Table 7.4: Off-street parking provision (based on the indicative concept proposal)

<table>
<thead>
<tr>
<th>Type</th>
<th>Number of parking spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adaptable dwelling car spaces</td>
<td>35</td>
</tr>
<tr>
<td>Car share spaces (50% to be accessible)</td>
<td>15</td>
</tr>
<tr>
<td>Accessible retail / non-residential car spaces</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>65</td>
</tr>
</tbody>
</table>

Figure 7.14 shows the indicative basement car park layout for the Metro Quarter. The final design of the basement will be subject to confirmation of total parking to be provided.

Figure 7.14: Indicative basement car park layout

Car share

A minimum rate of 1 car share space per 50 dwellings has been applied and is based on the City of Sydney’s DCP 2012 which requires a minimum of 1 space per 50 off-street car spaces. 50 per cent of these spaces will be designed as accessible spaces as per Australian Standard AS2890.6. A minimum of 15 off-street car share spaces would ensure residents of the Metro Quarter have a suitable alternative travel mode available. The future provision of additional off-street or on-street car share spaces should also be considered in order to reduce the reliance on car ownership and contribute to sustainable modes of travel.

There is also the potential that on-street spaces managed by the City of Sydney would include car-share provision, encouraging more frequent use of the service by residents of the Metro Quarter and the general public. Access arrangements for off-street car share spaces will be determined at later development stages in accordance with City of Sydney requirements. As a general principle all car share spaces will need to be available to general public access regardless of location.

Service vehicle parking

The number of parking spaces for service vehicles has been based on the City of Sydney DCP requirement rate of 1 space for the first 50 dwellings, plus 0.5 spaces for every 50 dwellings or part thereafter. Given the 700 Metro Quarter dwellings, this would result in the provision of 8 service vehicle parking spaces.
Motorcycle parking

The number of parking spaces for motorcycles has been based on the City of Sydney DCP requirement rate of 1 space for every 12 car spaces. A total of 65 off-street car spaces is proposed for the Metro Quarter, resulting in the provision of 6 motorcycle parking spaces.

Bicycle parking

Off-street bicycle parking to support the Metro Quarter OSD would be provided in line with the rates specified under the Sydney DCP 2012. However, as the exact future mix of commercial and community land uses within the ground floor and podium are to be further developed as part of the detailed SSD Application, an estimation of the required bike parking is provided below in order to understand indicative requirements. The bike parking requirements will be refined further in the detailed SSD Application.

Bicycle parking requirements for the Waterloo Station will be provided as part of the CSSI Approval within a bicycle storage room in the southern station box (accommodating 100 spaces), as well as 40 bike rails (accommodating 80 bikes) within the public domain along Raglan, Cope and Wellington Streets.

An indicative breakdown of the bicycle parking based on the requirements of Sydney DCP 2012 is provided in the following table:

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Apartments/GFA</th>
<th>Rate</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>700 apartments</td>
<td>1 space per dwelling (residents)</td>
<td>700 spaces (residents)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 space per 10 dwellings (visitors)</td>
<td>70 spaces (visitors)</td>
</tr>
<tr>
<td>Shops, restaurants and cafes</td>
<td>4,000m² GFA</td>
<td>1 space per 250m² GFA</td>
<td>16 spaces (employees)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 plus 1 per 100m² over 100m² GFA</td>
<td>41 spaces (customers)</td>
</tr>
<tr>
<td>Office premises or business premises</td>
<td>8,500m² GFA</td>
<td>1 per 150m² GFA</td>
<td>57 spaces (employees)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 per 400m² GFA</td>
<td>22 spaces (customers)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>906 spaces</strong></td>
<td></td>
</tr>
</tbody>
</table>

The concept proposal is expected to generate bicycle parking requirements for approximately 906 spaces.

The concept proposal includes 700 basement spaces for residents, 400 spaces in the basement for a bike hub and 40 spaces provided at street level along Raglan Street (in addition to the 80 bike rail spaces provided as part of the CSSI Approval). This equates to a total of 1,220 bicycle parking spaces (excluding the 100 spaces provided within the bike storage inside the Metro Station box as part of the CSSI Approval), which satisfy the total number required for the Metro Quarter OSD.

The bike hub would be accessible from the proposed public plaza via a ramp and would also include end of trip facilities, including showers and lockers, consistent with the requirements of Sydney DCP 2012.
7.6.2 On-street parking

The on-street parking approach is designed to avoid creating unrestricted long stay parking, minimising traffic and amenity impacts on Waterloo Precinct and the wider road network. Table 7.6 outlines the approach to on-street parking for the Metro Quarter.

City of Sydney’s Neighbourhood Parking Policy manages on-street parking supply and demand using a range of parking controls and a parking permit scheme, applying throughout City of Sydney Local Government Area. Waterloo Precinct currently falls within the Redfern (Area 41) permit zone. The recommended controls and permit scheme conditions relevant to an urban renewal area outlined in this policy have been used to develop the on-street parking approach for Waterloo Precinct.

