North Eveleigh Concept Plan

Response to comments made by SKM on behalf of Department of Planning

August, 2008

Redfern Waterloo Authority

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NCSI Certified Quality System ISO 9001

2112425C PR_1983 RevA

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Date:	19 August 2008
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Contents

Page Number

Executive summary ..... **iii**

1. Introduction **1**

1.1 Background 1
1.2 Organisation of report 1

2. Traffic generation **2**

2.1 SKM comment 2
2.2 Traffic generation factor justification 2

3. Heavy vehicle routes **4**

3.1 SKM comment 4
3.2 Heavy vehicle traffic 4
3.3 Heavy vehicle routes to North Eveleigh 5

4. Parking provision **6**

4.1 SKM comment 6
4.2 Comparison of parking standards 6
4.3 Why the increase in on-street parking is necessary, but not an inducement to car use 7
4.4 Implications of adopted parking codes 7

5. Additional issues **9**

Contents (continued)

Page Number

List of tables

Table 4-1 Comparison of parking rates for residential development 7

List of figures

Figure 3-1 Expected truck routes to the North Eveleigh site 5

List of appendices

Appendix A
Table of comments and responses
Appendix B
Vehicle tracks
Appendix C
Built Environment Plan – Traffic & Transport Strategy

Executive summary

PB was commissioned by the Redfern Waterloo Authority to undertake a Traffic and Transport Impact Assessment (TIA) for the concept plan for the development of the former railway yards at North Eveleigh. The concept plan was submitted to the Department of Planning in June 2008. PB was asked by Redfern Waterloo Authority to respond to comments from a review of our work by SKM, on behalf of the Department of Planning.

PB has had a long standing involvement in the precinct, which included earlier assessments to determine the capacity of the North Eveleigh site along with other strategic sites in the Redfern Waterloo area as part of a traffic and transport context to the Built Environment Plan (a copy of which is attached to this report as Appendix C), and the earlier traffic assessment for the Carriageworks Centre for the Performing Arts Centre.

SKM raised several questions in its review, and our responses are discussed in depth in Chapters 2-4. A complete list of SKM's issues and comments is included in Appendix A with our responses.

The three key points SKM raised were:

The methodology and validity of the traffic generation rate used by PB

This is described in Chapter 3 of the *North Eveleigh Traffic and Transport Impact Assessment.* PB used the RTA rates for commercial and residential developments set out in the RTA's *Guide to Traffic Generating Developments.* The rates were then subject to site adjustment factors, also described in the report, to account for its density, transit availability and urban location. This was done to reflect the nature of the development in relation to the average metropolitan medium density housing site.

The impact of heavy vehicles accessing the site

The proportion of heavy vehicles in local traffic is unlikely to change due to this development, with the exception of the construction period. PB discussed potential heavy vehicle routes and likely generation of heavy vehicles within chapters 2 and 5 of the TIA. More specific generation forecasting is dependant on the final use of the site by the commercial and retail tenants. The heavy truck routes proposed in the TIA follow the shortest routes to the state roads and are similar to ones designated for construction of the Carriageworks Performing Arts Centre. The routes would connect King Street and the western access, along Golden Grove Road, and from City Road along Shepherd Street or from Cleveland Street via Abercrombie Street, then Shepherd Street to the eastern access. A map is given on p 4.

The proposed parking rates adopted by the concept plan.

The proposed parking code for North Eveleigh adopts the principles of the City of Sydney LEP. They fit with the parking rates set for developments in the local area. The former South Sydney parking rates were applied to commercial and retail components of the development.

The adopted code has been tested to ensure that sufficient off-street parking is provided for residents of the development, and to ensure demands for existing on-street parking are not unduly increased, while constraining the overall parking supply to discourage commuter vehicle trips.

1. Introduction

1.1 Background

PB was appointed by Redfern Waterloo Authority (RWA) to undertake the traffic and transport impact assessment required by the Department of Planning (DoP) as part of the Director General of Planning's requirements (DGR's) under part 3(a) of the Environment and Planning Act [1979]. This work continued on from traffic and transport planning principles established in the Traffic and Transport Planning Report that accompanied the Built Environment Plan for RWA sites in the Redfern, Eveleigh and Darlington Area.

PB has been involved with this project and other projects in the local area for a number of years and has gained a significant understanding of local traffic conditions and those likely to be experienced in the future.

This report responds to comments and requests for further information made by the consultants SKM who provided the Department of Planning with an independent review of the traffic and transportation impact study prepared by PB.

1.2 Organisation of report

This report is organised as follows:

Chapter 1 - provides a brief overview of the work undertaken prior to this report.

Chapter 2 – provides an explanation of the methodology used to derive traffic generation for the North Eveleigh site.

Chapter 3 – provides further details of the heavy vehicle route currently used and proposed to be used to access the North Eveleigh site

Chapter 4 – summarises the comments made and provides an overview of the responses to the comments raised by SKM and tabulated in Appendix A

Appendix A – reproduces the table of comments and requests for information made by SKM and provides our detailed responses.

2. Traffic generation

2.1 SKM comment

With regard to traffic generation SKM made the following comment:

> *We are concerned that the nominated trip generation rates potentially underestimate traffic generation from the proposed development. It is our understanding that trip generation rates published by the RTA are for vehicle trips, and include some allowance for such factors as vehicle occupancy and non-car mode use. Thus the approach taken by PB to further discount the traffic generation for mode share and vehicle occupancy requires justification.*

2.2 Traffic generation factor justification

PB used trip generation rates set out in the RTA's *Guide to Traffic Generating Development,* then adjusted them to reflect the character and situation of this particular concept plan.

Some of the residential buildings in this concept plan clearly met the definition of High Density residential, while some might be closer to medium density given the height constraints, so we took a very "prudent" base and then looked at accepted factors for travel reduction. For the residential components of the site, PB started with the **upper end** value of the range given for 'Medium density residential flat buildings' in the RTA Guide, which was 6.5 vehicle trips per dwelling per day.

The RTA guidelines allow for 25% of that rate to be "internal trips" to the zone in which the dwellings are located. Given the mix of land uses within and adjacent to the site, and its close proximity to major employment sites, limited parking and kerbside restrictions, these 25% are not expected to be vehicle trips. This took the number of daily vehicle trips to 4.9.

This rate was then discounted for the extremely high access of the residential zone to frequent train and bus services as two/thirds of the average metro generation rate given the mode expectations. This resulted in a daily trip rate of 3.2, and it can be reasonably argued this site's rate is closer to 3 vehicle trips per day per dwelling (or 0.24 vehicle trips per dwelling in the peak hour) assumed for high density residential flat buildings in the RTA Guidelines. This is the final rate used in the analysis reflected:

- inner city densities of destinations
- transit availability
- small size of average units
- parking restrictions at likely trip destinations.

For the commercial development, vehicle trip generation was based on the Gross Floor Area (GFA) Trips result from employees needing to get to and from employment. This means that the vehicle trip generation is closely linked to the employment density. PB worked with RWA to determine an appropriate employment density of 4 employees per 100 square metres of GFA, in order to balance the availability of transit and parking capacity and future travel behaviour.

RTA's commercial vehicle trip generation rate reflects an average behaviour across the metro region from surveys of several years ago. Applying it fully would result in a far higher estimated car use than is expected at North Eveleigh given the location and the concept plans commitment to reach mode share targets and restrict parking. A mode share factor of 40% was applied to all trips, including the commercial trips, which is in line with similarly located and transit-served centres such as North Sydney, Bondi Junction and Chatswood. For the North Eveleigh traffic, a car passenger factor of .25 was applied to the vehicle traffic to account for the relatively low vehicle ownership ratio expected as per the City of Sydney, Waverley and Leichhardt ratios.

For the retail spaces, PB again used the RTA *Guide to Traffic Generating Developments.* Trip generation for retail space was considered to best relate to Gross Leasable Floor Area (GLFA), so a conversion factor was applied to the GFAs provided by RWA to produce a GLFA figure, as this reflected the mixed use nature of the site and its community focus.

Retail trip generation is complex and governed by a range of factors including the size and nature of the stores and businesses, along with their proximity to commercial and residential areas. Businesses such as cafés, hairdressers and video stores in metropolitan areas can thrive and generate a high number of customers, very few of which will arrive by vehicle or even as a part of linked-car trip. Conversely, stores selling bulky goods or specialist stores may be visited almost entirely be vehicle users but are likely to generate few trips. To provide an estimate of the likely trip generation for the retail area in the concept plan, PB used the trip generation rate for a retail development of up to 10,000 square metres of GLFA in size, of 12.5 vehicle trips in the peak hour. This was then factored to allocate relatively high levels of mode share to walking and cycling then a 40% transit use rate to account for the high mode share already achieved in the area, convenience use by passing pedestrian traffic to the University and nearby residences. So if you like discounts were applied to account for internal trips within the site from the mixed use in North Eveleigh and Darlington and linked trips with commuters and students passing the site between their origins and destinations and the train station.

3. Heavy vehicle routes

3.1 SKM comment

SKM made the following comments regarding heavy vehicle routes to the North Eveleigh site:

> *Our observations suggest that the nominated heavy vehicle access routes are not of suitable standard to safely cater for heavy vehicle traffic, in particular articulated trucks, and are likely to impact significantly on amenity in the predominantly residential Golden Grove and Wilson Streets. The assessment does not address this issue, and our concern is that an increase in heavy vehicle activity would have a negative impact on safety and amenity in the area. Justification of the use of these streets for heavy vehicle access is required.*

3.2 Heavy vehicle traffic

The North Eveleigh site currently attracts heavy vehicle traffic, including articulated vehicles and coaches, to the existing western site access. This traffic is infrequent for the current users, CarriageWorks and RailCorp. Existing heavy vehicle traffic is discussed in chapter 2 of the TIA. The likely future traffic and impacts are presented in Chapter 5 of the Traffic Impact Assessment.

After the construction phase, truck traffic is expected to be limited to:

- waste disposal from residential and commercial properties, this is a activity that currently occurs in neighbouring streets thus the additional trucks needed to service the site are unlikely to further degrade existing levels of safety or amenity
- occasional deliveries, including by articulated vehicles and coaches, to the western end of the site, and this is anticipated to be at the levels currently experienced, thus no net change from current levels of safety or amenity.
- deliveries to the retail floor space. The number of deliveries will be dependant on the final retail tenancies. If the space were to be used as a mid sized supermarket (2000 square metres) than a single delivery by a large truck once to twice a day would be standard practice. Permissible use of the loading dock, and details of delivery handling and time restrictions, would be subject to conditions of consent and related traffic management plan.

During the construction phase, additional truck traffic can be expected. The size and numbers of trucks will be dependant on the final design of buildings, the actual tenancies, the construction method adopted and the phasing and timing of works. As original levels are largely maintained, it is the excavation stages of the new residential and commercial buildings that are expected to represent the peak truck movement period. Paths of movement will depend on the contractors used, but are expected to be no wider in impact than during the recent construction of the CarriageWorks Performing Arts Centre. A Trafffic Management Plan would be required at the development approval stage taking into account the traffic management principles discussed in the North Eveleigh report.

3.3 Heavy vehicle routes to North Eveleigh

Routes suitable for heavy vehicles in the Darlington area are limited and the area is covered by an environmental truck ban to protect residential and educational amenity. Truck traffic within the Darlington area is largely limited to:

- deliveries to shops on Abercrombie Street, the TAFE and university buildings
- waste disposal and recycling activities
- occasional coach traffic to the university and TAFE
- occasional deliveries and removal vehicles.

The expected routes, shown in Figure 3-1, for the existing heavy vehicle traffic from the site are Wilson Street, Shepherd Street and Abercrombie Street to gain access Cleveland Street; and Wilson Street and Golden Grove Street to gain access to King Street. These routes, while not suited to large volumes of heavy vehicular traffic, are capable of accommodating the expected low levels of truck traffic.

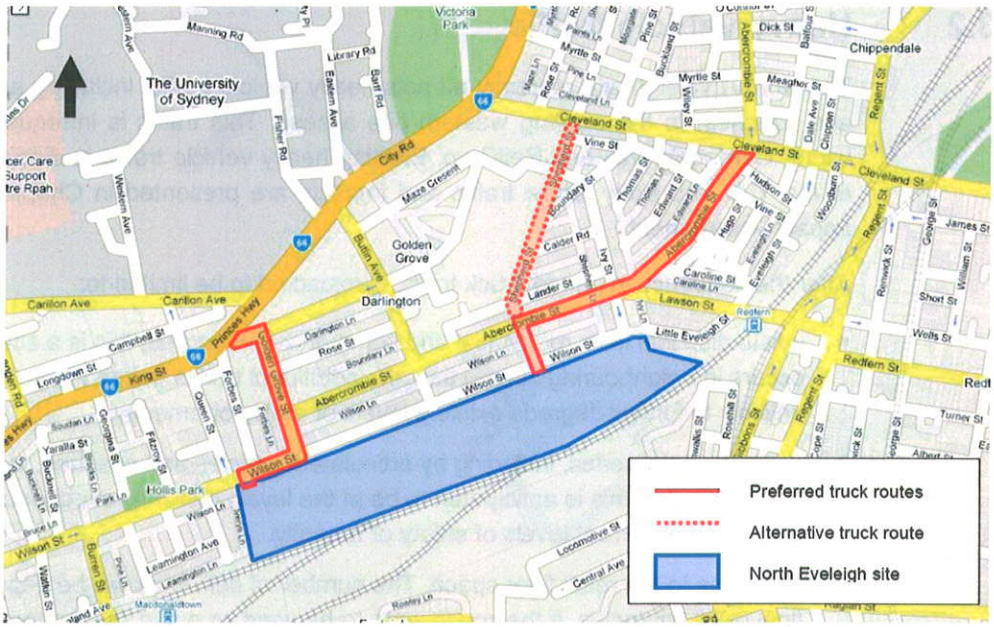


Figure 3-1 Expected truck routes to the North Eveleigh site

While the roads in the Darlington area were not built during an era that addressed heavy vehicle traffic; service, fire and garbage collection vehicles do use the site. Other factors such as the predominantly residential nature of the area (with little set back from the street), the amount of on street parking and the widths of roads also work to discourage the use of the streets by large vehicles. Excess speed will not be a factor in the area or a concern with safety. The expected volume of heavy vehicles is not anticipated to increase significantly and thus is unlikely to have a noticeable impact on either the safety or amenity of the area. Currently, heavy vehicle use in the area very low, so an increase may be detectable by residents. However, the heavy vehicle volumes that can be expected once construction is complete are likely to be less than similar inner-urban residential areas in Sydney where streets are wider and more through traffic infiltrates the residential area to reach the CBD. The barrier of the rail corridor controls many opportunities for rat-running traffic and the long standing LATM schemes have been successful in diverting through traffic to the state roads.

4. Parking provision

4.1 SKM comment

With regards to parking provision SKM made the following comment:

> *"The development proposes rates of parking provision above the current DCP requirements, and creates an increase in on-street parking availability. There is an inconsistency between this approach and the stated objectives of reducing private car use. On one hand, the parking supply is 'intended to manage growth in car travel, while on the other hand the amount of parking to be provided is in excess of Council guidelines. The implications of the parking supply on achieving the mode share targets of the project are not discussed in the assessment."*

4.2 Comparison of parking standards

PB has worked with the Redfern Waterloo Authority to develop appropriate parking standards for the North Eveleigh site, this work is set out in the traffic and transport context report prepared by PB to support stage 1 of the Built Environment Plan for the Redfern Waterloo area. This report is attached in Appendix C.

