NSW GOVERNMENT | sydney METRO

West

Major civil construction between The Bays and Sydney CBD

Environmental Impact Statement 2021

Technical Paper 1

Transport and traffic

Sydney Metro West

Major civil construction work between The Bays and Sydney CBD

Technical Paper 1 – Transport and traffic

October 2021 | Version: 1

Contents

Executive summary

Overview

Sydney Metro West will double rail capacity between Greater Parramatta and the Sydney CBD, transforming Sydney for generations to come. The delivery of Sydney Metro West is critical to keeping Sydney moving and is identified in a number of key strategic planning documents including the *Greater Sydney Region Plan: A Metropolis of Three Cities – connecting people* (Greater Sydney Commission, 2018a) and the Future Transport Strategy 2056 (Transport for NSW, 2020).

The once-in-a-century infrastructure investment will have a target travel time of about 20 minutes between Parramatta and the Sydney CBD, link new communities to rail services and support employment growth and housing supply.

Stations have been confirmed at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock, The Bays, Pyrmont and Hunter Street (Sydney CBD).

The planning process for Sydney Metro West is being assessed as a staged infrastructure application under section 5.20 of the *Environment Planning and Assessment Act 1979* (EP&A Act).

The Sydney Metro West Concept and major civil construction work for Sydney Metro West between Westmead and The Bays (Stage 1 of the planning approval process for Sydney Metro West), application number SSI-10038, were approved on 11 March 2021.

The Concept is described in Chapter 6 of the *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a) and includes:

- Construction and operation of new passenger rail infrastructure between Westmead and Sydney CBD, including:
  - Tunnels, stations (including surrounding areas) and associated rail facilities
  - Stabling and maintenance facilities (including associated underground and overground connections to tunnels)
- Modification of existing rail infrastructure (including stations and surrounding areas)
- Ancillary development.

Major civil construction work for Sydney Metro West between Westmead and The Bays (Stage 1 of the planning approval process) is described in Chapter 9 of the *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a) and includes:

- Tunnel excavation including tunnel support activities between Westmead and The Bays
- Station excavation for new metro stations at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock and The Bays
- Shaft excavation for services facilities
- Civil work for the stabling and maintenance facility at Clyde.

Stage 2 of the planning approval process (this proposal) includes all major civil construction work including station excavation and tunnelling between The Bays and Sydney CBD.

Future planning applications for Sydney Metro West will include tunnel fit-out, construction of stations, ancillary facilities and station precincts, and operation and maintenance of the Sydney Metro West line, between Westmead and Sydney CBD.

This proposal would be located largely underground in twin tunnels. The proposed major civil construction work between The Bays and Sydney CBD would include:

- Enabling work such as demolition, utility supply to construction sites, utility adjustments, and modifications to the existing transport network
- Tunnel excavation including tunnel support activities
- Station excavation for new metro stations at Pyrmont and Hunter Street, in the Sydney CBD.

Components of this proposal are subject to further design, and changes may be made during the ongoing design which take into account the outcomes of community and stakeholder engagement and environmental field investigations.

The surface construction work at station and shaft excavation sites are intended to occur across a period of about three years.

The *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020) assessed the impacts of The Bays Station construction site to:

- Carry out the excavation of The Bays Station
- Launch and support two tunnel boring machines for the drive west to the Sydney Olympic Park metro station construction site.

The Bays Station construction site is being established under the Sydney Metro West Concept and Stage 1 planning approval.

The Bays tunnel launch and support site in this proposal would be located within a part of The Bays Station construction site. This Technical Paper only assesses the proposed use of the eastern and southern part of The Bays Station construction site to launch and support two tunnel boring machines for the drive east to the proposed Hunter Street Station (Sydney CBD) construction sites. There would be minimal surface ground disturbance associated with this work.

Approach to transport and traffic assessment

To assess the impact of the major civil construction work between The Bays and Sydney CBD on the transport and traffic network, the following methodology has been used to identify and, where possible, quantify the following:

- Impacts on road network performance – Assessed through the use of traffic modelling (Aimsun and Vissim) to determine the performance of the road network with and without construction vehicles associated with this proposal
- Impacts on parking – Assessed through a qualitative analysis of removed parking spaces and availability of parking in nearby locations to determine the impacts of parking overflow
- Impacts on property access – Assessed through an analysis of existing access provisions and a comparison with access provisions during construction

- Impacts on public transport – Assessed through an analysis of proposed changes to public transport operations including routes and stop infrastructure to determine impacts on public transport customers
- Impacts on pedestrians and cyclists – Assessed through an analysis of proposed changes to shared user paths, cycleways, footpaths and pedestrian crossings to determine impacts on access to and availability of pedestrian and cycle infrastructure
- Cumulative impacts – Assessed through a qualitative analysis and use of traffic modelling to determine the performance of the road network with construction vehicle movements associated with other major projects expected to be occurring at the same time as this proposal based on current publicly available information.

Overview of potential impacts

The potential impacts of the proposal have been identified as the following:

- Temporary loss of parking spaces surrounding the Pyrmont Station construction sites and the Hunter Street Station (Sydney CBD) construction sites
- Temporary closure of pedestrian facilities in the vicinity of Pyrmont Station construction sites
- Temporary decommissioning of a bus stop adjacent to the Pyrmont Station western construction site
- Potential deterioration of intersection performance around construction sites
- Potential minor increase in delays to bus services on routes around construction sites
- Potential safety implications for pedestrians, cyclists and motorists, especially around construction access and egress points and during special events.

Summary of mitigation measures

The planning for the proposal and the arrangements of the construction sites have been developed to avoid and minimise transport and traffic related impacts where possible. This has included the following:

- Haulage routes have been developed in consultation with Transport for NSW and have aimed to minimise the use of local roads and use the most efficient route to the arterial road network
- Selection of truck sizes at each construction site has considered a balance between reducing overall truck movements and manoeuvrability to, from and within the construction sites.

Mitigation and management measures relevant to transport and traffic impacts of this proposal have been identified and broadly include:

- Ongoing consultation (as relevant) with Transport for NSW teams, Sydney Trains, NSW TrainLink, local councils, emergency services and bus operators for the duration of the construction period
- Using directional signage and line marking to direct and guide drivers and pedestrians past construction sites and on the surrounding road network.
- Coordinating with the Transport for NSW in the event of an unplanned transport or traffic related incident

- Notifying the community in advance of proposed road, public transport and pedestrian network changes through appropriate forms of community liaison
- Managing vehicle access to and from construction sites
- Enhancing pedestrian, cyclist and motorist safety near construction sites
- Maintaining access to existing properties and buildings in consultation with property owners
- Ensuring all trucks enter and exit construction sites in a forward direction, where feasible and reasonable
- Managing construction site traffic to minimise movements during peak periods
- Managing construction site traffic immediately around construction sites to minimise movements through school zones during pick up and drop off times
- Consulting relevant local councils to investigate opportunities to provide alternative parking facilities where existing parking is removed to facilitate construction activities
- Managing construction sites to minimise the number of constructions workers parking on surrounding streets
- Providing access at all times to properties for emergency vehicles.

Construction site specific mitigation and management measures (where applicable) have also been identified and are documented in Chapter 6 of this Technical Paper.

TERMINOLOGY

Term	Definition
Average delay	Duration, in seconds, of the average vehicle waiting time at an intersection
Bus lane	A traffic lane dedicated to buses, but which can also be used by taxi, hire cars, bicycles and motorcycles
Capacity	The nominal maximum number of vehicles which has a reasonable expectation of passing over a given section of a lane or roadway in one direction during a given time period under prevailing roadway conditions
CBD	Central Business District
Corridor	A substantial segment of the transport network, in which parallel, possibly competing, transport routes (and modes, where appropriate) operate between two locations
Cumulative impacts	Impacts that, when considered together, have different and/or more substantial impacts than a single impact assessment on its own
Detour	An alternative route, using existing roads, made available to traffic
Footpath	A paved area in a footway
Footprint	The extent of the impact that a development (in plan-view) makes on the land
Heavy vehicles	A heavy vehicle is classified as a Class 3 vehicle (a two-axle truck) or larger, in accordance with the Austroads Vehicle Classification System. A heavy vehicle is defined as having a gross vehicle mass of more than 4.5 tonnes.
HPAA	Areas of high pedestrian activity, near shopping strips, railway stations, bus interchanges, beach-sides and services such as medical centres. The maximum speed limit is 40 kilometres per hour at all times
Impact	Influence or effect exerted by a project or other activity on the natural, built and community environment
Light vehicle	Vehicles up to 4.5 tonnes Gross Vehicle Mass (GVM), including cars which have been registered for business use
Local road	A road or street used primarily for access to abutting properties
Midblock	A general location on a road between two intersections

Term	Definition
Motorway	Fast, high capacity, access-controlled roads that primarily link regional hubs and cities usually with grade separated interchanges and without traffic signals. May be tolled or untolled
NML	Noise Management Level
Off ramp	A ramp by which one exits a limited access highway/tunnel
On ramp	A ramp by which one enters a limited access highway/tunnel
Public transport	Includes, metro, train, bus, ferry and light rail
SMPM	Sydney Motorway Planning Model
SPECTS	Safety, Productivity and Environment Construction Transport Scheme
Transport for NSW	Transport for New South Wales
Truck and dog	A construction vehicle with 20 cubic metre capacity and a maximum length of 19 metres
Vehicles/hr	Vehicles per hour
Unreleased demand	In a microsimulation traffic model, this is the number of vehicles unable to enter the model due to congestion extending back into model entry points. The number of unreleased vehicles is an indication of the effectiveness of the modelled network in meeting the forecast traffic demand. The lower the number of unreleased vehicles, the better the modelled network is able to accommodate the forecast demand flows.

1 Introduction

1.1 Sydney Metro West

Sydney Metro West will double rail capacity between Greater Parramatta and the Sydney CBD, transforming Sydney for generations to come. The delivery of Sydney Metro West is critical to keeping Sydney moving and is identified in a number of key strategic planning documents including the *Greater Sydney Region Plan: A Metropolis of Three Cities – connecting people* (Greater Sydney Commission, 2018a).

The once-in-a-century infrastructure investment will have a target travel time of about 20 minutes between Parramatta and the Sydney CBD, link new communities to rail services and support employment growth and housing supply.

Stations have been confirmed at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock, The Bays, Pyrmont and Hunter Street (Sydney CBD). The main elements of Sydney Metro West are shown in Figure 1-1.

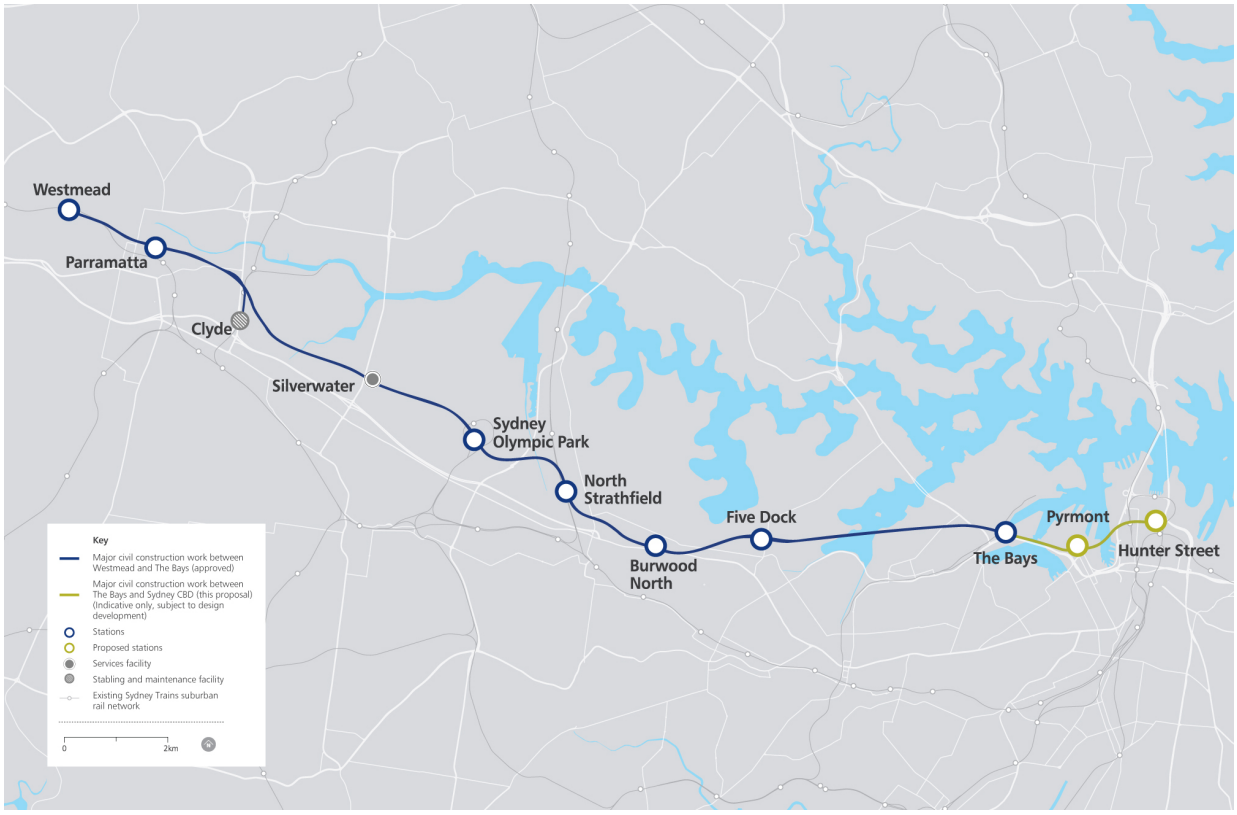

Figure 1-1 Sydney Metro West

The planning process for Sydney Metro West is being assessed as a staged infrastructure application under section 5.20 of the *Environment Planning and Assessment Act 1979* (EP&A Act).

The Sydney Metro West Concept and major civil construction work for Sydney Metro West between Westmead and The Bays (Stage 1 of the planning approval process for Sydney Metro West), application number SSI-10038, were approved on 11 March 2021.

The Concept is described in Chapter 6 of the *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a) and includes:

- Construction and operation of new passenger rail infrastructure between Westmead and Sydney CBD, including:
  - Tunnels, stations (including surrounding areas) and associated rail facilities
  - Stabling and maintenance facilities (including associated underground and overground connections to tunnels)
- Modification of existing rail infrastructure (including stations and surrounding areas)
- Ancillary development.

Major civil construction work for Sydney Metro West between Westmead and The Bays (Stage 1 of the planning approval process) is described in Chapter 9 of the *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a) and includes:

- Tunnel excavation including tunnel support activities between Westmead and The Bays
- Station excavation for new metro stations at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock and The Bays
- Shaft excavation for services facilities
- Civil work for the stabling and maintenance facility at Clyde.

Stage 2 of the planning approval process (this proposal) includes all major civil construction work including station excavation and tunnelling between The Bays and Sydney CBD.

Future planning applications for Sydney Metro West will include tunnel fit-out, construction of stations, ancillary facilities and station precincts, and operation and maintenance of the Sydney Metro West line, between Westmead and Sydney CBD. The associated potential impacts are being assessed and will be presented within the Environmental Impact Assessment currently being prepared for 'Sydney Metro West - Rail infrastructure, stations, precincts and operations' (Stage 3 of the planning approval process). Sydney Metro West - Rail infrastructure, stations, precincts and operations have been assessed in this assessment only in relation to potential cumulative impacts with this proposal, where relevant.

1.2 Overview of the proposal

This proposal would be located largely underground in twin tunnels. Indicative locations of the proposed alignment and stations are shown in Figure 1-2.

Figure 1-2 Overview of Sydney Metro West between The Bays and Sydney CBD

The proposed major civil construction work between The Bays and Sydney CBD would include:

- Enabling work such as demolition, utility supply to construction sites, utility adjustments, and modifications to the existing transport network
- Tunnel excavation including tunnel support activities
- Station excavation for new metro stations at Pyrmont and Hunter Street, in the Sydney CBD.

Components of this proposal are subject to further design, and changes may be made during the ongoing design which take into account the outcomes of community and stakeholder engagement and environmental field investigations.

The surface construction work at station and shaft excavation sites are intended to occur across a period of about three years.

The proposal is further described in Chapter 5 (Project description) of the Environmental Impact Statement.

The *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020) assessed the impacts of The Bays Station construction site to:

- Carry out the excavation of The Bays Station
- Launch and support two tunnel boring machines for the drive west to the Sydney Olympic Park metro station construction site.

The Bays Station construction site is being established under the Sydney Metro West Concept and Stage 1 planning approval.

The Bays tunnel launch and support site in this proposal would be located within a part of The Bays Station construction site. This Technical Paper assesses the proposed use of the eastern and southern part of The Bays Station construction site to launch and support two tunnel boring machines for the drive east to the Hunter Street Station (Sydney CBD) construction sites. There would be minimal surface ground disturbance associated with this work.

1.3 Purpose and scope of this Technical Paper

This Transport and Traffic Technical Paper is one of a number of Technical Papers that form part of the Environmental Impact Statement for major civil construction work between The Bays and Sydney CBD. The purpose of this Technical Paper is to identify and assess the potential impacts of the proposal in relation to transport and traffic. It responds directly to the Secretary's Environmental Assessment Requirements outlined in Section 1.3.1.

The study area assessed in this Technical Paper is the transport and traffic environment surrounding the construction vehicle routes from each site to the nearest arterial road interface.

The objectives of this Technical Paper include:

- A review of the existing transport network, including a description of transport infrastructure in the study area, public transport service provision, pedestrian and cycle networks, and traffic volumes and patterns
- Assessment of the potential transport and traffic impacts of this proposal, including consideration of cumulative impacts
- Report on the operational traffic performance of the existing and future road network around The Bays, Pyrmont and Sydney CBD, during typical weekday AM peak and PM peak hours
- A suite of measures to mitigate and manage the identified transport and traffic impacts during construction of this proposal.

1.3.1 Secretary's environmental assessment requirements

The Secretary's Environmental Assessment Requirements were issued on 07 July 2021. The requirements specific to transport and traffic, and where these requirements are assessed in this Technical Paper, are outlined in Table 1-1.

In support of seeking the Secretary's Environmental Assessment Requirements, the *Sydney Metro West Scoping Report – Major civil construction from The Bays to Sydney CBD* (Sydney Metro, 2021) identified a number of investigations and further assessments relevant to this Technical Paper. How the Technical Paper addresses these matters is provided in Table 1-2.

Table 1-1 Secretary's environmental assessment requirements – Transport and traffic

Secretary's environmental assessment requirements	Where addressed
5. Transport and traffic	
1 Construction transport and traffic (vehicle, pedestrian and cyclists) impacts of construction, including but not necessarily limited to:	
a. a considered approach to route identification and scheduling of construction vehicle movements;	Section 3.5 and 5.4 to 5.7
b. the indicative daily number, frequency and size of construction related vehicles (passenger, commercial and heavy vehicles, including spoil management movements) across the construction schedule;	Section 3.5 and 5.4 to 5.7
c. construction worker parking and management	Section 3.5
d. the nature of current traffic (types and number of movements) on construction access routes (including consideration of peak traffic times and sensitive road users and parking arrangements);	Section 4.2 to 4.4
e. access constraints and impacts on public transport (infrastructure and services), pedestrians and cyclists and property; and	Section 5.1 to 5.2 and 5.4 to 5.6
f. the need to close, divert or otherwise reconfigure elements of the road, pedestrian and cycle network associated with construction of the project and the duration of these changes; and	Section 5.4 to 5.7
g. impacts to on-street parking, loading, servicing and pick-up, including to residents and businesses.	Section 5.4 to 5.6

Table 1-2 Investigations and further assessments identified in Scoping Report – Transport and traffic

Investigations and further assessments	Where addressed
Transport and traffic	
Identification of the existing transport and traffic environment including consideration of peak traffic times and sensitive road users and parking arrangements	Section 4
Identification of haulage routes, construction site access and egress points	Section 5
Daily and peak traffic movements likely to be generated and the potential impacts on the local and regional traffic network	
Potential for temporary service adjustments required to rail and bus services to allow for construction activities to safely occur	
Potential for temporary adjustments to vehicular, pedestrian, cyclist, emergency services and public transport access and duration of these changes	

Investigations and further assessments	Where addressed
Potential for temporary adjustments to parking supply, loading zones, servicing access and taxi zones	
Potential for temporary altered access to private property	
Measures to minimise or mitigate identified potential impacts, including an assessment of available options taking into consideration the implementation of the *Sydney Metro Construction Traffic Management Framework* (Sydney Metro, 2020), and the expected effect of the measures proposed, in accordance with relevant best practice guidelines	Section 6

1.4 Structure of this Technical Paper

The structure of this Technical Paper is outlined below:

- Chapter 2 presents relevant legislative and policy context to this proposal
- Chapter 3 documents the assessment methodology for this assessment
- Chapter 4 details the existing transport and traffic environment
- Chapter 5 provides an assessment of the potential transport and traffic impacts of this proposal during construction, including cumulative impacts
- Chapter 6 identifies mitigation and management measures.

2 Legislative and policy context

The legislative and policy context in the *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a) would broadly apply to the transport and traffic assessment for the major civil construction work between The Bays and Sydney CBD. The legislation, policy and guidelines that are relevant to this proposal are summarised in Table 2-1.

The following guidelines were not considered to be relevant to this proposal:

- *Cycling Aspects of Austroads Guides (Austroads, 2014)*
- *NSW Bicycle Guidelines v 1.2 (RTA, 2005)*
- *Planning Guidelines for Walking and Cycling (DIPNR, 2004)*
- *Transport for NSW Sustainable Design Guidelines Version 4.0 (Transport for NSW, 2017).*

Table 2-1 Relevant legislation, policy and guidelines

Legislation/policy/guideline	Brief description	Relevance to proposal
Traffic Modelling Guidelines (Roads and Maritime Services, 2013)	The Traffic Modelling Guidelines were developed to provide consistency in traffic modelling practice and promote high quality model outputs.	• The approach to traffic modelling for this assessment aligns with the Traffic Modelling Guidelines and is detailed in Section 3.
Traffic Signals in Microsimulation Modelling (Roads and Maritime Services, 2018)	The guideline provides technical direction including a brief overview of the SCATS system and endorses traffic signals key requirements and identifies appropriate data sources.	• The approach to traffic modelling for this assessment is aligned with the Traffic Signals in Microsimulation Modelling guidance.
Guide to Traffic Management – Part 3 Transport Study and Analysis Methods (Austroads, 2020)	The guideline provides direction for the collection and analysis of traffic data for the purpose of traffic management and traffic control within a network, including guidance on traffic studies and surveys.	• The approach to traffic modelling for this assessment is aligned with the Transport Study and Analysis Methods guidance.
Guide to Traffic Generating Developments Version 2.2 (RTA, 2002)	The guide outlines all aspects of traffic generation considerations relating to developments and gives background into the likely impacts of traffic from various types of developments, thereby illustrating the importance of accurate development assessment.	• The approach to traffic modelling for this assessment is aligned with the Guide to Traffic Generating Developments and is detailed in Section 3.4.

3 Assessment methodology

3.1 Overview

To assess the impact of this proposal on the transport and traffic network, the following methodology has been used to identify and, where possible, quantify the following:

- Impacts on road network performance – Assessed through the use of traffic modelling (Aimsun and Vissim) to determine the performance of the road network with and without construction vehicles associated with this proposal
- Impacts on parking – Assessed through a qualitative analysis of temporarily removed parking spaces and availability of parking in nearby locations to determine the impacts of parking overflow
- Impacts on property access – Assessed through an analysis of existing access provisions and a comparison with access provisions during construction
- Impacts on public transport – Assessed through an analysis of proposed changes to public transport operations including routes and stop infrastructure to determine impacts on public transport customers
- Impacts on pedestrians and cyclists – Assessed through an analysis of proposed changes to shared user paths, cycleways, footpaths and pedestrian crossings to determine impacts on access to and availability of pedestrian and cycle infrastructure
- Cumulative impacts – Assessed through a qualitative analysis and use of traffic modelling to determine the performance of the road network with construction vehicle movements associated with other major projects expected to be occurring at the same time as this proposal based on current publicly available information.

