Rozelle Village

Transport and Accessibility Management Plan

17 February 2012

Prepared for

Pacific Investments Pty Ltd

Halcrow

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This report has been issued and amended as follows:

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Contents

1 Introduction

This Transport Management and Accessibility Plan (TMAP) has been prepared by Halcrow on behalf of Pacific Investments Pty Ltd to provide information on the traffic and transport effects of the proposed Rozelle Village development on the site of the former Balmain Leagues Club and adjoining sites on Victoria Road, Rozelle.

In particular this TMAP report has been prepared to address the traffic and transport related requirements of the Director General's Requirements (DGRs) for the project as set out in the DGRs dated 5th April 2011.

The DGRs set out specific traffic modelling requirements for this study including the use of micro simulation modelling to assess the implications of the proposed development (and other future developments) on bus operations along Victoria Road.

A Paramics Micro-simulation traffic model was developed as part of the TMAP process to help understand the effects of the proposed development.

Previously the proposed development site was the subject of an extensive rezoning and Development Control Plan (DCP) process. In September 2009 a development application was lodged with Leichhardt Council in for the redevelopment of the site for a mixed use site include residential, retail and commercial uses. This process included extensive traffic analysis on behalf of the Balmain Tigers site applicant and Council.

The current proposed development for the Rozelle Village site takes into consideration the previous planning guidelines for the site.

Similarly the traffic and transport assessment presented in this TMAP draws on the previous traffic investigations and updates the assessments to include the operational characteristics of the recently opening Inner West Busway along Victoria Road past the site.

This report presents the findings of the traffic and transport assessment in the following sections:

- Section 2 – provides an overview of the Rozelle Village development proposal with regard to traffic and transport;
- Section 3 - provides a description of the proposed development within the strategic context of regional planning policies;
- Section 4 – provides a summary of the traffic modelling methodology used in the assessment of the Rozelle Village development proposal to address the DGRs;
- Section 5 – describes the existing traffic and transport conditions surrounding the proposed Rozelle Village development site;
- Section 6 – assesses the traffic and transport implications of the development proposal and provides recommendations as to infrastructure improvements and management measures required to address identified impacts; and
- Section 7 - provides the TMAP conclusions.

2 Overview of the Proposal

2.1 Site Location

The Rozelle Village site is situated in Rozelle within the Leichardt Local Government Area. The site comprises the majority of the city block bounded by Victoria Road, Moodie Street, Waterloo Street and Darling Road (see Figure 1).

The site encompasses the Balmain Rugby Leagues Club (Club) and its associated car parking areas. The Club building is currently vacant as a result of the Club relocating to Five Dock in 2010 to accommodate the then proposed Sydney Metro station.

The site's main road frontage is to Victoria Road. Victoria Road is one of Sydney's busiest transport corridors, carrying in the order of 75,000 vehicles per day and around 200,000 bus passengers travelling on it each week. During a typical weekday morning peak, up to 170 buses carry more than 8,000 passengers between Gladesville Bridge and The Crescent, Rozelle.

The area has local shopping strip along Darling Street while Waterloo Street and Moodie Street are mostly residential.

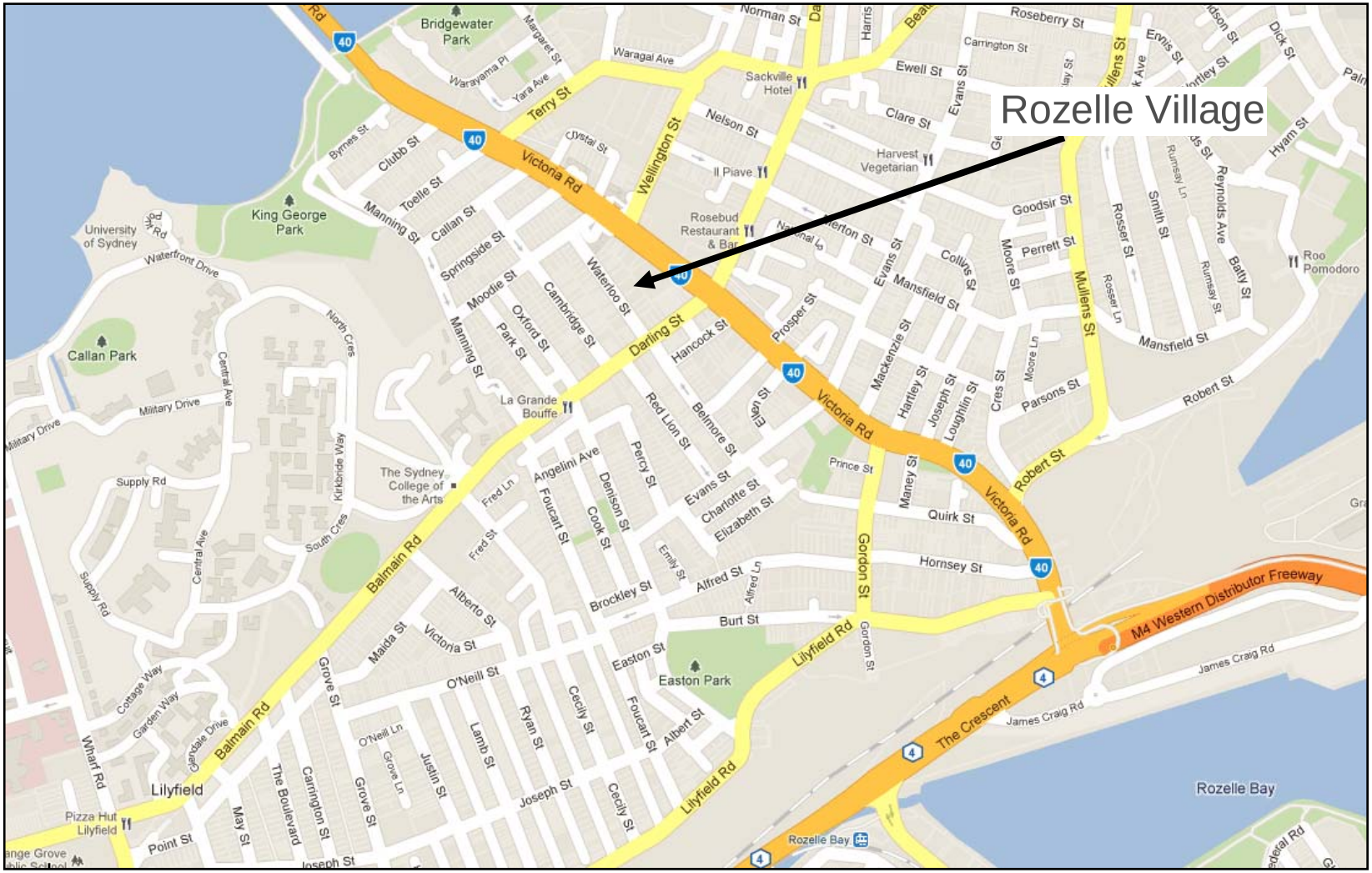
2.2 Development Proposal Land Uses

The Rozelle Village development proposal is a mixed use redevelopment of the former Balmain Tigers Leagues Club in Rozelle.

The proposed land used mix included in the Pararmic modelling assessment is as following:

- Residential = 304 apartments
- Retail (8,324m2 GFA)
    - including a supermarket, major and specialty shops
- Restaurants (4,160m2 GFA)

Figure 1 – Site Location



Source: maps.google.com.au

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- Commercial (1,696m2 GFA)
- Gymnasium (3,676m2 GFA)
- Club (2,400m2 GFA)
- Professional Medical Consulting Rooms (730m2 GFA)
- Child Care Centre (80 children)
- Community Centre (367m2 GFA)
- Basement Car Park (total = 834 car spaces)
    - Residential = 290 car spaces
    - Non-Residential = 544 car spaces
- Basement loading / service vehicle area

The proposed site access and car parking layout is shown in Appendix A.

2.3 Vehicle Access Arrangements

Two vehicle access points are proposed for the Rozelle Village development site. The main vehicle access will be located on Victoria Road and a secondary residents only access at Waterloo Street.

Essentially the Victoria Road access will provide access to all public car parking spaces (544 car spaces) for the development's non residential land uses such as the retail areas, gym, commercial etc and the site's loading dock facility.

This proposed vehicle access arrangement is consistent with the vehicle access objectives for the site set out in the *Leichardt Development Control Plan – Part D1.0 Site Specific Controls, Balmain Leagues Club Precinct* (2008).

The proposed Victoria Road entrance is modelled as a new (forth) approach to the Wellington / Victoria Road signalised intersection. The proposed new approach will have one left and one right turn lane from the car park while a central lane will be reserved for vehicles from the loading dock only.

The Waterloo Street access will be accessed by resident vehicles only and service residential parking spaces (290 car spaces). The Waterloo Street access is proposed as a priority controlled vehicle driveway. The indicative intersection layouts are presented in Figure 2.

2.4 Previous Transport and Traffic Planning for the Site

2.4.1 Background

The original rezoning application for the Balmain Leagues Club redevelopment was accompanied by a transport report prepared by Consultant SKM. A Paramics microsimulation traffic model was prepared by that consultant to examine traffic impacts.

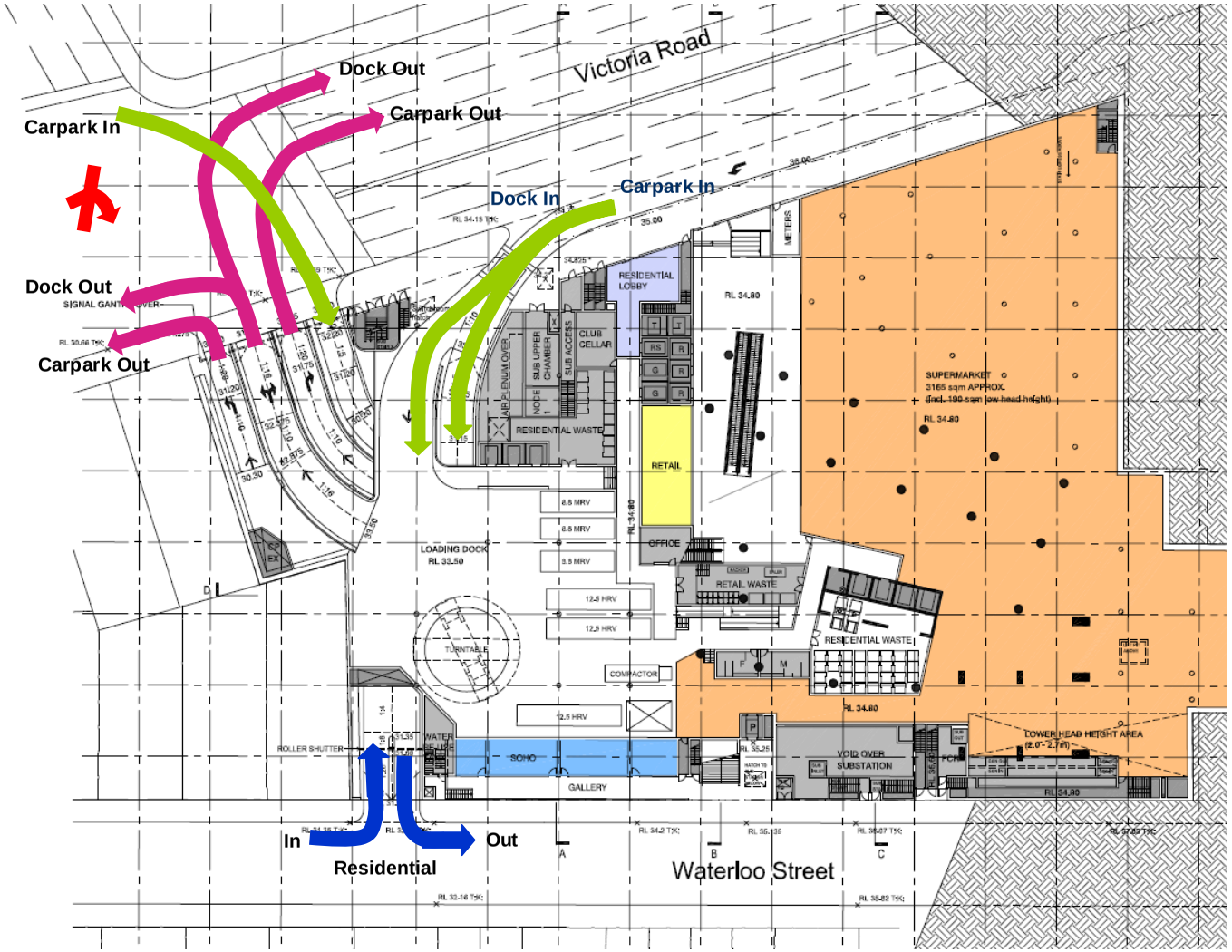
Because an application to rezone the former Carrier air-conditioning site was current at the same time as the Balmain Leagues Club was before Leichhardt Council, Council commissioned consultant Arup Pty Ltd to advise on collective traffic implications of the two proposals.

After conducting a preliminary investigation, Arup concluded a more definitive study which formed the basis of Council's adoption of a Local Environmental Plan amendment and a DCP for the site. Details of this investigation are provided below.

2.4.2 The Arup Traffic Investigations

The Arup investigation involved the preparation of a detailed microsimulation traffic model of the road network serving the two sites. It included in particular Victoria Road, Darling Street and other streets surrounding the two sites. This work was largely funded by the Balmain Leagues Club and was the subject of considerable scrutiny by both SKM and Masson Wilson Twiney (now Halcrow) that was at the time working on the Carrier Site project. The work was also presented to the RTA (now RMS), representatives of which attended meetings with all parties.

Figure 2 – Modelled Site Access Arrangements



In the end the Arup model and study found that the Rozelle road network would operate satisfactorily if the traffic generation of 65% of that initially proposed for the two developments was to occur.

The initial levels of development (before the recommended reductions) are shown in Table 2-1.

Table 2-1 - Initial Levels of Development

	Balmain Leagues Club	**Terry Street Precinct Sites (Carrier Site)**
Retail Floor Area	10,785m^2	10,703m^2
Commercial Floor Area	1,620m^2	13,771m^2
Bulky Goods Retail		5,484m^2
Club Floor Area	4,250m^2	
Residential Floor Area	18,561m^2	40,120m^2
Total	35,216m^2	70,078m^2

The critical time for both sites was found to be on a Thursday evening as this would be the time for peak overlaps of site traffic generation and commuter traffic on Victoria Road and Darling Street.

Saturday midday periods would not be as critical as there would only be low activity in the Club and commercial components. The Club would not be open and there would be low retail activity during weekday morning peak periods (see further discussion below).

The initially tested traffic generation totals for each site were as follows:

- Balmain Leagues Club – 486 vehicles / peak hour
- Terry Street Precinct – 888 vehicles / peak hour

1,374 vehicles / peak hour

Thus the Arup study determined that the surrounding road network would operate satisfactorily with a combined sites traffic generation of 893 vehicles per peak hour.

Notwithstanding the Arup traffic analysis, Leichhardt Council received separate advice on retail needs for the area and on the basis of this determined that only one new full line supermarket was desirable in the area. It nominated the Balmain Leagues Club site as the preferred location for this. In the absence of a full line supermarket, the shopping centre scheme as promoted by Multiplex for the Carrier Site was not deemed to be viable.

Leichhardt Council is now exploring alternative less traffic intensive options for the development of the Terry Street precinct. This is reflected in the recent rezoning submissions for the Carrier Site (see Section 6.1 of this report).

Without a shopping centre it is highly unlikely that development on the Terry Street Precinct would reach the 65% (of the original estimate) traffic budget suggested by Arup for the precinct.

2.4.3 Traffic Effects of Development

The Arup analysis assumed that the following traffic management changes would take place in the vicinity of the subject site in order to expedite traffic flow:

- signalised intersection at Darling Street/Waterloo Street [This has already been provided]
- parking restrictions on Darling Street in the southbound direction from Victoria Road to Red Lion Street (currently restrictions are from Victoria Road to Belmore Street) [During peak traffic periods]
- deceleration lane into Tigers site from Victoria Road westbound
- relocation of the southbound bus stop on Darling Street from between Victoria Road and Belmore Street to between Belmore Road and Red Lion Street

These measures have been considered as part of the current development proposal for the Rozelle Village site as described further in this report.

The Arup traffic modelling reached the following conclusions in relation to the operation of the local road network when loaded with traffic consistent with the 65% development scenario.

- travel times on key travel paths through the area would be maintained to within 10% of existing travel times

- evening peak hour traffic volumes on Waterloo Street and in Moodie Street would increase to about 328km/hr and 240veh/hr at the southern and northern end of Waterloo Street respectively and to 360veh/hr on Moodie Street

- these volumes would at two locations be above the desirable traffic limit for good residential amenity of 300 veh/hr but well below the environmental limit of 500 veh/hr.

As is appropriate for most major developments, the report advises that monitoring to detect possible increases in short cutting movements between Darling Street south and Victoria Road west be undertaken after the development was complete. This would allow an appropriate response to this to be developed.

2.4.4 Leichhardt DCP Response to Traffic Generation Budget

The *Leichhardt DCP* specified site specific development objectives and controls for the Balmain Leagues Club site. *Clause D1.11 Traffic Management* specifies that the traffic objective is:

> *"To ensure traffic generated by the development is within environmental limits and is well managed throughout the local network".*

A specified control is that:

> *"The final mix of development must ensure that traffic does not significantly impact the road network in the area."*

Generally these measures can be achieved by:

- adhering to the traffic generation budget specified by Arup in its report, and

- adhering to the split of entering and exiting traffic between Victoria Road and Waterloo Street specified in Table 10.1 of the DCP.

Table 10.1 of the DCP specifies that all service access be off Victoria Road and that retail and commercial traffic exit only to Victoria Road. This control is complied with in the DA plan.

Although the DCP does not specifically refer to the Arup report, the report and the extensive consultation behind it do set the benchmark for an acceptable traffic generation limit for the site. As indicated above, this equates to 893 vehicle trips per peak hour from a combined Rozelle Village and Carrier Site development.

The traffic management measures incorporated in the Traffic Management Plan for the site are designed to achieve this limit. These include:

- location of the development within a major public transport corridor;
- provision of land use mixes that will allow multipurpose visits;
- limitations on car parking (as required by the DCP);
- provision of a shopper home delivery service; and
- provision of a community bus.

3 Strategic Context

3.1 State Government Plans

A number of regional strategic planning policies have relevance to the proposed development. These have been identified in the DGR's and their relevance to the Rozelle Village development proposal is considered below.

3.1.1 NSW State Plan

The NSW State Plan 2010 defines the NSW Government's long term plan to deliver the best possible services to the people of NSW and sets targets and measurement tools for service improvements.

It is intended to set a framework for linking the various other NSW Government plans and policies, including the Metropolitan Transport Plan and the Metropolitan Strategy.

Transport-relevant goals include:

- Improved public transport system usage and reliability
- Improved road network
- Improved Road safety
- Increase walking and cycle as a mode of travel

Beneath these goals are a number of transport-relevant priorities with associated targets.

The priorities are:

- Increase the share of commute trips made by public transport
- Increase the proportion of total journeys to work by public transport in the Sydney Metropolitan Regions to 28% by 2016.
- Safer roads
- Cleaner air and progress on greenhouse gas reduction
- Jobs closer to home

- Improve the efficiency of the road network

The Rozelle Village development site will place jobs, residents, facilities and services in close proximity to good public transport services. Furthermore the implementation of constrained on site parking provision and promotion of non private vehicle modes discourage the reliance on private vehicle travel in line with the State Plan's transport policies.

