Appendix K Rozelle Station Traffic Management Plan

SydneyMetro

CBD Metro
TA 2108 Transport and Access Advisor

Rozelle Station - Traffic Management Plan

Sydney Metro

18 August 2009

Document Reference: **CBD-2108-MSM-EP-DO-084**

SINCLAIR KNIGHT MERZ SKM MVA MVA ASIA LIMITED AECOM

Rozelle Station -Traffic Management Plan

Prepared for

Sydney Metro

Prepared by

AECOM Australia Pty Ltd
Level 11, 44 Market Street, Sydney NSW 2000, PO Box Q410, QVB Post Office NSW 1230, Australia
T +61 2 8295 3600 F +61 2 9262 5060 www.aecom.com
ABN 20 093 846 925

In association with

Sinclair Knight Merz and MVA Asia

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Glossary

Term	Acronym / Abbreviation	Description
Acoustic		Pertaining to the sense of organs of hearing, or to the science of sound.
Ambient		Surrounding or existing.
Bored tunnel		An underground tunnel constructed by a tunnel boring machine.
CityRail Station		Existing rail station on the CityRail network
Construction Environmental Management Plan	CEMP	A document setting out the management, control and monitoring measures to be implemented during construction of a development, to avoid or minimise the potential environmental impacts identified during an environmental impact assessment process.
Construction site (or worksite)		Land required for construction activities associated with the project (including storage, amenities, site offices, etc), and may be required for the construction and commissioning phases. A construction site may be temporary (eg for Enabling Works such as adjustment to a water main) or long term (eg a station construction worksite).
Construction Environmental Management Plan	CEMP	A document setting out the management, control and monitoring measures to be implemented during construction of a development, to avoid or minimise the potential environmental impacts identified during an environmental impact assessment process
Construction Traffic Management Plan	CTMP	Construction Traffic Management Plan is a document prepared for each stage of construction work, and describes the impact and mitigation measures to address changes to traffic conditions resulting from discreet elements and stages of construction activity.
Crossover		Track form to allow trains to move to an adjacent track.
Cut and cover construction		Method of construction for underground structures where a hole is excavated from the surface down, the structure is built and then covered.
Director-General's requirements		Requirements for an environmental assessment issued by the Director-General of the Department of Planning in accordance with the Environmental Planning & Assessment Act 1979.
Diamond Crossover		Two crossovers located adjacent to each other in a diamond formation.
Earth Pressure Balance Machine		Is a mechanised tunnelling method in which spoil is admitted into the tunnel boring machine (TBM) via an arrangement which allows the pressure at the face of the TBM to remain balanced without the use of slurry.
Framework Traffic Management Plan	FTMP	Framework Traffic Management Plan is a document which outlines the processes and systems to be established to control traffic issues which are common to all Metro Worksite locations.
Integrated Metro Operations	IMO	Integrated Metro Operations is responsible for running the Metro Operation, within the permanent route infrastructure and refers to all running systems and operations required to operate the Metro.

Term	Acronym / Abbreviation	Description
IMO contractor		Integrated Metro Operations contractor responsible for rollingstock, rail systems, tunnel services, and station building works, fitout and services including mechanical and electrical.
IMO construction contract		The agreement between the project company and the construction contractor to undertake the IMO works
IMO site access plan		The plans of that name that form part of the project management plans and must be updated by the project company in accordance with the plan and reports schedule
IMO construction traffic management plan		Plan for site access for contractors and public during construction and operation phases.
Geotechnical conditions		Relating to the form, arrangement and structure of geology, soils etc.
Kiss-and-ride		Where a car passenger is dropped off at a public transport station/bus interchange by a private car. This is generally by a family member, hence the 'kiss' goodbye.
Maintenance depot		Land including buildings and facilities for the maintenance of the Metro system, including rolling stock and the infrastructure.
Metro railway		A guided system designed to transport passengers on a railway track, together with its infrastructure and associated sidings, that: (a) provides high-frequency commuter and other passenger services, and (b) is operated using automated systems, that are integrated with trains, from one or more central control points, and (c) is operated using dedicated rail infrastructure facilities that are not operationally connected with other types of rail infrastructure facilities.
Metro railway system		(a) a metro railway and its rail infrastructure facilities, and (b) stations, platforms, maintenance facilities, depots and other transport interchanges, works, structures and facilities associated with or incidental to the metro railway or rail infrastructure facilities (including commercial and retail facilities).
Ministry of Transport	MOT	NSW Government Ministry of Transport.
Paid concourse		Area of the station that can only be accessed by ticket holders.
NCLG		The Network Coordination Liaison Group is a group of stakeholders who are to be formed to ensure that construction related impacts of the CBD Metro are managed with respect to changing road demands and competing interests in the CBD over the life of the construction of the project.
Proponent		The person proposing to carry out development comprising all or any part of the project, including any person certified by the Minister for Planning to be the proponent (such certification to be obtained prior to commencement of the relevant part of the project). Sydney Metro is the proponent for the CBD Metro project.
Permanent Route Infrastructure	PRI	Comprises the civil, tunnelling works and station excavations to be designed and constructed by the PRI Contractor on behalf of Sydney Metro, for handover to the IMO contractor for construction of the IMO Works.

Term	Acronym / Abbreviation	Description
PRI Contractor		(PRI) contractor, responsible for surface works for construction of the Stabling and Maintenance Depot, tunnelling works, and excavation and retaining structures associated with the station boxes
Product		The new metro railway in total including assets, brand, systems, intellectual property, interfaces and metro services
Road header		Machine used to excavate tunnels with a boom-mounted cutting head.
Road User		A road user is any person who uses a road, driveway or footpath, and includes motorists, buses, pedestrians, cyclists, taxis etc.
Rolling stock		Standard single deck metro trains used on the metro railway.
Road Occupancy License	ROL	A Road Occupancy License is a process whereby an Authority (primarily RTA) gives its approval for an activity which involves removing one or more lane of the road from traffic or parking use to another use – usually temporary construction.
Spoil		Excess material resulting from the cut and fill balance. Generally comprises soil and rock material. All volumes refer to solid volume.
Stabling facility		Location where rolling stock (trains) are stored when not in service.
Station		Refers to proposed Metro station infrastructure, including platforms, concourse, entrance, pedestrian connections, staff facilities and associated requirements/facilities to service the station.
Station Plan		Plans that may be prepared for land on which metro railway stations are to be situated, and land in the vicinity of such metro railway stations, with respect to development, traffic and parking management arrangements, pedestrian links and access facilities, retail and commercial development associated with metro railway stations, public domain amenities and improvements, and other matters ancillary to the operation of metro railway stations and any associated transport or other facilities.
Sydney Metro		Sydney Metro is the NSW Government agency constituted under the Transport Administration Act 1988 to develop a metro railway system, including procuring the CBD Metro and possible future extensions of it.
Speed Zone Authorisation	SZA	A speed Zone Authorisation is a process whereby the RTA gives permission for a change to the speed limit.
Traffic Management Plan	TMP	A traffic management plan is a document which describes the traffic impact and management measures for a specific work area.
Traffic and Transport Liaison Group	TTLG	The Traffic and Transport Liaison Group is a group of stakeholders which will be formed to ensure those stakeholders have the opportunity to review and comment on the traffic management measures and road changes proposed to be put into place to manage traffic on and adjacent to the project.
Tunnel boring machine	TBM	Machine used to excavate tunnels with a circular cross section through a variety of soil and rock strata.

Term	Acronym / Abbreviation	Description
Turnback		Configuration of tracks allowing a train to terminate a service and return to its starting point.
Unpaid concourse		Areas of the station that can be accessed by any member of the public.
Virgin excavated natural material	VENM	Natural material (such as clay, gravel, sand, soil and rock) that: (a) is not mixed with any other type of waste; and (b) has been excavated from areas of land that are not contaminated.
Variable Message Sign	VMS	Variable message signs used to provide advance notice of upcoming works and traffic arrangements and alternate routes and traffic arrangements during the works. Subject to prior approval and availability this may include existing RTA VMS and project VMS.

Executive Summary

This Traffic Management Plan outlines the traffic impact and traffic mitigation measures proposed to be put in place to manage construction of the Rozelle Place worksites for CBD Metro.

This Plan has been developed at an early stage based on the anticipated traffic management measures that could be selected by the successful contractor/s, once awarded. The Plan demonstrates the impacts and mitigation measures for a feasible traffic management scenario.

Traffic impacts have been determined based on worksite layouts and construction methodologies provided by the CBD Metro TA2100 adviser and are current as to the date of this report. PARAMICS modelling is to be undertaken by the RTA to determine the traffic impact of the proposed construction traffic, utilising the CBD and Victoria Rd network models.

There are no network adjustments resulting from this Plan. However there a few impacts the most significant ones being as follows:

- Construction of a left turn into the St Thomas's site across the footpath and bus passenger waiting area on the inbound side of the Darling Street intersection, necessitating a relocation of the bus stop further inbound to avoid conflict with the proposed site entry. Cyclist movement on this footpath would also be disrupted by truck entry movements;
- Trucks turning left on exit from the St Thomas's site are anticipated to require traffic control, due to the proximity of the Victoria Rd traffic signals and busy pedestrian footpath conditions;
- Construction of a left turn into the St Paul's site across the Darling Street footpath to the east of Victoria Road requiring traffic control for pedestrians and vehicles;
- Early construction of the proposed 4th leg of the Waterloo Street / Victoria Road intersection to provide for right turning vehicles out of the Tigers site.

The major mitigation strategies recommended for implementation to manage construction impacts resulting from this Plan are:

- Dilapidation reports to be prepared prior to significant heavy vehicle use of private roads;
- Traffic controllers to monitor and where necessary to manage pedestrian and construction truck conflict at the Pitt Street/ Lee Street and Eddy Avenue frontage to worksites;
- Advance notification of upcoming traffic changes, potential bus stop relocation, signage and management, advance directional and advisory signage for pedestrians and cyclists.

The major residual impacts of the construction traffic on the road network highlighted in this Plan are:

- Increase in truck movements on Victoria Rd and over a short section of Darling St; and
- Friction for bus movements in kerbside lanes of Victoria Rd due to truck entry and exit movements on Victoria Rd;
- Minor increase in walking distance for pedestrians to the relocated inbound bus stop.

1.0 Introduction

1.1 Project background

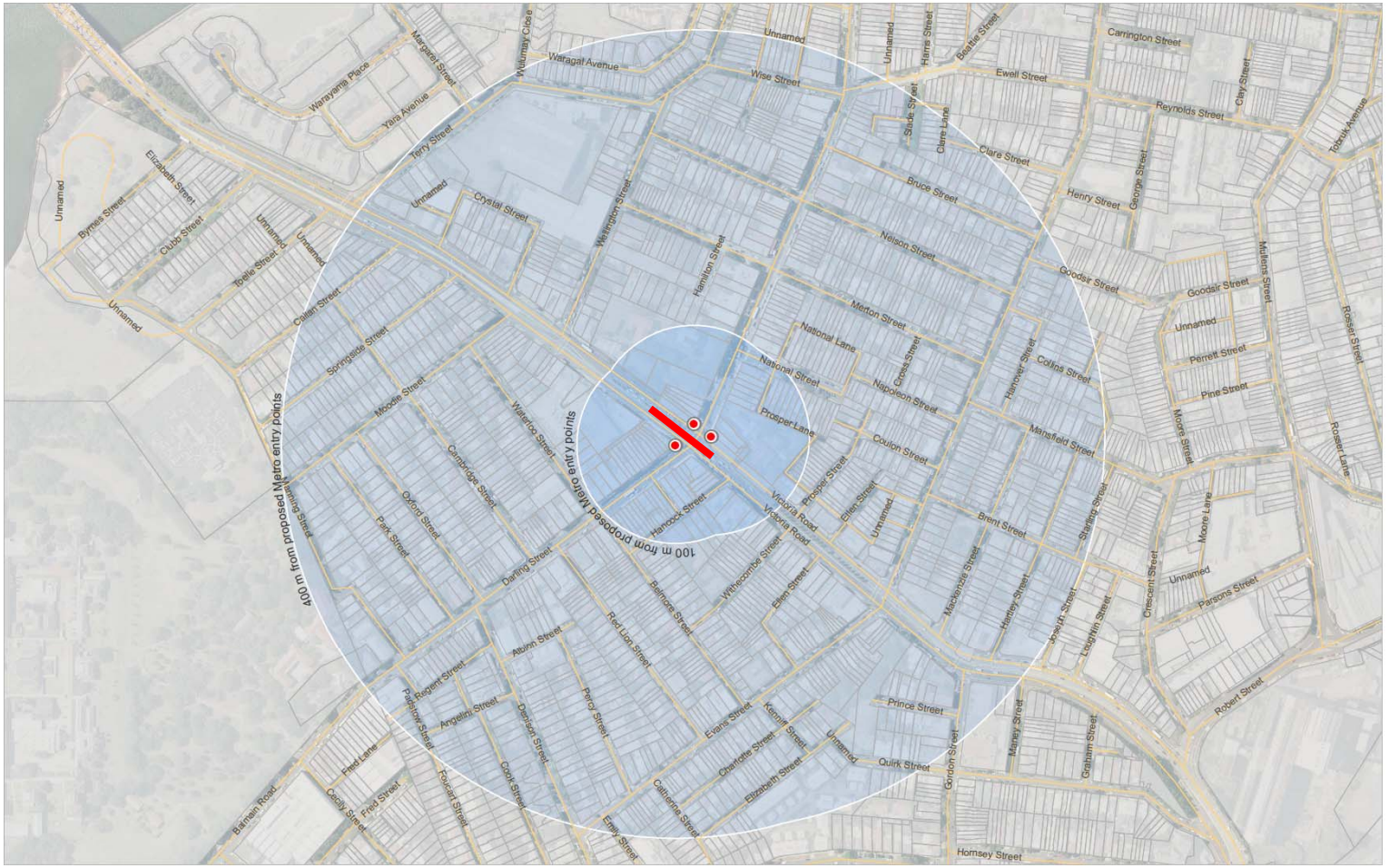
The CBD metro is a 7 km metro railway from Central to Rozelle and will be the first metro in a Sydney wide metro network. New metro stations are proposed at:

- Central;
- Town Hall Square;
- Barangaroo- Wynyard;
- Pyrmont;
- Martin Place; and
- Rozelle

There is also a potential future station safe guarded at White Bay.

The Rozelle Metro Station is located in the predominately residential precinct under the alignment of Victoria Road at the intersection with Darling Street, as illustrated in **Figure 1.1**.

