City West Housing Pty Ltd

North Eveleigh Affordable Housing Project (SSD_5708)

Transport Assessment

Issue | 2 April 2013

Job number 228749

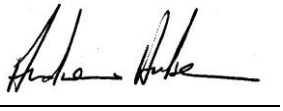
Arup
Arup Pty Ltd ABN 18 000 966 165

Arup
Level 10 201 Kent Street
PO Box 76 Millers Point
Sydney 2000
Australia
www.arup.com

ARUP

Document Verification

ARUP

Job title		North Eveleigh Affordable Housing Project (SSD_5708)			**Job number** 228749
Document title		Transport Assessment			**File reference**
Document ref					
Revision	**Date**	**Filename**	Nth Eveleigh Affordable Housing_Draft Report.docx		
Draft 1	31 Jan 2013	**Description**	First draft		
			Prepared by	Checked by	Approved by
		Name	JDM	JDM	AMH
		Signature			
Draft 2	6 Mar 2013	**Filename**	Nth Eveleigh Affordable Housing_Draft 2 Report.docx		
		Description	Updated unit mix		
			Prepared by	Checked by	Approved by
		Name	AMH	AMH	AMH
		Signature			
Draft 3	21 Mar 2013	**Filename**	Nth Eveleigh Affordable Housing_Draft 3 Report.docx		
		Description			
			Prepared by	Checked by	Approved by
		Name	AMH	AMH	AMH
		Signature			
Issue	2 Apr 2013	**Filename**	Nth Eveleigh Affordable Housing Transport Assessment Report.docx		
		Description	Issue		
			Prepared by	Checked by	Approved by
		Name	AMH	AMH	AMH
		Signature			

Issue Document Verification with Document ✓

Contents

Tables

Figures

Appendices

1 Introduction

This transport assessment has been carried out by Arup on behalf of City West Housing (CWH). The purpose of the report is to define, understand and address the travel and transport planning requirements for the affordable housing component of the North Eveleigh Concept Plan. This development provides for the introduction of 88 residential dwellings at the western end of the site.

The purpose of the study is to develop a transport strategy that provides a practical and sustainable basis for land use development – supporting the achievement of a maximum 40% car mode share for the site. It will be important to understand, define and address the travel and transport planning requirements for new developments and strategic planning projects, thereby achieving integrated and sustainable transport.

1.1 Study Background

The North Eveleigh Concept Plan was approved by the Department of Planning in December 2008. The approved plan allowed for the development of the 10.7 hectare site, for a maximum of 177,527m^2 GFA, comprised of approximately:

- 95,000m^2 of residential GFA;
- 60,000m^2 of commercial and retail GFA; and
- 23,000m^2 of cultural and community GFA.

A maximum of 50,698m^2 of residential GFA was approved for the western precinct.

At this stage RailCorp has only agreed to release approximately 15,900m^2 of land for redevelopment. This is located at the western end of the North Eveleigh site adjacent to Wilson Street. City West Housing has been selected by UrbanGrowth NSW Development Corporation (UGDC) to develop and manage building D4 (6,480m^2 GFA) for affordable housing. This is shown in Figure 1.