3.1.2 Metropolitan Plan for Sydney

In December 2010, the NSW Government released its Metropolitan Plan for Sydney 2036. This document supercedes the Metropolitan Strategy for Sydney to 2031.

This Metropolitan Plan draws on the strengths and principles of 2005's Metropolitan Strategy - City of Cities: A Plan for Sydney's Future, and the Metropolitan Transport Plan 2010: Connecting the City of Cities. It incorporates public feedback on the Metropolitan Transport Plan and the first five-yearly review of the Metropolitan Strategy to form a single, integrated Metropolitan Plan for Sydney 2036.

The Metropolitan Plan's transport vision for Sydney includes:

- radial public transport links feeding into each city
- cross regional transport connections, linking more subregions to the Global Economic Corridor; and
- a developing network of transport connections serving a range of different trips and strategic centres that support economic activity across more locations

3.1.3 Metropolitan Transport Plan

The Metropolitan Transport Plan was released in February 2010 and provided a 25 year vision for the linking of Sydney's land use planning with its transport network. The plan included a 10 year funding guarantee for essential transport infrastructure and services.

The Metropolitan Transport Plan has been integrated into the Metropolitan Plan to ensure the city's sustainable growth and seeks to help make Sydney a more connected, sustainable city as the population grows over the next 25 years.

The Metropolitan Plan, integrated with the Metropolitan Transport Plan, outlined the government's commits to the delivery of transport solutions that match Sydney's population and employment needs, and supports economic growth.

The plan aims to encourage public transport usage wherever possible.

The Metropolitan Transport Plan includes:

- Start of work on the North West rail link from Epping to Rouse Hill.
- Expansion of the current light rail system with an extension from Lilyfield to Dulwich Hill.
- Improvement to bus services – including new strategic bus corridors.
- Western Express City Rail Service – a separate dedicated rail track to slash travelling times from Western Sydney to the city.
- New trains (additional rail carriages).
- Cycleways.
- Commuter car parks.
- Ferries.
- Motorway planning, transit corridor reservations and land acquisition.
- Freight network improvement works in Sydney.

3.1.4 Draft Inner West Subregional Strategy

The draft Inner West Subregional Strategy sets the following objectives:

- Addressing network wide issues
- Managing traffic congestion
- Increasing public transport capacity and use
- Managing travel demand
- Improving local and regional public transport connections
- Managing freight movements

It is noted that draft Inner West Subregional Strategy identified the duplication of the Iron Cove Bridge and bus priority measures along Victoria Road as key element in addressing the strategy's objectives. The implementation of these measures has been undertaken.

It is noted that the RMS is currently investigating additional traffic and bus priority measures along Victoria Road including the introduction of weekday and weekend clearway parking restrictions along both side of Victoria Road between The Crescent and Iron Cove Bridge.

3.1.5 NSW Bike Plan, NSW Government, 2010

The NSW Bike Plan builds on the Metropolitan Transport Plan's $158 million commitment to cycling infrastructure.

The NSW Bike Plan will encourage more bike-riding by:

- creating connecting cycling networks;
- making bike-riding safe for all;
- planning cycling-friendly;
- neighbourhoods;
- growing jobs in cycling; and
- getting organisations working together to support bike-riding.

With regard to Rozelle Village, the NSW Bike Plan documents the recently constructed bike way over the new Iron Cove Bridge and the proposed local connections to be constructed to link this new piece of cycling infrastructure to the broader network (see Section 5.4).

3.1.6 Planning Guidelines for Walking and Cycling, NSW Department of Infrastructure, Planning and Natural Resources, Roads and Traffic Authority, 2004

These guidelines aim to assist land-use planners and related professionals to improve consideration of walking and cycling in their work. It is anticipated that improving practice in planning for walking and cycling will create more opportunities for people to live in places with easy walking and cycling access to urban services and public transport. This will help reduce car use and create healthier neighbourhoods and cities.

This planning at a local level, and to some degree regional level, has been undertaken and incorporated into the NSW Bike Plan and the Leichhardt Bicycle Strategy. This strategy was considered as part of the traffic and transport assessment of the Rozelle Village development proposal.

The integration of on site cycle facilities with the local bicycle network will be considered as part of the Travel Plan to be prepared for the development as discussed in Section 6 of this TMAP report.

With regard to walking the Rozelle Village development proposal will provide pedestrian links through the site and along each of the site's road frontages.

3.1.7 Integrating Land Use and Transport Policy Package, Department of Urban Affairs and Planning, Transport NSW, 2001.

In September 2001, the State Government released the Integrating Land Use and Transport (ILUT) Planning Policy Package. The package provides a framework for State Government agencies, councils and developers to integrate land use and transport planning at the local and regional level.

More specifically, it aims to:

- improve access to housing, jobs and services by walking, cycling and public transport
- increase the choice of available transport and reduce reliance on cars
- encourage people to travel shorter distances and make fewer trips
- support the viable operation of public transport services
- provide for the efficient movement of freight.

It is noted that the major centres mentioned in the ILUT package are now superseded by the strategic centres identified in the Government's Metropolitan Strategy. Reference to the Metropolitan Strategy is provided in this report.

Notwithstanding the above, the principles of managing transport demand and providing transport choices have been considered as part of the Rozelle Village development

proposal. Compliance with the transport controls set out in the Leichhardt DCP and the implementation of a Travel Plan will embody the principles set out in the ILUT policy.

3.2 Local Planning Context

3.2.1 Leichhardt Development Control Plan (DCP Amendment No. 15 Balmain Leagues Club Precinct, June 2008)

As discussed in Section 2.4 of this report, previous transport planning studies have guided the formulation of the site specific planning controls for the Rozelle Village site contained in the *Leichhardt DCP – Part D1.0 – Balmain Leagues Club*.

Relevant transport planning objectives include:

- **D1.10 Access and Management** – Configure parking areas and entrances so that the focus of heavy vehicle movements is Victoria Road, and that traffic impacts on neighbouring residential streets is contained.

- **D1.11 Traffic Management** – To ensure traffic generated by the development is within environmental limits and is well managed throughout the network.

- **D1.12 Parking –** To provide parking on site that reflects the site's proximity to public transport and promote choice in available transport modes and reduce dependency on cars.

Each of these objectives and the associated controls have been considered and incorporated into the Rozelle Village development proposal.

It is noted that with regard to site access, the DCP allows for Club, retail and commercial uses to enter the site via Waterloo Street. To reduce the potential implications to Waterloo Street, the proposal will only provide access to the site for these uses via Victoria Road.

3.3 Comment on Strategic Context

Many of the underlying themes of the plans and strategies have relevance to the proposed Rozelle Village development site. Current State policies provide a good framework to support local strategies to improve the level of accessibility and sustainable transport.

A list of objectives has been developed for the assessment of the proposed Rozelle Village development proposal which aim to support the State and local transport strategies.

3.3.1 Objectives

The objectives for achieving sustainable travel for the development proposal would include:

- Reduce the rate of growth of car based trips;
- Support and improve sustainable transport facilities for future residents and visitors with access to public transport, walking and cycling facilities; and
- At the same time ensure that appropriate provisions are made for car parking and for traffic travelling to and from the centre to minimise the impacts to surrounding residents.

3.3.2 Considerations

The Rozelle Village development site has a number of advantages in relation to the achievement of above objectives, namely:

- Close proximity to bus services providing good walkable access to public transport;

- Introduction of a car parking policy which provides on site parking at less than the standard RTA requirements thereby providing a constrained car parking provision;

- Development of a mixed use site located on regional transport networks has the potential to capture existing travel demand from the local area thereby reducing the length of trips travelled and potentially achieving a mode shift given the location of services and facilities within walking distance of its primary catchment.

4 Traffic Modelling Methodology

4.1 Director General's Requirements

The Director's General Requirements (DGRs) for this project have specified the need to undertake traffic modelling taking into account coordinated traffic signals with a key measure relating to the performance of bus travel times along Victoria.

Discussions were undertaken with the RTA (now RMS) regarding the type of model appropriate for use in the assessment of the Rozelle Village development proposal. These discussions concluded that the Paramics model was appropriate for the assessment in order to address the DGRs.

4.2 Overview of Modelling Methodology

This section of the TMAP provides an overview of the methodology used in the development of the traffic model used in the assessment of the Rozelle Village development proposal.

A detailed description of the modelling methodology used in the assessment is provided in Appendix B which includes the following reports:

- Working Paper No. 1 - Traffic Modelling Methodology Statement (19 September 2011)
- Working Paper No.2 - Network Build (31 October 2011)
- Working Paper No. 3 – Calibration Report (18 January 2012)
- Working Paper No. 4 – Paramics Modelling Results Report (10 February 2012)

4.2.1 Selection of Assessment Model

As noted above, the DGRs require traffic modelling to be undertaken of the proposed development taking into account, amongst other things, co-ordinated traffic signals.

A number of micro-simulation models have been developed recently for Victoria Road in the vicinity of the Rozelle Village site.

These models include:

- Inner West Bus Corridor (Victoria Road)- Paramics (Scat-Sim) – RTA model prepared by Halcrow
- Carrier Site (Terry Street) - Paramics – prepared by Halcrow
- Rozelle Village development – Paramics S – Leichhardt Council model repared by Arup
- Rozelle Village development – Paramics Q – Arup model convert to Q by Halcrow.

Of the models, only the RTA's model includes the busway and is SCAT SIM coded (ie. modeling of co-ordinated traffic signals).

Consultation with the then RTA (now RMS) was undertaken and permission provided to use the RTA's SCAT SIM model with the inner west bus way.

The traffic model used in the assessment of the Rozelle Village development is based on the RTA's Inner West Busway model with a cut at Iron Cove Bridge but with extensions east along Darling Street and inclusion of the Streets between Darling Street and Moodie Street. The extent of the traffic model is shown in Figure 3 and Figure 4.

4.2.2 Base Model (No Development)

Three base scenario's have been be built to cover the critical time periods to the development. These periods are:

- The Thursday morning (AM peak) with coincidence of commuter, residential and gym traffic;
- The Thursday evening (PM peak) with coincidence of commuter, residential and shopping traffic; and
- The Saturday Midday peak during the midday shopping peak.

Figure 3 – Modelled Network Area

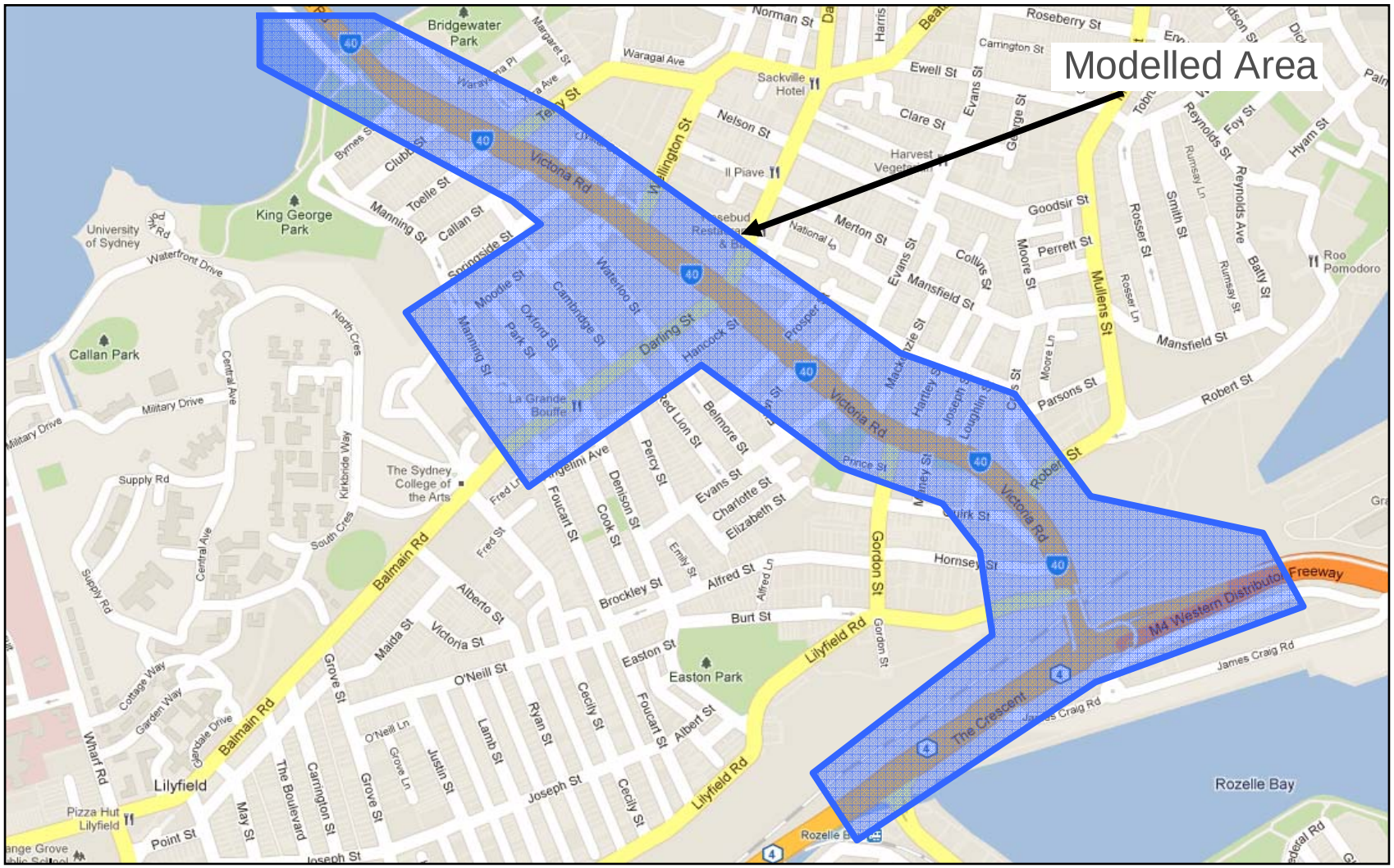


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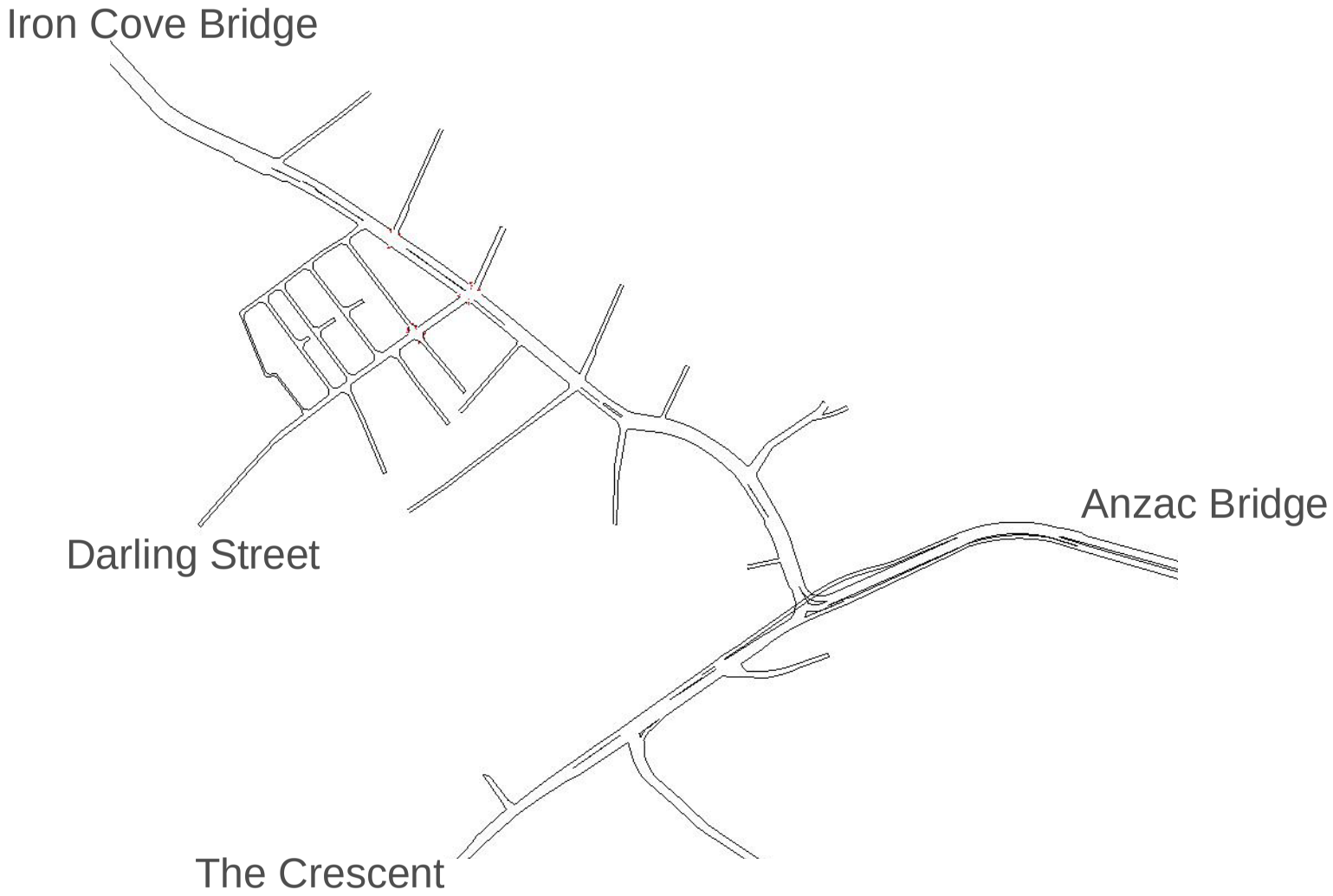
Figure 4 - Paramics Model Network Extents



The models will have 1 hour warm-up period to load traffic onto the network, followed by a two hour calibration period where the model will be calibrated to traffic volumes and a 1 hour cool down post peak period.

The modelled periods will be:

- Thursday AM Peak (6-10am)
- Thursday PM Peak (3-7pm)
- Saturday Midday Peak (10 – 2pm)

Data collection was undertaken in order to update the base models to existing traffic conditions, namely post opening of the Iron Cove Bridge duplication and the operation of the Inner West bus way along Victoria Road.

The following data was incorporated into the base model:

- Traffic counts
- Pedestrian counts
- Bus travel time surveys
- Signal timing
- Site inventory – parking controls, bus stop locations etc
- On site observations

Table 4-1 provides a summary of the data collection times.

Table 4-1 Model Data

Data	Source	Date
Traffic Counts	Roar Data	8 September 2011
		10 September 2011
		15 September 2011
		17 September 2011
Travel Time Surveys (Buses)	AusTraffic	8 September 2011
		10 September 2011
Travel Time Surveys (Cars)	Halcrow	15 September 2011
		17 September 2011
SCATS History	RTA	8 September 2011
		10 September 2011

The location of traffic and pedestrian counts correspond with the key intersections indentified in the DGRs to be examined. The locations of the counts are shown in Figure 5.

4.2.3 Estimation of Traffic Generation

An estimate of traffic generated by the proposed development (and other developments) for each of the three peak periods has been used in modelling exercise.

