10 Construction traffic

This chapter addresses the potential impacts associated with traffic and transport during the construction of the CBD Metro. A detailed assessment is contained in Technical Paper 1 *Transport and Traffic*.

The Director-General's requirements
The Environmental Assessment must include consideration of, and a management framework for construction traffic, including a considered approach to route identification and scheduling of transport movements, having regard to alternatives to road transport, the number, frequency and size of construction related vehicles (both passenger, commercial and heavy vehicles), the nature of existing traffic on construction access routes (with consideration of peak traffic times and sensitive road users, including emergency vehicles and buses), the need to close, divert or otherwise reconfigure elements of the road network associated with construction of the project, and how construction traffic impacts would be managed to minimise the potential for cumulative traffic impacts with other major construction activities in the region (whether this is to be managed as part of the subject approval, or through a separate overarching mechanism beyond the direct scope of the project).

The Environmental Assessment must also present a strategy for monitoring and mitigating traffic impacts, with a particular focus placed on those activities identified as having the greatest potential for adverse traffic flow, capacity or safety implications, and a broader, more generic approach developed for day-to-day traffic management.

10.1 Overview

10.1.1 Assessment methodology

The CBD Metro project requires construction work to be undertaken adjacent to and connecting with the proposed station sites at busy locations within the CBD. This chapter deals primarily with the effects of construction vehicles in city streets, the access to and egress from construction sites, the selection of routes and movement of construction vehicles along those routes, and impacts associated with construction vehicle movements. The main emphasis is on minimising the impact of construction on public transport, private traffic, pedestrians and cyclists.

The volume of construction traffic depends upon the quantity of material being produced, the scale of the workforce and the quantity of material being delivered to each of the sites. The primary site for the removal of excavated spoil is White Bay where the TBM would be launched. Station caverns would be excavated before the arrival of the TBM and the material from these station excavations would be removed from the station construction sites.

As the removal of spoil is expected to generate the highest volumes of heavy vehicle traffic, the construction traffic impact assessment is based on this stage of work. Alternatives to truck haulage of spoil are addressed in Chapter 9. This chapter assumes all spoil would be moved by truck, to ensure the worst-case traffic impacts are addressed.

The establishment of construction sites and the 'enabling' component of work at project commencement would have a different set of traffic impacts, related primarily to enabling activity where trucks cannot be accommodated on site. For this period of activity, construction 'works zones'

are proposed in place of existing parking restrictions and elsewhere where required out of peak periods, to facilitate truck access to the sites.

Within the CBD, it is expected that there would be limitations on the size of vehicle permitted to operate on the city streets. For the CBD locations of Central, Town Hall Square and Martin Place as well as Pyrmont, it is expected that trucks would be limited to rigid single-tray trucks for ongoing spoil removal. Larger trucks are expected to be able to access the sites for Barangaroo-Wynyard (Sussex Street), White Bay/Rozelle stabling and maintenance depot (City West Link) and Rozelle (Victoria Road).

Maximum hourly truck volumes have been estimated based on the physical time taken for a truck to enter the site, load and leave. Truck movements for other purposes such as deliveries are not included in the maximum hourly movements, as many of the construction sites are very small, so it is not possible to fit more than one truck operationally on the site at a time. Vehicles entering the site for other purposes such as making deliveries would not do so concurrently with a spoil truck movement, so this represents a maximum traffic generation at the smaller construction sites. Construction sites such as Barangaroo-Wynyard, White Bay and the Rozelle stabling and maintenance depot are not space constrained, so the maximum truck-trip generation at these sites may be higher.

Maximum hourly truck movements are unlikely to coincide, as different construction sites would be in operation at different times. However, for the purposes of assessing traffic impact, a ‘worst case’ of all construction sites operating at peak capacity has been assumed, with these truck movements occurring during peak hours.

10.1.2 Hours of truck operation

In order to meet the construction program (see Chapter 7), construction activities would occur outside normal daytime construction hours. Some activities would therefore require truck movements outside normal working hours. However, as required at some construction sites, restrictions on truck movements would be set to meet local environmental considerations. Table 10.1 shows the proposed hours of truck operation.

Table 10.1 Proposed truck operating hours[1]

Construction site	Construction activities			
	Demolition	**Enabling**	**Excavation**	**Fitout, etc[2]**
Central	N/A	M–F 7am–7pm Sat 7am–5pm	24 hours/day	M–F 7am–7pm Sat 7am–5pm
Town Hall Square	M–F 7am–7pm Sat 7am–5pm	M–F 7am–7pm Sat 7am–5pm	24 hours/day	M–F 7am–7pm Sat 7am–5pm
Martin Place	M–F 7am–7pm Sat 7am–5pm	M–F 7am–7pm Sat 7am–5pm	24 hours/day	M–F 7am–7pm Sat 7am–5pm
Barangaroo-Wynyard	M–F 7am–7pm Sat 7am–5pm	M–F 7am–7pm Sat 7am–5pm	24 hours/day	M–F 7am–7pm Sat 7am–5pm
Pyrmont	M–F 7am–7pm Sat 7am–5pm	M–F 7am–7pm Sat 7am–5pm	24 hours/day	M–F 7am–7pm Sat 7am–5pm
White Bay	N/A	24 hours/day	24 hours/day	24 hours/day
Rozelle	M–F 7am–7pm Sat 7am–5pm	M–F 7am–7pm Sat 7am–5pm	24 hours/day	M–F 7am–7pm Sat 7am–5pm

1 Hours of traffic control permitted at some construction sites may restrict hours of truck movement. This is subject to confirmation by PARAMICS modelling being undertaken for the Traffic Management Plans.
2 Excluding oversized deliveries

In addition to the hours noted in Table 10.1, the following restrictions would apply to truck operating hours at the Martin Place Station construction site:

- Truck movements at the construction site within Martin Place would not be permitted between 7am and 9am and between 4pm and 6pm.
- Truck movements at the construction site within Martin Place would be reduced between 12pm and 2pm.

Notwithstanding the hours presented in Table 10.1, there would be opportunities to undertake truck movements during night-time periods to reduce traffic impacts during peak periods. This would be subject to the mitigation of potential noise impacts.

10.1.3 Truck routes

Truck routes to and from construction sites were developed in the context of minimising impacts on local streets and maximising use of arterial roads. The suggested truck routes have been developed in consultation with local councils, the RTA, NSW Transport and Infrastructure and Sydney Transit Authority (STA). The process involved:

- Holding initial discussions with the RTA, City of Sydney and Leichhardt Municipal Council to define the broad approach to truck routing having regard to proposed construction sites. Truck access was defined on the basis of either limiting trucks to the higher order road network (preferably arterial roads) or limiting the extent to which trucks need to traverse the lower order road network in order to gain access to an arterial road.
- Defining the routes according to the Guide to Traffic Control at Worksites (RTA 2003) and other relevant standards and guidelines.
- Defining truck routes on the basis that the bulk of potential destinations would be located in western Sydney.
- Identifying potential CBD-wide (and external to the CBD) trucking routes on the basis of the initial construction site locations. Potential ingress and egress points at the sites were identified and shortest path routes to the arterial road network assessed.
- Modifying the suggested routes at the local level, and more broadly, having regard to the safety needs and desire lines of pedestrians, and the access needs of other modes including emergency vehicles, buses, taxis and coaches.
- Assessing these proposed routes with the assistance of the RTA's Paramics SCATSIM models.