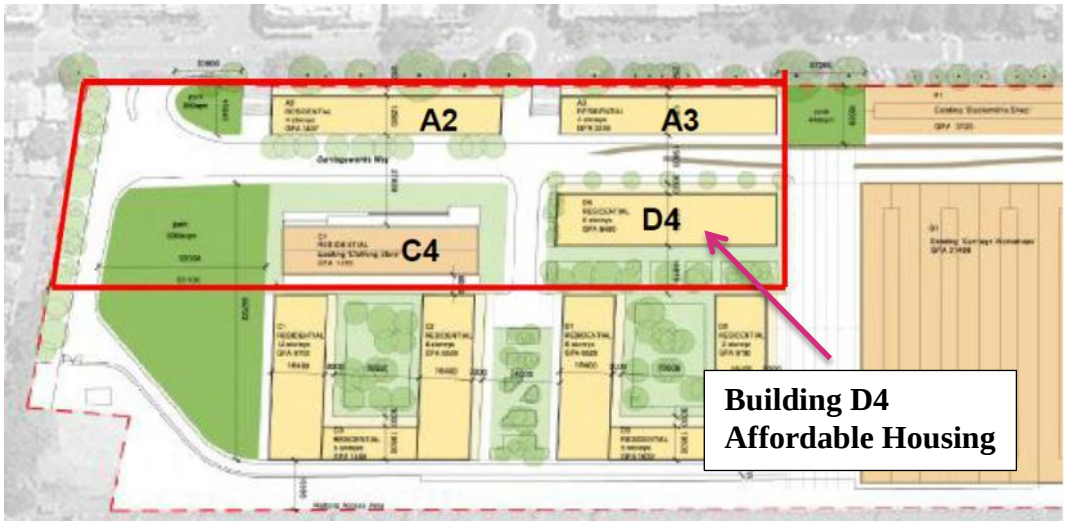


Figure 1: Stage 1 Development Site Area

1.2 Stage 1 Transport Management and Accessibility Plan (TMAP)

This Stage 1 Transport Management and Accessibility Plan (TMAP) was prepared by Arup on behalf of the UrbanGrowth NSW Development Corporation (UGDC) in February 2013. The purpose of the report was to satisfy the requirement for a TMAP in accordance with Condition B3 of the approved North Eveleigh Concept Plan, and to define, understand and address the travel and transport planning requirements for the first stage of the North Eveleigh Concept Plan. The first development stage provides for the introduction of up to 200 residential dwellings at the western end of the site. The TMAP concluded that the proposed Stage 1 Development is considered to have a minimal impact on the local transport network.

1.3 Study Objectives

This report responds to the transport related issues addressed in the DGR SSD_5708 as summarised below:

- *Detail access arrangements for all stages of construction*
- *Demonstrate the provision of sufficient on-site car parking*
- *Provide an assessment of the implications of development on non-car travel modes (including public transport, walking and cycling)*

More specifically, the assessment aims to:

- Discuss the existing transport network conditions surrounding the site,
- Establish the likely trip generation from affordable housing development,
- Identify potential measures to reduce reliance on car mode share to below 40% (Note that the adjacent Darlington precinct has a low car dependence for the journey to work of only 19%),
- Provide traffic modelling which forecasts the future operation of local intersections,
- Review the vehicle access arrangements into the proposed development
- Review pedestrian and cyclist accessibility in the precinct and within the site itself and provide recommendations to improve existing facilities,
- Assess the proposed on-site parking provision, and
- Establish the likely construction vehicle routes associated with the development.

2 Existing Transport Conditions

2.1 Site Location

The affordable housing development site of the North Eveleigh Development is located on the northern side of Eveleigh, approximately 4km south of the Sydney CBD. The site is bounded by Darlington to the north, Redfern to the east, Alexandria and Erskineville to the south and Newtown to the west. Figure 2 shows a context location of the surrounding suburbs.