Traffic generation was estimated using RTA guidelines, comparable site traffic generation and first principles and is based on the proposed land use, floor space and number of car parking spaces to be provided in the final plan.

Further details of traffic generation estimates are provided in Section 6 of this TMAP.

Trip distribution (where people are going to and coming from) was estimated and vehicle trips assigned to the network.

4.2.4 Scenario Testing

The additional traffic generated by the proposed development was overlaid on the base model to test the effects of the development on the surrounding road network for each peak period.

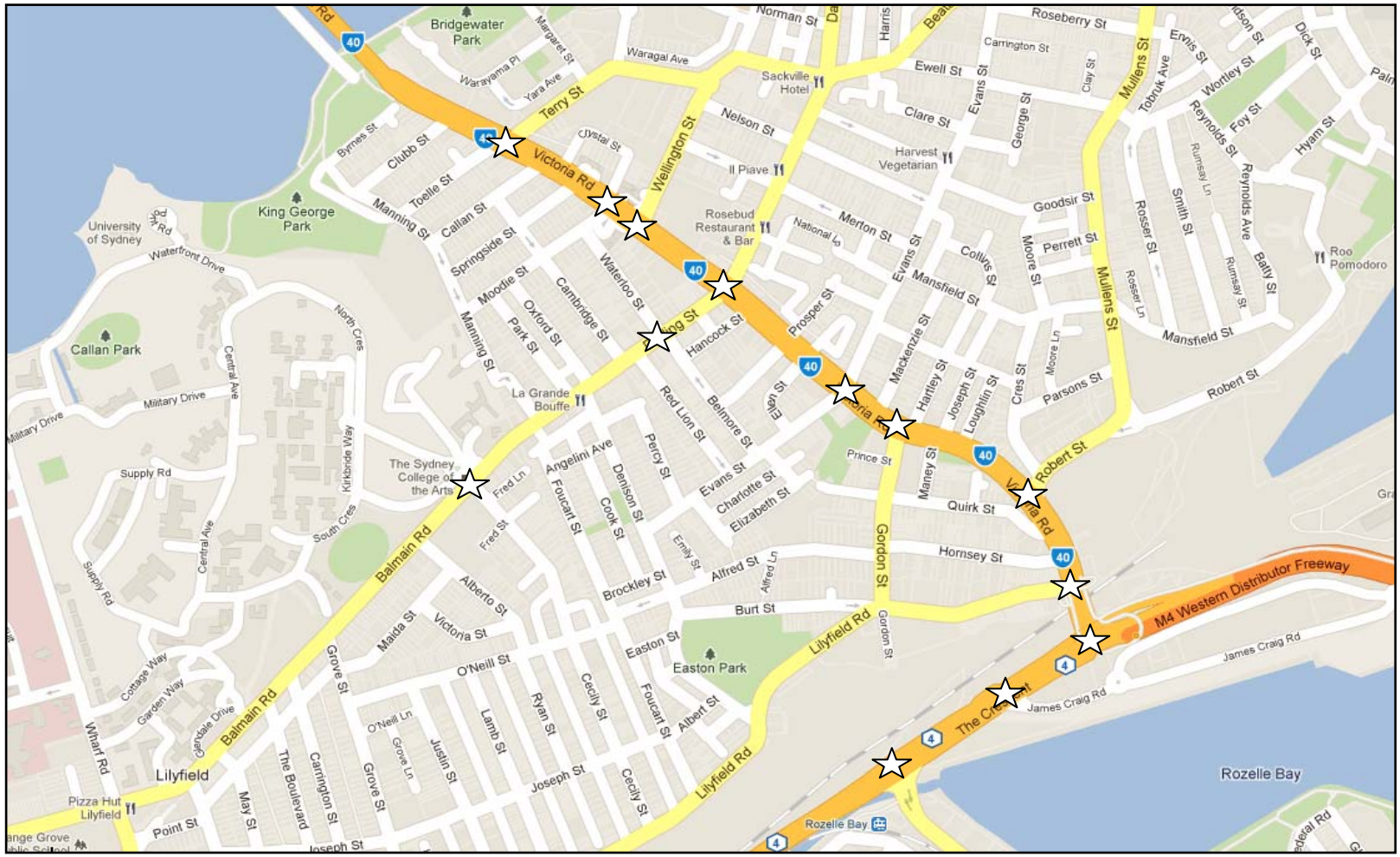
A summary of the modelled scenarios is provided in Table 4-2.

Table 4-2 Modelling Scenarios

	Base Case	**With Development** [1.]
Thursday AM Peak	7am – 9am	7am – 9am
Thursday Peak	4pm-6pm	4pm-6pm
Saturday Midday	11am-1pm	11am-1pm

Note: 1. "With Development" includes consideration of other developments including Carrier Site and White Bay.

Figure 5 – Traffic and Pedestrian Count Locations



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5 Existing Transport Conditions

5.1 Previous Site Use and Transport Operations

The Balmain Leagues Club has about 6,700m^2 of floor space including a 500 seat capacity auditorium. In addition the development site includes three retail properties with about 800m^2 of floor space.

A survey of the traffic generated by the Club's car park (as presented in Arup's report Rozelle Transport Study – Tigers and Multiplex Scenario Modelling dated March 2008) found that it generates about 88 vehicle trips per hour during a Thursday evening peak period. This survey was undertaken prior to the Club's relocation to Five Dock.

The Club also has a 35 space car park on Waterloo Road that is managed by Leichhardt Council as a public car park. This was surveyed to generate 55 vehicle movements per hour during a Thursday evening peak period.

The existing development on the site has numerous driveways on Waterloo Street and Victoria Road as follows:

- Waterloo Street
  - council managed car park – separate in and out driveways at each end of the site
  - side by side entry and exit driveways at the southern end of the Club car park
  - exit driveway at the northern end of the Club car park.

- Victoria Road
  - entry driveway towards the northern end of the site
  - separate entry and exit driveways serving the separate building used as a dance studio midway along the club's frontage
  - two side by side exit driveways serving different levels of the car park at the northern end of the site.

The Club has a multi-storey car park that was built in the 1960's and falls well below contemporary standards. In total the present Club has about 200 parking spaces.

5.2 Road Network Operating Conditions

5.2.1 General Road Network Operation

Victoria Road is a major Sydney Arterial road that connects Parramatta to the City via the ANZAC Bridge carrying in the order of 75,000 vehicles per day. It is also a major trunk bus route between the city and the north west.

Based on published RTA data the Annual Average Daily Traffic (AADT) for Victoria Road at Iron Cove, traffic flows have been experiencing general decline as shown in Table 5-1. Between 1999 and 2008 traffic has dropped by some 14% in total or 1.5% per annum.

Table 5-1 Victoria Road AADT at Iron Cove Bridge

Year	Citybound AADT	Outbound AADT	Total AADT
1999	45875	39675	85550
2000	45110	39113	84223
2001	43099	38468	81567
2002	43889	38146	82035
2003	43008	37985	80993
2004	42439	36870	79309
2005	41375	36770	78145
2006	40771	35815	76586
2007	-	-	73895
2008	-	-	73931

The reduction in daily flows could be attributed to a number of factors including:

- Congestion has lead to some traffic diverting to other routes or to alternate modes such as buses;
- Construction of alternate routes has made Victoria Road less attractive (ie. City West Link & M4 motorway); and
- Land use changes in the corridor.

In 2010 the inner-west bus way was opened and provides a peak hour bus lane along Victoria Road from the Gladesville Bridge to The Crescent and has tidal flow arrangements at Darling Street. Victoria Road has a posted 60km/h speed limit.

Darling Street is a collector road that feeds traffic to and from the Balmain peninsula and Rozelle. The intersection with Darling Street is a critical intersection to traffic flow on Victoria Road.

City West Link is a major arterial that links traffic to the Crescent and then Victoria Road or ANZAC Bridge. The intersection between the Crescent and Victoria Road features a grade separated eastbound through movement ("the mouse hole") and tidal flow lane arrangement from Victoria Road that allows 1 right turn lane in the morning peak and two right turn lanes in the evening peak.

Due to congestion on Victoria Road there are known "alternative" routes that use local roads to avoid queues on Victoria Road.

Site observations were undertaken such the extent of existing road network congestion could be quantified and incorporated in the traffic modelling via the calibration process. The site observations indicate the following key points with regard to traffic congestion.

AM Peak

The indicative queuing is indicated in Figure 6.

- Am Peak Tidal flow is in operation with bus lane
- Bus lane was moving relatively freely.
- Slow moving traffic City Bound.

Figure 6 – Existing Weekday AM Peak Congestion

- Congestion outbound from Drummoyne sometimes extended beyond the Iron Cove Bridge.

PM Peak

The key queues are noted in Figure 7.

- Traffic was moving relatively freely compared with the AM peak.
- The right turn citybound on Victoria Road to Darling Street at times extended beyond the Wellington Street.
- Long queue turning right outbound into Robert Street.

Saturday Peak

The Saturday peak showed significant queues citybound from Darling Street (Figure 8) The section of road between Wellington Street and Darling Street City bound allows parking on Saturdays which restricts the through traffic to two lanes. The congestion was observed beyond the Iron Cove Bridge.

5.2.2 Surveyed Traffic Flows

Table 5-2 provides a summary of the traffic survey results on the key roads for each of the peak periods.

The surveyed traffic flows have been used in the development of the base case Paramics models. The existing (base case) road network operating conditions (level of service), general and bus travel times and changes to traffic flows are reported with and compared to the proposed development scenarios in Section 6 of this report.

Figure 7 – Existing Weekday PM Peak Congestion

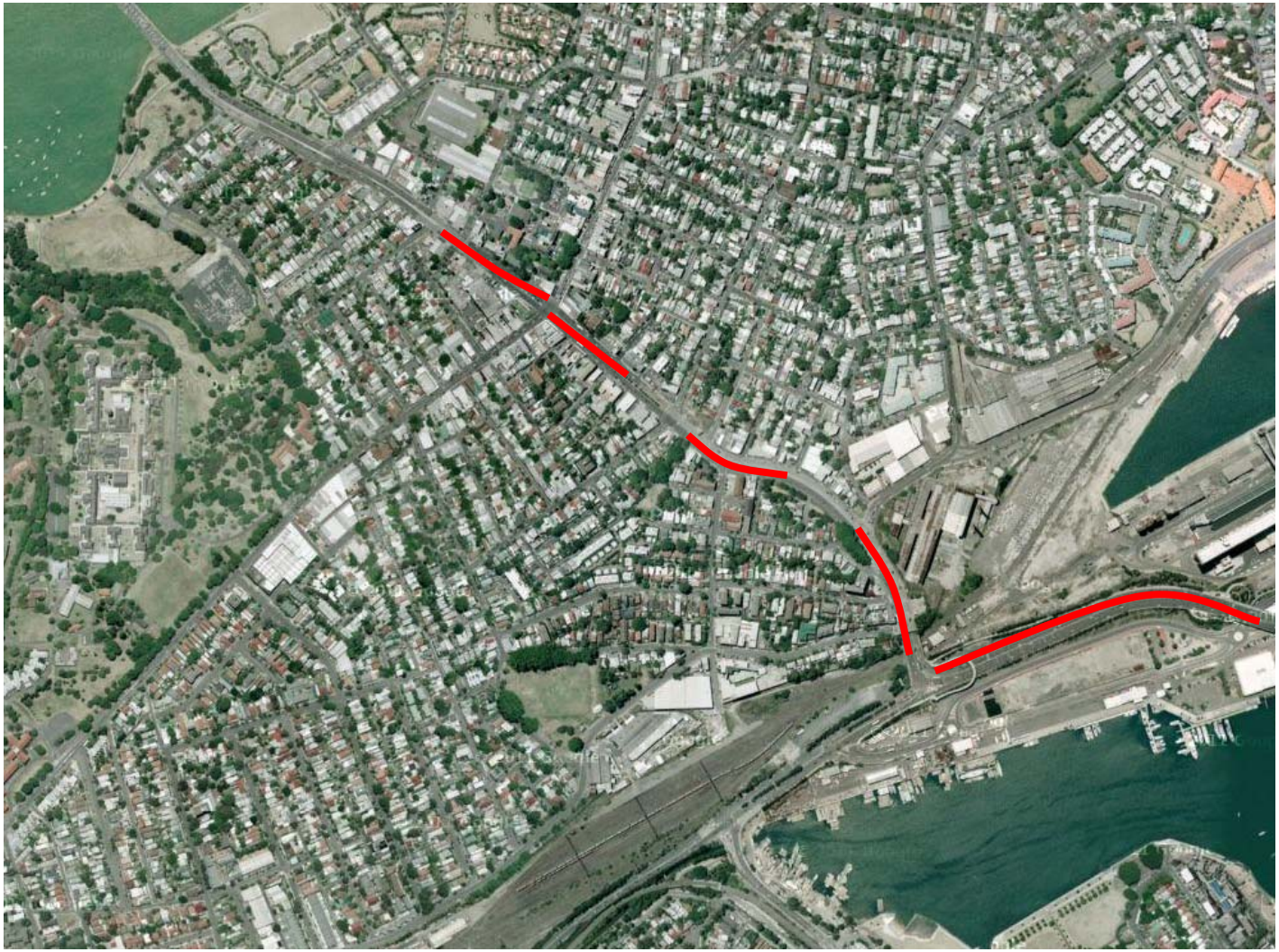


Figure 8 – Existing Weekend Midday Peak Congestion

Table 5-2 Surveyed (2011) Peak Period Traffic Flows

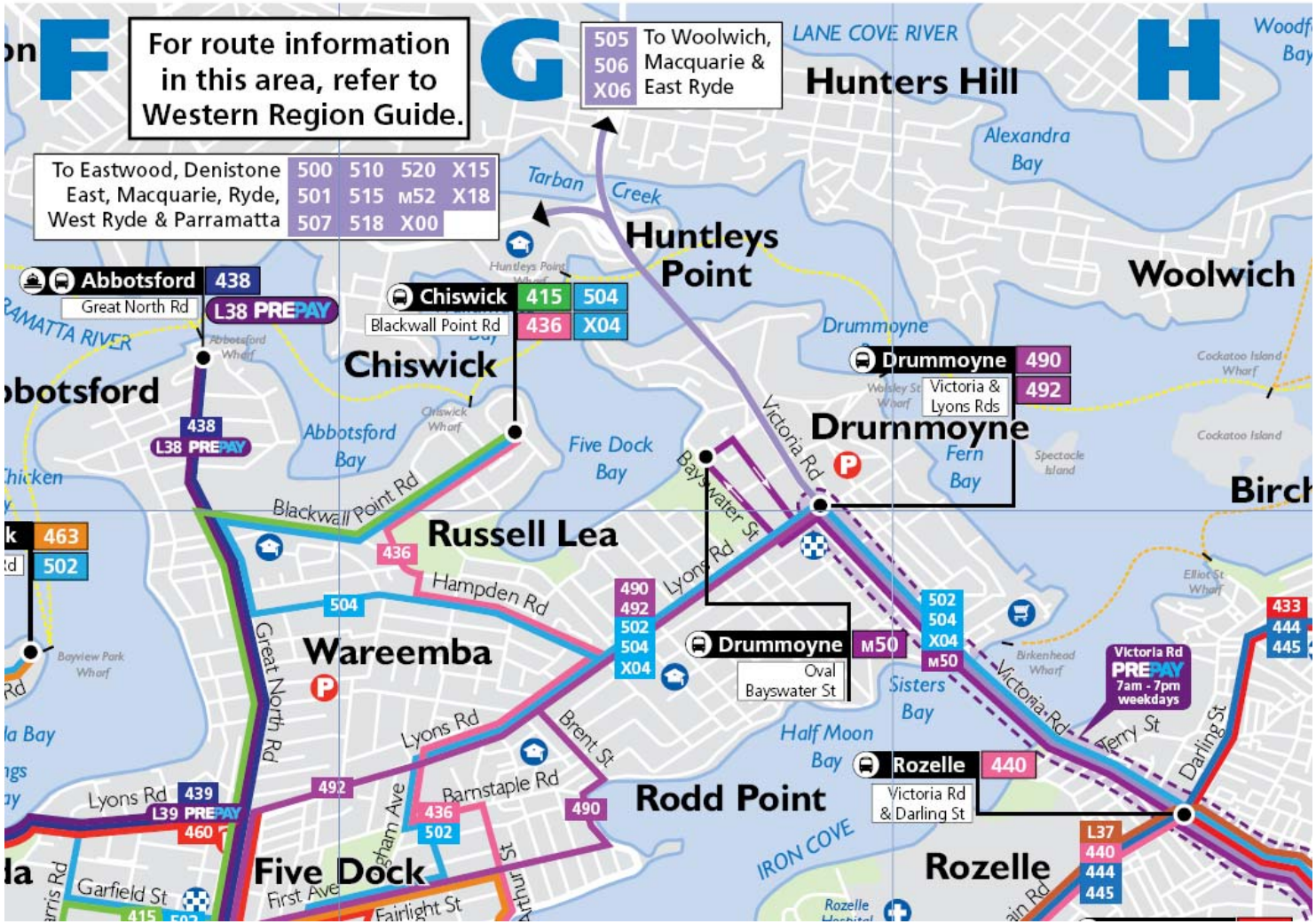
Road	Location	AM Peak 8-9am	PM Peak 5-6pm	Saturday Peak 12-1pm
Victoria Rd	City West Link / Lilyfield Rd	6888	7188	6419
Victoria Road	Evans St / Gordon St	4235	4832	4316
Victoria Road	Darling St / Wellington St	4317	5195	4347
Victoria Road	Moodie Street / Springside St	4733	5703	5105
Darling Street / Balmain Road	West of Manning	1128	1148	1246
Darling Street	Victoria St / Waterloo St	1109	1187	1153
Darling Street	East of Victoria Rd	905	882	1089
Waterloo Street	North of Darling St	125	163	216
Terry Street	East of Victoria Rd	562	581	671
Wellington Street	East of Victoria Rd	528	435	625

5.3 Buses Services and Operation

Victoria Road is a trunk bus route with frequent bus services to and from the Sydney CBD and other destinations.