The on-street parking approach proposes controls and permit scheme conditions for areas within 400 metres of Sydney Metro Waterloo Station. This is to acknowledge the high pedestrian activity that will take place in the vicinity of the station and to limit unnecessary vehicle movements around the station precinct.

Within 400 metres of Waterloo Station, short stay parking on selected local streets may be permitted. Permit holders would be prohibited from using these spaces for longer stays in this area. Exceptions may be granted to care workers in accordance with City of Sydney policies.

New developments are proposed to be ineligible for parking permits, including residents and businesses, in line with the City’s Neighbourhood Parking Policy. The proximity of the Metro Station and urban context is expected to reduce the need for private vehicle use significantly, limiting parking needs.

Table 7.6: Proposed on-street parking approach, Waterloo Precinct

<table>
<thead>
<tr>
<th>Area</th>
<th>Land use characteristics</th>
<th>Parking controls</th>
<th>Permit scheme controls</th>
</tr>
</thead>
</table>
| Within 400m of Waterloo Station | • Mainly mixed-use with retail and related non-retail  
• High density residential  
• Metro Station | • ‘Point to point’ and taxi drop-off / pick-up at Waterloo Station  
• Restricted parking accommodating short stay users only on designated streets | • No permits for new developments  
• No permit holder exemptions (with exception of approved carers) |

7.6.3 Travel plan

Travel demand within the Metro Quarter will be managed to reduce car dependency. This can be implemented through workplace travel plans and green travel plans which typically involve a set of practical initiatives that are put in place by employers or building managers before occupying a new or existing development that encourages staff and residents to choose alternatives to driving that are healthier and more sustainable. For travel plans to be successful in reducing vehicular travel demand, they should be developed in a tailored manner that respects the specific needs to each particular location / organisation.

Elements of such travel plans can include information programs for sustainable transport, active transport initiatives, flexible work hours, proactive cooperation with transport agencies to tailor public transport facilities to the site and employer initiated parking policies that support public transport use. Future developers of the Metro Quarter will be charged with supporting the development, delivery and monitoring of travel plans within the development site; in accordance with City of Sydney guidelines. Expected outcomes of the plans (e.g. mode share targets) should be monitored on an ongoing basis.
7.7 Road network

7.7.1 Aimsun traffic model

An Aimsun traffic model for the area surrounding Waterloo was built to test future land use and road network options. The base model has been calibrated and validated to weekday peak periods using intersection counts, travel time surveys, and origin-destination surveys. The purpose of the model is to assess cumulative network impacts within the highest demand weekday period. This approach and the study area extents was agreed with Transport for NSW, City of Sydney and Roads and Maritime Services via email on 29 May 2017.

A range of traffic and transport data was collected to calibrate and validate transport models. Data collected included:

- Intersection counts of light vehicles, heavy vehicles, buses, pedestrians, and cyclists covering every signalised intersection in the surrounding area. Counts cover an average weekday between the hours of 6-10am and 3-7pm
- Travel time surveys on the key routes through the study area including Botany Road, McEvoy Street, and Elizabeth Street. Counts cover an average weekday between the hours of 6-10am and 3-7pm
- Origin-Destination surveys matching key entry / exit points within the surrounding area including Botany Road, O’Riordan Street, Bourke Street, Elizabeth Street, McEvoy Street and Henderson Road. Counts cover an average weekday between the hours of 6-10am and 3-7pm
- Traffic generation surveys of comparable residential / mixed used developments in Waterloo and Redfern including counts of pedestrians and cyclists. Counts cover an average weekday between the hours of 6-10am and 3-7pm. Intersection data was also collected at the same time to ensure volumes were comparable to previously collected days.

The base model was reviewed by RMS on 16 May 2018 and revised based on their feedback. The agreed final model was issued on 24 May 2018.

The model covers a region broadly defined by the following roads (refer Figure 7.15):

- Phillip Street / Henderson Road to the north
- Wyndham Street to the west
- Bourke Street / Bourke Road to the south
- Elizabeth Street to the east
7.7.2 Road network performance

Analysis of the base Aimsun model developed for the Waterloo Precinct indicates that the road network currently experiences congestion during both morning and evening weekday peak periods with vehicles travelling at low speeds compared to the speed limit. This is shown in Figure 7.16 and Figure 7.17 which shows the speed ratio (average travel time speed versus sign-posted speed limit) along each section of road during both peak periods. Constrained intersections where this is particularly evident include:

- Botany Road / Henderson Street and Wyndham Street / Henderson Road
- Botany Road / McEvoy Street and Wyndham Street / McEvoy Street
- Botany Road / Bourke Street and O'Riordan Street / Wyndham Street / Bourke Road
- Elizabeth Street / Bourke Street

These results represent a constrained and congested road network around Waterloo Precinct. This supports the approach that future car mode share for Waterloo Precinct should be minimised as much as possible. The vast majority of new trips from the Precinct will be undertaken by public transport and active transport.
Figure 7.16: Morning peak 2017 base network Level of Service (Aimsun)
Figure 7.17: Evening peak 2017 base network Level of Service (Aimsun)

7.7.3 Trip generation

Trip generation rates are an influential component of the transport assessment process, directly related to and impacting on mode share. Trip generation rates for developments are influenced by the following key factors:

- The quality of public transport services and facilities
- Active transport links and street environment
- Levels of car parking provision and car ownership
- Demographics of the area
- Density and intensity of development
- Activities in the surrounding urban environment.
Trip generation rates are subsequently very site specific due to the interplay of these and other factors. As part of determining a meaningful base trip generation rate for Waterloo Precinct, a number of comparable high density developments have been selected and surveyed to determine the existing generation rates for all modes of travel. This approach has been used rather than adopting a blanket standard trip generation rate, such as those provided in Roads and Maritime’s *Guide to Traffic Generating Developments*, which is currently being updated by TfNSW and Roads and Maritime.