Figure 1.1: Location of Rozelle Station



BASE MAP | **ROZELLE**

1.2 Scope of this report

This Traffic Management Plan (TMP) for Metro Rozelle Station outlines the construction methodology and timeframes, (based in advice from the CBD Metro, Construction Technical Advisors (TA2100)), concept staging of works impacting on roads and transport road works; and traffic management measures to mitigate the impacts of construction.

This TMP operates under the Framework Traffic Management Plan (FTMP), which covers traffic management responses and strategic processes, which are common to all work sites, to enable construction of the CBD Metro.

The FTMP identifies a hierarchy of access that was applied in developing traffic management arrangements, i.e.:

- Incidents;
- Events;
- Pedestrians;
- Service Vehicles;
- Cycles;
- Public Transport – Buses;
- Coaches;
- Taxis; and
- Kiss n' Ride

A further level of traffic management detail will be contained in the Construction Traffic Management Plans (CTMP's & TCP's), which will be the responsibility of the CBD Metro Permanent Route Infrastructure (PRI) and Integrated Metro Operations (IMO) contractors, once appointed.

1.3 Hierarchy of construction traffic management plans

This TMP operates under the Framework Traffic Management Plan (FTMP), a further level of traffic management detail will be contained in the Construction Traffic Management Plans (CTMP's), which will be the responsibility of the CBD Metro PRI and IMO contractors, once appointed.

The traffic management plan hierarchy is as follows:

1) Framework TMP (Sydney Metro)
2) Site Specific TMPs (Sydney Metro)
3) Construction TMPs (PRI & IMO Contractors)
4) Construction TCPs (PRI & IMO Contractors)

1.4 Report structure

This report operates under the general project requirements and policies outlined in the Framework Traffic Management Plan. The report outlines the site specific strategies for the Metro Rozelle Station and is structured as follows:

Section 1 Describes the CDB Metro project and TMP process
Section 2 Describes the Existing Transport context for Rozelle Station
Section 3 Outlines the Proposed Work Method
Section 4 Describes the Worksite Operation and Management
Section 5 Identifies Impacts and Mitigation Measures

2.0 Existing Situation

2.1 Pedestrian movements and volumes

The pedestrian network in the vicinity of Rozelle is illustrated in **Figure 2.1**.

Site observations were carried out on 26 March, 2009 during both AM and PM peak hour to gain an understanding of how the Rozelle interchange currently operates. The following observations and data collections were undertaken during the site visits.

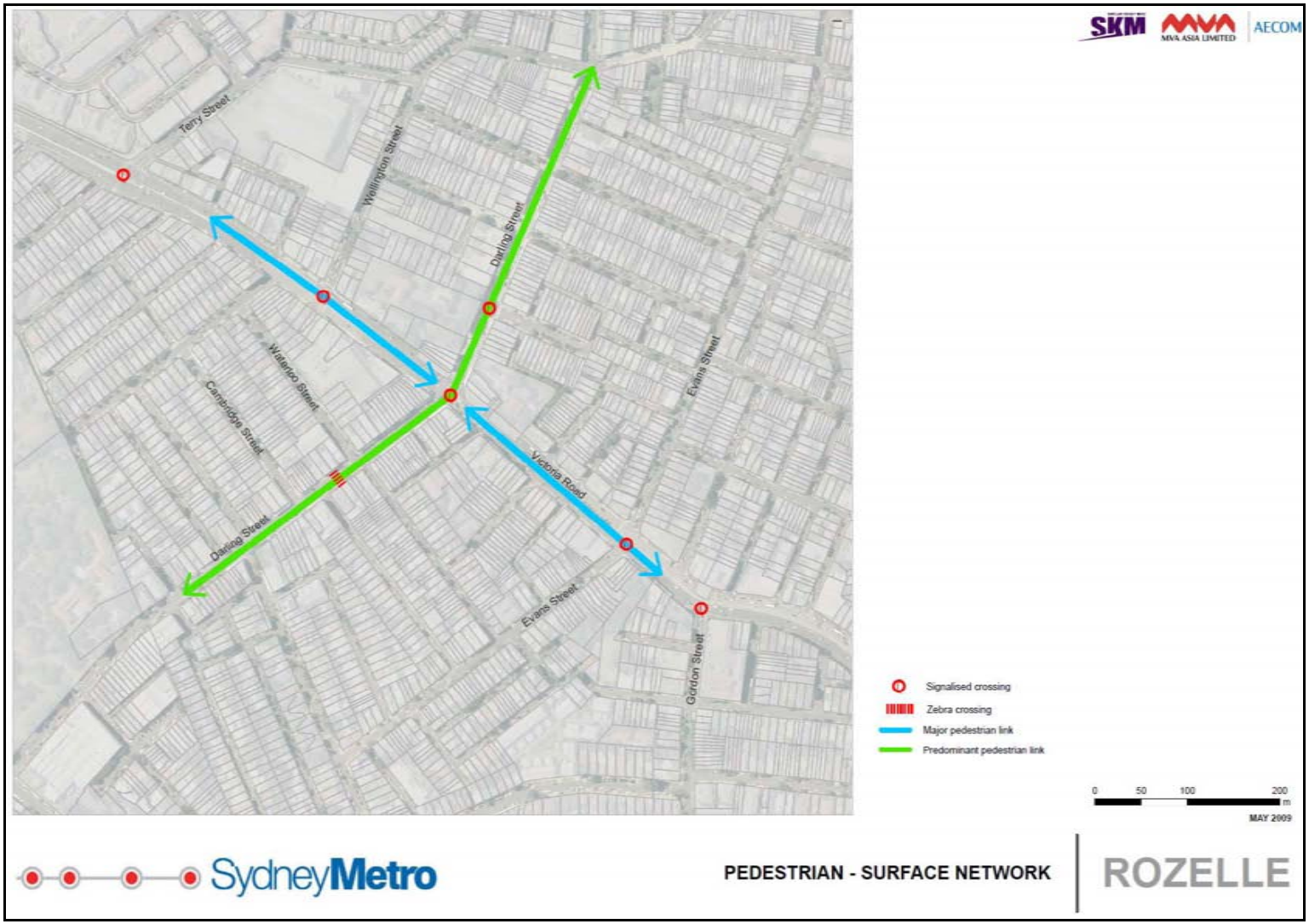
Observations from the site visit indicate that the major pedestrian desire line within the Rozelle precinct is along Darling Street ridgeline during both AM and PM peak hour. Local streets, perpendicular to Darling Street, provide a network of routes permeating the residential areas adjacent, these streets 'feed' the main pedestrian link along Darling Street.

Darling Street, north of Victoria Road, was observed to have an increased level of pedestrian activity when compared to Darling Street, south of Victoria Road. A vibrant retail frontage as well as other pedestrian generators, such as schools and key bus stops contributes to the pedestrian activity. In addition, observations showed that the majority of pedestrian activity occurs on the eastern side of Darling Street, both to the north and south of Victoria Road; again this is related to the increased vibrancy of retail on the eastern side of Darling Street in the vicinity of the station precinct.

Pedestrian activity along both the northern and southern sides of Victoria Road is minimal. Pedestrian routes along Victoria Road do not link to major attractors or generators and are impacted by steep gradients and poor amenity.

There are lower levels of pedestrian movement during the AM peak hour than the PM peak hour. Flows during the AM peak were more concentrated, combining journey to work and journey to school flows, with queues forming at pedestrian crossings and at bus stops. The major attractors during the AM peak are bus stops, particularly stops located on the north side of Victoria Road, serving inbound buses to the city. In addition, southbound bus stops on Darling Street approximately 30m north of the Victoria Road intersection, were busy with groups of school children. PM peak hour pedestrian flows were dominated by passengers alighting buses on the south side of Victoria Road, to the east of the intersection with Darling Street. These flows then dispersed north and south along Darling Street.

Figure 2.1: Pedestrian Surface Network, Rozelle Station

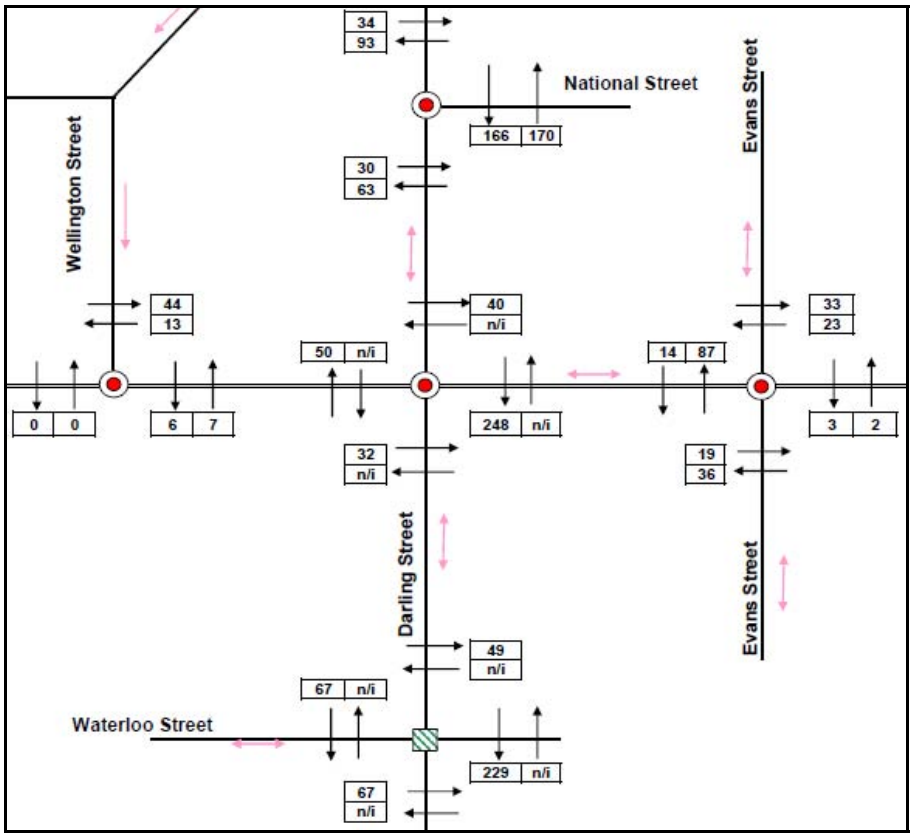


2.1.1 Pedestrian surveys

In addition to general observations, pedestrian surveys were undertaken on 17 April 2009 during the AM (8-9am), midday (12.30-1.30pm) and PM peak hour (5-6pm) within the Rozelle precinct. The crossing movements during each of the surveyed time periods were low at the Wellington Road / Victoria Road intersection. Evans Street northbound crossing movements are generally higher than southbound movements with higher demand occurring in the AM peak period.

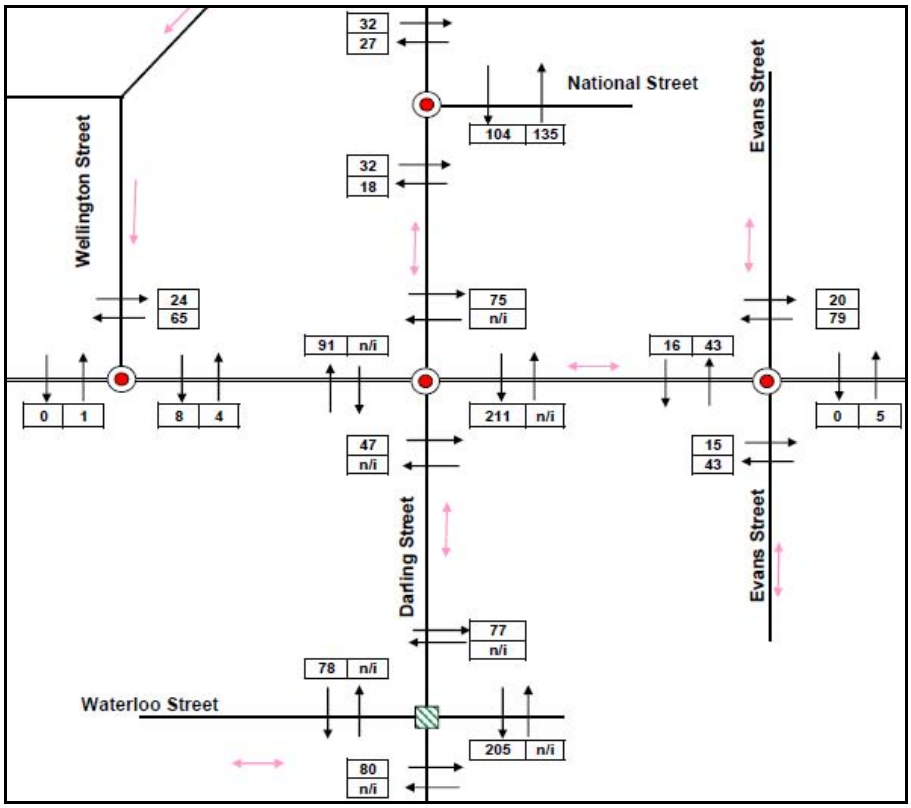
At Darling Street, the crossing on the eastern side of the intersection is significantly busier with higher flows during each of the surveyed time periods. During the AM peak hour, a total of 248 (2-way) pedestrian movements were recorded on the busier eastern side of the Victoria Road / Darling Street intersection. The western section recorded only 50 (2-way) movements. In the PM peak, 211 (2-way) movements were recorded on the eastern side of the intersection with 91 (2-way) movements recorded during the PM peak. Pedestrian peak hour flows in the Rozelle vicinity are shown in **Figure 2.2** and **Figure 2.3.**

Figure 2.2: AM Pedestrian counts, Rozelle Station, April 2009



Source AECOM 2009

Figure 2.3: PM Pedestrian counts, Rozelle Station, April 2009



Source AECOM 2009

2.2 Bus routes and stops

The location of existing bus stops and routes are shown in **Figure 2.4** and **Figure 2.5.**

Observations of passenger boarding and alighting bus services were undertaken by AECOM in March / April 2009 during the AM and PM peak periods.

Rozelle is a minor bus interchange with services operating along Victoria Road to the CBD in the AM peak and to Chiswick / Breakfast Point / Ryde / Parramatta in the PM peak. Approximately 75 buses travel inbound to the CBD during the AM peak hour (8am-9am) through the intersection of Darling Street / Balmain Road at Rozelle. All of these buses currently stop on Victoria Road beyond the Darling Street / Balmain Road intersection.

Approximately 60 buses travel in the PM peak hour (5pm - 6pm) outbound from the CBD through the intersection of Darling Street / Balmain Road at Rozelle. 45 of these buses currently stop on Victoria Road near the Darling Street / Balmain Road intersection, 15 express services currently operate through this intersection, with their first stop out of the CBD being at Lyons Road, Drummoyne.