3.2 Study area

The study area relevant to the traffic and transport assessment comprises the area covered by the traffic modelling. Modelling was undertaken in the following geographical sub-areas corresponding to each construction site:

- The Bays tunnel launch and support site
- Pyrmont Station construction sites
- Hunter Street Station (Sydney CBD) construction sites.

3.3 Traffic modelling approach

To assess the impacts of major civil construction work between The Bays and Sydney CBD on road network performance, traffic modelling has been undertaken of proposed primary and secondary construction vehicle routes (where applicable) between each construction site and the nearest arterial road inclusive of the arterial road interface.

The approach to traffic modelling undertaken for this assessment aligns with the *Traffic Modelling Guidelines* (Roads and Maritime Services, 2013) and includes the following broad steps:

- Development of calibrated and validated base models to align with existing operational conditions (2021) along each construction vehicle route
- Development of future year base models to align with anticipated operational conditions in the year of peak construction activity (2024 for The Bays tunnel launch and support site and Pyrmont Station construction sites and 2025 for the Hunter Street Station (Sydney CBD) construction sites) including road network changes as a result of the operation of the WestConnex M4-M5 Link project
- Future cordon demand matrices were extracted from the Sydney Motorway Planning Model (SMPM) provided by Transport for NSW for use in the future year modelling assessment (with and without proposal)
- Application of anticipated construction traffic demands to the future year base models to allow the identification of potential impacts to road network performance.

Models were developed using Aimsun Next version 20.0.2 (except for The Bays tunnel launch and support site) and Vissim (2021 SP06) (for The Bays tunnel launch and support site) traffic modelling software packages. Vissim was used for The Bays tunnel launch and support site to provide consistency with existing modelling undertaken by Transport for NSW for the Rozelle area. While The Bays construction site is being established under the Sydney Metro West Concept and Stage 1 planning approval as described in *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a), the baseline and future predictions are not to be compared with this assessment as the road network configuration for the assessed years has changed.

Aimsun and Vissim are microsimulation traffic modelling software packages that use dynamic, stochastic, discrete time modelling techniques to simulate the movement of individual vehicles based on car-following, lane-changing and gap acceptance algorithms that are updated several times every second. These vehicle-to-vehicle interactions provide the basis for calculating delays. Their flexibility allows the modelling of complex traffic operations. The advantage of this type of modelling is that the build-up and dissipation of queues and their effect on surrounding congestion and travel times is sensitively modelled. This type of modelling can provide a better representation of queuing, congestion and delays in at-capacity urban networks compared to static traffic modelling software packages.

The traffic modelling was undertaken for the morning and evening peak periods only, which is consistent with the standard approach for this type of assessment. The modelled peak periods are shown in Table 3-1.

Table 3-1 Modelled peak periods for each construction site

Construction site	Morning peak period	Evening peak period
The Bays tunnel launch and support site	7 am to 9 am	4.30 pm to 6.30 pm
Pyrmont Station construction sites	8 am to 10 am	4.45 pm to 6.45 pm
Hunter Street Station (Sydney CBD) construction sites	8 am to 10 am	5 pm to 7 pm

The peak traffic periods represent a worst-case scenario as during these periods the road network experiences the maximum background traffic demand and the available spare capacity of the road network is at its most limited. Construction vehicle volumes are anticipated to be higher outside the morning and evening weekday peak periods; however, the number of movements would remain relatively low and be within the range of daily variations in traffic volumes on the road network when compared to background traffic. The number of construction vehicles modelled for the construction assessment corresponds to the construction phase that generates the highest number of construction vehicle movements (when converted to passenger car units) over the two-hour modelled peak period. However, the traffic modelling results presented for the construction assessment corresponds to the network peak hour which represents a worst-case scenario.

To determine the effects of the COVID-19 pandemic on modelled traffic, existing traffic volumes for pre COVID-19 conditions in March 2019 and post COVID-19 conditions in March 2021 were compared at the Cahill Expressway (north of Macquarie Street) and the Western Distributor (east of Victoria Road). The latter location served both The Bays and Pyrmont precincts for comparison purposes due to the close proximity of the two precincts. This comparison showed that changes in traffic volume were minimal between a typical traffic month of 2021 and 2019 (less than five per cent). As a result, it is considered that the existing traffic volumes collected in March 2021 accurately represent traffic conditions regardless of the impacts of and can be concluded that the March 2021 traffic survey data accurately represent traffic conditions.

In addition, a review of Saturday traffic volumes compared to weekday traffic volumes at the Western Distributor and the Cahill Expressway generally indicates that weekday peak hour traffic volumes are higher than Saturday peak hour traffic volumes. Hence, a quantitative assessment on Saturdays has not been undertaken. Although construction vehicles would be generated on Saturdays, the addition of construction vehicles on the road would be below the peak hour volumes on a weekday, and therefore would not represent a worst-case scenario.

3.4 Performance indicators

The performance of a road network is largely dependent on the operating performance of intersections, which form critical capacity control points. The performance indicators that are reported for this assessment include:

- Intersection Level of Service – Based on criteria outlined in Table 3-2 and defined in the *Guide to Traffic Generating Developments* (Roads and Traffic Authority, 2002). The average delay assessed for signalised intersections is for all movements. The average delay assessed for priority (sign-controlled) intersections is for the worst movement and is expressed in seconds per vehicle
- Maximum queue length on each approach (in metres) over the peak hour.

Table 3-2 Intersection Level of Service criteria

Level of Service	Average delay per vehicle (seconds per vehicle)	Traffic signals and roundabouts
A	Less than 15	Good operation
B	15 to 28	Good with acceptable delays and spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Operating near capacity

Level of Service	Average delay per vehicle (seconds per vehicle)	Traffic signals and roundabouts
E	57 to 70	At capacity; at signals, incidents will cause delays Roundabouts require other control mode
F	Over 70	Extra capacity required

Source: Guide to Traffic Generating Developments (Roads and Traffic Authority, 2002)

It is generally accepted that when intersection performance falls to Level of Service D, investigations should be initiated to determine if suitable remediation can be provided. However, limited road capacity and high peak period traffic demands mean that, in general, Level of Service E and Level of Service F are regularly experienced by motorists across all road networks, particularly during peak periods.

3.5 Key assumptions

Key assumptions included for the analysis of construction impacts are outlined below.

3.5.1 Construction vehicle types

The anticipated construction vehicle numbers are based on factors such as sites accessibility (factoring any constraints on the local road network), materials required to be delivered to the site, spoil volumes and construction activities. The heavy vehicle types and sizes selected and shown in Table 3-3 are based on the proposed vehicles anticipated to be able to service the construction sites. Larger vehicles may also be required for oversize deliveries or those under the Safety, Productivity and Environment Construction Transport Scheme (SPECTS). SPECTS allows participating heavy vehicles greater road network access and the ability to carry more construction materials in return for meeting higher environmental, safety and compliance standards.

Table 3-3 Construction vehicle type

Construction site	Heavy vehicle type	Capacity (cubic metres)
The Bays tunnel launch and support site	Rigid truck and dog trailer	20
Pyrmont Station construction sites Hunter Street Station (Sydney CBD) construction sites	Rigid truck	8

Under the Heavy Vehicle National Law (NSW), a heavy vehicle is defined as having a gross vehicle mass of more than 4.5 tonnes. Within this assessment, a light vehicle is classified as any vehicle equal to or less than 4.5 tonnes.

3.5.2 Construction hours

Proposed construction hours for each construction activity are shown in Table 3-4. These hours have been developed based on a balanced consideration of the construction program and the need to minimise noise and traffic-related impacts.

Most aboveground construction activities would be carried out during the following hours:

- Monday to Friday: 7 am to 6 pm
- Saturday: 8 am to 6 pm (with highly noise-intensive work on Saturday restricted to between 8 am to 1 pm)
- No works on Sundays or public holidays.

Table 3-4 Proposed construction hours

Construction work	Construction hours	Comments or exceptions
Underground construction work		
Tunnelling (including associated excavation)	24 hours per day, seven days per week	Activities that support tunnelling may need to occur 24 hours per day, up to seven days per week. Rockbreaking in the tunnel and cross passages between 10 pm and 7 am would not occur except where appropriate noise impact management measures have been established.
Station excavation and concrete lining	24 hours per day, seven days per week	Out of hours underground excavation works at the Pyrmont Station construction sites would only occur once the acoustic sheds have been constructed. Mined cavern excavation works at the Hunter Street Station (Sydney CBD) eastern construction site would occur within the existing acoustic shed. The majority of vehicle movements at Pyrmont would likely be restricted to between 7 am and 10 pm due to proximity of night-time sensitive receivers. Infrequent heavy vehicles may, however, be required during the night-time at Pyrmont to support concrete delivery during cavern lining pours for safety reasons.
Aboveground construction work		
Enabling and site establishment work Aboveground construction work (including piling, civil works and construction of surface structures such as acoustic sheds)	• 7 am–6 pm Monday to Friday • 7 am–10 pm Saturdays • No work on Sundays or Public Holidays, with the exception of removal of spoil	Acoustic sheds would be constructed over excavation and spoil handling areas as early as possible at Pyrmont, prior to excavation and tunnelling work. Piling works would only occur intermittently during a 15 week period between 7 am to 6 pm. Up to two and four piling rigs would be active at the same time. Construction work requiring the temporary possession of roads or to accommodate road network requirements may need to be carried out outside of the standard daytime construction hours during periods of low demand to minimise safety impacts and inconveniences to motorists. Given the largely commercial receiver environment of the Hunter Street Station (Sydney CBD) construction sites, it is anticipated that extended construction hours for aboveground construction activities would occur on Saturdays and Sundays, outside the proposed construction hours.
Tunnel boring machine launch, support and retrieval	24 hours per day, seven days per week	Acoustic measures would be implemented, including an acoustic shed at The Bays tunnel launch and support site. Aboveground work supporting underground construction work (e.g. concrete pumping, truck loading) are expected to be required 24 hours per day, up to seven days per week where noise mitigation is in place.

Construction work	Construction hours	Comments or exceptions
Construction traffic for material supply to, and spoil removal from, tunnelling and underground excavation	24 hours per day, seven days per week	Restrictions may be in place during peak hours and special events. Heavy plant deliveries are likely to be restricted to outside of standard daytime construction hours during periods of low demand to minimise safety impacts and inconveniences to motorists. At Pyrmont, where night-time sensitive receivers are close to construction sites, substantial vehicle movements are likely to be restricted to between 7 am and 10 pm due to proximity of night-time sensitive receivers. Given the largely commercial receiver environment of the Hunter Street Station (Sydney CBD) construction sites, it is anticipated that extended construction hours for the removal of spoil would be proposed during night-time hours.
Utility management and power supply work	24 hours per day, seven days per week	Utility work requiring the temporary possession of roads may need to be carried out outside of the standard daytime construction hours during periods of low demand to minimise safety impacts and inconveniences to motorists.

However, other activities (as identified in Table 3-4) would need to be carried out outside these hours. As the tunnel boring machines would operate continuously, the tunnelling and associated support activities would need to be carried out up to 24 hours per day and seven days per week.

Other activities that would be carried out outside of standard construction hours include:

- Construction work, including utilities work, that would require the temporary possession of roads
- Work determined to comply with the relevant noise management level (NML) at the nearest sensitive receiver
- Work required to be carried out during rail possessions
- Delivery of materials outside approved hours as required by the NSW Police or other authorities (including Transport for NSW) for safety reasons
- Emergency situations where it is required to avoid the loss of lives and property and/or to prevent environmental harm
- Situations where agreement is reached with affected receivers.

Oversize deliveries are anticipated to be required to support the following activities:

- Tunnel boring machine delivery and recovery
- Establishment and demobilisation of spoil / acoustic sheds
- Gantry / overhead crane installation and demobilisation
- Establishment of site facilities including worker crib rooms
- Delivery of construction plant and equipment

- Haulage/delivery of tunnel segments.

All deliveries of this type would require Oversize Overmass (OSOM) Permits and would be undertaken during non-standard construction hours with specific traffic management arrangements.

3.5.3 Construction haulage routes and volumes

The construction haulage routes assessed for each construction site is provided in Section 5.5 to Section 5.6. For each construction site, the assessment has considered the construction stage that would generate the greatest number of movements in the AM and PM peak hours.

3.5.4 Construction assessment year

The indicative average number of trucks per day for spoil removal by site and activity is shown in Table 3-5 with the periods of peak construction activity shown in bold.

Table 3-5 Indicative average number of trucks per day for spoil removal

Site	Activity	Program	Proposed Truck type	Truck Capacity (cubic metre)	Average number of trucks per day[1]	Peak number of trucks per day[1]
The Bays	The Bays cross-over cavern	June 2023 – December 2023	Truck and Dog (19 m)	20	35	-
	Tunnel boring machine tunnelling	March 2024 – November 2024	Truck and Dog (19 m)	20	69	78
Pyrmont	Eastern access shaft	November 2023 – June 2024 February 2025 – March 2025	Rigid Truck (12.5 m)	8	73	71
	Western access shaft	June 2024 – December 2024	Rigid Truck (12.5 m)	8	71	74
	Eastern station cavern	September 2023 - May 2024 December 2024 – January 2025	Rigid Truck (12.5 m)	8	91	118
	Western station cavern	September 2023 - May 2024 December 2024 – January 2025	Rigid Truck (12.5 m)	8	18	20

Site	Activity	Program	Proposed Truck type	Truck Capacity (cubic metre)	Average number of trucks per day[1]	Peak number of trucks per day[1]
Sydney CBD	Eastern access shaft, station cavern and turnback cavern only	March 2023 – May 2025	Rigid Truck (12.5 m)	8	149	163
	Western access shaft	July 2024 – March 2025	Rigid Truck (12.5 m)	8	73	74
	Eastern and western access shaft, station cavern and turnback cavern	July 2024 – March 2025	Rigid Truck (12.5 m)	8	222	236

Note 1: Trucks per day means two-way movement (i.e. 20 trucks per day means 10 entering and 10 leaving each day). Number of trucks calculation in some cases is represented by an odd number due to averaging

Based on Table 3-5, the peak construction year that has been assessed is 2024 for The Bays tunnel launch and support site and Pyrmont Station construction sites and 2025 for the Hunter Street Station (Sydney CBD) construction sites. This coincides with peak tunnelling for this proposal, when the haulage of spoil (which constitutes the majority of construction vehicle movements) would be at its maximum.

An assessment of cumulative construction impacts has been undertaken, which considers projects that fall within the construction footprint of this proposal, as well as projects with construction vehicle routes that use roads near the proposal construction sites. Further details are provided in Section 5.7.

3.5.5 Construction worker parking

Some construction worker parking would be provided at The Bays tunnel launch and support site, although it would not meet the expected full demand based on indicative workforce numbers. Shuttle bus services to transfer construction workers to and from major transport interchange(s) would be considered. The final arrangements for this service would be confirmed during detailed construction planning of this proposal and may be coordinated with other concurrent transport projects in consultation with Transport for NSW.

No construction worker parking would be provided at Pyrmont Station and Hunter Street Station (Sydney CBD). Construction workers at these sites would be encouraged to use the extensive existing public transport network options or existing commercial car parking facilities.

The approach to managing and mitigating construction worker parking impacts would be managed through the development of Construction Traffic Management Plan/s as outlined within the Construction Traffic Management Framework (Appendix D of the Environmental Impact Statement).

4 Existing environment

4.1 Tunnel alignment between The Bays and Sydney CBD

The proposed corridor extends from the western edge of The Bays Station box through to the end of the turnback and stub tunnel east of the Hunter Street Station (Sydney CBD) construction sites.

The existing transport and traffic environment throughout the tunnel alignment contains a number of transport modes, including those described in Table 4-1.

Table 4-1 Transport modes around the corridor

Transport mode	Description
Regional active transport network	The regional active transport network around the Concept consists of footpaths, shared paths, signalised road crossings and cycle networks. Recreational cycle and pedestrian facilities are located along the foreshores of Iron Cove (known as the Bay Run), Rozelle Bay, Blackwattle Bay and Johnstons Bay. Key off-road cycle corridors include Drummoyne to Sydney CBD via Victoria Road and ANZAC Bridge, Kent Street and Pitt Street. The removal of the Victoria Road pedestrian overbridge has also resulted in significant pedestrian and cyclist demand from The Crescent and A4-City West Link Road via James Craig Road and Solomons Way onto the ANZAC Bridge.
Rail network	Rail services are operated by Sydney Trains and NSW TrainLink, providing connections throughout Sydney, regional NSW and interstate. Relevant major interchanges between rail lines are located at Wynyard station, including the following rail lines: • T1 North Shore Line • T2 Inner West Line • T3 Liverpool Line • T4 Eastern Suburbs Line • T8 Airport Line • T9 Northern Line.
Metro	The Sydney Metro City & Southwest (currently under construction) in the vicinity of the Sydney CBD Sydney Metro West major civil construction work between Westmead and The Bays (Stage 1 of the planning approval process)
Bus network	The bus network generally consists of cross-regional services; services that connect to metropolitan centres and strategic centres; local services that connect to rail stations, shopping centres, school and hospitals; and on-demand services. Major bus interchanges are located around Wynyard Station and various locations throughout the Sydney CBD.
Light rail	The following light rail lines are within the Concept: • The L1 Dulwich Hill Line – Operates between Dulwich Hill and Central via Lilyfield and Pyrmont. Light rail stops between Leichhardt North and Central are located in the vicinity of the proposal corridor

Transport mode	Description
	• The L2 Randwick Line – Operates between Randwick and the Sydney CBD. Various stops, including the Wynyard stop, are within the vicinity of the Concept throughout the Sydney CBD • The L3 Kingsford Line – Operates between Juniors Kingsford and the Sydney CBD. Various stops, including the Wynyard stop, are within the vicinity of the Concept throughout the Sydney CBD.
Ferry	Ferry services and stops operate at Circular Quay and Pyrmont in the vicinity of the proposal corridor.

4.2 The Bays tunnel launch and support site

The Bays Station construction site is being established under the Sydney Metro West Concept and Stage 1 planning approval as described in *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a). This included a description of the existing environment as it relates to transport and traffic.

The transport and traffic environment in the area around The Bays tunnel launch and support site, particularly at A4-City West Link Road / Victoria Road intersection, has been altered due to works associated with construction of the approved Western Harbour Tunnel and Warringah Freeway Upgrade and the WestConnex M4-M5 Link. However, the road network layout is generally similar with only minor changes to lane provision. Furthermore, the transport and traffic environment within White Bay (including Port Access Road, Solomons Way and Sommerville Road) has been altered due to the existing construction work for The Bays Road Relocation Project for Sydney Metro West. Following completion of The Bays Road Relocation work, The Bays Station construction site (under the existing Stage 1 approval) will be established.

Otherwise, the existing environment generally remains consistent in that the active, public transport and road networks outside of White Bay would be the same as the environment presented as part of the *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro 2020a). The only changes include:

- Footpaths are only partially provided at A4-City West Link Road due to temporary footpath closures associated with construction of approved Western Harbour Tunnel and Warringah Freeway Upgrade and the WestConnex M4-M5 Link
- Short bus only lanes at the Victoria Road / A4-City West Link Road intersection on the westbound approach and the northbound kerbside departure lane between The Crescent and Lilyfield Road have been removed to facilitate works associated with construction the approved Western Harbour Tunnel and Warringah Freeway Upgrade and the WestConnex M4-M5 Link
- The number of lanes for the left-turn from the A4-City West Link Road to Victoria Road northbound has been reduced from three to two lanes
- The posted speed limit in the study area has been reduced from 70 kilometres per hour to 60 kilometres per hour (A4-City West Link Road) to facilitate works associated with construction of the approved Western Harbour Tunnel and Warringah Freeway Upgrade and the WestConnex M4-M5 Link. Similarly, the posted speed limit at The Crescent has been reduced from 60 kilometres per hour to 40 kilometres per hour.

4.2.1 Active transport network

Pedestrian activity within the immediate vicinity of the construction site is low given the industrial land uses present. Footpaths are provided on both sides of Victoria Road, James Craig Road and Robert Street. Footpaths are provided on one side of Solomons Way and Sommerville Road, however sections of these roads are not open to the general public. The surrounding suburbs of Rozelle, Balmain, Glebe and Annandale have well-developed pedestrian networks.

Pedestrian crossings are provided at the following locations:

- Footpaths are only partially provided at The Crescent due to temporary footpath closures associated with construction of the approved Western Harbour Tunnel and Warringah Freeway Upgrade and the WestConnex M4-M5 Link
- Signalised crossings at the Victoria Road / Robert Street intersection, the Victoria Road/The Crescent intersection and the James Craig Road / A4-City West Link Road intersection
- Staged crossing via the median at the roundabout on James Craig Road (east of The Crescent).

The cycle network surrounding the construction site includes:

- Off-road shared paths on Victoria Road, James Craig Road, ANZAC Bridge, The Crescent, Robert Street (east of Buchanan Street), Railway Parade, and throughout Jubilee Park and on the western side of White Creek
- On-road cycle routes along Balmain Road, Darling Street, Lilyfield Road, Robert Street, Crescent Street, Gordon Street, Denison Street and Cecily Street.

The future active transport network within the vicinity of The Bays tunnel launch and support site will be modified to accommodate WestConnex M4-M5 Link, which is part of the WestConnex program of works. These changes will be implemented by the time construction of the proposal starts.

4.2.2 Public transport network

A summary of the public transport services around The Bays Station construction site is provided in Table 4-2.

Table 4-2 The Bays tunnel launch and support site existing public transport services

Public transport mode	Description
Train	• No train line or stations
Light Rail	• No light rail line or stations
Bus	• 23 bus routes • 20 school bus routes • Major bus stops on Victoria Road, The Crescent and Lilyfield Road. • Short bus only lanes at the Victoria Road / A4-City West Link Road intersection on the westbound approach and the northbound kerbside departure lane between The Crescent and Lilyfield Road have been removed to facilitate work

Public transport mode	Description
	associated with construction of the approved Western Harbour Tunnel and Warringah Freeway Upgrade and the WestConnex M4-M5 Link
Ferry	• Ferry service between the White Bay Cruise Terminal and Barangaroo when cruise ships are docked at the White Bay Cruise Terminal (Captain Cook Cruises)

4.2.3 On-street parking, loading, servicing and pick-up arrangements

Parking is prohibited in both directions along the A4-City West Link Road with clearways in operation at all times. Also, on-street parking is not available along James Craig Road and The Crescent south of the A4-City West Link Road.

There are no kiss and ride, loading zone or point to point transport service zones on roads immediately surrounding the construction site.

4.2.4 Traffic volumes and patterns

Traffic volumes are high on the A4-City West Link Road, The Crescent and Victoria Road in both directions. These are arterial (state) roads that carry volumes between 1,660 and 3,730 vehicles per hour in each direction. Eastbound volumes on the A4-City West Link Road and The Crescent are generally higher than the traffic volumes in the opposite direction during the morning and evening peak hours. On Victoria Road, a distinct southbound peak direction is evident during the morning peak hour while traffic volumes are similar in both directions during the evening peak hour.

Substantially lower volumes of up to 140 vehicles per hour are experienced on James Craig Road, which is a local road accessing the White Bay area.

The future road network within the vicinity of The Bays Station construction site will be modified to accommodate WestConnex Rozelle Interchange. Additional road network changes are proposed as part of the approved Western Harbour Tunnel and Warringah Freeway Upgrade, which would connect to the Rozelle Interchange (part of the WestConnex M4-M5 Link) and the surface road network in Rozelle.

Approximate peak hour midblock volumes on key roads are shown in Table 4-3.