To select appropriate developments to undertake trip generation surveys, a benchmarking process has been undertaken in order to select sites that were reflective of the future land use and transport scenario envisaged for Waterloo.

The location and site selection process involved two keys stages:

- **Stage 1**: Identifying locations comparable to Waterloo socio-economically and geographically, using the 2011 SEIFA index, Census data including household size, housing tenure, motor vehicle ownership and population data, and public transport timetable data.

- **Stage 2**: Identify and select suitable survey sites in comparable locations, based on accessibility to public transport, development density, age of development, and the extent of parking supply restrictions.

The final shortlist of comparable locations for Stage 1 was identified previously in Table 5.3. Based on the Stage 2 criteria, two survey sites were identified; Site 1: 40-46 McEvoy Street, Waterloo and Site 2: 7-9 Gibbons Street, Redfern and are shown in Figure 7.18.

![Figure 7.18: Trip generation survey sites and walking catchment](image-url)
Site 1 in Waterloo had a consistent morning and evening peak hour trip generation rate of 0.14 vehicle trips per dwelling. This site is located within walking distance to Green Square Station and has significant levels of bus access to Sydney CBD.

Site 2 in Redfern had a trip generation rate of 0.09 and 0.08 vehicles trips per dwelling during the morning and evening peak hour, respectively. This site is located near Redfern Station, which provides access to a wide range of destinations of the heavy rail network.

Overall traffic generation rates from the two survey sites are lower than the high density average rate (0.19 and 0.15 vehicle trips per unit during the morning and evening peak hour, respectively) in Roads and Maritime’s Guide to Traffic Generating Developments – Updated traffic surveys (TDT 2013/04a), and comparable to specific Roads and Maritime survey sites in Strathfield, St Leonards, Pyrmont and Chatswood as shown in Figure 7.19.

A trip generation rate of 0.14 vehicle trips per dwelling (based on Site 1 in Waterloo and agreed to by RMS, TINSW and City of Sydney) was used in the assessment. This traffic generation rate has been developed assuming Category A parking rates from the SLEP 2012 are in place, in order to model a worst case scenario.

Figure 7.19 : Trip generation rate per dwelling
Proposed non-residential uses in the Metro Quarter precinct are small in scale. As such it is assumed that there will be limited associated vehicle traffic generation from these uses and that traffic generated will be outside the peak hour or undertaken as part of multi-purpose trips by residents. The total traffic generation potential of the Metro Quarter is therefore based on the residential yield only and is shown in Table 7.7.

Table 7.7: Metro Quarter traffic generation summary

<table>
<thead>
<tr>
<th>Land use</th>
<th>Dwellings</th>
<th>Peak hour traffic generation per dwelling (trips)</th>
<th>Total peak hour traffic generation (trips)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>700</td>
<td>0.14</td>
<td>98</td>
</tr>
</tbody>
</table>

This level of traffic generation and its impact on the surrounding road network is considered to be negligible. Traffic modelling to test the impact of such a small number of trips would generally not be required, however due to the expected large increase in pedestrian volumes as a result of the Metro Station, it was considered prudent to analyse the future performance of several key intersections in the precinct.

It is also noted that the traffic generation of the existing uses on the site would be low. The previous land use comprised light industrial uses and the retained church. It is expected that these uses would have generated a lower level of traffic than the proposed Metro Quarter development. As the site has already been cleared for the construction of the metro station, with the exception of the church, the ‘existing’ traffic generation is no longer applicable in any case.

### 7.7.4 Intersection modelling

Three key intersections around the Metro Quarter have been assessed as outlined below and in Figure 7.20:

- Cope Street/Raglan Street
- Botany Road/Henderson Road/Raglan Street
- Henderson Road/Wyndham Street
- Buckland Street / Wyndham Street
- Botany Road/ Buckland Street /Wellington Street
- Wellington Street / Cope Street

These intersections were chosen on the basis that they are adjacent to the proposed development. As such these intersections will experience the largest increase in pedestrian volumes. These intersections also play a strategically important role in the road and bus networks so their future performance warrants investigation.
No changes to intersection layouts are proposed with the exception of the conversion of the Raglan Street/Cope Street roundabout and Wellington Street/Cope Street roundabout to give-way priority controlled intersections. A marked pedestrian crossing is proposed on Raglan Street outside of the Metro Station entrance. This configuration is consistent with Sydney Metro’s proposed layout.

