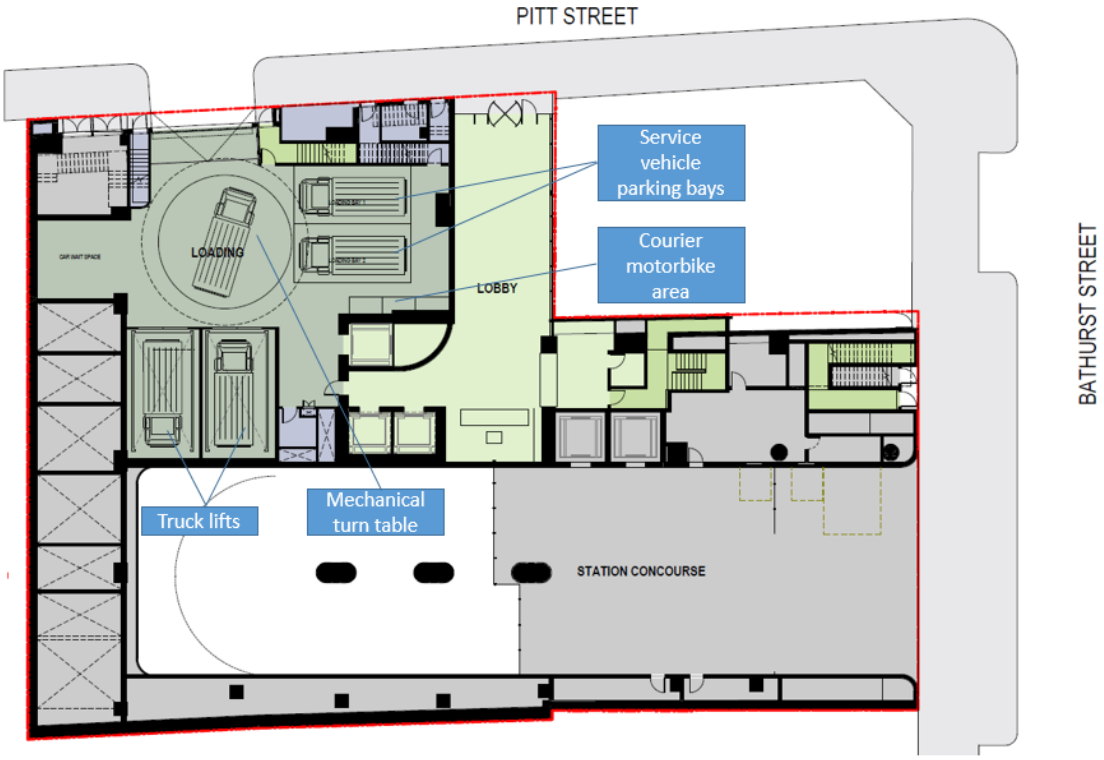


Figure 24 Service vehicle loading dock – Ground Floor (Commercial Option)

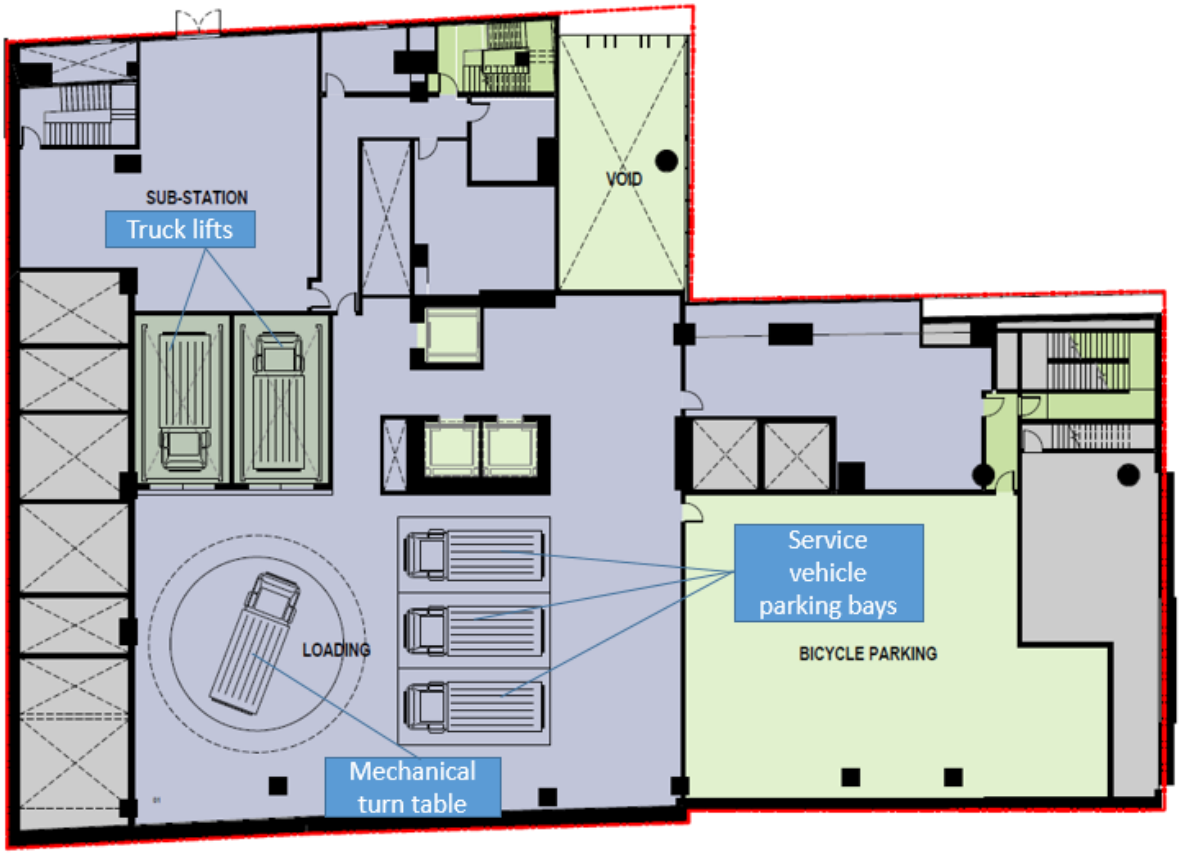


Figure 25 Service vehicle loading dock – Second Floor (Commercial Option)

3.4.6 Motorcycle parking

City of Sydney Council encourages the use of motorcycles as a contribution to more environmentally sustainable transport options. New developments are to make adequate provision for motorcycles to ensure this mode of transport can be easily used. Schedule 7.8.4 of the DCP 2012 outlines the minimum provision of one space for every 12 car spaces. Application of this rate results in the minimum motorcycle parking provision of three motorcycle spaces (based on a proposed 34 car spaces).

Although the concept SSD Application design drawings have not identified specific areas for motorcycle parking within the general parking, there is available space within the parking levels to accommodate several motorcycle parking bays. The future design should identify these bays in accordance with AS2890.1 with minimum parking space dimensions of 1.2 m x 2.5 m. Consideration could be given, if space is available, to provide additional motorcycle parking over the minimum requirement to encourage the use of alternative transport options.

The commercial (office) development option currently has a designated area within the loading dock on the ground floor for courier motorcycle, to be utilised as short term parking for deliveries to the OSD.

3.4.7 Car share

City of Sydney Council strongly encourages the use of car share because it is sustainable, practical and popular with city business owners and residents. Section 3.11.2 of the DCP 2012 outlines that additional spaces for car share services can be provided in addition to the maximum parking permitted for the OSD. Developments within Land Use and Transportation Integration Category A may provide a minimum of one car space per 50 car spaces for the use of car share scheme or within Public Transport Accessibility Level Category D, an additional minimum of one car space per 30 car spaces.

The DCP outlines that car share maybe provided and the concept SSD Application has provision for one car share space for either development option for the use of a car share facility. This would be subject to further investigation. Alternatively there are several existing car share facilities in close proximity of the site (three within 550 m).

3.5 Pedestrian analysis

Reference is made to the Sydney Metro Report for "*Pitt Street South OSD Modelling Assessment*" dated 13 December 2017. This modelling assessment was undertaken to determine the pedestrian trip generation and movements as a result of the OSD and Pitt Street Metro Station.

The review included a review of the footpath capacity at key locations and within proximity of the Metro station/OSD entry and exit locations on Bathurst Street and Pitt Street. This review was undertaken for the 2036 peak hour scenario with 15 percent background growth. A peak minute demand with a factor 1.2 was applied to determine the Level of Service of the footpath locations against the Fruin Level of Service (LoS) criteria as shown in **Figure 26**.

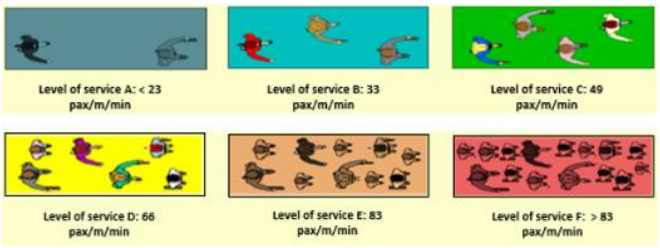


Figure 26 Fruin Level of Service criteria

The effective width used for the review was the total footpath width excluding some clearances for street furniture, trees, kerbs and buildings. The Sydney Metro Report (December 2017) results are outlined in

Table 13**.**

Table 13 Footpath performance for pedestrians

ID	Location	2-way pedestrian flow (pp/hr)	Effective width (m)	LoS
1	Bathurst Street, West of the southern station entrance	4,137	3.8	A
2	Bathurst Street, East of the southern station entrance	2,808	2.9	A
3	Pitt Street, South of intersection with Bathurst Street	2,185	1.2	C

Source: Pitt Street South OSD Modelling Assessment" dated 13 December 2017

The above results outline the pedestrian level of service provided is satisfactory.