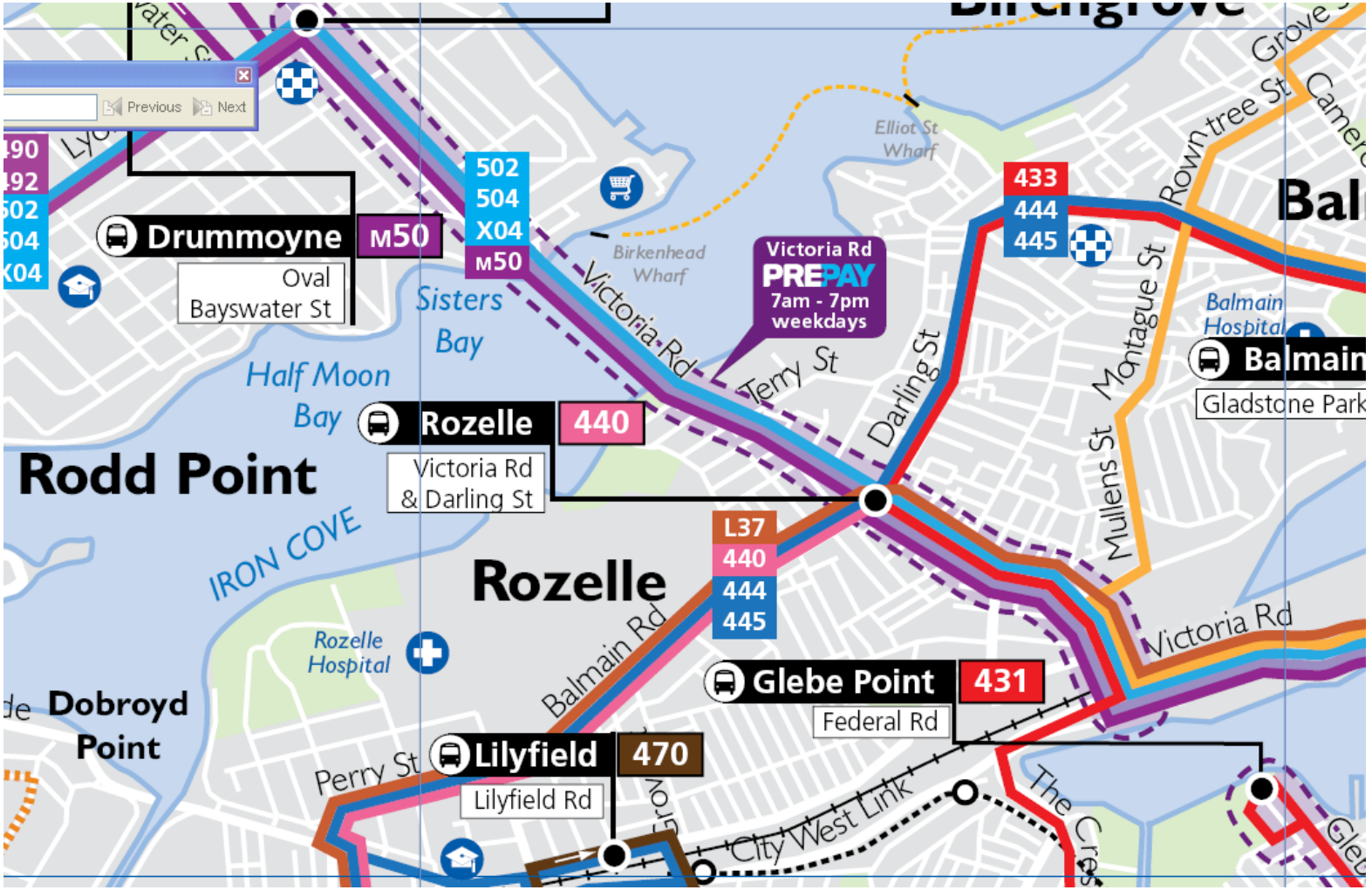
The Inner West busway was recently opened which provides a continuous AM peak bus lane from the Gladesville Bridge to The Crescent. This has improved the bus reliability with buses influenced less by general traffic congestion.

Figure 9 – Existing Bus Routes



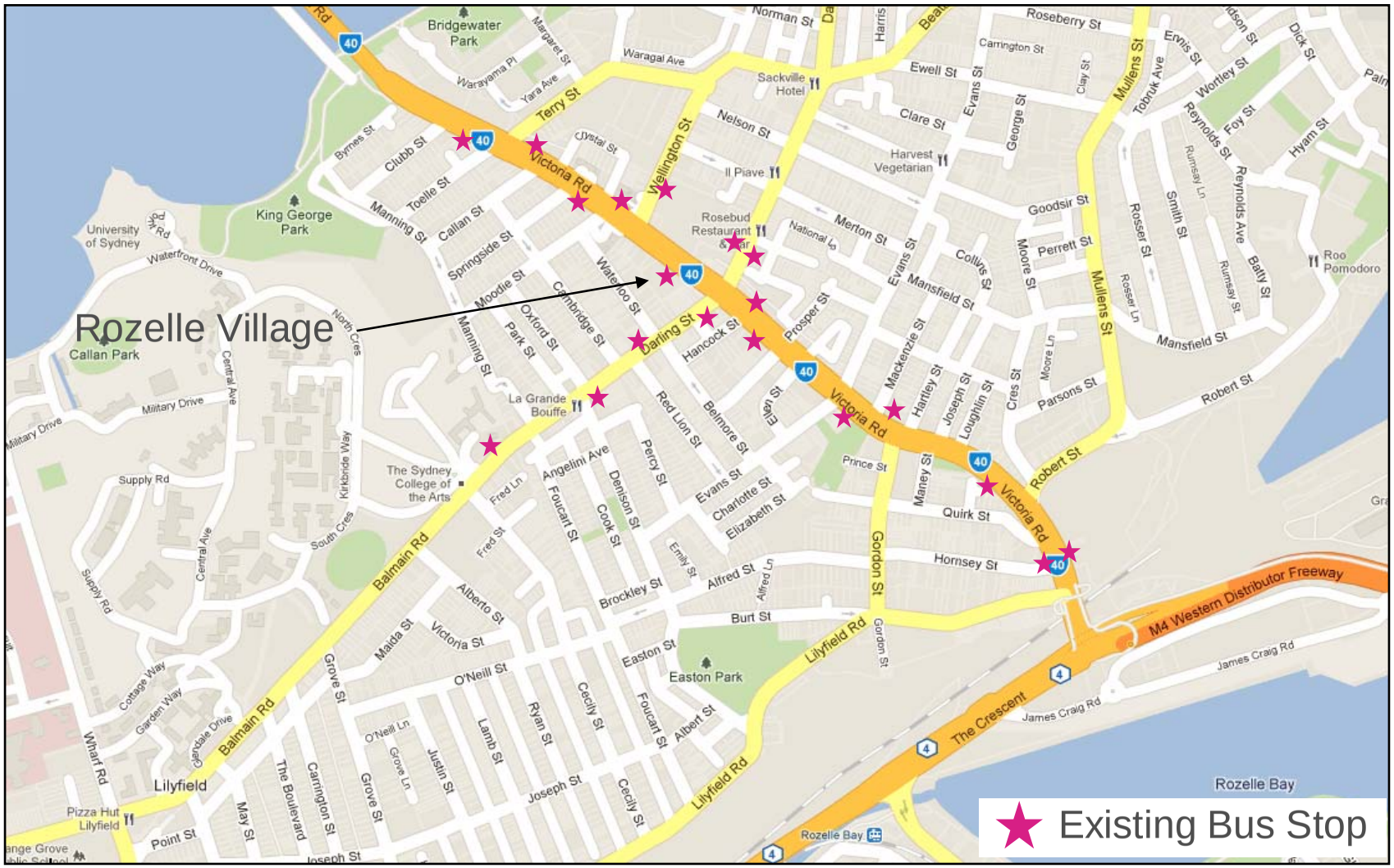
Source: www.131500.com.au

Figure 10 – Existing Bus Routes



Source: www.131500.com.au

Figure 11 – Existing Bus Stop Locations



As well as buses on Victoria Road there are bus routes that operate along Darling Street at frequent intervals.

A summary of the existing bus services travelling along the Rozelle Village site's frontage (either Victoria Road or Darling Street) is provided in Table 5-3. These route services are shown in Figure 9 and Figure 10.

The locations of existing bus stops on these routes are shown in Figure 11.

Table 5-4 provides a summary of the number of bus surveyed to pass the Rozelle Village site during each of the peak periods.

The existing bus service provision in the vicinity of the Rozelle Village site is considered to be good. This is reflected in the Leichhardt DCP which seeks to encourage increased usage of bus services with the implementation of restrictive on site parking provisions.

Anecdotal observations would indicate that bus travel times have improved for the Weekday AM citybound movements with the introduction of the bus lane.

Table 5-3 Existing Bus Services Passing Rozelle Village Site

Route Number	Between		Notes
502	City	Bayview Park	
504	City	Chiswick	
X04	City	Chiswick	Express - Prepay Only
M50	Drummoyne	Coogee	via City (Park near Pitt Street)
500	City	Ryde	
501	City	Ryde/West Ryde	
507	City	Macquarie Uni	
510	City	Ryde Depot	
515	City	Eastwood	
518	City	Macquarie Uni	
520	City	Parramatta	
M52	City	Parramatta	
X00	City	Ryde	Prepay Only
X15	City	Eastwood	Express (Only one direction)
X18	City	Denistone	Prepay Only
505	City	Woolwich	
506	City	Macquarie Uni	
X06	City	East Ryde	Prepay Only
L37	City	Haberfield	Prepay Only
440	City	Rozelle	
444	Balmain Wharf	Canterbury	
445	Balmain Wharf	Canterbury	
433	Balmain	Millers Point	

Table 5-4 Surveyed Bus Flows Along Victoria Road at Rozelle Village

	AM Peak 8-9am Buses / hr	PM Peak 5-6pm Buses / hr	Saturday 12-1pm Buses / hr
City bound	73	57	17
Out bound	62	63	16
Total	135	120	33

5.4 Cyclist and Pedestrian Facilities

An extract of Leichhardt Council bicycle route map is shown in Figure 12. A full copy of the map is provided in Appendix C.

Figure 12 indicates that there are designated cycle routes running along 3 of the Rozelle Village site's frontages, namely:

- Victoria Road - RTA Shared both (off road) on both sides of the road
- Darling Street - Strategic Link on road
- Waterloo Street - Local link on road

The Victoria Road link is an important commuter cycle link which connects the CBD with routes to the north of Iron Cove Bridge.

The recent duplication of the Iron Cove Bridge included the provision of a dedicated cycle / pedestrian path which form the missing link of the Bay Run.

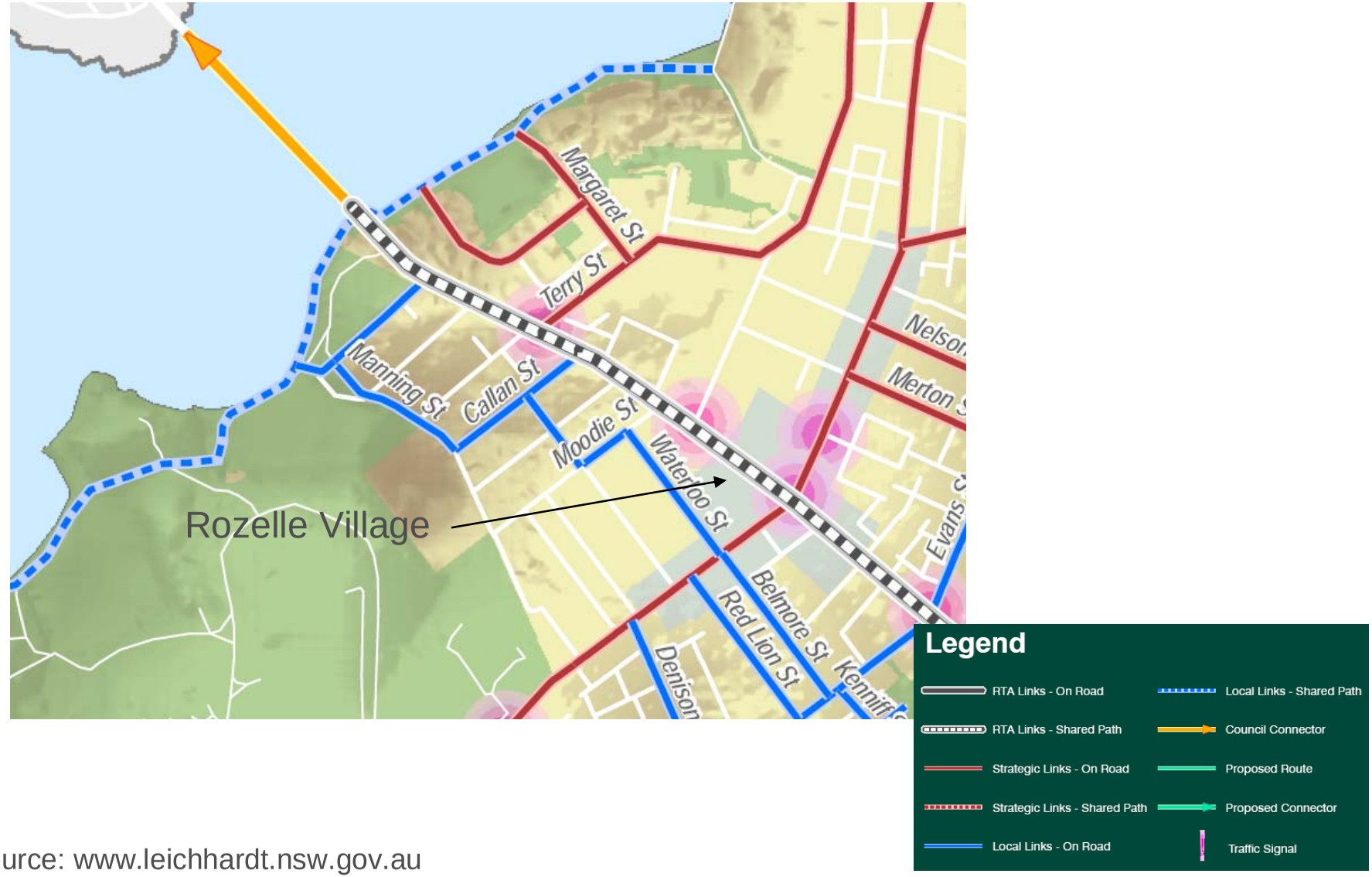
Footpaths are provided along each of the site's road frontages. However, the existence of the Club over the site does not currently facilitate through site linkages.

5.5 On Street Car Parking

5.5.1 Victoria Road

On street parking along Victoria Road is generally permitted outside of the weekday AM and PM clearway hours between The Crescent and the Iron Cove Bridge.

Figure 12 – Bicycle Routes



Source: www.leichhardt.nsw.gov.au

At the Rozelle Village site, on street parking is not permitted at any time on the southern (site's) side of Victoria Road.

However parking is currently allowed on the northern side (Balmain side) of Victoria Road between Wellington Street and Darling Street outside of peak AM and PM periods. That is vehicles can park on this section of Victoria Road during Saturday periods. Observations during Saturday peaks indicated that this parking currently creates significant delays to Victoria Road citybound traffic flows.

It is noted that the RMS has submitted a proposal for public comment to enforce 24 hour per day seven days a week clearway restrictions along Victoria Road between The Crescent and the Iron Cove Bridge. The purpose of this proposal is to improve the traffic efficiency of Victoria Road for buses and general traffic outside of the existing clearway hours, particularly on weekend periods.

A copy of the RMS's proposal is provided in Appendix D.

5.5.2 Darling Street

On street parking in Darling Street is permitted at various times between Victoria Road and Waterloo Street / Belmore Street.

The existing parking arrangements along Darling Street between Victoria Road and Waterloo Street / Belmore Street are summarised in Table 5-5.

It is noted that like the parking on Victoria Road, parking on Darling Street currently generates an adverse impact on traffic flows along Darling Street and in particular the turning movements to and from Victoria Road.

Also indicated in Table 5-5 is the modelled with development parking controls along Darling Street. It is proposed that the on street parking be banned on Darling between Victoria Road and Waterloo Street during the Saturday peak period as it is in the PM peak.

Table 5-5 Darling Street On Street Parking Controls between Victoria Rd / Waterloo St

Darling Street Parking	Existing (Base)	With Development
Waterloo St Side (4 spaces)		
- AM peak weekdays	Banned	Banned
- PM peak weekdays	Banned	Banned
- Saturday Midday	Permitted	Banned
Belmore St Side (6 spaces)		
- AM peak weekdays	Permitted	Permitted
- PM peak weekdays	Banned	Banned
- Saturday Midday	Permitted	Banned

6 Transport Assessment of Rozelle Village Development

6.1 Traffic Generation and Distribution

6.1.1 On Site Parking Provisions

As described in Section 3.2.1 the site specific controls of Leichhardt DCP relating to the Rozelle Village development site seek to apply restrictive on site parking provisions as a mechanism for constraining the demand for private motor vehicle usage. As such traffic generation of the proposed development relates to on site parking provision rather than proposed floor area.

The proposed allocation of on site parking spaces by land use type used to estimate proposed development traffic flows are as follows:

- Residential Apartments: 290 spaces (including visitors)
- Retail: 125 spaces
- Restaurant: 153 spaces
- Gymnasium: 165 spaces
- Medical Centre: 10 spaces
- Child Care Centre: 0 spaces
- Commercial / Community Centre: 21 spaces
- Club: 70 spaces

A total of 834 car parking spaces will be provided on site with 544 publically accessible spaces accessed via Victoria Road and 290 residential spaces with access via Waterloo Street.

6.1.2 Traffic Generation by Land Use

A summary of the traffic generation estimates of the Rozelle Village development proposal used in the Paramics Modelling is provided in Table 6-1.

A detailed breakdown is provided in the *Rozelle Village – Working No. 4 - Paramics Modelling Results Report* contained in Appendix B to this report.

Table 6-1 Summary of Rozelle Village Development Traffic Generation

	Residential Uses (veh/hr)	Non Residential Uses (veh/hr)	Total (veh/hr)
Weekday AM Peak			
Inbound	18	134	151
Outbound	70	114	185
Total	88	248	336
Weekday PM Peak			
Inbound	70	263	334
Outbound	18	211	228
Total	88	474	562
Weekend Midday			
Inbound	44	214	258
Outbound	44	214	258
Total	88	428	516

6.1.3 DCP Traffic Generation Budget

As detailed in Section 2.4.4 of this report, the Leichhart DCP site specific controls are based on the findings of the Arup traffic modelling that traffic generation budget of some 893 vehicles per peak hour by a combined Carrier and Rozelle Village site could be adequately accommodated by the surrounding road network.

It is understood that the Carrier site development is estimated to generate in the order of 150 vehicle movements per peak hour. Further details are contained the *Rozelle Village – Working No. 4 - Paramics Modelling Results Report* contained in Appendix B to this report.

Under the revised development proposal for both these sites, the estimated traffic generation is estimated to be:

- AM Peak (weekday): 486 vehicles per hour
- PM Peak (weekday): 712 vehicles per hour
- Saturday Midday: 666 vehicles per hour

The estimated traffic generation for each of the modelled peak periods for the combined sites is less than the traffic budget (893 vehicles per hour) established in the Arup modelling and incorporated into the DCP controls.

It is estimated that the combined sites will generate peak traffic generation during the Weekday PM peak period. It is noted that the PM peak hour generation is approximately 80% of the DCP traffic budget.

Modelling assumptions regarding other developments in the vicinity of the site such as the Carrier site and the White Bay Cruise Terminal proposals are detailed in the *Rozelle Village – Working No. 4 - Paramics Modelling Results Report* contained in Appendix B to this report.

6.1.4 Traffic Distribution

Traffic distribution to and from the Rozelle Village site has been estimated using a number of sources of information including:

- Journey to Work data (2006);
- Rozelle Village Economic Impact Assessment (February 2012)
- Existing traffic controls (ie. turn bans at intersections) and site access arrangements.

The trip distributions assumptions and modelled distributions for each of the modelled scenarios are detailed in the *Rozelle Village – Working No. 4 - Paramics Modelling Results Report* contained in Appendix B to this report.

6.2 Intersection Operation

The Paramics models were used to assess the implication of the proposed Rozelle Village development (and the Carrier site) on peak period intersection operation for the surrounding road network. The implications to Level of Service and average vehicle delay at intersections have been reported in the *Rozelle Village – Working No. 4 - Paramics*

Modelling Results Report contained in Appendix B to this report and are summarised in this section of the TMAP report.