The areas most recent controls on parking were embodied in the former South Sydney Council's DCP 11 which aimed to reduce vehicle travel in the area by reduced parking provision and by improving public transport, walking and cycling. The City of Sydney is currently developing a new parking code, the status of which is unknown at this time, but is expected to have a similar approach to DCP 11. The intention of the City of Sydney's parking code can be inferred from Chapter 2, part 5 of the Sydney Local Environment Plan 2005 which states that encouraging private vehicles for commuting was inconsistent with its ecologically sustainable development objectives, and the environmental amenity of the city and region.

The parking code adopted by RWA for the concept plan for North Eveleigh aims to provide a maximum acceptable level of parking for the whole of the site that both limits vehicle trips attracted and ensures that "over-flow" parking does not adversely affect neighbouring streets. The code aims to restrain commuter parking for commercial trips while providing enough parking space for businesses to function effectively. For commercial parking, the former South Sydney rates were adopted. These rates were among the most restrictive in Sydney, but the proximity of Redfern Railway Station and the good level of bus transit make these rates feasible and appropriate.

For the residential development on the site, the rates proposed within the City of Sydney LEP 2005 were selected. In setting these **maximum** provisions with RWA, PB reviewed parking rates for the former South Sydney Council DCP11, along with the parking rates adopted by recent developments in the local area. Table 4-1 provides a comparison of parking rates currently adopted close to North Eveleigh.

Table 4-1 Comparison of parking rates for residential development

Land Use	North Eveleigh Concept Plan	City of Sydney LEP	South Sydney DCP 11	Green Square TMAP
1 bed studio	**0.25**	0.25	0.5	0.5
1 bed apartment	**0.5**	0.5	0.5	1.0
2 bed apartment	**1.2**	1.2	0.8	1.2
3 bed apartment / town house	**2**	2	1.2	2
Visitor	**0.166**	0.166	0.166	0.14

The slightly higher maximum potential provision for the larger apartments was endorsed to protect the local streets from on-street parking demand, and recognises that new residents of this development will not be eligible for parking permits under City of Sydney regulations. The final developer is welcome to suggest fewer spaces, and we recommend that in that case, the particular proposal be examined on its merits. Parking over the whole site was set at a maximum so as not to attract more traffic than the reasonable capacity of the local road network. This also reduced the overall density of the concept plan.

4.3 Why the increase in on-street parking is necessary, but not an inducement to car use

Resident parking has been proposed in the residential buildings at a level to minimise demands on on-street parking in established residential areas, but not in multiple vehicle levels to encourage the use of more vehicles than dwellings. The new streets in North Eveleigh are expected to be regulated for resident use or short stay visitors, but the streets will be out of sight of passing traffic in Darlington and on Wilson Street. This, of course, is a regulatory area for City of Sydney. Some local Darlington residents, unable to find parking in their preferred streets, will know to look in this area as an option but casual visitors are unlikely to find the spaces given the remoteness of the new supply and lack of visual connection.

4.4 Implications of adopted parking codes

The concept plan needs to demonstrate that the site and environs surrounding the site can accommodate the proposed development, including sufficient parking. The codes adopted for the North Eveleigh site produce a **maximum** number of spaces that should be provided to meet the broad objectives of: constraining commuter vehicle travel, and providing sufficient parking to permit resident and business activity to be maintained at a reasonable level. The concept plan then suggests how these spaces could be allocated across the land uses proposed to support the mode share target of 60% non-car travel.

Based on the 2006 census data the current transit mode share for journeys to work in the Darlington area, as a whole, is between 30 and 40%. In this context, the target mode share of 60% by transit by 2016 does not seem unreasonable given:

- the accelerated growth in transit use for work trips since 2006 given factors such as oil prices, tolls and the cost of car parking
- the University, a major local employer, does provide parking for staff at rates that will not be repeated in new developments
- the state road network in the vicinity of the concept plan does not have excess capacity or speed flow characteristics that encourage car commuting
- the greater mix of uses proposed will enhance the opportunities for local walking and cycling commutes
- the State Plan transport infrastructure improvements, such as RTA is committed to for the strategic bus corridor on Gibbons/Regent Streets and the proposed upgrade of Redfern Station, which is to be funded by the sale of the North Eveleigh site.

Parking for commuters to the site is limited to 426 spaces for approximately 53,000 square metres of GFA ,which is the level of parking currently required by DCP requirements.

5. Additional issues

SKM tabulated a list of comments and issues requesting clarification. PB's responses to these comments are included in Appendix A. Also appended to this report, in Appendix B, is a more detailed tracking analysis of key parts of the road network showing vehicle body positions and indicative kerb lines.

Appendix A

Table of comments and responses

Section / Paragraph	Topic	Specific Concern	Response
2.5.2 page 17	Bus Services	This section highlights problems with current bus services – how would these problems be addressed to make PT use more attractive?	The RTA is committed to making infrastructure improvements on the strategic bus route, strategic bus corridor 21, Miranda to the CBD, that runs along the Gibbons Street / Regent Street arterial pair to improve the speed and reliability of bus services. The provision of street furniture for waiting passengers and the control of parking along bus routes is under the control of the City of Sydney and there is no direct nexus with this site on those two areas of City control. The net proceeds of the sale of the North Eveleigh site are hypothecated to fund the upgrade of the Redfern Railway station. While the timing of this improvement is not known at this time, and RailCorp are a party to this determination as well, this is expected to improve the attractiveness of public transit for the local area and the quality of interchange along the Strategic bus corridor. Improved wayfinding was recommended in the transport strategy in the BEP.
Table 2-3	RTA Volumes	2005 data is available and should also be reviewed.	Historic traffic data is further discussed in Chapter 3 of the TIA report. Table 2-2 and 2-3 clearly show that traffic is declining. PB did not have access to 2005 data from the selected RTA count sites. 2005 data does not appear to have been published by the RTA and is not included within its website, but more recent traffic counts were available from 2006. Recent changes given petrol prices and mode shifting, does not suggest that 2005 data would add insight into the process.
3.2.5	Justification for modelling AM peak only	The highest uni-directional volume may be in the AM peak, but in terms of 2-way volumes the AM and PM peaks are similar. The analysis, and therefore any recommended improvements to intersections etc would be biased toward the	An analysis of both the AM and PM peak was undertaken prior to a preliminary part 3(a) application. See Appendix C. This showed that the worst traffic in volumetric terms was in the AM peak. Therefore we had no empiric reason to study the PM peak. As many of the intersections are connected to SCATS, cycle times are applied adaptively. Provided the network can accommodate the worst that the peak hour flow the network will function better than this level at all other times.

Section / Paragraph	Topic	Specific Concern	Response
		AM peak, and would not consider the impact in the PM peak, when different traffic patterns are evident. How would key intersections operate in the PM peak period?	
3.5	Date of site visit and traffic counts	11 April 2006 was in the week before Easter, when traffic volumes may be lower than normal. How was the representativeness of these traffic counts assured?	There was no evidence that levels were lower than normal. School holidays had not started and the University was in session. For the micro simulation model, SCATS data for the 13 March 2007 (a Tuesday) was used in the RTA-based Paramics plug-in. The date was chosen as a representative normal day with students in attendance at the university. The day is also in a time of year considered peak season. The day of the week was chosen to be a neutral day. The date also corresponded to the time of year when earlier traffic surveys had been undertaken (11 April 2006).
		The PB site visit and traffic counts were undertaken in February, before the start of the University semester. How was the season effect on traffic volumes taken into account?	The site visits on the 12 and 13 of February 2008 during the AM peak hours 0700 – 0900 confirmed turning movements where this data was not available from other counts.
3.6.2	Demand profile	Might the 'dip' in demand 7:45-8:00am reflect the impact of congested conditions on SCATS' ability to count all vehicles, rather than an actual drop in demand during that time? Do the volumes fed into the model reflect actual demand (including latent	PB observation was that within the study area, the congestion was not significantly holding up the throughput. It is the actual vehicle number through the intersections, so it would not be useful in calibration to get more traffic through than the actually occurred.

Section / Paragraph	Topic	Specific Concern	Response
		demand) during the study period?	
3.7.5	Model calibration	The ARRB in its report *The use and application of micro simulation traffic models* recommends that turn movements should be calibrated to minimum GEH measures. How do turn movements in the model compare against GEH criteria?	The correlation parameter R square is another acceptable way for turning movement calibration in addition to GEH. The correlation result should be in the same order as the GEH result.
3.7.5	Model calibration	How was the model validated against independent data such as travel times or queue lengths?	PB validated the model at two points, as discussed in Chapter 3. Validation included comparing queue lengths from the model with those experienced on site. The validation of the model demonstrated that the base case had a good fit with traffic conditions currently experienced.
4	Intersection upgrades	On what basis were these intersections identified for upgrade, and how were the proposed upgrades chosen?	The first round of intersection improvements, those included in the base model, were identified in the Built Environment Plan in Appendix C. Intersections where identified for upgrade based on there performance in terms of Level of Service, Degree of Saturation and Average Delay based on the worst leg of the intersection. This is common practice.
		Given the co-ordinated nature of signals under SCATS control, is extending cycle times a realistic proposal?	Generally, traffic signals using an adaptive signal timing regime such as SCATS perform better that those under fixed time control. The concept plan needs to demonstrate that the network has capacity to accommodate the additional traffic. It has been demonstrated that with some modifications to signal timings (within the range of acceptable cycle times) and with some lengthening of turning bays, the developments could be accommodated. How signals are actually modified and how capacity is distributed by the SCATS system is the subject of detailed design and RTA review.

Section / Paragraph	Topic	Specific Concern	Response
4.2.1	RTA reference document	What is the RTA *Guidelines for Re-development Traffic Generation*? How does this document relate to the RTA *Guide to Traffic Generating Developments*?	The RTA reference document was the RTA ***Guide to Traffic Generating Developments***.
4.2.1	Conversion to AM peak period	What was the basis for using 0.18 to convert from daily to AM peak 2 hours?	The conversion factor, to convert daily trips into AM peak hours, is an assumption based on approximately 18% of daily traffic occurring in the peak 2 hours. Experience and counts of traffic in South Sydney would suggest that this is a reasonable assumption.
Table 4-3	Dwelling trip generation rate	What were the justification for adopting 6.5 trips / day for residential dwelling in the development?	This is the subject of section 2 in this report.
Table 4-3	Trip generation rates	What is the source of the Commercial and Retail trip generation rates?	The generation rates for commercial and retail land use are extracted directly from the RTA's ***Guide to Traffic Generating Developments*** (Sections 3.5 and 3.6 respectively). The commercial rates were adjusted to reflect the employment density proposed by the Built Environment Plan as explained in Section 2 of this report.
Table 4-3	Footnotes	The footnotes under 'Estimated Quantity' were not provided.	Footnote on Table 4-3 reads "table 4-3 uses the gross floor areas and land uses provided by RWA. It generates a total of 29,658 trips per day".

Section / Paragraph	Topic	Specific Concern	Response
Table 4-4	Mode splits	Should different mode split assumptions be made for the different land uses? Eg residential vs commercial	There was no reason to reject a target of 60% by transit for the site as a whole. This target fits with the policy objectives of RWA, the City and regional strategies. The 2006 census suggests that transit mode share for work trips is approximately 30 – 40%. Mode share for University students, with current trends in transport including fuel prices and wider understanding of environmental cost of travel combined with the good availability of public transit a 60% transit mode share for commercial and residential users appeared reasonable with no real gain for looking for different behaviours, especially in the peak periods when the capability of the road network was being studied.
4.2.1	Discounts for multi-occupant car users	The RTA trip generation rates are for vehicle trips generated by each dwelling, not for trips made by individuals. Please justify the discounting of these rates for mode split and multi-occupant vehicle trips.	The average household size suggested in the concept plan is quite modest, approximately 65 sq metres. Average residents/dwelling, ie travellers making the trips in vehicles, is therefore expected to be lower than average. Final plans could differ. The factoring was to demonstrate that even if one started at the relatively high base generation rate of 6.5 vehicle trips per day, the conditions quickly brought one back to rates closer to those for high density residential development. RTA suggests accessibility to transit as a valid discount, while it is silent on whether multi-occupant vehicle trips might vary geographically. If PB had used the high density figures and then discounted, perhaps greater justification might have been expected.
Table 4-5	Distribution	The in/out proportions in this table are inconsistent with each other and the text above it.	In/out proportions take account of both distribution to access points as well as the split to in/out movements.
Table 4-6	Trip generation rates	What was the justification for rejecting the RTA guide rates for childcare centres? What is the source of the rates used in this table?	The day care centre at Abercrombie Precinct operates all day and is predominantly used by university staff and students who make combined trips to the campus to drop off and collect their children. The centre currently employs 8 staff and has 55 students. The centre is proposed to be of a size, and operate in a manner, that falls outside the average basis used in the RTA ***Guide to Traffic Generating Developments***. PB thus considered it more appropriate to create a traffic generation rate from observation of present use and first principles. This day care centre has children arriving all day, and not just in the AM peak hours.

Section / Paragraph	Topic	Specific Concern	Response
4.2.2	Discounts for multi-occupant car users	The RTA trip generation rates are for vehicle trips generated by each dwelling, not for trips made by individuals. Please justify the discounting of these rates for mode split and multi-occupant vehicle trips. What is the basis of assuming 52% of car users sharing their trip?	The RTA rates make assumptions regarding mode share that are an average per household across the metro area. In most areas transit alternatives are poor, so the RTA endorses reducing the generation per household to account for the site situation under discussion. This site has good accessibility and rates of 40 to individuals would also apply to households which are expected to be heavily weighted towards all adults given the student and inner-city demographic in the area. As stated earlier, the factor in North Eveleigh of .25 being passengers was to account for the historically lower rate of car ownership per household in this area which represents many situational aspects of the household such as high educational trip purpose, low parking availability, CBD work and retail situations and relatively high density of uses. The rates used for traffic generation for the University are also those typical for a TAFE or higher education establishment. The University of Sydney has carried out travel surveys and demonstrated that only 3% of student travel to the University is by car. This is significantly less than application of RTA assumptions, hence the use of steep allocation of 52 to get near the actual survey results without overloading the transit or walking figures as reported.
Table 4-9	Additional traffic in the model	Please explain why the difference in the number of trips in the future model and in the future base model (1881) does not match the number of trips to be generated by the North Eveleigh and Abercrombie Precinct developments (1601 + 152)	Abercrombie precinct proposals were assumed to generate 213 vehicles trips + North Eveleigh 1601 = 1814 vehicle trips in total, which is the difference between future case 15,828 and future base case 17,642.
4.2	Traffic distribution	How was the distribution of development traffic determined?	As part of preliminary work for the North Eveleigh site, PB reviewed the Transport Data Centre (TPDC then) journey to work data set and adapted a distribution from this, including considering the additional traffic from the site, to determine the distribution of development traffic.