There are bus stops on the inbound (to the CBD) carriageway located at:

- East of Terry Street;
- West of Wellington Street;
- East of Darling Street;
- West of Evans Street;
- West of Robert Street; and
- White Bay Hotel.

The bus stops on the outbound (from the CBD) carriageway are located at:

- West of Lilyfield Road;
- East of Lilyfield Road;
- Between Quirk street and Gordon Street;
- Between Gordon and Evans Street;
- Between Withercombe Street and Darling Street;
- Between Moodie Street and Springside Street; and
- West of Toelle Street.

The major bus stops within the Rozelle precinct for inbound services are located on the north side of Victoria Road, east of Darling Street. For outbound services, the major stop is located on the south side of Victoria Road, east of Darling Street. All other stops (located on Darling Street) are termini or minor stops en route to other destinations such as the Balmain and Birchgrove area.

The main AM peak hour bus movements (8-9am) are:

- 80 services operating inbound from Rozelle / Inner North West (Drummoyne / Ryde) to the CBD via Darling / Victoria Road intersection with an additional 20 services operating via Robert Street;
- 15 services operating inbound from Rozelle to the CBD via Glebe; and
- 7 services operating via Leichhardt to the CBD from Rozelle.

The PM peak hour key bus movements (5-6pm) are:

- 58 services (15 express not stopping at Rozelle) operating outbound from the CBD to Rozelle / Inner North West (Drummoyne / Ryde) via Darling / Victoria Road intersection with an additional 20 services operating via Robert Street;
- 15 services operating outbound to Rozelle from the CBD via Glebe; and
- 7 services operating via Leichhardt from the CBD to Rozelle.

Figure 2.4: Existing AM Peak Bus Routes, Rozelle Station

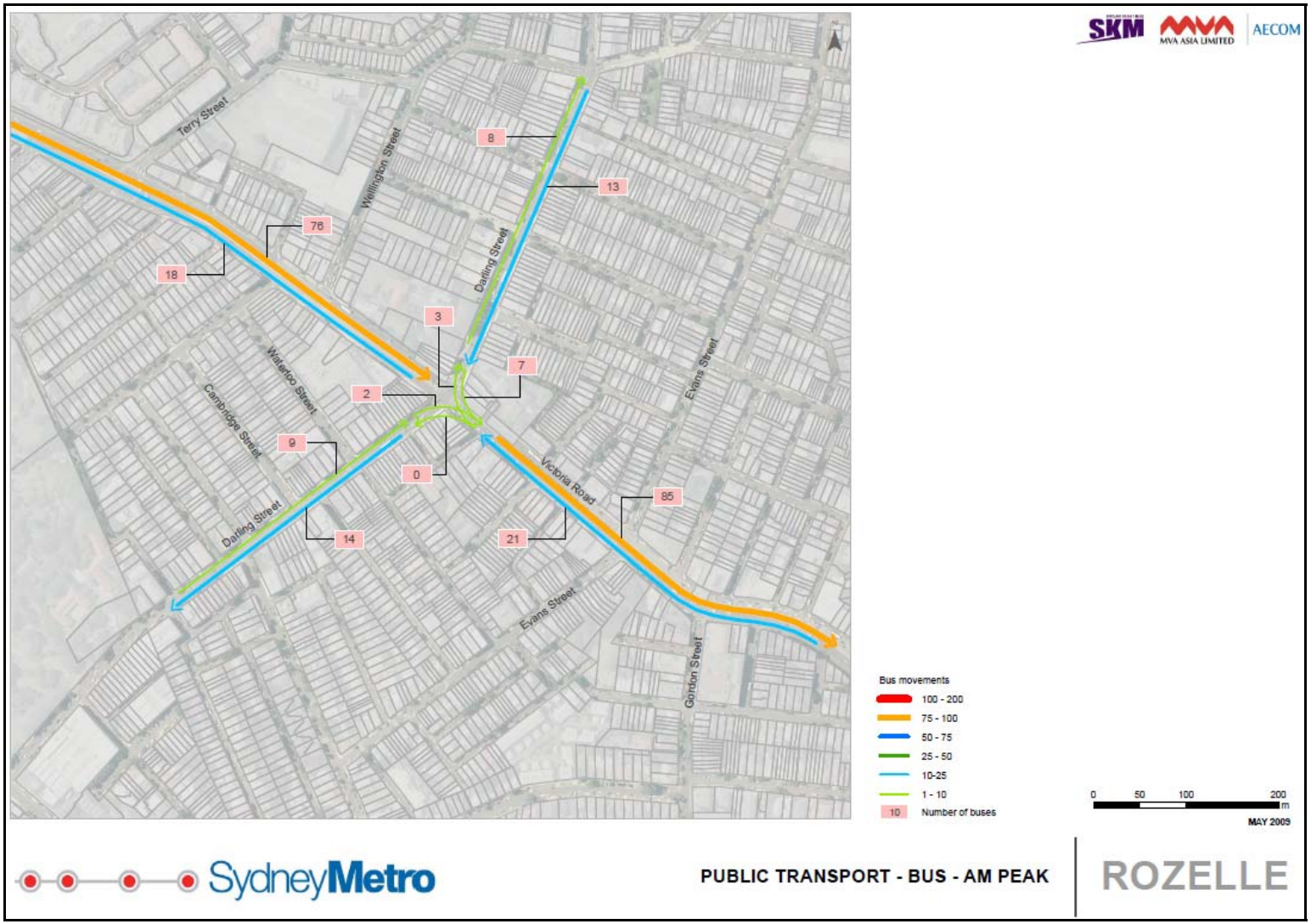


Figure 2.5: Existing PM Peak Bus Routes, Rozelle Station

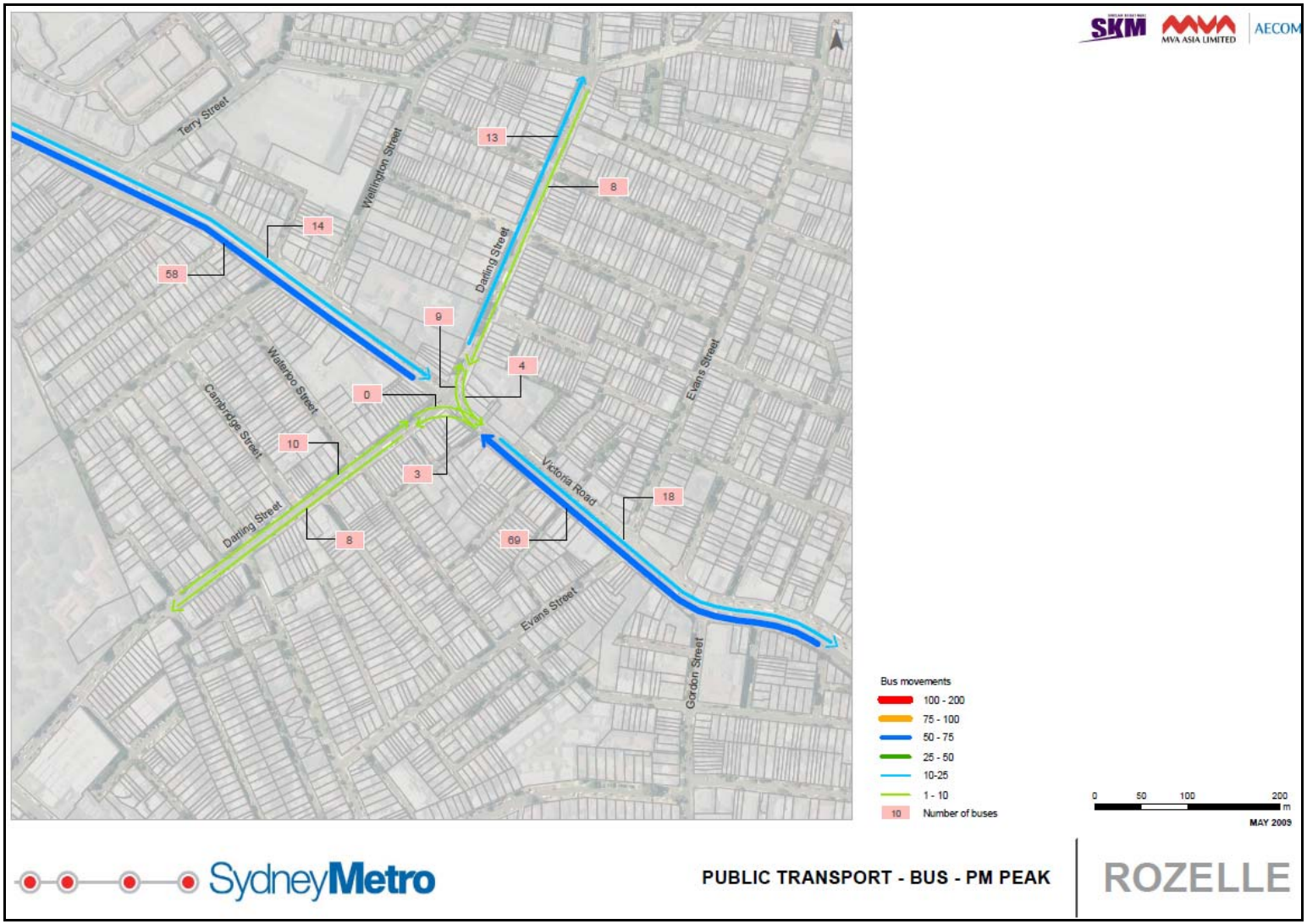
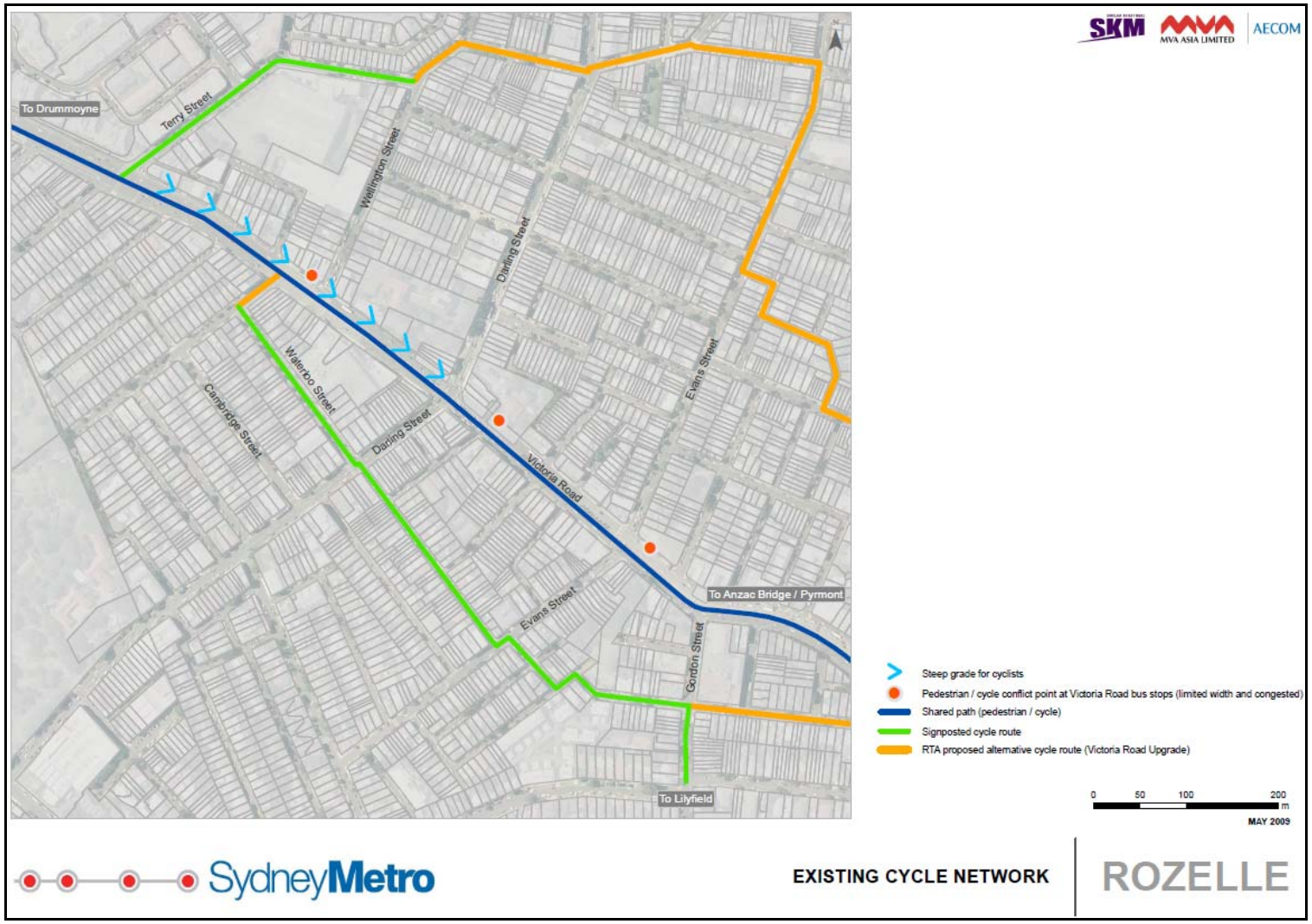


Figure 2.6: Existing Cycle Network, Rozelle Station



2.2.1 Issues related to bus operations

A number of key issues on the Victoria Road corridor have been identified as part of the *Victoria Road Upgrade Report* (Hyder, 2008) – currently termed the Inner Western Busway Project. This is a report prepared on behalf of the RTA in support of the proposed Inner West Busway project (see description in the following sections). These major issues affecting bus reliability include:

- Heavy congestion in the transit lane impeding the flow of high occupancy vehicles particularly buses. This reduces the reliability of travel times for bus users with a 12 minute scheduled time, between Gladesville Bridge and The Crescent, reducing the attractiveness of bus as a mode; and
- Enforcement of the transit lane improves conditions for bus users; however, traffic conditions for general traffic deteriorate due to additional use of the general lanes.

In addition, on site bus observations undertaken during the AM peak in March 2009, indicate the majority of buses inbound on Victoria Road at the Darling Street intersection are close to capacity with standing room only. There are two bus shelters inbound on Victoria Road at Darling Street. During the AM peak these bus stops are significant generators of pedestrian traffic, mainly from Darling Street north and south. Observations show that a maximum of 10-15 people queue before a bus arrives. The high frequency of services along Victoria Road minimises the extent of queuing that occurs.

It was also noted during the AM peak that buses queue back from the stop on Victoria Road to the Darling Street intersection (queue of three buses), with additional buses queuing on the approach to the intersection. No buses were observed to queue across the Victoria Road / Darling Street intersection.