6.2.1 Level of Service Criteria

The intersection level of service has been recorded across the 2 hr calibration period of model.

Level of service is based on the average vehicle delay at the intersection as described in Table 6-2.

Table 6-2 – Level of Service Criteria

Level of Service	Average Delay per Vehicle (secs/veh)	Signals & Roundabouts	Give Way & Stop Signs
A	less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & Spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays Roundabouts require other control mode	At capacity, requires other control mode
F	> 70	Extra capacity required	Extreme delay, traffic signals or other major treatment required

Adapted from RTA Guide to Traffic Generating Developments, 2002.

The level of service results for each modelled scenario are presented below in Table 6-3, Table 6-4 and Table 6-5.

6.2.2 AM Peak Period

The Level of Service and average delay results presented in Table 6-3 indicate that there is a degree of congestion and delay within the existing road network with intersections generally operating at Levels of Service C to F.

Table 6-3 AM Peak Intersection Performance Level of Service

Location	Base		Development	
	Av Delay	LoS	Av Delay	LoS
Terry Street and Victoria Road	119	F	139	F
Darling Street and Victoria Road	60	E	57	E
The Crescent / Victoria Road	83	F	101	F
The Crescent / City West Link	67	E	66	E
Wellington Street/ Victoria Road / Site Access	41	C	44	D
Waterloo Street / Darling Street	21	B	31	C
Evans Street / Victoria Road	43	D	36	C
Gordon Street / Victoria Road	34	C	35	C
Robert Street / Victoria Road	61	E	64	E
James Craig Road / The Crescent	16	B	16	B

In the AM peak the Level of Service results indicate high delays at Terry Street in the base and with development scenarios. This delay is related to the congestion caused down stream at Darling Street. The model indicates an increase in this delay under the development scenario.

The Level of Service and intersection delays remain relatively consistent between the base and with development scenarios with only minor increases to delays and no more than 1 level change in level of service.

It is noted that the Rozelle Village site access on Victoria Road at Wellington Street will operate satisfactorily (LoS D).

6.2.3 PM Peak Period

The Level of Service and average delay results presented in Table 6-4 indicate that there is a degree of congestion and delay within the existing road network with intersections generally operating at Levels of Service B to D. Exceptions are the Victoria Road and City West Link intersections along The Crescent which operate at Levels of Service F and E respectively.

Table 6-4 PM Peak Intersection Performance Level of Service

Location	Base		Development	
	Av Delay	LoS	Av Delay	LoS
Terry Street and Victoria Road	13	A	24	B
Darling Street and Victoria Road	50	D	63	E
The Crescent / Victoria Road	109	F	103	F
The Crescent / City West Link	58	E	58	E
Wellington Street/ Victoria Road / Site Access	15	B	39	C
Waterloo Street / Darling Street	14	A	15	B
Evans Street / Victoria Road	17	B	20	B
Gordon Street / Victoria Road	15	B	29	C
Robert Street / Victoria Road	35	C	37	C
James Craig Road / The Crescent	17	B	13	A

Modelling of the with development scenario indicates that there would only be small increases in delay at intersections across the network in the PM peak period.

It is noted that the Rozelle Village site access on Victoria Road at Wellington Street will operate satisfactorily (LoS C).

6.2.4 Saturday Midday Peak Period

In the Saturday Peak a base scenario with no parking along Victoria Road between Wellington Street and Darling Street was included for comparative purposes. The models indicate that by removing the on street parking significantly improves the Citybound traffic flow and the resulting intersection operation (see Table 6-5).

Furthermore the with development scenario assumed that on street parking on Darling Street between Victoria Road and Waterloo Street was banned during the Saturday midday peak period as it is in the PM Peak.

Table 6-5 Sat Peak Intersection Performance Level of Service

Location	Base		Base + No Parking		Development	
	Av Delay	LoS	Av Delay	LoS	Av Delay	LoS
Terry Street and Victoria Road	165	F	15	B	17	B
Darling Street and Victoria Road	67	E	61	E	66	E
The Crescent / Victoria Road	48	D	48	D	75	F
The Crescent / City West Link	49	D	49	D	56	D
Wellington Street/ Victoria Road / Site Access	45	D	23	B	33	C
Waterloo Street / Darling Street*	67	E	44	D	18	B
Evans Street / Victoria Road	18	B	18	B	24	B
Gordon Street / Victoria Road	15	B	14	A	14	A
Robert Street / Victoria Road	35	C	33	C	26	B
James Craig Road / The Crescent	9	A	9	A	28	B

*Signal Times for Waterloo Street were optimised for the Development Scenario

Modelling of the with development scenario indicates that there would only be small increases in delay at intersections across the network in the Saturday peak period compared with the base case with on street parking removed. .

It is noted that the Rozelle Village site access on Victoria Road at Wellington Street will operate satisfactorily (LoS C).

6.2.5 Summary

Overall the results of the modelled scenarios indicate that there would not be a significant impact on the operation of intersections within the modelled road network as a result of additional / modified traffic flows associated with the proposed Rozelle Village development and other modelled development.

This conclusion assumes that on street parking restrictions are implemented along Victoria Road and Darling Street during the Saturday midday peak period as they are during other weekday peak periods.

6.3 Implications on Bus Travel Times

The Paramics models were used to assess the implication of the proposed Rozelle Village development (and the Carrier site) on bus travel times during the modelled peak periods.

The implications to bus travel times have been reported in the *Rozelle Village – Working No. 4 - Paramics Modelling Results Report* contained in Appendix B to this report and are summarised in this section of the TMAP report.

6.3.1 Weekday AM Peak Period

Bus travel times for the AM peak are indicated in Table 6-6 and Table 6-7. The bus travel times are recorded from bus stops near Terry Street, Darling Street and Robert Street.

Table 6-6 Bus Travel Times (07:00 – 08:00)

	Base	Development
Citybound		
Terry St - Darling St	1:58	2:01
Darling St - Robert St	2:28	2:36
Total	**4:26**	**4:37**
Outbound		
Robert St - Darling St	2:02	2:01
Darling St - Terry St	2:02	2:07
Total	**4:04**	**4:08**

Table 6-7 Bus Travel Times (08:00 – 09:00)

	Base	Development
Citybound		
Terry St - Darling St	1:52	1:54
Darling St - Robert St	2:46	2:43
Total	**4:38**	**4:37**
Outbound		
Robert St - Darling St	2:17	2:18
Darling St - Terry St	2:03	2:14
Total	**4:20**	**4:32**

The models indicate a minimal effect on buses under the with development scenario with an average increase in travel time of 11 seconds citybound in the first hour and 4 seconds outbound.

The second hour from 8:00 – 9:00am was closer to the base scenario with no increase to citybound buses and only 12 seconds for outbound buses.

These results reflect the operation of the dedicated bus lane operating city bound in the AM peak period and to a lesser extend the clearway operating in the outbound direction.

6.3.2 Weekday PM Peak Period

The PM peak bus travel times are shown in Table 6-8 and Table 6-9. In the Citybound direction the model shows an increase in travel time of 16 seconds in the first hour and 20 seconds in the second hour.

The outbound direction shows an increase in travel time of about 30 seconds in both hours.

Table 6-8 Bus Travel Times (16:00 – 17:00)

	Base	Development
Citybound		
Terry St - Darling St	0:59	1:08
Darling St - Robert St	1:53	2:00
Total	**2:52**	**3:08**
Outbound		
Robert St - Darling St	2:14	2:17
Darling St - Terry St	1:44	2:03
Total	**3:55**	**4:21**

Table 6-9 Bus Travel times (17:00 – 18:00)

	Base	Development
Citybound		
Terry St - Darling St	1:10	1:30
Darling St - Robert St	2:05	2:06
Total	**3:16**	**3:36**
Outbound		
Robert St - Darling St	1:58	2:11
Darling St - Terry St	1:32	1:55
Total	**3:30**	**4:06**

6.3.3 Saturday Midday

The Saturday base model was run with and without on street parking between Wellington Street and Darling Street. The models showed that removing the parking will improve travel time for buses in the citybound direction. The modelled bus travel times are shown in Table 6-10 and Table 6-11 below.

Compared to the 'base no parking scenario' in the citybound direction the model indicates that there will be a about a 21 second increase in bus travel times in the first hour and no change in the second hour. In the outbound direction bus travel times increase by about 22 seconds in the first hour and about 12 seconds in the second hour compared to the base case.

Table 6-10 Bus Travel Time (11:00 – 12:00)

	Base	Base + No Parking	Development
Citybound			
Terry St - Darling St	2:47	1:40	1:55
Darling St - Robert St	2:16	2:13	2:19
Total	**5:03**	**3:53**	**4:14**
Outbound			
Robert St - Darling St	2:41	2:39	2:47
Darling St - Terry St	1:54	2:02	2:10
Total	**4:34**	**4:42**	**4:57**

Table 6-11 Bus Travel Time (12:00 – 13:00)

	Base	Base + No Parking	Development
Citybound			
Terry St - Darling St	2:45	1:48	1:52
Darling St - Robert St	2:21	2:27	2:17
Total	**5:06**	**4:15**	**4:09**
Outbound			
Robert St - Darling St	2:38	2:32	3:01
Darling St - Terry St	1:48	1:48	1:36
Total	**4:25**	**4:20**	**4:37**

6.4 Implications to General Traffic Flows

6.4.1 Weekday AM Peak Period

The general traffic travel times are indicated in Table 6-12 and Table 6-13. It shows that the effect on general traffic travel times from Iron Cove Bridge to the Crescent would be minimal.

Table 6-12 General Traffic Travel Time (07:00 – 08:00)

	Base	Development
CityBound		
Iron Cove - Darling Street	2:36	2:36
Darling Street - The Crescent	3:24	3:22
Total	**6:00**	**5:58**
Outbound		
The Crescent - Darling	1:45	1:46
Darling St - Iron Cove	0:47	0:53
Total	**2:31**	**2:39**

Table 6-13 General Traffic Travel Time (08:00 – 09:00)

	Base	Development
CityBound		
Iron Cove - Darling Street	3:21	3:08
Darling Street - The Crescent	3:48	3:29
Total	**7:08**	**6:36**
Outbound		
The Crescent - Darling	2:12	2:15
Darling St - Iron Cove	0:50	0:54
Total	**3:02**	**3:08**

6.4.2 Weekday PM Peak Period

The general traffic travel times for the PM peak are shown in Table 6-14 and Table 6-15. The results are consistent with the bus travel times which reflects the operation of clearway and not dedicated bus lane operation along Victoria Road.

Table 6-14 General Traffic Travel Time (16:00 – 17:00)

	Base	Development
CityBound		
Iron Cove - Darling Street	1:14	1:52
Darling Street - The Crescent	1:45	1:45
Total	**2:59**	**3:36**
Outbound		
The Crescent - Darling	2:05	2:17
Darling St - Iron Cove	0:47	0:45
Total	**2:52**	**3:02**

Table 6-15 General Traffic Travel Time (17:00 – 18:00)

	Base	Development
CityBound		
Iron Cove - Darling Street	1:14	2:12
Darling Street - The Crescent	1:53	1:54
Total	**3:07**	**4:06**
Outbound		
The Crescent - Darling	1:51	2:23
Darling St - Iron Cove	0:46	0:41
Total	**2:37**	**3:04**

6.4.3 Saturday Midday Peak Period

The general traffic travel times for the Saturday peak period are presented in Table 6-16 and Table 6-17 below.

The models show an improvement in travel time of 2 minutes citybound when the parking along Victoria Road is removed between Wellington Street and Darling Street.

Table 6-16 General Traffic Travel Times (11:00 – 12:00)

	Base	Base + No Parking	Development
CityBound			
Iron Cove - Darling Street	3:59	1:21	1:54
Darling Street - The Crescent	2:26	2:37	2:41
Total	**6:26**	**3:58**	**4:35**
Outbound			
The Crescent - Darling	2:01	1:56	2:08
Darling St - Iron Cove	0:49	0:49	0:45
Total	**2:49**	**2:45**	**2:53**

Table 6-17 General Traffic Travel Times (12:00 – 13:00)

	Base	Base + No Parking	Development
CityBound			
Iron Cove - Darling Street	3:31	1:34	1:45
Darling Street - The Crescent	2:36	2:31	2:41
Total	**6:07**	**4:05**	**4:26**
Outbound			
The Crescent - Darling	2:02	1:56	2:32
Darling St - Iron Cove	0:49	0:50	0:47
Total	**2:51**	**2:46**	**3:19**

With the development the citybound travel times increased on average by 30 seconds in the first hour and 20 seconds in the second compared with the no parking scenario but as less than those for the base case (ie. with parking). The outbound travel times increased by some 8 seconds in the first hour and 34 seconds in the second hour.

6.5 Road Network Traffic Flows Changes

Changes in traffic volumes are presented on Table 6-18, Table 6-19 and Table 6-20 for the AM, PM and Saturday Peaks respectively. The volume changes are minimal along Victoria Road and are generally within the daily variation of traffic.

Changes in traffic on local streets occur mainly on Moodie Street and Waterloo Street however these traffic volumes are within the range that could normally be expected on a residential street during a peak hour and are within the environmental limits (500 vehicles per hour) specified by the RTA guidelines for local collector streets.

Table 6-18 AM Peak Traffic Volume Changes

Road	Street 1	Street 2	Direction	Base		Development	
				7-8	8-9	7-8	8-9
Victoria Road	Iron Cove Bridge		Eastbound	3599	3163	3454	2947
			Westbound	2143	1881	2193	1973
Terry Street	East of Victoria Rd		Northbound	320	458	412	467
			Southbound	77	105	82	100
Victoria Road	Terry St	Wellington St	Eastbound	3376	2895	3148	2688
			Westbound	2204	1956	2262	2097
Moodie Street	West of Victoria Rd		Northbound	225	152	210	171
			Southbound	11	2	53	50
Wellington St	East of Victoria Rd		Southbound	607	528	723	723
Victoria Road	Wellington Street	Darling St	Eastbound	3163	2672	3101	2625
			Westbound	1478	1412	1602	1518
Darling Street	East of Victoria Rd		Northbound	349	457	355	421
			Southbound	393	391	381	403
Waterloo St	Darling Street	Moodie St	Southbound	41	36	126	127
			Northbound	68	89	56	99
Darling Street	Waterloo Street	Victoria Rd	Eastbound	494	466	562	514
			Westbound	524	566	485	611
Darling Street	West of Manning St		Eastbound	636	602	711	634
			Westbound	443	521	513	626
Victoria Road	Darling Street	Evans St	Eastbound	3314	2731	3213	2737
			Westbound	1354	1383	1401	1471
Victoria Road	North of Robert St		Eastbound	3580	3308	3585	3322
			Westbound	1312	1323	1380	1406
Victoria Road	The Crescent	Robert St	Eastbound	4413	4324	4431	4318
			Westbound	1744	2075	1800	2192
Anzac Bridge			Eastbound	5920	5570	5897	5700
			Westbound	2820	3146	2973	3156
The Crescent	James Craig Rd	Victoria Rd	Eastbound	544	483	565	531
			Westbound	2109	2300	2150	2223

Table 6-19 PM Peak Traffic Volume Changes

Road	Street 1	Street 2	Direction	Base		Development	
				4-5	5-6	4-5	5-6
Victoria Road	Iron Cove Bridge		Eastbound	2953	2914	3003	2953
			Westbound	3182	2676	3024	2871
Terry Street	East of Victoria Rd		Northbound	591	554	721	702
			Southbound	48	70	82	107
Victoria Road	Terry St	Wellington St	Eastbound	2569	2539	2604	2563
			Westbound	3350	2771	3307	3039
Moodie Street	West of Victoria Rd		Northbound	158	173	150	172
			Southbound	66	52	142	149
Wellington St	East of Victoria Rd		Southbound	633	402	505	623
Victoria Road	Wellington Street	Darling St	Eastbound	2199	2169	2236	2186
			Westbound	2739	2250	2886	2473
Darling Street	East of Victoria Rd		Northbound	512	482	527	545
			Southbound	438	415	449	424
Waterloo St	Darling Street	Moodie St	Southbound	48	35	101	88
			Northbound	56	90	84	138
Darling Street	Waterloo Street	Victoria Rd	Eastbound	503	410	638	562
			Westbound	816	732	751	826
Darling Street	West of Manning St		Eastbound	584	432	707	620
			Westbound	799	586	733	690
Victoria Road	Darling Street	Evans St	Eastbound	2228	2156	2268	2172
			Westbound	2714	2285	2757	2407
Victoria Road	North of Robert St		Eastbound	2518	2404	2530	2482
			Westbound	2673	2283	2738	2334
Victoria Road	The Crescent	Robert St	Eastbound	3209	3037	3313	3205
			Westbound	3631	3318	3705	3323
Anzac Bridge			Eastbound	4583	4544	4716	4634
			Westbound	5113	4871	5158	4785
The Crescent	James Craig Rd	Victoria Rd	Eastbound	905	812	910	802
			Westbound	2834	2800	2836	2806

Table 6-20 Saturday Midday Peak Traffic Volume Changes

Road	Street 1	Street 2	Direction	Base		Base + No Parking		Development	
				11-12	12-1	11-12	12-1	11-12	12-1
Victoria Road	Iron Cove Bridge		Eastbound	2463	2670	2673	2577	2788	2687
			Westbound	2430	2455	2388	2474	2419	2634
Terry Street	East of Victoria Rd		Northbound	441	616	472	621	559	678
			Southbound	84	89	100	91	80	101
Victoria Road	Terry St	Wellington St	Eastbound	2177	2270	2414	2086	2471	2291
			Westbound	2505	2594	2494	2600	2559	2809
Moodie Street	West of Victoria Rd		Northbound	362	279	324	265	355	335
			Southbound	16	38	21	28	69	79
Wellington St	East of Victoria Rd		Southbound	527	583	531	587	657	783
Victoria Road	Wellington Street	Darling St	Eastbound	1891	1991	2062	1876	2160	2001
			Westbound	1693	1856	1734	1868	1787	1990
Darling Street	East of Victoria Rd		Northbound	594	584	598	661	704	665
			Southbound	365	385	359	414	428	442
Waterloo St	Darling Street	Moodie St	Southbound	53	66	63	51	125	135
			Northbound	134	142	110	145	138	164
Darling Street	Waterloo Street	Victoria Rd	Eastbound	435	338	451	439	546	510
			Westbound	632	644	722	657	845	859
Darling Street	West of Manning St		Eastbound	606	428	558	556	689	618
			Westbound	567	549	641	538	819	742
Victoria Road	Darling Street	Evans St	Eastbound	1936	1999	2078	1893	2175	2002
			Westbound	1818	2053	1884	2046	1917	2089
Victoria Road	North of Robert St		Eastbound	2285	2274	2312	2160	2476	2277
			Westbound	1770	2085	1835	2138	1833	2168
Victoria Road	The Crescent	Robert St	Eastbound	3049	3044	3128	2965	3289	3054
			Westbound	2551	2945	2605	2942	2574	3019
Anzac Bridge			Eastbound	4770	4879	4799	4808	4862	4861
			Westbound	3659	4271	3747	4159	3799	4262
The Crescent	James Craig Rd	Victoria Rd	Eastbound	732	746	747	776	721	803
			Westbound	2482	2655	2589	2567	2684	2631

6.6 *Pedestrian and Cyclist Implications*

As discussed in Section 5.4 the proposed Rozelle Village development site is located with good access to the existing bicycle and pedestrian network with direct frontages to shared off road (Victoria Road) and on road routes (Waterloo Street and Moodie Street).