Table 4-3 Existing peak hour traffic volumes by direction (2021) – The Bays

Road	Direction	Morning peak hour volume (vehicles per hour)	Evening peak hour volume (vehicles per hour)
A4-City West Link Road west of James Craig Road	Eastbound	3,260	2,970
	Westbound	2,280	2,510
A4-City West Link Road west of The Crescent	Eastbound	2,650	2,440
	Westbound	1,660	1,970
James Craig Road east of The Crescent	Eastbound	130	40
	Westbound	60	140

Road	Direction	Morning peak hour volume (vehicles per hour)	Evening peak hour volume (vehicles per hour)
Victoria Road north of The Crescent	Northbound	1,720	2,890
	Southbound	3,730	2,820

Source: Traffic surveys, Thursday 25 March 2021

4.2.5 Existing intersection performance

Modelled intersection performance during the morning and evening peak hours for key intersections in the vicinity of The Bays Station construction site is shown in Table 4-4.

Modelled intersection performance indicates that the following intersections perform poorly under existing conditions at Level of Service E or F:

- Victoria Road / Robert Street during the evening peak hour.

While the proposal will result in traffic impacts on some intersections within the study precinct, including Victoria Road / Robert Street, it would not directly result in additional heavy vehicles travelling through this intersection.

Modelling results also suggest that the intersection of Victoria Road / A4-City West Link Road is already operating at capacity, with long queues at the westbound approach during the evening peak hour.

Poor performance of these intersections is a result of high volumes of through traffic conflicting with right turning and cross-street traffic, in conjunction with substantial queuing along City West Link in the westbound and eastbound direction, including queuing as a result of the construction of the WestConnex M4-M6 Link.

Table 4-4 Modelled intersection performance (Vissim 2021) – The Bays Station construction site

Intersection and peak hour	Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service[1]	Maximum queue length by directional approach (metres)[2]	
Victoria Road / Robert Street					
Morning	5,859	24	B	NB	170
				EB	-
				SB	470
				WB	110
Evening	6,022	93	F	NB	250
				EB	-
				SB	480
				WB	200
Victoria Road / A4-City West Link Road					
Morning	9,992	39	C	NB	-
				EB	100
				SB	180
				WB	320

Intersection and peak hour	Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service[1]	Maximum queue length by directional approach (metres)[2]	
Evening	10,430	51	D	NB	-
				EB	160
				SB	250
				WB	>500
A4-City West Link Road / James Craig Road					
Morning	5,518	9	A	NB	40
				EB	180
				SB	-
				WB	140
Evening	5,790	7	A	NB	30
				EB	170
				SB	-
				WB	160
A4-City West Link Road / The Crescent					
Morning	5,608	25	B	NB	160
				EB	260
				SB	-
				WB	200
Evening	6,022	30	C	NB	100
				EB	180
				SB	-
				WB	160
A4-City West Link Road / Catherine Street					
Morning	4,673	26	B	NB	70
				EB	350
				SB	100
				WB	140
Evening	5,339	25	B	NB	80
				EB	340
				SB	110
				WB	180

Note 1: The Level of Service stated for traffic controlled intersections is an average across all vehicle movements, while the Level of Service stated for priority controlled movements is the worst performing movement.

Note 2: A comparison of traffic data between 2019 and 2021 showed that traffic volume change is minimal between 2021 and 2019 (less than five per cent lower in 2021 however some variability in data is expected). This suggests that traffic data collected as part of this assessment (March 2021) accurately represent traffic conditions prior to the COVID-19 pandemic and have no bearing on the modelled intersection performance.

4.3 Pyrmont Station construction sites

4.3.1 Active transport network

Footpaths are provided along the majority of roads in the vicinity of the Pyrmont Station construction sites, with the exception of the Western Distributor and Darling Drive. Near the site, signalised crossings are provided on all approaches of the following intersections:

- Pyrmont Bridge Road / Bank Street
- Pyrmont Bridge Road / Harris Street
- Pyrmont Bridge Road / Pyrmont Street
- Union Street / Murray Street / Darling Drive
- Union Street / Edward Street
- Pyrmont Street / Union Street.

A zebra crossing is provided across Union Street at the Pyrmont Bridge Road / Union Street intersection.

Further south on Harris Street, signalised crossings are provided on most or all approaches of the following intersections:

- Harris Street / Allen Street
- Harris Street / Western Distributor
- Harris Street / Quarry Street
- Harris Street / William Henry Street
- Harris Street / Macarthur Street
- Harris Street / Mary Ann Street
- Harris Street / Ultimo Road
- Harris Street / Thomas Street
- Harris Street / George Street / Broadway / Regent Street.

Pedestrian activity at Pyrmont and Ultimo is high as the surrounding land use is primarily residential, commercial, educational and retail. At Pyrmont, High Pedestrian Activity Areas (HPAA), with signposted speed limit of 40 kilometres per hour, include the Pyrmont Bay light rail stop, Harbourside shopping centre, Pyrmont Bridge and The Star Sydney. Being a night-time precinct, there are also a number of licensed or entertainment venues close to the site which can lead to a pedestrian presence in the evening and night-time periods. Further south towards Ultimo, areas of high pedestrian activity include the Ian Thorpe Aquatic Centre, Powerhouse Museum, University of Technology and TAFE campuses and along Broadway and George Street.

The cycle network surrounding the Pyrmont Station construction sites is shown in Figure 4-1 and consists of an off-road shared path along Union Street and the Pyrmont Bridge, a moderate difficulty on-road route along Miller Street, a moderate difficulty on-road route along Darling Drive north of the Convention light rail stop and an off-road shared path along Darling Drive south of the Convention light rail stop. These cycling facilities provide connectivity between the ANZAC Bridge, Pyrmont, Sydney CBD and the wider cycling network.

Figure 4-1 Cycle network surrounding the Pyrmont Station construction sites

Source: Cycleway Finder (Roads and Maritime Services, 2021)

4.3.2 Public transport network

There are no train stations located in close proximity to the Pyrmont Station construction sites. The light rail network is accessible at the nearby Convention, Pyrmont Bay, The Star Sydney, John Street Square, Fish Market and Wentworth Park light rail stops which are part of the L1 Dulwich Hill Line.

In the vicinity of the site, Pyrmont is served by two bus routes which provide access to the Sydney CBD, Bondi Junction, Rozelle, Drummoyne, Ryde and Parramatta. Bus stops near the sites are located on Harris Street and Miller Street. Further south, George Street / Broadway is a major bus corridor that services an additional 29 bus routes including 10 NightRide bus routes. Near Harris Street, bus lanes are provided on both sides of George Street / Broadway. In the eastbound direction, the bus lanes operate between 6 am to 10 am and 3 pm to 8 pm on weekdays. In the westbound direction, the bus lanes operate between 6 am to 10 am and 3 pm to 7 pm on weekdays.

Ferry services are accessible at the Pyrmont Bay wharf located about 300 metres east of the site. The F4 Pyrmont Bay operates to and from this wharf, providing connections between Pyrmont Bay and Circular Quay.

The public transport network surrounding the Pyrmont Station construction sites is shown in Figure 4-2.

Figure 4-2 Public transport network surrounding the Pyrmont Station construction sites

4.3.3 On-street parking, loading, servicing, and pick-up arrangements

Near the site, clearways are in operation at the following locations:

- Pyrmont Bridge Road in the eastbound direction west of Pyrmont Street – 6 am to 10 am and 3 pm to 7 pm Monday to Friday
- Harris Street in the northbound direction between Allen Street and Pyrmont Bridge Road – 6 am to 10 am and 3 pm to 7 pm Monday to Friday
- Harris Street in the southbound direction south of Allen Street – 6 am to 10 am and 3 pm to 7 pm Monday to Friday
- Harris Street in the northbound direction between Allen Street and Thomas Street – 3 pm to 7 pm Monday to Friday
- Harris Street in the northbound direction between Thomas Street and Broadway – 6 am to 10 am and 3 pm to 7 pm Monday to Friday.

Outside of clearway restrictions, on-street parking is generally provided on roads surrounding the sites including Harris Street, Pyrmont Street, Union Street, Miller Street and Edward Street and is generally ticketed and time-restricted on all days. On-street parking is not provided on Pyrmont Bridge Road or Darling Drive.

Other on-street parking arrangements include loading zones at various times at multiple locations surrounding the site, including on Pyrmont Street, Miller Street, Union Street and Harris Street. In addition, there are several mail zones located on Harris Street. A taxi zone is

located on the eastern side of Harris Street, south of William Henry Street adjacent to the Powerhouse Museum as well as on the western side of Darling Drive near the Convention light rail stop.

4.3.4 Traffic volumes and patterns

Darling Drive / Pyrmont Bridge Road / Bridge Road is a collector road that connects Ultimo to Camperdown via Pyrmont and provides connections to major arterial roads and motorways including Parramatta Road and the Western Distributor. Near the sites during the morning peak hour, the peak direction on Pyrmont Bridge Road is eastbound with volumes of about 1,270 vehicles. During the evening peak hour, the peak direction is also eastbound with a lower volume of about 760 vehicles.

Harris Street is a collector road that connects Pyrmont to Ultimo at George Street / Broadway and exhibits a northbound morning and evening peak direction. Near its intersection with Pyrmont Bridge Road, peak hour volumes on Harris Street are up to 470 vehicles. Further south, near its intersection with Fig Street / Western Distributor, peak hour volumes on Harris Street are up to 910 vehicles.

Pyrmont Street is a local road that carries volumes ranging from 150 to 490 vehicles per hour in each direction and exhibits a southbound morning and evening peak direction.

Union Street / Miller Street is a local road that carries traffic volumes ranging between 40 and 160 vehicles per hour in each direction during peak periods.

Approximate peak hour midblock volumes on key access roads are shown in Table 4-5.

Table 4-5 Existing peak hour traffic volumes by direction (2021) – Pyrmont

Road	Direction	Morning peak hour volume (vehicles per hour)	Evening peak hour volume (vehicles per hour)
Pyrmont Bridge Road east of Bank Street	Eastbound	1,270	760
	Westbound	380	530
Harris Street north of Pyrmont Bridge Road	Northbound	470	350
	Southbound	210	270
Harris Street north of Fig Street / Western Distributor	Northbound	600	520
	Southbound	910	780
Pyrmont Street north of Pyrmont Bridge Road	Northbound	200	150
	Southbound	290	490
Union Street west of Edward Street	Eastbound	40	120
	Westbound	50	160
Darling Drive east of Murray Street	Northbound	310	280
	Southbound	210	170

Source: Traffic surveys, Thursday 25 March 2021

4.3.5 Existing intersection performance

Modelled intersection performance during the morning and evening peak hours for key intersections in the vicinity of Pyrmont Station construction sites is shown in Table 4-6.

Modelled intersection performance indicates that the following intersections perform poorly under existing conditions at Level of Service E or F:

- Pyrmont Bridge Road / Bank Street during the morning and evening peak hour
- Harris Street / Fig Street / Western Distributor during the morning peak hour.

Key points include:

- The poor performance of the Pyrmont Bridge Road / Bank Street intersection during the morning peak hour is due to high traffic volumes on the northern and southern approaches
- The poor performance of the Pyrmont Bridge Road / Bank Street intersection during the evening peak hour is due to downstream queuing from the Western Distributor onto the westbound/northbound on ramp and Bank Street. This traffic congestion and queueing spill back onto Bank Street prevents vehicles from Pyrmont Bridge Road turning left into (western approach) and right into (eastern approach) the Western Distributor on ramp, and is reflected in the poor performance of the Pyrmont Bridge Road / Bank Street
- High traffic volumes on all approaches to the Harris Street / Fig Street / Western Distributor intersection results in its poor performance during the morning peak hour.

Table 4-6 Modelled intersection performance (Aimsun 2021) – Pyrmont Station construction sites

Intersection and peak hour	Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service[1]	Maximum queue length by directional approach (metres)[2]	
Pyrmont Bridge Road / Bank Street					
Morning	2,760	67	E	NB	230
				EB	70
				SB	210
				WB	60
Evening	2,836	>100	F	NB	150
				EB	310
				SB	170
				WB	160
Pyrmont Bridge Road / Harris Street					
Morning	1,671	25	B	NB	90
				EB	100
				SB	60
				WB	30
Evening	1,556	36	C	NB	210
				EB	90
				SB	70
				WB	40

Intersection and peak hour	Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service[1]	Maximum queue length by directional approach (metres)[2]	
Pyrmont Bridge Road / Pyrmont Street					
Morning	1,456	17	B	NB	-
				EB	50
				SB	90
				WB	20
Evening	1,445	23	B	NB	-
				EB	60
				SB	110
				WB	30
Darling Drive / Union Street / Murray Street					
Morning	911	24	B	NB	40
				EB	50
				SB	50
				WB	30
Evening	820	29	C	NB	30
				EB	30
				SB	70
				WB	50
Darling Drive / Harbourside Access Road					
Morning	471	4	A	NB	20
				EB	-
				SB	10
				WB	0
Evening	440	2	A	NB	20
				EB	-
				SB	10
				WB	0
Union Street / Edward Street					
Morning	284	16	B	NB	40
				EB	20
				SB	10
				WB	40
Evening	445	18	B	NB	40
				EB	30
				SB	20
				WB	50

Intersection and peak hour	Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service[1]	Maximum queue length by directional approach (metres)[2]	
Union Street / Pyrmont Street					
Morning	531	11	A	NB	40
				EB	30
				SB	50
				WB	20
Evening	734	17	B	NB	70
				EB	30
				SB	80
				WB	40
Harris Street / Allen Street					
Morning	1,488	27	B	NB	50
				EB	100
				SB	60
				WB	-
Evening	1,354	29	C	NB	60
				EB	80
				SB	70
				WB	-
Harris Street / Fig Street / Western Distributor					
Morning	3,421	60	E	NB	70
				EB	130
				SB	70
				WB	310
Evening	2,939	45	D	NB	50
				EB	120
				SB	100
				WB	160

Note 1: The Level of Service stated for traffic controlled intersections is an average across all vehicle movements, while the Level of Service stated for priority controlled movements is the worst performing movement.

Note 2: A comparison of traffic data between 2019 and 2021 showed that traffic volume change is minimal between 2021 and 2019 (less than one per cent lower in 2021 however some variability in data is expected). This suggests that traffic data collected as part of this assessment (March 2021) accurately represent traffic conditions prior to the COVID-19 pandemic and have no bearing on the modelled intersection performance

4.4 Hunter Street Station (Sydney CBD) construction sites

4.4.1 Active transport network

The pedestrian network surrounding the Hunter Street Station (Sydney CBD) construction sites is well developed. Footpaths are provided along both sides of all roads and controlled crossings are provided at all signalised intersections. Zebra crossings are currently located:

- Across Lang Street at Grosvenor Street
- Across Gresham Street at Bridge Street
- Across Spring Street at Pitt Street

- Across Loftus Street at Bent Street
- Across Gresham Street at Bent Street / Spring Street.

Pedestrian volumes are typically high throughout the day as the adjacent land uses are primarily residential, commercial and retail. All roads near the sites are signposted HPAAs with signposted speed limit of 40 kilometres per hour.

Underground walkways provide pedestrian access between Wynyard Station, George Street and Pitt Street. The walkway is one of six possible pedestrian accesses to Wynyard Station concourse and is used by about 10 per cent of pedestrians (Arup, 2014).

The cycle network surrounding the Hunter Street Station (Sydney CBD) construction sites is shown in Figure 4-3 and consists of on-road and off-road cycle routes. An off-road bicycle path is provided on the eastern side of Kent Street between the Western Distributor on-ramp and Liverpool Street and provides north – south connectivity to the wider cycling network at Pyrmont Bridge and the Sydney Harbour Bridge. A shared path is provided on the eastern side of Macquarie Street between north of Albert Street and Bent Street and connects to the shared path on the Cahill Expressway. In July 2020, a cycleway was opened on the western side of Pitt Street which provides north – south connectivity between Circular Quay and King Street.

O-ring and U-rail bicycle parking facilities are located throughout the Sydney CBD including on Hunter Street, Margaret Street, Jamison Street and Kent Street[1].

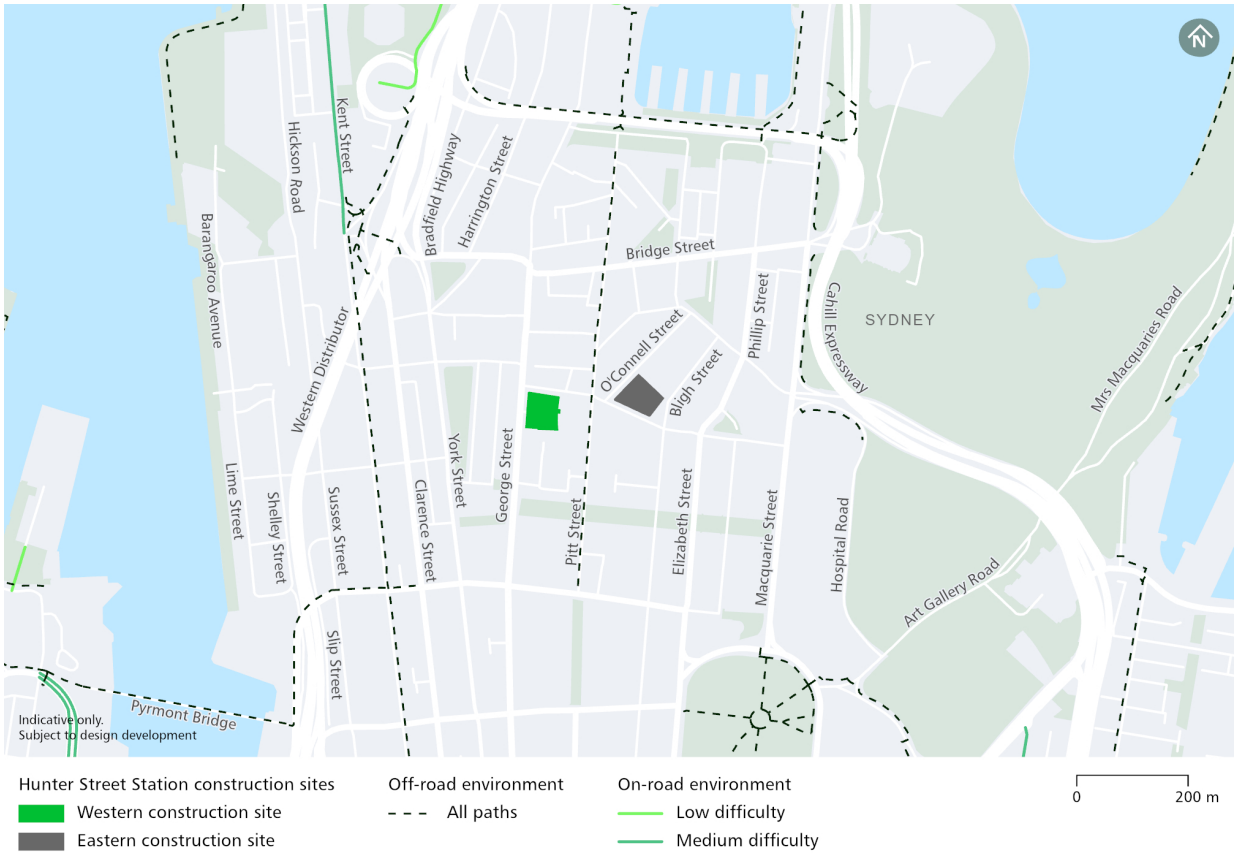

Figure 4-3 Cycle network surrounding the Hunter Street Station construction sites

Source: Cycleway Finder (Roads and Maritime Services, 2021)

[1] Source: City of Sydney Bicycle Parking Map, 2021

4.4.2 Public transport network

The Sydney CBD is well served by public transport services. The Wynyard, Circular Quay and Martin Place train stations are located near the Hunter Street Station (Sydney CBD) construction sites and are served by the T2 Inner West & Leppington Line, the T3 Bankstown Line and the T8 Airport & South Line, which provide direct connections to Leppington, Liverpool, Parramatta, Strathfield, Bankstown, Sydenham, Campbelltown and Sydney Domestic and International Airport. Wynyard station is also served by the T1 North Shore & Western Line, the T9 Northern Line and CCN Central Coast & Newcastle Line, which provide direct connections to Penrith, Richmond, Blacktown, Parramatta, Strathfield, Berowra, Hornsby, Epping, Chatswood, North Sydney, Gosford and Newcastle. Martin Place station is located to the south-east of the sites and is served by T4 Eastern Suburbs & Illawarra Line and South Coast Line, which provide direct connections to Bondi Junction, Sydenham, Sutherland, Waterfall, Wollongong and Kiama.

A substantial number of buses serve the Sydney CBD. Near the sites, bus stops along York Street, Carrington Street, Clarence Street, Kent Street, Bridge Street, Phillip Street and Macquarie Street are served by 76 bus routes which connect the Sydney CBD to multiple locations across Greater Sydney. A bus interchange is located along York Street and Carrington Street near Wynyard station and allows customers to easily transfer between the suburban rail network, intercity rail network, regional rail network and bus network. The Martin Place bus interchange allows customers from the to easily transfer between Hunter Street and Martin Place along Castlereagh Street and Elizabeth Street.

The L2 Randwick Line and L3 Kingsford Line light rail services operate along George Street and provide connections between the Sydney CBD, Surry Hills, Moore Park, Kingsford and Randwick. The Bridge Street and Wynyard light rail stops are located in close proximity to the site.

Ferry services are accessible at Circular Quay located about 500 metres north of the site. The F1 Manly, F2 Taronga Zoo, F3 Parramatta River, F4 Pyrmont Bay, F5 Neutral Bay, F6 Mosman Bay, F7 Double Bay, F8 Cockatoo Island and F9 Watsons Bay ferry services operate to and from this wharf, providing connections between Sydney CBD and the Eastern Suburbs, Northern Beaches and Western Sydney. Ferry services are also accessible at the Barangaroo Wharf located about 850 metres west of the site, which is serviced by the F3 Parramatta River and F4 Pyrmont Bay service.

The Chatswood to Sydenham component of Sydney Metro City & Southwest is currently planned to commence operation in 2024, including the construction of Barangaroo and Martin Place metro stations. Construction and operation of the Chatswood to Sydenham component of Sydney Metro City & Southwest would coincide with the proposal construction period.

The public transport network surrounding the Hunter Street Station (Sydney CBD) construction sites is shown in Figure 4-4.