The southbound bus stop on Darling Street also experienced crowding during the AM peak with large numbers of school children waiting for buses.

As mentioned previously, conflicts between bus passengers waiting at the bus stops on the north side of Victoria Road and cyclists using the shared path were observed frequently during the AM peak.

2.2.2 Inner West busway related works

As part of the Inner West Busway Project, the Bridge to Bay Alliance and the RTA propose to make changes to the Parramatta Valley Cycleway, the regional pedestrian-bicycle route which runs on the northern side of Victoria Road from the terminus of the Anzac Bridge cycleway to Parramatta.

The current regional route has a number of barriers to pedestrian – cycle use, including pavement quality, signage, signals, route directness etc. The route is characterised by conflicts between pedestrians and cyclists at pinch points.

To manage a current pinch-point at the bus loading zone and Leichhardt Municipal Council (LMC) advertising bus shelter at the inbound bus stop on the St Thomas's corner of Victoria Road / Darling Street, the RTA proposes to construct a fence separating through pedestrian and cyclist movements from the alighting bus passengers at the bus stop.

Part of this plan includes relocating one of the LMC standard advertising shelters to a position closer to the existing advertising bus shelter and connecting the two shelters with a fence. The fence separates 1.3m of the path for bi directional cycling and walking movements and provides 2.2m for waiting bus passengers/ shelters/ seating and rubbish bins. The proposed 1.3m bidirectional cycleway to be marked "slow" and painted with hatched warning strips.

In Rozelle, the Inner West Busway project will provide:

- An outbound bus lane from Clubb Street, Rozelle to the end of the new Iron Cove bridge in the AM peak;
- Clearways during peak periods; and
- Changed traffic arrangements in Rozelle.

A single right turn lane will be provided into Darling Street (inbound) in the AM peak. At all other times, two turning lanes will be provided. Overhead signs will advise motorists of turning arrangements.

The right turn into Evans Street (westbound) will be closed. Drivers wishing to access Balmain will need to turn right at Robert Street, Darling Street or Terry Street. The right turn into Gordon Street (inbound) will be closed. Drivers can turn right at Darling Street or The Crescent.

The outbound right turn lane into Terry Street will be extended and the dedicated left turn lane into Terry Street inbound will be removed. The turning lanes into Darling Street (from both directions) will be extended.

Clearways will be in place on both sides of Victoria Road in the AM peak and in the PM peak. On-street parking will be available at all other times[1].

Construction on Inner West Busway works commenced in June 2009.

2.3 Taxis

No formal taxi ranks exist in the vicinity of the Rozelle intersection at Darling Street and Victoria Road.

2.4 Cyclists

The existing cycle network in the vicinity of the station is shown in **Figure 2.6.**

The existing mode share for cycling is less than two percent of total trips in the City of Sydney (2006) with the bicycle mode share for journey to work trips from Leichhardt LGA (2006) accounting for a similar proportion of trips (almost two percent), ABS 2006. Both LGA's experience a higher mode share for journeys to work involving cycling than other inner Sydney LGAs (*New C & Rissel C. Cycling to work in Sydney: analysis of journey-to-work Census data from 2001 and 2006. Liverpool: Sydney South West Area Health Service, Health Promotion Service,* May 2008) and have experienced an increase cycling trips between the 2001 and 2006 censuses.

There are a number of on road and off road cycle routes linking Balmain / Rozelle to the Anzac Bridge which forms a key link in the network connecting to the CBD. The major constraints to cycling in this area are topography and the major road corridors, principally Victoria Road. The main cycle route through Balmain/Rozelle along Victoria Road includes a steep grade from Iron Cove Bridge to the intersection of Darling Street and limited width in a number of locations, particularly around bus stops near Terry Street, Darling Street and Evans Street.

1. Retrieved from Inner West Bus way website

2. New C & Rissel C. Cycling to Work in Sydney: Analysis of Journey-to-Work Census Data from 2001 and 2006. Liverpool: Sydney South West Area Health Service, Health Promotion Service, May 2008).

There are approximately 940 cyclists using the Anzac Bridge cycleway on weekdays (2007), and approximately 430 cyclists using it on the weekends. Approximately 355 cyclists use Iron Cove Bridge cycleway on weekdays (2007), and 365 cyclists use it on the weekends (RTA cycle traffic counts 2007). The Iron Cove Bridge and Anzac Bridge are linked by a regional cycle route along the northern side of Victoria Road. Observations and data collected by Leichhardt Council indicate the cycle route along Victoria Road is more heavily used during the AM peak than the PM peak.

In addition to the regional cycle route on Victoria Road, there are a number of other local cycle routes through the residential areas of Balmain and Rozelle. An alternative cycling route to Victoria Road through Balmain (promoted by RTA as part of the Inner West Busway) uses Terry Street, Wise Street, Beattie Street, Evans Street, Collins Street and Crescent Street. In Rozelle, the alternative route to Victoria Road uses Quirk Street, Belmore Street and Waterloo Street.

2.4.1 Issues

The shared path is well utilised along the steep section of Victoria Road as it offers a safe and uncongested route along a major traffic corridor. The sections with limited width around bus stops cause significant disruption to cyclists, with cyclists forced to dismount to manoeuvre around bus shelters and queuing passengers. Other obstacles to cyclists on the shared path include bins. As a result, some cyclists, particularly east of the Darling Street intersection use the bus lane rather than the shared path to continue towards the city.

2.5 Parking

No on-street parking exists in the immediate vicinity of the Darling Street and Victoria Road intersection. Currently 'no stopping' and bus zone restrictions apply along either side of Victoria Road and Darling Street. Limited parking is available along the southern arm of Darling Street south of Hancock Lane.

2.6 Traffic signals

Traffic signal control is provided at all intersections on approach and departure from the worksites, ie:

- Victoria Road and Darling Street;
- Victoria Road and Wellington Street; and
- Victoria Road and Evans Street

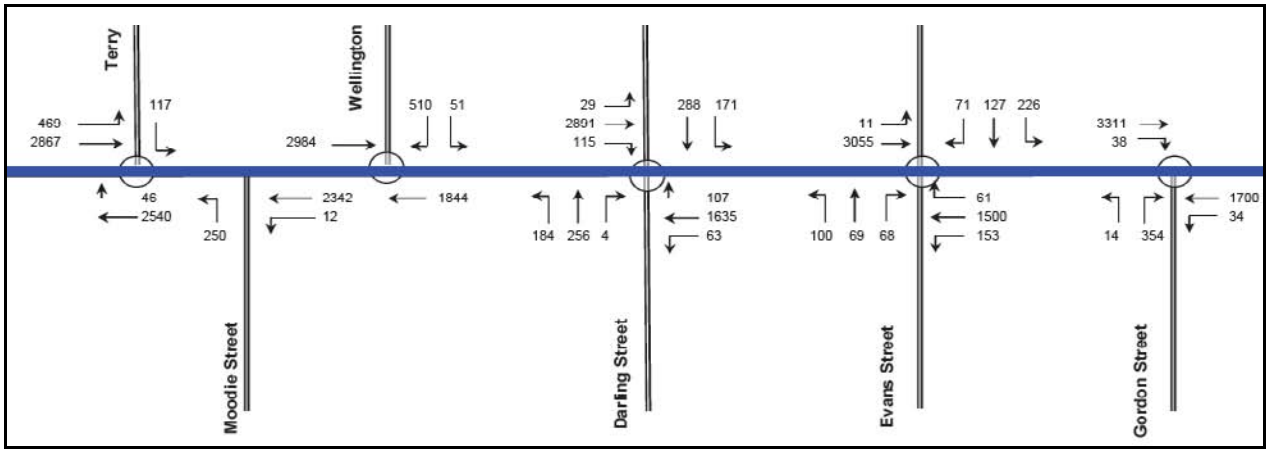
2.7 Traffic volumes and turning movements

The section of Victoria Road in proximity to the Rozelle Station precinct is a major arterial corridor carrying up to 75,000 vehicles per day. This segment of Victoria Road is highly trafficked and heavily congested in all peak periods. The traffic flow along Victoria Road is controlled by SCATS intelligent traffic signals that operate to balance the demands of high traffic volumes on Victoria Road, whilst providing sufficient opportunities for vehicles on side streets to enter or cross Victoria Road.

Darling Street, Balmain Road, Lilyfield Road and Robert Street all carry up to 10,000 vehicles per day. Darling Street on weekends has its highest traffic demand around midday, with significant numbers of trips made associated with local retail and entertainment uses.

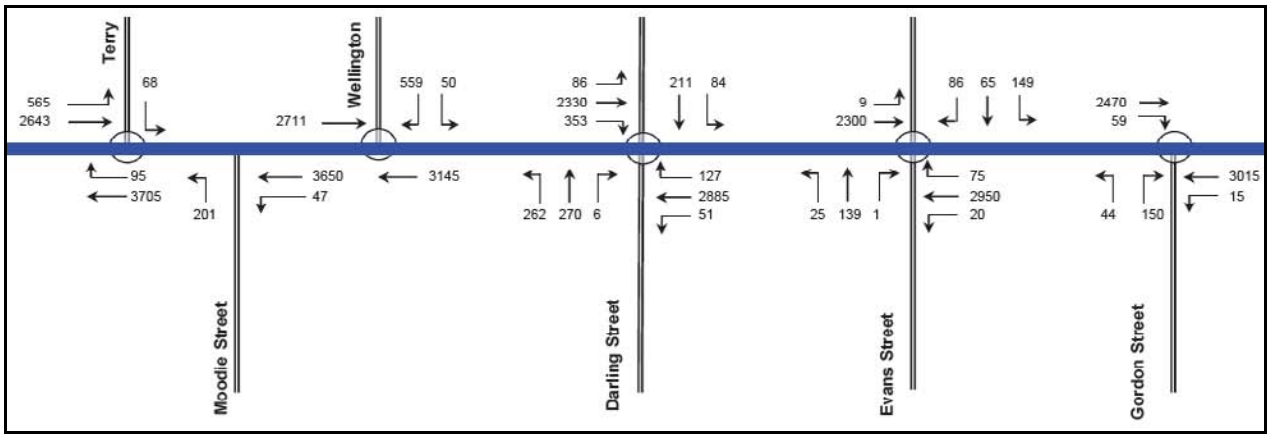
The AM and PM peak hour flows are illustrated in **Figure 2.7** and **Figure 2.8**.

Figure 2.7: AM Peak (8-9)Traffic Flows , Rozelle



Source: MWT, Victoria Road Upgrade EA March 2008

Figure 2.8: (5-6) PM Peak Traffic Flows, Rozelle



Source: MWT, Victoria Road Upgrade EA March 2008

2.8 Other

2.8.1 Adjacent developments

White Bay forms the major development site opportunity in the Balmain / Rozelle precinct. An estimated 30,000 jobs and 3,000 additional residents could be generated through development of mixed land uses in the location.

The Balmain Tigers Leagues Club is planning redevelopment of its current site on Victoria Road. The proposed mixed use development will include new club premises, a supermarket, a leisure centre a 6 storey residential tower and additional car parking.

The mixed use redevelopment of the Carrier site, bounded by Victoria Road and Terry Street, is proposed to include 15,000sqm of retail floor space and 11,500sqm of commercial floor space as well as a residential component.

Photograph 2.1: Rozelle Victoria Road inbound departure from Darling Street

Source AECOM, April 2009

2.8.2 Access

Victoria Road has only a few access driveways along this section through Rozelle. On the outbound direction between Withercombe Street and Wellington Street there are two driveways on the approach and three on the departure side of the Darling Street intersection with direct access to Victoria Road. On the inbound side there are no driveway with direct access on the approach side to the Darling Street intersection and only one on the outbound side.

Pedestrian access across Victoria Road is prohibited by the presence of a pedestrian fence along the median.

3.0 Proposed Work Method

The underground stations along the proposed CBD Metro route will be cavern stations with the exception of White Bay station, which will be constructed using cut and cover techniques

Cavern stations are planned at locations where there are depth or land use restrictions for construction of cut and cover stations. Caverns are required to be in competent ground conditions to ensure the large spans required for the stations can be supported.

Cavern stations will primarily be mined with surface structure elements such as entrance, emergency egress and ventilation shafts constructed using cut and cover techniques similar to typical building basement methods.

A primary worksite will be established at the surface to support all stages of cavern station construction and secondary worksites will be required to support shaft construction activities. The site constraints at the surface are considerable with impacts on pedestrian and vehicular traffic for four or more years at each station primary worksite and to a lesser extent at secondary worksites.

Station shafts will excavated using conventional excavation methods and the caverns will be excavated using roadheaders and rock breakers. It is envisaged that cavern excavation would be completed prior to the arrival of the Tunnel Boring Machines (TBMs) constructing the running tunnels. TBMs will be pulled through the station and prepared for the tunnel drive to the next station. A range of activities will be required at the primary worksite to support this process.

The main truck generating activity will be associated with spoil removal from the excavation of cavern stations, entrance, emergency egress and ventilation shafts, as discussed in Section 4. Other activities that will be supported by truck movements include:

- Enabling works will include building demolition works for property at primary worksites; temporary construction power supply installation; utilities/services relocation or diversion clear of the works and site establishment of station worksites;
- Ground support and lining works for station caverns with plant and material delivered to the underground cavern from the surface;
- Structural concrete works for station entrances, emergency egress and ventilation shafts, followed by internal building works and station architectural fit-out/finishes;
- Specialised installation works associated station platforms, concourses, accommodation and circulation areas, services and other amenities, station entry/exit gates, platform screen doors and barrier installation;
- Mechanical and electrical fitout of station services and communication systems (including local power supply, lighting, public address, plant room cooling/humidity control; building management systems, smoke exhaust, gas purging, water and waste water, mechanical ventilation, etc.);
- Underground pedestrian concourse areas are to be constructed by combination of mining methods (to minimise disturbance of the road surfaces); and
- Testing and commissioning station systems.

The indicative station construction staging and indicative construction timeframe for the construction activities are summarised in **Table 3.1**.