Section / Paragraph	Topic	Specific Concern	Response
4.3	Intersection performance	How was the intersection Level of Service and Average Delay determined? What modelling tool was used?	The levels of service and average delays at intersections were extracted as an output from the Paramics model.
Table 4-11	Intersection level of service	SIDRA modelling of key intersections using the volumes in Appendix B suggests that the quoted results significantly underestimate delays at these intersections. Please provide details of the intersection assessment.	Table 4-11 uses LOS and delay extracted from the Paramics model. These results will differ from analysis using SIDRA because of the different methodologies employed within the SIDRA analysis package and the Paramics simulation model.
4.3	Cycle times	What is the basis for adopting these cycle times? Site observation suggests cycle times are longer than stated.	Many of the traffic signals on site connect to SCATS which adjusts cycle times to manage capacity. This can not be achieved in aaSIDRA. The cycle times used in SIDRA intersection assessment are based on the assumption that the intersection will be functioning optimally. As with many types of modelling and assessment more than one solution may be optimal.
Table 4-11	Intersection improvements	What would the LoS be if no intersection improvements were made?	Please also refer to the BEP Traffic report in Appendix C. As described in the North Eveleigh/Abercrombie Report, by 2016, with a growth of 0.9 %, several key intersections will require improvements irrespective of the developments. These improvements have been assumed to take place in the future case. Without these improvements in the future case, the model would not be useful, as traffic could not have grown as forecast from the development for assessment due to capacity constraints..
Table 4-11	Site access intersections	What level of service would be achieved at the two site access intersections with Wilson Street?	This was not included within the study as it was studied in the BEP report using SIDRA. However, the traffic volumes in this part of Wilson Street are low ,so the performance of this accesses is likely to be of a LOS of A.

Section / Paragraph	Topic	Specific Concern	Response
Appendix B	Forecast turning movements	Appendix B appears to contain the base SCATS counts, rather than forecast turning movements. Please confirm.	Appendix B of the TIA contains the forecast turning movements.
Table 4-12	Contributions	Why was this analysis only done for the Abercrombie Street / Shepherd Street intersection? Please provide details of the mix at the other intersections nominated for upgrade.	This is the closest intersection to both developments and experienced the greatest increases in traffic resulting from the developments. As such, it gives a good indication of the contribution of each development. It would be possible to calculate the contribution of traffic to each intersection attributed to each development; however, this is unlikely to provide a more informative result.
5.2.3	On-street parking	What measures would be in place to ensure that the existing on-street parking spaces were not used by residents or employees of the development? Would this affect the assessment and subsequent conclusions?	The existing streets are subject to resident parking schemes and/or 2 hour parking restrictions for extended periods of the day to discourage use by students. We expect approach to continue in the future, at least in the streets in the residential zone. But that is the prerogative of the City of Sydney. Employees are likely to find parking capacity for more than 2 hours to be very scarce, and that will be known to potential employers moving into the site. The final measures adopted by the City would not affect the assessment as the concern from existing residents expressed at every consultation was increased pressure on their parking supply, which should not occur as the new residents will have more access to off street options and will not be eligible for resident parking schemes..
5.3.2	Impact of trucks	Please explain why the increase in truck activity would not be a nuisance?	The impacts of trucks are discussed in chapter 3 of this report. Additional truck traffic generated by the proposed development is not clearly definable as it is mainly dependant on the final use of the commercial building. However, it is not anticipated that truck volumes will be above those normally experienced in the local area, so they would not be presumed to be a greater nuisance than at present. Given the limited connections of this area to the regional road network, only heavy vehicles with a local purpose are expected to be using the streets.

Section / Paragraph	Topic	Specific Concern	Response
5.3.2	Truck traffic	What is the current level of truck activity on Shepherd, Golden Grove and Wilson Streets? Are they currently used by articulated vehicles?	See Chapter 3 of this report.
5.3.2	Local access	The text states that the site would have a 'permeable road system that will allow vehicles to enter and exit by either access'. This statement is not reflected in the plan in Appendix A7 of the North Eveleigh Concept Plan, showing 'roads to be dedicated'.	It is intended that the portion of road fronting the CarriageWorks would be a pedestrian zone protected by bollards, but available to emergency or special event vehicles for through trips if necessary. There may remain a reference to out-dated local road network plans, but the above description is the intent of the Concept Plan.
5.3.6; 5.4.3	Heavy vehicle routes	The nominated routes were not clear. Can these routes be shown on a map for clarity?	See Figure 3.1 of this report.
5.4.3	Heavy vehicle routes	Have these routes been assessed for physical suitability for articulated trucks eg swept path analysis or roundabouts, corners, overhead clearances etc?	See Chapter 3 of report. This report did not check currently legal routes for movements that are currently able to be made on those routes. Routes are currently used by heavy traffic including articulated vehicles. All the new connections to the road network were thoroughly tested.

Section / Paragraph	Topic	Specific Concern	Response
6.2.2	Redfern Station	How reliant are the proposed mode split targets on Redfern Station being upgraded? When is any upgrade likely to begin?	The mode targets are not reliant on Redfern Station being upgraded as capacity is not the issue. The station's perceived security and permeability is considered to be more of an issue, so its upgrade would be a catalyst for optimism in the inner area. Demand for housing that is not reliant on car access is already at a peak in the vicinity, as recent news reports on the shortage of inner suburban housing to rent or buy demonstrate. The net proceeds from the sale of the North Eveleigh site are intended to fund an upgrade of the Redfern Station. The timing is subject to the sale and the cooperation of RailCorp, but with the hypothecation, it is reasonable to expect that the upgrade would occur before the development was fully occupied.
6.2.3	Bus routes	The western access to the site is approximately 1100m from the entrance to Redfern Station. This is in excess of the 800m nominated as an 'easy walking distance'. Would this affect the conclusion of the assessment?	The 880m diameter is generally used without assigning walk distances as you have, but there are pedestrian opportunities for access before one reaches the western access. There are shorter internal routes for pedestrians to Redfern Station. The new footbridge would be one for train travellers coming off the Eastern Suburbs and Illawarra Lines. The western part of the site is served by railway stations at both Macdonaldtown, which is just 250 m away, as well as Redfern. Both stations are accessible on walkable footpaths. The west end of the site is also close to the bus routes on King Street, which should assist in making the 60% mode share achievable.
		Can the route between Redfern Station and the developments accommodate an additional 7,000 pedestrians / cyclists (if no bus routes diversion is planned)? Is the 7000 trips per day or in the 2-hour AM peak? The text is not clear.	Pedestrians to transit would divide between routes to Redfern Station, Macdonaldtown Station, King Street and Gibbons/Regent Streets. Data from the compendium of CityRail Travel Statistics, fifth Edition April 2006, shows that 2,470 people currently access Redfern Station in the AM peak period. And that 7,050 currently exit the station. Macdonaldtown clearly has no platform constraints. RailCorp figures demonstrate that capacity at this railway station is not an issue as at least 4580 seats are available.

	AM Peak			24 Hours		
Station	Entry	Exit	Total	Entry	Exit	Total
Redfern	2470	7050	9520	15820	15820	31640
MacDonaldtown	390	140	530	820	820	1640

Section / Paragraph	Topic	Specific Concern	Response
			PB also understands that the City of Sydney intends to upgrade the cycle facilities in the area, particularly Wilson Street, further expanding the capacity of this mode without any reduction in pedestrian areas. The 7,000 trips are in the 2 hour morning peak period.
6.3.2	Footpath width	Consigning pedestrians to walk on the road (Little Eveleigh Street), no matter the traffic volume, could result in significant safety issues. How would these be managed?	No aspect of the Concept Plan requires pedestrians to walk in the road. Currently, some pedestrians do walk in the road in Little Eveleigh Street because the pavement is obstructed by overgrown planting. The road has speed bumps, does not have through traffic, and traffic speeds are low. The road safety issues on this potential route are not considered significant, nor is there a history of concern or reported incidents. Consideration could be given to signing this road as a 'shared zone' as speed and use would fit with RTA guidelines, but this may need to be considered with any other local road access road changes the City's LATM review may bring forward. Alternative routes to Little Eveleigh Street exist and are also used by pedestrians, including Ivy lane and Abercrombie and Lawson Streets. The proposed bridge and redeveloped Redfern Station may reduce potential foot traffic on Little Eveleigh Street.
6.3.2	Pedestrian access at Abercrombie / Shepherd	The proposal nominates the removal of the pedestrian scramble phase at the intersection of Abercrombie and Shepherd Streets. How is this proposal consistent with providing 'improved pedestrian facilities' at this key crossing point?	A conventional traffic signal controlled crossing with 2 pedestrian phases would provide greater time for pedestrians to cross and shorter waiting times. Conventional control may also provide a safer option. The scramble phase makes pedestrians wait for a longer period of time than a conventional crossing and provides a shorted amount of time for pedestrians to cross thus encouraging them to cross out of phase. Footpath storage capacity for waiting pedestrians is also overwhelmed by the greater wait time. This behaviour can be observed on site, and has been reported anecdotally. Conventional signal phasing provides less waiting time for pedestrians and a longer crossing time and is likely to better manage pedestrian movements.

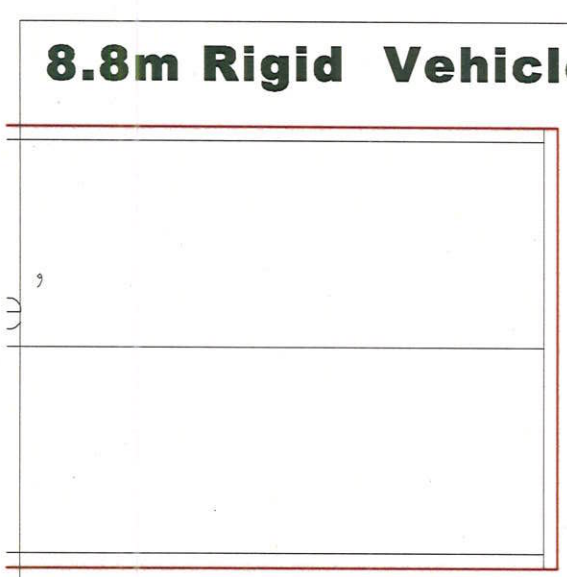
Section / Paragraph	Topic	Specific Concern	Response
			The introduction of the bridge and retail elements in the North Eveleigh may alter pedestrian movement with greater connection through to Wilson Street ,if this occurs a scramble phase crossing may offer further reduced benefits to pedestrians.
6.6.1 Appendix C	Heavy vehicle manoeuvring	How will the safety implications of reversing articulated vehicles be managed?	Articulated vehicles are only required to reverse into the loading dock which is not an area proposed with pedestrian conflicts. This movement can be made in a single manoeuvre and is a common retail arrangement.
Appendix C	Sketch plans	Please provide more detail on the sketch plans (e.g. kerb lines) to verify that articulated vehicles will be able to manoeuvre in the available space.	Please see Appendix B
Appendix C	Sketch plans 6a	This appears to be a very complex manoeuvre, with 2 individual reversals required (see Section 6.7.3, paragraph 1). Could this be simplified, and if not, how could it be managed safety?	The sketch shown in this plan is for a HRV. This class of vehicle is not expected to use the residential roads. CarriageWorks Way will be sufficiently wide to accommodate the occasional use of HRV's which are only expected to need to access the site for major furniture removals.
6.7.3	Turning heads	Please provide swept path analysis for the turning heads?	Please See Appendix B

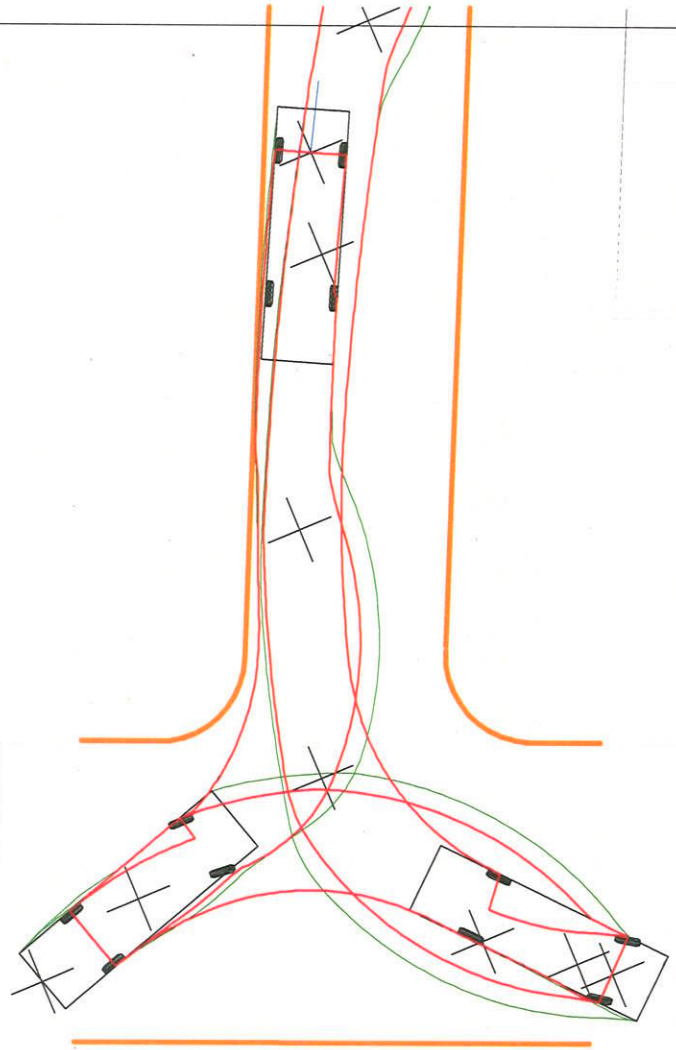
Section / Paragraph	Topic	Specific Concern	Response
Table 6-1	Parking rates	What was the justification for increasing the number of parking spaces for residential land use compared to DCP 11? Do the adopted rates allow for visitor parking?	Please see discussion in Chapter 4.
Table 6-1	Blacksmith's shop	How has the 51 approved spaces in the Blacksmith's Shop been taken into account?	The Black smith's Workshop and the CarriageWorks are subject to existing DA's and not part of this application, but they fit within the overall cap of 2000 spaces on the site as a whole.
6.8.4	Loading bays	How do the loading bays discussed in this section relate to the loading docks in Section 6.6?	The loading bays referred to here are areas of kerb space controlled by regulation that can be used for loading and unloading. These should have been called loading zones, and this will be corrected in the text. These are not loading docks.
7.2	Parking	How would a 'significant amount of spare parking capacity' support the mode split targets adopted for the development?	Discussed in Chapter 4 of this report.