However, widening of the footpath into the parking lane along Bathurst Street to the Pitt Street intersection, as well as the need to widen the signalised pedestrian crossing across the Pitt Street (South) approach of the intersection with Bathurst Street has been proposed as a part of the Station public domain upgrade works. Serviceability to pedestrian movement could be further improved with the removal of street furniture to minimise areas of constraints on Pitt Street south of the intersection with Bathurst Street. It should be noted that public domain works are part of the CSSI approval and not part of the concept SSD Application.

It is acknowledged that the Sydney Metro (December 2017) analysis was undertaken on a larger residential OSD option (307 dwellings) when compared to the current concept residential development option, thereby the potential pedestrian movement associated with the OSD would be less and thereby a worst-case scenario. When comparing the commercial (office) development option to the Sydney Metro (December 2017) analysis, the OSD could potentially provide approximately 50 percent more workers (approximately 279 people) (refer to Section 3.5.1). It is considered that this variation in occupants/workers when compared to typical hourly movements of between 2,000-4,000 people in the public domain (equating to less than one percent variation), would not significantly alter the findings of the Sydney Metro (December 2017) analysis.

3.5.1 Building occupancy

The Sydney Metro Report *"Pitt Street South OSD Modelling Assessment*" dated 13 December 2017 outlined the potential residential occupants within the OSD of 494 based on 307 dwellings.

Table 14 provides an updated potential occupancy within the OSD based upon occupancy rates outlined in the City of Sydney DCP. The concept SSD Application potentially could have 233 fewer occupants for the residential development option or 279 additional workers for the commercial (office) development option, when compared to the Sydney Metro Report (December 2017). It is acknowledged that the residential option is comparatively far less than the Sydney Metro Report (December 2017) analysis, while the commercial (office) development option could generate approximately 50 percent additional workers. It is considered that the increase in potential workers for the commercial (office) development

option would not alter the findings of the Sydney Metro (December 2017) analysis associated with pedestrian movement as outlined in Section 3.5, as the additionally 304 potential occupancy consists of less than one percent of the typical hourly movements in the public domain.

Table 14 Forecast OSD occupancy (person)

Residential option				
Room Type	Occupancy Rate	Number of dwellings	Potential OSD Occupants	Sydney Metro Report (December 2017) Comparison
Studio	1 person per dwelling*	33	33	
1 bed	1.3 people per dwelling	33	43	*221*
2 bed	1.9 people per dwelling	83	158	*232*
3 bed	2.7 people per dwelling	10	27	*41*
Total		**159**	**261**	***494***
Commercial (office) option				
Room Type	Occupancy Rate	NFA (m^2)	Potential OSD Workers	Sydney Metro Report (December 2017) Comparison
Office premises – in a building with 4 or more storeys	1 worker per 21 m^2	16,750	798	*494*
Total		**16,750**	**798**	***494***

(*) The City of Sydney DCP does not outline studio rates: assumed one person per studio

3.6 Sustainable transport initiatives

Sustainable Sydney 2030 includes an action to promote sustainable travel behaviour by developing Green Travel Plans that should be implemented for new developments.

The purpose of Green Travel Plans is to reduce the impact of vehicular traffic to and from the future development. This is achieved through the review of existing policies and identifying programmes to encourage residents and visitors to adopt more active and sustainable forms of transport including walking, cycling, public transport and car sharing and outline goals and monitoring procedures.

The Green Travel Plan can identify processes to:

- Review of existing public transport infrastructure and future transport options;
- Assess of existing travel patterns within the area;
- Develop a modal share target for the future development;

- Develop a framework to identify and respond to travel demand from the future development and surrounding area;
- Outline strategies to implement prior and during occupancy; and
- Monitor strategy to track the performance of the Green Travel Plan.

The Green Travel Plan should incorporate a Transport Access Guide that outlines what alternate transport options are available and where they are located from the development.

A Transport Access Guide can take forms such as a map erected in prominent areas (i.e. Strata notice boards) and issued to owners and tenants through Annual General Meetings, staff inductions (for commercial premises) or a periodic period through the year.

It is recommended that the OSD include the preparation of Green Travel Plan and/or Transport Access Guide to encourage and ensure information is available for residents, employees and visitors to the alternate transports options available within vicinity of the site.

3.7 Construction activity traffic management

3.7.1 Construction traffic management objective

A Construction Management Statement is provided at Appendix Z to the EIS for this concept SSD Application, detailing the construction traffic management approach that will be adopted during detailed design and construction. A Construction Traffic Management Plan (CTMP) would need to be prepared prior to the commencement of works, with site induction for construction personnel being undertaken to outline the requirements of the CTMP. The CTMP will be dependent upon the final development option adopted. The aim of the CTMP is to maintain the safety of all workers and road users within the vicinity site and should include the following objectives:

- To minimise the impact of the construction vehicle traffic on the overall operation of the road network.
- To provide continuous, safe and efficient movement of traffic for both the general public and construction workers.
- Installation of appropriate advance warning signs to inform users of the changed traffic condition.
- To provide a description of the construction vehicles and the volume of these construction vehicles accessing the construction site.
- To provide information regarding the changed access arrangement and also a description of the proposed external routes for vehicles including the construction vehicles accessing the site.
- Establishment of a safe pedestrian environment in the vicinity of the site.

3.7.2 Construction vehicle types

The construction of the proposed OSD is expected to involve the use of a number of different vehicle types. The project involves the demolition of the existing buildings on site

and construction of the station and OSD above which will require removal and delivery of various materials including spoil/waste, steel reinforcement, concrete and fit out equipment. This would typically involve medium rigid vehicles (i.e. concrete trucks), heavy rigid vehicles (i.e. spoil removal vehicles) and the use of up to an 'Articulated Vehicle" (19 m in length) for such activities as steel reinforcement deliveries.

3.7.3 Construction vehicle routes and access

Details of the site access and construction routes have not been finalised at this stage of the project, however it is anticipated that access will be via Pitt Street and Bathurst Street and potentially a through site access. Access routes will be limited to the existing one way road network system surrounding the site including;

- Pitt Street: Northbound
- Castlereagh Street: Southbound
- Bathurst Street: Eastbound
- Liverpool Street: Westbound

3.7.4 Traffic management

Public access of through vehicles past the site is to be maintained. Vehicles will be directed to travel past the work site with traffic signage in accordance with a Traffic Control Plan (TCP) to be developed in accordance with RMS Traffic Control at Works Sites and AS1742.3 – Traffic Control for Works on Roads. This is to advise motorists of changes in road network or vehicle movements to/from the site including "Truck turning" activity or partial lane closures.

Should partial road closures be required as part of the works, the contractors would be required to ensure that both RMS and Council approvals are obtained prior to implementation and appropriate TCPs are implemented as part of the works. Closures are to occur outside peak road network periods.

Any TCP will need to be developed as part of the detailed CTMP prior to commencement of construction activity on the site.

3.7.5 Traffic activity and parking provisions

There will be limited parking on site for site personnel therefore contractors should encourage carpooling between workers which will decrease traffic activity and parking demand. Furthermore, the site is located within an acceptable walking distance of alternate transport options, such as bus and train services.

Contractors should discourage the use of on street parking and encourage the use of alternate travel arrangements to decrease traffic movements and parking demand associated with construction workers.

Large deliveries should be avoided, where possible, during peak road network periods, to minimise impacts on the adjoining road network and assist in accessibility to the site.

3.7.6 Pedestrian management

Site access is to be restricted to authorised personnel only. Pedestrian access to and around the site is to be maintained at all times.

The site is located in a busy CBD context. Consequently, the nearby road network will contain heavy pedestrian activity along the footpaths adjoining the site. Visibility from the site is to be maintained to allow visual engagement between the driver and pedestrians and signage is to be erected to advise pedestrians of heavy vehicle movements to and from the site.

The pedestrian travel paths are to be maintained and be free from trip hazards.

4.0 Summary and conclusion

The following summary and conclusions are made based on the above assessment.

4.1 Proposed works

This Traffic and Parking Impact Assessment outlines the traffic, transport, parking and access impacts as a result of the proposed OSD consisting of high-density residential dwellings located over the Pitt Street Metro Station. Access to the OSD will be via Pitt Street for residents, visitors, service vehicles and private vehicles, with pedestrian access to the Metro Station via Bathurst Street. The proposal concept SSD Application comprises of two development options:

- Option 1 - Residential development:
    - 159 Residential dwellings:
        - 33 studio apartments;
        - 33 one-bed apartments;
        - 83 two-bed apartments; and
        - 10 three-bed apartments.
    - 34 car spaces (including one designated trade parking space for the use of maintenance vehicle (utes/vans) and car share space).
    - Communal bicycle storage area suitable to accommodate for up to 175 bicycles and individual storage cages for each residential dwelling that should be designed to facilitate the storage of bicycles.
    - Two service vehicle spaces to facilitate small rigid vehicle up to 6.4 m in length and mechanical turntable to accommodate waste collection vehicle up to 9.5 m in length.
- Option 2 – Commercial (office) development:
    - 19,031 m^2 GFA (16,750 m^2 NFA)
    - 11 car spaces (including one designated trade parking space for the use of maintenance vehicle (utes/vans) and car share space).
    - Communal (or individual) bicycle storage area suitable to accommodate for up to 150 bicycles are located on levels 2 and 4 and supported with end of trip facilities.
    - Two service vehicle spaces to facilitate small rigid vehicle up to 6.4 m in length and mechanical turntable to accommodate waste collection vehicle up to 9.5 m in length on the ground floor.
    - Potential loading area for up to three Small Rigid Vehicles (6.4 m in length) accessed via truck lift and mechanical turntable within level 2.