Table 3.1: Construction Staging Program

Construction Staging Activities	Indicative Station Construction Timeframe																							
	2010				2011				2012				2013				2014				2015			
Enabling & Site Establishment Works																								
Shaft & Cavern Excavation																								
Ground Support and Cavern Lining																								
Structural Concrete Works																								
Specialised Installation Works																								
Mechanical and Electrical Services																								
Underground Pedestrian Link Works																								
Systems Testing and Commissioning																								

Source: CBD Metro July 2009

4.0 Work Site Operation and Management

4.1 Worksite locations

Worksite locations for Rozelle Station are proposed, as follows:

- Northern Shaft and North-Western Shaft Worksites, (Sites RZ-A, RZ-B, and RZ-D), which will be the primary construction sites for the cavern excavation and which include the "Tigers" site on the south-western side of Victoria Road, and extending to the north-west corner of Darling Street.
- Further smaller sites are proposed at the Darling Street intersection, as follows:

  - North-Eastern Shaft, Site RZ-C(adjacent to St. Paul's Church site);and
  - South-Eastern Shaft, Site RZ-E(adjacent to St. Thomas's Church site).

Figure 4.1 shows the worksite locations.

The North-eastern worksite (Site RZ-C) boundary has changed since the preparation of the site plans illustrated in the preceding **Figure 4.1**, as illustrated in the following **Figure 4.2**.

4.2 Site access and egress

4.2.1 Truck access locations

Access is proposed via the Victoria Road frontages for:

4.2.1.1 Tigers site

Truck access is proposed via left turn entry from Victoria Road and exit via the traffic signal controlled intersection of Wellington Street, with trucks manoeuvring on site to exit in a forward direction.

- Inbound via Victoria Road (westbound) and left turn entry;
- Inbound via Victoria Road (city eastbound) and right turn directly into site at traffic signals, based on possible early introduction of access at Wellington Street signals and subject to peak hour restrictions and RTA tidal flow arrangements; and
- Outbound via a left turn and right turn to Victoria Road westbound at Wellington Street signals, based on early introduction of access at Wellington Street signals.
- Possible access to and from Waterloo Street within the commercial zone adjacent to Darling Street. It is noted that there is a left turn ban from Waterloo Street to Darling Street north for vehicles longer than 6m is in place at this recently signalised intersection. This restriction together with the swept path requirements for large vehicles will restrict this potential access to vehicles that can turn within a radius of ~ 10m.

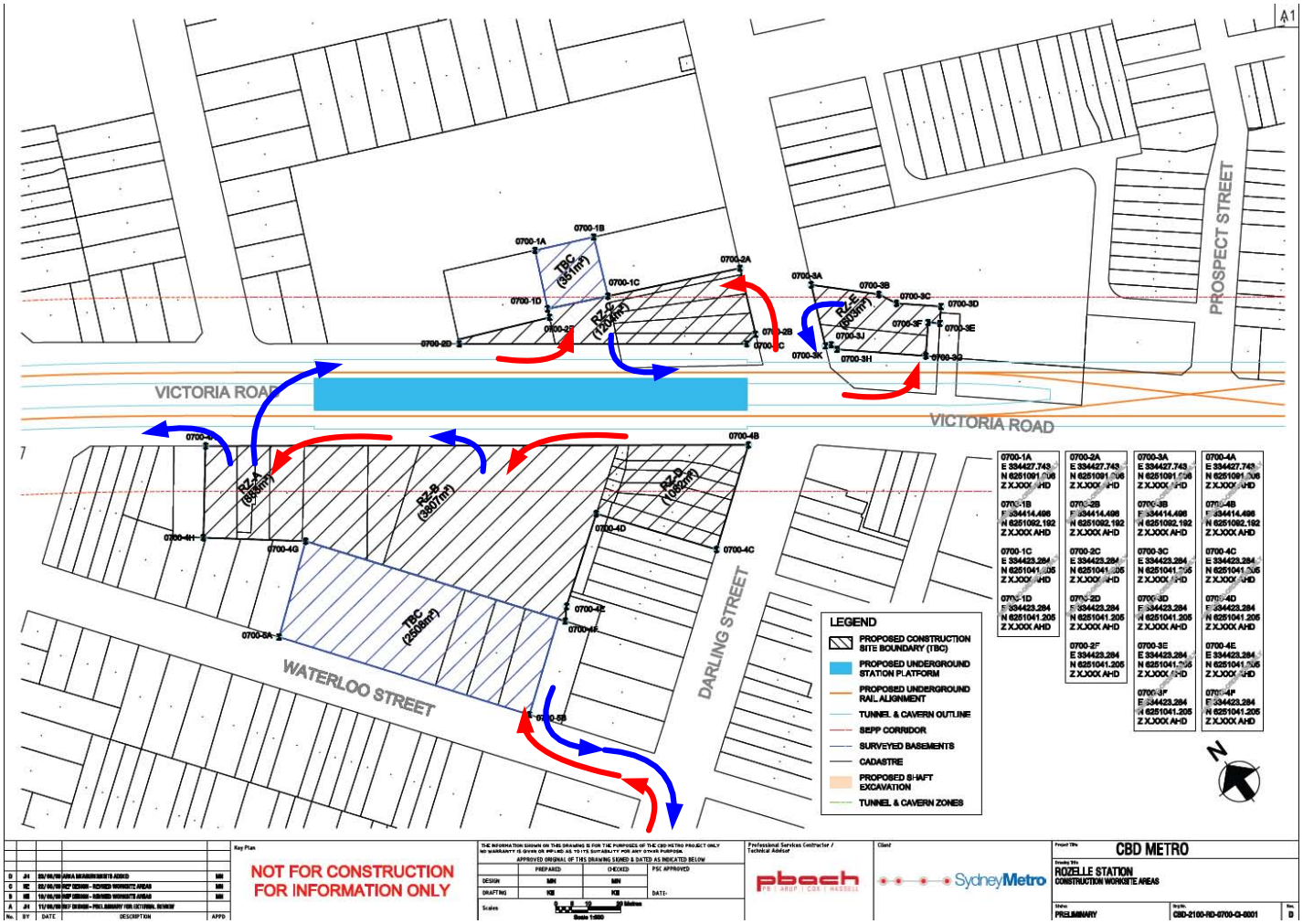
4.2.1.2 St Pauls site

Two access arrangements have been considered:

1) Victoria Road

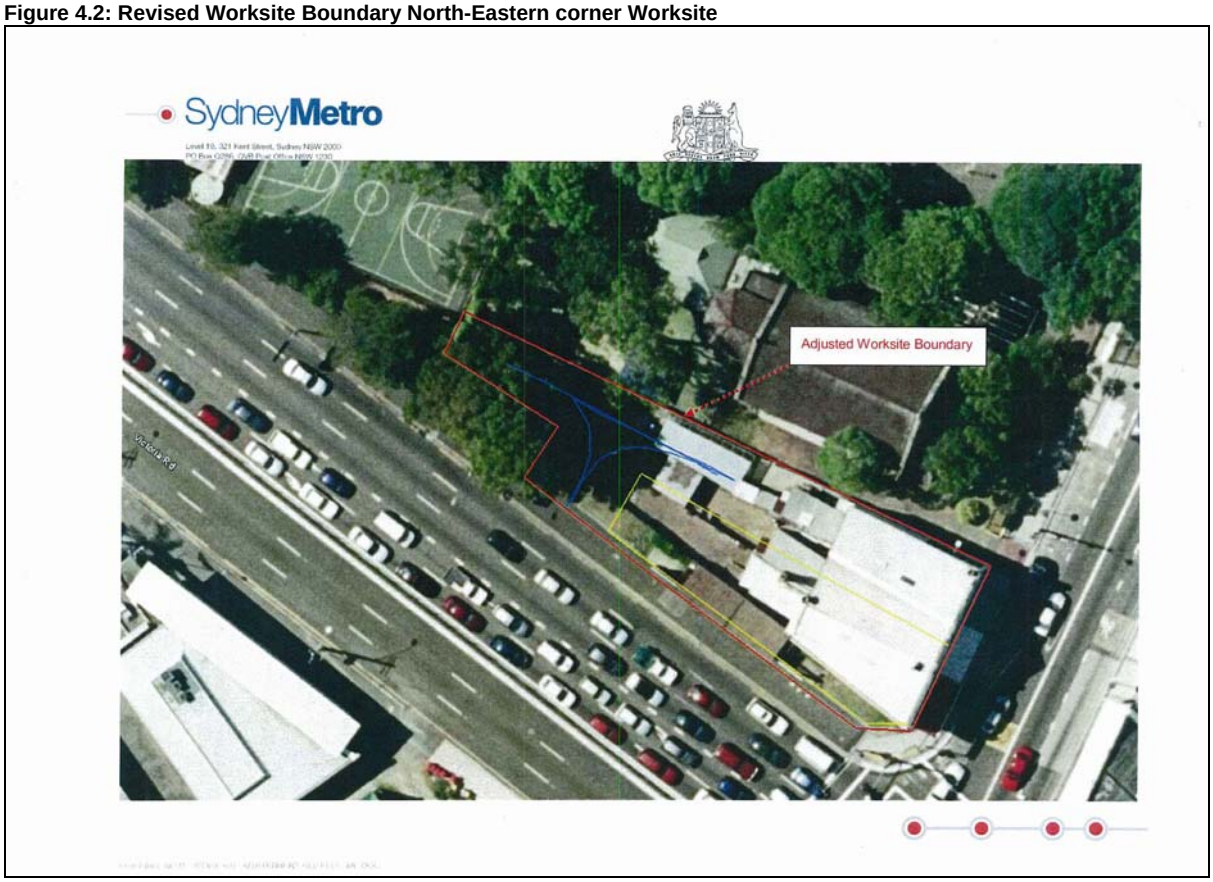
Truck access is proposed via left turn entry and exit from Victoria Road with trucks manoeuvring on site to exit in a forward direction, as described below:

Figure 4.1: Rozelle Station – Worksite Locations and Access Proposals



Source: Rozelle Construction Worksite Areas, PBACH (23/05/09) as supplied by Sydney Metro, 25/06/09.

Figure 4.2: Revised Worksite Boundary North-Eastern corner Worksite



Source: Rozelle Adjusted Worksite boundary for North-Eastern Worksite, (untitled, undated) as supplied by Sydney Metro, 22/06/09.

- Inbound via Victoria Road (city eastbound) and left turn only;
- Trucks approaching on Victoria Road westbound would be able to enter the 'Tigers' site, drive through and exit via a right turn at the Wellington Street signals , in order to approach the site eastbound on Victoria Road;
- Outbound via Victoria Road (eastbound) and left turn only; and
- In order for trucks to proceed to the west will require drivers to continue to White Bay turn right to the City West Link and continue to Parramatta Road.

2) Darling Street

Truck access is proposed via left turn entry from Darling Street to form a one way loop anticlockwise to allow entry and left turn exit onto Victoria Road in a forward direction. Once the access via the Wellington St signals becomes available alternate access options would also be available for the sites on the Northern side of Victoria Rd, as described below:

- Inbound via Victoria Road (eastbound towards the City) and left turn into Darling Street and left run entry;
- Trucks approaching on Victoria Road westbound would be able to enter the 'Tigers' site, drive through and exit via a right turn at the Wellington Street signals, in order to approach the site eastbound on Victoria Road. This access would facilitate truck movement between the worksite and White Bay, if spoil storage or truck marshalling is necessary at White Bay to reduce local impacts;
- Outbound via a right turn into Darling Street and then a left turn into the site
- Outbound via a left turn onto Victoria Road (eastbound towards the City);

- In order for trucks to proceed to the west will require drivers to continue to White Bay, turn right to the City West Link and Parramatta Road.

This routing system is preferred as it reduces the number of truck movements that will occur in the new Inner Western Busway.

Alternate access routes are available via the local side streets, between Darling Street and Victoria Road, e.g. on Wellington Street / Evans Street and Waterloo Street. However, these streets are generally narrow, with residential frontages and limited off street parking, which means that the majority of residents park on the street. The combination of residential frontages and narrow traffic lanes means these streets are not considered desirable access routes.

4.2.2 South-Eastern shaft site St Thomas's

Access to this site is proposed via left turn entry from Victoria Road a drive through the site and exit to Darling Street (southbound) under traffic control. Entry from Victoria Rd is proposed in order to avoid circulation on local roads such as Terry Street, Beattie Street to approach the site from Darling Street (north).

- Inbound via Victoria Road (eastbound towards the City) and entry via left turn only;

  Once the Tiger's St is established with the introduction of access opposite the Wellington St signals, trucks approaching on Victoria Road westbound would be able to enter the 'Tigers' site, drive through and exit via a right turn at the Wellington Street signals, in order to approach the site eastbound on Victoria Road. This access would facilitate truck movement between the worksite and White Bay, if spoil storage or truck marshalling is necessary at White Bay to reduce local impacts; and
- Outbound via left turn to Darling Street southbound, under traffic control.

  Trucks would then proceed via Darling St, Balmain Rd to the City West link to proceed west.

Alternate access routes are available via the local side streets, between Darling Street and Victoria Road, e.g. on Wellington Street / Evans Street and Waterloo Street. However, these streets are generally narrow, with residential frontages and limited off street parking, which means that the majority of residents park on the street. The combination of residential frontages and narrow traffic lanes means these streets are not considered desirable access routes.

As a result of the restriction in site access to left-in, left- out off Victoria Road, alternate approach and departure routes and turnaround areas have been identified to permit access to and from both eastbound and westbound travel directions on Victoria Road.

The site locations and access arrangements are diagrammatically illustrated in **Section 4.2.3**.

As a result of the restriction in site access to left–in, left- out off Victoria Road, alternate approach and departure routes and turnaround areas will be required to the west of Wellington Street to permit access to and from both eastbound and westbound travel directions on Victoria Road.

4.2.3 Standard spoil truck size

A 12.5m dual rear and single front axleaxle has been adopted as the maximum sized vehicle to access worksites for spoil removal. Given tight worksite spatial constraints, the manoeuvrability of the vehicle within the worksite is of primary importance. Articulated or truck and dog vehicle combinations are not ideal for use at most sites for spoil operations, given safety concerns with running these large vehicles on the city streets.

However larger trucks including articulated vehicles may be used at other stages of the contract for deliveries to the site and other non spoil removal activities. The actual truck size will be determined by the contractor and specified in the Construction Traffic Management Plans.

4.2.3 Truck manoeuvring requirements

It is assumed that concertina gates to control pedestrians crossing the site access driveways would operate in parallel with the outside edge of site boundary hoardings. The wider the driveway (and separation of the concertinas), the less the lane width required on the street from which the truck is either entering or departing in order to allow it to turn to or from the kerbside lane.
In order to assess this requirement, and Autrotrack turning path simulation has been undertaken was undertaken for a 12.5m truck. The worksite boundaries have been established having regard to this truck size.

4.2.4 Access for workers

Access for workers will be via the existing pedestrian footpath network or via a shuttle bus to the site. Provision of a shuttle bus service will be a matter for the PRI and IMO contractors to consider. The most likely sites for worker parking and an associated shuttle bus service is White Bay and possibly Barangaroo.