Appendix B

Vehicle tracks

8.8m Rigid Vehicle





1125

6 storeys

565

C2

8 storeys

850

D1

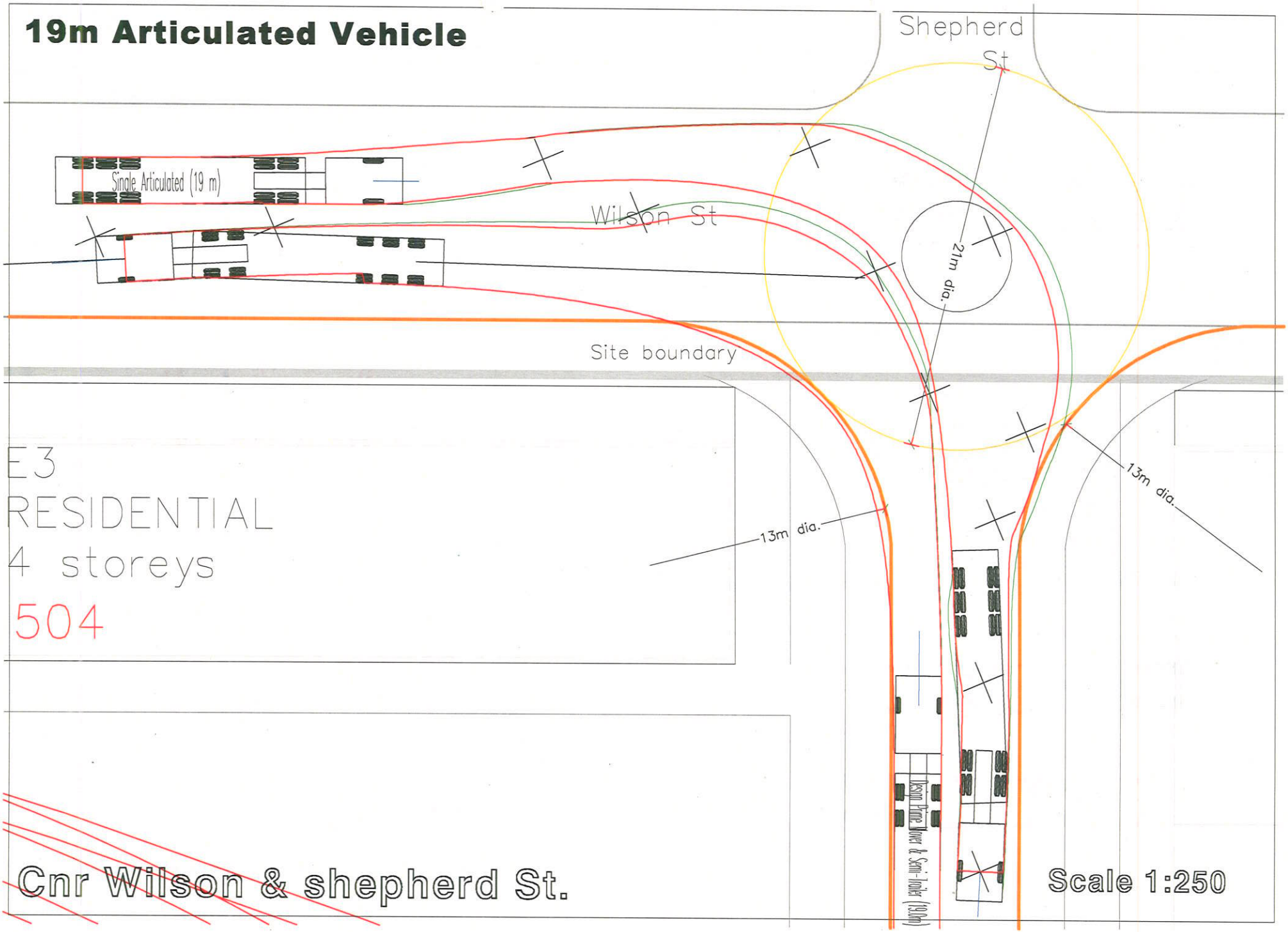
8 storeys

850

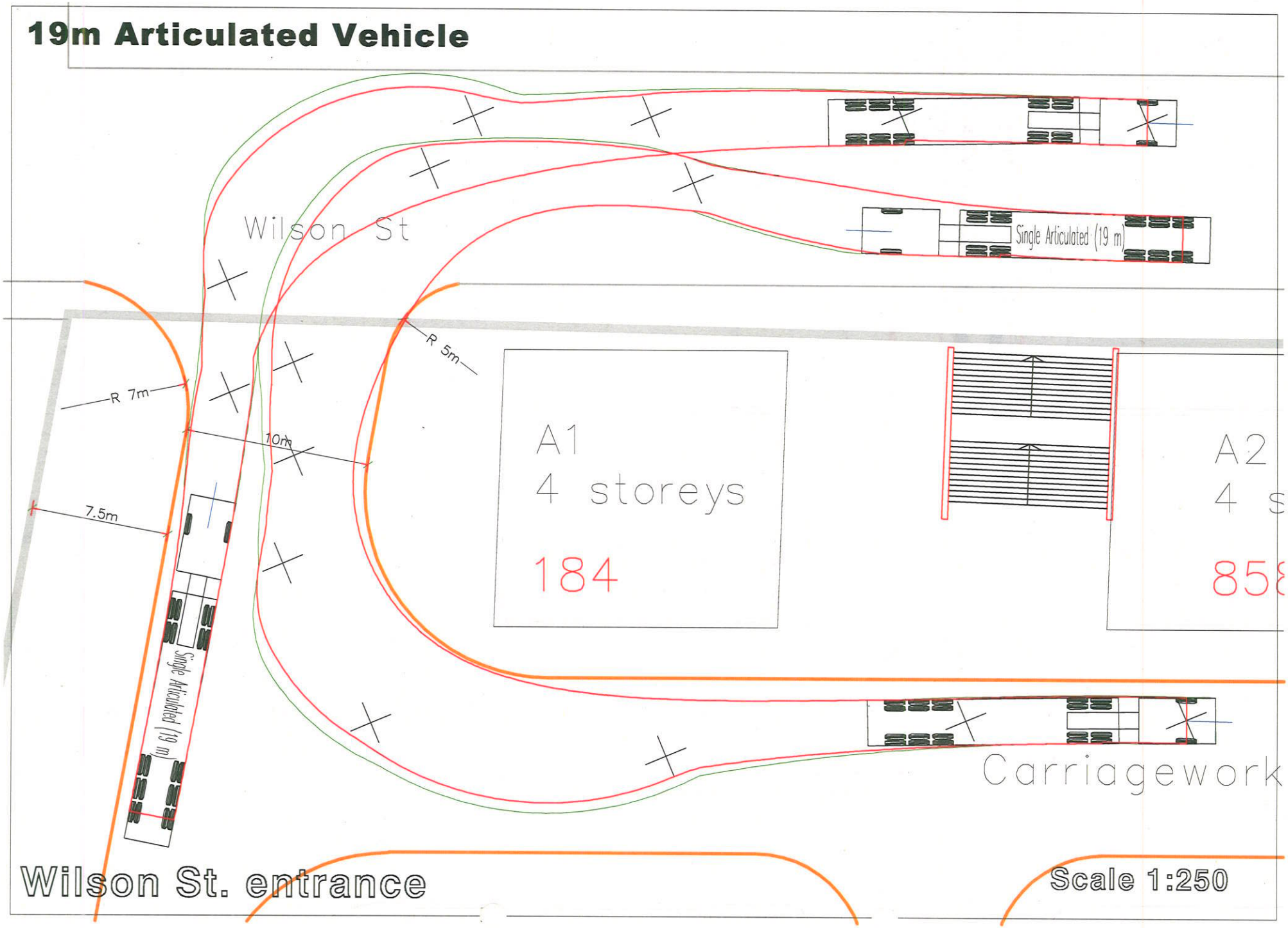
Internal road bet. 8 storey buildings

Scale 1:250

19m Articulated Vehicle



19m Articulated Vehicle



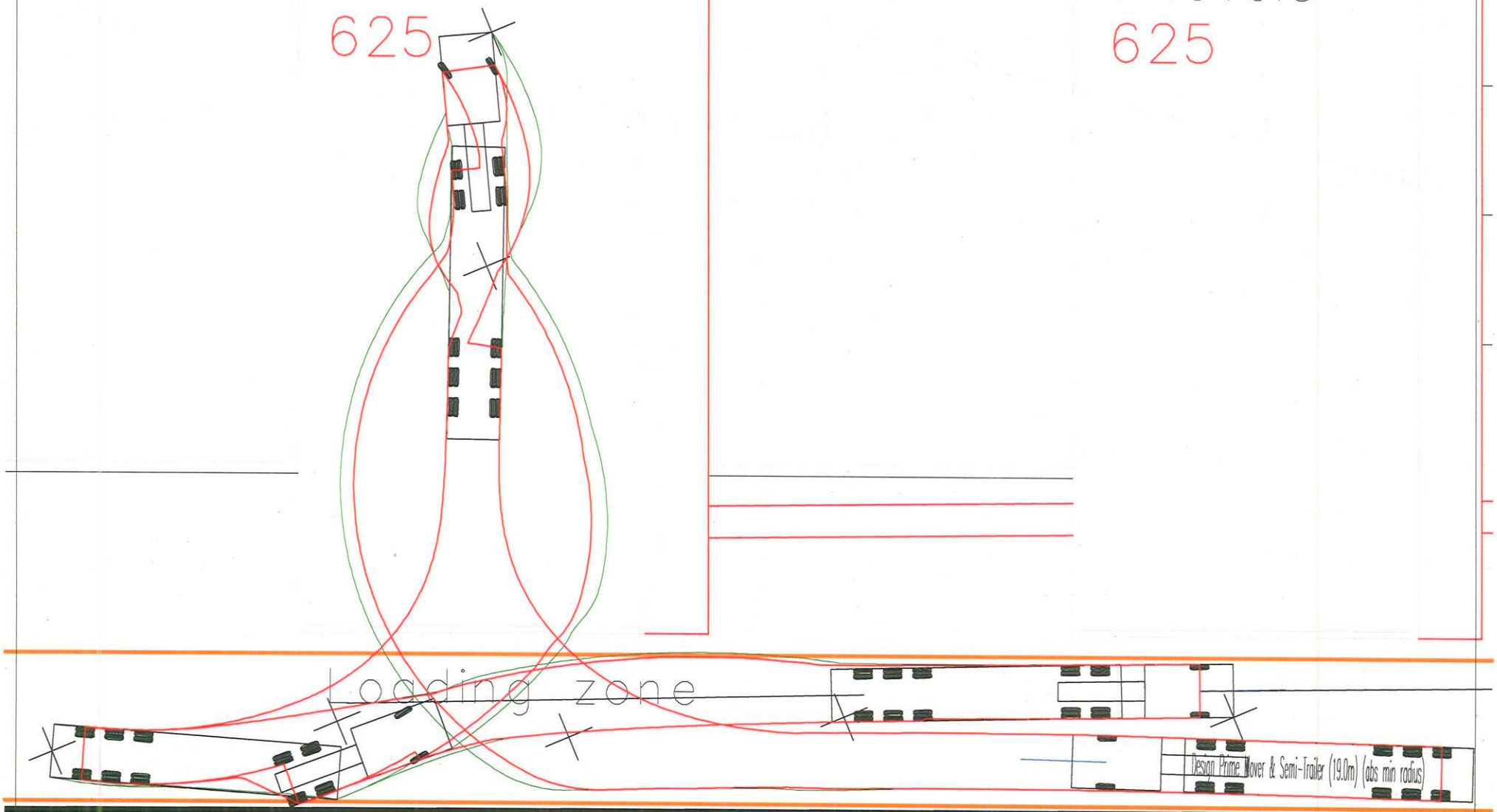
Wilson St. entrance

Scale 1:250

19m Articulated Vehicle

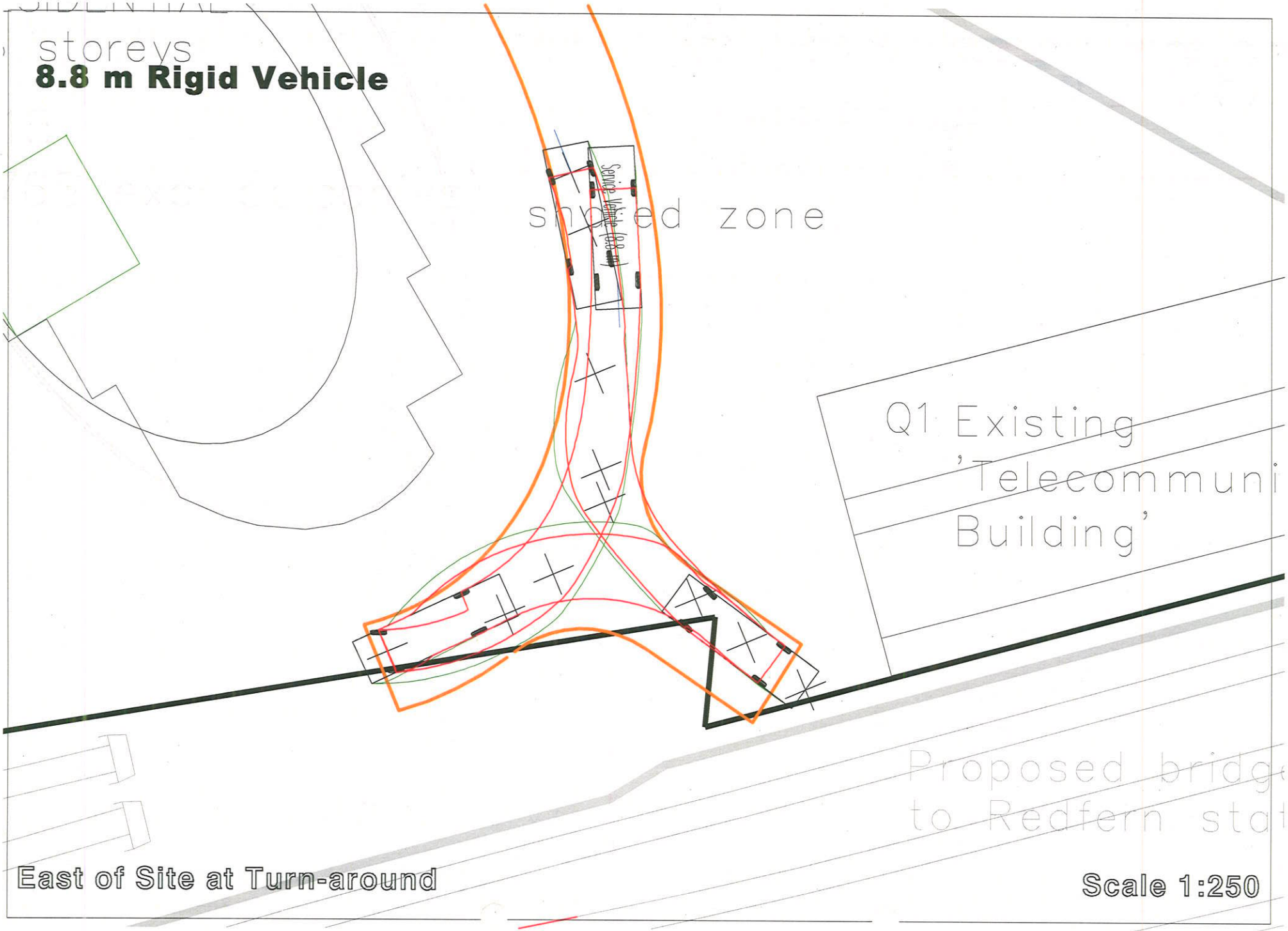
H3
RESIDENTIAL
4 levels
625

H4
RESIDENTIAL
4 levels
625



South near Railcorp access area into 4 lvl residential

Scale 1:250


storeys
8.8 m Rigid Vehicle
Service Vehicle 8.8m
shared zone
Q1 Existing
'Telecommuni
Building'
Proposed bridg
to Redfern sta
East of Site at Turn-around
Scale 1:250