Modelling has been undertaken using SIDRA software for the following scenarios:

- 2017 Base
- 2036 Do Minimum – Includes Waterloo Station but no Metro Quarter development
- 2036 Metro Quarter – Includes Waterloo Station and Metro Quarter development

Traffic demand for the 2036 Do Minimum scenario was derived from applying a 0.25 per cent per year growth rate to existing traffic volumes based on analysis of past growth at permanent counter locations in the area. Pedestrian demands were provided by Sydney Metro.

Traffic and pedestrian demand for the 2036 Metro Quarter scenario were obtained by adding the Metro Quarter demand outlined in sections 7.5.1 and 7.7.1 to the Do Minimum demand.

Intersection performance has been measured by calculating the average delay of all movements and identifying a Level of Service based on RMS criteria in Table 7.8.
Table 7.8: Intersection level of service criteria (RMS Guide to Traffic Generating Developments)

<table>
<thead>
<tr>
<th>Level of Service</th>
<th>Average delay (sec/vehicle)</th>
<th>Signals or roundabout</th>
<th>Give way or stop sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>&lt;14</td>
<td>Good operation</td>
<td>Good operation</td>
</tr>
<tr>
<td>B</td>
<td>15-28</td>
<td>Good with acceptable delays &amp; spare capacity</td>
<td>Acceptable delays &amp; spare capacity</td>
</tr>
<tr>
<td>C</td>
<td>29-42</td>
<td>Satisfactory</td>
<td>Satisfactory</td>
</tr>
<tr>
<td>D</td>
<td>43-56</td>
<td>Operating near capacity</td>
<td>Near capacity &amp; accident study required</td>
</tr>
<tr>
<td>E</td>
<td>57-70</td>
<td>At capacity; at signals, incidents will cause excessive delays Roundabouts require other control model</td>
<td>At capacity, requires other control mode</td>
</tr>
<tr>
<td>F</td>
<td>&gt;70</td>
<td>Over capacity</td>
<td>Over capacity</td>
</tr>
</tbody>
</table>

Table 7.9 and Table 7.10 show the intersection performance of modelled intersections for the 2017 Base and 2036 scenarios during the morning and evening peak hour, respectively.

Table 7.9: Morning peak intersection performance

<table>
<thead>
<tr>
<th>Intersection</th>
<th>2017 Base</th>
<th>2036 Do Minimum</th>
<th>2036 Metro Quarter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vehicles</td>
<td>Pedestrians</td>
<td>Vehicles</td>
</tr>
<tr>
<td></td>
<td>Avg. delay (sec)</td>
<td>LOS</td>
<td>Avg. delay (sec)</td>
</tr>
<tr>
<td>Wyndham Street / Henderson Road</td>
<td>28</td>
<td>C</td>
<td>47</td>
</tr>
<tr>
<td>Botany Road / Henderson Road / Raglan Street</td>
<td>33</td>
<td>C</td>
<td>33</td>
</tr>
<tr>
<td>Cope Street / Raglan Street</td>
<td>5</td>
<td>A</td>
<td>N/A</td>
</tr>
<tr>
<td>Buckland Street / Wyndham Street</td>
<td>31</td>
<td>C</td>
<td>19</td>
</tr>
<tr>
<td>Botany Road / Buckland Street / Wellington Street</td>
<td>10</td>
<td>A</td>
<td>20</td>
</tr>
<tr>
<td>Wellington Street / Cope Street</td>
<td>5</td>
<td>A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Modelled intersection performance indicates the following:

- All intersections are expected to experience an increase in delay in the 2036 Do Minimum scenarios compared to the 2017 Base scenarios. This is generally due to a combination of additional pedestrian demands and background traffic at these intersections.
- Intersection performance in 2036 Metro Quarter scenarios is consistent with the 2036 Do Minimum scenarios.
- Botany Road / Henderson Road / Raglan Street is forecast to operate at Level of Service F during the morning and evening peak in all 2036 scenarios.
- Pedestrian delay time is also expected to increase in the 2036 scenarios compared to the 2017 base scenarios.

It is noted that these modelling results are sensitive to signal settings and cycle times. SIDRA has optimised the phasing to produce the least vehicle delay with a cycle time of 130 seconds for both signalised intersections. In reality shorter cycle times would result in improved pedestrian performance but increased delay for vehicles. The final operating configuration of these intersections will be at the discretion of Roads and Maritime Services.
Additional options were investigated for the Botany Road / Henderson Road / Raglan Street intersection in order to improve safety and efficiency for all road users. These included:

- A new pedestrian connection between the Metro station and the western side of Botany Road
- Scrambled pedestrian phasing at Botany Road

However, consultation with TfNSW in relation to the delivery of the Sydney Metro Waterloo Station has confirmed that the subject intersection is considered to be adequately sized to support the current configuration (phased crossing and widened pedestrian crossing on the southern side). Notwithstanding this, investigation into the viability of a new connection between the Metro Station and the western side of the Botany Road / Henderson Road / Raglan Street intersection is recommended.

### 7.7.5 Street hierarchy

As discussed in Section 5.5.3, TfNSW's movement and place framework allows streets to be classified according to their relative movement and/or place function. The framework has been applied to the road network surrounding the Metro Quarter and is presented in Figure 7.21.