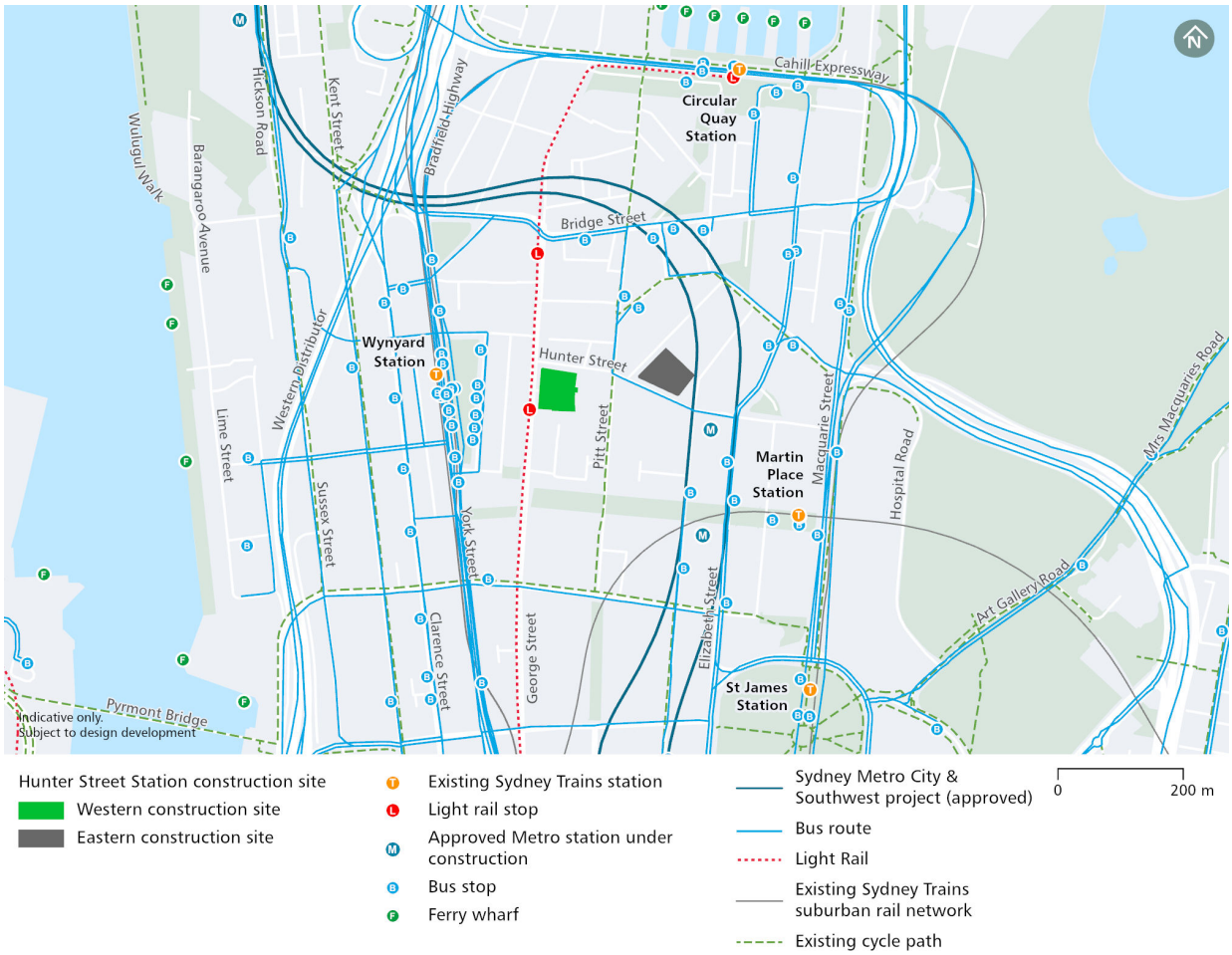

Figure 4-4 Public transport network surrounding the Hunter Street Station construction sites

4.4.3 On-street parking, loading, servicing and pick-up arrangements

On-street parking in the Sydney CBD consists of paid time-restricted parking on most streets near the Hunter Street Station (Sydney CBD) construction sites, including on Grosvenor Street / Bridge Street, Margaret Street, Hunter Street, Bent Street, Phillip Street and Macquarie Street. Near the sites, parking is not permitted on Clarence Street, York Street or George Street. Loading zones are also provided on most roads near the site, with ticketed loading zones provided on streets including Grosvenor Street / Bridge Street, Jamison Street, Lang Street, Bond Street, Spring Street, Kent Street, Clarence Street, Bligh Street and De Mestre Place. Un-ticketed loading zones are also located on Hunter Street.

Taxi zones are provided at multiple locations including Bridge Street, Hunter Street, O'Connell Street and Phillip Street. In addition, there are several mail zones and 'No Stopping Australia Post Vehicles Excepted' zones located on Phillip Street, Bridge Street, O'Connell Street, George Street and Pitt Street.

4.4.4 Traffic volumes and patterns

Grosvenor Street / Bridge Street is the main two-way east – west connector road near the sites that facilitates connectivity between the Western Distributor, Cahill Expressway / Eastern Distributor and local roads in the Sydney CBD. Bridge Street experiences a westbound morning peak direction and eastbound evening peak direction with traffic volumes between 320 and 790 vehicles in each direction. Hunter Street, Margaret Street and Bent Street are also two-way roads that travel in the east – west direction and carry traffic volumes of up to 570 vehicles in each direction. Two way east-west traffic movement via the Hunter Street –

George Street – Margaret Street 'dogleg' is still possible following the introduction of light rail operations along George Street.

Macquarie Street is the main two-way north – south connector road near the sites that provides access between the Cahill Expressway / Eastern Distributor and Sydney CBD. Macquarie Street carries traffic volumes of between 880 and 1,300 vehicles in each direction during the peak hour.

The road network near the sites is also served by one-way north – south local roads including Clarence Street, York Street, George Street, Pitt Street, O'Connell Street and Bligh Street / Castlereagh Street. These roads carry lower volumes of traffic of up to 680 vehicles per hour. While traffic is not permitted on George Street south of Hunter Street to facilitate L2 and L3 light rail services, taxis and unloading vehicles are permitted.

Approximate peak hour midblock volumes on key access roads are shown in Table 4-7.

Table 4-7 Existing peak hour traffic volumes by direction (2021) – Sydney CBD

Road	Direction	Morning peak hour volume (vehicles per hour)	Evening peak hour volume (vehicles per hour)
Grosvenor Street east of Harrington Street	Eastbound	610	610
	Westbound	270	560
Bridge Street west of Macquarie Street	Eastbound	460	790
	Westbound	730	320
Margaret Street east of Clarence Street	Eastbound	170	160
	Westbound	480	280
Hunter Street west of Macquarie Street	Eastbound	370	350
	Westbound	570	310
O'Connell Street north of Hunter Street[1]	Northbound	-	-
	Southbound	90	70
Bent Street west of Macquarie Street	Eastbound	320	460
	Westbound	570	430
Macquarie Street north of Bent Street	Northbound	980	880
	Southbound	880	1,300
George Street north of Margaret Street[2]	Northbound	110	90
	Southbound	-	-
Clarence Street north of Margaret Street[2]	Northbound	370	680
	Southbound	-	-

Source: Traffic surveys, Thursday 25 March 2021

Note 1: As this road is one-way, no northbound traffic travels along this road

Note 2: As this road is one-way, no southbound traffic travels along this road

4.4.5 Existing intersection performance

Modelled intersection performance during the morning and evening peak hours for key intersections in the vicinity of Hunter Street Station (Sydney CBD) construction sites is shown in Table 4-8.

Modelled intersection performance indicates that all intersections perform at Level of Service D or better during the morning and evening peak hour. The intersection of Margaret Street / Clarence Street is approaching capacity and experience queues that extend past adjacent intersections.

Table 4-8 Modelled intersection performance (Aimsun 2021) – Hunter Street Station (Sydney CBD) construction site

Intersection and peak hour	Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service[1]	Maximum queue length by directional approach (metres)	
Macquarie Street / Bridge Street					
Morning	2,176	26	B	NB	70
				EB	50
				SB	10
				WB	40
Evening	2,655	25	B	NB	90
				EB	80
				SB	50
				WB	40
Macquarie Street / Bent Street / Shakespeare Place					
Morning	3,383	29	C	NB	70
				EB	50
				SB	180
				WB	150
Evening	3,875	32	C	NB	80
				EB	80
				SB	100
				WB	120
Macquarie Street / Hunter Street					
Morning	2,213	31	C	NB	270
				EB	100
				SB	60
				WB	-
Evening	2,073	23	B	NB	150
				EB	80
				SB	80
				WB	-
Hunter Street / Elizabeth Street					
Morning	1,936	26	B	NB	80
				EB	50
				SB	70
				WB	70

Intersection and peak hour	Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service[1]	Maximum queue length by directional approach (metres)	
Evening	1,843	22	B	NB	120
				EB	50
				SB	70
				WB	50
Hunter Street / Castlereagh Street					
Morning	1,191	11	A	NB	-
				EB	70
				SB	50
				WB	30
Evening	900	9	A	NB	-
				EB	30
				SB	20
				WB	30
Hunter Street / Pitt Street / O'Connell Street					
Morning	1,016	21	B	NB	60
				EB	60
				SB	40
				WB	80
Evening	753	22	B	NB	40
				EB	30
				SB	30
				WB	50
Bent Street / Phillip Street					
Morning	1,349	26	B	NB	60
				EB	30
				SB	100
				WB	80
Evening	1,729	30	C	NB	100
				EB	30
				SB	90
				WB	80
Bent Street / Bligh Street					
Morning	643	9	A	NB	-
				EB	50
				SB	-
				WB	50
Evening	726	9	A	NB	-
				EB	50
				SB	-
				WB	40

Intersection and peak hour	Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service[1]	Maximum queue length by directional approach (metres)	
Hunter Street / George Street / Margaret Street					
Morning	526	20	B	NB	-
				EB	70
				SB	-
				WB	60
Evening	427	27	B	NB	-
				EB	80
				SB	-
				WB	70
Margaret Street / York Street					
Morning	1,578	14	A	NB	-
				EB	50
				SB	70
				WB	70
Evening	1,227	20	B	NB	-
				EB	50
				SB	80
				WB	110
Margaret Street / Clarence Street					
Morning	939	41	C	NB	80
				EB	80
				SB	-
				WB	40
Evening	1,165	51	D	NB	60
				EB	80
				SB	-
				WB	50
Clarence Street / Jamison Street					
Morning	645	12	A	NB	20
				EB	-
				SB	-
				WB	30
Evening	1,013	12	A	NB	50
				EB	-
				SB	-
				WB	50

Note 1: The Level of Service stated for traffic controlled intersections is an average across all vehicle movements, while the Level of Service stated for priority controlled movements is the worst performing movement.

Note 2: A comparison of traffic data between 2019 and 2021 showed that traffic volume change is minimal between 2021 and 2019 less than five per cent lower in 2021 however some variability in data is expected). This suggests that traffic data collected as part of this assessment (March 2021) accurately represent traffic conditions prior to the COVID-19 pandemic and have no bearing on the modelled intersection performance.

5 Impact assessment

5.1 Pedestrian, cyclist and road user safety

Access and egress arrangements at construction sites have been developed with consideration for sensitive road users (including pedestrian and cyclists) and motorist safety. For example, the need for construction vehicles to perform a right turn to or from an arterial road to access a construction site has been avoided where possible.

Appropriate controls would be established where vehicles are required to cross footpaths to access construction sites. This may include manual supervision, physical barriers or temporary traffic signals as required. Road safety audits would be carried out as part of construction traffic management planning for each of the construction sites, with road safety risks removed or reduced so far as is reasonably practicable.

Measures to further enhance pedestrian, cyclist and motorist safety in the vicinity of construction sites include:

- Assessing the suitability of construction haulage routes through sensitive land use areas with respect to road safety
- Deployment of speed awareness signs in conjunction with variable message signs near construction sites to provide alerts to drivers
- Providing community education and awareness about sharing the road safely with heavy vehicles
- Specific construction driver training to understand specific route constraints, safety and environmental considerations such as sharing the road safely with other road users, including pedestrians and cyclists, and limiting the use of compression braking
- Requiring technology and equipment to improve vehicle safety, eliminate heavy vehicle blind spots and to monitor vehicle location and driver behaviour.

If applicable, key locations where safety and amenity measures will be concentrated include:

- Construction site access and egress points where construction vehicles would interface with pedestrians using surrounding footpaths and marked cycle routes. This would be especially important in Pyrmont and Sydney CBD where high volumes of pedestrians and cyclists are expected
- Locations where footpath widths are reduced around construction sites (refer to Section 5.5.3, Section 5.6.3 and Section 5.7.3)
- Locations of increased vulnerable user demand such as near schools and licensed venues.

5.2 Emergency vehicles

The introduction of construction traffic is anticipated to result in minor impacts to the surrounding intersection performance at most construction sites (refer to Section 5.5.7, Section 5.6.7 and Section 5.7.7). As such, there is not anticipated to be any substantial change to emergency vehicle access. Furthermore, construction sites would be arranged so

that emergency vehicle access to nearby buildings and the surrounding area would be maintained, or alternative arrangements are in place as determined in consultation with relevant emergency services. Construction sites may also be made available for emergency vehicle passage if required and whenever possible (e.g. access may not be possible during demolition). Ongoing consultation would be carried out with emergency providers in relation to changed traffic conditions. As no health precincts or hospitals are located in close proximity to the proposal construction sites, emergency vehicle access to health precincts or hospitals is not further considered in this assessment.

5.3 Major special events

Special events often occur within Pyrmont and the Sydney CBD. The *Transport for NSW Special Events Management Guidelines 2018*, identifies the following classes of special events:

- Class 1 – An event that impacts major transport systems and traffic and there is significant disruption to the non-event community. For example, an event that affects a principal transport route in Sydney, or one that reduces the capacity of the main highway through a country town
- Class 2 – An event that impacts local transport systems and traffic and there is low scale disruption to the non-event community. For example, an event that blocks off the main street of a town or shopping centre but does not impact a principal transport route or highway
- Class 3 – An event with minimal impact on local roads and negligible impact on the non-event community. For example, an on-street neighbourhood Christmas party
- Class 4 – An event that is conducted entirely under Police control (but is not a protest or demonstration). For example, a small march conducted with a Police escort.

Liaison would occur with event organisers of Class 1 and 2 events, and (as relevant) Transport for NSW to provide appropriate management of construction vehicle movements to address potential impacts to event patrons, the public and the construction works. This may involve measures such as temporary adjustment to construction vehicle routes, construction working hours or potentially stopping works for the duration of the event.

Construction activities on road corridors would require a Road Occupancy Licence to close the road or lane for any period. The granting of a Road Occupancy Licence would generally be subject to network operation restrictions, which would preclude road closures during high-activity holidays such as New Year's Eve, or during the set up and pack down times for major events such as sports grand finals or during major road closures.

Major special events in Pyrmont and the Sydney CBD are shown in Table 5-1. It is noted that many special events calendars have been disrupted recently due to the COVID-19 pandemic. No special events are anticipated to occur in the vicinity of The Bays tunnel launch and support site.

Table 5-1 Major special events in Pyrmont and Sydney CBD

Indicative month	Event	Location
Pyrmont		
April	Anzac Day Service	Union Square and Anzac Bridge
September	Pyrmont Food and Wine Festival	Pirrama Park
October	Seven Bridges Walk	Pyrmont Bridge and Pyrmont Village
December	Pyrmont Village Christmas Concert	Pirrama Park
December	Christmas Carols	Union Square
Sydney CBD		
January	Field Day	The Domain
January	Sydney Festival	Sydney CBD
January	Australia Day Celebrations	Primarily harbour foreshore area
February	Sydney Lunar Festival	Throughout Sydney CBD
February	Opera in the Domain	The Domain
March	Mardi Gras Parade / Party	Oxford Street / Hyde Park area
March	St Patrick's Day Parade and Festival	The Rocks
April	Anzac Day Parade	Martin Place, Pitt Street, George Street, Bathurst Street, Elizabeth Street, Hyde Park
April to May	Sydney Comedy Festival	Throughout Sydney CBD
May	Mother's Day Classic	Martin Place, Hyde Park and The Domain
May	Sydney Morning Herald Half Marathon	Throughout Sydney CBD
May/June	Vivid Festival	Throughout Sydney CBD
June	Sydney Film Festival	Throughout Sydney CBD
July	Reserve Forces Day	Macquarie Street
July	Sydney Harbour 10k & 5k	Throughout Sydney CBD
July	Bastille Day	The Rocks

Indicative month	Event	Location
August	City 2 Surf	Hyde Park, Park Street, William Street
September	Sydney Marathon	Milsons Point, Circular Quay, Sussex Street, Macquarie Street, Phillip Street, The Domain, Hyde Park, Oxford Street and Darling Harbour
September	Sydney Fringe Festival	Throughout Sydney CBD
September to October	Art and About Sydney	Throughout Sydney CBD
October	Sydney Spring Cycle	Milsons Point, Barangaroo, Cahill Expressway, Sussex Street
October	Seven Bridges Walk	Throughout Sydney CBD
October	Australian Beer Festival	The Rocks
October	Oktoberfest in the Gardens	The Domain
October to November	Good Food Month	Hyde Park
October to November	Night Noodle Markets	Hyde Park
November	Sydney International Art Series	Throughout Sydney CBD
December	Carols in the Domain	The Domain
December	Christmas Tree and Lights	Martin Place
December	Sydney to Hobart Yacht Race	Sydney Harbour foreshore
December/January	New Years' Eve Celebrations	Primarily Circular Quay, Blues Point and Barangaroo areas. Whole Sydney CBD would be affected.

During special events, mitigation measures would reduce impacts to the transport and traffic network by:

- Minimising the level of construction activity, and if necessary, ceasing all construction activity
- Maintaining appropriate access to all areas within the event precinct
- Erection of hoardings, site fencing and gates at key locations within the construction site boundary to permit pedestrian movements adjacent to the construction site and separate pedestrians from construction vehicles
- Scheduling deliveries to the construction site outside of event periods.

5.4 Road condition

The increase in construction traffic, in particular heavy vehicles, on the road network has the potential to impact the condition of roads along construction vehicle routes. A pre-construction condition survey would be undertaken to document the existing condition of local roads along construction vehicles routes. Upon completion, a post-construction condition survey would be undertaken to determine whether construction activities and/or construction vehicles have caused sections of road to deteriorate.

A report would be prepared by the construction contractor in consultation with Transport for NSW and relevant councils, detailing the findings of the pre-construction and post-construction condition surveys and any remediation works required. Damage attributed to construction works would be rectified or compensated by the construction contractor, in line with any relevant Transport for NSW and council requirements.

5.5 The Bays Station tunnel and launch support site

The Bays Station construction site is being established under the Sydney Metro West Concept and Stage 1 planning approval as described in *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a). The potential transport and traffic impacts associated with the proposed use and activities for The Bays Station tunnel and launch support site is described below.

5.5.1 Location and access

The Bays Station construction site is bound by Victoria Road, Robert Street and White Bay. Roads forming part of the primary construction vehicle route include the A4-City West Link Road, The Crescent, James Craig Road, Port Access Road, Sommerville Road and Solomons Way as shown in Figure 5-1. Primary site access would be right-in, left-out via Solomons Way. This route is the same as the primary route approved as part of the approved Stage 1 of the planning approval process, however additional traffic movements would be associated with The Bays tunnel launch and support site as a result of this proposal. An alternative route, however, is not assessed for this proposal. Work site vehicular access via Robert Street is only anticipated to be used in the event of an incident / emergency situation.

Road network changes as a result of other approved projects

As the approved Western Harbour Tunnel and Warringah Freeway Upgrade would not be operational by 2024, it has not been further considered in this assessment.

For the purposes of this assessment, it has been assumed road network changes associated with WestConnex M4-M5 Link will be in operation by the time peak tunnelling and station excavation activity for the proposal starts in 2024. These road network changes do not alter the nominated haulage routes to and from the Bays construction site, but may assist in impact mitigation as they are opened to traffic.

The WestConnex M4-M5 Link project is a new multi-lane road link between the M4 East Motorway at Haberfield and the New M5 Motorway at St Peters. The project would also include an interchange at Lilyfield and Rozelle (the Rozelle Interchange) and a tunnel connection between Anzac Bridge and Victoria Road, east of Iron Cove Bridge (Iron Cove Link)

Road network changes in The Bays, and the associated redistribution of traffic resulting from the road network changes, have been incorporated into the ‘2024 without this proposal’ and ‘2024 with this proposal’ traffic models.

These changes include:

- Ancillary infrastructure at the Rozelle West motorway operations complex (MOC2), Rozelle East motorway operations complex (MOC3) and Iron Cove Link motorway operations complex (MOC4)
- Connections to the surface road network at Lilyfield and Rozelle
- Construction of tunnels, ramps and associated infrastructure as part of the Rozelle interchange to provide connections to the approved Western Harbour Tunnel and Warringah Freeway Upgrade
- Victoria Road bridge upgrade
- Traffic signal installation at the new M5 to City West Link on and off ramps
- New grade separated vehicular overpass at The Crescent
  - The road overpass will allow vehicles to travel from The Crescent (northbound) to The Crescent (city-bound) towards the ANZAC Bridge or Victoria Road without using the signalised intersection at The Crescent / A4-City West Link Road intersection.

5.5.2 Construction activities

Major construction activities anticipated at The Bays tunnel launch and support site include:

- Excavation and concrete lining of a crossover cavern
- Launch and support two tunnel boring machines for the drive east including:
  - High voltage power supply
  - Spoil storage and removal
  - Fresh air ventilation
  - Work train
  - Grout batching plant
  - Water supply
  - Water treatment and disposal
  - Material storage
  - Office facilities, worker amenities and parking
  - Storage and installation of precast concrete lining elements.

These activities will already be carried out on the construction site as part of the approved Stage 1 of the planning approval process. The difference would be the duration of activities being extended and the direction of tunnel boring.

Figure 5-1 The Bays tunnel launch and support site indicative construction vehicle routes

5.5.3 Impacts on the active transport network

In the vicinity of The Bays tunnel launch and support site, shared paths adjacent to James Craig Road and The Crescent would remain open during construction. Within the Bays precinct, nearer to the construction site, temporary footpath and lane closures and diversions may be required from time to time throughout construction. These impacts would be managed through the development of Construction Traffic Management Plan/s as outlined within the Construction Traffic Management Framework (Appendix D of the Environmental Impact Statement).

A number of changes to the active transport network are proposed as part of the approved WestConnex M4-M5 Link project. These include the following:

- Rozelle Rail Yards link – Provision of an off-road active transport east–west connection between The Bay Run and Greenway in the west to ANZAC Bridge and Sydney CBD in the east
- Whites Creek link – Provision of a link between Callan Park, Rozelle Rail Yards and Parramatta Road via a predominately off-road active transport link along Whites Creek to Easton Park
- Rozelle land bridge – Provision of a link from Bicentennial Park and Glebe foreshore to Rozelle Rail Yards and Easton Park, providing north–south connectivity between Glebe, Annandale, Rozelle and Balmain.

These active transport links would remain following the construction of the WestConnex M4-M5 Link project, and the proposal would not result in any impacts to or closures of these links.

5.5.4 Impacts on the public transport network

The A4-City West Link Road is used by buses and also forms part of the construction vehicle route for The Bays tunnel launch and support site. Modelled bus travel times under the '2024 without this proposal' (without construction vehicles) and '2024 with this proposal' (with construction vehicles) scenarios for key bus routes are summarised in Table 5-2 and Table 5-3 for the morning and evening peak hours.

Minimal impacts to buses are expected and would be limited to a potential minor increase in travel time due to the additional construction vehicles on the road network. No impacts are anticipated on the operation of bus stops.

No impacts to the light rail network or the White Bay Cruise Terminal are anticipated during construction. There may be some increase in delay for vehicles moving to and from the White Bay Cruise Terminal via the Port Access Road as a result of increased light and heavy vehicle traffic near The Bays tunnel launch and support site. This increase would be managed through the development of Construction Traffic Management Plan/s as outlined within the Construction Traffic Management Framework (Appendix D of the Environmental Impact Statement).

Table 5-2 Modelled morning hour peak bus travel times (Vissim 2024) – The Bays tunnel launch and support site

Route	Direction	2024 without this proposal (minutes)	2024 with this proposal (minutes)
ANZAC Bridge to Victoria Road	Eastbound	03.59	04.05
	Westbound	03.15	03.15

Table 5-3 Modelled evening peak hour bus travel times (Vissim 2024) – The Bays tunnel launch and support site

Route	Direction	2024 without this proposal (minutes)	2024 with this proposal (minutes)
ANZAC Bridge to Victoria Road	Eastbound	04.59	04.58
	Westbound	03.51	03.45

5.5.5 Impacts on parking and property access

No impacts to parking or property access are anticipated during construction.

Some construction worker parking would be provided at construction sites, although it would not meet the expected full demand based on indicative workforce numbers. The Construction Traffic Management Framework (Appendix D of the Environmental Impact Statement) sets out the approach to managing construction worker parking for the project. At The Bays tunnel launch and support site, a shuttle bus services to transfer construction workers to and from major transport interchanges would be considered.

5.5.6 Construction vehicle movements

Construction vehicles would access and egress The Bays tunnel launch and support site 24 hours a day during tunnelling and tunnelling support activities. The arrival and departure pattern of construction vehicles aims to minimise the impact of construction activity during the network peak periods.

The anticipated number of construction vehicle movements to and from the site per hour during construction is shown in Figure 5-2 and Figure 5-3 Heavy vehicles have been assumed to travel to and from the construction site within the hour, for example eight heavy vehicle movements during an hour would comprise four heavy vehicle movements to the construction site and four heavy vehicle movements from the construction site.

The total daily number of construction vehicle movements for each stage is provided in Table 5-4.