The proposed construction routes for all the construction sites are illustrated in Figure 10.1 to Figure 10.3.

10.2 Objectives and strategy

The construction traffic arrangements of the CBD Metro have been designed to occur with the minimum possible disruption to pedestrians, cyclists and traffic. The traffic objectives for the project are:

- Objective 1: Minimise disruption to pedestrians, cyclists, buses and motorists.
- Objective 2: Ensure the Sydney CBD can continue to function from a traffic perspective.
- Objective 3: Limit impacts on bus routes and stops.
- Objective 4: Minimise changes to traffic operation and kerbside access.
- Objective 5: Minimise access disruptions to adjoining properties.
- Objective 6: Maximise construction-related road safety.
- Objective 7: Minimise construction activities on roads and footpaths wherever possible.
- Objective 8: Minimise traffic at construction sites by providing remote parking for workers.
- Objective 9: Avoid disruptive construction-related truck operations during peak periods.

The strategy to manage construction traffic impacts would be a four-tiered approach. A Framework Traffic Management Plan (FTMP) would be prepared to provide traffic management responses and strategic processes to issues that are common to all construction sites and site-specific Traffic Management Plans (TMPs) would also be prepared. A Construction Traffic Management Plan (CTMP) and Traffic Control Plans (TCP) would be prepared consistent with the FTMP and TMPs. Further detail of the FTMP, TMPs, CTMPs, TCPs and other related documentation is provided in section 10.4.

10.3 Specific issues

10.3.1 Description of construction sites and activities

The construction sites are described in Chapter 7. This section discusses the construction sites in the context of access to the road network and the numbers of heavy vehicles leaving or arriving at the construction site during the most intensive construction activities, such as excavation.

Central Station
The main Central Station construction site would be on the western forecourt, bound by Pitt Street and Lee Street and Central Station main entrance. Limited construction activities would also be required within Belmore Park and at Quay Street.

Construction site access points for the western forecourt and Belmore Park would be left in/left out from Pitt Street. Access to the construction site at Quay Street would be from Quay Street via Pitt Street. It is likely that all truck movements would be controlled by flagmen during peak periods (including peak pedestrian periods such as lunch time or special events) to provide protection to pedestrians and other road users. Trucks would enter and leave all of the construction sites in a forward direction.

During the construction at the western forecourt, pedestrians would be confined to the outer perimeter of the site with a minimum walkway width of 3.5 metres. Other pedestrian walkways along Pitt Street, George Street and Quay Street would be retained. The expected level of truck activity for this site during the excavation phase is shown in Table 10.2.

Table 10.2 Spoil quantities and truck generation at Central Station

Location	Activity	Excavation (m^3)	Average production (m^3 per day)	Truck trips per day[1] [2]	Maximum truck movements[3] (trips per hour)
Eddy Avenue	Northern entrance shaft – cut-and-cover	Soft: 24,634 Rock: 35,121	180 136	72 56	24
Pitt Street	Southern entrance shaft – cut-and-cover	Soft: 26,694 Rock: 53,656	579 272	232 110	24
Pitt Street	Cavern and mined tunnels	Rock: 33,830	334	134	24
Pitt Street	Central cross-over cavern	Rock: 26,906	164	66	24
Quay Street	Shaft	Soft: 9,883 Rock: 4,150	25 23	12 10	<10
Total		**214,900**			

1 Number of trucks per day estimated on the basis of 5m^3 per single unit dump truck.
2 Daily trucks trips assume each truck generates one inbound and one outbound trip or two trips per truck.
3 Maximum truck trips per hour, based on the maximum throughput of one truck per five minutes and two trips per truck.

Primary traffic impacts of construction at Central are likely to include:

- Reduced vehicle access to Central Station main entrance.
- A less direct path for pedestrians currently using the western forecourt to gain access to Central Station, with pedestrians diverted to the footpath around the construction site.
- Construction site traffic movements crossing pedestrian movements on Pitt Street and Lee Street frontage during construction.
- Impacts on access to Central Station during construction, particularly taxi access, passenger access, flow and way-finding. Disruptions to taxi, coach and other vehicular access to the western forecourt areas of Central Station and diversion to the Hay Street ramp for access to the main concourse.
- Maintenance of access to the Medina Hotel car parking, RailCorp food preparation area and small retail outlets, during works affecting Ambulance Lane.
- Truck movements occurring primarily during the cavern excavation with fewer truck movements during demolition and station fitout.
- The need to relocate University of NSW shuttle bus stops on Eddy Avenue (at the Belmore Park construction site) to Pitt Street or Chalmers Street. Provision of new facilities and the associated legibility and capacity of the pedestrian access route to the relocated stops.
- Partial lane closure in Eddy Avenue at the eastbound bus stop.
- The need for oversized loads for deliveries and/or removal of equipment/materials. Operation may be restricted to night-time hours. Any oversized loads would be limited one-off events and would be subject to RTA restrictions on access routes and times and approval.

- Rationalisation of activities on the western forecourt and the conversion of the upper level rail employee parking to coach layover and public parking.

Town Hall Square Station

The main construction site would be located on the southern side of Park Street between Pitt and George streets. An additional construction site is required in Bathurst Street, east of Pitt Street, to permit a vent shaft and other services to be constructed.

Access to the main construction site is proposed via two locations, with an entry from Pitt Street and an exit onto Park Street. Access to and from the Bathurst Street construction site would be via Bathurst Street (eastbound). Pedestrians would be directed around the sites using hoardings and clear widths for pedestrians would be maintained for the duration of construction. The expected level of truck activity for Town Hall Square construction sites during the excavation phase is shown in Table 10.3.

Table 10.3 Spoil quantities and truck generation at Town Hall Square Station

Location	Activity	Excavation (m^3)	Average production (m^3 per day)	Truck trips per day [1]	Maximum truck movements [2] (trips per hour)
Woolworths/ Park Place	Shaft Mined tunnels Main cavern	Soft: 10,590 Rock: 18,850 Rock: 2,040 Rock: 38,710	386 204 23 334	156 82 10 134	24
Bathurst Street	Shaft Plant room	Soft: 1,683 Rock: 3,893 Rock: 1,835	193 34 23	78 14 10	24
Pitt Street	Shaft/mined tunnel	Soft: 2,629	329	132	10
Total		**80,300**			

1 Number of trucks per day estimated on the basis of 5 m^3 per single unit dump truck and each movement generating one inbound and one outbound trip.
2 Maximum truck trips per hour, based on the maximum throughput of one truck every five minutes and two trips per truck. Pitt St worksite estimated at five trucks per hour.

It is likely that authorised traffic controllers and concertina gates used between the hours of 7am–7pm Monday to Friday, would stop pedestrians whenever a truck is crossing the footpath. An ongoing operational review would be undertaken to determine if additional times for traffic control of pedestrian movements would be required (that is, for periods such as Thursday late night shopping, Friday and Saturday night entertainment, or during special events).