In accordance with the Leichhardt DCP, the development proposal includes the following improvements:

- Footpath upgrades along the site's road frontages;
- Provision of through site pedestrian linkages
- Provision of on site bicycle parking facilities for all site uses (ie. residential, staff and visitors).

The provision of these facilities and upgrades will improve the existing pedestrian and cyclist conditions in the immediate vicinity of the site and improve the existing linkages to the local and regional networks.

6.7 *Loading and Service Vehicle Arrangements*

All loading and service vehicle access is proposed to take place via the Victoria Road access in accordance with the DCP controls.

The development proposal will provide a common driveway for service vehicles and other traffic entering the public car parking facility. However within a short distance inside the development a separate driveway would lead to a designated loading area which is to be separated from general traffic flows.

The following loading facilities are proposed:

- a compactor unit for the supermarket
- loading platforms
- three heavy rigid truck loading bays
- three medium rigid truck loading bays

- vehicle turn table
- queuing space for one truck in the separate accessway leading up to the loading area.
- Designated loading dock exit lane to Victoria Road.

The supermarket loading provision is in line with normal supermarket requirements.

The approximately 4,160m^2 of restaurant and retail space would normally require about one service space per 1,500m^2 and would thus need two - three medium rigid vehicle spaces. These would also serve the occasional needs of the commercial space.

The Club would have one medium rigid vehicle space available. Residents would be able to use the other two spaces.

While adequate provision has been made, use of the loading area would nevertheless be regulated by Centre Management and residents or others moving house or otherwise needing one-off loading access would need to pre-book a time slot.

6.8 Construction Traffic Management

6.8.1 Overview

A preliminary Construction Management Plan (CMP) is provided in the Environmental Assessment Report for the Rozelle Village development proposal.

This CMP will need to be firmed up by the appointed builder with consultation with Council. It is expected that the preparation of a detailed CMP would be a Condition of Consent and would normally be submitted for approval by Council or its Local Traffic Committee.

6.8.2 Proposed Construction Methodology

It is estimated that construction works will occur on the site for a duration of 42 months.

Peak construction traffic generation is estimated to occur during excavation and podium / tower construction periods. For these periods truck movements (one way) are estimated to be:

- Excavation: 100 vehicles / day for 6-7 months
- Building works: 60-90 vehicles / day for 10 months

The construction traffic daily generation profile for the 42 month program is shown in CMP.

The type of truck likely to access the site will include:

- Articulated vehicles (predominately truck and trailer with limited semi trailer access)
- Medium Rigid vehicles
- Small trucks and vans

It is proposed to provide three construction vehicle access driveways:

- Victoria Road at proposed car park access;
- Waterloo Road at existing car park access; and
- Waterloo Road at northern end of the site.

It is proposed that the Waterloo Road accesses would not be used simultaneously. The access arrangements are shown in the CMP.

During excavation it is proposed to provide a loop road (internal link road) between the Waterloo Street and Victoria Road accesses.

It is proposed that a Work Zone be utilised along the site's front to Waterloo Street. No long term work zones are proposed along Victoria Road.

6.8.3 Management Measures to Minimise Construction Traffic Implications

Based on the preliminary construction methodology the following measures should be considered as part of the development of a detailed CTMP to minimise the traffic implications during construction:

- Construction activities to be undertaken in accordance with the approved hours of operation;
- Pedestrian access around the site to be maintained at all times. This may include the erection of hoardings and use of traffic controllers at the construction access driveways;
- Wherever practical, Victoria Road shall be used as the primary construction vehicle access. It is recommended that the formal access arrangements at Victoria Road (ie. slip lane) be constructed as early as possible to facilitate access to and from Victoria road during construction;
- No on site parking to be provided for construction workers. Workers will be encouraged to utilise existing public transport.
- Maintain existing public transport service, no deviations of services to occur during construction activities.
- Access to neighbouring properties to be maintained at all times.
- Implementation and enforcement of driver protocols relating to construction vehicle routes, access arrangements
- Implementation of appropriate on road advance warning signage in accordance with the relevant Traffic Control Plan in accordance with RMS guidelines.

6.9 Green Travel Planning

From the above, it will be seen that the Rozelle Village site already enjoys excellent external transport infrastructure that both encourages and facilitate access to the site by non-car modes.

In order to build on this strong foundation, a number of measures or initiatives have either identified for incorporation into the preparation of a Green Travel Plan for the site.

The statement of commitments for the proposed development includes the preparation of a green travel plan for the site. Measures to be considered as part of the green travel plan include:

- implementation of restrictive car parking provisions in accordance with the DCP controls.

- centre management to provide transport information on its website.
- directions to bus stops to be available at the information desks.
- boards will be erected within the centre to provide information on public transport options at each of the street entrances.
- home delivery services for major retail outlets
- pedestrian way finding signage to promote walk and cycle modes. Maps and information on walking routes should be available at the development entrance points and at bus stops in the area.
- priority parking for mobility impaired, seniors, and parents with prams will be marked within the centre car park near accessible entrances to the centre.
- implementation of car share schemes ie. Go Get

7 Conclusions

This TMAP report is provided to address the transport assessment requirements for the Rozelle Village development proposal set out in the DGRs.

In summary, the report finds the following:

- The site has been the subject of extensive prior traffic planning.

- This has developed a traffic generation budget for the site as defined by the Leichhardt DCP and its supporting documentation. This would ensure that its traffic generation would be in keeping with the environmental and operational capacity of the surrounding road network.

- The proposed development adheres to this traffic generation budget for the combined Rozelle Village and Carrier site developments through a series of travel demand management measures including.
    - constraint on on-site parking provisions in accordance with the objectives of the Leichhardt DCP
    - provision of a mixed land use development proposal
    - provisions of a free community bus
    - provision of a home delivery service for purchases
    - provision of on site ample bicycle parking

- Paramics traffic modelling has been undertaken with post Inner West busway opening traffic flows and developed in accordance with the modelling specification set out in the DGRs.

- The Paramics modelling indicated that with development traffic generation could be accommodated within the surrounding road network without significant adverse impacts to intersection operation, bus travel times or general vehicle travel times.

- To adequately accommodate traffic generation of the proposed development, some on street parking restrictions are required during the Saturday midday period along Victoria Road (northern side opposite the site) and along Darling Street between Victoria Road and Waterloo Road.

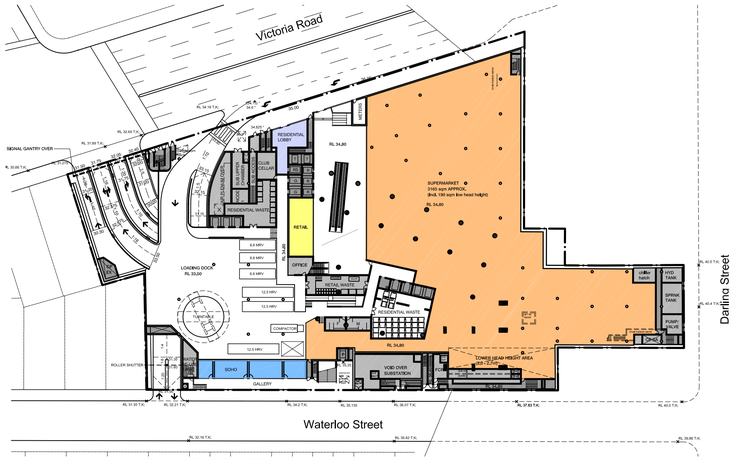
- The proposed development would be able to accommodate any such displaced parking within its car park if Council so desired. Otherwise on-site parking is provided in accordance with DCP requirements.

- The loading area would provide satisfactory loading capacity and comply with the Leichhart DCP regarding service vehicle access arrangements.

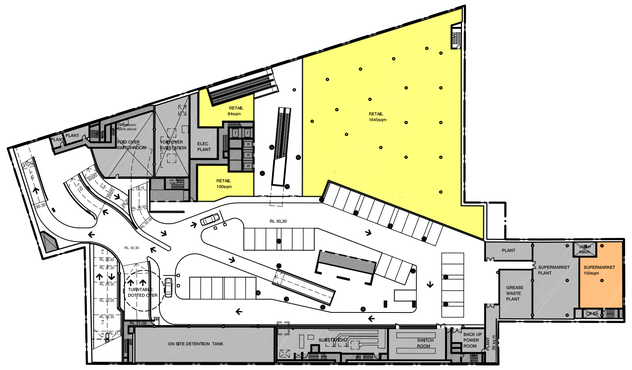
- A Construction Traffic Management Plan is to be provided for finalisation and approval once a building contractor is appointed.

It is the conclusions of this TMAP that the proposed Rozelle village satisfactorily complies with the DGR requirements and the site specific DCP in terms of transport and traffic management.

Appendix A Rozelle Village Concept Plan



BASEMENT 1



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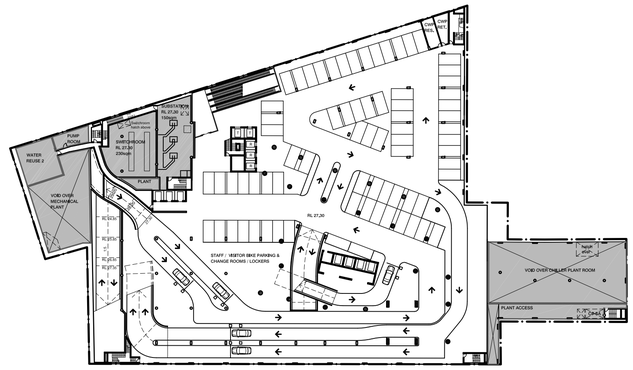

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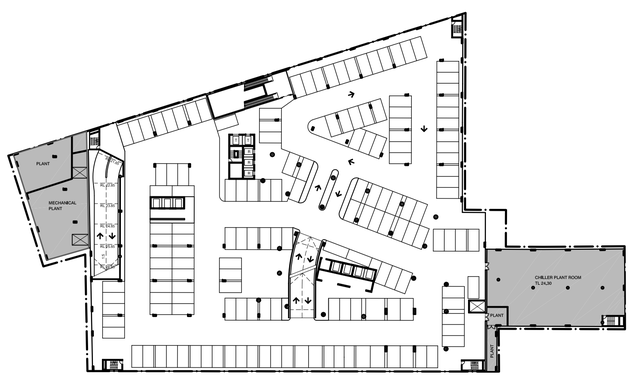

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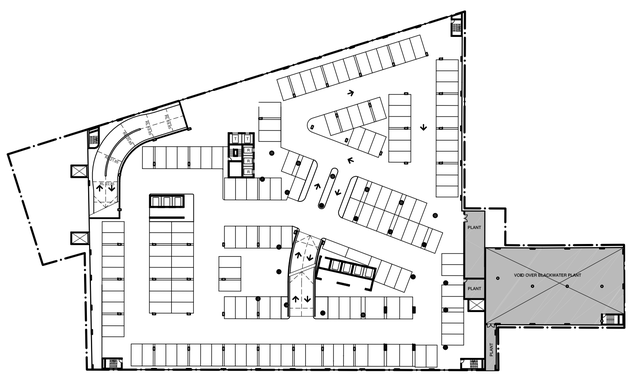

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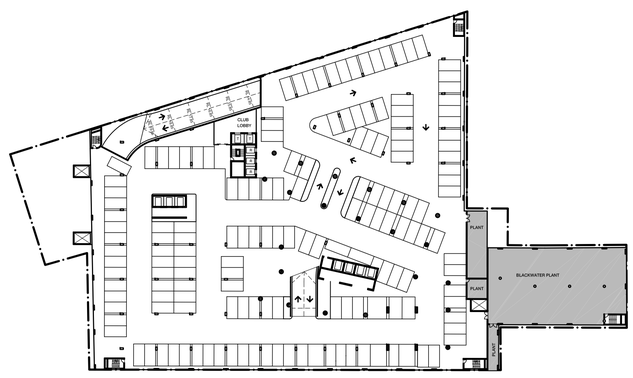

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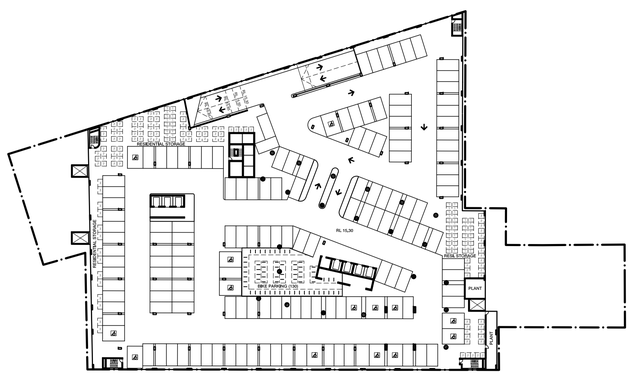
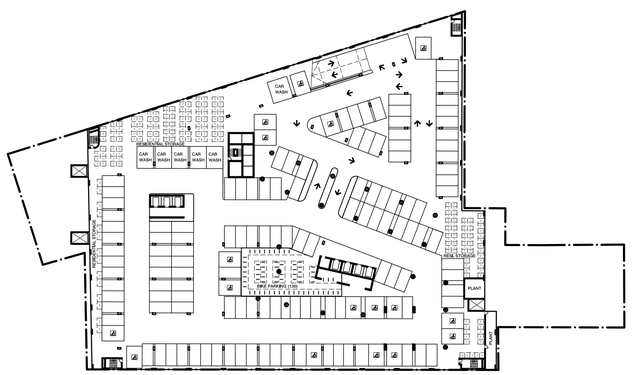


BASEMENT 7



BASEMENT 8

PARKING SCHEDULE

	PUBLIC	RESI	TOTAL
B1	-	-	**-**
B2	31	-	**31**
B3	74	-	**74**
B4	157	-	**157**
B5	154	-	**154**
B6	160	-	**160**
B7	-	154	**154**
B8	-	139	**139**
TOTAL	**576**	**293**	**869**

Revision		
-	-	-
07	preliminary issue for coordination	25.10.2011
08	inc services & ESD input	31.10.2011
09	parking update	04.11.2011
10	basement 9 deleted following cinema deletion	11.11.2011
11	update from Fire & Life Safety review	17.11.2011
12	update from services review	22.11.2011
14	for coordination	18.01.2012

Revision

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PTW

Drawing

DRAWN LJR
CHECKED DH
PROJ NO. 210.006.00
SCALE not to scale
DATE as Rev

SCHEDULE OF CAR PARKING & BASEMENT PLANS

Project
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PA100/1 14
-

Appendix B Paramics Modelling

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Memorandum

To	Christopher Zito (RTA)	**Project**	Rozelle Village TMAP
From	Jason Rudd		
Date	19 September 2011	**Ref**	JCATCKm01

Re Rozelle Village TMAP – Traffic Modelling Methodology Statement

Dear Chris

Thank you for allowing Halcrow to utilise the RTA's Inner West Busway model as part of the transport assessment for the Rozelle Village TMAP.

The following sets out our proposed methodology for using the Inner West Busway model to address the TMAP requirements set out in the Director General Requirements for this study.

Modelling utilising this methodology is about to commence. Thus should the RTA have any comments regarding the appropriateness of methodology to deliver findings in accordance with the DGRs we request that these comments be proved to us by 23 September 2011 such that they can be reviewed and incorporated into the modelling methodology.

Modelling Methodology

1. General

The following is a methodology for the modelling of Victoria Road and associated roads for the development approval process for the Tiger's site in Rozelle. The model will be produced in Paramics using the Signal Player plugin to control the signal timings to replicate the existing SCATS operation. Future signal timing changes will also be reflected in updated signal player files and/or fixed time signal operation.

The following software will be used in the development of the models.

- Quadstone Paramics (ver 6.7.1)
- Ceejazz Plugins (6.7.1)

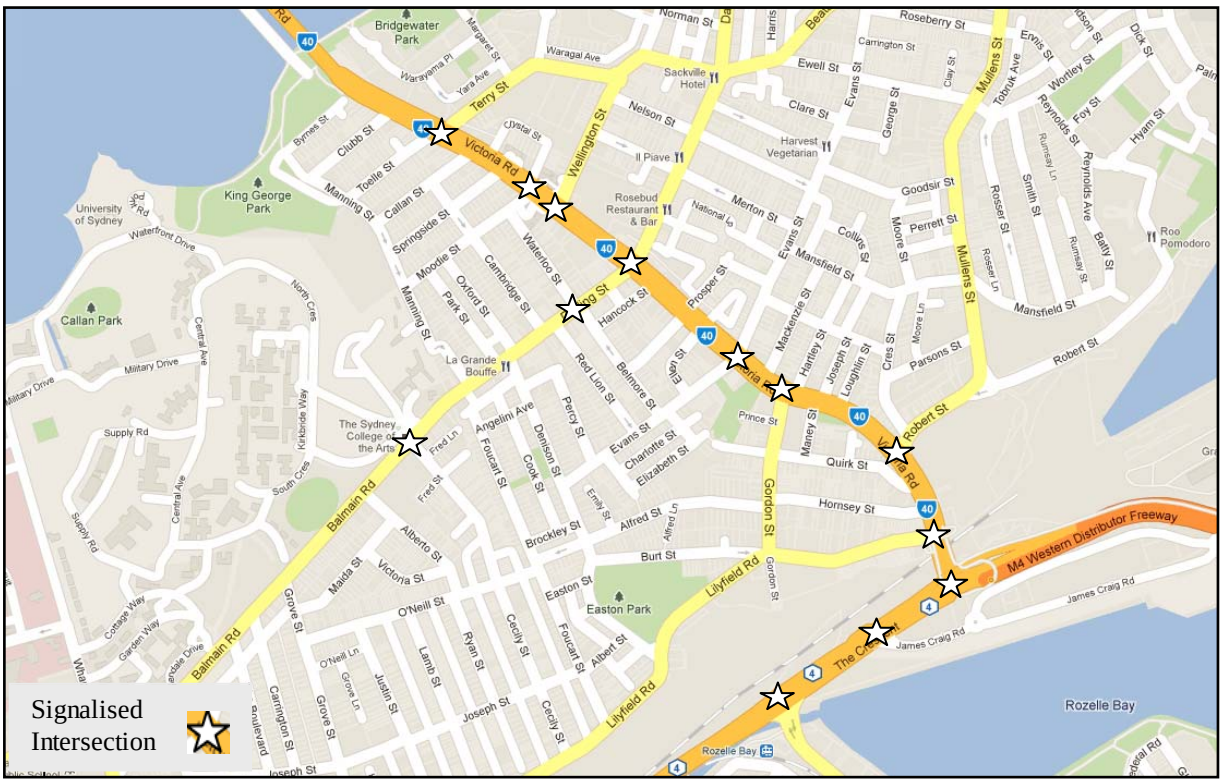
2. Data Collection

Paramics models require that a number of data inputs are sourced from traffic volumes to signal timings and road geometry. This section describes the data collection process.

2.1 Traffic Counts

Traffic turning counts have been undertaken by a qualified traffic survey at the locations indicated on the plan below.

This covers the intersections specified in the Director General's requirement. The counts are classified by vehicle type, Lights, Heavies and Buses in 15 minute periods.