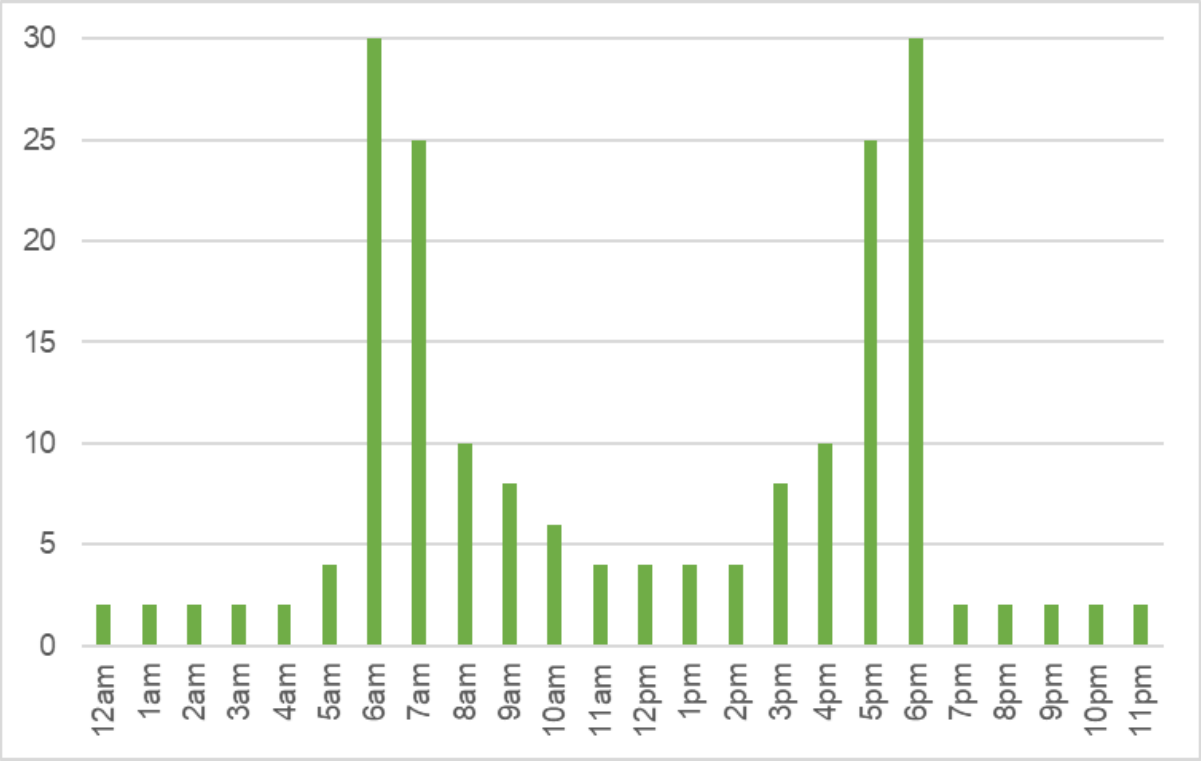

Figure 5-2 Indicative hourly light vehicle movements[1] (arrival and departure) at The Bays tunnel launch and support site over a typical day

Note 1: Movement means a one way movement. A vehicle entering then leaving the work site represents two movements.

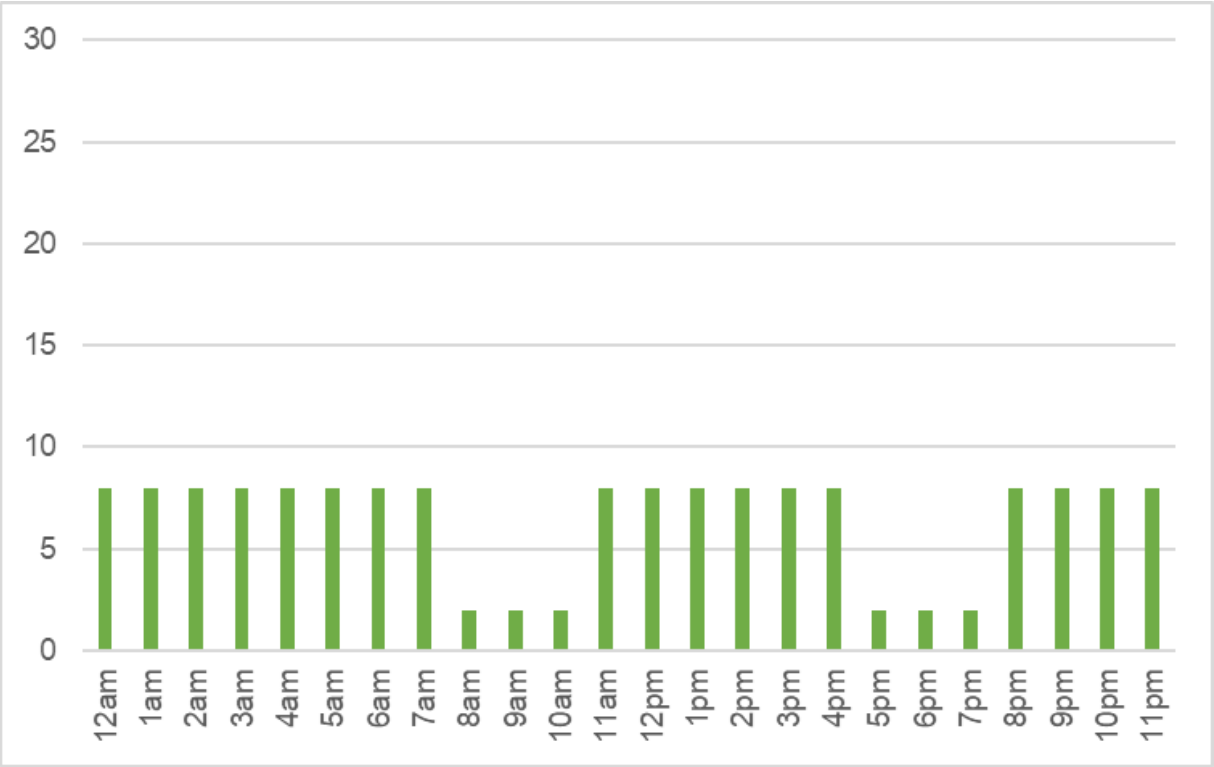

Figure 5-3 Indicative hourly heavy vehicle movements (arrival and departure) at The Bays tunnel launch and support site over a typical day

Note 1: Movement means a one way movement. A vehicle entering then leaving the work site represents two movements.

Table 5-4 Daily construction movements per day throughout construction of the proposal – The Bays tunnel launch and support site

Phase	Total movements[1] per day			Total movements[1] per hour		
	Light vehicles	Heavy vehicles	Total	Light vehicles	Heavy vehicles	Total
Tunnelling, launch and support (24 hours)	192	156	348	8	7	15

Note 1: Movement means a one-way movement. A vehicle entering and then leaving a construction worksite represents two movements

Source: Sydney Metro

5.5.7 Impacts on road network performance

Intersection performance results under the '2024 without this proposal' (without construction vehicles) and '2024 with this proposal' (with construction vehicles) scenarios are summarised in Table 5-5 for the morning and evening peak hours.

While road transport would be the primary transport method for transporting spoil from the construction sites and is considered feasible due to the location of construction sites directly adjacent to or close to the existing arterial road network, in particular the proximity to the motorway and arterial road network. Other options for the transport of spoil by barge from The Bays tunnel launch and support site have also been considered and are discussed further in Chapter 2 of the Environmental Impact Statement.

During the morning peak hour presented in this assessment (8 am to 9 am), it is anticipated that the construction site would generate ten light vehicle movements (ten light vehicles

travelling to the construction site) and two heavy vehicle movements (one heavy vehicle travelling to and from the construction site). During the evening peak hour presented in this assessment (5.30 pm to 6.30 pm), it is anticipated that the construction site would generate approximately 28 light vehicle movements (28 light vehicles travelling from the construction site) and two heavy vehicle movements (one heavy vehicle travelling to and from the construction site). As discussed in Section 3.3, the peak hour presented in this assessment was selected to represent when background traffic demand is at its greatest.

Modelled intersection performance with construction traffic indicates that all intersections forming part of the construction vehicle route would perform at the same Level of Service compared to the scenario without construction traffic. Minor average intersection delay increase (less than five seconds) is observed at some intersections for the scenario with construction traffic. It is noted that while there would be road network performance changes at the Victoria Road / Robert Street intersection, these changes would be due to network-wide performance effects and would not directly result from the proposal.

Analysis of modelled intersection performance results shows that at some locations, the addition of construction traffic would result in a small reduction in demand flow due to the following factors:

- Additional ‘latent’ or ‘unreleased’ demand, which is traffic that is not able to be assigned in the model during the morning and/or evening peak period. These trips are assumed to still exist, however, these trips would be delayed and not completed until after the peak period, effectively increasing the duration of the peak period
- Fewer vehicles passing through an intersection due to the addition of construction-related heavy vehicles, which have a slower acceleration profile compared to light vehicles. This would likely result in an increase to average delay.

In reality, from an operational perspective, the performance of an intersection where the modelling results show a small reduction in demand flow and/or average delay would remain very similar with and without construction traffic.

Compared to existing conditions, there is a substantial decrease in demand flow at intersections along the A4-City West Link Road and Victoria Road. This is due to the progressive opening of WestConnex stages, where a considerable proportion of traffic that currently travels on the A4-City West Link Road and Victoria Road is forecast to shift onto WestConnex by 2023.

Table 5-5 Modelled intersection performance (Vissim 2024) – The Bays tunnel launch and support site

Intersection and peak hour[1]	2024 without this proposal					2024 with this proposal				
	Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)		Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)	
Victoria Road / Robert Street										
Morning	4,826	>100	F	NB	150	4,878	>100	F	NB	130
				EB	-				EB	-
				SB	470				SB	470
				WB	210				WB	220
Evening	5,441	25	B	NB	180	5,394	25	B	NB	180
				EB	-				EB	-
				SB	200				SB	200
				WB	110				WB	90
Victoria Road / A4-City West Link Road										
Morning	6,629	25	B	NB	-	6,657	25	B	NB	-
				EB	90				EB	90
				SB	90				SB	90
				WB	120				WB	140
Evening	7,701	26	B	NB	-	7,616	25	B	NB	-
				EB	100				EB	100
				SB	80				SB	80
				WB	280				WB	220
A4-City West Link Road / James Craig Road										
Morning	3,851	16	B	NB	30	3,873	17	B	NB	30
				EB	60				EB	50
				SB	-				SB	-
				WB	140				WB	140
Evening	4,149	10	A	NB	40	4,150	11	A	NB	40
				EB	20				EB	30
				SB	-				SB	-
				WB	140				WB	140
A4-City West Link Road / The Crescent										
Morning	6,775	30	C	NB	250	6,779	29	C	NB	240
				EB	250				EB	240
				SB	-				SB	-
				WB	50				WB	50
Evening	6,813	9	A	NB	50	6,819	9	A	NB	60
				EB	50				EB	60
				SB	-				SB	-
				WB	80				WB	80

Intersection and peak hour[1]	2024 without this proposal					2024 with this proposal				
	Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)		Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)	
A4-City West Link Road / Catherine Street										
Morning	4,572	50	D	NB	110	4,575	48	D	NB	110
				EB	390				EB	390
				SB	120				SB	120
				WB	70				WB	120
Evening	5,258	39	C	NB	50	5,263	41	C	NB	50
				EB	330				EB	330
				SB	210				SB	210
				WB	490				WB	>500

Note 1: Morning peak – Two heavy vehicle movements and ten light vehicle movements to be generated to/from the site. Evening peak – Two heavy vehicle movements and 28 light vehicle movements to be generated to/from the site

5.5.8 Construction impacts summary

Figure 5-4 provides a summary of construction impacts on road network performance. There are no major construction impacts on parking, access, public transport and active transport.

Figure 5-4 Road network performance summary (Vissim 2024) – The Bays tunnel launch and support site

5.6 Pyrmont Station construction sites

5.6.1 Location and access

The Pyrmont Station construction sites consist of two sites (Pyrmont Station western construction site and Pyrmont Station eastern construction site) bound by Pyrmont Bridge Road, Union Street and Pyrmont Street. Roads forming part of the primary construction vehicle route include the Western Distributor, Pyrmont Bridge Road, Darling Drive, Union Street, Harris Street and Pyrmont Street as shown in Figure 5-5. Primary site access would be left-in, left-out via Pyrmont Bridge Road. Site access will also be required left-in / left-out via the Union Street frontage to the eastern construction site.

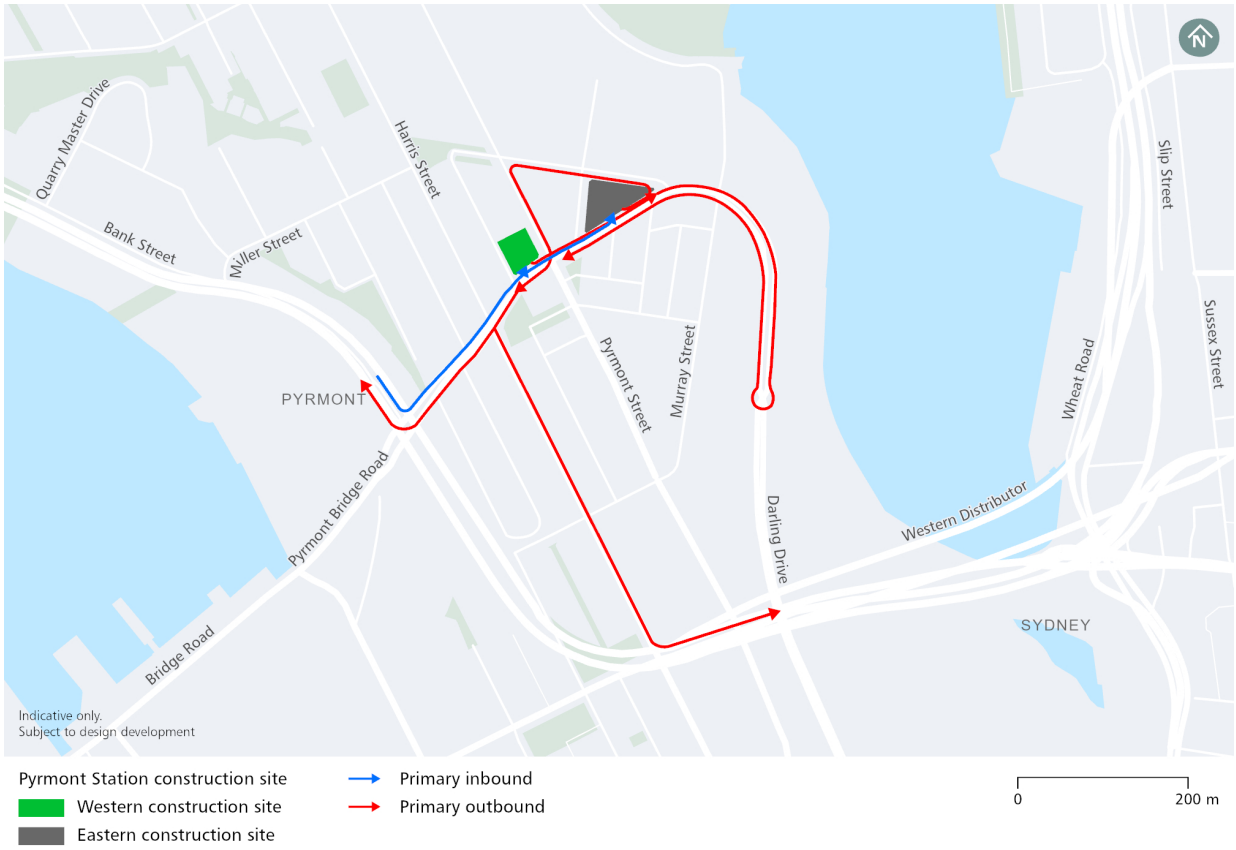

Figure 5-5 Pyrmont Station construction sites indicative construction vehicle routes

5.6.2 Construction activities

Major construction activities anticipated at the Pyrmont Station construction sites include:

- Demolition and site establishment
- Piling
- Excavation
- Station cavern and lining.

5.6.3 Impacts on the active transport network

Footpaths on the southern side of Union Street between Pyrmont Street and Pyrmont Bridge Road would be temporarily closed during construction to allow for safe site access and the loading and unloading of vehicles. The footpath and separate cycleway on the northern side of Union Street would be maintained throughout construction and pedestrian access would be

maintained via a detour to the northern footpath. Therefore, impacts to the pedestrian network would be minimal. Temporary footpath closures at all construction site frontages will be required at different times during construction. Should a section of pedestrian footpath be required to be closed, pedestrians will be informed of the diversion and directed to nearby crossing facilities.

Potential impacts would be managed through the development of Construction Traffic Management Plan/s as outlined within the Construction Traffic Management Framework (Appendix D of the Environmental Impact Statement).

The cycleway on the northern side of Union Street would remain operational at all times.

5.6.4 Impacts on the public transport network

Buses on Harris Street and Miller Street would interface with the construction vehicle route for the Pyrmont Station construction site. Modelled bus travel times under the '2024 without this proposal' (without construction vehicles) and '2024 with this proposal' (with construction vehicles) scenarios for key bus routes are summarised in Table 5-6 and Table 5-7 for the morning and evening peak hours.

Minimal impacts to buses are expected and would be limited to a potential minor increase in travel time due to the additional construction vehicles on the road network. No impacts are anticipated on the operation of bus stops except for one. The bus stop on Pyrmont Bridge Road, adjacent to the Pyrmont Station western construction site, would be temporarily decommissioned as part of the proposal. However, this stop is not currently used by any public transport bus services.

No impacts to the light rail or ferry networks are anticipated during construction.

Table 5-6 Modelled morning peak hour bus travel times (Aimsun 2024) – Pyrmont Station construction sites

Route	Direction	2024 without this proposal (minutes)	2024 with this proposal (minutes)
North of Miller Street and south of Allen Street via Harris Street	Northbound	04.23	04.52
	Southbound	03.56	04.09

Table 5-7 Modelled evening peak hour bus travel times (Aimsun 2024) – Pyrmont Station construction sites

Route	Direction	2024 without this proposal (minutes)	2024 with this proposal (minutes)
North of Miller Street and south of Allen Street via Harris Street	Northbound	04.51	04.52
	Southbound	03.09	03.09

5.6.5 Impacts on parking and property access

At Pyrmont station construction sites, construction workers would be encouraged to use the extensive existing public transport options or existing commercial car parking facilities. The Construction Traffic Management Framework (Appendix D of the Environmental Impact Statement) sets out the approach to managing construction worker parking for the project.

All on-street parking spaces and a loading zone would be temporarily removed along both sides of Union Street between Edward Street and Pyrmont Bridge Road to allow for safe site entry and vehicle loading and unloading while maintaining two-way traffic flow along Union Street. The combined loss of on-street parking spaces would have minor impacts to the road network given the availability of parking on other local roads nearby, and the permanent demolition of properties that currently generate parking demand. Opportunities to mitigate impacts to on-street car parking would be explored in consultation with City of Sydney during construction planning.

There would be no impacts to private property access.

5.6.6 Construction vehicle movements

The majority of vehicle movements at the Pyrmont Station construction site would likely be restricted to between 7 am and 10 am due to the proximity of night-time sensitive receivers. Infrequent heavy vehicles may, however, be required during the night-time at Pyrmont to support concrete delivery during cavern lining pours for safety reasons. The arrival and departure pattern of construction vehicles aims to minimise the impact of construction activity during the network peak periods.

The anticipated number of construction vehicle movements to and from the site per hour during the various phases of construction is shown in Figure 5-6 to Figure 5-8. Heavy vehicles have been assumed to travel to and from the construction site within the hour, for example eight heavy vehicle movements during an hour would comprise four heavy vehicle movements to the construction site and four heavy vehicle movements from the construction site. Figure 5-6 summarises the light vehicle construction movements to and from both construction sites.

The total daily number of construction vehicle movements for each stage is provided in Table 5-8.

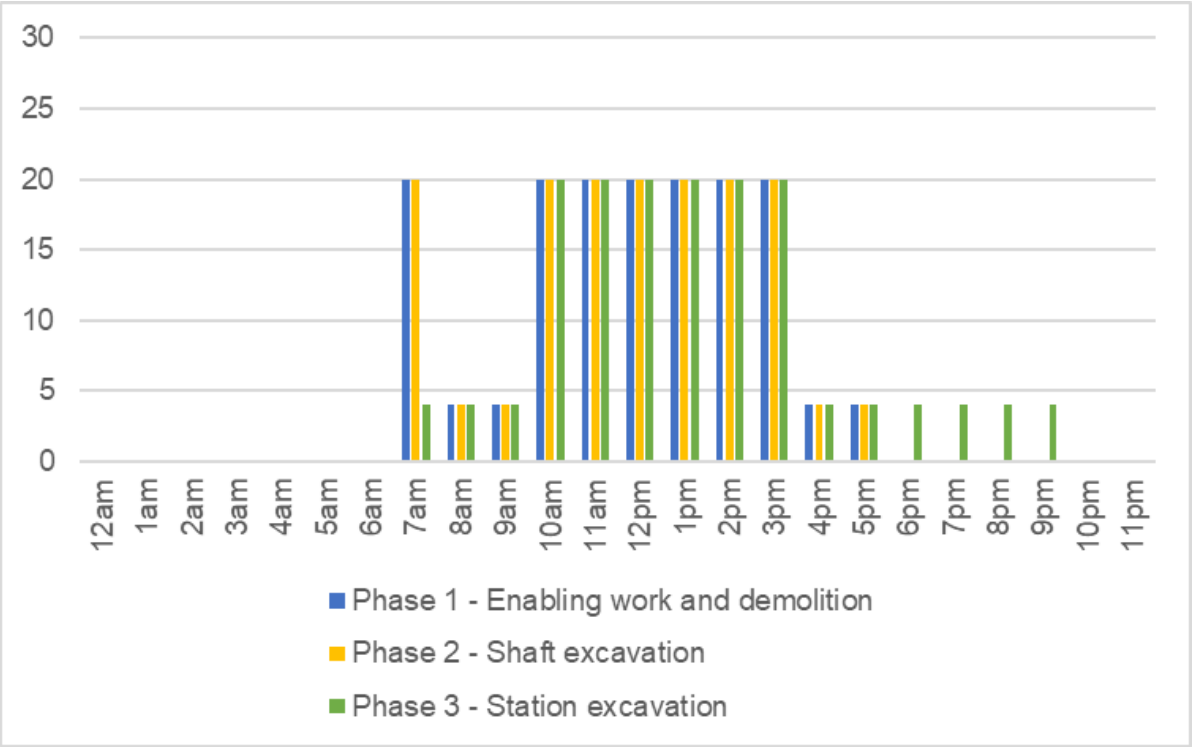

Figure 5-6 Indicative hourly light vehicle movements[1] (arrival and departure) at Pyrmont Station construction sites over a typical day

Note 1: Movement means a one way movement. A vehicle entering then leaving the work site represents two movements.