![Figure 7.21: Metro Quarter movement and place](image)

The future function of Cope Street as a busy pedestrian corridor represents a significant departure from its current role as a local street with limited foot traffic. As such, the design of the Metro Quarter would include adjustments to pedestrian facilities along Cope Street to cater for the large future demand, maintain safety and provide an excellent urban amenity outcome. This would involve the reconfiguration of Cope with a maximum 40km/h speed limit, wider footpaths and narrow traffic lanes. It is also recommended that the implementation of Cope Street as a ‘slow street’ with a speed limit below 40km/h be considered. In accordance with Roads and Maritime’s *Design and implementation of shared zones including provision for parking*, a slow street should be
considered where there is high pedestrian activity combined with the need to maintain sufficient vehicle access and throughput, and where there is a desire to activate ground floor retail and promote walking and cycling.

A 'slow-street' is preferred over a shared zone given potential issues regarding point to point areas, drainage design and the likely number of vehicles using Cope Street each day. The final design of the street would need to ensure that vehicles are encouraged to travel slowly through the area via the use of traffic calming measures. A narrow carriageway would allow pedestrians to efficiently cross the road where possible whilst slow vehicle speeds would encourage cyclists of all abilities to mix with traffic.

Converting Cope Street to a 'slow-street' would also complement City of Sydney’s Liveable Green Network, particularly at its interface with Wellington Street where pedestrian and cyclist safety would improve.

7.8 Vehicle access

Proposed vehicle access on Botany Road, Cope Street and Wellington Street for the Metro Quarter are shown in Figure 7.22. These would be designed in accordance with AS 2890 and relevant Roads and Maritime and City of Sydney guidelines. Accesses will be subject to further investigation during the DA process and detailed design. Service vehicle volumes are expected to be in the order of 10-15 per day, including both 12m rigid and 19m articulated trucks. It is anticipated that these movements will be restricted to outside of peak periods where possible. Furthermore, both service vehicle access locations are proposed as left-in/left-out to minimise impacts to the road network. Service vehicle impacts are therefore considered to be negligible assuming both are designed to ensure sufficient sight lines and widths for all expected vehicle types.

Access via Raglan Street has not been proposed due to the very large forecast pedestrian flows at this location and potential safety concerns.

Residential vehicle access points are proposed on Cope Street and Wellington Street. The adopted traffic generation rate of 0.14 vehicles per dwelling indicates a demand of less than 50 vehicles per hour using each access point. These volumes are unlikely to cause operational network issues. Both accesses will need to be designed to ensure sufficient sight lines and widths for all expected vehicle types. Swept path analysis undertaken for these access points is provided at Appendix A.

Figure 7.22: Proposed vehicle access
7.8.1 Proposed shared zone in ‘new street’

The proposed street between Cope Street and the residential access is planned to operate as a shared zone. This is due to the large number of pedestrians expected to use the link as well as the low volume of projected vehicle movements – no more than 50 trips in the peak hour. Current guidance, based on Safer Speeds Policy & Guidelines – Shared Zones (Transport for NSW, 2012) indicates that a shared zone should carry no more than 100 vehicles per hour. The link will provide a high quality active transport link through the Metro Quarter which will increase permeability and help to disperse pedestrians and cyclist throughout the precinct. The final function and management of the street will need to be confirmed at the detailed design stage in consultation with TfNSW and RMS however with the information currently available, a shared zone is the preferred option for this link.

7.8.2 Emergency vehicle access

The proposed layout provides road frontage to all areas of the Metro Quarter site. Access for emergency vehicles has therefore not been precluded. It is recommended that the detailed design of the site and vehicle access locations considers the needs of emergency service vehicles to ensure safe and easy access to all areas of the site.

7.9 Construction of the proposal

A Construction Traffic Management Plan (CTMP) would be prepared as part of the Development Application for the Metro Quarter. The CTMP would outline the guidelines, general requirements and specific procedures to be used for any works that may have an impact on traffic operation. The plan would be prepared in accordance with the City of Sydney’s Appendix A: Standard Requirements for Construction Traffic Management Plan.

Items to be addressed would include but not be limited to:

- The safety of all road users
- Details of routes and roads to be used by construction vehicles
- Construction vehicle access arrangements
- Construction vehicle types
- Any temporary adjustments to existing traffic and transport infrastructure that may be required
- Details of any applications required to organise appropriate approvals for works zones and/or road closures, use of driveways, cranes, barricades or hoarding, and consent of construction hours
- Management of traffic including the use of traffic controllers to direct vehicles, pedestrians or cyclists

7.10 Infrastructure preservation and capital costing

No transport related corridor preservations additional to those already identified within relevant strategic plans and planning instruments have been proposed as part of this proposal. In addition, capital costing of transport items and assignment of funding responsibilities has not been undertaken and will be determined at a later date as the proposal progresses.
7.11 Draft Interchange Access Plan

An Interchange Access Plan is being developed for Waterloo Station by Sydney Metro in order to:

- Respond to the requirements of the Sydney Metro City & Southwest – Chatswood to Sydenham Critical State Significant Infrastructure conditions of approval.
- Inform the interchange design of transport and access facilities, including footpaths, cycle paths and bike parking and bus stops.
- Identify customer amenities, shelter, and road and traffic management required to ensure easy, accessible, safe and efficient customer transfer.
- Provide a list of actions for delivery partners and other stakeholders to enable the implementation of an easy customer transfer which supports the project objectives.