All traffic counts will be entered into a stick figure to provide a graphical representation of the traffic volumes and to allow any discrepancies in the counts to be easily identified.

2.2 Pedestrian Counts

As pedestrians interact with vehicular traffic at intersections pedestrian counts were included in the intersection traffic survey counts. These counts record the volumes using pedestrian crossings at major intersections and delays to traffic and buses due to the presence of pedestrians will be reflected in the models.

2.3 Bus Travel Times

Bus travel times have been recorded at three locations using vehicle matching techniques. The locations were:

- Robert St Bus Stops
- Bus Stops south of Darling St
- Bus Stops near Terry Street.

These bus travel times will be used to calibrate the bus travel times in the model.

2.4 Signal Timing

Traffic signal timing will be purchased from the RTA. This includes:

- LX Files
- History Files (.Hist)
- SM Files (.SM)
- Signal Plans
- IDM files to be recorded for a Thursday and Saturday

These files will be used as inputs to the Signal Player Plugin.

2.5 Site Inventory

A site visit will be undertaken to record parking restrictions, bus stop locations, speed restrictions and non-complying behaviour near the site. This will be recorded on a plan.

2.6 Observations

Observations of traffic conditions will be made to understand driver behaviour and queuing patterns.

3. Traffic Demands

The following considerations

- Vehicle traffic demands will be based on the observed counts.
- The OD matrix pattern will be built up from Halcrow's SMTM model and previous modelling work undertaken in the area.
- The OD pattern will be refined using the estimator module in Paramics to match turn counts with most recent survey data.

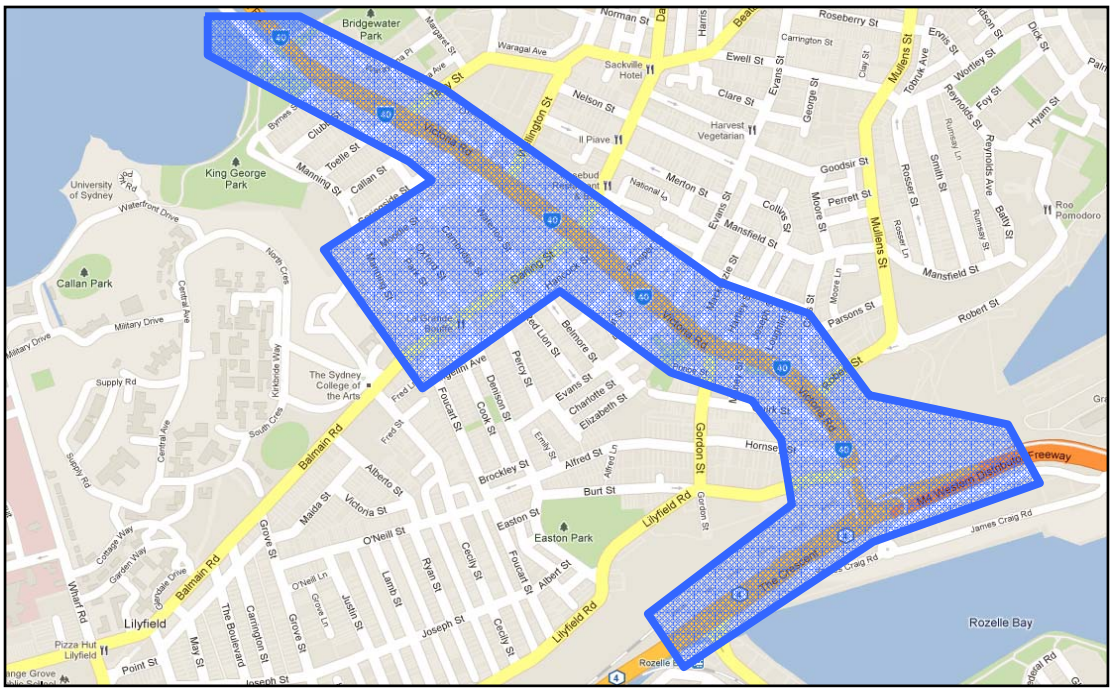
- It will be assumed there is no traffic growth in the peak direction within the corridor as the network is close to capacity and historical evidence suggested that volumes have remained stable over the past 10 years. Notwithstanding the above we will review the future predictions from the SMTM for both Peak direction and non peak directions and accounted for in the future models.

4. Model Structure

The following section describes the model structure.

4.1 Model Extents

The model will be based on the RTA's Inner West Busway model with a cut at Iron Cove Bridge but with extensions east along Darling Street and inclusion of the Streets between Darling Street and Moodie Street. The extents are shown in the figure below.



4.2 Model Periods

The modelled periods will be:

- Thursday AM Peak (6-10am)
- Thursday PM Peak (3-7pm)
- Saturday Midday Peak (10 – 2pm)

The models will include a 1 hr 'warm-up' period to load traffic onto the network. A 2 hour calibration period calibrated for each hour followed by a 1 hour cool down period. The Peak hours will be chosen based on the results of the traffic surveys.

4.3 Pedestrian Crossings

Pedestrian crossings would by modelled to reflect the delays caused to turning vehicles.

4.4 Bus Coding

Buses will be coded according to published bus timetables and where possible this will include school buses. However as there are other buses including dead runners not timetabled we will attempted to match bus volumes to the observed counts. These buses would not use bus stops.

4.5 Signal Control and Coordination

The model will make use of the Signal Player plugin. This process allows the traffic signals in the model to be based on SCATS history files. The process uses 15 minute averages and can replicate the signal coordination within subsystems. This would be the closest to SCATSIM without using SCATSIM.

4.6 Heavy Vehicle Proportions

The vehicle demand matrices will be divided into two separate matrices for light vehicles and heavy vehicles. The heavy vehicle proportions will be based on the observed traffic data.

4.7 Profiles

A vehicle arrival profile will be set up in the model for 15 minute periods to reflect the build up of traffic over the peak. This will be based on the arrival patterns at the cordon of the model.

4.8 RTA Standard Files

The RTA standard files will be used as a basis of the model. These include the vehicles file, configuration and categories files. Some minor changes to these files may need to be made depending on the model.

The TWOPAS climbing model will be used as the model includes gradients.

4.9 Bus Lanes

A bus lane restriction will be coded to replicate the bus movements. The lane choice plugin will be used to replicate general traffic vehicles turning from the bus lane.

4.10 Parking Restriction

The use of lane closures will be used to replicate parking.

4.11 Traffic Assignment

As there is limited route choice in the model the models will use the "all or nothing" plus perturbation assignment method. Perturbation will be set to 5% for all vehicle types.

4.12 Constraints

End constraints in the study area will be used to replicate congestion outside the study area. This will based on the observed congestion on site. For example congestion north of the Iron Cove Bridge may tailback into the model and this may require an end speed on Iron Cove Bridge to replicate this. Similarly any congestion at The Crescent will be similarly represented.

4.13 Plugins

The model will make use of the Plugins to provide additional functionality. The key plugins to be used are:

- Signal Player
- Lane Choice
- Economic Evaluation
- Level of Service
- Validator

5. Calibration and Validation

5.1 Calibration

The Calibration of the models will focus on matching the observed traffic volumes to the modelled. We will adopt the DMRB (part 12) standard of 85% of all turn counts below a GEH of 5 and no counts greater than a GEH of 10.

5.2 Validation

The models will be validated qualitatively to the observed queuing behaviour. Further the buses will be validated to the observed travel times.

5.3 Reporting

A calibration report will be produced that will include:

- Assumptions
- Data Used
- Calibration Statistics
- Description of the Validation

6. Future Model Testing

Future model testing will require:

- Coding of upgraded intersections and car park access.
- Additional trips generated by the site.

The network coding will include the modelling of the car park access and ticket barriers.

The car park access from Victoria Road will require modification of the existing intersection at Wellington Street. The intersection will be coded as per the car park design and signal timings adjusted to optimise traffic flows along Victoria Road.

Boom gates will be included in the model to investigate the potential problem of entrance queues extending onto Victoria Road. This will enable the number of gates required for the design to be determined.

Traffic generation for the site will be developed using floor space area rates and traffic generation from comparable developments. This will be the subject of more detailed investigation. Likewise traffic distribution for the site will be based on available information.

Should you have any queries regarding the above please do not hesitate to contact either Stephen Read or myself on 02 9410 4100.

Regards

Jason Rudd
Associate Director

Rozelle Village TMAP

Working Paper 2 - Network Build

31 October 2011

Prepared for

Pacific Investments Pty Ltd

Halcrow

Rozelle Village TMAP
Working Paper 2 - Network Build

Prepared for
Pacific Investments Pty Ltd

This report has been issued and amended as follows:

Rev	Description	Date	Prepared by	Approved by
V01	Client review	31/10/11	SWR	JR

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Contents

1 Introduction

Halcrow were commissioned by Pacific Investment Pty Ltd to build a Paramics traffic model of Victoria Road, Rozelle for the development of Rozelle Village. This working paper details construction of the Paramics Network and includes a description of:

- Network Road Coding
- Bus Routes
- Signal Timings
- Pedestrians
- Model Structure

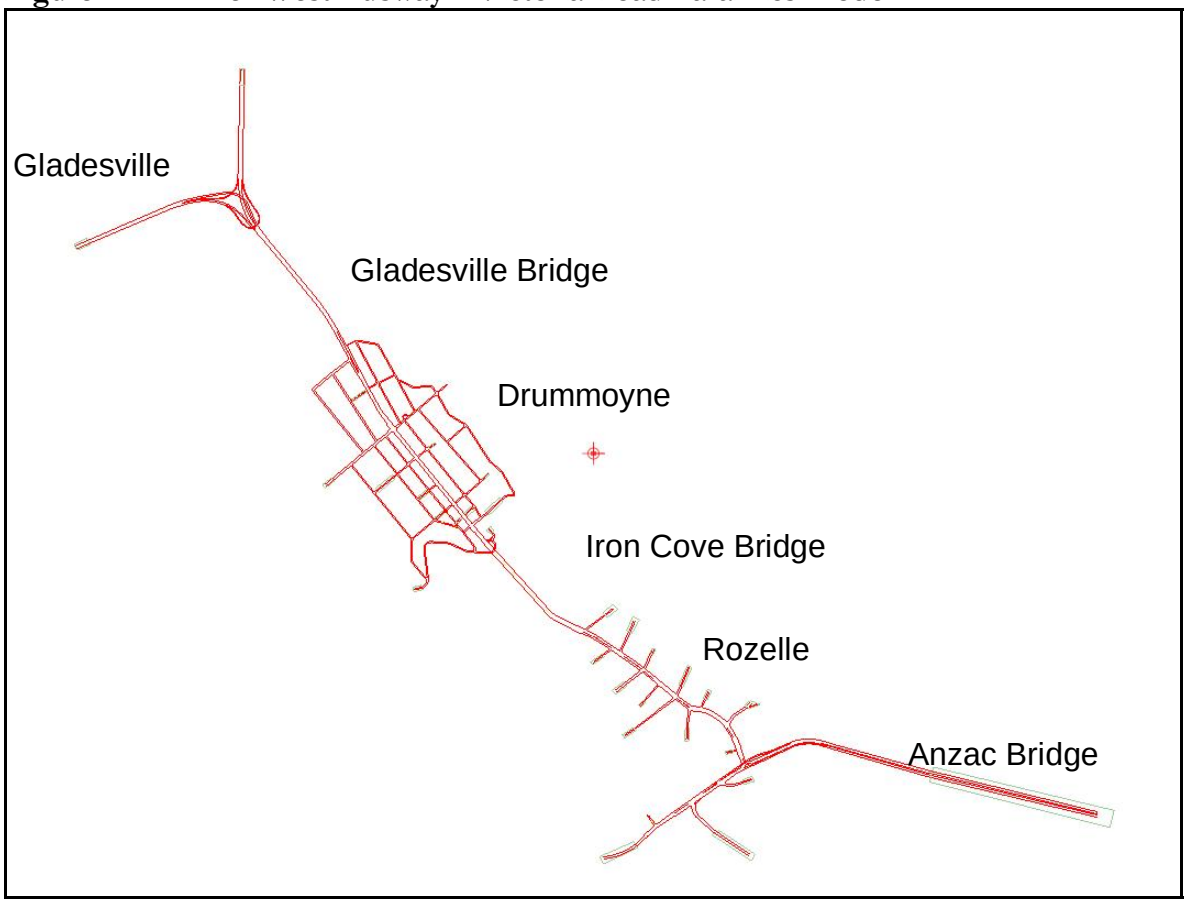
Paramics is a Microscopic-simulation that models the behaviour and interaction of individual vehicles. The model is graphical in nature and can be used to quickly visualise traffic conditions in a way that is readily understandable by the traffic engineer or lay person. It can also be used to collect traffic statistics that can be used to evaluate the traffic network performance.

2 Network

2.1 Road Network

The Paramics network is based on the RTA's Victoria Road model for the Inner-West Busway which is shown in the Figure 1 below.

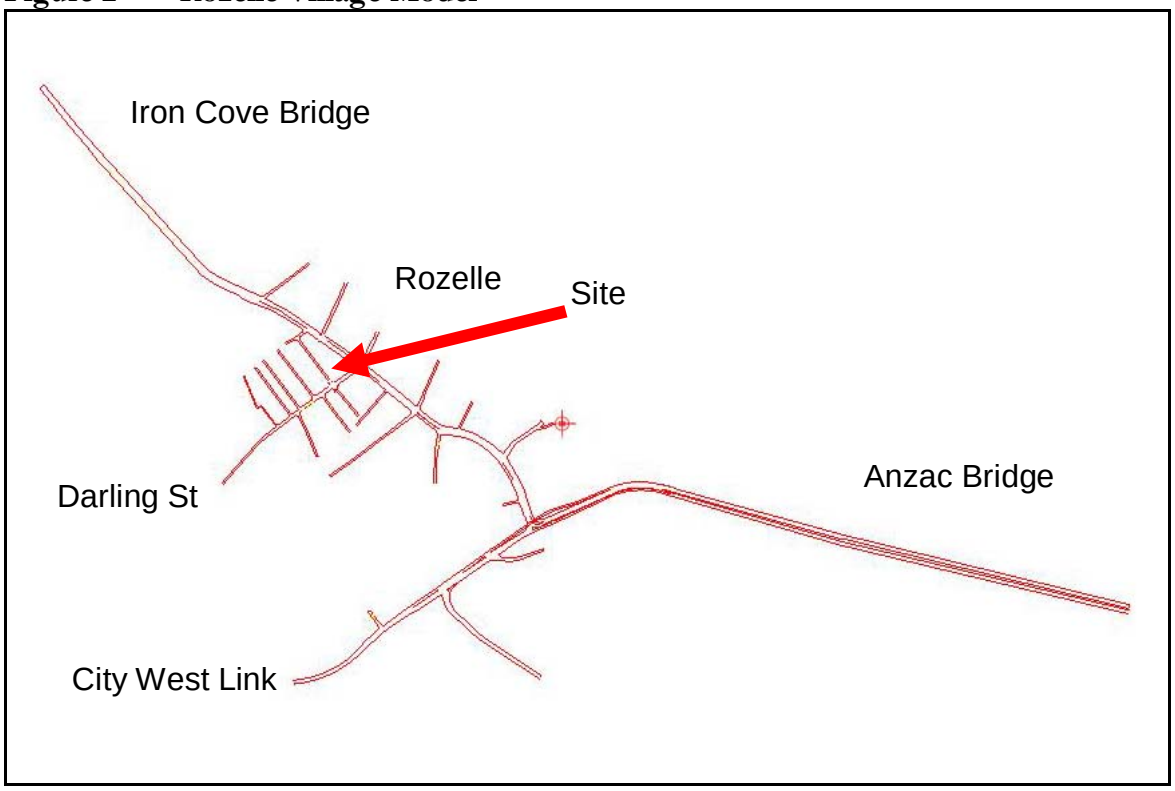
Figure 1 Inner-West Busway – Victoria Road Paramics Model



The Victoria Road Inner-West Busway model was cut at Iron Cove Bridge keeping the southern section including Rozelle, The Crescent, City West Link and Anzac Bridge. The model was then extended along Darling Street to include the intersections of Darling Street and Waterloo St, Cambridge St, Oxford Street, Park Street as shown in Figure 2.

The model network used reflects the requirements of the Director General Requirements (DGRs) for the Rozelle Village development dated 5 April 2011.

Figure 2 Rozelle Village Model



The networks have been further refined to reflect the on-street parking and lane arrangement for each model scenario. The following key differences have been included.

- **AM Peak** – This model includes the tidal flow and bus lane arrangements that are in the morning peak.

- **PM Peak** – Lane arrangements in the afternoon peak with clearways and the double right turn at Darling Street.

- **Saturday Peak** – With the same lane arrangement at the PM Peak the Saturday peak reflects the effects of parking along Victoria Road on weekends. This is achieved through closing the kerbside lane to vehicles.

2.2 Zones and Sectors

Paramics introduces traffic onto the road network from zones. Each vehicle in the model is assigned an origin zone and a destination zone. The zones in the model were chosen replicate those in the Victoria Road Inner-West Busway model, however to simulate the extension along darling Street additional zones were added to the model. Each of the zones used are compared in Table 2-1.