It is assumed that workers who do not use the shuttle bus, or if a shuttle bus is not provided, will arrive at the various sites by public transport. Given the high levels and accessibility of public transport to the CBD and that construction hours not coinciding with peak periods for office workers, the use of public transport is not anticipated to be an issue. The limited areas available for on site parking will generally preclude the provision of on site parking for the general workforce. However there may be limited parking required for operational purposes at each of the sites for the project engineer / foreman / inspectors etc which may account for one or two vehicle spaces.

Access to worksites for material and equipment required by tradespersons during IMO / fit out stage may be limited either by size constraints or other concurrent activities. Consideration will be given to storing materials and equipment remotely at either White Bay or possible Barangaroo and transferring them when needed.

4.2.5 Approach and departure routes for trucks

Identification of the primary routes for the main truck generation activity, i.e. spoil disposal has focussed on travel to and from the west. The majority of spoil disposal sites identified to date, are located to the west of the CBD Metro worksites, as discussed in Section 4.8, but the exact location will depend on the type of material being excavated and particulars of the disposal location in terms of material / quantities and operating hours.

However, this does not preclude alternate spoil disposal locations or changes in the method of transport being identified by the contractor. These would be detailed in the CTMP and site specific TMPs and TCPs for construction. Further, truck trips for other stages of the work, while significantly lower in number, may have more dispersed origins and destinations, dependant on the location of equipment and material suppliers. The location of potential suppliers is not identifiable, however there are suitable approach and departure routes available via the major arterial road network

Truck marshalling at White Bay is proposed to avoid bunching of truck movements on CBD streets and the Victoria Road corridor. In addition White Bay would provide materials storage/ warehousing and storage facilities for tradespersons during the IMO phase.

Site access for most worksites is proposed via left turn entry and exit to Victoria Road. The separate eastbound and westbound carriageways of Victoria Road will preclude right turn movements, i.e. require trucks to turn around to enter via left turn movements.

The Tigers site would have an alternative approach route, as shown in **Figure 4.3**, via the City West Link and Darling Street, entering the site via a left turn from Darling Street.

Figure 4.3 shows the truck approach and departure routes for the Rozelle worksites.

Alternate access routes to permit entry/exit from both travel directions on Victoria Road are available via the local side streets, between Darling Street and Victoria Road, e.g. on Wellington Street / Evans Street and Waterloo Street. However, these streets are generally narrow, with residential frontages and limited off street parking, which means that the majority of residents park on the street. The combination of residential frontages and narrow traffic lanes means these streets are not considered desirable access routes.

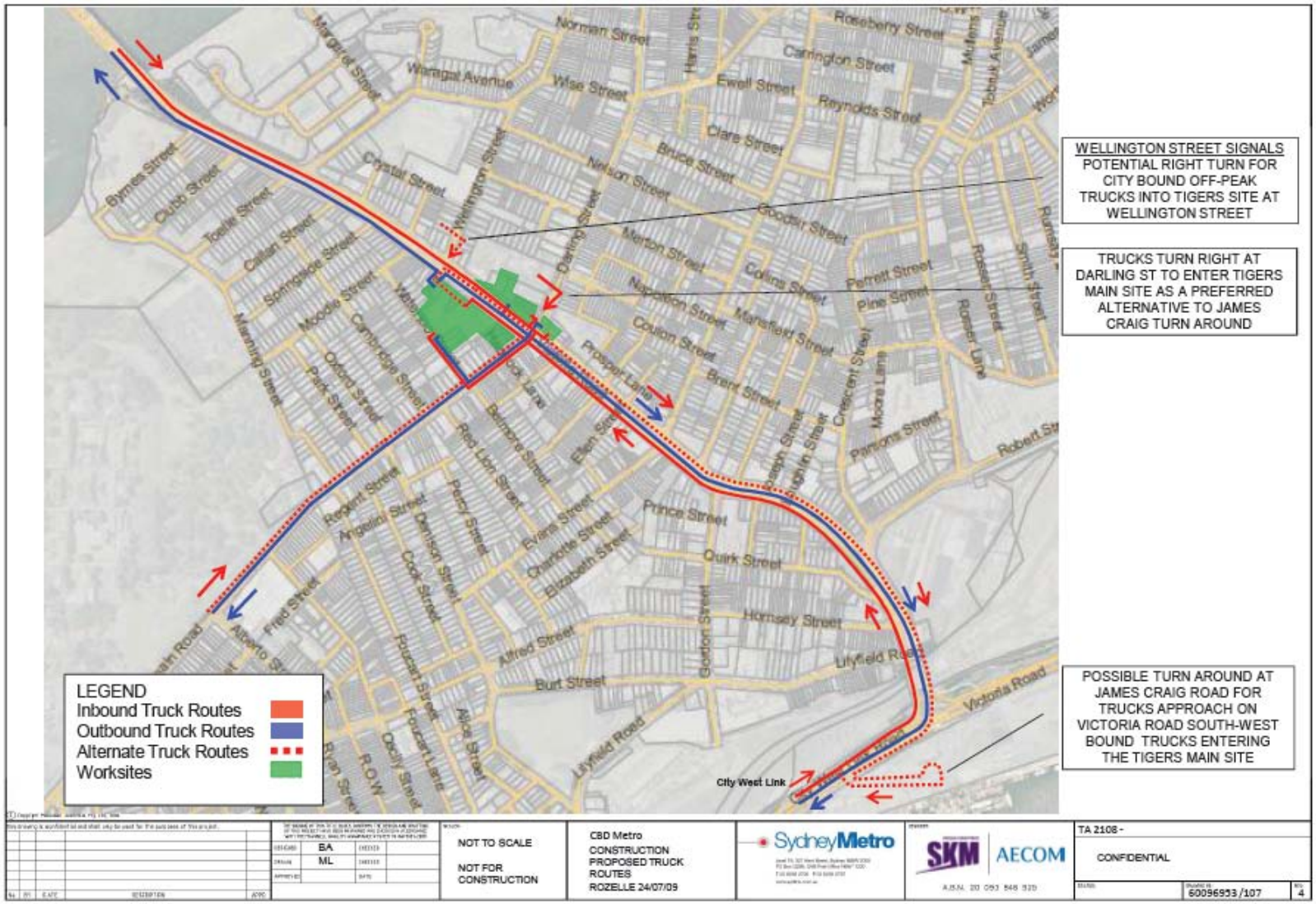
- Evans Street, which has residential frontages, which predominantly rely on on-street parking, and are relatively narrow and is unsuitable for truck traffic; and
- Roberts Road, could accommodate truck u-turning, east of the Mullens Street junction, however this may prove hazardous and the right turn exit to Victoria Road westbound is prohibited in peak hours, which would limit truck movement times. This route is therefore not recommended.

Alternate access routes to permit entry/exit from both travel directions on Victoria Road for sites adjacent to the southern side of Victoria Road (westbound carriageway) are available.

- Outbound trucks would turn left into Victoria Road westbound. Drivers wanting to proceed to the east would need the Wellington Street signals to proceed eastbound. Alternative local routes within Rozelle via:
  - Turning right to Terry Street / Beattie Street to Darling Street.
  - Turning left to Moodie Street / Waterloo Street and right onto Darling Street would provide access to City West Link, via Darling Street and Balmain Road.

- The preferred access arrangement for the Tiger's worksite is therefore to install the future signalised access opposite Wellington Street. However the availability of this access may be dependent upon the site requirements for the construction of the vent stack in this location.

Figure 4.3: Rozelle Truck Routes



4.2.6 Truck manoeuvring requirements

In order to assess truck manoeuvring requirement, AUTOTRACK turning path simulation was undertaken for a 12.5m truck size. Due to the site limitations and the location, this truck is the maximum size truck anticipated to use the St Thomas's and St Pauls sites. The Tigers site may be capable of accommodating a lager truck or truck and dog combination; however this would be subject to detailed consideration in the CTMP.

Truck manoeuvring requirements indicate that 10.0m to 15.0m wide driveways on Victoria Road will need to be provided to permit trucks to enter and exit the site. The exact width required is related to the width of the site access opening (and between pedestrian concertina gates); the wider the gate opening the less road width is required.

4.3 Management of site access

4.3.1 Site security

The Rozelle worksite(s) will be completely hoarded off to provide public safety and site security. The hoarding will be at the property boundary (existing building line) of the adjoining roads.

Truck access driveways to Victoria Road would generally remain closed, opening under traffic control / gates for the truck arrivals and exits. This will mitigate impacts on pedestrian movement on Victoria Road and crossing at the signals, in addition to the visual, dust and noise impacts of the work site(s).

4.3.2 Truck access

The worksite locations will require trucks to cross relatively busy footpaths, most particularly at the St Thomas's corner site, where the entry driveway is close to bus stops on Victoria Road and the exit is very close to the Darling Street signal approach. At peak times in the morning and afternoon peak periods, it is envisaged that trucks movements may be prevented or reduced to minimise potential conflicts between pedestrians and trucks. At other times, traffic controllers would manage access with concertina to stop pedestrian movement on the footpath and deter pedestrians from using the roadway.

Outside peak periods, truck drivers may be able to enter and exit observing normal requirements to give way to pedestrians when crossing footpaths. This would be supported by give way signage and line marking for exiting drivers to reinforce this requirement. Traffic controllers would be available to monitor the need for traffic control.

All trucks will enter the worksites, load spoil (or other material/ deliveries) and exit in a forward direction.

4.4 Management of pedestrians and cyclists at Victoria Road bus stop

The existing footpath width (3.6m) on the northern side of Victoria Road eastbound, east of Darling Street, provides limited space for the shared pedestrian and cycle path, bus shelter, signal controller and for pedestrian storage at the bus stop. Refer to **Photograph 4.1.**

Photograph 4.1: Victoria Rd eastbound, looking east at Darling St

Source AECOM, April 2009

The St Thomas worksite, with entry access approximately 20m east of Darling St, will require careful management of pedestrian / cycle / truck conflicts, which will affect the number of truck movements achievable and the permitted times for trucks to enter the worksite.

Existing pedestrian walkway widths will be maintained at all times, between the face of hoarding and kerb. The pedestrian walkway will be maintained without obstruction e.g. due to hoarding footings, posts and trip hazards.

Advance warning should be provided for cyclists of the potential need to stop at construction site access locations.

4.5 Hours for truck movements

Standard NSW construction hours are 7.00am to 6.00pm on weekdays and 8.00am to 1.00pm on Saturdays. While some of the construction work would be undertaken within these standard construction hours, the majority of the works would need to be undertaken on a 24 hour, seven day week basis. Some adjustment to these standard project work hours may be considered by CBD Metro for the Pyrmont worksites.

The proposed construction hours for the below-ground and above-ground activities are outlined below in **Table 4.1**. In exceptional cases of urgency it may be necessary to depart from these assumed hours. This would not take place without prior discussion with and/or notification of local residents and the Department of Environment and Climate Change.

Table 4.1: Expected hours of work

Activity	Construction Hours	Comment/expectations
Below-ground construction activities		
Tunnelling	24 hours per day, six days per week	▪ Some activities that support tunnelling and fitout works may need to occur 24 hours per day, seven days per week ▪ Rock hammering in the tunnel between 10.00pm and 7.00am is likely to be precluded where it may impact on residential receivers
Construction of station caverns	As above	
Above-ground construction activities		
Construction Sites	Standard DECC construction hours	The following activities would be undertaken 24 hours per day, six days per week where noise impact management measures have been established: ▪ Surface works supporting underground construction (e.g. concrete pumping, truck loading) ▪ Excavation in hard ground Non-disruptive preparatory work, repairs or maintenance may be carried out on Saturday afternoons or Sundays between 8am and 5pm. Activities requiring temporary possession of roads may need to be undertaken outside the assumed hours to minimise safety impacts and inconvenience to commuters. Similarly, works involving utilities would need to be undertaken during periods of low demand likely to be outside of standard hours.
Construction Traffic	24hours per day, 7 days per week	▪ Spoil trucking operations are likely to occur between 7am to 10pm, seven days per week. Spoil trucking from the White Bay worksite will take place 24hours per day, 7 days per week. ▪ At locations where sensitive noise receptors are close to construction sites, significant construction vehicle movements are likely to be restricted during evening and night-time periods. ▪ Extended periods of localised lane and road closures would likely be required for safety purposes for the demolition of multi-storey buildings.

Source: CBD Metro July 2009

4.6 Truck movements associated with spoil excavation

For the ongoing worst case period of spoil excavation, **Table 4.2** summarises the maximum number of truck movements per day, based on the average spoil production per day and removal by single unit dump trucks. These figures have been estimated based on the maximum daily production rates advised from TA2100 on 27/07/09, and may be subject to revision once a more detailed construction methodology and program is developed.

It should be noted that maximum daily production rates refer to the ability of equipment to produce spoil. The maximum daily production rates may not be achieved if shift times are shortened due to the program of this station not being on the critical path for TBM arrival. Not all worksites will be operating concurrently.

Table 4.2: Summary of Excavated Spoil Quantities and Associated Number of Trucks per day

Location / Activity	Excavation (m^3)	Average Production[1] (m^3 per day)	Trucks per day[2] (trips per hour)	Average Truck Movements[3] (trips per hour)	Maximum Truck Movements[4] (trips per hour)
St Paul's Church Site North- Eastern Entrance Shaft Cut and cover	Soft:1,070 Rock:12,770	193 68	78 28	6 2	24
St Thomas's Church Site South-Eastern Entrance Shaft Cut & cover Mined Tunnels	Soft:1,422 Rock:5,858 Rock:1,600	193 68 17	78 56 8	6 2 1	24
Tiger's Site North Western Entrance Shaft Cut & cover Mined tunnels Cavern & 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	6 4 1 9 7	24
Sub-Total-Soft:	5142	579	234	18	
Sub-Total-Rock:	133927	893	392	26	
Total	139,069	**NA**	**NA**	**NA**	**NA**

Source: Preliminary estimates of excavation , CBD Metro TA 2100, 27/07/09, based on spoil quantities as of 17/06/09. Preliminary estimates of truck movements per day and hourly truck movements, CBD Metro TA 2108 28/ 07/09, based on assumed average production rates (CBD Metro TA 210, 27/07/09) and daily truck movements.

Note:

1 Number of trucks per day estimated on the basis of $5m^3$ per single unit dump truck
2 Daily truck movements assume each truck generates one inbound and one outbound trip.
3 Average truck trips per hour based 15 hours per day operation on Victoria Road
4 Maximum truck trips per hour, based on the maximum throughput of one truck per 5 minutes and two trips per truck at each worksite.