4.2 Traffic impact

The Sydney Metro Report "*Pitt Street South OSD Modelling Assessment*" dated 13 December 2017 determined a peak traffic generation of 34 trips within the each AM and PM peak hour (based on a turnover of each car space within the peak hour). The parking provision for this assessment corresponds with the current concept SSD Application residential option. The commercial (office) development option provides 11 car spaces, which would generate less traffic. Therefore, the findings within the Sydney Metro Report (December 2017) would be a worst-case scenario for the current concept SSD Application.

The Sydney Metro (December 2017) study concluded that the background traffic growth sensitivity analysis indicated delays at the Elizabeth Street and Park Street intersection (not located within immediate vicinity of the subject site). However the modelling associated with the OSD traffic showed relatively minor variations in the level of service and will not have a significant impact on the surrounding road network.

4.3 Pedestrian impact

The Sydney Metro Report "*Pitt Street South OSD Modelling Assessment*" dated 13 December 2017 outlined the review of the footpath capacity at key locations and within proximity of the Metro station/OSD entry and exit locations on Bathurst Street and Pitt Street and concluded the pedestrian level of service provided is satisfactory.

However, widening of the footpath into the parking lane along Bathurst Street to the Pitt Street intersection, as well as the need to widen the signalised pedestrian crossing across the Pitt Street (South) approach of the intersection with Bathurst Street has been proposed as a part of the Station public domain upgrade works. It should be noted that public domain works are part of the CSSI Approval and not part of the concept SSD Application.

4.4 Public, active and alternate transport accessibility

In reviewing the site and its accessibility to public transport, reference was made to the *NSW Planning Guidelines for Walking and Cycling (2004).* This document outlines a recommended walkable distance of 400 m to 800 m to public transport and other local amenities or a 1.5 km cycle distance.

In accordance with its central location within the Sydney CBD, the subject site is extremely well served by public transport and is in line with the *NSW Planning Guidelines for Walking and Cycling (2004)*.

Additional car share facilities were located within walking distance providing opportunity for residents to utilise this alternative transport option.

The Sydney Metro Report "*Pitt Street South OSD Modelling Assessment*" dated 13 December 2017 reviewed the potential mode share split of the OSD based on existing journey to work data obtained for Town Hall Station. It is anticipated that in excess of 50 % of the residents (or workers) would utilise the Train/Metro to travel to work, compared to car

driver use of up to 10 %, which is a result of the minimised parking provision on site to encourage the alternate transport options.

It is recommended that the OSD include the preparation of a Green Travel Plan and/or Transport Access Guide to encourage and ensure residents are aware of the alternate transports options available within the vicinity of the site.

4.5 Parking provision and layout

The broad conclusions of the parking assessment within the report are as follows for the concept SSD Application:

- Assessment of the statutory requirement of the City of Sydney LEP and DCP indicates the concept SSD Application will meet the statutory parking requirement with the provision 34 car spaces for the residential development option and 11 car spaces for the commercial (office) development option . Based on the current proposed development options, a maximum of 81 car spaces would be the maximum permissible for the residential development option and 93 spaces for a commercial (office) development option.
- The loading dock facility for the residential development option provides parking for two service vehicles up to 6.4 m in length. While larger vehicles up to 9.5 m can be accommodated with the use of the mechanical turntable, through traffic movements to access the residential parking lifts will be partially obstructed during loading / unloading procedures (e.g. waste collection). A designated trade vehicle space suitable for van/utes is proposed within the general parking area.
- The commercial (office) development option investigations proposes to maintain the ground floor service vehicle provisionsoutlined in the residential development option, with the provision of a twin truck lift system to provide access to level 2 which services up to three 6.4 m service vehicles. A designated trade vehicle space suitable for van/utes is proposed within the general parking area.
- The proposed provision of three service vehicle bays for the residential development option and six bays for the commercial (office) option meets the service vehicle parking requirements outlined in City of Sydney's DCP.
- It is recommended that a Delivery Service Plan would be in place to manage the use of the loading dock (including pre-arrange times of permissible use, smart locker systems) and incorporate a loading dock manager. A Preliminary Delivery Service Plan is included in **Appendix C**.
- The current design drawings have not identified specific areas for motorcycle parking, however there is available space within the parking levels to accommodate several motorcycle parking bays to meet the minimum requirement of three motorcycle spaces (based on 34 car spaces). Consideration could be given, if space is available, to provide additional motorcycle parking over the minimum requirement to encourage the use of alternative transport options.

- The layout of the car park is in generally in accordance with AS2890.1, and AS2890.6 for the residential or commercial (office) land use. However, it has been identified the proposed column locations encroach on the parking design envelope. The location of such columns may marginally affect some vehicles accessing the adjoining space. However, when considering the additional aisle and parking space width, slow moving vehicles and anticipated low turnover of vehicles of private vehicles, it is considered the columns are not a significant constraint for car space access. The future design should consider adjustment to avoid encroachment of the parking design envelope.
- Assessment of the statutory requirement of the City of Sydney DCP indicates the concept SSD Application will meet the statutory parking requirement of a minimum of 175 bicycle parking spaces for a residential development or 175 for a commercial (office) development. Although Council's DCP does not apply to the concept SSD Application, the DCP can provide guidance on bicycle parking facilities to encourage alternative transport options. While the details of the bicycle spaces, have not been outlined in the drawings, areas have been identified to facilitate a communal compound which could store up to 175 bicycles for the residential development option. Additionally, individual storage cages for each residential dwelling are proposed that could be designed to facilitate the storage of bicycles. Investigations for the commercial (office) development option indicates potential bicycle storage areas on levels 2 and 4 for up to approximately 150 bicycles and is supported with end of trip facilities. Consideration within the future design is required on the allocation of the communal areas for the use of visitor bike parking and the provision of access and way finding signage to such facilities.

4.6 Construction traffic management

A Construction Management Statement is provided at Appendix Z to the EIS for this concept SSD Application, detailing the construction traffic management approach that will be adopted during detailed design and construction. Prior to the commencement of construction, a Construction Traffic Management Plan (CTMP) would be prepared by the contractor. The CTMP is required to address the principles and objectives of a CTMP and to demonstrate how traffic and pedestrians will be managed throughout the works. Objectives include, but would not be limited to:

- Minimise the impact of the construction vehicle traffic on the overall operation of the road network.
- Provide continuous, safe and efficient movement of traffic.
- Inform users of changed traffic conditions.
- Outline vehicle access routes and restrictions associated with the site (delivery time, on site parking etc).
- Establishment of a safe pedestrian environment in the vicinity of the site.

4.7 Alignment with the SEARs

The SEARs outlines the EIS must include a Transport and Traffic Impact Assessment that provides, but is not limited to, the items outlined in **Table 15.** This table provides a summary on how this report addressed the SEARs.

Table 15 Alignment with the SEARs

Item	SEARs Requirement	Comment	Report Section
1	Accurate details of the current daily and peak hour vehicle, public transport, pedestrian and bicycle movements from existing buildings/ uses on the site using the adjacent and surrounding road network.	The assessment in conjunction with the CSSI Approval Sydney Metro City & Southwest - Chatswood to Sydenham identifies the quality of the existing and future road and transport network within vicinity of the site. The assessment of the concept SSD Application options has been considered within the overall contract of the Pitt Street South Sydney Metro Station. The site is currently not in operation, however an outline of the pre-existing site conditions is included with the report. Additionally the assessment includes a review of accessible transport options within the vicinity of the site	2
2	Forecast total daily and peak hour trips likely to be generated by the proposed development including vehicle, public transport, pedestrian and bicycle trips, together with cumulative impacts of existing, proposed and approved developments in the area and any transport / traffic upgrade.	The traffic and pedestrian impact assessment in conjunction with the CSSI Approval Sydney Metro City & Southwest - Chatswood to Sydenham identifies the quality of the future road and transport network within vicinity of the site. The assessment of the concept SSD Application for either the residential or office option concluded that the traffic generation is expected to have minimal impacts to the operation of the surrounding road network with the existing road network remaining similar to the existing situation. This is primarily due to the reduction in on-site parking and the integrated nature of the proposal supporting a shift to alternate travel modes away from private vehicles, including public transport and bicycles. The concept proposal is well positioned to encourage and facilitate the use of public transport, including the future Sydney Metro. The assessment identified the need to provide a Transport Access Guide to assist in the informing the occupants the alternate transport options and relevant location. The concept proposal includes the provision of onsite bicycle parking to support City of Sydney Council bike plans.	3.2, 3.3, 3.4, 3.5
3	Assessment of the Public Transport Accessibility Level of the land and	The assessment includes an understanding of accessibility to public transport in line with City of Sydney LEP and references the requirements to limit	2.5, 3.2