Hoardings would protect pedestrians when using footpaths adjacent to the construction sites. Where gantry hoardings are used, adequate lighting would be provided to ensure a safe pedestrian environment.

Primary traffic impacts of construction at Town Hall Square are likely to include:

- Re-allocation of existing kerbside loading/parking restrictions to enable provision of a ‘works zone’ adjacent to each site, including in the site establishment/demolition phase.
- Temporary lane closures in Pitt Street (northbound) on its approach to Park Street during off peak periods to enable trucks to serve the Pitt Street construction site.

- To provide building basement support works a single temporary lane (parking) and footpath closure is likely to be required in Pitt Street.
- Re-allocation of existing kerbside loading/parking restrictions to enable provision of a truck call-forward location in Bathurst Street, between Kent and George streets.
- Minor footpath narrowing in the immediate vicinity of the construction sites.
- Closure of underground access to the Woolworths building (to be demolished) from CityRail's Town Hall Station.
- Additional truck movements on the surface road network adjoining the site.
- Minor delays to pedestrian movement on footpaths adjoining the site when trucks are required to cross the footpath.

Martin Place Station

The main construction sites would be located north of Martin Place between Castlereagh and Elizabeth streets and in Martin Place west of Castlereagh Street. A construction site would also be located on the western side of Castlereagh Street north of King Street. Truck access to the site on Castlereagh/Elizabeth streets would be from Castlereagh Street (southbound), with trucks exiting on Elizabeth Street (northbound). Access to the Martin Place construction site would be from Castlereagh Street (southbound), with the exit also to Castlereagh Street (southbound). Access to the construction worksite north of King Street would be via Castlereagh Street (southbound). Construction works within the road pavement and footpath of Castlereagh Street would also be required.

The volumes of truck movements at the Martin Place construction sites during excavation are shown in Table 10.4.

Table 10.4 Spoil quantities and truck generation at Martin Place Station

Location	Activity	Excavation (m^3)	Average production (m^3 per day)	Truck trips per day [1] [2]	Maximum truck movements[3] (trips per hour)
Chifley Arcade northern shaft	Cut-and-cover Mined tunnels	Soft: 2,212 Rock: 14,594 Rock: 9,960	193 204 140	78 82 56	24
Martin Place Station northern shaft	Cavern and mined tunnels	Rock: 38,710	334	134	24
Martin Place	Entrance shaft	Soft: 3,593 Rock: 13,538	193 68	78 28	24
Martin Place	Subway	Soft: 5,891 Rock: 5,411	97 34	40 14	<10
Castlereagh Street entrance shaft	Cut-and-cover Mined tunnels	Soft: 2,101 Rock: 15,130 Rock: 2,520	193 68 23	78 28 10	<10
Total		**113,600**			

1 Number of trucks per day estimated on the basis of 5 m^3 per single unit dump truck.
2 Daily truck movements assume each truck generates one inbound and one outbound movement, or two trips.
3 Maximum truck trips per hour, based on the maximum throughput of one truck every five minutes and two trips per truck for larger sites and five trucks per hour for smaller sites.

The level of pedestrian activity at the Martin Place Station construction sites is high in peak periods and busy throughout the day. It is expected that the requirements for pedestrian access may limit the number and timing of truck movements.

Primary traffic impacts of construction at Martin Place Station are likely to include:

- Impacts on pedestrian movements in Martin Place and bus passengers on Castlereagh Street and Elizabeth Street. There may also be some impact on pedestrians on Hunter Street, Bligh Street, O'Connell Street and other CBD streets within the vicinity of the works due to construction traffic movements.
- Possible periodic closure of the western footpath along Castlereagh Street and diversion of pedestrians to the eastern side of Castlereagh Street via the King Street/Castlereagh Street and Martin Place/Castlereagh Street signal crossings.
- A temporary lane closure on Castlereagh Street to construct the ventilation facilities in existing parking bays.
- Impacts on traffic and pedestrian movements along Castlereagh and Elizabeth streets due to trucks entering from Castlereagh Street southbound and exiting onto Elizabeth Street northbound.
- Impacts on bus services on Castlereagh Street (southbound bus lane) and Elizabeth Street northbound due to truck movements (the northbound bus lane operates between 6.00–10.00am and 3.00–8.00pm Monday to Friday). As part of the CBD Bus Strategy, relocation of existing southbound Castlereagh Street bus services to George Street and Elizabeth Street would remove all buses from Castlereagh Street, and remove any conflict between buses and truck movements.
- The temporary removal of on-street parking on Castlereagh Street and Elizabeth Street adjacent to the site access locations to facilitate truck turns from the kerbside lane and avoid delays to through-traffic movements.
- The need for oversized loads for deliveries and/or removal of equipment/materials. Hours of operation may be restricted to night-time hours. Any oversized loads would be limited, one-off events and would be subject to RTA restrictions on access routes and times and approval.

Barangaroo-Wynyard Station

Construction of Barangaroo-Wynyard Station includes building the Barangaroo Pedestrian Link between Barangaroo and CityRail's Wynyard Station.

The main construction site would be located within the Barangaroo development site at the intersection of Sussex and Shelly streets, with access to the site from Sussex Street (northbound) and egress onto Sussex Street (southbound). A secondary construction site would be located within the area bounded by the northern corner of York Lane and Clarence Street. Access to this site would be from Clarence Street (northbound) and egress would be onto Clarence Street (northbound). An additional construction site would also be established on the opposite side of Clarence Street. The bulk of spoil from this site would be extracted from the York Lane site. The Barangaroo Pedestrian Link would primarily be built from a site in Napoleon Street, west of Kent Street, with access and egress from Napoleon Street.

The estimated truck movements for the construction of Barangaroo-Wynyard Station and the Barangaroo Pedestrian Link are shown in Table 10.5.

Table 10.5 Spoil quantities and truck generation at Barangaroo-Wynyard Station

Location	Activity	Excavation (m^3)	Average production (m^3 per day)	Truck trips per day [1]	Maximum truck movements [2] (trips per hour)
Barangaroo	Cut-and-cover, shaft, mined tunnels	Soft: 24,360 Rock: 7,310	386 68	136 28	24
	Cavern[3]	Rock: 53,800	334	134	
York Lane	Shaft, mined tunnel	Soft: 12,540 Rock: 35,750	193 204	78 82	24
Napoleon Street	Cut-and-cover, mined tunnel	Soft: 2,000 Rock: 12,334	97 164	40 66	24
Total		**148,000**			

1 Number of trucks per day estimated on the basis of 5 m^3 per single unit dump truck and each movement generating one inbound and 2 one outbound trip
3 Maximum truck trips per hour, based on the maximum throughput of one truck per 5 minutes and two trips per truck.
The main station cavern excavation takes place via the Barangaroo Worksite.