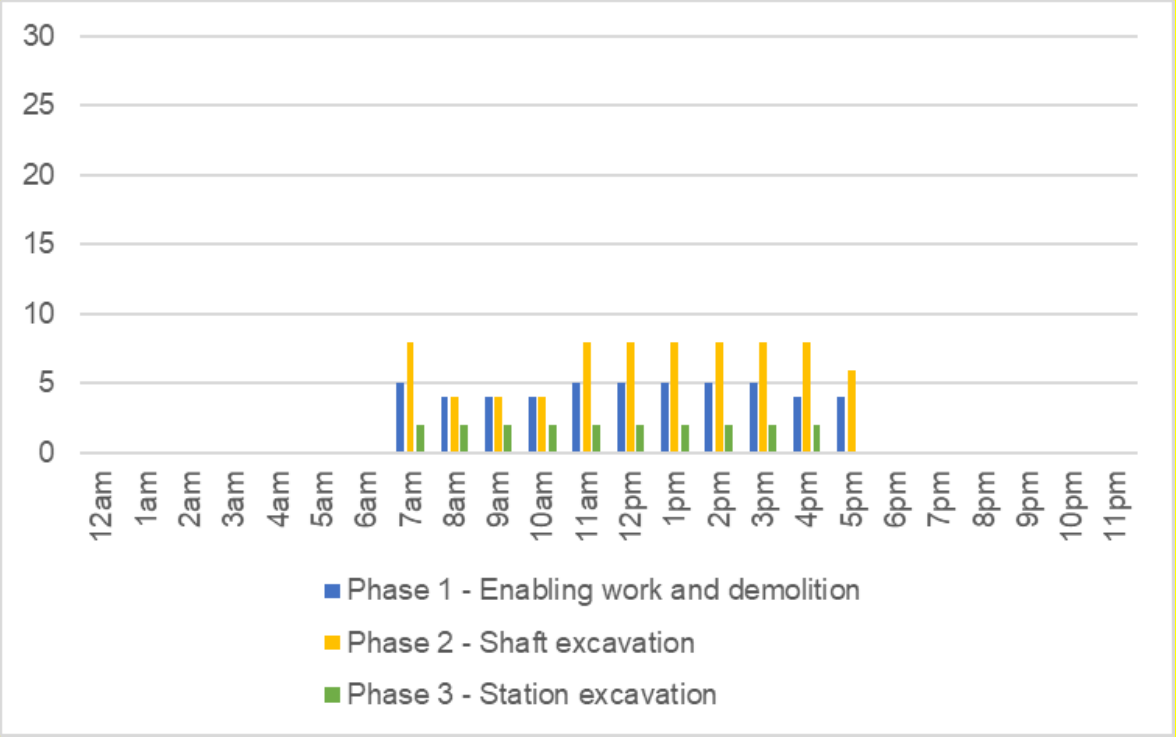

Figure 5-7 Indicative hourly heavy vehicle movements[1] (arrival and departure) at the Pyrmont Station western construction site over a typical day

Note 1: Movement means a one way movement. A vehicle entering then leaving the work site represents two movements.

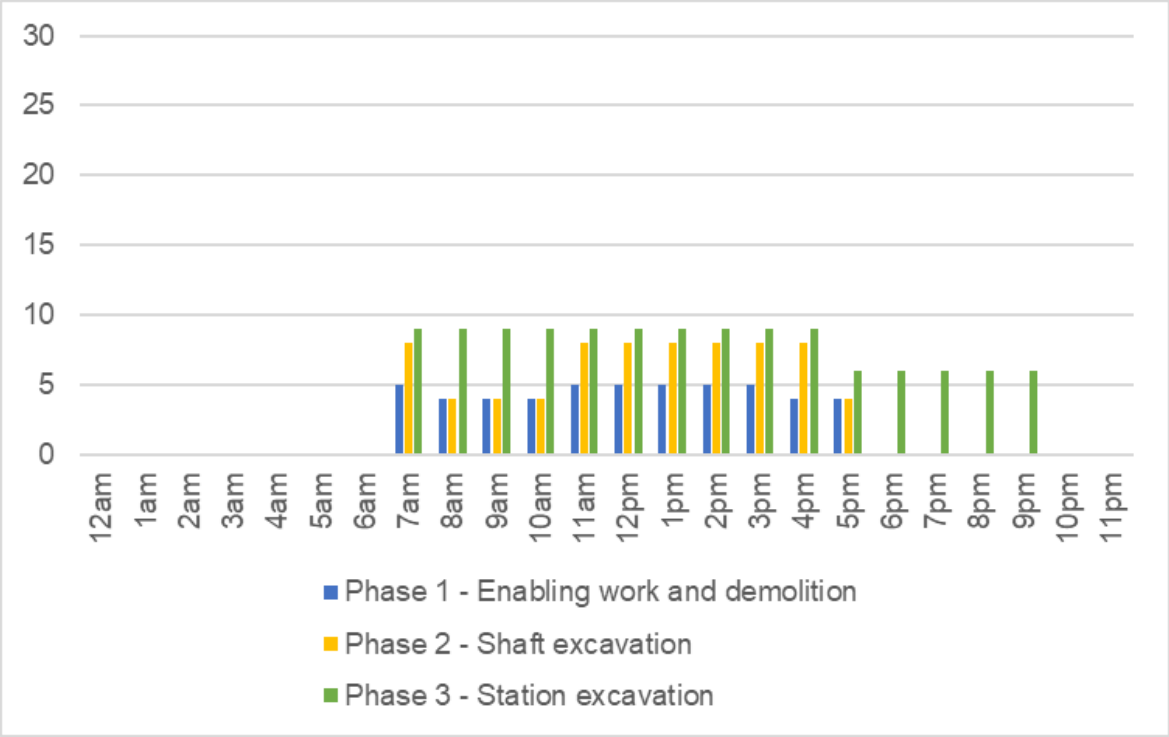

Figure 5-8 Indicative hourly heavy vehicle movements[1] (arrival and departure) at the Pyrmont Station eastern construction site over a typical day

Note 1: Movement means a one way movement. A vehicle entering then leaving the work site represents two movements.

Table 5-8 Daily construction movements per day by phase – Pyrmont Station construction sites

Phase	Total movements[1] per day			Total movements[1] per hour		
	Light vehicles	Heavy vehicles	Total	Light vehicles	Heavy vehicles	Total
Phase 1 – Enabling work and demolition						
Eastern construction site	78	50	128	7	5	12
Western construction site	78	50	128	7	5	12
Phase 2 - Shaft excavation						
Eastern construction site	78	72	150	7	7	14
Western construction site	78	74	152	7	7	14
Phase 3 - Station excavation						
Eastern construction site	78	120	198	5	8	13
Western construction site	78	20	98	5	2	7

Note 1: Movement means a one-way movement. A vehicle entering and then leaving a construction worksite represents two movements

Source: Sydney Metro

5.6.7 Impacts on road network performance

Intersection performance results under the '2024 without this proposal' (without construction vehicles) and '2024 with this proposal' (with construction vehicles) scenarios are summarised in Table 5-9 for the morning and evening peak hours.

During the morning peak hour presented in this assessment (9 am to 10 am), it is anticipated that the construction sites would generate four light vehicle movements (one light vehicle travelling to and from each construction site) and 14 heavy vehicle movements (approximately five heavy vehicles travelling to and from the eastern construction site and two heavy vehicles travelling to and from the western construction site). During the evening peak hour presented in this assessment (5.45 pm to 6.45 pm), it is anticipated that the construction sites would generate four light vehicle movements (one light vehicle travelling to and from each construction site) and six heavy vehicle movements (three heavy vehicles travelling to and from the eastern construction site only). As discussed in Section 3.3, the peak hour presented in this assessment was selected to represent when background traffic demand is at its greatest.

Modelled intersection performance with construction traffic indicates that the following intersections would experience a deterioration in Level of Service, however, would still operate with spare capacity:

- Pyrmont Bridge Road / Harris Street during the morning and evening peak hour – From Level of Service B to C
- Union Street / Pyrmont Street during the morning peak hour – From Level of Service A to B.

All other intersections forming part of the construction vehicle route would perform at the same Level of Service compared to the scenario without construction traffic.

The poor performance of the Pyrmont Bridge Road / Bank Street intersection during the morning peak hour is due to high traffic volumes on the northern and southern approaches, which further increase in the future compared to the existing conditions. The poor forecast performance of the Pyrmont Bridge Road / Bank Street intersection during the evening peak hour is due to downstream queuing from the Western Distributor onto the westbound/northbound on-ramp and Bank Street as also observed in the existing conditions. This traffic congestion and queueing spill back onto Bank Street prevents vehicles from Pyrmont Bridge Road turning left into (western approach) and right into (eastern approach) the Western Distributor on-ramp, and is reflected in the poor performance of the Pyrmont Bridge Road / Bank Street.

Analysis of modelled intersection performance results shows that at some locations, the addition of construction traffic would result in a small reduction in demand flow due to the following factors:

- Additional ‘latent’ or ‘unreleased’ demand, which is traffic that is not able to be assigned in the model during the morning and/or evening peak period. These trips are assumed to still exist, however, these trips would be delayed and not completed until after the peak period, effectively increasing the duration of the peak period
- Fewer vehicles passing through an intersection due to the addition of construction-related heavy vehicles, which have a slower acceleration profile compared to light vehicles. This would likely result in an increase to average delay.

In reality, from an operational perspective, the performance of an intersection where the modelling results show a small reduction in demand flow and / or average delay would remain very similar with and without construction traffic.

Table 5-9 Modelled intersection performance (Aimsun 2024) – Pyrmont Station construction sites

Intersection and peak hour[1]	2024 without this proposal					2024 with this proposal				
	Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)		Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)	
Pyrmont Bridge Road / Bank Street										
Morning	2,885	>100	F	NB	390	2,895	>100	F	NB	320
				EB	50				EB	70
				SB	260				SB	270
				WB	80				WB	130
Evening	2,939	>100	F	NB	100	2,971	>100	F	NB	100
				EB	310				EB	310
				SB	190				SB	210
				WB	160				WB	160
Pyrmont Bridge Road / Harris Street										
Morning	1,851	26	B	NB	70	1,897	30	C	NB	100
				EB	120				EB	100
				SB	70				SB	100
				WB	30				WB	30
Evening	1,751	26	B	NB	100	1,808	35	C	NB	150
				EB	70				EB	90
				SB	70				SB	80
				WB	50				WB	50
Pyrmont Bridge Road / Pyrmont Street										
Morning	1,688	19	B	NB	-	1,726	21	B	NB	-
				EB	70				EB	70
				SB	50				SB	50
				WB	50				WB	50
Evening	1,597	21	B	NB	-	1,675	21	B	NB	-
				EB	60				EB	60
				SB	70				SB	70
				WB	40				WB	40
Darling Drive / Union Street / Murray Street										
Morning	992	26	B	NB	30	1,012	25	B	NB	30
				EB	50				EB	70
				SB	50				SB	50
				WB	50				WB	50
Evening	953	31	C	NB	40	1,004	30	C	NB	40
				EB	30				EB	50
				SB	120				SB	120
				WB	80				WB	100

Intersection and peak hour[1]	2024 without this proposal					2024 with this proposal				
	Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)		Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)	
Darling Drive / Harbourside Access Road										
Morning	476	4	A	NB	20	477	4	A	NB	20
				EB	-				EB	-
				SB	20				SB	30
				WB	0				WB	0
Evening	543	3	A	NB	30	543	3	A	NB	30
				EB	-				EB	-
				SB	10				SB	10
				WB	10				WB	10
Union Street / Edward Street										
Morning	322	15	B	NB	40	324	16	B	NB	40
				EB	20				EB	20
				SB	20				SB	20
				WB	10				WB	30
Evening	439	20	B	NB	30	429	18	B	NB	40
				EB	30				EB	30
				SB	20				SB	20
				WB	50				WB	30
Union Street / Pyrmont Street										
Morning	554	14	A	NB	40	552	19	B	NB	30
				EB	10				EB	10
				SB	50				SB	50
				WB	40				WB	50
Evening	736	14	A	NB	40	740	14	A	NB	40
				EB	30				EB	30
				SB	70				SB	50
				WB	40				WB	40
Harris Street / Allen Street										
Morning	1,608	26	B	NB	70	1,612	26	B	NB	70
				EB	90				EB	90
				SB	70				SB	50
				WB	-				WB	-
Evening	1,387	28	B	NB	50	1,394	28	B	NB	50
				EB	80				EB	80
				SB	50				SB	50
				WB	-				WB	-

Intersection and peak hour[1]	2024 without this proposal					2024 with this proposal				
	Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)		Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)	
Harris Street / Fig Street / Western Distributor										
Morning	3,484	56	D	NB	60	3,488	56	D	NB	60
				EB	140				EB	140
				SB	80				SB	70
				WB	290				WB	290
Evening	3,014	38	C	NB	50	3,017	38	C	NB	50
				EB	100				EB	100
				SB	70				SB	70
				WB	90				WB	90

Note 1: Morning peak – 14 heavy vehicle movements and four light vehicle movements to be generated to/from the sites. Evening peak – Six heavy vehicle movements and four light vehicle movements to be generated to/from the sites

5.6.8 Construction impacts summary

Figure 5-9 provides a summary of construction impacts on road network performance.

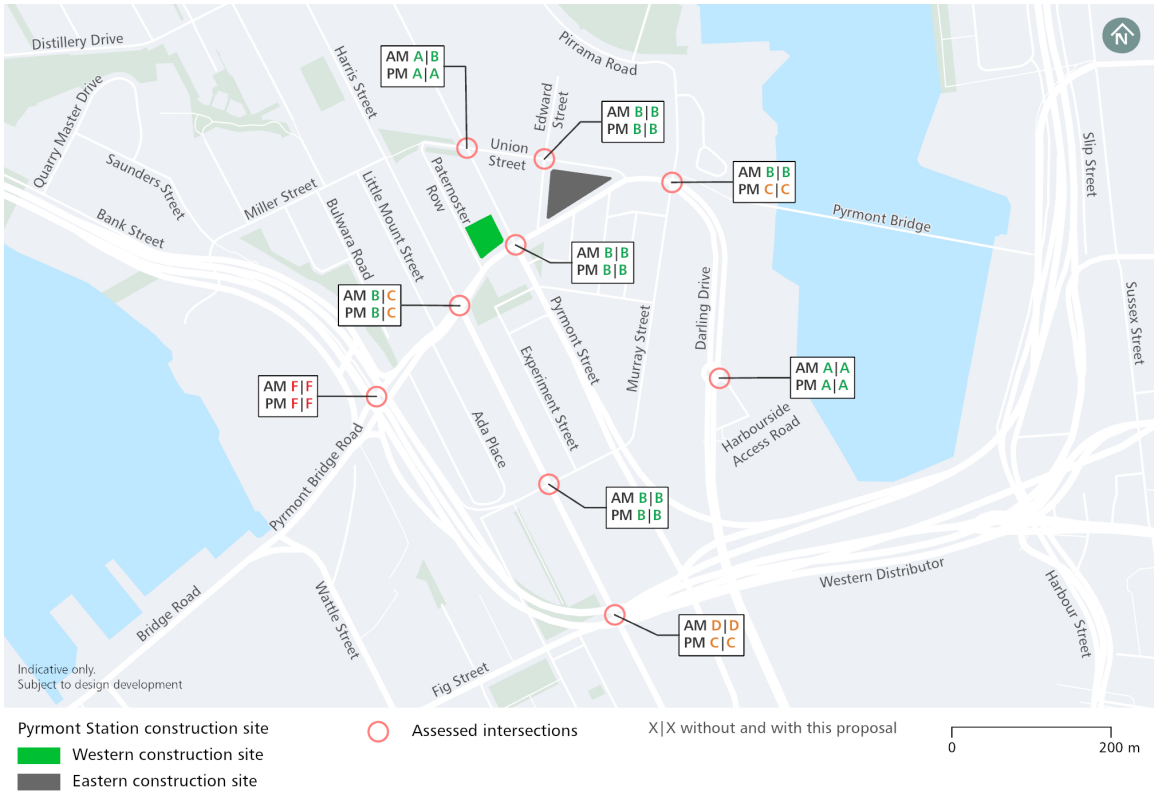

Figure 5-9 Road network performance summary – Pyrmont Station construction sites

5.7 Hunter Street Station (Sydney CBD) construction sites

5.7.1 Location and access

The Hunter Street Station (Sydney CBD) western construction site is bounded by George and Hunter Streets and Hunter Street Station (Sydney CBD) eastern construction site by Hunter, O'Connell and Bligh Streets. Roads forming part of the primary construction vehicle route include Macquarie Street, Bent Street, O'Connell Street, Hunter Street and Margaret Street as shown in Figure 5-10 and Figure 5-11.

About 50 per cent of inbound construction traffic would enter each construction site by the Cahill Expressway, with the remaining 50 per cent of vehicles entering each construction site via Bridge Street. Vehicles would then arrive westbound on Hunter Street and be enter the site with the assistance of pedestrian and temporary traffic management. Primary site access would be left-in, left-out via O'Connell Street and left-in, right-out via Hunter Street.

Outbound vehicles would exit the construction sites via Hunter Street. Under the preferred route shown in Figure 5-10, construction vehicles would exit eastbound onto Hunter Street. This preferred route would require a right turn onto Hunter Street. Opportunities to facilitate this turn would be explored in consultation with Customer Journey Planning and City of Sydney during detailed construction planning, and traffic controllers will assist vehicles in safely exiting the site Eastbound onto Hunter Street. From Hunter Street, vehicles would turn left onto Macquarie Street, with about 50 per cent of vehicles would turn on to the Cahill Expressway and the remaining 50 per cent of vehicles would continue along Bridge Street, as summarised in Table 5-10.

Under the alternative route, vehicles would exit westbound onto Hunter Street and then right onto George Street as shown in Figure 5-11. There would be an interface with the light rail, however this is not foreseen to be a concern as this move is already under control of traffic signals at this location. Vehicle arrival and departure would also be managed to reduce the likelihood of conflicts between trucks and light rail. The alternative route assumes that:

- All outbound traffic from the western site would travel via the Hunter Street – George Street - Margaret Street 'dogleg' via Clarence Street
- All traffic from the eastern site would use Macquarie Street, with about 50 per cent of vehicles turning on to the Cahill Expressway and the remaining 50 per cent of vehicles would continuing along Bridge Street as shown in Table 5-10.

Table 5-10 Hunter Street Station (Sydney CBD) construction traffic route distribution

Route	Construction site	Outbound construction traffic		
		Via Macquarie St-Cahill Expy	Via Macquarie St-Bridge St	Via Margaret St-George St
Preferred	Eastern	50%	50%	0%
	Western	50%	50%	0%
Alternative	Eastern	50%	50%	0%
	Western	0%	0%	100%

Source: Sydney Metro

The Construction Environmental Management Framework (Appendix C of the Environmental Impact Statement) describes the approach to environmental management, monitoring and reporting during construction. Specifically, it lists the requirements to be addressed by the construction contractor in developing the Construction Environmental Management Plans, sub-plans, and other supporting documentation for each specific environmental aspect.

Figure 5-10 Hunter Street Station construction sites indicative preferred route construction vehicle routes

Figure 5-11 Hunter Street Station construction sites indicative alternative route construction vehicle routes

5.7.2 Construction activities

Major construction activities anticipated at the Hunter Street Station (Sydney CBD) construction sites include:

- Demolition and site establishment
- Piling
- Excavation.

5.7.3 Impacts on the active transport network

The Hunter Street Station western construction site is located above the existing underground pedestrian walkway between Wynyard Station and Pitt Street. This underground pedestrian walkway would be temporarily closed for the proposal, and future underground pedestrian access would be provided from the Hunter Street (Sydney CBD) Station to Wynyard Station following the completion of the Sydney Metro West project. All five other possible pedestrian accesses to Wynyard Station concourse would remain open. Pedestrians using the tunnel would be diverted to the Wynyard surface entries on George Street and would instead access the surface pedestrian network to travel to their destination. As a result, it is anticipated that the affected pedestrians may experience an increase in travel journey times, as they would have to utilise the signalised pedestrian crossings at Margaret Street / Carrington Street, Margaret Street / George Street, George Street / Hunter Street and Hunter Street / Pitt Street. While some increase in overcrowding along the footpaths is expected, impacts to travel times would be minor as these alternative intersections are signalised.

While footpaths and cycleways would remain open during construction, temporary diversions would be required at times during construction and oversized deliveries. These impacts would

result from both the preferred and alternative routes and would be managed through the development of Construction Traffic Management Plan/s as outlined within the Construction Traffic Management Framework (Appendix D of the Environmental Impact Statement). No impacts to cycle routes are anticipated as a result of the alternative or proposed routes.

The permanent closure of De Mestre Place will reduce vehicle movements on George Street and improve pedestrian flows in this area.

5.7.4 Impacts on the public transport network

Roads forming part of the Hunter Street Station (Sydney CBD) construction vehicle route that are also used by buses include Bridge Street, Macquarie Street and Clarence Street. Modelled bus travel times under the '2025 without this proposal' (without construction vehicles) and '2025 with this proposal' (with construction vehicles) scenarios for key bus routes are summarised in Table 5-11 and Table 5-12 for the morning and evening peak hours.

Impacts to buses would be limited to a potential minor increase in travel time due to the additional construction vehicles on the road network. No impacts are anticipated on the operation of bus stops.

No interface with the light rail network would be required as a result of the preferred route. Under the alternative route, construction vehicles would interface with the light rail network at the George Street / Margaret Street and George Street/Hunter Street intersections. At this intersection, outbound construction vehicles would be required to cross the light rail line. Impacts to the light rail network are not foreseen as this move is already possible under traffic signal control and there is no proposal at this stage to alter phasing to accommodate the proposed Metro vehicle movements.

No impacts to the rail or ferry networks are anticipated during construction.

Table 5-11 Modelled morning hour peak bus travel times (Aimsun 2025) – Hunter Street Station (Sydney CBD) construction sites

Route	Direction	2025 without this proposal (minutes)	2025 with this proposal – preferred route (minutes)	2025 with this proposal – alternative route (minutes)
Clarence Street to Sydney Harbour Bridge	Northbound	02.06	02.06	02.08
Sydney Harbour Bridge to York Street, Wynyard Station	Southbound	03.17	03.18	03.17
Elizabeth Street to Phillip Street	Northbound	05.05	05.06	05.18
Phillip Street to Elizabeth Street	Southbound	03.08	03.10	03.10
Shakespeare Lane to Elizabeth Street	Eastbound	03.30	03.40	03.29
	Westbound	02.06	02.06	02.08

Table 5-12 Modelled evening peak hour bus travel times (Aimsun 2025) – Hunter Street Station (Sydney CBD) construction sites

Route	Direction	2025 without this proposal (minutes)	2025 with this proposal – preferred route (minutes)	2025 with this proposal – alternative route (minutes)
Clarence Street to Sydney Harbour Bridge	Northbound	01.54	01.55	01.53
Sydney Harbour Bridge to York Street, Wynyard Station	Southbound	02.47	02.46	02.46
Elizabeth Street to Phillip Street	Northbound	04.30	04.28	04.37
Phillip Street to Elizabeth Street	Southbound	05.10	05.02	04.46
Shakespeare Lane to Elizabeth Street	Eastbound	N/A	N/A	N/A
	Westbound	01.54	01.55	01.53

5.7.5 Impacts on parking and property access

On-street parking spaces and loading zones would be temporarily removed for the duration of this proposal, including the following:

- All parking spaces on the southern side of Hunter Street adjacent to the Hunter Street western construction site
- All parking spaces on the eastern side of O'Connell Street adjacent to the Hunter Street eastern construction site
- Extension of the duration of the existing restrictions for the parking lane on the northern side of Hunter Street between Pitt Street and Bligh Street, to include a morning peak clearway in addition to the existing evening peak clearway.

Removal of additional car spaces may be required to accommodate heavy vehicle queuing. Opportunities to mitigate impacts to on-street car parking would be explored in consultation with City of Sydney during ongoing design development and construction planning.

The following sections of Hunter Street would be temporarily closed during oversize deliveries outside of standard construction hours:

- Hunter Street between George Street and Pitt Street – Full closure during deliveries
- O'Connell Street – Full closure during deliveries.

Oversize deliveries would be required on an occasional basis to deliver or remove major items of plant or equipment from site, including but not limited to roadheaders, cranes, site sheds, tunnel boring machines and mechanised formwork. These deliveries would be anticipated to require either night time or weekend road closures to minimise impacts to traffic. Additional parking zones immediately adjacent to the construction sites would be temporarily suspended for the duration of the closure if required to facilitate safe loading/unloading. Pedestrian access (and vehicular access wherever possible) to properties would be maintained.

At Hunter Street Station construction sites, construction workers would be encouraged to use the extensive existing public transport options or existing commercial car parking facilities. The Construction Traffic Management Framework (Appendix D of the Environmental Impact Statement) sets out the approach to managing construction worker parking for the project.

5.7.6 Construction vehicle movements

Construction vehicles would access and egress the Hunter Street Station (Sydney CBD) construction sites 24 hours a day during excavation, with construction vehicles generated for all other activities to access and egress the construction site during standard hours. The arrival and departure pattern of construction vehicles aims to minimise the impact of construction activity during the network peak periods.

The anticipated number of construction vehicle movements to and from the site per hour during the various phases of construction is shown in Figure 5-12 and Figure 5-14. Heavy vehicles have been assumed to travel to and from the construction site within the hour, for example eight heavy vehicle movements during an hour would comprise four heavy vehicle movements to the construction site and four heavy vehicle movements from the construction site.