The Waterloo Interchange Access Plan will be finalised prior to the commencement of permanent above ground facilities at Waterloo Station. Further information on the methodology for planning and designing the interchange for Waterloo Station and its alignment with the Metro Quarter development is provided in the Waterloo Interchange Planning Technical Note at Appendix B.

The design and planning of Waterloo Station intersection and the Metro Quarter precinct is integrated to help manage conflict and allow for efficient and safe movement of all modes of travel. The relevant details that help to demonstrate integrated planning and design outcomes are presented in Table 7.11.
Table 7.11 : Waterloo Station Interchange Access Plan review

<table>
<thead>
<tr>
<th>Sydney Metro infrastructure</th>
<th>Integration with the surrounding network and community</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bicycle parking near the Metro Station entry on Raglan Street, consisting of a bicycle shed and racks</td>
<td>Bicycle parking is conveniently located within 30 metres of the entrance and within 50 metres of the gateline, improving the customer experience.</td>
</tr>
<tr>
<td>Bus stops on Botany Road and Wellington Street or Raglan Street</td>
<td>Bus stops on Botany Road and Wellington Street or Raglan Street would be accessible from widened footpaths surrounding the precinct and via the new street.</td>
</tr>
<tr>
<td>Taxi rank on the west side of Cope Street, adjacent to Metro Station</td>
<td>The taxi rank is located near the Metro Station entrance on Raglan Street and is easily accessible.</td>
</tr>
<tr>
<td>Relocation of the Botany Road southbound bus stop north of Raglan Street to south of Raglan Street</td>
<td>The Botany Road southbound interchange would include a widened footpath able to accommodate the expected pedestrian demand. The interchange is also easily accessible via the new street.</td>
</tr>
<tr>
<td>Point to point zone on the west side of Cope Street south of Raglan Street</td>
<td>The point to point zone is easily accessible as it is located near the Raglan Street entrance and the Community Centre.</td>
</tr>
<tr>
<td>Wellington Street cycleway (by others)</td>
<td>The proposed Wellington Street cycleway would interface with Cope Street, which is proposed to be traffic calmed and have a maximum speed limit of 40km/h. Therefore, cyclists have safe access routes via Cope Street or the new street when travelling to and from the Metro Station. The Wellington Street cycleway would also interface with the north-south cycle path on George Street, improving cycle connectivity. It is proposed that spatial and physical allowance is provided in the design of the streetscape and public domain on Wellington Street northern footpath to allow for the implementation of the proposed cycleway as part of the delivery of precinct development.</td>
</tr>
<tr>
<td>Widened pedestrian crossing on the south approach of the Botany Road / Henderson Road / Raglan Street intersection</td>
<td>A widened pedestrian crossing would accommodate the high volume of pedestrians anticipated due to Waterloo Station. This would also facilitate movements between the station and ATP, which is a major pedestrian desire line.</td>
</tr>
<tr>
<td>Slow points along Cope Street</td>
<td>Traffic calming along Cope Street would improve safety and promote active transport as an attractive mode of travel.</td>
</tr>
<tr>
<td>Spatial proofing for a mid-block crossing</td>
<td>It is proposed that spatial and physical allowance is provided in the design of the streetscape and public domain on Botany Road eastern footpath to allow for the implementation of the proposed signalised mid-block crossing as part of the planning and design of precinct development.</td>
</tr>
</tbody>
</table>
8. Implementation plan and strategy

8.1 Public transport

The assessment of public transport impacts due to the Metro Quarter proposal has demonstrated the following:

- Additional customer demand at Waterloo Station generated due to the Metro Quarter is anticipated to be relatively low (less than 200 peak hour trips) and can be accommodated given that the metro network will operate with a capacity of 46,000 people per hour per direction (almost double the capacity of existing heavy rail lines).

- Bus services generally operate with some spare capacity at existing stops surrounding the Metro Quarter. The Metro Quarter is expected to generate approximately 50 bus trips in the peak hour.

- Localised changes to bus routes 309, 310 and 355 such as increasing frequency / span of hours to match metro operation would improve the bus network and potentially benefit future residents within the Metro Quarter.

- Whilst future residents of the Metro Quarter will have a range of transport needs, key customer requirements will be met as follows:
  - Mass transit connections to key employment centres and the existing heavy rail network will help to serve the needs of the working age residents undertaking trips for employment.
  - Local bus services will help to serve the needs of older residents, social housing tenants and school age children.

8.2 Active transport

The assessment of active transport impacts due to the Metro Quarter proposal has demonstrated the following:

- The majority of pedestrian and cyclist demand generated near the Metro Quarter would be generated due to Waterloo Station rather than the proposed development.