Removal of spoil would take place from within the York Lane and Barangaroo construction sites for the construction of the station, and from the Napoleon Street site for the construction of the Barangaroo Pedestrian Link. Truck movements would occur into and out of these sites. Footpath widths would be reduced to 2.1 metres at locations in York, Clarence, Kent and Sussex streets, and on the southern side of Margaret Street, but would be maintained at existing widths on the northern side of Margaret Street between Clarence and York streets.

Primary traffic impacts of construction at Barangaroo-Wynyard are likely to be:

- Temporary relocation of the taxi zone (two spaces) in Sussex Street south of Shelly Street.
- Temporary closure of the footpath on the southern side of Margaret Street, (between York and Clarence streets and Clarence and Kent streets) and the eastern side of Clarence Street at the York Lane site.
- Relocation of the Sydney Explorer bus stop in Sussex Street to an adjoining location.
- Removal of parking in Kent Street, Hickson Road, Sussex Street, Napoleon Street, Margaret Street and Clarence Street.
- Removal of the loading zone (two spaces) in York Lane and, potentially, elsewhere in York Street, Clarence Street and Kent Street.
- Removal of authorised RailCorp parking from York Lane.
- Lane closures and, potentially, temporary road closures in Margaret, Kent and Sussex/Shelly streets due to staged cut-and-cover activity in these streets.
- Temporary reduction in lanes on Sussex, Margaret, Kent and Napoleon streets, and reconfiguration of Shelly and Lime streets.
- Permanent loss of lanes in Napoleon Street (due to Barangaroo Pedestrian Link).
- Loss of parking and the potential reduction in the number of eastbound lanes in Margaret Street adjacent to Transport House for the purpose of pedestrian management.

- Removal of the right-turn bay into the Sussex Street development.
- Temporary closure of Shelly Street, north of Lime Street.

The most significant pedestrian impact would be associated with the closure of the Kent Street pedestrian tunnel, which provides pedestrian access between CityRail's Wynyard Station, Erskine Street and Kent Street. The tunnel carries a very high volume of pedestrians in the peak period of between 4,000 and 5,000 persons per hour in the morning peak period. Construction of the Barangaroo-Wynyard Station would require closure of the Kent Street pedestrian tunnel at the locality of no.1 Margaret Street. This would require the re-routing of CityRail patrons via the footpaths of York Street, Clarence Street and Margaret Street, and possibly via York Lane. Specific arrangements for the management of these pedestrians will be detailed within the Construction Traffic Management Plans and the Traffic Control Plans.

Some traffic congestion may occur during the partial closure of Kent Street and the closure of Margaret Street. This congestion would be offset by bus routing changes, parking restrictions on Clarence Street, and drivers choosing alternative routes.

The proposed construction routes for all the construction sites within the CBD are illustrated in Figure 10.1.

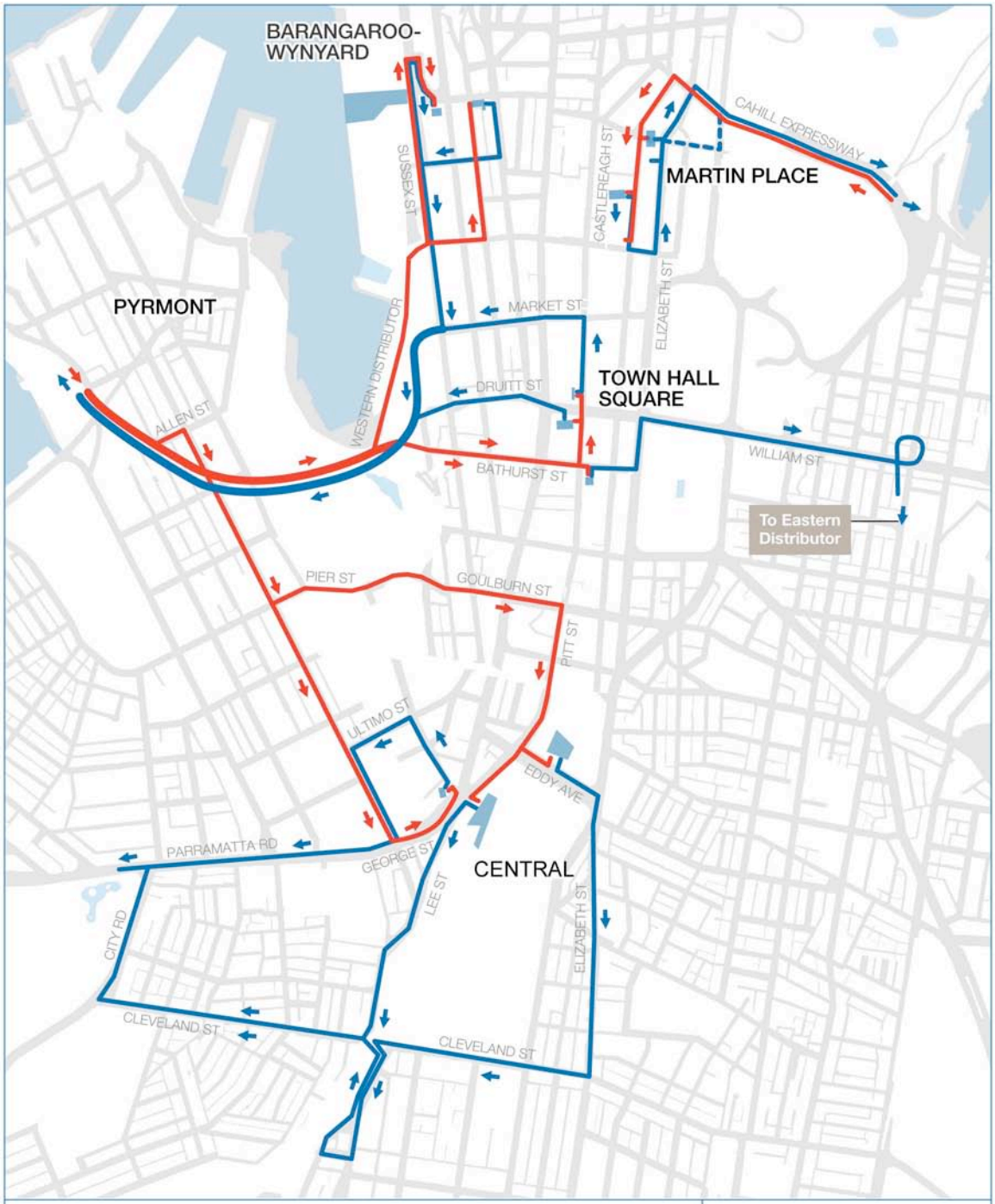

Figure 10.1 Proposed CBD construction truck routes

Note: Project detail shown is indicative only, subject to detailed design

Pyrmont Station

The proposed location of Pyrmont Station is beneath Union Square, near the intersection of Harris Street and Miller Street. The construction sites would be located at the western end of the cavern at the corner of Miller and Mount streets and at the eastern end of the cavern at the corner of Union and Pyrmont streets. Access and egress to the western site would both be via Miller Street (eastbound). For Alternative 1 station design option, access to the eastern site would be via Pyrmont Street, with departure across Union Square and westbound along Miller Street. The western construction site would be expanded into Pyrmont Street under Alternative 2, with trucks travelling north along Pyrmont Street and not accessing Union Street or Union Square.