Item	SEARs Requirement	Comment	Report Section
	consequent recommended development mode split.	parking and encourage other transports modes in lieu of private vehicles. The site is well situated, close to many public transport options including the future Sydney Metro services located directly beneath the OSD.	
4	Impacts of the proposed development on the operation of existing and future transport networks, including the public transport capacity and its ability to accommodate the forecast number of trips to and from the development including surrounding footpaths and cycleways.	The assessment includes review of pedestrian analysis on the footpaths, surrounding road network and accessibility to public transport and cycle infrastructure. It should be noted that public domain works are part of the Critical State Significant Infrastructure approval and not part of the concept SSD Application.	3.2, 3.3, 3.4, 3.5
5	Detailed assessment of the existing and future performance of key intersections providing access to the site (including pedestrian access), supported by appropriate modelling and analysis to the satisfaction of RMS and TfNSW.	The assessment provides a reference to potential traffic generation which determined the performance of key intersections within the vicinity of the site will maintain their current performance. Traffic generation is limited as a result of the concept proposal as a result of regulating a maximum parking provision on site in line with City of Sydney council objectives.	3.3
6	Measures to mitigate impacts of the proposed development on the operation of existing and future traffic, public transport, pedestrian and bicycle networks, including any required upgrades.	The assessment outlines an understanding of potential mitigation measures that will assist in the management and operation of the future development including the recommendations of a Green Travel Plan and Transport Access Guide and Delivery Service Plan (also known as a Loading Dock Management Plan). It should be noted that public domain works identified are part of the Critical State Significant Infrastructure approval and not part of the concept SSD Application.	3.4, 3.6, Appendix B
7	Proposed car and bicycle parking provision for residents, staff and visitors, including consideration of the availability of public transport and the requirements of the relevant parking codes and Australian Standards.	The concept SSD Application aligns with City of Sydney LEP and DCP requirements for car and bicycle parking provision. A preliminary review of Australian Standards suitable for a concept application has been undertaken to identify requirements for the car and bicycle parking layout requirements.	3.4.1, 3.4.4
8	Loading dock and servicing arrangements, including	The assessment for the concept SSD Application loading dock and the services vehicle facilities has been compared to the City of Sydney DCP	3.4.2, 3.4.3

Item	SEARs Requirement	Comment	Report Section
	consideration of loading zone hub facilities.	requirements for residential and commercial (office) land uses. The proposed parking provisions meet these minimum requirements. Additionally it is recommended that a Delivery Service Plan (also known as a Loading Dock Management Plan) be developed to manage the demands of the loading facility. The assessment also includes a Preliminary Delivery Service Plan which will be further developed during the detailed design stage.	3.4.5 Appendix C
9	Measures to be implemented to encourage users of the development to make sustainable travel choices, including walking, cycling, public transport and car sharing, such as provision of adequate bicycle parking and end of trip facilities.	The concept SSD Application limits the availability of parking on-site to encourage alternate transport uses in line with City of Sydney council objectives. The site is well serviced by public transport, car share and active sustainable transport opportunities. A Green Travel Pan and Transport Access Guide to advise occupants of these alternate transport options is recommended. Bicycle parking and ends of trip facilities (when required for the commercial (office) development) have been incorporated within the concept proposal.	3.4, 3.6

4.8 Conclusion

Based on the assumptions and investigations undertaken by GHD and Sydney Metro Report "*Pitt Street South OSD Modelling Assessment*" dated 13 December 2017, it is considered that the proposed options of either the residential or commercial (office) schemes for the concept SSD Application satisfy the planning requirements on traffic engineering grounds. The forecast traffic generation associated with the proposal is expected to have minimal impacts to the operation of the surrounding road network.

Appendix A – Parramatta Road Urban Transformation Planning and Design Guidelines (Movement and Place Framework)

Appendix T

	Motorways	Movement corridor	Vibrant streets	Places for people	Local Streets
	Motorways are strategically significant roads that move people and goods rapidly over long distances.	Movement corridors are main roads that provide safe, reliable and efficient movement between regions and strategic centres.	Vibrant Streets have a high demand for movement as well as destinations and activity centres within the same road space.	Places for People are streets with high demand for activities and lower levels of vehicle movement. They create places people enjoy, attract visitors, and are places communities value.	Streets that facilitate local access to communities.
TRIP TYPES	• Longer distance trips including freight	• Intermediate and longer distance trips including freight	• Mix of trip distances, through trips destination trips	• Destination trips	• Local access trips
TYPICAL SPEED LIMIT	• 80 – 110 km/hr	• 60-90 km /hr	• 40-60 km/hr	• 10-40 km/hr	• 10-50 km/hr
INTERSECTION TREATMENTS	• Long distances between intersections • Intersections generally grade separated • Grade separated pedestrian access across	• Signals limited to significant connections • Limited access and left in/left out for minor intersections • Signal-controlled pedestrian crossings • Road design prioritised for vehicle movement	• Signalised or sign posted • Some left in-left out turns • Signal-controlled pedestrian crossings • Mid-block signalised pedestrian crossings in areas of high demand • Road design balanced for vehicle movement and support place based activity	• Moderation and calming of traffic through a range of measures (sign posting, roundabouts, built out kerbs, raised thresholds, road narrowing etc) • High permeability for pedestrians crossings at intersections, mid-block and roundabouts • Road design prioritised for people/ pedestrians	• Signal controlled at major cross streets • Marked pedestrian crossings where required • Likely to have informal arrangements consistent with a low traffic volumes and lower speed environment
CLEARWAYS/ STOPPING ZONES	• No stopping, no parking • Arrangements for breakdowns, incidents and incident response	• Clearways or no stopping zones during times of high movement demand to facilitate movement of public transport, private vehicles prioritised	• In some instances, clearways during AM and PM peak to facilitate movement of public transport, private vehicles, freight and goods • No Stopping in select locations (intersection approaches, pedestrian crossing locations, public transport stops)	• No Stopping Zones by exception	• No Stopping Zones by exception
KERBSIDE PARKING	• Emergency zones only	• Kerbside parking and loading limited to non-peak times, where provided • Time restricted parking on Movement Corridor or adjacent local streets to support local commercial business	• Kerbside parking and loading outside peak times and on weekends • Time restricted parking to support adjacent commercial business	• Time restricted parking and loading to support adjacent commercial business, additional off-street parking, where possible. On-street parking may be restricted to improved pedestrian amenity • Increased footway width in areas to reduce carriageway width, limit parking and improve pedestrian crossing opportunities and safety	• Resident parking schemes or unrestricted parking • Loading and commercial parking provided on a needs only basis
PEDESTRIAN ACTIVITY	• Footway only in breakdown areas • No pedestrian volumes or activity	• Standard width footpaths provided • Generally lower pedestrian volumes or activity and limited facilities	• Standard or wider footpath widths provided with wider footways in high pedestrian areas • High pedestrian volumes or activity, including potential outdoor seating and facilities	• Standard or wider footpath widths provided with wider footways in high pedestrian areas • Very high to significant pedestrian volumes and activity, including outdoor seating and facilities • Road design prioritised for people/ pedestrians	• Standard footways consistent with low to moderate pedestrian volumes • Shared zones, where warrant is met and are likely to have informal arrangements consistent with a low traffic and pedestrian volumes
CYCLING PROVISION	• Restricted or fully segregated where possible	• Fully segregated where possible, sometimes on a shared path, on road cycling usually for experienced bike riders	• Generally on-road to allow for separation with pedestrian activity on the footway • Provision of cycle parking and destination and to support commercial premises	• Cyclists generally on-street and safer street environment for less experienced bike riders	• Cyclists generally on-street and safer street environment for less experienced bike riders
LAND USE INTERFACE	• Grade separated (viaduct or subterranean) • No direct vehicle access to properties	• Mix of uses residential and non-residential • Some active frontages – may be discontinuous • Generally wide lanes/narrow kerbs • Restricted vehicle access to properties to minimise disruption to traffic flows	• Higher density retail, commercial and entertainment uses attracting high pedestrian activity (retail, cafes/dining) • Active frontages over a significant street frontage • Standard lanes/varying kerb widths • Limited vehicle access to properties from the street, reducing conflicts with pedestrians	• Higher density retail, commercial and entertainment uses attracting high pedestrian activity (retail, cafes/dining) • Active frontages over a significant street frontage • Narrow lanes/widened kerbs • Restricted vehicle access to properties to reduce conflicts with pedestrians (i.e.: pedestrian prioritised)	• High degree of residential development • Narrow lanes/widened kerbs • Higher degree of vehicle access servicing individual properties

Appendix B – Vehicle Turn Paths

LEGEND:

SRV

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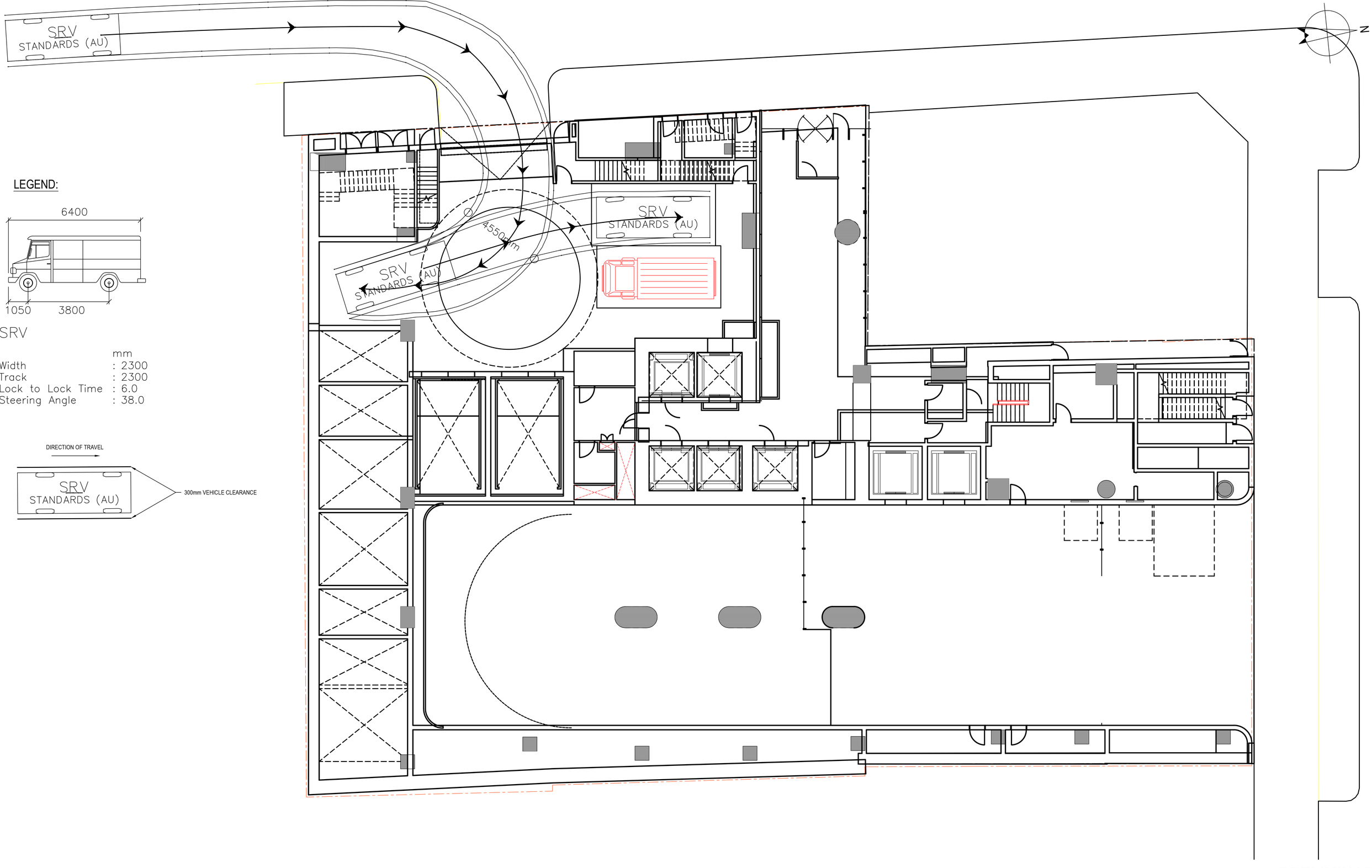
Width	: 2300
Track	: 2300
Lock to Lock Time	: 6.0
Steering Angle	: 38.0



PRELIMINARY

0 3 6 Meters

06.07.18

SCALE: 1:100

PITT STREET SOUTH OVER STATION DEVELOPMENT
RESIDENTIAL OPTION - GROUND FLOOR
INBOUND VEHICLE TRACKING PLAN

21-25561-SK001 **REV A**

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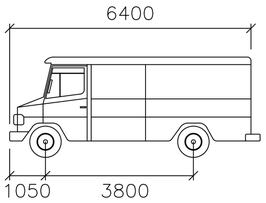

SRV

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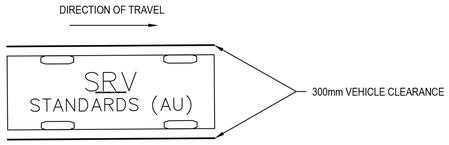
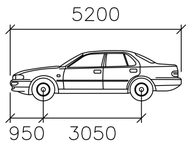
Steering Angle	: 38.0





B99

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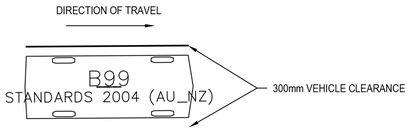

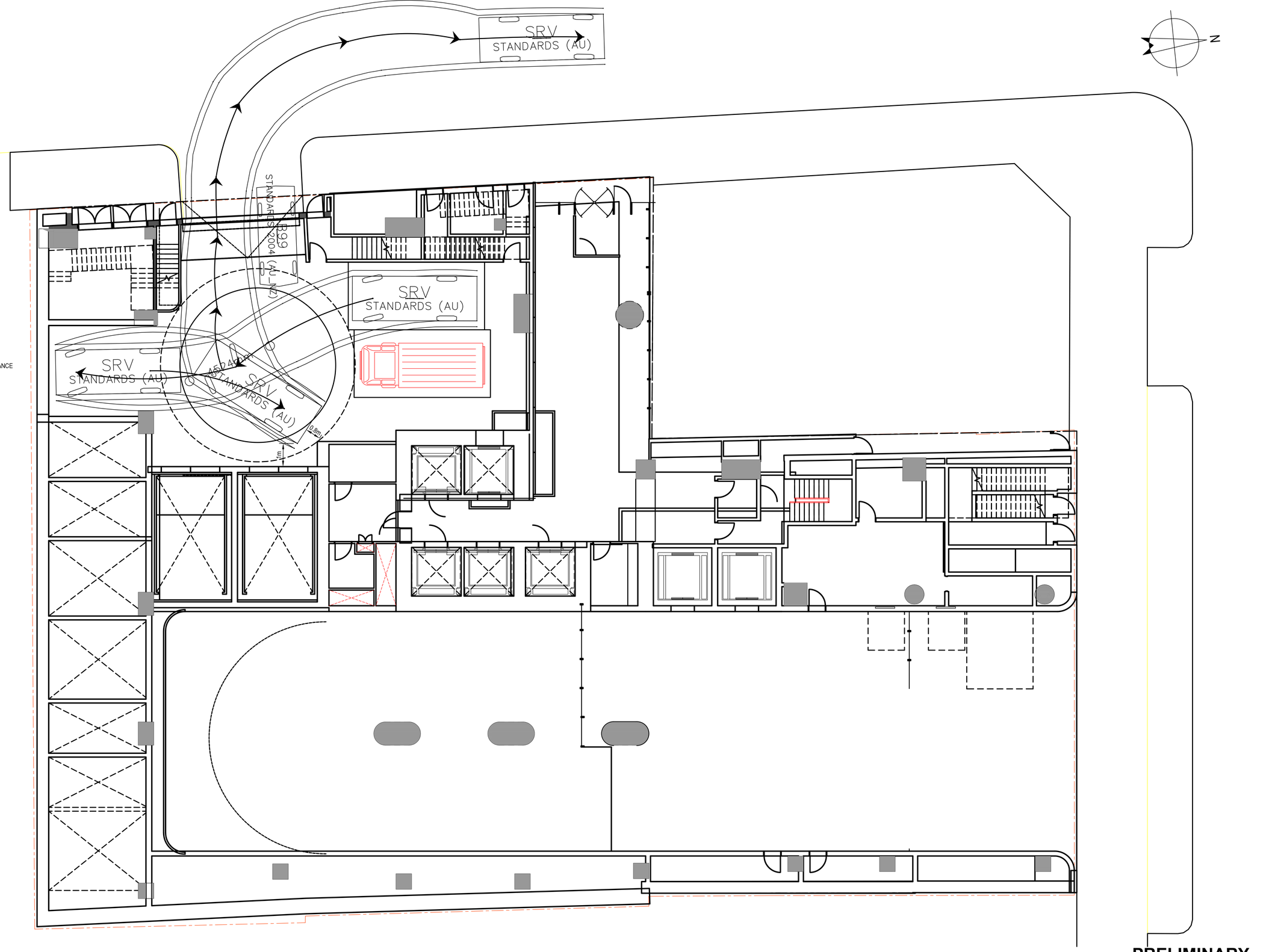

PRELIMINARY

0 3 6 Meters

06.07.18

SCALE 1:100

PITT STREET SOUTH OVER STATION DEVELOPMENT
RESIDENTIAL OPTION - GROUND FLOOR
OUTBOUND VEHICLE TRACKING PLAN

21-25561-SK002 **REV A**

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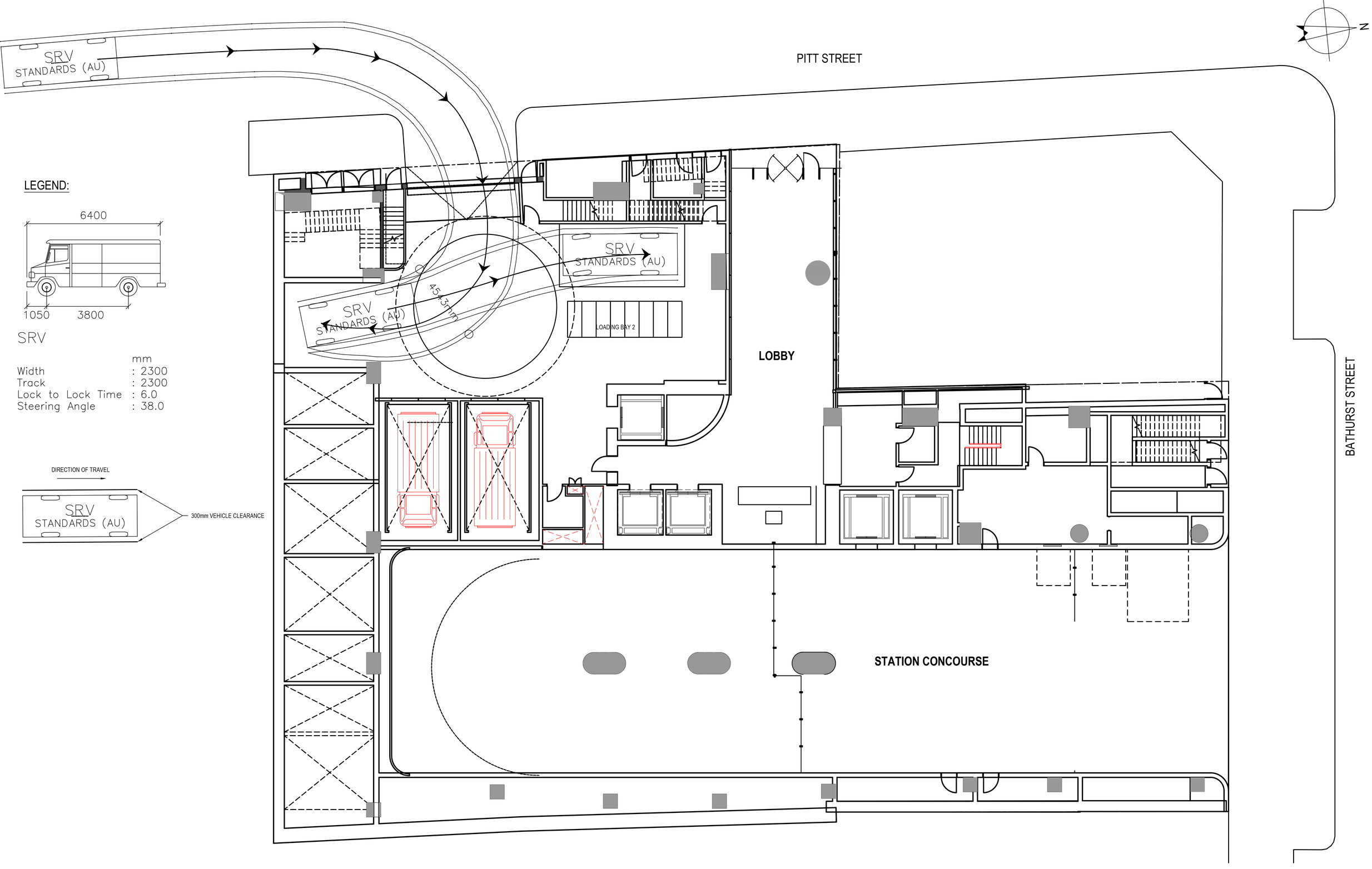