Table 2-1 Equivalent Zones

Zone	Victoria Road Model	Rozelle Village Model
Burns Bay Drive	1	Not Used
Lyons Road	2	Not Used
Edwin Street	3	Not Used
Day Street	4	Not Used
Thornley St	5	Not Used
Park Avenue	6	Not Used
Cary Street	7	Not Used
Terry Street	8	2
Wellington Street	9	3
Darling Street	10	10
Evans Street	11	11
Joseph Street	12	12
Robert Street	13	13
ANZAC Bridge	14	14
James Craig Road	15	15
The Crescent	16	16
City West Link	17	17
Lilyfield Road	18	18
Gordon Street	19	19
Evans St	20	20
Withecombe St	21	21
Darling St (West)	22	9
Moodie Street	23	4
Henley Marine Drive	24	Not Used
Thornley Street	25	Not Used
Day Street	26	Not Used
Church Street	27	Not Used
Edwin Street	28	Not Used
Lyons Road	29	Not Used
Victoria Road	30	Not Used
Tavistock St	31	Not Used
Cambridge Street	Not Used	5
Oxford Street	Not Used	6
Park Street	Not Used	7
Manning Street	Not Used	8
Red Lion Street	Not Used	21

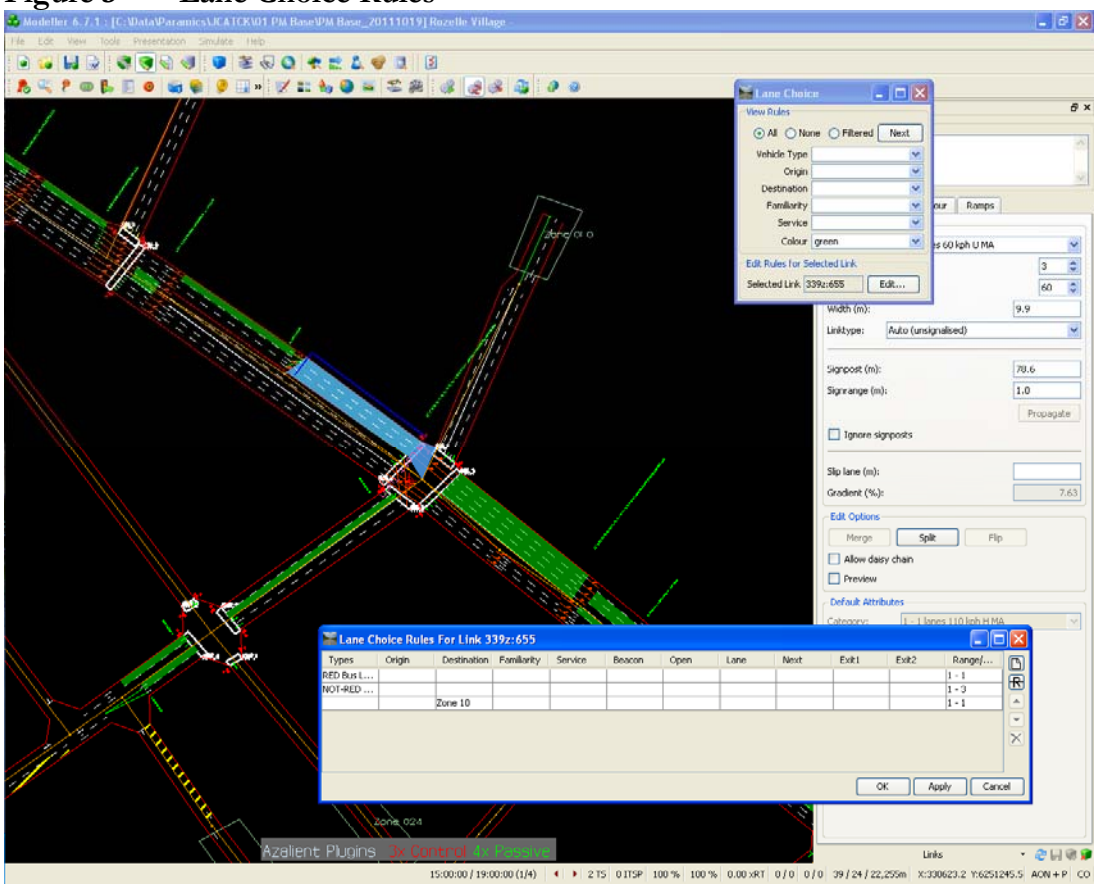
Denison Street	Not Used	23
Belmore St	Not Used	24

2.3 Lane Choice Rules

The models use the Ceejazz plug-ins to provide additional functionality. Plug-ins are third party software that take advantage of the Paramics API. The Victoria Road model uses the 'Lane Choice' plug-in to improve the lane discipline within the model. This is important in congested networks where vehicles may not find suitable opportunities to change lanes.

The lane choice rules were adapted from the Victoria Road Inner-West Busway model by adjusting to the equivalent zones in the Rozelle Village model using the table above. In some instances sectors, or zone groups, were required to replicate 1 zone in the Victoria Road model.

Figure 3 Lane Choice Rules



3 Buses

Bus routes were adopted from the Victoria Road models. These bus routes included the timetabled buses and the 'dead runner' (buses returning to the depot). These bus routes were matched to bus stopping patterns and stop times surveyed for the Inner-West Busway.

A similar bus pattern was assumed for Saturday with the volume of buses calibrated to the traffic survey volumes.

Figure 4 Coding Bus Routes

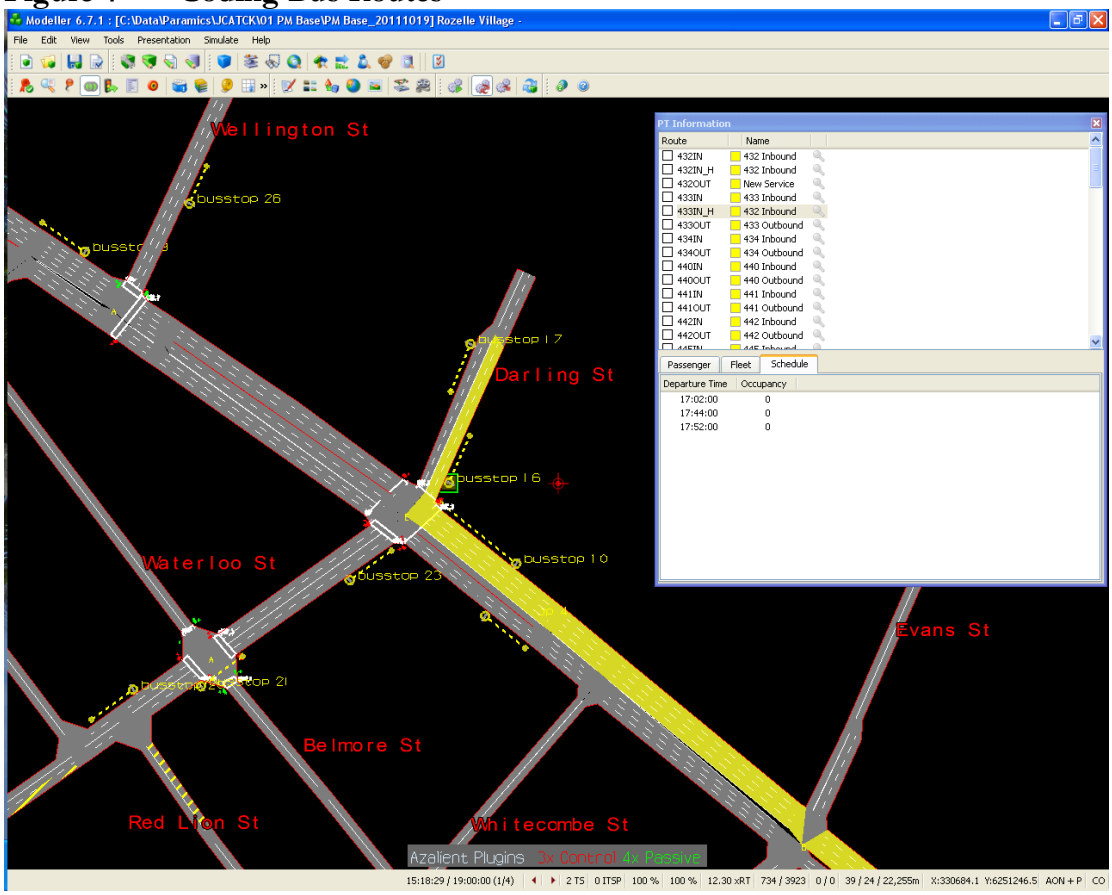
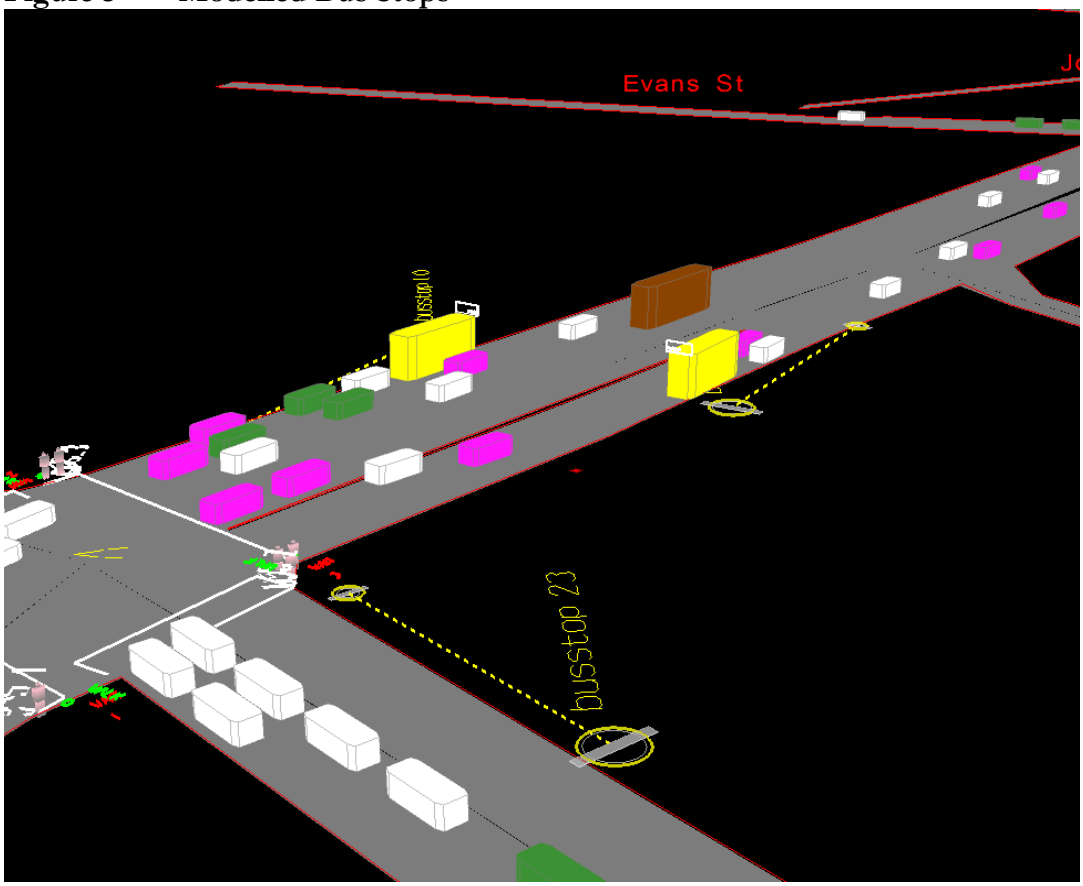


Figure 5 Modelled Bus Stops



4 Traffic Signals

4.1 Signal Player

The model has a number of traffic signals that have been coded into the network. The signalised intersections include:

- Victoria Road / Terry Street
- Victoria Road / Wellington Street
- Victoria Road/ Darling Street
- Victoria Road / Evans Street
- Victoria Road / Gordon Street
- Victoria Road / Robert Street
- Victoria Road / The Crescent
- Darling Street / Waterloo Street
- The Crescent / James Craig Road
- The Crescent / City West Link

Signal timings in the model are modelled using the signal player plugin. Signal Player takes data produced by SCATS (Sydney Coordinated Traffic System) and averages the signal timings by 15 minutes. This is then replayed in the model.

The advantage of this system is that the signals operate similar to the real world traffic signals. The data also provides offset data which can be used to create the proper signal coordination in the models.

Figure 6 Traffic Signals (Darling Street)

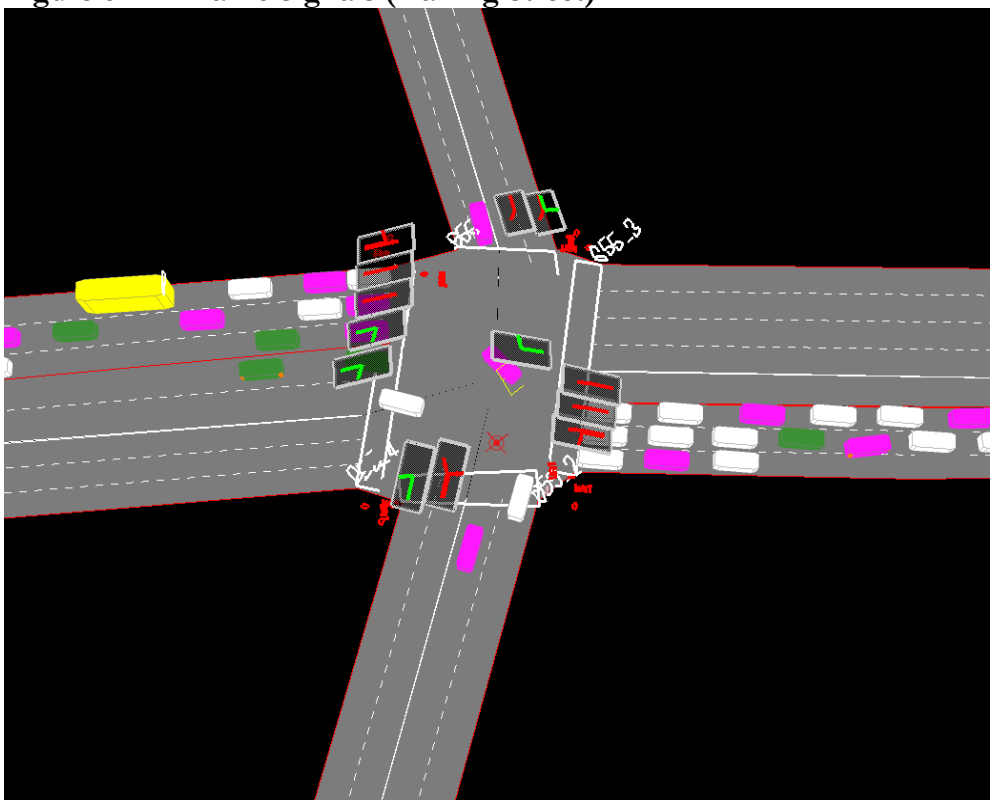
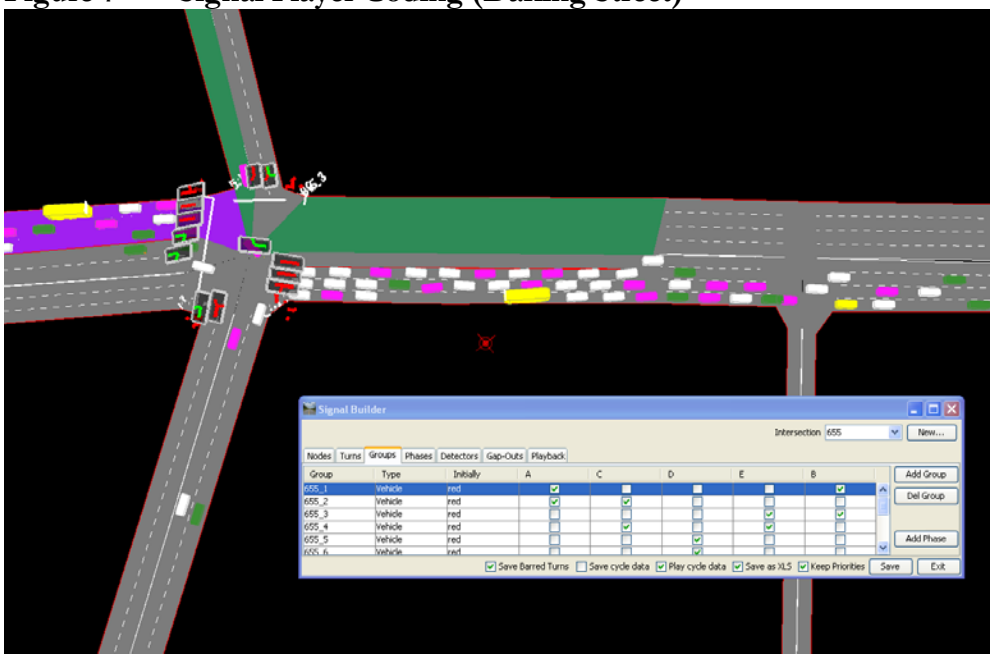


Figure 7 Signal Player Coding (Darling Street)

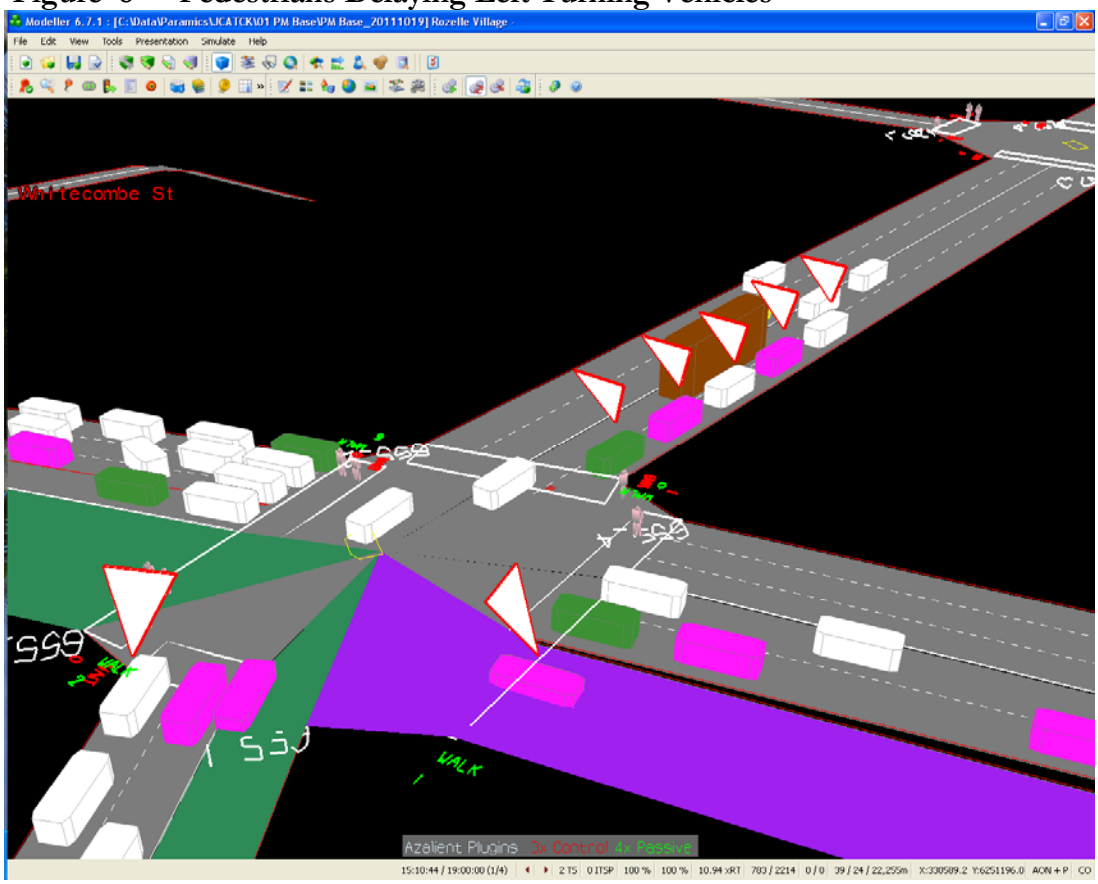


5 Pedestrians

The models reflect the effect of pedestrian crossings on traffic flow and the delays to turning vehicles using the Pedestrian Plug-in. This allows pedestrian using the relevant pedestrian volumes the models delay vehicles that are turning while a pedestrian is crossing. As the models are run with the signal player the pedestrian phases are called every cycle.

However data collected shows that pedestrian volumes are high enough that a pedestrian walk is called almost every cycle. Figure 8 shows left turning vehicles being delayed by pedestrians. The delayed vehicles are indicated by the triangles.

Figure 8 Pedestrians Delaying Left Turning Vehicles



6 Network Configuration

6.1 Model Periods

Three model scenarios have been set up to represent:

- AM Peak
- PM Peak
- Saturday Peak

With in each of the model there are 4 periods – Warm-up, Calibration Hour 1, Calibration hour 2 and the model cool-down.

6.2 Traffic Assignment

The models have only 1 area where vehicles have a choice route to the same destination and that is at Waterloo Street or Darling Street to reach Victoria Road. Cost factors were added to the model to place a cost for using the back roads and an alternate route. Figure 9 illustrates the proportions using each route by bandwidth in blue.

Figure 9 Route Choice Bandwidths for Waterloo Street