- The footpath and waiting areas proposed at the Botany Road southbound bus interchange are sufficiently wide enough to accommodate waiting or queuing bus customers and pedestrians passing through the interchange.

- Improved footpaths on Henderson Road between ATP and Waterloo Station should be investigated given that this route would form a major pedestrian desire line.

- Widened pedestrian crossings spanning Botany Road at the Botany Road/Henderson Road/Raglan Street intersection and widened footpaths on Raglan Street on approach to the intersection would be required to accommodate the high volume of pedestrians anticipated.

- A midblock pedestrian crossing on Cope Street between Raglan Street and Wellington Street would be required, serving pedestrian trips between the Waterloo Estate and the Metro Quarter.

- The width of footpaths proposed on Cope Street and Raglan Street are sufficient to cater to the expected pedestrian demand.

- Cycling infrastructure to support Waterloo Station would significantly improve access to the Waterloo Metro Quarter.

- Planned cycling upgrades such as the Wellington Street cycleway would improve the safety and efficiency of cycling trips throughout the Metro Quarter precinct.
8.3 Parking and demand management

The assessment of parking and demand impacts due to the Metro Quarter proposal has demonstrated the following:

- High levels of accessibility and non-car options available to future residents of the Metro Quarter minimises the need for parking provision.
- Provision of point to point and taxi areas, restricted short-stay parking on designated streets, and no exemptions for residents except for approved carers would minimise traffic and amenity impacts around the station precinct as unnecessary vehicle movements would be limited.
- Category A parking rates from SLEP 2012 are proposed as the residential DCP control given that these rates are the most restrictive parking control in the City of Sydney. Category D are proposed to be applied to non-residential uses. Maximum parking provision allowed under Category A and D rates would be 427 total spaces, based on the currently assumed dwelling and retail mix.
- A proposed supply of 8 off-street service vehicle parking spaces and 6 off-street motorcycle parking spaces, is in line with City of Sydney’s DCP requirements.
- Provision of 700 residential bicycle parking spaces and 520 public bicycle parking spaces (comprising a bike hub and public domain), with end of trip facilities such as showers and lockers provided as part of the bike hub as per the requirements of the City of Sydney’s DCP.
- Travel plans which may include information programs for sustainable transport, active transport initiatives, flexible working hours and proactive cooperation between agencies should be delivered and monitored by future developers of the Metro Quarter to encourage staff and residents to choose alternatives to driving.

8.4 Road

The assessment of road network impacts due to the Metro Quarter proposal has demonstrated the following:

- Microsimulation modelling of the road network around Waterloo indicates that:
  - the road network is constrained and congested and hence future car mode share for the Metro Quarter should be minimised.
  - the anticipated low traffic generated due to the Metro Quarter (around 98 trips during peak hour) would have a negligible impact to the wider road network.
- Intersection modelling of the road network surrounding the Metro Quarter indicates that
  - there would be an increase in average vehicle delay with Waterloo Station in 2036 due to the large increase in pedestrian demand, however additional impacts due to the Metro Quarter would be negligible.
  - Botany Road / Henderson Road / Raglan Street is forecast to operate at Level of Service F with and without the Metro Quarter development by 2036 and therefore it is recommended to investigate new pedestrian connections between the Metro Station and the western side of the intersection to improve efficiency and safety.
  - converting the roundabouts at Raglan Street/Cope Street and Wellington Street/Cope Street to give-way intersections with pedestrian crossings would improve pedestrian safety.
  - Metro Quarter development has a negligible impact on intersection performance.
- Cope Street to have a maximum of 40km/h speed limit, wider footpaths and narrow traffic lanes would cater to the large future demand, maintain safety and provide an excellent urban amenity outcome.
8.5 Vehicle access

The assessment of access impacts due to the Metro Quarter proposal has demonstrated the following:

- Left-in/left-out service vehicle access on Botany Road and Wellington Street and the low number of service vehicles anticipated per day (10-15 vehicles) would result in negligible impacts to the road network provided that sufficient sight lines and widths are implemented for all expected vehicle types.

- The less than 50 vehicles per hour anticipated to use the residential access points either at Cope Street and Wellington Street would minimally impact the road network and are unlikely to cause operational network issues given the low volume of vehicles.

- Operating a shared zone on the proposed new street between Cope Street and the residential access points (provided that fewer than 100 vehicles per hour use the new street) would provide a high quality active transport link through the Metro Quarter, increasing permeability and help to disperse pedestrians and cyclists through the precinct.

8.6 Summary strategy

A summary of the traffic and transport infrastructure to be provided for the Metro Quarter is shown in Figure 8.1.
Figure 8.1: Summary of proposed measures to support the Metro Quarter

- Convert roundabout to give-way intersection
- Re-route 355 bus service to Wellington Street
- Increase frequency and operational hours of 388 from service Wellington Street Flyover
- Residential & service vehicle access (left-in, left-out)
- Pedestrian Crossing
- New street designated as a "shared zone"
- Service vehicle access outside peak periods (left-in, left-out)
- 6m footpath on Botany Road
- 16m footpath on Botany Road at bus interchange
- Utility Road northbound bus interchange
- Utility Road southbound bus interchange
- Provision of off-street parking for:
  - 65 cars (35 adaptable, 15 accessible)
  - 8 motorcycles
  - 8 service vehicles
  - 1,570 bays/7500 residential/520 public

NB: Parking subject to change. Maximum parking provision will be based on City of Sydney CoG AAD rates (Sydney LDP 2012)
Provision of the proposed traffic and transport infrastructure shown above may be staged and implemented by the agencies outlined in Table 8.1.