PRELIMINARY

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06.07.18

SCALE 1:100

PITT STREET SOUTH OVER STATION DEVELOPMENT
COMMERCIAL OPTION - GROUND FLOOR
INDOUND VEHICLE TRACKING PLAN

21-25561-SK003 REV A

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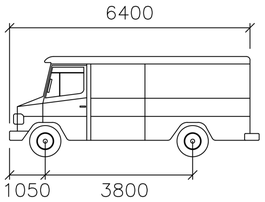

SRV

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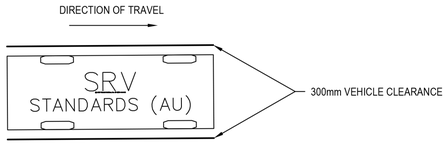
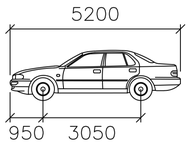
Steering Angle	: 38.0





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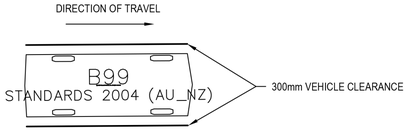
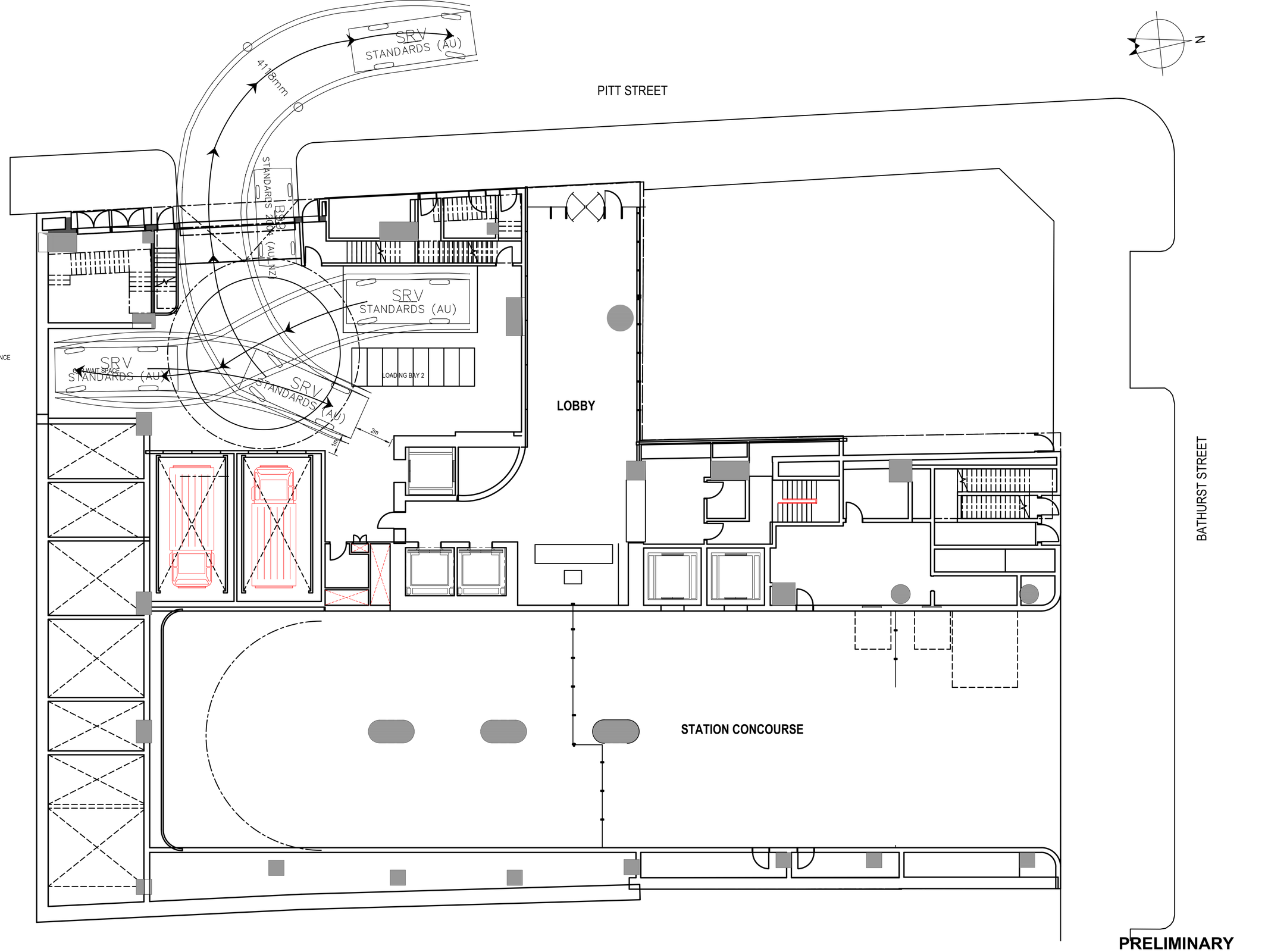




PRELIMINARY

0 3 6 Meters

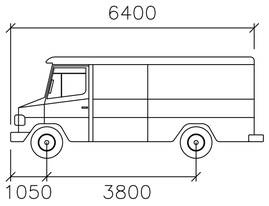
06.07.18

SCALE 1:100

PITT STREET SOUTH OVER STATION DEVELOPMENT
COMMERCIAL OPTION - GROUND FLOOR
OUTBOUND VEHICLE TRACKING PLAN

21-25561-SK004 REV A

LEGEND:



SRV

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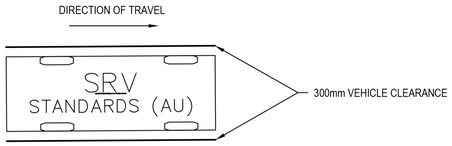
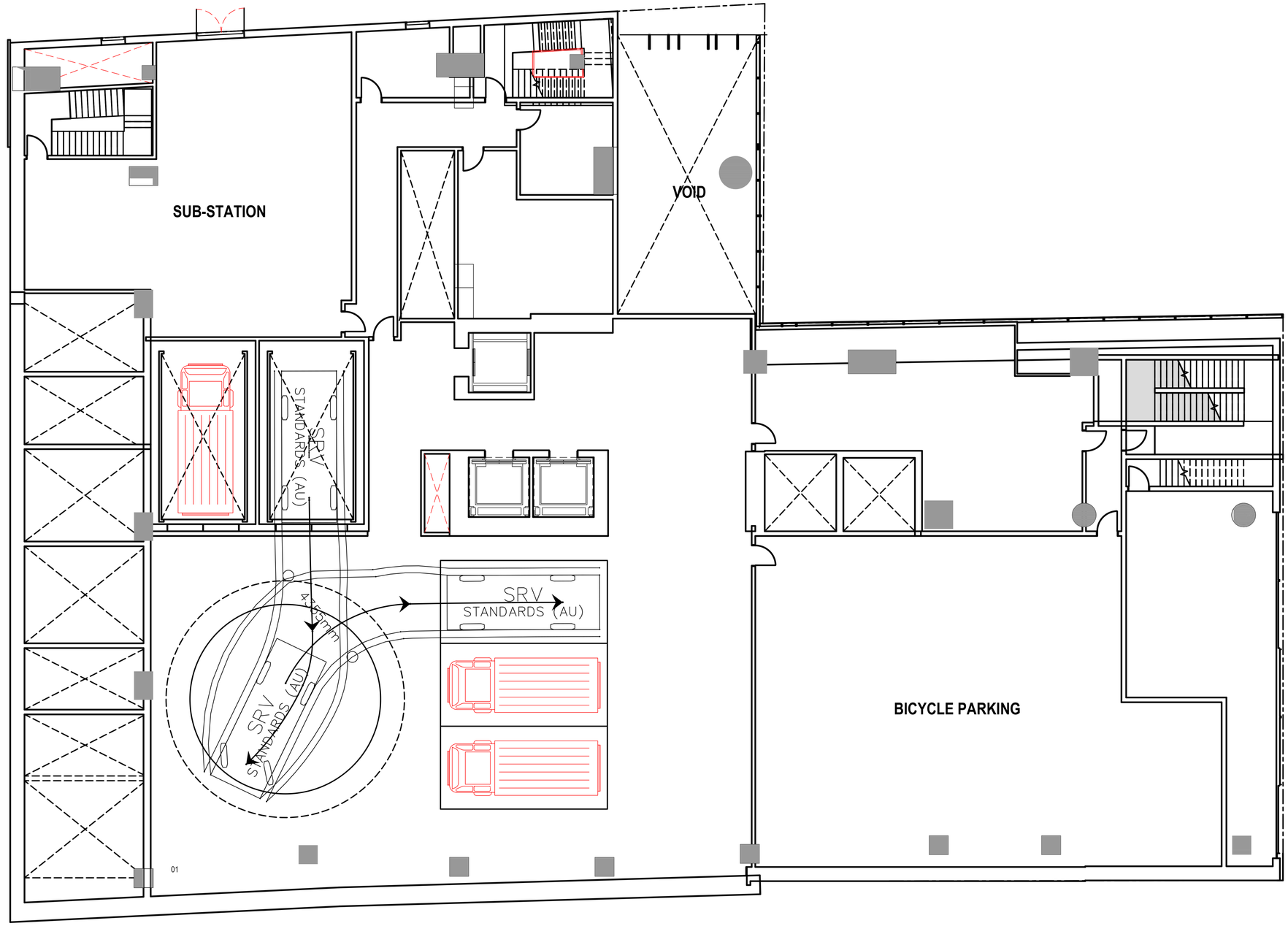
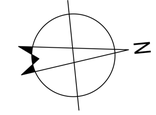
Steering Angle	: 38.0