The estimated truck movements for the construction of Pyrmont Station are shown in Table 10.6.

Table 10.6 Spoil quantities and truck generation at Pyrmont Station

Location	Activity	Excavation (m^3)	Average production (m^3 per day)	Truck trips per day [1] [2]	Maximum truck movements[3] (trips per hour)
Western entrance shaft	Cut-and-cover	Soft: 2,974	193	78	24
		Rock: 26,287	122	50	
	Mined tunnels	Rock: 2,322	23	10	
	Cavern and mined tunnels	Rock: 35,893	334	134	
Eastern entrance shaft	Cut-and-cover	Soft: 2,069	193	78	24
		Rock: 18,169	68	28	
	Mined tunnels	Rock: 3,186	23	10	
Total		**90,900**			

1 Number of trucks per day estimated on the basis of 5 m^3 per single unit dump truck.
2 Daily truck movements, assume each truck generates one inbound and one outbound movement or two trips.
3 Maximum truck trips per hour, based on the maximum throughput of one truck every five minutes and two trips per truck for larger sites and five trucks per hour for smaller sites.

Pedestrian access surrounding the sites would be as follows:

- The footpath on the northern side of Miller Street would be maintained at 2.6 metres (minimum), and would be unchanged on the southern side.
- The footpath on the eastern side of Mount Street would be temporarily closed.
- Pedestrian and cycle access through Union Street would be maintained on the northern side.
- The footpath on the western side of Pyrmont Street would be maintained at 2.4 metres (under Alternative 1) and 2.1 metres (under Alternative 2).

Other primary traffic impacts of construction are likely to include:

- Impacts on pedestrian movements through Union Square, which is part of a cycle and pedestrian route between Anzac Bridge and the CBD.
- Limited impacts on footpath capacity due to hoardings extending over footpaths on Miller Street and Pyrmont Street.
- Truck access and pedestrian/cycle/vehicular conflict management, notably in the vicinity of Union Square at the Paternoster Row intersection and at the Harris Street intersection.

- Truck movements generated on Miller Street and crossing Harris Street to gain access to the eastern construction site.
- Pedestrian diversion away from the western kerb of Pyrmont Street at the construction site.
- Local access and traffic diversions at Paternoster Row and Union Square/Pyrmont Street.
- Closure of the eastbound traffic lane on Union Street between Paternoster Row and Pyrmont Street to accommodate the work site.
- Re-routing of Paternoster Row (northbound) through Union Square shared zone to the Harris Street and Miller Street intersection.
- Pedestrian re-routing and diversions primarily on Union Square and Mount Street.
- Displacement of on-street car parking from Mount Street (six spaces) and Union Street (five spaces).

The same impacts are expected under Pyrmont Station Alternative 2, however with additional impacts on pedestrians and parking at the Pyrmont Street frontage, which are:

- Displacement of on-street car parking in Pyrmont Street (about 11 spaces).
- Diversion of the existing pedestrian footpath on the western side of Pyrmont Street south of Union Street and a reduction in width to 1.5 metres, utilising part of the existing kerbside parking lane.
- Reconfiguration of the existing traffic signals at Miller Street/Harris Street and Pyrmont Street/ Union Street intersections.

The proposed construction route for Pyrmont is illustrated on Figure 10.2.

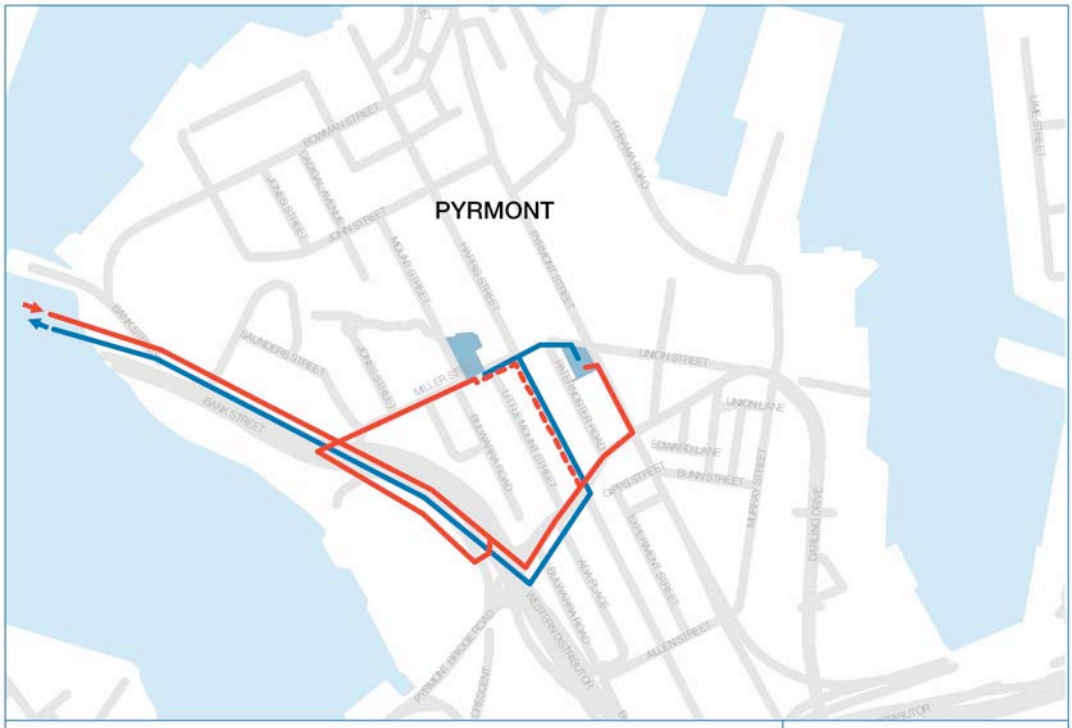

Figure 10.2 Proposed Pyrmont construction truck routes

Note: Project detail shown is indicative only, subject to detailed design

Rozelle Station

The proposed location of Rozelle Station would be under Victoria Road, between the intersections of Darling Street and Moodie Street. The main construction site would be on the Balmain Leagues Club site, Victoria Road, and truck access would be from Victoria Road. Limited access from Waterloo Street (from Darling Street only) would be required to reduce traffic impacts on Victoria Road.

Construction sites for the station would also be required on the eastern side of Victoria Road, on both sides of Darling Street (the north-eastern and south-eastern corner of the intersection). Access to and from the site on the north-eastern corner would be from Victoria Road (southbound). Access to the site on the south-eastern corner would be from Victoria Road (southbound), with egress onto Darling Street (westbound).

The estimated truck movements for the construction of Rozelle Station are shown in Table 10.7.