The total daily number of construction vehicle movements for each stage is provided in Table 5-13.

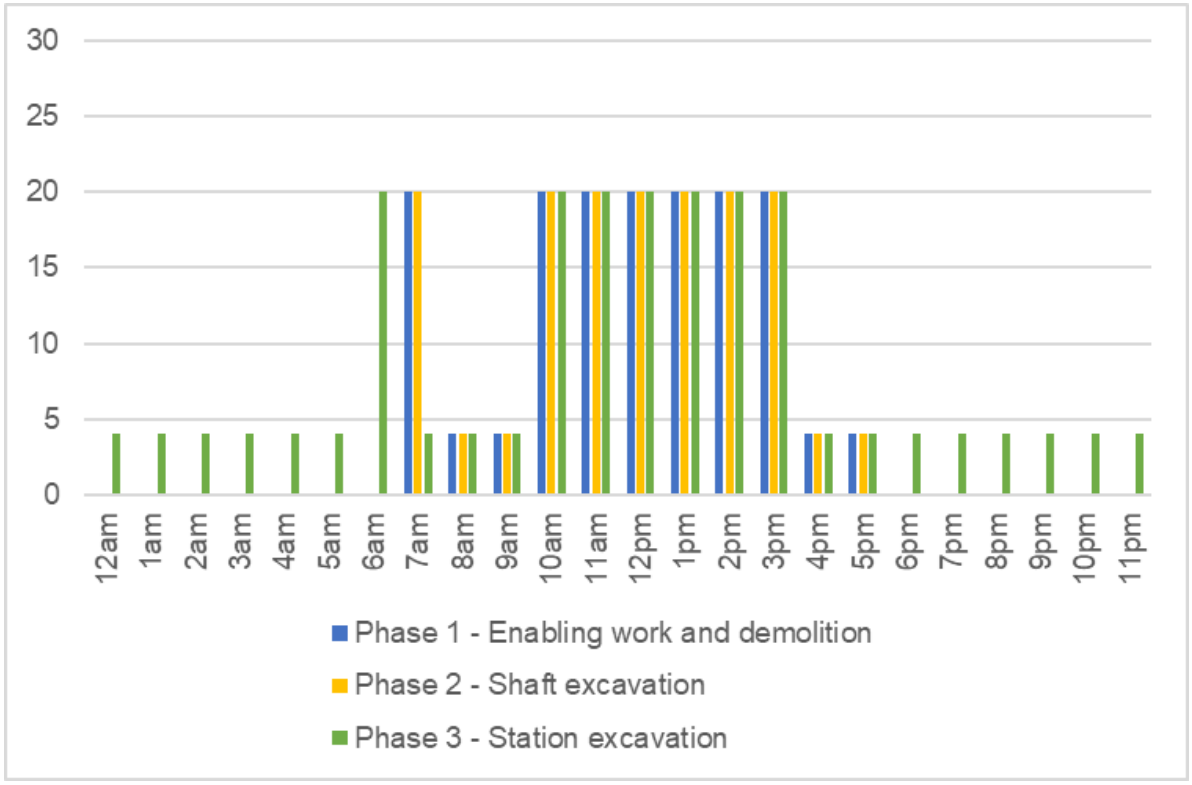

Figure 5-12 Indicative hourly light vehicle movements[1] (arrival and departure) at Hunter Street Station construction sites over a typical day

Note 1: Movement means a one way movement. A vehicle entering then leaving the work site represents two movements.

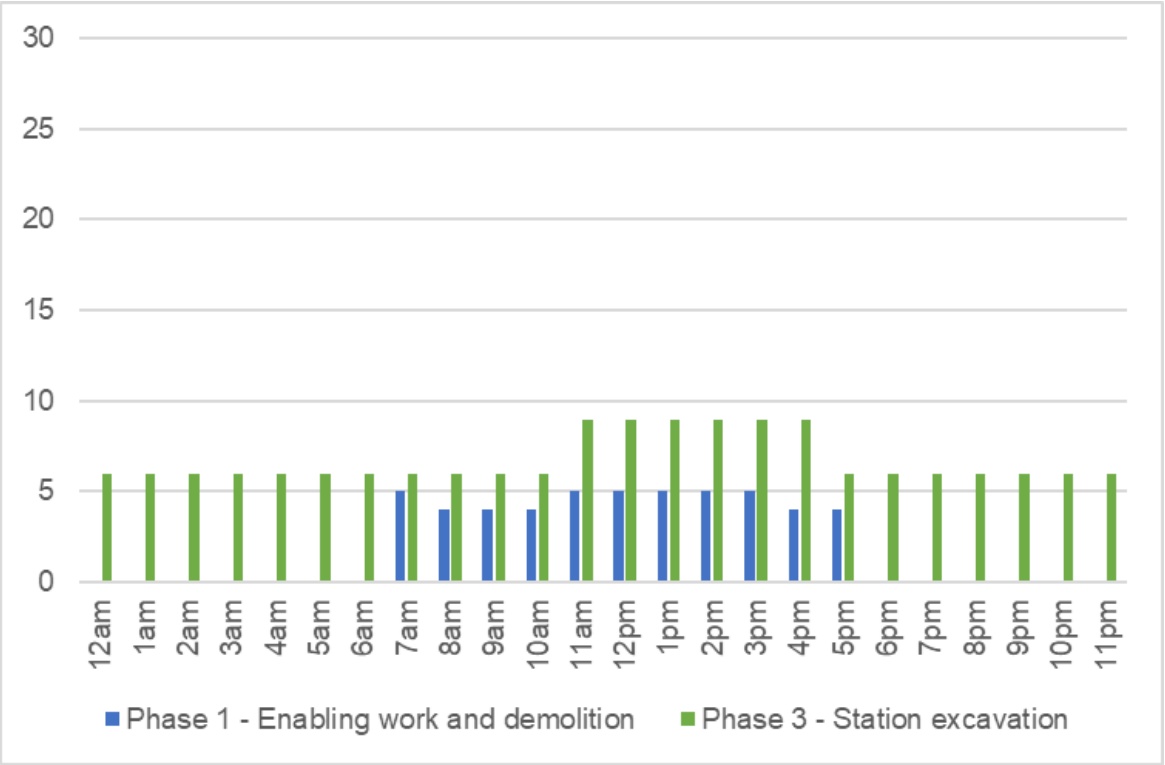

Figure 5-13 Indicative hourly heavy vehicle movements[1] (arrival and departure) at Hunter Street Station eastern construction site over a typical day

Note 1: Movement means a one way movement. A vehicle entering then leaving the work site represents two movements. Note 2: Phase 2 – Shaft excavation not relevant for the Hunter Street Station eastern construction site

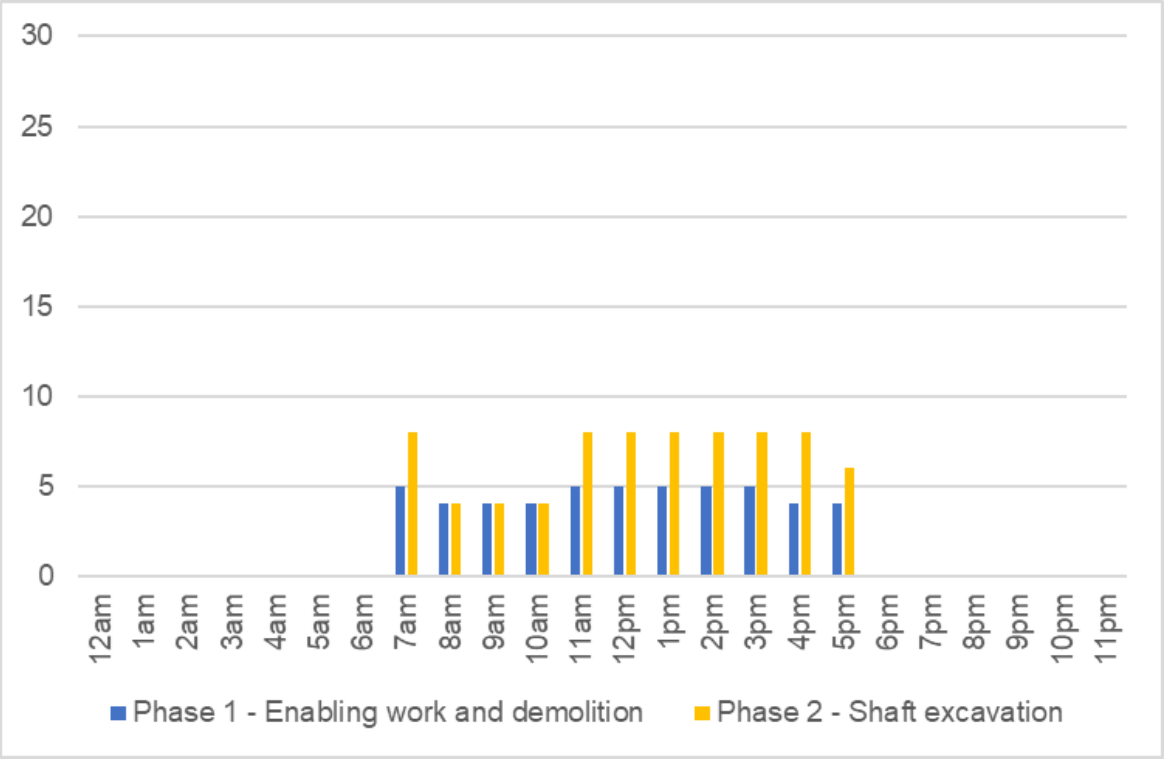

Figure 5-14 Indicative hourly heavy vehicle movements[1] (arrival and departure) at Hunter Street Station (Sydney CBD) western construction site over a typical day

Note 1: Movement means a one way movement. A vehicle entering then leaving the work site represents two movements. Note 2: Phase 3 – Station excavation not relevant for the Hunter Street Station western construction site

Table 5-13 Daily construction movements per day by phase – Hunter Street Station construction sites

Phase	Total movements[1] per day			Total movements[1] per hour		
	Light vehicles	Heavy vehicles	Total	Light vehicles	Heavy vehicles	Total
Phase 1 – Enabling work and demolition						
Eastern construction site	78	50	128	7	5	12
Western construction site	78	50	128	7	5	12
Phase 2 – Shaft excavation						
Eastern construction site	78	0	78	7	0	7
Western construction site	78	74	152	7	7	14
Phase 3 – Station excavation						
Eastern construction site	104	162	266	4	7	11
Western construction site	104	0	104	9	0	9

Note 1: Movement means a one-way movement. A vehicle entering and then leaving a construction worksite represents two movements

Source: Sydney Metro

5.7.7 Impacts on road network performance

Both outbound construction vehicle routes were assessed, assuming a 50/50 per cent split in use. Intersection performance results under the '2025 without this proposal' (without construction vehicles) and '2025 with this proposal (preferred route)' (with construction vehicles) scenarios are summarised in Table 5-14 for the morning and evening peak hours. Intersection performance results under the '2025 without this proposal' (without construction vehicles) and '2025 with this proposal (alternative route)' (with construction vehicles) scenarios are summarised in Table 5-15 for the morning and evening peak hours.

The construction activity programme for the eastern site suggests that there will be a period when demolition and cavern excavation activities overlap. As such, the cumulative construction traffic movements for these activities were considered in the traffic impact assessment as a worst-case scenario.

During the morning peak hour presented in this assessment (9 am to 10 am), it is anticipated that the construction sites would generate six light vehicle movements (two light vehicles travelling to and from the eastern construction site and one light vehicle travelling to and from the western construction site) and 14 heavy vehicle movements (five heavy vehicles travelling to and from the eastern construction site and two heavy vehicles travelling to and from the western construction site). During the evening peak hour presented in this assessment (6 pm to 7 pm), it is anticipated that the construction sites would generate four light vehicle movements (one light vehicle travelling to and from each construction site) and six heavy vehicle movements (three heavy vehicles travelling to and from the eastern construction site only). As discussed in Section 3.3, the peak hour presented in this assessment was selected to represent when background traffic demand is at its greatest.

Modelled intersection performance with construction traffic (preferred route assessment) indicates that the following intersections would experience a deterioration in Level of Service, however, would still operate with spare capacity:

- Macquarie Street / Hunter Street during the morning peak hour – From Level of Service B to C
- Bent Street / Philip Street during the morning peak hour – From Level of Service B to C.

All other intersections forming part of the construction vehicle route would perform at the same Level of Service compared to the scenario without construction traffic. The intersection of Hunter Street / Elizabeth Street during the evening peak hour (scenario with construction traffic) shows a minor improvement in average delay (two seconds). This minor improvement would result from construction-related traffic leading to additional queuing being experienced at adjacent intersections, reducing the flow of vehicles into this intersection.

Modelled intersection performance with construction traffic (alternative route assessment) indicates that the following intersections would experience a deterioration in Level of Service, however, would still operate with spare capacity:

- Hunter Street / Castlereagh Street during the morning peak hour – From Level of Service B to C
- Hunter Street / George Street / Margaret Street during the evening peak hour – From Level of Service B to C.

All other intersections forming part of the construction vehicle route would perform at the same Level of Service compared to the scenario without construction traffic. The intersection of Hunter Street / Elizabeth Street during the evening peak hour (scenario with construction traffic) shows a minor improvement in average delay (one second). This minor improvement would result from construction-related traffic leading to additional queuing being experienced at adjacent intersections, reducing the flow of vehicles into this intersection.

Analysis of modelled intersection performance results shows that at some locations, the addition of construction traffic would result in a small reduction in demand flow due to the following factors:

- Additional ‘latent’ or ‘unreleased’ demand, which is traffic that is not able to be assigned in the model during the morning and/or evening peak period. These trips are assumed to still exist, however, these trips would be delayed and not completed until after the peak period, effectively increasing the duration of the peak period
- Fewer vehicles passing through an intersection due to the addition of construction-related heavy vehicles, which have a slower acceleration profile compared to light vehicles. This would likely result in an increase to average delay.

In reality, from an operational perspective, the performance of an intersection where the modelling results show a small reduction in demand flow and / or average delay would remain very similar with and without construction traffic.

The closure of De Mestre Place to traffic is not anticipated to result in any changes to loading zones, as these loading zones would not be required following demolition of buildings.

The forecast volume of heavy vehicle arrivals into the Sydney CBD would not result in queuing or circulation of vehicles on streets on approach to the construction sites. Management of heavy vehicle arrivals and departures would be managed through the development of

Construction Traffic Management Plan/s as outlined within the Construction Traffic Management Framework (Appendix D of the Environmental Impact Statement).

Options to reallocate road space on the western part of Hunter Street will be investigated to partially or fully close Hunter Street to through traffic to/from George Street / Margaret Street. These investigations, which could mitigate the construction impacts of the proposal, will be undertaken in consultation with relevant stakeholders including Transport for NSW.

Table 5-14 Modelled intersection performance, Preferred route (Aimsun 2025) – Hunter Street Station (Sydney CBD) construction sites

Intersection and peak hour[1]	2025 without this proposal					2025 with this proposal (primary route)				
	Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)		Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)	
Macquarie Street / Bridge Street										
Morning	2,175	27	B	NB	80	2,177	27	B	NB	90
				EB	50				EB	50
				SB	30				SB	30
				WB	70				WB	150
Evening	2,547	27	B	NB	80	2,537	27	B	NB	70
				EB	80				EB	80
				SB	90				SB	90
				WB	20				WB	40
Macquarie Street / Bent Street / Shakespeare Place										
Morning	3,422	30	C	NB	70	3,409	31	C	NB	70
				EB	40				EB	40
				SB	100				SB	140
				WB	160				WB	140
Evening	4,014	41	C	NB	90	4,041	41	C	NB	90
				EB	100				EB	100
				SB	140				SB	160
				WB	140				WB	140
Macquarie Street / Hunter Street										
Morning	2,120	28	B	NB	160	2,090	30	C	NB	200
				EB	140				EB	100
				SB	70				SB	50
				WB	-				WB	-
Evening	2,183	38	C	NB	190	2,187	40	C	NB	210
				EB	150				EB	120
				SB	90				SB	80
				WB	-				WB	-

Intersection and peak hour[1]	2025 without this proposal					2025 with this proposal (primary route)				
	Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)		Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)	
Hunter Street / Elizabeth Street										
Morning	1,948	30	C	NB	70	1,914	31	C	NB	70
				EB	60				EB	60
				SB	100				SB	100
				WB	100				WB	70
Evening	2,001	29	C	NB	160	2,000	27	B	NB	170
				EB	60				EB	50
				SB	70				SB	50
				WB	50				WB	50
Hunter Street / Castlereagh Street										
Morning	1,194	22	B	NB	-	1,196	21	B	NB	-
				EB	110				EB	100
				SB	120				SB	100
				WB	30				WB	30
Evening	1,030	13	A	NB	-	1,027	10	A	NB	-
				EB	100				EB	40
				SB	50				SB	30
				WB	30				WB	40
Hunter Street / Pitt Street / O'Connell Street										
Morning	1,145	24	B	NB	60	1,148	26	B	NB	60
				EB	70				EB	80
				SB	70				SB	70
				WB	50				WB	50
Evening	897	19	B	NB	50	874	21	B	NB	60
				EB	50				EB	50
				SB	30				SB	30
				WB	60				WB	70
Bent Street / Phillip Street										
Morning	1,416	27	B	NB	70	1,447	31	C	NB	60
				EB	10				EB	20
				SB	120				SB	120
				WB	80				WB	90
Evening	1,911	54	D	NB	160	1,950	55	D	NB	160
				EB	40				EB	40
				SB	210				SB	200
				WB	100				WB	100

Intersection and peak hour[1]	2025 without this proposal					2025 with this proposal (primary route)				
	Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)		Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)	
Bent Street / Bligh Street										
Morning	665	5	A	NB	-	684	8	A	NB	-
				EB	40				EB	50
				SB	-				SB	-
				WB	30				WB	40
Evening	876	7	A	NB	-	913	8	A	NB	-
				EB	50				EB	50
				SB	-				SB	-
				WB	30				WB	50
Hunter Street / George Street / Margaret Street										
Morning	712	21	B	NB	-	694	22	B	NB	-
				EB	90				EB	80
				SB	-				SB	-
				WB	70				WB	70
Evening	609	28	B	NB	-	577	27	B	NB	-
				EB	100				EB	110
				SB	-				SB	-
				WB	80				WB	70
Margaret Street / York Street										
Morning	1,716	18	B	NB	-	1,681	18	B	NB	-
				EB	70				EB	60
				SB	70				SB	70
				WB	80				WB	80
Evening	1,408	21	B	NB	-	1,392	21	B	NB	-
				EB	50				EB	60
				SB	80				SB	70
				WB	120				WB	120
Margaret Street / Clarence Street										
Morning	1,063	59	E	NB	100	1,044	55	D	NB	80
				EB	80				EB	80
				SB	-				SB	-
				WB	40				WB	40
Evening	1,316	53	D	NB	190	1,319	53	D	NB	190
				EB	80				EB	80
				SB	-				SB	-
				WB	50				WB	40

Intersection and peak hour[1]	2025 without this proposal					2025 with this proposal (primary route)				
	Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)		Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)	
Clarence Street / Jamison Street										
Morning	731	18	B	NB	60	734	18	B	NB	60
				EB	-				EB	-
				SB	-				SB	-
				WB	40				WB	40
Evening	1,017	14	A	NB	70	1,051	14	A	NB	70
				EB	-				EB	-
				SB	-				SB	-
				WB	40				WB	40

Note 1: AM peak - 14 heavy vehicle movements and six light vehicle movements to be generated to/from the sites. PM peak - Six heavy vehicle movements and four light vehicle movements to be generated to/from the sites

Table 5-15 Modelled intersection performance, alternative route (Aimsun 2025) – Hunter Street Station (Sydney CBD) construction sites

Intersection and peak hour[1]	2025 without this proposal					2025 with this proposal (secondary route)				
	Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)		Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)	
Macquarie Street / Bridge Street										
Morning	2,175	27	B	NB	80	2,189	27	B	NB	80
				EB	50				EB	50
				SB	30				SB	30
				WB	70				WB	70
Evening	2,547	27	B	NB	80	2,553	24	B	NB	80
				EB	80				EB	80
				SB	90				SB	70
				WB	20				WB	30
Macquarie Street / Bent Street / Shakespeare Place										
Morning	3,422	30	C	NB	70	3,421	28	B	NB	60
				EB	40				EB	40
				SB	100				SB	140
				WB	160				WB	140
Evening	4,014	41	C	NB	90	4,055	40	C	NB	90
				EB	100				EB	100
				SB	140				SB	150
				WB	140				WB	140

Intersection and peak hour[1]	2025 without this proposal					2025 with this proposal (secondary route)				
	Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)		Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)	
Macquarie Street / Hunter Street										
Morning	2,120	28	B	NB	160	2,090	22	B	NB	150
				EB	140				EB	110
				SB	70				SB	70
				WB	-				WB	-
Evening	2,183	38	C	NB	190	2,193	35	C	NB	200
				EB	150				EB	130
				SB	90				SB	90
				WB	-				WB	-
Hunter Street / Elizabeth Street										
Morning	1,948	30	C	NB	70	1,919	35	C	NB	70
				EB	60				EB	60
				SB	100				SB	100
				WB	100				WB	120
Evening	2,001	29	C	NB	160	2,014	28	B	NB	150
				EB	60				EB	60
				SB	70				SB	60
				WB	50				WB	50
Hunter Street / Castlereagh Street										
Morning	1,194	22	B	NB	-	1,205	37	C	NB	-
				EB	110				EB	120
				SB	120				SB	120
				WB	30				WB	50
Evening	1,030	13	A	NB	-	1,048	11	A	NB	-
				EB	100				EB	50
				SB	50				SB	30
				WB	30				WB	30
Hunter Street / Pitt Street / O'Connell Street										
Morning	1,145	24	B	NB	60	1,154	24	B	NB	70
				EB	70				EB	80
				SB	70				SB	60
				WB	50				WB	50
Evening	897	19	B	NB	50	906	21	B	NB	60
				EB	50				EB	60
				SB	30				SB	30
				WB	60				WB	60

Intersection and peak hour[1]	2025 without this proposal					2025 with this proposal (secondary route)				
	Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)		Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)	
Bent Street / Phillip Street										
Morning	1,416	27	B	NB	70	1,470	28	B	NB	70
				EB	10				EB	20
				SB	120				SB	120
				WB	80				WB	100
Evening	1,911	54	D	NB	160	1,938	53	D	NB	150
				EB	40				EB	30
				SB	210				SB	210
				WB	100				WB	100
Bent Street / Bligh Street										
Morning	665	5	A	NB	-	718	7	A	NB	-
				EB	40				EB	40
				SB	-				SB	-
				WB	30				WB	40
Evening	876	7	A	NB	-	888	8	A	NB	-
				EB	50				EB	50
				SB	-				SB	-
				WB	30				WB	40
Hunter Street / George Street / Margaret Street										
Morning	712	21	B	NB	-	703	21	B	NB	-
				EB	90				EB	80
				SB	-				SB	-
				WB	70				WB	70
Evening	609	28	B	NB	-	626	30	C	NB	-
				EB	100				EB	100
				SB	-				SB	-
				WB	80				WB	70
Margaret Street / York Street										
Morning	1,716	18	B	NB	-	1,684	19	B	NB	-
				EB	70				EB	60
				SB	70				SB	70
				WB	80				WB	70
Evening	1,408	21	B	NB	-	1,422	21	B	NB	-
				EB	50				EB	50
				SB	80				SB	80
				WB	120				WB	120

Intersection and peak hour[1]	2025 without this proposal					2025 with this proposal (secondary route)				
	Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)		Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)	
Margaret Street / Clarence Street										
Morning	1,063	59	E	NB	100	1,088	61	E	NB	180
				EB	80				EB	80
				SB	-				SB	-
				WB	40				WB	40
Evening	1,316	53	D	NB	190	1,304	52	D	NB	190
				EB	80				EB	80
				SB	-				SB	-
				WB	50				WB	40
Clarence Street / Jamison Street										
Morning	731	18	B	NB	60	774	27	B	NB	70
				EB	-				EB	-
				SB	-				SB	-
				WB	40				WB	50
Evening	1,017	14	A	NB	70	1,002	14	A	NB	70
				EB	-				EB	-
				SB	-				SB	-
				WB	40				WB	40

Note 1: AM peak – 14 heavy vehicle movements and six light vehicle movements to be generated to/from the sites. PM peak – Six heavy vehicle movements and four light vehicle movements to be generated to/from the sites

5.7.8 Construction impacts summary

Figure 5-15 and Figure 5-16 provide a summary of construction impacts on road network performance for both construction routes assessed. There are no major construction impacts on parking, access, public transport and active transport.