Appendix C

Built Environment Plan – Traffic & Transport Strategy

Preliminary Traffic and Transport Strategy for Draft Built Environment Plan (Stage 1)

September, 2006

Redfern-Waterloo Authority

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Contents

Page Number

Executive summary ..... **iv**

1. Introduction **1**

1.1 Context for the transport and traffic strategy 1
1.2 The study area 2
1.2.1 North Eveleigh 3
1.2.2 Redfern Railway Station, Gibbons and Regent Streets 4
1.3 Report structure 4

2. Overview of the draft Redfern Waterloo Built Environment Plan (Stage 1) **5**

2.1 Sustainable outcomes 5
2.2 Transport and traffic strategy principles 6
2.3 The elements of a transport and traffic strategy 7

3. Consultation on transport and traffic **8**

3.1 Reviewing the policy environment 8
3.2 Legacies from earlier studies of the area 9
3.3 Responses from stakeholder agencies 10
3.3.1 Roads and Traffic Authority 10
3.3.2 NSW Department of Planning 10
3.3.3 City of Sydney 11
3.3.4 State Transit 12
3.3.5 RailCorp 12
3.4 Summary of traffic and transport issues raised in submissions on the draft BEP 12

4. Existing traffic conditions **14**

4.1 Existing road hierarchy 14
4.2 Existing access arrangements for North Eveleigh and Redfern Railway Station, Gibbons and Regent Streets site 18
4.2.1 North Eveleigh 18
4.2.2 Redfern Railway Station, Gibbons and Regent Streets 18
4.3 Traffic flows 18
4.3.1 Heavy vehicle movements 22
4.4 Traffic growth rate 22
4.5 Public transport access 24
4.5.1 Rail 24
4.5.2 Bus 24
4.5.3 Taxis 26
4.6 The pedestrian network 26
4.7 Bicycle networks 27

5. Proposed transport and traffic strategy **29**

5.1 Aims of the transport and traffic strategy 29
5.2 Future road hierarchy 29
5.3 Public transport improvement program 30
5.4 Pedestrian and cycle networks 30
5.5 A traffic model 31
5.6 Draft parking policy 31
5.6.1 On-site Parking requirements 32
5.6.2 Comparison of Parking Rates 32
5.6.3 Preferred Parking Strategy 35
5.7 Commercial Vehicle Policy 36
5.8 Recommendations on parking control 38

6. Application of strategy to North Eveleigh, Redfern Railway Station, Gibbons and Regent Streets sites **39**

6.1 The sites 39

Contents (continued)

Page Number

6.2 Access to North Eveleigh and Redfern Railway Station 40
6.2.1 North Eveleigh 40
6.3 Pedestrian and cycle requirements 45
6.4 Implications of proposed development on traffic 45
6.5 Trip generation 45
6.6 Trip distribution 48
6.7 Intersection assessment criteria for simulations 52
6.7.1 Level of service 52
6.7.2 Degree of saturation 53
6.7.3 Average delay 53
6.7.4 Maximum queue length 53
6.8 Intersection analysis results 53
6.8.1 Pre development conditions 53
6.8.2 Post-development conditions 54
6.9 Mid-block capacity 56
6.10 Summary of impacts of proposed development on traffic 57

7. Further Investigations 59

7.1 Proposed traffic control measures to accommodate growth 59
7.2 Improvement in pedestrian connections between Redfern Street and Redfern Station and North Eveleigh 59
7.2.1 Investigation of a Gibbons Street underpass 59
7.2.2 The future of the one-way arterial pair 61
7.2.3 Other measures 62
7.3 Traffic impact assessment modelling 63

Contents (continued)

Page Number

List of tables

Table 3-1	Frequency of issues being raised in submissions	13
Table 4-1	Survey peak hours at eight key intersections	19
Table 4-2	Percentage of heavy vehicles	22
Table 4-3	Historical traffic volume data	23
Table 4-4	RTA traffic volume data	23
Table 4-5	State Transit bus routes in Study Area	25
Table 5-1	South Sydney Council DCP 11 - Transport Guidelines for Development	32
Table 5-2	Eveleigh CarriageWorks TMP	33
Table 5-3	Maximum car parking under Sydney LEP	34
Table 6-1	Indicative development estimates the proposed developments	46
Table 6-2	Assumed vehicle occupancy rate for the inner city area	46
Table 6-3	Different assumptions for trip generation rates	47
Table 6-4	Comparison of traffic generation approaches	47
Table 6-5	Estimated inbound and outbound peak hour trips for proposed developments	48
Table 6-6	Directional distribution	49
Table 6-7	Trip assignment for North Eveleigh site	49
Table 6-8	Trip assignment for Redfern Railway Station, Gibbons & Regent Streets sites	49
Table 6-9	Level of service criteria for intersections	52
Table 6-10	Pre-development intersection performance	54
Table 6-11	Post-development intersection performance	55
Table 6-12	Post-development intersection performance with improvements	55
Table 6-13	Mid-block volumes at key road sections	56
Table 7-1	Differences between the Options	61

List of figures

Figure 1-1	The Redfern Waterloo Authority's operational area, with RWA's strategic sites	2
Figure 4-1	Road Hierarchy in 2006	15
Figure 4-2	Existing morning peak hour intersection volumes (vph)	20
Figure 4-3	Existing afternoon peak hour intersection volumes (vph)	21
Figure 4-4	Sydney Bus services adjacent to key sites	25
Figure 4-5	Local Bicycle Network as developed by South Sydney Council	28
Figure 6-1	North Eveleigh Site with proposed land use zones	39
Figure 6-2	Proposed land use zones for Redfern Railway Station, Gibbons and Regent Streets	40
Figure 6-3	Options for vehicle circulation in western section of North Eveleigh	43
Figure 6-4	Predicted peak hour generated traffic (vph)	50

List of appendices

Appendix A
References

Executive summary

Parsons Brinckerhoff Australia (PB) was engaged by the Redfern-Waterloo Authority to prepare a preliminary transport and traffic strategy to support its Draft Built Environment Plan which was then on exhibition (April-May, 2006). The Redfern Waterloo Authority's Draft Built Environment Plan required a transport context for the entire area of its interest, as well as detailed traffic advice on the potential implications of development of two of the eight key sites included in the Plan; North Eveleigh and the site defined by Redfern Station and Gibbons, Lawson, Regent and Margaret Streets. The purpose of the Transport and Traffic Strategy was to investigate and confirm that these sites could meet their proposed development yields without generating unsustainable levels of car traffic.

Traffic surveys were done of the area that showed traffic levels for the most part have fallen in the area since the opening of the Eastern Distributor and Cross City Tunnel. Heavy vehicle traffic was low, except on Gibbons and Cleveland Streets. Pedestrian numbers were high along all roads, but especially PM access to the Redfern Railway Station from Surry Hills and Redfern on Gibbons Street, and AM access from the Station to the University of Sydney.

To inform the development of the preliminary strategy, analysis was carried out of submissions on the draft BEP that related to traffic, and agencies such as RTA, DOP, RailCorp, State Transit and the City of Sydney, were interviewed

The elements of the proposed preliminary strategy were:

A set of aims for the transport and traffic strategy – Those listed on page 26 of the draft Built Environment Plan (BEP) were the basis, and these were confirmed as feasible by testing future traffic levels and management schemes.

An adopted road hierarchy – the existing road hierarchy as defined by present traffic levels was confirmed (Figure 4-1) as the traffic impacts of the key strategic sites would not alter it. A few investigations were suggested for traffic model testing in terms of potential change to the road hierarchy: the impact of the new access to ATP from Henderson Road, which is under construction; a more direct link between the CBD and the ATP via Boundary Street, and investigation of reducing some on-street parking in Shepherd Street.

A public transport orientation – this is expressed through improved bus route performance in Gibbons and Regent Street, as delivered by RTA's Strategic Bus Corridors program, and better connections in the public domain between local bus stops, Redfern Railway Station Access and the Redfern Street pedestrian upgrade project. Parking controls would be applied to support this objective, too.

An identified network of pedestrian and cycle routes – The City of Sydney's upgrade of Redfern Street is leading a reorientation of the access to Redfern Railway Station and other potential upgrades in the public domain of the station. RWA is constructing a new pedestrian access to Wilson Street opposite Codrington Street. South Sydney Council (Figure 4-5) developed quite a good cycle network that is being extended by RWA through the new pedestrian and bicycle bridge across the rail lines between the ATP and North Eveleigh. This project will connect the off-road cycle path in ATP with the shared zone in North Eveleigh and the Wilson Street cycleway. Lawson Street is maintained as a significant bicycle route

A traffic model that can estimate future traffic impacts – a full traffic impact assessment was carried out of the key strategic sites of North Eveleigh and Redfern Railway Station, Gibbons and Regent Streets which indicated that the traffic control measures proposed resulted in little impact on present traffic conditions other than some adjustment to traffic signals timings in 2016 and some potential loss of on-street parking to lengthen turning bays in Lawson and Shepherd Streets. This assessment was based on the present road network. However, before changing the road networks, a more complex assessment is required, such as through an area-wide Paramics traffic simulation model, that would describe interaction of future impacts and allow contributions to be assessed from developers of the key strategic sites.

A parking policy to manage vehicle use – the provisions of South Sydney's former parking policy, DCP 11, were found to be a good fit for the development objectives of the site, but additional restrictions should be placed on sites immediately adjacent to Redfern Railway Station to achieve a no more than a 40% travel share to private vehicles across the RWA area. As well as on-site parking provision, commercial vehicles need to be managed throughout the day. Again DCP 11 has suitable provisions. These could be supported by the foundation of a Transport Management Group (TMG) for the key sites, which would be handed over to occupants when developments are occupied. The TMG would liaise with transit service providers, the City of Sydney Traffic Committee on kerb-side controls, and coordinate on-site vehicle regulations.

In specific terms relating to the key strategic sites, the proposed redevelopments at North Eveleigh and Redfern Railway Station, Gibbons & Regent Streets sites are expected to generate approximately 1,560 vehicle trips during the AM peak hour. The report explains why this is more realistic forecast than the 3,800 trips that would result from applying the generic RTA formula. When the trips generated from the proposed developments were then added to the background traffic for the future year of 2016, the key roads were determined to have sufficient capacity for the future demand. Using intersection modelling software to analyse the performance of key intersections under pre-development and post-development conditions in 2016 showed that

- key intersections would operate at an acceptable level of service of B or better during both the morning and afternoon peak periods in 2016 with considerable capacity remaining
- with post-development traffic conditions, Abercrombie Street-Shepherd Street, Abercrombie Street-Lawson Street and Cleveland Street-Shepherd Street would require minor modifications to operate acceptably. These included adjustment to the signal phase timing and some lengthening of turn bays through a local reduction in on-street parking.

Major site access to North Eveleigh was recommended to Wilson Street at the existing T-junction between Queen and Forbes Streets and opposite the roundabout at Shepherd Street. A potential minor access could be developed opposite Ivy Street. Frontage properties should have combined access to minimise the impact on parking and the cycleway. Access to the commercial sites on Gibbons and Regent streets should be via the laneways, although not at the expense of key pedestrian links to Redfern Street.

A supplementary task to improved traffic management would be a comprehensive directional sign program for all site users; cars, trucks, transit passengers, pedestrians, cyclists and delivery services.

The next stages in developing the transport and traffic strategy would involve:

Improvements to pedestrian access to Redfern Railway Station – which could range from putting Gibbons Street's two through-traffic lanes in an underpass, to altering the one-way/two-way flows of traffic on Regent and/or Gibbons Streets, to tidying up the Gibbons Street frontage of Redfern Railway Station.

Development of an area-wide traffic simulation model – to measure the impact of network changes and measure the contribution of individual development sites to that change. This model would be an effective tool to assess the traffic impacts of the pedestrian improvement projects.

1. Introduction

Parsons Brinckerhoff Australia (PB) was engaged by the Redfern-Waterloo Authority to prepare a preliminary transport and traffic strategy to support its Draft Built Environment Plan which was then on exhibition (April-May, 2006). The Redfern Waterloo Authority's Draft Built Environment Plan required a transport context for the entire area of its interest, as well as detailed traffic advice on the potential implications of development of two of the eight key sites included in the Plan; North Eveleigh and the site defined by Redfern Station and Gibbons, Lawson, Regent and Margaret Streets. The purpose of the Transport and Traffic Strategy was to investigate and confirm that these sites could meet their proposed development yields without generating unsustainable levels of car traffic.

Other large scale redevelopments in the vicinity, such as the Kent Brewery and Green Square will claim capacity on the same road and transit networks, while existing businesses and residents want to maintain acceptable levels of amenity and safety in their neighbourhoods. To respond to this, the preliminary Transport and Traffic Strategy was developed within a framework with clear principles on safety, amenity, road hierarchy and transport choice to guide future local Transport Management Plans. It also considered the strategies of overarching authorities and previous local traffic studies, some prepared in consultation with the local community, that have proposed transport and traffic improvements for the area, to ensure that those plans inform the new Strategy.

1.1 Context for the transport and traffic strategy

Under the NSW government's Metropolitan Strategy *City of Cities: A Plan for Sydney's Future* (2005), the Redfern-Waterloo area is part of the Sydney CBD to Sydney Airport economic corridor. This, in turn, is a critical part of Australia's broader global economic activity corridor, extending from North Ryde to the Airport. The Redfern-Waterloo area is within the expanded boundaries of the City of Sydney and contains the same dense, urban accessibility to the region that is present in the central business district (CBD). To achieve the outcomes in the Metropolitan Strategy, the State has nominated several strategic sites adjoining Redfern Railway Station that are government owned and provide the opportunity for increased residential and employment development adjacent to high quality public transport services, the Sydney CBD and significant health and education facilities.

The Redfern-Waterloo Authority (RWA) was established in early 2005 to provide an overall framework for revitalising its operational area through urban renewal, job creation, improvements to the physical environment and improvements in the provision of human services. Transport infrastructure and services are important contributors to successful redevelopment of the Redfern-Waterloo area. The NSW Government is a significant landowner in the area, and manages key transport assets such as Redfern Railway Station, the bus services, the arterial pair of Gibbons and Regent Streets, and boundary arterial routes, Cleveland Street, City Road and Henderson Road.

The principal functions of the RWA are to promote and undertake the economic development and use of surplus government land, including the provision of infrastructure and improvement of public spaces. The RWA must also provide and promote employment opportunities and housing choice for local residents and manage and encourage cultural activities.

Under the Redfern-Waterloo Act, the responsible Minister is required to prepare a Redfern-Waterloo Plan to provide an overall framework for the revitalisation of the operational area. The Redfern-Waterloo Plan is to contain three major components; a Built Environment Plan, a Human Services Plan, and an Employment and Enterprise Plan. The Built Environment Plan (Stage 1) was prepared to provide a planning framework for the redevelopment of the RWA's strategic sites within its operational area as shown in Figure 1-1. This preliminary transport and traffic strategy focuses on two of these sites.