The estimate of maximum truck trips provided in **Table 4.2** is based on the limited site area available for the Victoria Road south-eastern worksite, which will preclude more than one truck being able to access the site at any one time. The time taken for a truck to enter the site, be loaded from the stockpile and exit is estimated at about 5 minutes, yielding a physical limitation of the number of trucks per hour able to access the smaller worksites to 12 trucks, or 24 two way trips per hour. The northern sites are constrained to approximately 1-3 trucks on site at any one time.

4.6.1 Other activities generating truck movements

The estimated truck generation shown in **Table 4.2** is expected to be the period of maximum truck movements, however truck access will be also be required for demolition and IMO stages. Structural concrete and steel, plant and equipment, fittings and fixtures, escalators, and other engineering material will be required to be delivered to the site for construction and fit out of the site.

It is not possible to accurately determine the volume of truck movements that will access the site for the purpose of making deliveries, and it is likely that this will change over the course of the various stages of construction activity. However the deliveries are anticipated to generate lower numbers of truck movements than the peak movements associated with spoil removal.

4.7 Provision for over-dimensional vehicles

Procedures for over dimensional vehicles to access the site will be required. This may include low loaders transporting construction plant and equipment. The haulage contractor will be responsible for complying with RTA restrictions on access routes and travel times, together with obtaining any prior approvals.

4.8 Disposal locations and proposed haulage routes

Disposal locations for the excavated spoil have been identified as outlined in the Environmental Assessment. Generally the potential spoil disposal locations are in Western Sydney, however the exact locations will be dependent on the type of excavated material and specific sites at the time of construction. This aspect would be detailed in the Construction TMPs for individual sites.

4.9 Other temporary worksites

In addition to the main construction sites identified, other temporary worksites would be required from time to time, as part of the enabling works, PRI works, IMO works and/or other minor works packages.

The temporary worksites would be short in duration in comparison with the main CBD Metro construction sites. Duration for these worksites would range from less than 24 hours (for overnight delivery of oversized loads to site), to longer durations of up to 12 months (for worksites required for utility diversions, initial stages of building demolition works, and other staged areas to facilitate infrastructure construction).

The size, location and extent of temporary worksites have not been determined at this stage of the project; however the activities would likely be for work items such as:

- Delivery and lifting of large construction equipment, materials, and components of the works (e.g. escalators, lifts, steel or concrete beams/columns, etc) from within the road reserve, that cannot be undertaken from within the main construction sites due to space limitations;
- Removal and lifting of large construction equipment and material (eg TBM components at Belmore Park (Central Station), materials from demolition of existing building, etc) that cannot be undertaken from within the main construction sites due to space limitations;

- Pit and duct systems for 11kV construction power supply for all station sites, and 33kV supply at Pyrmont and Rozelle/Lilyfield;
- Other utility/services connections for construction purposes (e.g. water supply points, connections for telecommunications, etc);
- Construction and permanent depot access connections onto City West Link Road at Lilyfield;
- Pit and duct systems for bulk power supply routes at Central/Surry Hills and Rozelle/Lilyfield;
- Relocation or diversion of existing services/utilities clear of the main CBD Metro construction sites;
- Initial stages of building demolition works where there is no suitable vehicular access within the property boundary;
- Utility/services connections for the CBD Metro infrastructure in the vicinity of stations, and the stabling and maintenance depot (e.g., water supply, sewer, stormwater, power supply, telecommunications, data, etc);
- Other staged temporary areas to facilitate infrastructure construction works;
- Station precinct and stabling and maintenance depot urban domain and finalisation works external to the main worksite locations including minor adjustment/interface with roads; provision of bicycle ways, pedestrian areas and footpaths; hard and soft landscaping; relocation or adjustment to bus stops and taxi ranks; provision of bicycle storage facilities; wayfinding and signage; line marking; exterior lighting; and other urban domain treatment works.

Measures and management processes that would be implemented to minimise impact associated with temporary worksites would include items such as the following:

- Coordination of works to ensure concurrent worksites at any one location do not coincide (for example a water main diversion on one side of the road would not be undertaken at the same time as installing a telecommunications cable pathway on the opposite side of the road);
- Staging of the works to ensure extent of impact is minimised. For example 'rolling' worksites would be used for linear worksites required for utilities. Trenches for utilities within roads would be excavated, pipe work/ducts installed, and backfilled in short (easier to manage) sections along the length of the utility works wherever practicable;
- Alternative 'trenchless' construction methods including pipe jacking, auger boring, micro-tunnelling, pipe ramming, pilot tube, and horizontal directional drilling could be used where space and methods permitted reduces disturbance on the surface;
- Where works in roadways are required to cross through or are in proximity of intersections, or other constrained areas, night works and the use of road plates would be employed to ensure day-time traffic is not impacted;
- The construction contractors would be required to prepare Traffic Control Plans (TCPs) and road occupancy permits for each worksite for approval by the relevant authorities (e.g. RTA and/or Council) prior to the works commencing on site;
- Provision of suitable traffic control and warning devices as detailed in the TCPs such as traffic control personnel, signage, etc;
- Provision of suitable worksite fencing/barricades to ensure safety of the public and the workers. Where works are proposed in or adjacent to the road reserve, vehicular barricades would be used, otherwise chain wire/mesh type fencing would be used around worksites within footpath areas;
- Access and security of temporary worksites would be carefully managed at all times including when no activity is being undertaken within the sites;
- Minimising storage of materials and equipment within temporary worksites;
- Selection of noisy construction equipment and methods (such as jack picks, jack hammers, rockbreakers, concrete cutting, cranes, etc) would include consideration of proposed working hours, duration of works, and proximity of residential and other sensitive receivers;

- Use and management of suitable environmental controls such as cleaning of truck wheels, sweeping or pavements, control of excavated material to prevent mud tracking and dust, silt socks around stormwater inlets, etc;
- Maintaining and coordinating access to adjacent properties, and access for emergency services at all times;
- Undertaking appropriate community notification and liaison prior to and during the works.

4.9.1 Trenchless construction methods

Trenchless construction methods are an alternative to open trenching. There are different methods depending on the sites specific requirements. Trenchless methods use either steerable or non-steerable equipment. The steerable equipment can provide pipelines at accurate lines and grades, which is essential for certain applications such as gravity flow sewers. Each different method has its advantages and limitations and the selection of the appropriate method is crucial. The various trenchless methods available are pipe jacking, auger boring, micro-tunnelling, pipe ramming, pilot tube, and horizontal directional drilling. The particular trenchless techniques also vary depending on whether pressure conduits, gravity flow conduits, where and under what facility they are being installed, length of the installation, and the diameter.

5.0 Management of Impacts and Mitigation Measures

5.1 Primary construction impacts

Primary impacts of construction are envisaged to relate to:

- **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;
- Minor relocation of the inbound bus stop at Victoria Rd east of Darling St to pedestrian / cycle / vehicular conflict;
- Impacts on traffic and **pedestrians** on Darling Street, with trucks exiting the South-Eastern Site in proximity to the traffic signals;
- Potential impacts on the regular Saturday/ Sunday Market Days, church services and meetings , and schools which attract additional pedestrian movements in the vicinity of the worksites;
- Potential impacts on local side streets adjacent to the site have been minimised by avoiding truck movements on local streets adjacent to residential frontages.
- Limited site access for construction heavy vehicle access, with vehicle size limited to the single unit dump trucks;
- The early introduction of access to the Tigers Site opposite Wellington Street will improve site access by heavy vehicles to and from the east (White Bay);
- Delivery and/or removal of oversized loads may be restricted to night time hours, subject to normal RTA / EPA approvals; and
- Relocation or diversion of major services, which may impacts on footpaths and road crossings, affecting both the duration and extent of disruption.

5.2 Incidents and events

5.2.1 Incidents

Incident response and relevant responsibilities for managing incidents are outlined in the FTMP.

5.2.2 Emergency vehicle access

No change to access arrangements for emergency vehicles is envisaged.

5.2.3 Events

Unlike the CBD which is hosts several significant events, which affect visitor numbers on city streets, Rozelle is affected by community related activities associated with the market days, special days for Church services and school activities.

Potential issues are associated with construction activities affecting pedestrian footway capacity and bus access, together with noise and vibration sensitivities for these occasions. These potential impacts will need to be managed by the CBD Metro contractor (s) to avoid or mitigate impacts and in accordance with any RTA / Council approval conditions.

5.3 Pedestrian management

5.3.1 Site access management

Tigers site

Pedestrian movements on the southern outbound side of Victoria Rd, to the west of Darling St are low and likely to reduce as a result of the proposed worksite occupying the 'Tigers' site and adjacent businesses; and the absence of bus stops between Darling St and Wellington St.

In addition, the site area permits left turn entry and exit under signal control, once the access opposite Wellington St is established within the existing traffic signals.

Truck access into the site is expected to be prevented in the PM peak period (4.00-6.00pm), when traffic and buses on Victoria Rd (westbound) are heaviest and decelerating trucks may delay following buses and general traffic or pose a rear-end accident hazard.

Entry to the 'Tiger's' site is proposed to be permitted in the morning peak period, given the low existing pedestrian movements on this footpath and the lower westbound traffic flows on Victoria Road. Entry movements in the PM peak period may be feasible, providing it can be demonstrated that trucks decelerating to enter the site will not impact on outbound bus services, e.g. by providing a deceleration lane for site entry. For the current plan, it is conservatively assumed that truck access is prevented, however more detailed consideration as part of the CTMP may vary this restriction.

These factors are envisaged to limit the need for full-time traffic controllers and concertina gates to stop pedestrian movement on the footpath at site access locations. However, monitoring of the site access is desirable to ensure that conflicts between turning trucks and pedestrians can be safely managed, i.e. with trucks giving way to pedestrians on the footpath or when traffic controllers are required to stop pedestrians for trucks to enter or exit.

St Pauls site

Pedestrian movements on the northern side of Victoria Rd, to the west of Darling St are low given the absence of major attractors, such as shops etc at the street frontage and possibly the deterrent effect of the steep upgrade. There are limited pedestrian movements between the hotel at the Wellington St corner, and residences to the retail outlets on Darling St and bus stops on Victoria Rd to the east.

It is expected that truck movements will enter from Darling Street by turning left into the site. This will largely avoid conflicts with Victoria Road buses. Trucks will exit the site onto Victoria Road with a left turn movement.

There will still be a need for full-time traffic controllers and concertina pedestrian gates on Darling Street to stop pedestrian movement on the footpath at site access locations. However, monitoring of the site access is desirable to ensure that conflicts between turning trucks, cyclists and pedestrians are safely managed.

St Thomas's site

The St Thomas's worksite is close to the Victoria Road and Darling Street intersection. Trucks crossing the footpath will affect pedestrians walking to and from the inbound bus stop to the east of Darling St, cyclists on the shared pedestrian/cycle (foot) path and inbound buses stopping at the bus stop. The eastern crossing of Victoria Rd has the highest number of pedestrian crossings in peak hours. The signalised intersection tends to concentrate pedestrian flows, with pedestrians storing at the corner, while waiting to cross. The inbound bus stop may need to be relocated further away from the intersection to reduce pedestrian and construction vehicle impacts.

In the morning and afternoon peak periods, it is proposed to prevent truck movements, due to the level of potential pedestrian, cycle and bus conflict. While Victoria Road traffic flows and bus services display tidal flow characteristics, there are sufficient contra-peak direction flows to warrant limits on truck movement for this site. The Rozelle Markets operate on Saturday and attract increased pedestrian activity at the intersection

Traffic control of the footpath crossings, together with swing gates to prevent pedestrian and cycle movements at truck entry and exit times is proposed, at both the Victoria Rd and Darling St frontages. Increased supervision at other peak times, such as lunchtime and afternoon (school) peak periods, would be desirable. Traffic control of trucks exiting to Darling St is desirable due to the need for trucks to turn out across two southbound lanes and the short 10m distance to the stopline.

5.3.2 Impact on existing pedestrian network

Truck access driveways on Victoria Road would generally remain closed whilst there are no trucks entering or leaving the site. This will mitigate impacts on pedestrian movement at the signalised Darling Street intersection, in addition to the visual, dust and noise impacts of the work site(s).

The capacity of pedestrian pathways and in particular at the inbound bus stop location, to the east of Darling Street will be further constrained by the Inner Western Busway (IWB). This bus stop will need to be relocated further from the Darling Street intersection during construction to retain pedestrian amenity as proposed by the IWB. The effective capacity of the St Thomas's Victoria Road footpath will be affected by traffic control of the gate access to the St Thomas's construction site. This would also restrict access to the inbound bus stop during truck entry movements. Forecast truck movements for this site are expected to be a maximum of 12 entering trucks per hour or one every 5 minutes. Management strategies to reduce impact would be assessed as part of the CTMP.

5.3.3 Provision for pedestrians

Minimum footpath widths of 2.6m will be maintained on Victoria Road site frontages with traffic control at times of truck entry and exit movements. The pedestrian footways will be maintained without obstruction e.g. due to hoarding footings, posts and trip hazards. In addition, consideration of lighting conditions on existing footpaths for night-time security would be undertaken as part of CTMP.

Advisory signage for pedestrian and cyclists will be required prior to worksite access locations to warning of the potential need to stop. Pedestrian safety will be maintained by traffic controllers who will advise all pedestrians and assist vulnerable pedestrians by directing them to the appropriate path, and to guide visually impaired pedestrians around potential obstructions or conflict points.

5.4 Servicing

5.4.1 On-street servicing

There are no impacts on on-street servicing with the worksite frontages on Victoria Rd and Darling St currently subject to Clearway, No Stopping restrictions and T3 (inbound direction of Victoria Rd) restrictions. Two parking spaces are available outside peak hours on the western side of Darling St north of Victoria Rd and will remain.

5.4.2 Cash In transit

No impact on cash in transit operations is envisaged.

5.5 Cycle route and access

Cyclists currently using the shared footpath on Victoria Road will be impacted by the footpath closure during truck entry and exit movements. Advance warning signage of the potential need to stop and dismount should be provided well in advance of the worksites.

For cyclists travelling on-road in the kerbside lanes of Victoria Road, trucks turning left on entry to worksites may pose a hazard. Advance warning of the worksite location and potential for turning trucks will be provided by signage and detailed in CTMP and TCP. In addition truck drivers will receive advice on best practice on site access arrangements prevailing on each day.

At this stage it is not proposed to detour cyclists around the sites however this possibility will be reviewed in the CTMP's.

5.6 Bus routes and stops

No change to routes are proposed for construction, however it may be necessary to move the inbound Victoria Road Bus stop at St Thomas's further away from Darling Street so as to not require passengers to wait across the construction access driveway. Short duration footpath closures to permit truck access to worksites may delay bus patrons, notably on the St Thomas's corner of the Darling Street / Victoria Road intersection, however traffic controllers will be required to consider pedestrian, bus and construction traffic needs in their control practices.