Figure 5-15 Road network performance (Aimsun 2025) summary (preferred route) – Hunter Street Station construction sites

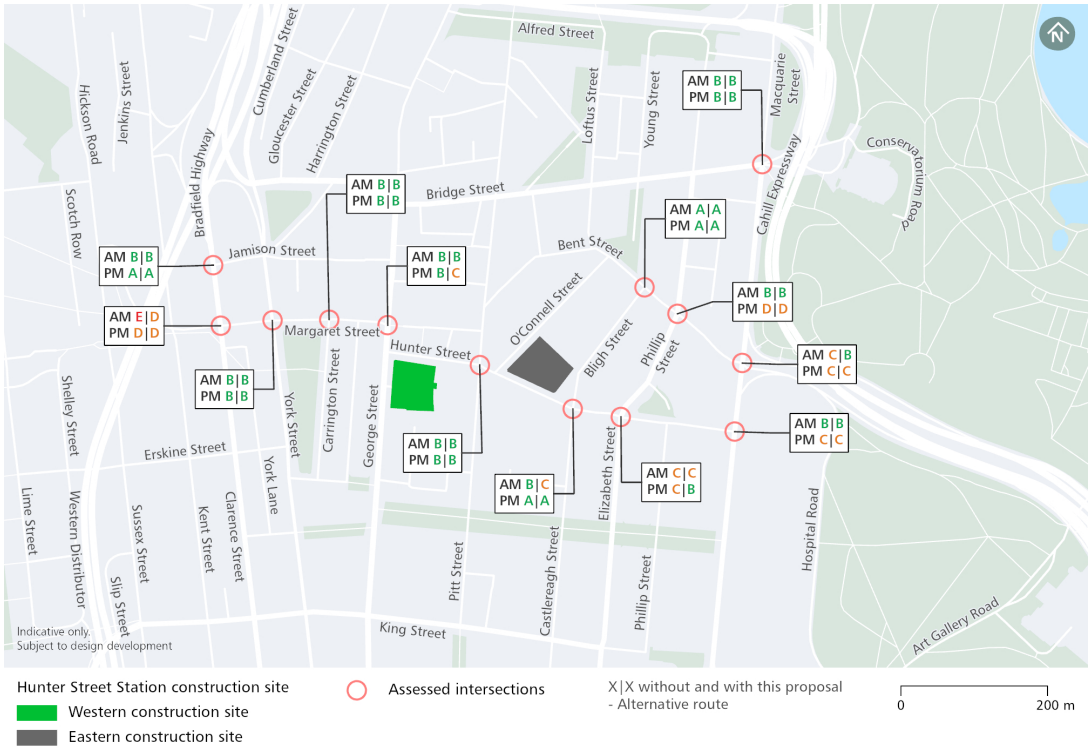

Figure 5-16 Road network performance (Aimsun 2025) summary (alternative route) – Hunter Street Station construction sites

5.8 Cumulative impacts

Cumulative impacts are impacts that result from the successive, incremental, or combined effects of an activity or project when added to other past, current, planned, or reasonably anticipated future impacts (Department of Planning and Environment, 2017). Work covered by this proposal has the possibility of interacting with a number of other projects along the planned tunnel alignment or at proposed construction sites. Projects which have been considered for the cumulative construction assessment are those which fall within the construction footprint of this proposal, as well as construction vehicle routes that use roads near construction sites of this proposal. The construction program of each project (using publicly available documents) has been analysed to determine the years that peak construction would occur, which corresponds to the maximum number of construction vehicles on the road network (worst-case scenario). If the year of peak construction is prior to the year of peak construction activity of this proposal (2024 for The Bays tunnel launch and support site and Pyrmont Station construction sites, and 2025 for the Hunter Street Station (Sydney CBD) construction sites), a qualitative assessment has been undertaken. If the year of peak construction is the year of peak construction activity of this proposal or later, a quantitative assessment has been undertaken.

A cumulative construction traffic impact assessment has not been carried out where publicly available information for projects near a construction site is not available and/or where the cumulative number of construction vehicles generated near a construction site would be low.

Key projects which may have a cumulative traffic impact with the proposal are described below.

5.8.1 Sydney Metro West existing approval and Western Harbour Tunnel and Warringah Freeway Upgrade

The Sydney Metro West Concept and major civil construction work for Sydney Metro West between Westmead and The Bays (Stage 1 of the planning approval for Sydney Metro West) were approved on 11 March 2021. As part of this work, The Bays tunnel launch and support site would initially be occupied by the Contractor undertaking construction work (tunnelling westbound) under the existing approval.

This part of the site would be vacated by the tunnelling contractor (for the tunnelling westbound) at about the end of the first quarter 2023. The Contractor for this proposal would undertake enabling work, crossover excavations and prepare for the tunnel boring machine launch from the end of the first quarter 2023. The site would, therefore, be in use for an extended period, from the second quarter, 2023 to about the end of the fourth quarter, 2025.

In addition, proposed work at The Bays tunnel launch and support site would occur concurrently with the approved tunnelling work westwards from The Bays to Sydney Olympic Park, for a period of about six months. The tunnelling west from this site as part of the existing approval would be carried out between mid-2022 and mid-2024, with peak construction activity (tunnel boring machine support services and spoil removal) occurring in 2023 and 2024. The tunnelling east as part of this proposal would be carried out between early 2024 and early 2025. Therefore, this concurrent tunnelling has the potential to have cumulative impacts on the transport and traffic network.

Further, The Bays tunnel launch and support site would have the potential to have cumulative impacts with the approved Western Harbour Tunnel and Warringah Freeway Upgrade project. The construction support sites for this project would be located at White Bay near The Bays Station construction support site. Expected construction is from 2021 to 2026 with peak construction from 2023 to 2025. The construction as part of this proposal would be carried out between early 2024 and early 2025. Therefore, this concurrent construction has the potential to have cumulative impacts on the transport and traffic network.

The number of additional cumulative construction vehicle movements at The Bays Station construction site is shown in Table 5-16.

Table 5-16 Number of cumulative construction vehicle movements at The Bays Station construction site

Project	Construction site	Morning peak hour		Evening peak hour	
		Light vehicle movements[1]	Heavy vehicle movements[1]	Light vehicle movements[1]	Heavy vehicle movements[1]
Major civil construction work between The Bays and Sydney CBD	The Bays Station tunnel launch and support site	10	2	28	2
Major civil construction work between Westmead and The Bays	The Bays Station construction site	2	8	60	8
Western Harbour Tunnel and Warringah Freeway Upgrade	Rozelle Rail Yards construction support site	45	14	30	14
	Victoria Road construction support site	41	37	71	37
	White Bay construction support site	40	63	140	63

Note 1: Movement means a one-way movement. A vehicle entering and then leaving a construction worksite represents two movements

Intersection performance results under the '2024 with this proposal' (without cumulative construction vehicles) and '2024 with cumulative construction' (with cumulative construction vehicles) scenarios are summarised in Table 5-17 for the morning and evening peak hours.

Modelled intersection performance with cumulative construction traffic indicates that the following intersections would experience a deterioration in Level of Service:

- Victoria Road / A4-City West Link Road during the evening peak hour – From Level of Service B to C
- A4-City West Link Road / James Craig Road during the evening peak hour – From Level of Service A to B
- A4-City West Link Road / The Crescent during the evening peak hour – From Level of Service A to B
- A4-City West Link Road / Catherine Street during the evening peak hour – From Level of Service C to D.

Analysis of modelled intersection performance results shows that at some locations, the addition of cumulative construction traffic would result in a large reduction in demand flow due to the following factors:

- Additional 'latent' or 'unreleased' demand, which is traffic that is not able to be assigned in the model during the morning and/or evening peak period. These trips are assumed to still exist, however, these trips would be delayed and not completed until after the peak period, effectively increasing the duration of the peak period
- Fewer vehicles passing through an intersection due to the addition of construction-related heavy vehicles, which have a slower acceleration profile compared to light vehicles. This would likely result in an increase to average delay.

In reality, from an operational perspective, this means that the road network is still operating with spare capacity at certain intersections. The cumulative impact of construction vehicles would result in increased intersection delays and queue lengths experienced by drivers, however.

Table 5-17 Modelled intersection performance with cumulative construction (Vissim 2024) – The Bays tunnel launch and support site

Intersection and peak hour	2024 with this proposal					2024 with cumulative construction				
	Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)		Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)	
Victoria Road / Robert Street										
Morning	4,878	>100	F	NB	130	4,691	109	F	NB	160
				EB	-				EB	-
				SB	470				SB	480
				WB	220				WB	190
Evening	5,394	25	B	NB	180	5,359	26	B	NB	180
				EB	-				EB	-
				SB	200				SB	220
				WB	90				WB	110
Victoria Road / A4-City West Link Road										
Morning	6,657	25	B	NB	-	6,433	28	B	NB	-
				EB	90				EB	110
				SB	90				SB	80
				WB	140				WB	140
Evening	7,616	25	B	NB	-	6,571	39	C	NB	-
				EB	100				EB	140
				SB	80				SB	80
				WB	220				WB	>500

Intersection and peak hour	2024 with this proposal					2024 with cumulative construction				
	Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)		Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)	
A4-City West Link Road/ James Craig Road										
Morning	3,873	17	B	NB	30	3,937	20	B	NB	50
				EB	50				EB	110
				SB	-				SB	-
				WB	140				WB	140
Evening	4,150	11	A	NB	40	4,205	22	B	NB	100
				EB	30				EB	60
				SB	-				SB	-
				WB	140				WB	140
A4-City West Link Road / The Crescent										
Morning	6,779	29	C	NB	240	6,803	29	C	NB	180
				EB	240				EB	180
				SB	-				SB	-
				WB	50				WB	50
Evening	6,819	9	A	NB	60	6,877	24	B	NB	60
				EB	60				EB	60
				SB	-				SB	-
				WB	80				WB	240
A4-City West Link Road / Catherine Street										
Morning	4,575	48	D	NB	110	4,640	45	D	NB	110
				EB	390				EB	410
				SB	120				SB	120
				WB	120				WB	130
Evening	5,263	41	C	NB	50	5,392	55	D	NB	50
				EB	330				EB	390
				SB	210				SB	230
				WB	>500				WB	>500

Figure 5-17 provides a summary of cumulative construction impacts on road network performance. There are no major cumulative construction impacts on parking, access, public transport and active transport.

Figure 5-17 Road network performance summary (cumulative construction) – The Bays tunnel launch and support site

5.8.2 Sydney Metro West - Rail infrastructure, stations, precincts and operations

Stage 3 of the planning approval process for Sydney Metro West includes tunnel fit-out, construction of stations, ancillary facilities and station precincts, and operation and maintenance of the Sydney Metro West line. The Scoping Report for *Sydney Metro West – Rail infrastructure, stations, precincts and operations* (Sydney Metro, 2021) was lodged on 21 June 2021. Station construction at The Bays Station would be carried out between the third quarter 2025 and the first quarter 2028, while station construction at Pyrmont Station and Hunter Street Station (Sydney CBD) would be carried out between the final quarter 2025 and the second quarter 2028. Construction activities associated with tunnel fit-out and rail systems would be carried out between the final quarter 2024 and the first quarter 2028. Given that there would be an overlap in construction timeframes with the proposal, both concurrent and consecutive cumulative impacts may occur relating to the presence of construction vehicles around the construction sites. This would be confirmed in the Environmental Impact Statement for Sydney Metro West - Rail infrastructure, stations, precincts and operations.

5.8.3 Sydney Metro City & Southwest

Sydney Metro City & Southwest will deliver 30 kilometres of new metro rail between Chatswood and Bankstown, including new twin tunnels under Sydney Harbour, and the upgrade and conversion of all 11 stations between Sydenham and Bankstown to metro railway standard. The Chatswood to Sydenham component of Sydney Metro City & Southwest was granted planning approval in January 2017, and the Sydenham to Bankstown upgrade was approved in December 2018.

The Sydenham to Bankstown component of this project was not considered in this cumulative impact assessment as this stage of the project did not meet the spatial relevance criterion.

Components of the Chatswood to Sydenham alignment relevant to this assessment include the tunnel rail systems fit out and station construction and fit out work which would overlap with shaft excavation work at the Hunter Street Station (Sydney CBD) eastern construction site during the first quarter of 2023.

The existing Sydney Metro City & Southwest tunnelling support site at 33 Bligh Street would be handed over from the City and Southwest contractor to the Sydney Metro West contractor around January 2023 and would become part of the Hunter Street Station (Sydney CBD) eastern construction site. The site would, therefore, be in use for an extended period, from January 2023 to approximately the end of the fourth quarter, 2025. This would result in potential consecutive cumulative construction impacts associated with the presence of construction vehicles around the Hunter Street Station (Sydney CBD) construction sites. Construction vehicles associated with both the Sydney Metro City & Southwest project and this proposal would be subject to traffic management measures to minimise potential impacts.

5.8.4 WestConnex M4-M5 Link

The WestConnex M4-M5 Link will comprise a new multi-lane road link between the M4 East Motorway at Haberfield and the New M5 Motorway at St Peters. The project will also include an interchange at Lilyfield and Rozelle (the Rozelle interchange) and a tunnel connection between Anzac Bridge and Victoria Road, east of Iron Cove Bridge (the Iron Cove Link).

All construction work on the mainline tunnels for the M4-M5 Link will be completed by the end of 2022. Therefore, it is anticipated that the proposal would only produce cumulative impacts with the Rozelle interchange and Iron Cove Link stage of the WestConnex M4-M5 Link which will continue until the third quarter of 2023. Work to be undertaken during this time include site rehabilitation and landscaping, demobilisation, and testing and commissioning at the C5 Rozelle civil and tunnel site and C8 Iron Cove Link civil site. Peak construction activity is expected to occur prior to 2024.

The overlapping work between the second quarter of 2023 and the third quarter of 2023 has the potential to have cumulative impacts on the transport and traffic network. However, given that a low number of construction vehicles would be generated during the demobilisation, rehabilitation, testing and commissioning phase in 2023, cumulative construction impacts at The Bays tunnel launch and support site are anticipated to be minimal.

5.8.5 Other projects

A review of the Department of Planning, Industry and Environment Major Project Register, Government agency websites, relevant local government websites and state media releases identified a list of 13 other projects that have the potential to generate further cumulative impacts with this proposal (see Appendix G of the Environmental Impact statement). The projects that have the potential to generate cumulative transport and traffic impacts are detailed in Table 5-18.

Table 5-18 Relevant potential cumulative projects and proposals

Project name, status, and expected construction period	Potential cumulative impact
Glebe Island concrete batching plant and aggregate handling *Approved* Construction program 2021 - 2022	Given that the identified construction works of this development are expected to be completed prior to construction of this proposal, potential cumulative construction impacts would be limited to minor consecutive impacts associated with the ongoing presence of construction vehicles. However, there is the potential for this proposal to have cumulative transport and traffic impacts with operation of the project, given that vehicles would be using similar routes to access the batching plant and aggregate handling facility.
Glebe Island Multi-User Facility *Approved* Construction program 2020 - 2021	Given that the identified construction works of this development are expected to be completed prior to construction of this proposal, no cumulative construction impacts are anticipated. However, there is the potential for this proposal to have cumulative transport and traffic impacts with operation of the project, given that vehicles would be using similar routes to access the multi-user facility.
The new Sydney Fish Market *Approved* Construction program 2020 - 2024	Given that the construction vehicle routes for this project do not directly interface with the proposal's construction vehicle routes, cumulative construction impacts at the Pyrmont Station construction sites are anticipated to be minimal.
Sydney Metro West - Rail infrastructure, stations, precincts and operations *Proposed* Construction program 2024 - 2029	The construction impacts from Stage 3 of the planning approval process for Sydney Metro West are currently unknown. Both concurrent and consecutive cumulative impacts associated with the ongoing presence of construction vehicles may occur. This would be confirmed in the Environmental Impact Statement for Sydney Metro West Rail infrastructure, stations, precincts and operations.
Cockle Bay Wharf mixed use development *Proposed* No construction program	Given the location of this project, construction vehicle routes are not likely to directly interface with routes for this proposal and therefore cumulative transport and traffic impacts are not anticipated.
50-52 Phillip Street New Hotel *Proposed* Construction program 2023 - 2026	Construction vehicle routes directly interface with the proposal's routes along Macquarie Street between Bridge Street and Eastern Distributor / Shakespeare Place. Given the size of the development, a low number of construction vehicles is expected to be generated and therefore cumulative impacts are anticipated to be minimal.

Project name, status, and expected construction period	Potential cumulative impact
One Sydney Harbour *Approved* Construction program 2019 - 2025	Given the location of this project, construction vehicle routes are not likely to directly interface with routes for this proposal and therefore cumulative transport and traffic impacts are not anticipated.
Sydney Metro – Martin Place Over Station Development *Approved* Construction program 2017 - 2024	While there is potential for cumulative construction traffic impacts with this project, the cumulative number of construction vehicles generated near the Hunter Street Station (Sydney CBD) construction sites would be low.
65-77 Market Street *Approved* Construction program 2020 - 2023	Given that the identified construction works of this project are expected to be completed prior to the construction of this proposal, potential cumulative construction impacts relating to transport and traffic are anticipated to be limited to consecutive impacts associated with ongoing presence of construction vehicles around the Hunter Street Station (Sydney CBD) construction sites.
317 and 319-321 George Street *Proposed* No construction program	Construction vehicle routes directly interface with the proposal's routes along Hunter Street between Macquarie Street and George Street. Information relating to construction vehicle numbers was not publicly available, however, given the size of the development, a low number of construction vehicles is expected to be generated and therefore cumulative impacts are anticipated to be minimal.
194-204 Pitt Street *Concept development application approved* No construction program	Given the location of this project, construction vehicle routes interfaces with routes for this proposal are expected to be limited and therefore cumulative transport and traffic impacts would be minimal.
301 and 305 Kent Street Concept Hotel Development *Approved* No construction program	Given the location of this project, construction vehicle routes interfaces with routes for this proposal are expected to be limited and therefore cumulative transport and traffic impacts would be minimal.
180 George Street *Approved* 2017 - 2022	Given the location of this project, construction vehicle routes are not likely to directly interface with routes for this proposal and therefore cumulative transport and traffic impacts with the Hunter Street Station (Sydney CBD) construction sites are not anticipated.

6 Mitigation and management measures

This section provides a summary of the mitigation and management measures that would be required to minimise, avoid or mitigate the impacts of the project on transport and traffic. Mitigation measures identified for this proposal are provided in Table 6-1.

The revised environmental mitigation measures included in the *Sydney Metro West Westmead to The Bays and Sydney CBD – Submissions Report* (Sydney Metro, 2020b) that would be applicable to the proposal are presented below, with additional mitigation measures added where relevant.

These would be supplemented by mitigation measures detailed in Chapter 23 (Synthesis of the Environmental Impact Statement) of the Environmental Impact Statement with respect to cumulative impacts.

Table 6-1 Summary of potential transport and traffic impacts and management measures

Reference	Impact	Mitigation measure	Applicable location(s)
TT1	Changes to the network	The community would be notified in advance of proposed road and pedestrian network changes through appropriate forms of community liaison.	All
TT2	Traffic incidents	In the event of a traffic related incident, coordination would be carried out with Transport for NSW.	All
TT3	Emergency vehicles access	Access to properties for emergency vehicles would be provided at all times.	All
TT4	Road safety	Vehicle access to and from construction sites would be managed to maintain pedestrian, cyclist and motorist safety. Depending on the location, this may require manual supervision, physical barriers, temporary traffic signals and modifications to existing traffic signals or, on occasions, police presence.	All
TT5	Road safety	Additional enhancements for pedestrian, cyclist and motorist safety near the construction sites would be implemented during construction. This would include measures such as: • Assessing the suitability of construction haulage routes through sensitive land use areas with respect to road safety • Deployment of speed awareness signs in conjunction with variable message signs near construction sites to provide alerts to drivers	All

Reference	Impact	Mitigation measure	Applicable location(s)
		• Providing community education and awareness about sharing the road safely with heavy vehicles • Specific construction driver training to understand route constraints, safety and environmental considerations such as sharing the road safely with other road users and limiting the use of compression braking • Road safety audits will be carried out on Traffic Guidance Schemes in line with the requirements of the Construction Traffic Management Framework, and identified road safety risks will be removed or reduced so far as is reasonably practicable. Requiring technology and equipment to improve vehicle safety, eliminate heavy vehicle blind spots, and monitor vehicle location and driver behaviour.	
TT6	Road safety	All trucks would enter and exit construction sites in a forward direction, where feasible and reasonable.	All
TT7	Congestion	Construction site traffic would be managed to minimise movements during peak periods.	All
TT8	Congestion	Construction site traffic would be managed to minimise vehicle movements through school zones during pick up and drop off times.	All
TT9	Loss of parking	Construction sites would be managed to minimise the number of construction workers parking on surrounding streets by: • Encouraging workers to use public or active transport • Encouraging ride sharing. Provision of alternative parking locations and shuttle bus transfers where feasible and reasonable.	All
TT10	Change of bus stop locations	Any temporary closure or relocation of bus stops would be carried out in consultation with Transport for NSW including Customer Journey Planning, the relevant local council and bus operators. Wayfinding and customer information would be provided to notify customers of relocated bus stops.	All

Reference	Impact	Mitigation measure	Applicable location(s)
TT11	Taxi relocation	Any relocation of taxi ranks would be carried out in consultation with Transport for NSW, the relevant local council and taxi operators. Wayfinding and customer information would be provided to notify customers of relocated taxi ranks.	Hunter Street Station (Sydney CBD) construction sites
TT12	Property access	Access to existing properties and buildings not required or demolished by the proposal would be maintained in consultation with property owners.	All
TT13	Construction vehicle impacts	Adjustments to site access arrangements and the local road network would be explored during detailed design to minimise conflicts with heavy vehicle movements.	Pyrmont Station construction sites Hunter Street Station (Sydney CBD) construction sites
TT14	Cumulative construction traffic impacts	Co-ordination of traffic management arrangements between major construction projects would occur in consultation with Transport for NSW.	The Bays tunnel launch and support site Hunter Street Station (Sydney CBD) construction sites
TT15	Impacts on special events	During major special events, impacts to the transport and traffic network would be reduced by (as necessary): • Minimising the level of construction activity, and if necessary, ceasing all construction activity • Maintaining appropriate access to all areas within the event precinct • Erection of hoardings, site fencing and gates at key locations within the construction site boundary to permit pedestrian movements adjacent to the construction site and separate pedestrians from construction vehicles. Scheduling deliveries to the construction site outside of event periods.	Pyrmont Station construction sites Hunter Street Station (Sydney CBD) construction sites

Reference	Impact	Mitigation measure	Applicable location(s)
TT16	Mitigating light rail and bus precinct impacts	In consultation with Transport for NSW and the City of Sydney, options will be considered to mitigate light rail and bus precinct impacts. This would include consideration of road space reallocation on the western part of Hunter Street to manage through traffic into Hunter Street from George Street / Margaret Street.	Hunter Street Station (Sydney CBD) construction sites

7 References

Roads and Maritime Services (2019). *Cycleway Finder*, available online: http://www.rms.nsw.gov.au/maps/cycleway_finder

Roads and Maritime Services (2013). *Traffic Modelling Guidelines*

Roads and Maritime Services (2018). *Traffic Signals in Microsimulation Modelling*

Roads and Traffic Authority (2002). *Guide to Traffic Generating Developments*

Sydney Metro (2021). *The Bays to Sydney CBD North: Environmental Impact Statement Stage 2, Constructability Report (Rev C)*