PRELIMINARY

0 3 6 Meters

06.07.18

SCALE 1:100

PITT STREET SOUTH OVER STATION DEVELOPMENT
COMMERCIAL OPTION - LEVEL 2
INBOUND VEHICLE TRACKING PLAN

21-25561-SK005 **REV A**

Appendix C – Preliminary Delivery Service Plan

2.0 Rules for Owners and Occupiers of the Loading Dock

2.1 Making Appointments

- The Loading Dock will be available for use by the Tenants, Owners and Occupiers entitled to use the Loading Dock by appointment.
- The Building Management Committee may nominate a person (which may be the Strata Manager or Building Manager) to take bookings and make all necessary arrangements for the use of the Loading Dock. This nominee of the Building Management Committee should establish and maintain a booking schedule.
- Members, Owners and Occupiers entitled to use the Loading Dock must only use the Loading Dock at the times booked with the nominee of the Building Management Committee.

2.2 Rules

- All Members, Owners and Occupiers entitled to use the Loading Dock must:
    - use the Loading Dock for garbage disposal and collection purposes in accordance with this Loading Dock Management Plan and any other rules determined by the Building Management Committee;
    - only use the Loading Dock for use by delivery vehicles and the loading and unloading of goods and not store any items in the Loading Dock area or obstruct access to and from the Loading Dock;
    - carry out the loading and unloading of goods wholly within the Loading Dock and not outside the Building;
    - promptly clean up any spills in the Loading Dock or the Building; and
    - understand the correct operation of the car lift and mechanical turntable system.
- The Building Management Committee may, update rules and impose conditions in relation to the use of the Loading Dock, provided that such rules and conditions will not adversely impact on the use and operation of the Lots and loading dock. These include but not limited to:
    - the hours in which access is permitted;
    - the manner in which large objects or deliveries to and from the Loading Dock and the Lots are to be transported;
    - the use of protective covers for surfaces forming part of the building during such times as large objects or deliveries are transported to and from the Loading Dock and the lots;
    - the use of trolleys or other moving devices; and

- insurance requirements.

- If any damage to the building occurs, the Building Management Committee or any person authorised by it, may rectify such damage and the costs of carrying out such work may be a debt payable by the Owner or Occupier to the Building Management Committee.

2.3 Amendments to the Delivery Service Plan

- The Building Management Committee may, from time to time by Unanimous Resolution vary the provisions of this Loading Dock Management Plan.
- The Building Management Committee must not repeal the Loading Dock Management Plan without the prior consent of Council.

3.0 Traffic management of the loading dock

3.1 Loading dock use

The loading dock is provided to service the various uses of the building. This includes activities such as, but not limited to:

- Deliveries to the residential or commercial (office) tenants (e.g. Grocery deliveries);
- Refuse collection for residents or commercial (office) tenants (general waste and recycling); and
- Furniture Removal / Deliveries.

There are a number of different uses therefore is important that the traffic management rules are strictly enforced.

3.2 Loading dock vehicle limits

The loading dock has the following capacity (residential development option):

- Ground floor:
    - Small Rigid Vehicle (SRV) up to 6.4 m in length: 2 spaces;
    - Medium Rigid Vehicle: (MRV) up to 9.5 m: 1 vehicle (while utilising the 2 SRV spaces);
    - Mechanical turntable to facilitate turning of vehicles up to 9.5 m in length; and
    - Maximum vehicle height up to 4 m.
- Level 4:
    - Trade parking space suitable for utes/vans: 1 space

The loading dock has the following capacity (commercial (office) development option):

- Ground Floor
    - Small Rigid Vehicle (SRV) up to 6.4 m in length: 2 spaces;
    - Medium Rigid Vehicle: (MRV) up to 9.5 m: 1 vehicle (while utilising the 2 SRV spaces);
    - Mechanical turntable to facilitate turning of vehicles up to 9.5 m in length; and
    - Maximum vehicle height up to 4 m.
    - Motorcycle parking area (short term).
- Level 2:
    - Accessed by dual truck lifts
    - Small Rigid Vehicle up to 6.4 m: 3 vehicles; and
    - Maximum vehicle height up to 4 m.

- Level 4:
    - Trade parking space suitable for utes/vans: 1 space

3.3 Loading dock access

3.3.1 Vehicle Access

The access and egress to the loading dock facilities can be summaries as below:

- Pre book loading dock use.
- Access for vehicles is in a forward direction from Pitt Street.
- Vehicles are to utilise the turntable to reverse into the allocated Loading Bay 1 or 2.
    - Commercial (office) development option
        - Vehicles to utilise the truck lift system to access Level 2 loading area when directed (either at booking or upon arrival)
        - Vehicles are to utilise the turntable to reverse into the allocated Loading Bay
- Vehicles are to exit the site in a forward direction onto Pitt Street.
- Vehicles are not to queue outside the loading dock area to obstruct the public road network. Drivers are to be directed away from the site and return at an allocated time when there is not available occupancy within the loading dock.
- Signage to be activated to advise motorist that the loading dock is in operation, particularly when in use by trucks longer that 6.4 m (i.e. as waste collection). Signage to include “Dock Full – Do Not Enter”
- Flashing lights and audible warning devices to be engaged upon vehicle exit to assist in advising pedestrians of exiting vehicles.

Note: Ground floor operation

- *Vehicles waiting for lift have priority. Vehicles within the loading bays are to wait until the lift waiting area is clear before proceeding to exit.*
- *Should two vehicles be required to enter and exit simultaneously and both require the use of the lifts, the vehicles will be instructed to pass one another.*
  If the entering vehicle is to be instructed to use the designated Loading Bay 1 or 2, this vehicle is to be positioned in front of the entry lift to allow the exiting truck to pass prior to aligning on the turntable, or using the turn in space, to enter the designated bay under the direction of the Loading Dock Manager.

3.3.2 Pedestrian Access

- Pedestrian access to the OSD will be via a separate pedestrian access on Pitt Street. Pedestrian thoroughfare through the loading to the OSD foyer will not be permitted.
- Pedestrian access to Metro will be via Bathurst Street.