Table 10.7 Spoil quantities and truck generation at Rozelle Station

Location	Activity	Excavation (m^3)	Average production (m^3 per day)	Truck trips per day [1] [2]	Maximum truck movements (trips per hour)[3]
St Paul's Church site North-eastern entrance shaft	Cut-and-cover	Soft:1,070 Rock:12,770	193 68	78 28	24
St Thomas Church site South-eastern entrance shaft	Cut-and-cover Mined tunnels	Soft:1,422 Rock:5,858 Rock:1,600	193 68 17	78 56 8	24
Balmain Leagues Club North-western entrance shaft	Cut-and-cover Mined tunnels Cavern and mined tunnel Large single cavern and mined tunnels	Soft:2,650 Rock:40,400 Rock:1,900 Rock:53,295 Rock:18,104	193 136 17 334 253	78 56 8 134 102	24
Total		**139,000**			

1 Number of trucks per day estimated on the basis of 5 m^3 per single unit dump truck
2 Daily truck movements assume each truck generates one inbound and one outbound trip.
3 Maximum truck trips per hour, based on the maximum throughput of one truck per five minutes and two trips per truck at each worksite.

The footpath around the Balmain Leagues Club site construction site would be reduced to 2.4 metres on Victoria Road. All other footpath widths would remain unchanged.

Potential impacts on local side streets adjacent to the site would be minimised as they are incompatible with truck movements as they are generally narrow, and are also heavily used for residential parking. The early introduction of future access to the Balmain Leagues Club site opposite Wellington Street is likely to improve site access by heavy vehicles to and from the east (that is, White Bay).

Primary traffic impacts of construction are therefore likely to include:

- Pedestrian/cycle/vehicular conflict on the northern side of Victoria Road, with trucks crossing footpaths and, to a lesser extent, along the southern side of Victoria Road.
- Impacts on traffic and pedestrians on Darling Street, with trucks exiting the south-eastern site near the traffic signals.
- Impacts on Victoria Road bus services, due to trucks entering and exiting construction sites.
- Potential impacts on the regular Saturday market days, church services and meetings, and schools, which attract additional pedestrian movements in the vicinity of the construction sites.
- The need for delivery and/or removal of oversized loads subject to relevant approvals (these may be restricted to night-time hours).
- Impacts on footpaths and road crossings due to the relocation or diversion of major services, affecting both the duration and extent of disruption.

The proposed construction route for Rozelle is illustrated on Figure 10.3.

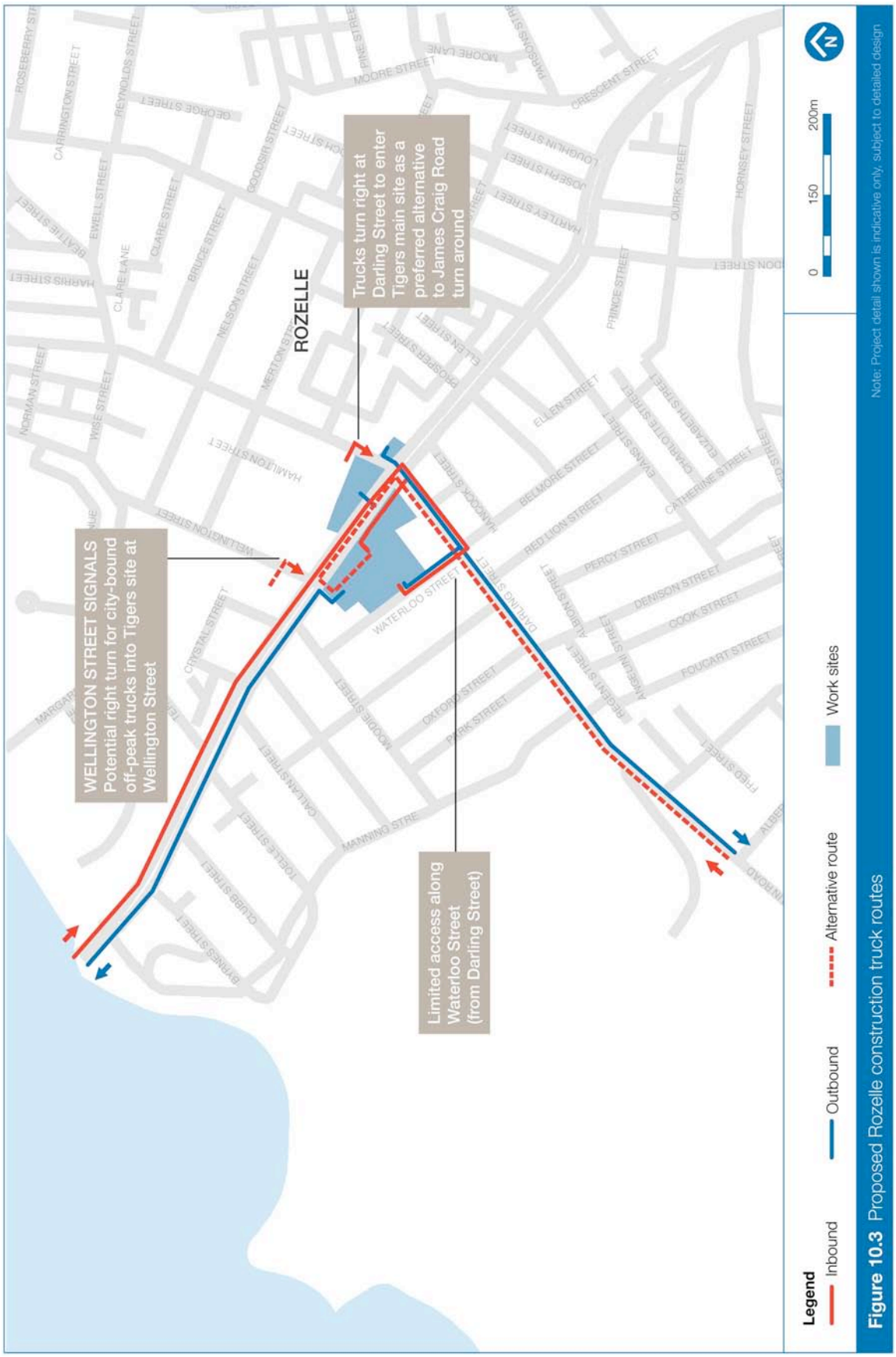

Figure 10.3 Proposed Rozelle construction truck routes

White Bay Station (future) and Rozelle stabling and maintenance depot

It is intended that the White Bay Station construction site would be used as the main construction and spoil removal site for the project. The Rozelle stabling and maintenance depot would be used to construct a stabling area, maintenance depot, operational control centre and other related infrastructure.

The estimated truck movements for construction at the White Bay construction site and the Rozelle stabling and maintenance depot are shown in Table 10.8.

Table 10.8 Spoil quantities and truck generation at White Bay Station and Rozelle depot

Location	Excavation (m^3)	Average production (m^3 per day)	Truck trips per day [1] [2]	Maximum truck movements (trips per hour)[4]
White Bay				
Diaphragm wall	Soft: 3,916 Rock: 1,100	53 18	12 2	1 <1
Station box	Soft: 36,282 Rock: 30,824	772 204	156 42	11 3
Running tunnels to Rozelle	Rock: 51,114	329	66[2]	5
Running tunnel to Central	Soft: 13,902 Rock: 256,988	951 614	192[2] 124	13 9
Cross passages/crossover	Rock: 6,000	389	78	6
Depot[3]				
Remove unsuitable topsoil	Soft: 57,000	386	78	6
Running tunnels to main line	Rock: 29,208	329	66	5
Total	**486,300**			

1 Number of trucks per day estimated on the basis of 10 m^3 per single truck (semi-trailer or truck and dog).
2 White Bay production consists of one roadheader drive and two TBM drives occurring simultaneously.
3 Depot production is indicatively estimated.
4 Hourly truck movements estimated on the basis of 15 hours per day operation.