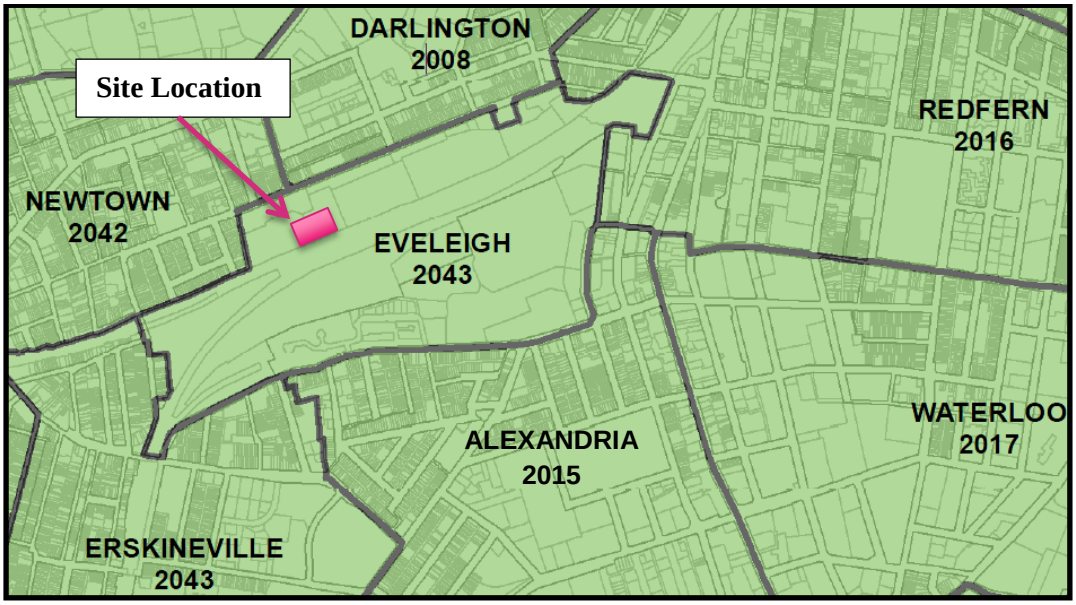


Figure 2: Surrounding Suburbs

2.2 Rail Network

The site is approximately 1200 metres or a 15 minute walk to Redfern railway station, which provides the area with frequent rail links to the surrounding region. Redfern station is the ninth busiest railway station in the Sydney area. The station has 12 platforms available, 10 of which are in use. 7 of the platforms serve CityRail services and 3 serve inner city services. Table 1 details the number of services at the station for each line.

Redfern Railway Station is proposed to undergo upgrades as part of the Long Term Transport Master Plan (LTTMP). The proposals facilitate access and connectivity, increased station capacity and improved links to multi-modal connections such as surrounding bus stops, pedestrian and cycle links.

Table 1: Redfern Railway Station Services

Rail Line	Direction	Trains per weekday	Trains in AM Peak[1]
Eastern Suburbs and Illawarra Line	Waterfall or Cronulla to Bondi Junction	178 trains	18 trains
	Bondi Junction or Cronulla to Waterfall	170 trains	14 trains
Bankstown Line	Liverpool or Lidcombe to City Circle	76 trains	5 trains
	City Circle to Liverpool or Lidcombe	80 trains	5 trains
Inner West Line	Liverpool to City via Regents Park	202 trains	15 trains
	City to Liverpool Via Regents Park	205 trains	12 trains
Airport and East Hills Line	Macarthur to City Circle via Airport or Sydenham	11 trains	3 trains
	City Circle to Macarthur via Airport or Sydenham	11 trains	0 trains
South Line	Campbelltown to City Circle via Granville	200 trains	15 trains
	City Circle to Campbelltown via Granville	200 trains	12 trains
North Shore Line	Berowra to Parramatta via City	193 trains	12 trains
	Parramatta to Berowra via City	206 trains	18 trains
Northern Line	Hornsby or Epping to City	79 trains	6 trains
	City to Hornsby or Epping	83 trains	6 trains

[1] For the purposes of this table only the trains during the AM peak hour is defined as the trains that depart Redfern Station between 08:00am and 09:00am. RailCorp definition of the AM peak period is 6.30am-9.30am which would include more services than indicated above.

The proposed development is served by a second railway station; Macdonaldtown Station located approximately 650 metres or an 8 minute walk from the site. Access to Macdonaldtown Station is via Burren Street under the railway bridge. While Macdonaldtown Station is closer to the site then Redfern Station, it is expected that the majority of patrons using trains will walk to Redfern station as a result of the more frequent services and additional lines servicing this station. This is shown in Table 2. Users travelling to Newtown and other stations on the inner west line are likely to use Macdonaldtown Station.

Table 2: Macdonaldtown Railway Station Services

Rail Line	Direction	Trains per weekday	Trains in AM Peak[2]
Inner West Line	From Macarthur to City	70 trains	4 trains
	From City to Macarthur	78 trains	5 trains

2.3 Bus Network

The majority of the buses in the area operate along City Road to the north of the site. Bus stops on City Road are approximately 500 metres away from the proposed development site – just over a 5 minute walk. Table 3 details a list of the existing bus routes in operation along City Road and the daily scheduled number of buses in operation on the route.

[2] For the purposes of this table definition of morning peak hour is between 08:00am and 09:00am.

Table 3: Bus Services Along City Road

Bus Number	Operator	Route	Total Number of Buses Per Day	Buses in the AM Peak Hour
Metrobus 30	Sydney Buses	Sydenham Station to Spit Junction	128	12
352	Sydney Buses	Bondi to Marrickville Junction	53	6
370	Sydney Buses	Coogee to Leichhardt	112	11
422	Sydney Buses	Circular Quay to Kogarah	156	10
423	Sydney Buses	Kings Grove to Circular Quay	148	11
426	Sydney Buses	Kingsgrove to Circular Quay	133	7
428	Sydney Buses	Dulwich to Circular Quay	135	10
L23	Sydney Buses	Kingsgrove – Circular Quay	17	5

2.4 Pedestrian Network

Pedestrian links facilitate connectivity from the proposed development to nearby bus stops on City Road and at Redfern and Macdonaldtown railway stations. Pedestrian laneways and wide footpaths equipped with pram ramps and street lighting further add to the pedestrian amenity in the area. A pedestrian priority crossing is located on Wilson Street opposite Hollis Park. A pedestrian area is located between Wilson Street and Little Eveleigh Street to the east of the site, providing access to Redfern Railway Station. Dedicated pedestrian crossings are provided on all legs of key signalised intersections on City Road and King Street.