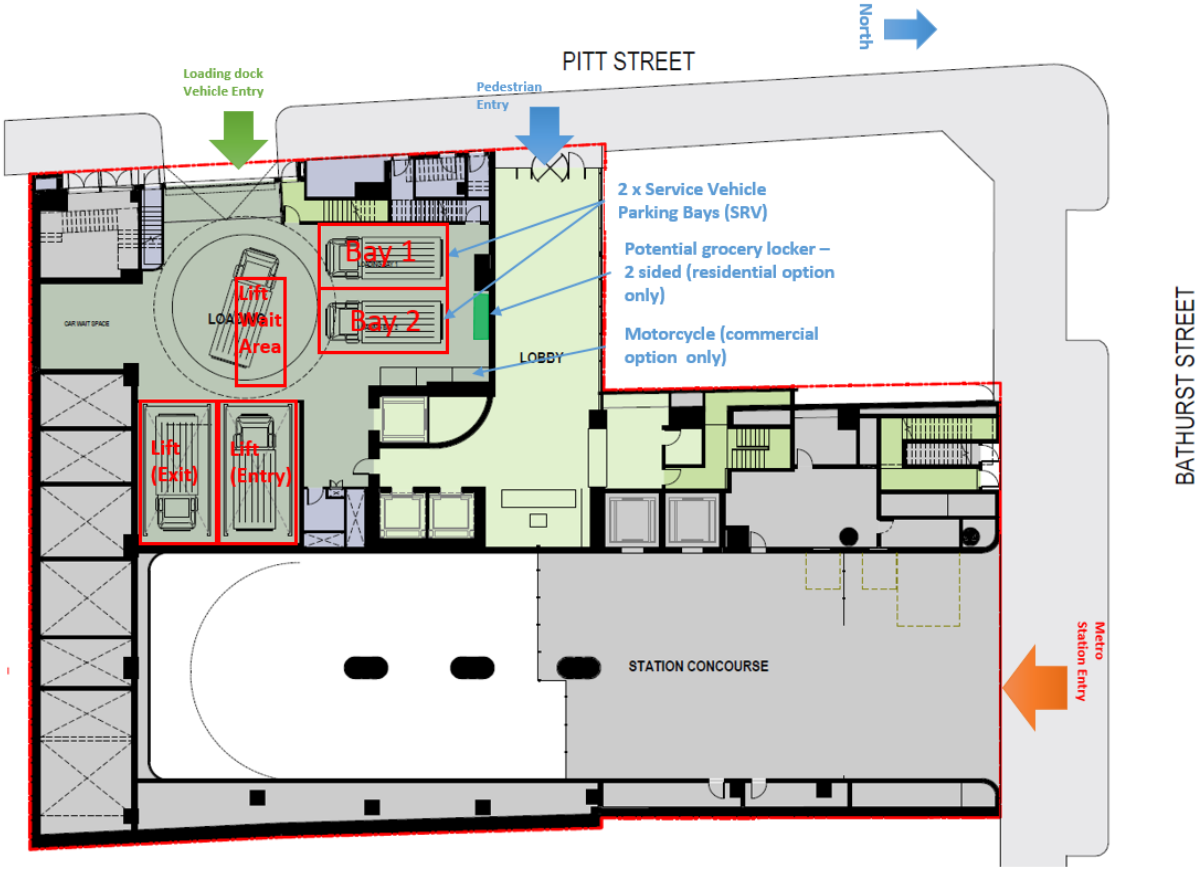


Figure 1 Site Access and Loading Dock Area

3.4 Hours of operation

The Pitt Street OSD is a managed facility with Security presence 24 hour a day / 7 day a week. The Loading dock will be staff by a Loading Dock Manager during 6 am to 6 pm, 7 days a week.

Outside this time, the use of the loading dock will be managed by building security, with additional loading dock staff to provide subject to the scheduled bookings.

Access to the parking area, for residents or workers, will be through the loading dock via car lifts and will be available 24 hours a day 7 days a week.

3.5 Vehicle booking system

All vehicles using the loading dock are to utilise a vehicle booking system (VBS) prior to arrival to the OSD development.

The VBS is to manage key delivery services such as, but not limited to:

- Building maintenance vehicles
- Waste collection

- Furniture removal / delivery
- Resident/worker deliveries

The VBS is to manage the number of vehicles able to use the loading dock facility at any one time and by vehicle type.

The VBS can be accessed via an online request system or directly to the Loading Dock Manager via phone or email. An approved booking will generate a unique barcode/pin number that can then be used for entry to the facility if required.

Regular services (i.e. waste collection) will be given a designated time slot. Vehicles in excess of 6.4 m will require the sole use of the loading dock for the designated periods. Through access to parking lifts will still be permitted during this period via the use of the single lift. To minimise the impact on the operation of the loading dock and vehicular thoroughfare, where possible, vehicles in excess of 6.4 m in length should be restricted to outside the peak hours (refer to **Figure 2**).

Residents/workers are responsible for allocated booking times with the loading Dock Manager for personal deliveries (i.e. groceries, office works) and when moving in or out of the OSD.

All vehicle bookings are of maximum 15 minute duration. The facility can only be used for picking up and dropping off goods. Due to capacity constraints and the shared requirements of the tenants, longer stays in the loading dock cannot be permitted without prior arrangement.

Parking for extended periods can be more readily facilitated after hours, between 6 pm and 6 am daily, as per the Loading Dock Manager approval. It is encouraged that all longer duration parking (such as furniture removal/delivery on building maintenance works) be carried out during this period.

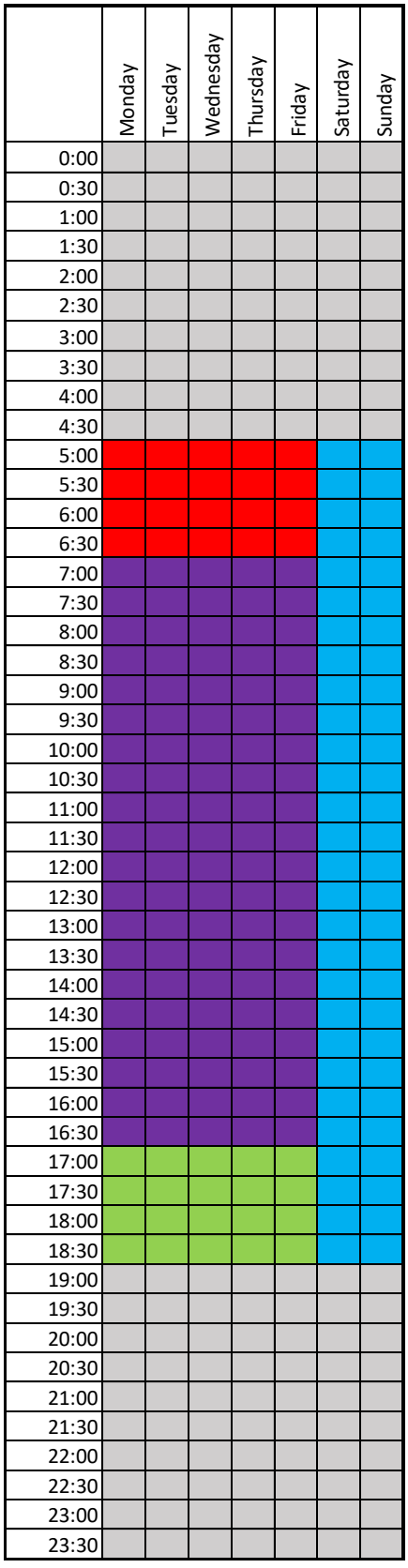
Typical periods of anticipated loading dock activities are summarised in **Figure 2**.

3.6 Mechanical turntable/lift maintenance periods

During periods of required maintenance of the mechanical turntable:

- Vehicles up to 6.4 m (SRV) can manoeuvre within the ground floor loading dock and are to enter and exit in a forward direction.
- Vehicles greater than 6.4 m (SRV) are to enter the site in a reverse manoeuvre under the direction of the loading dock manger (or other approved personnel).
- Commercial (office) development Level 2 loading area is to be limited to two 6.4 m (SRV) during maintenance period, to allow manoeuvrability of vehicle's within the loading dock area.

Periods of maintenance of the vehicle lift system is to be limited to the closure of one lift at a time.



	LEGEND
	Waste Collection
	Various (within peak hours)
	Residential Deliveries (eg Groceries)
	Removalist Activity
	Various (outside peak hours)

Figure 2 Typical anticipated loading dock activities

4.0 In-house managed solutions

A number of potential managed logistics solutions can be implemented into the loading dock to make the facility more efficient. These measures can be specifically implemented to reduce the dwell time of the delivery service vehicle and open the facility to a greater throughput capacity.

4.1 Smart locker system

A smart locker system provision can be made within the loading dock, allowing short duration deliveries of goods such as groceries. Vehicles are able to access the loading dock and the adjoining locker system and depart the loading dock immediately.

The smart locker system could then inform the tenant that goods are ready for collection. Some lockers should be refrigerated for after-hours fresh goods delivery.

This system is to encourage night-time delivery and ensure the ongoing safety and security of goods arriving onsite for tenants. The system will undergo continual review to determine whether this system can operate 24 hours a day.

The smart locker system contains a two-way operation with access to the smart locker system for deliveries via the loading dock and collection for the residents via the OSD pedestrian foyer area (refer to **Figure 1**), minimising the use of the loading dock of pedestrian activity.

4.2 Loading dock personnel

It is proposed that a Loading Dock Manager is to manage a team of loading dock staff to take receipt of deliveries for all tenants during the hours 6 am to 6 pm. These staff will monitor the VBS and direct drivers to allocated parking areas. Staff can also assist in the temporary storage of good within the dock, and alert the tenant for collection. This measure has been introduced to substantially reduce dwell time of delivery vehicles, and allow greater throughput capacity.

Staff hours will be extending as required subject to the demand of the loading dock as outlined in the VBS. Outside peak hours, building security can support the loading dock team should it be required.

4.3 Waste collection

The Pitt Street OSD is equipped with waste collection compactor technology minimising required footprint and occurrence of collections. Waste service providers will ensure all waste separation occurs in an offsite facility, allowing residents to comingle waste.

All residents or tenants are required to bring their waste to the compactor room and dispose into the compactor. Residents/tenants are to be provided with ID cards to use the compactor, which will weigh your waste upon disposal and allocate the respective resident's portion of costs. Waste disposal costs will be stated in each tenancy's quarterly lease statements.

Waste collection services will be allocated a time slot for collection typically prior to the peak morning period to minimise impact to the loading dock operation and residential vehicle thoroughfare.

Vehicles are not to queue outside the loading dock area to obstruct the public road network. Signage is to be activated to advise motorist that the loading dock in operation, particularly when in use by trucks longer that 6.4 m (i.e. as waste collection). Signage is to include “Dock Full – Do Not Enter”. Drivers are to be directed to return to the site at an allocated time, when spaces are available.

GHD

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Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
Draft A	S. Clarke	B. Prinsloo		M. Hegarty		13/02/2018
Draft B	S. Clarke	B. Prinsloo				16/03/2018
Rev 2	S. Clarke	B. Prinsloo				21/05/2018
Rev 3	S. Clarke	T. Thorp				12/7/2018
Rev 4	S. Clarke	T. Thorp				31/07/2018