Primary traffic impacts of construction are likely to be limited as direct access to the arterial road network would occur via James Craig Road onto The Crescent/City West Link and Victoria Road (see Figure 10.4).

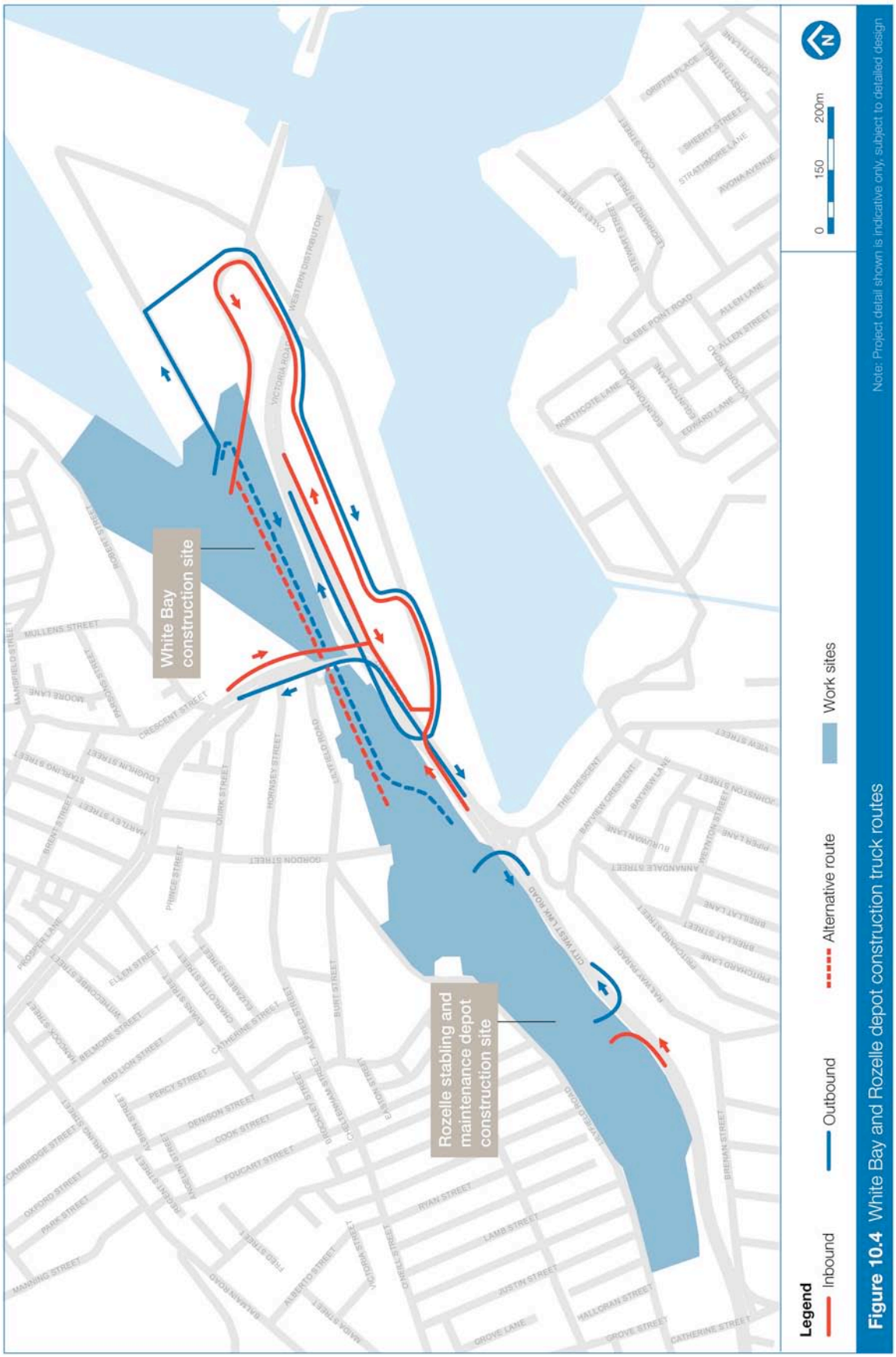

Figure 10.4 White Bay and Rozelle depot construction truck routes

10.3.2 Impacts on the road network

The traffic impacts during construction have been assessed with the assistance of the RTA's Paramics traffic model. Paramics is a traffic microsimulation software package comprised of a suite of microscopic traffic simulation tools. Preliminary modelling results indicate that traffic impacts as a result of the construction of the project would be manageable.

Network modelling
The assessment of construction traffic impacts and likely future mitigation responses is being undertaken with the assistance of the RTA's Paramics SCATSIM models of the CBD and Rozelle-Pyrmont corridor (PUR model). The full modelled area extends from Victoria Road at Iron Cove Bridge in the west, to College Street/Macquarie Street in the east, Hickson Road and the Sydney Harbour Bridge Toll Plazas in the north, to Railway Square and Foveaux Street in the south. Preliminary model results suggest that the impacts associated with cumulative construction at each of the proposed work sites can be mitigated through the measures documented in the TMPs.

Initial Paramics outputs indicated that signalised intersection operation remains within acceptable limits in the vicinity of all construction sites with the exception of the following:

- Margaret and Kent streets.
- Pyrmont and Union streets.
- Victoria and Wellington streets.
- Victoria Road and Darling Street.

These locations would be subject to further analysis within the appropriate model.

10.4 Mitigation and management

10.4.1 Overarching management strategy

Construction traffic impacts would be mitigated by the implementation of an overarching management plan supported by a series of site-specific Traffic Management Plans and Construction Traffic Management Plans.

Framework Traffic Management Plan
The overarching plan is the Framework Traffic Management Plan (FTMP). It would provide a framework for procedures and techniques to ensure effective management and delivery of the construction of the project. It would also prescribe the traffic management strategies, the traffic safety measures and the best-practice standards to be implemented during construction. The Framework Traffic Management Plan is provided as Appendix E of Technical Paper 1 *Transport and Traffic.*

Traffic Management Plans
Traffic Management Plans (TMPs) for each construction site have been produced by Sydney Metro (see Appendices F to L of Technical Paper 1 *Transport and Traffic)*. The TMPs include the following:

- Detail of existing traffic conditions (such as pedestrian movements and volumes, bus routes and stops, taxi ranks, cycle routes, parking and traffic volumes and turning movements).
- A description of the construction methodology, including proposed staging and duration of the works.
- A description of the construction site locations and truck access and egress.