1.2 The study area

Source: RWA Draft Built Environment Plan, 2006

Figure 1-1 The Redfern Waterloo Authority's operational area, with RWA's strategic sites

While this report sets a traffic context for the whole of RWA's Operational Area, the two sites that are looked at in detail in this Strategy are Site B, the North Eveleigh zone and Site E, defined by Redfern Railway Station, Lawson and Gibbons Streets. The purpose of this preliminary Transport and Traffic Strategy is to propose traffic management measures so these sites can reach their proposed development yields without generating unsustainable levels of car traffic. The main means of achieving this will be through a high future use of public transport, walking and cycling by the residents, workers and visitors travelling to and from the area.

The transport and traffic demands from the sites have to be managed within the urban context of the Sydney region and under a metropolitan context. Other redevelopments such as the Carlton United Brewery (CUB) and Green Square will claim capacity on the same road and transit networks, while existing businesses and residents will want to maintain acceptable levels of amenity and safety in their neighbourhoods. To allow for this, the preliminary Transport and Traffic Strategy proposes a framework of clear principles on safety, amenity, road hierarchy and transport choice to guide future development of a Transport Management Plan for the Redfern-Waterloo Area.

The Redfern-Waterloo area has been subject to many earlier investigations, yet critical regional inputs on transport planning have not been finalised by government, so the direction rather than forecasts have been addressed. This proposed preliminary strategy has reviewed recent studies in the area and attempts to align the preliminary Transport and Traffic Strategy with the Metro Strategy's Transport Strategy, RTA's vision for roads in the sub-region, and relevant planning by transit services. Proposed transport and traffic improvements for the area have been incorporated into the preliminary Strategy.

1.2.1 North Eveleigh

The sites themselves are not without context. North Eveleigh (Site B) in Darlington is adjacent to an historic residential area with neighbourhood businesses, close to Sydney University. The site was a major employment centre when the government railway shops and support services were located here around the beginning of the 20th century. Now these surplus rail buildings are either being adapted or replaced in three general land-use zones.

The middle zone is predominantly cultural and heritage in use, and contains buildings like the Carriage workshop which is being refurbished as an exciting performance space, or the Carpenters' Shop/Canteen, which is becoming a training centre for the service industry. Construction is currently underway, and new access has to be constructed for pedestrians and vehicles to use the site directly.

To its north, that part of North Eveleigh immediately adjacent to Redfern Railway Station, is the potential site for a landmark development. The Built Environment Plan (Stage 1) called for its character to be predominantly mixed business and residential. It contains a number of properties with access to Wilson Street that will continue as they are now, but extensive redesign and augmentation of the internal transport infrastructure for the bulk of the site between the rail lines and Wilson Street will be required. Whatever use is finally developed on site has to be an effective partner of a renovated Redfern Railway Station.

The southern portion of the site contains no structures of note, and is proposed to be essentially renewed and residential in character, to compliment and buffer the integration with the rest of Darlington.

1.2.2 Redfern Railway Station, Gibbons and Regent Streets

Site F surrounds Lawson Square and contains the twin towers of the former TNT headquarters that are so prominent on the city's southern skyline. Now containing various businesses, including local and state government offices, the structures are advantageously located adjacent to Redfern Railway Station, but are no longer prime office stock as business requirements have changed. With the refurbishment of Redfern Station currently underway, these properties will be key beneficiaries of the improvements, not only from better train access to their site, but from a regional strategic bus corridor, too, and an improved interchange between the two. The one-way arterial road pair of Regent and Gibbons Streets also give the site high sub-regional road accessibility, but at a price. The heavy traffic flows restrict pedestrian flows, create amenity problems with noise and fumes from the through traffic, and provide an alternative route to the harbour crossings for over-height trucks and those with hazardous freight than cannot use the motorway tunnels.

1.3 Report structure

Planning for transport is integrated with the land use development of the area and the regional role of the area. Therefore, the structure of this report is:.

Chapter Two	Describes key aspects of the draft Built Environment Plan (Stage 1) that relate to a policy basis for a transport and traffic strategy.
Chapter Three	Details a review of earlier transport studies and summarises discussions with officers from stakeholder agencies in transport and the City of Sydney.
Chapter Four	Examines the existing transport and traffic conditions generally in the operational area, and specifically those found around the two key redevelopment sites of North Eveleigh, and Redfern Railway Station, Gibbons and Regent Streets.
Chapter Five	Describes the overarching principles of the preliminary transport and traffic strategy.
Chapter Six	Applies the transport and traffic strategy to the proposed levels of use for the two key redevelopment sites of North Eveleigh and Redfern Railway Station, Gibbons and Regent Streets, and assesses the likely traffic and transport impacts.
Chapter Seven	Looks at the next steps in implementing the Transport and Traffic Strategy

2. Overview of the draft Redfern Waterloo Built Environment Plan (Stage 1)

Stage 1 of the draft Built Environment Plan (BEP) was put on public exhibition for two months from February until April, 2006. An amendment to the State Environmental Planning Policy (Major Projects) that enabled the BEP to be carried forward was also on exhibition at the same time. The following sections summarise aspects of the draft BEP that relate to establishing the policy basis for transport and traffic planning in the area.

2.1 Sustainable outcomes

The principles of sustainable development underpin the draft BEP and the amended SEPP (Major Projects) for the RWA strategic sites.

To achieve a more viable economic environment – the draft BEP provides for greater employment for local residents and the wider metropolitan area. It encourages high quality developments where retail, cultural and commercial businesses can provide jobs for the local and broader Sydney community. Not only will a stronger local economy mean greater investment to improve the places and spaces in the area, but there should be a reduction in trips lengths for workers, and more locals in the workforce. This is a multiplying benefit.

To achieve an improved social and cultural environment – the draft BEP promotes increased housing provision, choice and affordability, safety and access, activation of sites adjoining residential areas currently degraded and underutilised. By fostering retail and employment activity, and offering quality community, cultural and civic spaces for residents, workers and visitors more activities are undertaken locally and by modes other than driving. A greater sense of security will also promote walking and cycling over longer periods of the day.

To achieve an improved physical environment - the draft BEP envisages a place with a built form and civic spaces that responds to its context, provides for increased emphasis on public transport, improves access and connections and attracts investments that value environmentally sustainable outcomes. For example, redevelopments should feature reduced energy and water consumption and responsible waste management. The preliminary transport and traffic strategy will need to plan for the correct infrastructure to make transit use more attractive, and work with service providers to ensure service levels are maintained at attractive levels. A direct, safe and accessible pedestrian network is critical.

To achieve a strong governance structure - the draft BEP is supported by a SEPP which will provide the guidelines for future development, and the initiatives of the Human Services Plan and the Employment and Enterprise Plan. On-going governance will be needed to maintain excellence in transit management. One outcome may be delegation to a local transport agency to promote use of non-vehicular modes through direct action and perhaps through service levels. Local needs will be built into road and cycle service plans.

2.2 Transport and traffic strategy principles

On page 26 of the draft BEP, there is a discussion of how the area can capitalise on the high level of accessibility it already has in the metropolitan area to become a destination and origin of trips, as well as maintaining its importance as a place of transfer.

Redevelopment of Redfern Railway Station – the investment in a more attractive, functional and accessible railway station will be the primary catalyst for Redfern to become a destination. It is almost a necessary precursor to redevelopment if the target travel behaviour is to be achieved.

Management of traffic generated from new development - For non-residential land, a target mode-share of 60% non-car use has been chosen for journey to work trips. A parking policy will support this objective, which will be enforced through a Development Control Plan, guided by land use category and location.

Improved connections to bus services – in order to maximise the travel benefits from its rail and bus services, better public domain solutions will be pursued to connect the bus services to each other and the railway station.

Improved traffic operations on Regent and Gibbons Streets – the draft BEP seeks a better balance between the regional traffic roles for this arterial pair of one-way roads and local amenity and revitalised retail operations. On-street parking is being encouraged to aid both objectives, and there will be further investigations of options for pedestrian and traffic improvements on the roads, to discover potential benefits, and whether they can be sustained regionally.

Improved connections between the Australian Technology Park (ATP) and North Eveleigh – to overcome the barrier of the rail lines, the draft plan identifies the need for improved vehicle, pedestrian and cycle connections between the two areas. To this effect, the RWA has committed to construct a pedestrian/cycle bridge.

Safe and easy cycling in the area – the draft plan proposes to enhance the existing cycle network through good connections to the key strategic sites and through the inclusion of cycle terminal facilities in new development, such as secure parking, showers and change rooms.

These principles represent the base policy carried over into the preliminary transport and traffic strategy.

2.3 The elements of a transport and traffic strategy

The essential elements of the proposed preliminary strategy are:

1. a set of aims for the transport and traffic strategy so that the intentions of any guidelines are clear and can be reasonably applied to relevant sites as they are seeking approval for redevelopment
2. an adopted road hierarchy is essential so appropriate efficiency and amenity levels can be established for each road, and then applied in how they relate to adjacent land uses. This will include identifying which roads are suitable for bus services, pedestrian facilities, cycle ways, on-street parking and which would require risk assessment for safety review when roles outside the guidelines are proposed
3. a public transport improvement program so that service providers can respond to increased demand, infrastructure can be programmed that enhances the likelihood of transit being used, and the community can engage in understanding and increasing its use of public transport modes
4. an identified network of pedestrian and cycle routes that encourage the use of these modes for travel to destinations and to public transport modes
5. a traffic model that can estimate future traffic impacts of proposed developments or proposed network changes
6. a parking policy that seeks to manage the demand for car use so that other modes are more competitive, while not leading to excessive demand for on-street parking in the adjacent neighbourhoods as there is not a great supply of public parking in the area.

A policy for the management of commercial traffic that enables business to be carried out efficiently in the area with minimal additional demand for vehicle travel to and from the employment sites.

3. Consultation on transport and traffic

The RWA, while it is charged with achieving better outcomes for its area, is not a road authority or transport service provider. Understanding and working with the road authorities and transport service providers will be essential for realising future improvements. Inputs from stakeholders into the transport and traffic future for the area were taken from past reports and submissions, interviews with relevant officers in government authorities and review of the comments received on the draft BEP.

3.1 Reviewing the policy environment

The Sydney Metropolitan Strategy, *City of Cities: A Plan for Sydney's Future*, outlines a direction to support the use of more sustainable modes to locations with good public transport access and support the Government's investment in public transport. It endorsed the Department of Planning and RTA issued *Guidelines for Walking and Cycling* (January, 2005). The Strategy recognises the importance of controlling parking provision in order to encourage the use of non-car modes and to have a uniform approach to parking provision across centres. To that end, the Transport Section of the Department of Planning is leading a Working Group to prepare a metropolitan parking policy to address parking supply and parking management in centres to deliver the visions of the Metropolitan Strategy. A first draft is expected to be available for consultation in late 2006.

A representative of the Working group advised that the Parking Policy will have a strong focus on major centres, areas adjacent to centres, and within corridors. The Policy will address how parking should be addressed in these areas, such as whether or not the provision of commuter parking is warranted and whether or not to provide parking at railway stations. Another focus will be on how to treat kerbside parking which may be influenced by factors such as the need to provide clear bus priority lanes and the RTA's time of day approach to managing capacity on roads through parking controls.

Under SEPP 11, the RTA produced a *Guide to Traffic Generating Developments* that was intended to ensure that proposed developments contained sufficient provisions that they did not create problems on the road network and that adequate provision of parking was provided on-site, thus minimising the potential for parking overflow onto surrounding streets. Generally, developments were required to provide the minimum levels of parking set out in these guidelines by consent authorities trying to treat all applicants equitably. Providing parking below the rates had to be argued by the applicant, meaning this policy generally favoured developments which provide the minimum levels set out in the guide. RTA is currently looking at revising these guidelines to take into account the policy directions of the Metropolitan Strategy. A representative from RTA advised that the approach would be similar to that advocated in the draft Integrated Land Use and Transport SEPP 66. The proposed approach is centre-focussed and will scale a site's propensity to generate private car trips and to manage parking demand based on proximity to transit services, the mix of uses in the area, and transit loading factors that relate to the relationship of the centre in the network to other centres.

3.2 Legacies from earlier studies of the area

The Eveleigh CarriageWorks Transport management plan (TMP) had objectives to restrict parking supply on-site, to provide strong pedestrian linkages to Redfern Railway Station and surrounding areas and to maintain an acceptable level of service for vehicles using the local road network. The original calculation of parking provisions for the development was derived using South Sydney Council's DCP 11, however, the outcomes of this analysis found that those parking provisions on site might lead to an unrealistic mode share target for employee travel by modes other than car to the site, and therefore, overspill parking in the local area. As the car mode share then in nearby sites was around 40.5%, a less stringent parking provision accounting for 90% of expected car demand was applied (less than 100% in order to exert some negative pressure on car usage). The provisions were closer to the City of Sydney (CoS) Council's code then extent codes than the South Sydney standards. Conditions have changed as traffic growth has been constrained in the area and fuel prices have soared, and are expected to remain high. The more rigorous constraint of DCP 11 or the CoS's commercial parking code now appears warranted.

The Australian Technology Park (ATP) *Master Plan Transport Study* (Colston Budd, 1994) presented long term parking objectives for the site that achieved a modal split of approximately 25% car use, 10% walk/taxi/cycle/motorcycle/other and 65% bus/rail. The Study proposes approaches to encourage the use of public transport. The later *Parking Policy and Management* (1998) document outlined the longer term parking policy for the ATP as encouragement of travel behaviour towards use of public transport/walking/cycling by ATP tenants and visitors, achieved mainly through rationing the supply of car parking spaces on-site. There have been no recent studies of actual travel behaviour by employees and visitors to the site to measure how car parking behaviour relates to the target.

Other issues highlighted in the Masson Wilson and Twiney report *Australian Technology Park Transport Management Plan* (2002) were options for an improved connection between the ATP and the CBD, which selected a reconfiguration of Boundary Street to form a more direct connection between the site and the arterial road network to the CBD and Sydney Airport. Their later study, *ATP Draft Amendment #1 for a Proposed Access Intersection* (2002) recommended a new intersection with Henderson Road, at its junction with Mitchell Road, to be the main entrance to the ATP from the south and west. Construction of this intersection has recently commenced. The Department of Public Works and Services (1998) looked at local traffic benefits of options for connecting North Eveleigh to the ATP via a road tunnel under the rail lines. This was exhibited in the draft BEP. Also shown in the draft BEP was another connection across the train lines further north, towards Redfern Railway Station, for pedestrians and cyclists, where the crossing could be narrower.

In terms of bus service reform, in 2004, former Premier Barry Unsworth, chaired a taskforce that issued a *Review of Bus Services in New South Wales*. Many of the regulatory reforms suggested are being progressed by the Ministry of Transport, but the Strategic Bus Corridors identified are to be implemented by the RTA. Strategic bus corridors are a network of roads that link regional centres. All those identified are to be reviewed by the RTA to ensure that in the future bus services along them will have sufficient priority to provide fast, frequent convenient and direct services. The RTA is implementing the upgraded bus priority in stages.

3.3 Responses from stakeholder agencies

As well as the comments described above in the policy section, the following responses have been made in interviews with other government agencies:

3.3.1 Roads and Traffic Authority

During the course of this study, PB contacted RTA officers in the Network Planning and Traffic Management directorates who look after parking policy, strategic bus corridors, traffic flow issues and major development reviews. PB's key conclusions from those discussions are summarised below.