Table 8.1: Implementation plan

<table>
<thead>
<tr>
<th>Reference</th>
<th>Item</th>
<th>Agency</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT1</td>
<td>Increase frequency and operational hours of Botany Road bus services</td>
<td>Transport for NSW</td>
<td>By Metro Station opening (2024)</td>
</tr>
<tr>
<td>PT2</td>
<td>Increase frequency and operational hours of Wellington Street or Raglan Street bus services</td>
<td>Transport for NSW</td>
<td>By Metro Station opening (2024)</td>
</tr>
<tr>
<td>PT3</td>
<td>Re-route bus route 355 to Wellington Street or Raglan Street</td>
<td>Transport for NSW</td>
<td>By Metro Station opening (2024)</td>
</tr>
<tr>
<td>AT1</td>
<td>Construct Wellington Street cycleway</td>
<td>City of Sydney</td>
<td>By Metro Station opening (2024)</td>
</tr>
<tr>
<td>AT2</td>
<td>Widen footpaths around the Metro Quarter</td>
<td>Sydney Metro / UrbanGrowth Development Corporation</td>
<td>As development occurs</td>
</tr>
<tr>
<td>AT3</td>
<td>Widen pedestrian crossings on Botany Road at the Botany Road / Raglan Street / Henderson Road intersection</td>
<td>Sydney Metro / UrbanGrowth Development Corporation</td>
<td>By Metro Station opening (2024)</td>
</tr>
<tr>
<td>AT4</td>
<td>Widen footpaths on Raglan Street on approach to the Botany Road / Henderson Road / Raglan Street intersection</td>
<td>Sydney Metro / UrbanGrowth Development Corporation</td>
<td>By Metro Station opening (2024)</td>
</tr>
<tr>
<td>AT5</td>
<td>Investigate pedestrian improvements to and from Australian Technology Park</td>
<td>TBC</td>
<td>By Metro Station opening (2024)</td>
</tr>
<tr>
<td>AT6</td>
<td>Provide a midblock pedestrian crossing on Cope Street</td>
<td>Sydney Metro / UrbanGrowth Development Corporation</td>
<td>By Metro Station opening (2024)</td>
</tr>
<tr>
<td>AT7</td>
<td>Allow for future mid-block connections from adjacent precincts</td>
<td>Sydney Metro / UrbanGrowth Development Corporation</td>
<td>As development occurs</td>
</tr>
<tr>
<td>P1</td>
<td>Provide off-street parking spaces for cars, service vehicles and motorcycles</td>
<td>Sydney Metro / UrbanGrowth Development Corporation</td>
<td>As development occurs</td>
</tr>
<tr>
<td>P2</td>
<td>Provide bicycle parking and end of trip facilities</td>
<td>Sydney Metro / UrbanGrowth Development Corporation</td>
<td>As development occurs. Commuter facilities by metro opening (2024)</td>
</tr>
<tr>
<td>R1</td>
<td>Convert Raglan Street / Cope Street roundabout to a give-way intersection with pedestrian crossings</td>
<td>Sydney Metro / UrbanGrowth Development Corporation</td>
<td>By Metro Station opening (2024)</td>
</tr>
<tr>
<td>R2</td>
<td>Convert Wellington Street / Cope Street roundabout to a give-way intersection with pedestrian crossings</td>
<td>Sydney Metro / UrbanGrowth Development Corporation</td>
<td>By Metro Station opening (2024)</td>
</tr>
<tr>
<td>R3</td>
<td>Reduce speed limit on Cope Street – either to 40km/h or implement a ‘slow street’ (20km/h)</td>
<td>City of Sydney / Roads and Maritime</td>
<td>By Metro Station opening (2024)</td>
</tr>
<tr>
<td>Reference</td>
<td>Item</td>
<td>Agency</td>
<td>Timing</td>
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</tr>
<tr>
<td>A1</td>
<td>Provide Metro Quarter service vehicle access on Botany Road and Wellington Street</td>
<td>Sydney Metro / UrbanGrowth Development Corporation</td>
<td>By Metro Station opening (2024)</td>
</tr>
<tr>
<td>A2</td>
<td>Provide Metro Quarter residential vehicle access on Wellington Street and Cope Street</td>
<td>Sydney Metro / UrbanGrowth Development Corporation</td>
<td>As development occurs</td>
</tr>
<tr>
<td>A3</td>
<td>Operate a shared zone on the new street connecting to Cope</td>
<td>City of Sydney / Roads and Maritime</td>
<td>By Metro Station opening (2024)</td>
</tr>
</tbody>
</table>
Appendix A. Swept Path Analysis