- Site access management requirements (such as hours for truck movements, truck manoeuvring requirements, pedestrian management).
- Management of incidents and events (such as emergency vehicle access).
- Potential impacts on traffic (such as pedestrians, buses, taxis, cyclists and vehicles) and traffic management measures to mitigate impacts of construction.

Construction Traffic Management Plans (CTMPs)
Construction Traffic Management Plans for each construction site would be produced by the construction contractor for each construction stage. These plans would include any associated Road Occupancy Licence Applications and Speed Zone Authorisations that must be submitted to the RTA or council for consideration and approval. The CTMPs would also contain detailed drawings describing the individual Traffic Control Plans (TCPs).

Traffic Control Plans for all construction sites would be produced by the construction contractor for each traffic change and road occupancy. These plans would be produced in accordance with Australian Standard 1742.3 and the RTA publication, Guide to Traffic Control at Worksites (RTA 2003).

10.4.2 Specific mitigation measures

Minimise impacts of truck movements
The strategy for minimising the impact of truck movements in the CBD includes the following principles:

- Select the most direct route between the construction site and the arterial network to minimise the amount of time trucks spend on the lower order road network.
- Select truck routes that use roads where capacity is generally available to minimise congestion of the road network.
- Select appropriate truck sizes to form an effective balance between the need to enhance pedestrian safety, ensure sufficient manoeuvrability, carrying volume and axle loads, and to minimise the number of truck movements overall.
- Ensure truck movements occur where they minimise the impact on bus operations.
- Ensure pedestrian conflicts at driveway crossings are managed.
- Restrict hours of truck operation where the requirement to stop traffic using Stop/Slow control would result in flow-on impacts on the adjoining road network.

Minimise impacts on pedestrians and cyclists
Pedestrian needs would be given a high priority throughout the construction of the project. The strategy for minimising impacts on pedestrians and cyclists at all construction sites includes the following principles:

- Manage pedestrian and vehicular access to and past construction sites to ensure safe entry and exit procedures. Depending on the location, this may require manual supervision, physical barriers, temporary traffic signals, modifying existing signals, or on occasions, police presence.
- Maintain access to existing properties and buildings that may require temporary crossovers.
- Minimise visual, noise and air pollution associated with the works by using site screening, acoustic shrouds or covered work zones, secured and tidy site compounds, and dust and spillage minimisation measures for sites and trucks.

These principles would be achieved by the following measures:

- Providing a minimum footpath clear space, which would be derived from pedestrian volumes. This may require removal of obstructions such as street furniture.
- Providing a general minimum width of 2.1 metres to ensure disability requirements are met. This would include allowance for two-wheel chairs, prams and shopping trolleys.
- Providing adequate queuing space on footpaths at intersections to ensure that pedestrians are all able to queue on the available footpath space.
- Ensuring that cyclists would not be obstructed at the construction sites. This would be achieved by providing suitable lane widths and directing cyclists to use the whole lane rather so that cars do not squeeze cyclists into vehicle barriers and hoardings.
- Ensuring that trucks do not conflict with pedestrians on footpaths. Traffic controllers would manage access when trucks are crossing driveways into and out of construction sites.

Minimise impacts on parking

At a number of the construction sites, on-street parking spaces would be temporarily occupied by 'works zones' to facilitate truck movements and minimise impacts on through traffic. To minimise any further impacts on parking, the following strategies have been developed:

- Worker parking may be provided remotely to the station sites at Barangaroo, White Bay, the Rozelle stabling and maintenance depot site, and (for part of the construction period) Rozelle. Buses would transport the workers to each of the sites (including the CBD construction sites) at the beginning and end of each shift. Special consideration would need to be given to the provision of personal secure on-site storage of equipment and tools to overcome the need for contractors to drive work vehicles to site.
- Remote parking for truck marshalling would be required to reduce queuing and construction zone space needs within the CBD. The requirement to provide a truck call-forward location within a travel time of about one minute to the construction site, as well as provision of 'works zone' parking restrictions adjacent to construction sites and changes to traffic conditions/lanes, would require selected local removal/re-allocation of parking and loading at some locations.

Effective communications

Effective traffic and transport communication would help to minimise impacts associated with construction traffic. Priority would be given to providing adequate guidance to drivers, pedestrians, cyclists, consulting authorities and the community prior to commencement of the work; and responding appropriately to issues and events as they arise during construction. This would be achieved by:

- Providing directional signage and line marking to direct and guide drivers and pedestrians past construction sites and on the surrounding network. This would be supplemented by permanent and portable variable message signs (VMS) to advise drivers of potential delays, traffic diversions, speed restrictions, and alternative routes.
- Providing the public and the media with timely, accurate and comprehensive information of proposed traffic changes by newspaper, radio, website, and community liaison.
- Coordinating with the RTA's Traffic Operations Manager (TOM) in the event of incidents or undue congestion
- Managing traffic impacts to protect affected residential and business amenity.

Managing cumulative effects

Implementing a project of this scale involves significant interaction between Sydney Metro, various other organisations and the general public. Effective communication and coordination would be fundamental to delivering the metro. Proactive management by Sydney Metro and its delivery partners would reduce issues over the long term and support the effective delivery of the project.

Based on previous experience, it is suggested that at least two groups be established – the Network Co-ordination Liaison Group (NCLG) and the Traffic and Transport Liaison Group (TTLG).

The Network Co-ordination Liaison Group would:

- Provide a strategic and tactical forum for ensuring the CBD Metro works are coordinated with other development and public works. The NCLG would be concerned with longer term plans such as the end-state arrangements, and would coordinate with other existing groups and initiatives such as the Wynyard Transport Precinct Working Group, to ensure an integrated planning approach before, during and after the metro is constructed.
- Aim to mitigate impacts on local business, residents and CBD visitors by ensuring that construction impacts arising from the CBD Metro are integrated and balanced against the construction impacts of wider redevelopment and other changes occurring within the CBD.

The Traffic and Transport Liaison Group would:

- Ensure that all relevant traffic management authorities affected by construction traffic are aware of the proposed construction activities, upcoming works and related transport implications and have the opportunity to comment on the mitigation measures proposed prior to the start of construction.
- Possibly undertake the consultation functions, which would otherwise occur at forums such as the Council Traffic Committee (TMC), when determining traffic management measures to be put in place to manage construction activities.

The TTLG participants may vary depending on the construction site and potential issues and areas affected. However, the core group may consist of Sydney Metro, RTA (including TMC), Police, Fire and Ambulance, City of Sydney and Leichhardt Municipal Council traffic officers, State Transit Authority, NSW Transport and Infrastructure, Taxi Council, Bus and Coach Association, CBD Metro representative and the Contractor's Traffic Manager.

10.5 Conclusions

The CBD Metro project would require a large increase in truck movements within the CBD and inner west. The removal of spoil is expected to generate the highest volumes of heavy vehicle traffic.

The main emphasis in managing construction traffic would be to minimise the impacts on nearby receivers, as well as public transport, private traffic, pedestrians and cyclists.

Key to this would be a Framework Traffic Management Plan, produced by Sydney Metro, to provide a framework for procedures and techniques to ensure effective traffic management.