- RTA does not have an official position on traffic issues associated with in-fill development targeted in the Metropolitan Strategy. Draft SEPP 66 still applies, but it is revising its SEPP 11 guidelines as discussed in Section 3.1 and refers to its Guidelines for Walking and Cycling
- RTA has not yet adopted a formal position on the future of the Southern Arterial or its components, such as Gibbons and Regent Streets. The arterial roads will remain a major access to the City given the growth in airport traffic and Green Square, so RTA wishes to preserve, but not necessarily increase the traffic capacity of the route
- in terms of the local environment, the Minister for Roads has recently allowed the clearways requirement along Regent Street to be lifted so on-street parking may be allowed
- the RTA has no objection to RWA investigating cut and cover proposals for Gibbons Street, although it is generally not disposed towards contributing financially to such investigations. The main RTA concerns would be preservation of the traffic capacity in the corridor and no actions to undermine the strategic bus corridor. Gibbons Street is a hazardous goods route, an alternate route to Airport Motorway for goods that cannot use tunnels
- while Gibbons and Regent Streets are part of the Unsworth Strategic Bus Corridor program (Rte 21, Miranda to CBD), they are unlikely to be studied for a bus priority improvement program of works until 2007 (3rd tranche of studies)
- RTA has no issues with the current road hierarchy
- RTA is concerned about a road tunnel proposal between north and south Eveleigh, and would wish to see more analysis before adopting a position.

3.3.2 NSW Department of Planning

As well as the urban structure aspects of the Sydney Metropolitan Strategy referred to in the previous chapter, another key action for the Department in relation to this site is its role in developing a Metropolitan Parking Strategy. The Department's mandate is outlined in action D.3.2.1 - to develop and implement a metropolitan-wide parking policy for Sydney.

The development of the Metropolitan Parking Policy is in its early phase, and is being lead by the Transport Division of the NSW Department of Planning. An officer of this Section was interviewed in May, 2006. A group composed of representatives from Government agencies has been set up to guide the development of the Policy. This group is currently scoping the issues and aspects to be addressed in the new Policy. No draft document has yet been prepared, and it is anticipated that the first draft will be available in later 2006. In a parallel process, the RTA is reviewing its (SEPP 11) *Guide to Traffic Generating Development*, notably in relation to on-site parking rates where circumstances such as good access to public transport should allow the required parking to be reduced.

The draft (SEPP 66) Integrated Land Use and Transport planning package was considered a useful policy under which to find principles and objectives common to those that would direct development of the Metropolitan Parking Policy. One objective for the Policy would be to provide a consistent, metropolitan-wide framework for parking provision, and to remove competing approaches in the different regions throughout Sydney. The Policy intends to provide a framework for local Councils to guide the preparation of their parking policies.

The Parking Policy will work to encourage the use of public transport, particularly in areas where there is a good provision of public transport services. The objective is to encourage sustainable transport by controlling the provision of car parking and aiming to generate a mode shift towards public transport use. It will have a strong focus on major centres, areas adjacent to centres, and within corridors. The Policy should address how parking should be managed in these areas, such as whether or not the provision of commuter parking is warranted at certain railway stations. Another focus would be how to treat kerbside parking. Policy on kerbside parking will be influenced by factors such as the need for bus lanes and the RTA's approach to enforcing kerbside parking.

3.3.3 City of Sydney

In an interview with the Senior Manager Transport, the following observations were noted:

- the City is interested in preserving a future transit corridor along the Botany Road Corridor as it has already been nominated as a Strategic Bus Route, and it would like to see the RTA abandon any planning that maintains or extends operations of the one-way pair within this corridor
- the City is preparing an integrated transport strategy which will be released later this year. It will tend to focus on linking the City's villages and investigating the potential for the light rail options suggested in the Christie report, or Long-term Rail Plan for Sydney (2001), released under FOI by the NSW government
- the City would like to see the operation for bus rail interchange in the vicinity of Redfern Station improved and a general upgrade in public transport in the Gibbons/Regent Streets corridor
- the City's upgrade of Redfern Street is an important pedestrian initiative and should be integrated with RWA's pedestrian network and reinforced by additional transit service upgrades
- in terms of cycle routes, the City would promote better integration with Henderson Road
- the Traffic Section is looking at the future of LATM in Redfern and a brief has been released to consultants
- issues of parking provision will be addressed in the LEP review underway in the Planning Section of Council.

3.3.4 State Transit

How bus services are planned and operated in NSW was changed in 2004 with the State's adoption of the Unsworth bus service reform proposals. While the Ministry of Transport (MOT) now has the regional route planning role for bus routes in Sydney, especially in the strategic corridors, operations remain the responsibility of the contractor for the region. All of RWA's area of management falls within the Inner Sydney East region (contract 9) operated by State Transit. While the MoT made a submission on the draft BEP outlining its new role, the planning group within Sydney Buses had the following observations to make:

- intensive redevelopment of this area is generally supported given its close proximity to frequent bus services
- interchange does occur around Redfern Railway Station, but placement of the bus stops makes it awkward for passengers and operators, it would be keen to see the pedestrian network improved with the redevelopment of Redfern Railway Station
- if two way traffic operations are restored to Gibbons and Regent Streets, it would prefer to operate in Gibbons Street to remain close to Redfern Station for interchange
- Sydney Buses is interested in participating in any Transport Steering Group that is established by RWA or the Redfern Railway Station upgrade project, although a single organisation is preferred.

3.3.5 RailCorp

RailCorp is committed to the upgrade of Redfern Railway Station, which is a major and historic passenger facility in the Sydney's rail network. It has recently made funds available for a Concept Design Study of the station in conjunction with the RWA. Consultants have been appointed, and have started work in mid-2006.

3.4 Summary of traffic and transport issues raised in submissions on the draft BEP

The draft BEP (Stage 1) was on exhibition for two months until 14 April 2006. As input into the preparation of a preliminary transport and traffic strategy for the area, PB reviewed the comments received that related to traffic and transport. A summary of the responses is found in Table 3-1.

The objective of PB's review was to extract the key issues relating to traffic and transport from the submissions. This information would feed into PB's development of a transport strategy for the area, ensuring PB had covered all applicable issues in the area. Submissions included letters from residents, landowners, local businesses, interest groups and government agencies.

The Redfern-Waterloo Authority received around 325 submissions during the public exhibition of the draft BEP, about a third of which raised at least one traffic or transport issue.

Table 3-1 Frequency of issues being raised in submissions

Broad Topics	No. of comments relating to this topic
Potential increased traffic with the development of Marian Street Park	32
Concerns with future traffic and access to North Eveleigh	
▪ Increased traffic and parking problems for residents in Darlington	28
▪ Concerns over access to redevelopment, not wanting local, narrow streets such as Iverys Lane or Shepherd Street, to be impacted	9
Desire to be consulted and know the transport/traffic plan before BEP is adopted	24
Support for more pedestrian and cycle links	19
Insufficient traffic assessment of proposals for the Redfern Station, Gibbons and Regent Street site	17
General concern that more traffic information was needed	17
General need to upgrade the transit services in the area	16
Support for the urgent upgrading of Redfern Railway Station	11

Of the letters received, 108 identified issues or concerns about traffic and transport in the area. This included the potential impact of increased density on the strategic sites on roads and transit services. Some comments were general, while others raised concerns in regard to specific areas, such as the residential streets of Darlington or Marion Street. A number of requests were received asking for details on traffic and transport measures before the BEP was adopted.

33 letters highlighted issues with the proposed vehicular tunnel between North Eveleigh and the ATP, including how its traffic might impact the residents of Darlington.

4. Existing traffic conditions

An initial examination of the current traffic and how the systems perform is essential to understand the local environment and to set a benchmark against which to measure future system performance. PB got into detailed conditions at the two key sites it was asked to look at closely, North Eveleigh and Redfern Railway Station, Gibbons and Regent Streets. Some of the sites in North Eveleigh have not been occupied for some time, so redevelopment will mark a major change from current conditions. For the Redfern Railway Station site, there is current traffic generating activity, where the impact would arise from the increment of additional activity.

The street grid in the area is relatively fine, given the long established residential and commercial activity in the area and the relatively small land parcels through much of the area. The main passenger (and formerly freight) rail lines to the city also converge in this area, and they create a significant division between the land parcels on either side. There is only a single crossing of the rail lines within Redfern-Waterloo are, which is Lawson Street, with Cleveland Street on its northern boundary. Along the rail line there are a number of large land parcels that were formerly its main workshops. While rail activities still remain at the southern end of the site, many former workshops are being reused, such as at the Australian Technology Park and the CarriageWorks Contemporary Performing Arts Centre. However, much of the land to the west of the rail line is vacant or underutilised and is generating minimal traffic at present.

4.1 Existing road hierarchy

Roads within a network are classified according to a road hierarchy relating closely to their functional role within the road network and the volume of traffic they carry. The Roads and Traffic Authority (RTA) has defined four classes within the hierarchy of roads:

- Arterial Roads – predominately carry through traffic from one region to another forming the principal avenues for urban traffic movements. Typically traffic volumes would be in excess of 15,000 vehicles per day (vpd)
- Sub-arterial Roads – connect the arterial roads to areas of development or carry traffic directly from one part of a region to another, they may also relieve traffic on arterial roads in some circumstances. Typically traffic volumes would range from 5,000 vpd to 20,000 vpd
- Collector Roads – connect the sub-arterial roads to the local road system in developed areas. Typically traffic volumes would be in the range from 2,000 vpd to 10,000 vpd, but residential amenity would begin to decline with volumes in excess of 5,000 vpd
- Local Roads – are the sub-divisional roads within a particular developed area. These are used solely to provide local access, and typically carry low volumes, usually less than 2,000 vpd

- The existing road network in the study includes Regent Street, Gibbons Street, Cleveland Street, Lawson Street, Abercrombie Street, Shepherd Street, Wilson Street, Forbes Street, Golden Grove Street and Ivy Street. How these roads currently fit into a de facto road hierarchy is shown in Figure 4-1. This hierarchy is derived from the measured traffic volumes as they relate to the RTA classification. There is a separate classification of roads which relates not to use, but to responsibility. State roads are usually the high order routes, but they are built and maintained by the RTA. Regional roads are important traffic routes that are maintained by local government, but in recognition of their traffic role, RTA makes a payment to local government for their maintenance based on the total kilometres of regional roads in the municipality. Local roads are the sole responsibility of local government.

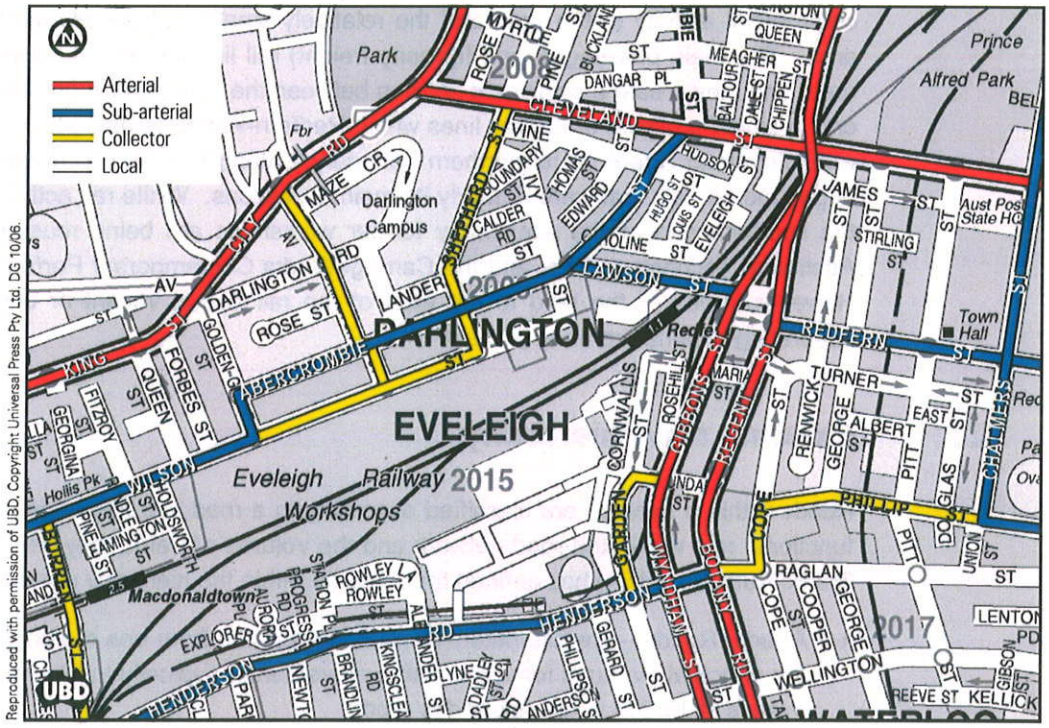

Figure 4-1 Road Hierarchy in 2006

Regent Street is a State road under RTA jurisdiction. RTA provides 100% of the funding towards its maintenance. It is part of a corridor the RTA has referred to as the Southern Arterial, that carries traffic between the CBD and the Airport, although this role has been reduced by the construction of the Airport Motorway. To its south, Regent Street becomes Botany Road and to its north, it connects to Lee Street and George Street. Regent Street is a one way southbound road between just north of Lawson Street to Henderson Road. It is a higher order arterial road and can be expected to carry in excess of 48,000 vpd immediately south of Cleveland Street, where it is a two-way road. It carries 25,000 vpd south of Henderson Road.

Regent Street, between Lawson Street and Henderson Road, is generally a four-lane road with a posted speed limit of 60km/h with a typical urban road cross-section (i.e. kerb and gutter on either side of the road). There are footpaths on both sides of the road which are heavily used. On-street parking is presently not permitted between Cleveland Street and Lawson Street, but is available between Redfern Street and Henderson Road. The RTA has recently permitted the extension of on street parking along Regent Street because of its commercial land use frontages.

Regent Street is also part of the proposed Miranda to CBD Strategic Bus Corridor (21). Due to the Airport Motorway being partially in tunnel, it also is an alternative route for trucks with over-sized or hazardous goods.

Gibbons Street is also a State Road under the jurisdiction of RTA. This route is in parallel with Regent Street, providing the northbound lanes in the arterial pair. To its south, Gibbons Street becomes Wyndham Street and just north of Lawson Street, the northbound and southbound lanes rejoin to become Regent Street. It is a higher order arterial road and carries approximately half of the Regent Street traffic, which is 24,000 vpd south of Cleveland Street.

Gibbons Street is generally a four-lane road with a posted speed limit of 60km/h, with a typical urban road cross section (i.e. kerb and gutter on either side of the road). There are footpaths on either side of the road which are well utilised, especially in the vicinity of Redfern Railway Station's entrance. On-street parking is generally permitted on Gibbons Street between Wyndham Road and Lawson Square. Gibbons Street is also part of the Strategic Bus Corridor and hazardous goods route. .