There is the potential minor impact to travel time for inbound bus operation on Victoria Road, although reduced truck access during the on-road peak periods is proposed and truck turning left into the site will have minor impact. Outside peak periods, minor impacts created by trucks slowing to enter worksites and merging into the traffic stream on exit from the worksite are envisaged. The additional volume of vehicles access sites is minor (4-5 entering the St Thomas's site and 4-5 departing the St Pauls site onto Victoria Road and a similar number entering and departing Darling Street (east), relative to existing traffic flows, the exact impacts are being quantified through network modelling.

5.7 Coaches

No impact of existing conditions for coaches is proposed

5.8 Taxis

No change is proposed to the taxi ranks; the impacts to taxi operation are envisaged to be minimal and related to friction created by trucks slowing to enter worksites and merging into the traffic stream on exit from the worksite.

5.9 Kiss and Ride

No impact of existing conditions for kiss and ride is proposed.

5.10 Parking

Victoria Road currently provides for no on-street parking at the worksite frontages. The existing Tigers parking will also be removed as part of the construction site development.

5.11 Traffic

5.11.1 Vehicle speeds

No change to existing speed limits of 60 km/h are proposed in accordance with AS1742.3 2009. The need for changes to the existing speed zoning may occur with development of the detailed traffic control plans as part of the CTMP. Any change would be subject to the Road Occupancy Licence and Speed Zoning Authorisation approval procedures.

5.11.2 Road network changes

There are generally no network changes proposed in order to manage traffic at the Rozelle Metro Station worksites.

The existing intersection of Wellington Street / Victoria Road is proposed to be converted to a cross intersection early in the project. This will allow construction access into the site subject to the needs of the construction activities at the vent shaft. The introduction of a site access within the existing Wellington Street traffic signal site is not envisaged to impact on existing operations, with site traffic operating at the same time as traffic exiting Wellington Street, i.e. no new additional phasing or delays to Victoria Road traffic is proposed.

The proposed bus only lane and driveway entrances are required to be created at the site access and egress points, which may have limited very short term impact on Victoria road in off peak periods during construction.

5.11.3 Intersection operation

No changes to the existing intersection operation of Darling Street / Victoria Road is proposed, however a right turn out of the Tigers site is proposed that will operate in the same phase as the right turn out of Wellington Street. This will have no impact upon intersection performance.

5.11.4 Freight and commercial vehicles

For Victoria Road, there will be an impact to on-street loading arrangements with ‘No Stopping’ currently applying. For Darling Street, a loss of two part-time parking spaces on the western side of the street, north of Victoria Road, may occur due to the Tigers worksite on this corner.

5.11.5 Impact of construction traffic on frontage roads

The forecast truck movements relative to the existing flows on frontage roads are presented in the following **Table 5.1**.

Table 5.1: Summary of Increased Traffic on Frontage Roads due to Construction- Rozelle Station

Frontage Road	Existing Traffic Flows			Forecast Truck movements		
	Average Daily Flow	AM Peak Hour	PM Peak Hour	Average Daily Flow[1]	AM Peak Hour[2]	PM Peak Hour[2]
Victoria Road Eastbound [3 &4]	45,000					
-west of Darling St		3,040	2,680	243 in	21 in	21 in
Increase (%)				0.5%	0.7%	0.8%
- east of Darling St		3,035	2,700	39 out	3 out	3 out
Increase (%)				0.1%	0.1%	0.1%
Victoria Road Westbound [3 &4]	39,000					
- west of Darling St		1,840	3,145	161out	11out	11out
Increase (%)				0.4%	0.6%	0.3%
Darling Street [3 &4]						
-north of Victoria Rd	13,000	851	778	39 in 43 out 82	6 in 7 out 13	6 in 7 out 13
Increase (%)				0.6%	1.5%	1.7%
-south of Victoria Rd	16,500	910	1,153	161in 43 out 204	12 in 3 out 15	12 in 3 out 15
Increase (%)				1.2%	1.7%	1.3%

Note:

1 Daily truck movements assume each truck generates one inbound and one outbound trip. Average daily flow is the sum of the maximum number of truck movements by construction phase at the worksite, eg cut and cover, cavern excavation, entrance shaft ,mined tunnel, derived from Table 4.2

2 Average truck trips per hour, based on 15 hours per day for truck movements. Number of truck trips in peak hours estimated on the basis of average trucks per hour. In practice this rate may not be achieved in peak hours, due to pedestrian flows;

3 The total site flows for Victoria Rd represent the addition of all entering and exiting movement at the Victoria Rd frontage to the eastbound or westbound carriageways. In practice, the total approaching from the west of Darling St (82 trucks per day to the north and eastern sites and 161 trucks to the western 'Tigers' site on the eastbound carriageway) and exiting to the east (82 trucks per from the north and eastern sites and 161 trucks exiting westbound from the western 'Tigers' site), will affect differing sections of Victoria Rd;

4 Traffic flows for Victoria Rd west of Darling St and on Darling St south of Victoria Rd assume traffic approaching the 'Tigers' site from Victoria Rd eastbound will use the preferred route via a right turn to Darling St and enter from Waterloo St.

5.12 Project impacts and sensitivities

The construction timeframe for the CBD Metro project is planned with consistent rates of spoil removal, based on average daily and hourly throughputs. For the smaller work sites, such as the St Thomas's site, there is very limited site area available for spoil storage, (in the order of 1000m^3 capacity), so the efficiency of the site relies on the ability to remove spoil, ahead of the excavation capability/ storage capacity.

Any factor which causes an unplanned delay to the rate of spoil removal will have fairly immediate effects on the quantity stored on site and ultimately on the rate of progress of the work. There is limited opportunity to increase the rate of truck arrivals at the site to clear a backlog, due to the time required to enter, load and depart, which is estimated at 5 minutes or a maximum of 12 trucks per hour.

For this reason, contingency planning for night-time spoil removal will need to be considered, however the feasibility of this option in terms of the potential noise and vibration impacts has not been confirmed.

5.12.1 Cumulative impacts

Cumulative construction traffic impacts may occur where multiple construction projects utilise the same construction traffic routes at the same time. Cumulative impacts could include traffic congestion, particularly if truck movements occur during peak hour and if truck queuing occurs.

Victoria Road and The Crescent/City West Link are likely to be common local construction traffic routes for the White Bay construction site and CBD Metro Rozelle Station, the Balmain Tigers development, the Inner West Bus Project, the Terry Street development, the Baileys Marine project and the White Bay Cruise Passenger Terminal.

At a regional level, CBD Metro construction traffic routes in and out of the CBD include the Western Distributor, Cleveland Street and the Eastern Distributor. Given the proximity of other projects to the CBD Metro construction sites, many of these construction traffic routes are likely to be used simultaneously by other construction traffic vehicles.

The impact of partial street closures has been assessed. There is the potential for further impacts to city traffic if other road closures associated with other projects occur concurrently (e.g. partial or full temporary closure of Little Albion, Dalley and Underwood streets for the CityGrid project). Multiple road closures have the potential to cause confusion to drivers and result in congestion to traffic if sufficient detours or other alternative arrangements are not provided and planned effectively. Sufficient detail of the location and timing of any other road closures is not available for further assessment at this point in time.

6.0 TMP Compliance and Approvals

The TMP has been prepared having regards to the requirements of the Director General and Department of Planning for the Environmental Assessment for the project.

The plan considers the management of traffic at worksites as well as the effects on pedestrians and traffic movements resulting from construction or changed conditions at worksites. Further, the plan considers in depth the legislated requirements for the provision of a safe and effective local road network management throughout all stages of construction.

6.1 Compliance with Director General's Requirements

Details of the specific construction related tasks from the Directors General's requirements to support the environmental assessment are further outlined in **Table 6.1.**

Table 6.1: Director General's Environmental Assessment Requirements

Requirement	Condition Requirements	Reference
Key issues	**General Construction Impacts** – Consider the potential impacts associated with the construction of the project, and present a management framework for construction works to ensure that impacts are mitigated, monitored and managed. The EA must include consideration of, and a management framework for:	Framework Traffic Management Plan.
	• construction noise and vibration, including a considered approach to scheduling construction activities including transport, blasting and tonal or impulse noise generating works).	Noise Assessment (by others) Construction Plan (by others)
	• 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 will 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 project, or through a separate overarching mechanism beyond the direct scope of the project)	This Rozelle Station-Traffic Management Plan. Construction Plan (by others) - Table 7.2 - Section 3 - N/A - Section 5

Requirement	Condition Requirements	Reference
	The EA 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. • Spoil management • Water Impacts	Framework Traffic Management Plan. This Rozelle Station-Traffic Management Plan. Construction Plan (by others) Framework Traffic Management Plan Construction TMP (by others)
Consultation	The EA must reflect an appropriate and justified level of consultation with relevant parties during the preparation of the EA, including: • local, State or Commonwealth government authorities and service providers such as the Roads and Traffic Authority, RailCorp, State Transit Authority, the Ministry of Transport, the Department of Environment and Climate Change, the Department of Water and Energy, NSW Maritime, Sydney Ports, Barangaroo Delivery Authority, Sydney Harbour Foreshore Authority, Leichhardt Council, and City of Sydney Council; • The public, including specialist interest groups and affected landowners. • The EA must describe the consultation process, document all community consultation undertaken to date and identify the issues raised (including where these have been addressed in the EA).	Framework Traffic Management Plan This Rozelle Station-Traffic Management Plan.

Appendix A Kerbside Changes

Table 6: Rozelle Station

Station	Worksite	Location	Existing Kerb Use	Proposed Changes to Kerbside Parking restrictions	Loss of Loading / Parking and duration		Mitigation Strategy
					Enabling	Construction	
Rozelle	**North-eastern site** RZ-C	Darling Street, west side north of Victoria Rd. RZ-1	Time restricted parking during business hours	On-street parking spaces (2) during business hours replaced with No Stopping for site access	2 spaces On-street parking removed. Duration of works	2 spaces On-street parking removed. Duration of works	Nil Demand diminished by worksite occupying existing retail premises.
	South-eastern worksite **RZ-E**	Victoria Rd north side east of Darling St	No affect on Parking No Stopping	Existing bus zone may be relocated 10m easterly to reduce conflict with site access	No loss of parking	No loss of parking	Nil
	North--Western **RZ-A** **RZ-B** **RZ-D** **RZ-F**	Victoria Rd north side east of Darling St	No affect on parking No Stopping/ Clearway	Indented bus bays introduced on Victoria Rd – no parking currently permitted.	No loss of parking	No loss of parking	Nil

Figure 6.1: Existing kerbside parking allocation

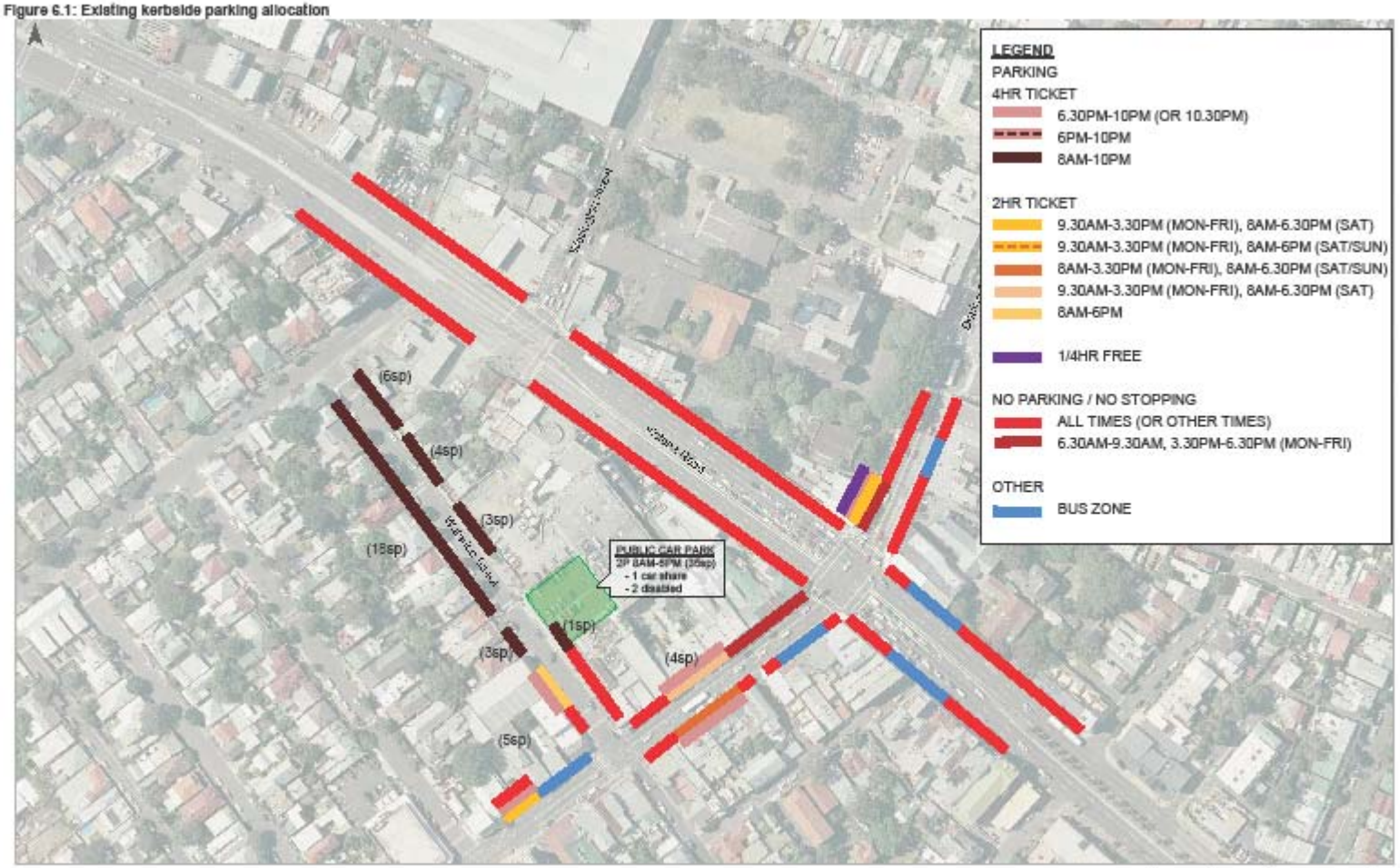


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Figure 6.2: Proposed worksites and changes to kerbside parking allocation