Cleveland Street is a State road, where RTA provides 100% of the funding towards its maintenance. Cleveland Street is a major arterial to the inner city and the eastern suburbs. Cleveland Street is a higher order arterial road and can be expected to carry in excess of 56,000 vpd. It is generally a four-lane, two-way undivided road with the posted speed limit of 60km/h with typical urban road cross section (i.e. kerb and gutter on either side of the road). On-street parking is generally not permitted on Cleveland Street during peak periods. It carries a high percentage of heavy vehicles. Its footpaths are not well used in this vicinity due to high traffic levels on the kerbside and limited land uses along the route that generate pedestrians.

Lawson Street is classified as a local road. Council provides 100% of the funding towards maintenance. It is a higher order local road, given it is one of the few connections across the main rail lines into the city, and provides access to the University of Sydney from the east and south. Lawson Street can be expected to carry traffic in the range of 7,000 vpd to 10,000 vpd which classifies it as a sub-arterial route. It is generally a two-lane, two-way undivided road with typical urban road cross section. The posted speed limit on Lawson Street is 50km/h. On-street parking is generally not allowed between Regent Street and Eveleigh Street, but is available between Eveleigh Street and Abercrombie Street. It plays a significant role in the pedestrian network, connecting Redfern Station, the University of Sydney and Redfern Town Centre. It is part of the cycleway that connects Wilson Street to Redfern Street.

Abercrombie Street is classified as a local road south of Cleveland Street, but an arterial road north of it. It is a connector between Cleveland Street and Golden Grove Street. Abercrombie Street can be expected to carry traffic in the range of 5,000 vpd to 8,000 vpd which classifies it as a sub-arterial route. It is generally a two-lane, two-way undivided road with typical urban road cross section. The posted speed limit on Abercrombie Street is 50km/h. On-street parking is generally available on Abercrombie Street. South of Lawson Street, it carries large numbers of pedestrians.

Shepherd Street is a local road under Council jurisdiction. It provides a connection to Cleveland Street and Wilson Street. Shepherd Street is a two-lane, two-way road with the posted speed limit of 50km/h, but some sections, particularly near Cleveland Street, are of sub-standard width. It carries in the range of 3,000 vpd to 5,000 vpd, classifying it as a collector road. On-street parking is generally available, and in heavy demand, on Shepherd Street.

Wilson Street is a local road under Council jurisdiction. It provides access to residential and commercial properties. Wilson Street is generally a two-lane, two-way road with the posted speed limit of 50km/h. Given it parallels the rail lines, there is little cross traffic. It can be expected to carry traffic in the range of 3,000 vpd to 5,000 vpd between Ivy Street and Golden Grove Street, classifying it as a collector road, but south of Golden Grove it carries traffic to Erskineville and Newtown from Abercrombie Road, so its function changes to sub-arterial. On-street parking is generally available, and is heavily used. Wilson Street contains an on-street cycleway which is popular and connects the Inner Western suburbs to the University of Sydney and the CBD.

Forbes Street is a local road under Council jurisdiction. It provides access to adjacent properties. It appears to carry less than 2000 cars a day, so it is a local road in the hierarchy, too. Forbes Street is a two-lane, two-way road with the posted speed limit of 50km/h, and is relatively wide in comparison with other streets in the area. It connects King Street with Wilson Street.

Golden Grove Street is a local distributor road under Council jurisdiction. It provides access to frontage properties. Golden Grove Street provides for two-way traffic with a relatively wide cross-section and connects King Street with Wilson Street, and carries traffic flows at the sub-arterial level along that section between Abercrombie and Wilson.

Ivy Street is a local road under Council jurisdiction. It provides access to adjacent properties and carries much less than 200o cars a day. It is a local road. Ivy Street between Abercrombie Street and Wilson Street is a three-lane, one-way road with on-street parking available on both sides of the road.

There are also a number of laneways in the area that are significant links in the pedestrian, property access and bicycle circulation network.

4.2 Existing access arrangements for North Eveleigh and Redfern Railway Station, Gibbons and Regent Streets site

4.2.1 North Eveleigh

There are only two entrances for pedestrians and vehicles to this site. Both are gated as the site is largely vacant and partly a construction site. At the northern end there is an access off Little Eveleigh Street, and at the southern end there is an access to Wilson Street, between Forbes and Queen Streets. This driveway also serves some RailCorp facilities along the rail line. RailCorp is proposed to receive an easement along the Iverys Lane boundary of the site to maintain operational access to its facilities.

There is a pedestrian-only access being constructed to Wilson Street opposite Codrington Street which will provide access to North Eveleigh site and be available from the opening Performing Arts facility.

4.2.2 Redfern Railway Station, Gibbons and Regent Streets

There are serval vehicle access points which use the laneways and cross streets; the closed extension of Redfern Street, Marian Street and Margaret Street and William Lane, to obtain access to the arterial pair. Few driveways have access directly to Gibbons or Regent Streets. The railway lines prevent local connections other than via Lawson Street, which does not directly connect to Redfern Street. The main pedestrian and cycle access to the area is along the Redfern Street axis, including the closed segment between Regent and Gibbons Streets. The double set of traffic signals to the Station, and the timing of traffic along the arterial route were observed to generate sufficient gaps for traffic from these side streets/lanes to enter the arterial traffic stream.

4.3 Traffic flows

Traffic counts were taken at the following intersections to update earlier counts and to measure the main routes likely to be impacted by development of the North Eveleigh and Redfern Railway Station, Gibbons and Regent Street sites. Pedestrians crossing the intersections were also counted at:

- Wilson Street/ Forbes Street
- Wilson Street/ Golden Grove Street
- Wilson Street/ Ivy Street
- Abercrombie Street/ Shepherd Street
- Abercrombie Street/ Lawson Street
- Lawson Street/ Gibbons Street
- Lawson Street/ Regent Street
- Cleveland Street/ Shepherd Street.

The traffic surveys were conducted on Tuesday, 11th of April 2006 for a morning and afternoon peak period at each intersection. The morning peak period surveys were conducted from 6:30AM to 9:00AM, and the afternoon peak period from 4:00PM to 6:00PM. Table 4-1 summarise the hours identified as experienced the highest traffic flow at each intersection.

Table 4-1 Survey peak hours at eight key intersections

Intersections	Survey peak hours	
	Morning peak hour	Afternoon peak hour
Wilson Street/ Forbes Street	7:45AM – 8:45AM	5:00PM – 6:00PM
Wilson Street/ Golden Grove Street	7:30AM – 8:30AM	5:00PM – 6:00PM
Wilson Street/ Ivy Street	7:45AM – 8:45AM	5:00PM – 6:00PM
Abercrombie Street/ Shepherd Street	8:00AM – 9:00AM	5:00PM – 6:00PM
Abercrombie Street/ Lawson Street	8:00AM – 9:00AM	5:00PM – 6:00PM
Lawson Street/ Gibbons Street	8:00AM – 9:00AM	5:00PM – 6:00PM
Lawson Street/ Regent Street	7:45AM – 8:45AM	5:00PM – 6:00PM
Cleveland Street/ Shepherd Street	8:00AM – 9:00AM	4:30PM – 5:30PM

Table 4-1 shows that for most of the intersections, the morning peak hour was generally between 8:00AM and 9:00AM in the study area, with the Wilson Street intersections having a slightly earlier peak hour. The afternoon peak hour, for all but the Cleveland Street/ Shepherd Street intersection, occurred between 5:00PM and 6:00PM.

Figure 4-2 and Figure 4-3 show the morning and afternoon peak hour intersection turning movement volumes at the eight key intersections surveyed. A passenger car unit (pcu) factor of three has been used for heavy vehicles. The traffic volumes in these figures are in vehicles per hour (vph). Pedestrian numbers from the counts are shown in red.

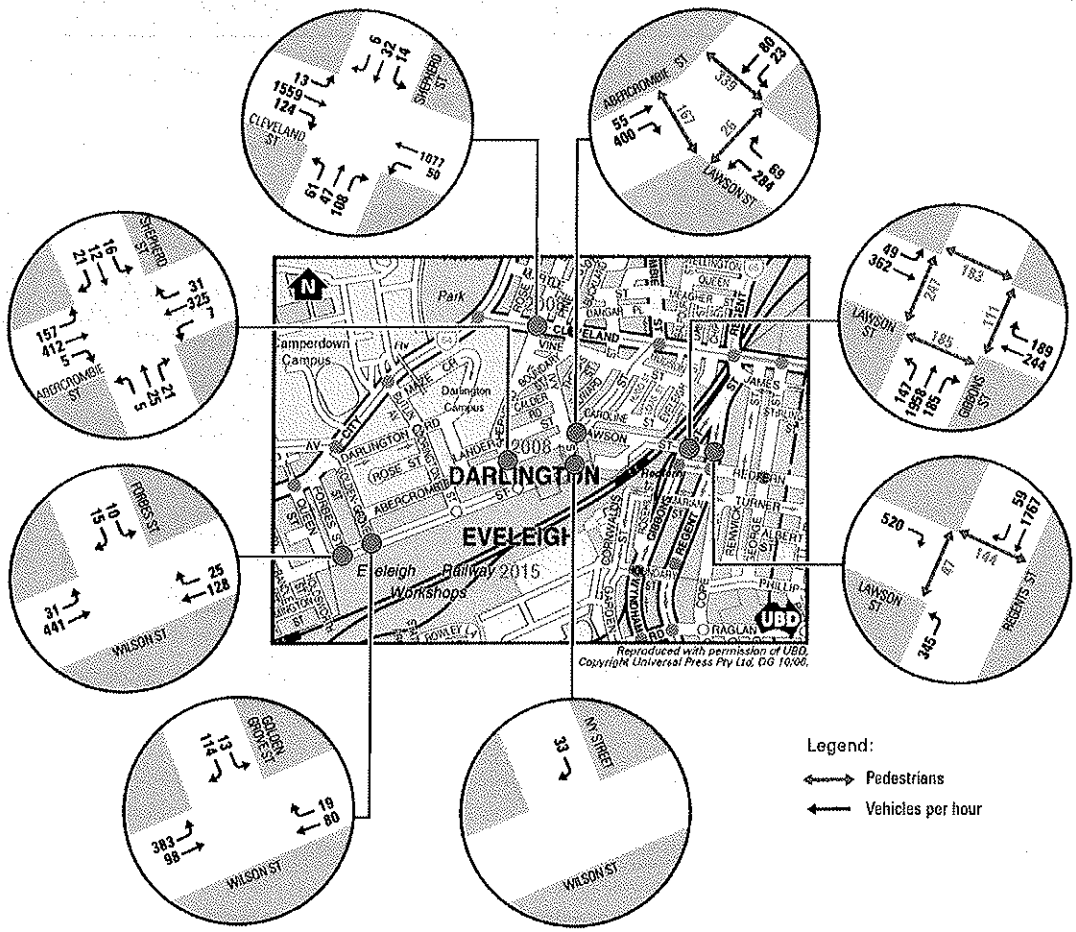

Figure 4-2 Existing morning peak hour intersection volumes (vph)

Table 4-3 Historical traffic volume data

Intersection	Peak hour	November 2001		April 2006		Growth rate per annum (%)	
		N-S	E-W	N-S	E-W	N-S	E-W
Wilson St-Forbes St	Morning	10	600	25	601	30.0%	0.1%
	Afternoon	24	581	12	629	-10.0%	1.7%
Wilson St-Golden Grove St	Morning	141	535	119	560	-3.1%	0.9%
	Afternoon	222	431	216	423	-0.5%	-0.4%
Abercrombie St-Shepherd St	Morning	225	824	100	905	-11.1%	2.0%
	Afternoon	130	1,002	165	898	5.4%	-2.1%
Cleveland St-Shepherd St	Morning	215	2,254	242	2,601	2.5%	3.1%
	Afternoon	400	2,778	349	2,582	-2.6%	-1.4%

NOTE: N-S – North-South direction; E-W – East-West direction

The comparisons in Table 4-3 show that there is no distinct pattern in the traffic flows between 2001 and 2006. In fact, there is virtually no increase in traffic which is more than 50 vehicles per hour in the local streets and which is less than one car a minute. The Abercrombie Street-Shepherd Street intersection shows a 2% increase per annum during the morning peak hour for the east-west direction and 5.4% increase per annum during the afternoon peak hour for the north-south direction. Cleveland Street-Shepherd Street intersection shows approximately 3% increase per annum in the morning peak hour and 2% decrease per annum in the afternoon peak hour. In the last five years, there has not been a measurable change in traffic conditions on local streets.

Annual average daily traffic (AADT) in the vicinity of the subject sites were also obtained from the RTA's Traffic Volume Data 2002 (Sydney Region). Five RTA station locations were shown in Table 4-4 for the survey year of 1999 and 2002.

Table 4-4 RTA traffic volume data

RTA station no.	Road name	Location	AADT		Growth rate per annum (%)
			1999	2002	
02.015	City Road	South of Cleveland Street	44,998	41,411	-2.66%
02.385	Regent Street	South of Cleveland Street	53,834	48,856	-3.08%
00.340	Cleveland Street	At Boundary St intersection	38,377	34,161	-3.66%
00.222	Lawson Street	At Abercrombie Street intersection	6,810	5,515	-6.34%
00.222	Abercrombie Street	At Lawson Street intersection	4,587	3,833	-5.48%

Source: RTA Counting program

The results in Table 4-4 show that there was a general decrease in traffic volumes for both arterial roads. For the arterial roads, such as City Road, Abercrombie Street, Regent Street and Cleveland Street, the decrease in traffic volume could be partially explained by the opening of the Eastern Distributor (from late 1999). Subsequently, the Cross City Tunnel and the high petrol prices would have been expected to support this trend until the present.

4.5 Public transport access

4.5.1 Rail

Redfern Railway Station is the tenth busiest in the Sydney Rail network, and is directly linked to all radial services to the CBD except the Airport Rail Link which passes underground to the east of the Station. The highest passenger loads are carried in the morning peak hour. Services are frequent and some inter-urban services also stop here. Trains arriving in the morning peak are carrying their peak loads, but as many passengers disembark for University, bus transfer and employment, there is generally capacity for passengers waiting at Redfern to board trains travelling in all directions.

The main passenger access to the Station is in Lawson Street, with a side entrance on Gibbons Street, opposite the pedestrianised extension of Redfern Street. Fencing prevents mid-block crossings. From the counts, the main pedestrian flow is west toward the University. East of the Station, the main road crossing is north/south across Lawson Street at Gibbons Street in both the AM and PM peaks. The east/west crossing of Gibbons Street is split between the Lawson Street traffic signals and the signals opposite the closed end of Redfern Street. Passengers may also enter the station from Marian Street directly to the south end of the easternmost surface platform if they possess a rail ticket, although there is no ticket barrier until the main concourse is reached.

Passenger facilities are basic, with no DDA compliant access, and only partial shelter for passengers waiting on the platforms.

4.5.2 Bus

A number of bus services pass through the study area, mainly on the arterial roads, and all are operated by the publicly owned Sydney Buses (State Transit). The service levels on Gibbons/Regent Streets are split due to the one-way traffic flow, but are regionally important enough for the route to be considered part of Strategic Bus Corridor 21, linking the CBD to Miranda. This means the RTA will be preparing a program for improving the speed and reliability of buses along this corridor, but this is not scheduled to begin until 2007.

There is another very important, frequent service corridor in the vicinity of North Eveleigh which is King Street/City Road. The route structure and its relationship to the Station are shown in Figure 4-4.