The Shepherd Street/ Abercrombie Street intersection is equipped with a ‘scramble phase’ crossing, an all red phase for vehicles which allows pedestrians to cross diagonally across the intersection. This crossing facilitates convenient access for university students accessing Maze Crescent, a pedestrian link across the university campus.

2.5 Bicycle Network

The proposed development is well connected by a series of bicycle routes that form part of the City of Sydney’s cycling network. Wilson Street is a key regional cycle route that runs adjacent to the site, providing connections to Newtown, Erskineville and Redfern. A contra-flow cycle lane is provided on Little Eveleigh Street to the east which connects Wilson Street to Lawson Street and Redfern station. The key cycle routes in the vicinity of the site are outlined in Figure 3.

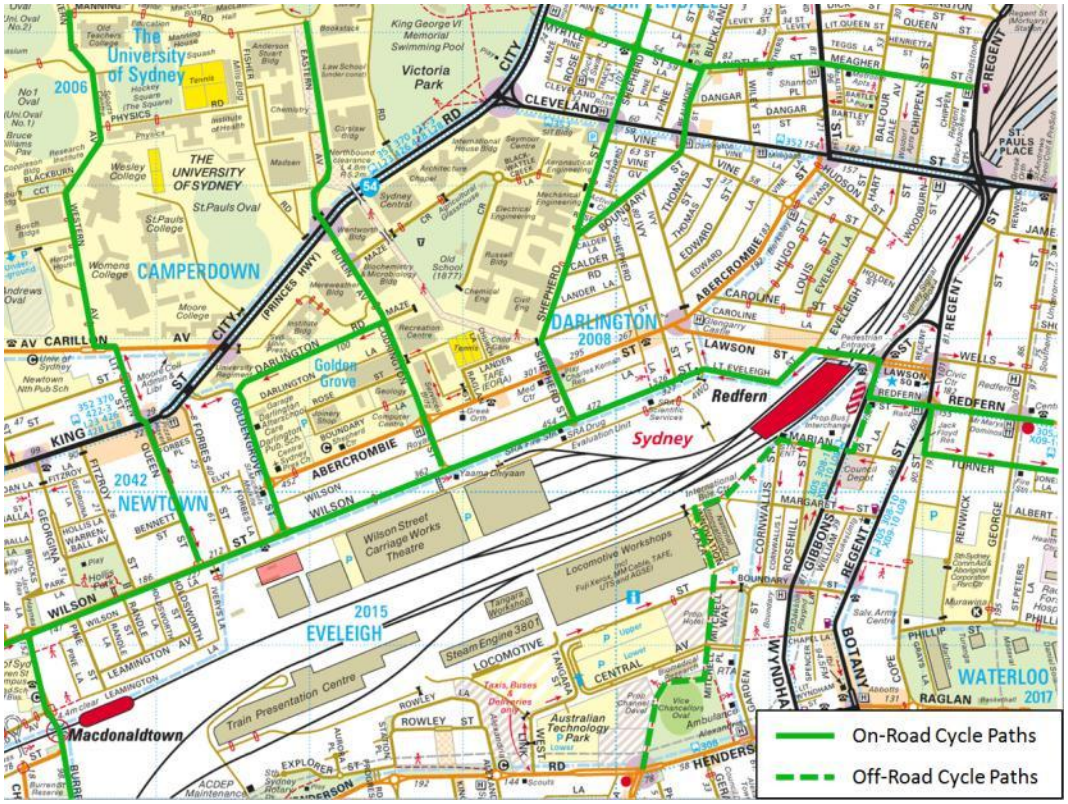


Figure 3: Cycle Routes surrounding North Eveleigh Site

The City of Sydney has commenced a roll out of cycleway connections across the entire LGA. These routes will facilitate regional cycle connections between the North Eveleigh site and key locations with the area. These routes are shown in Figure 4 below.

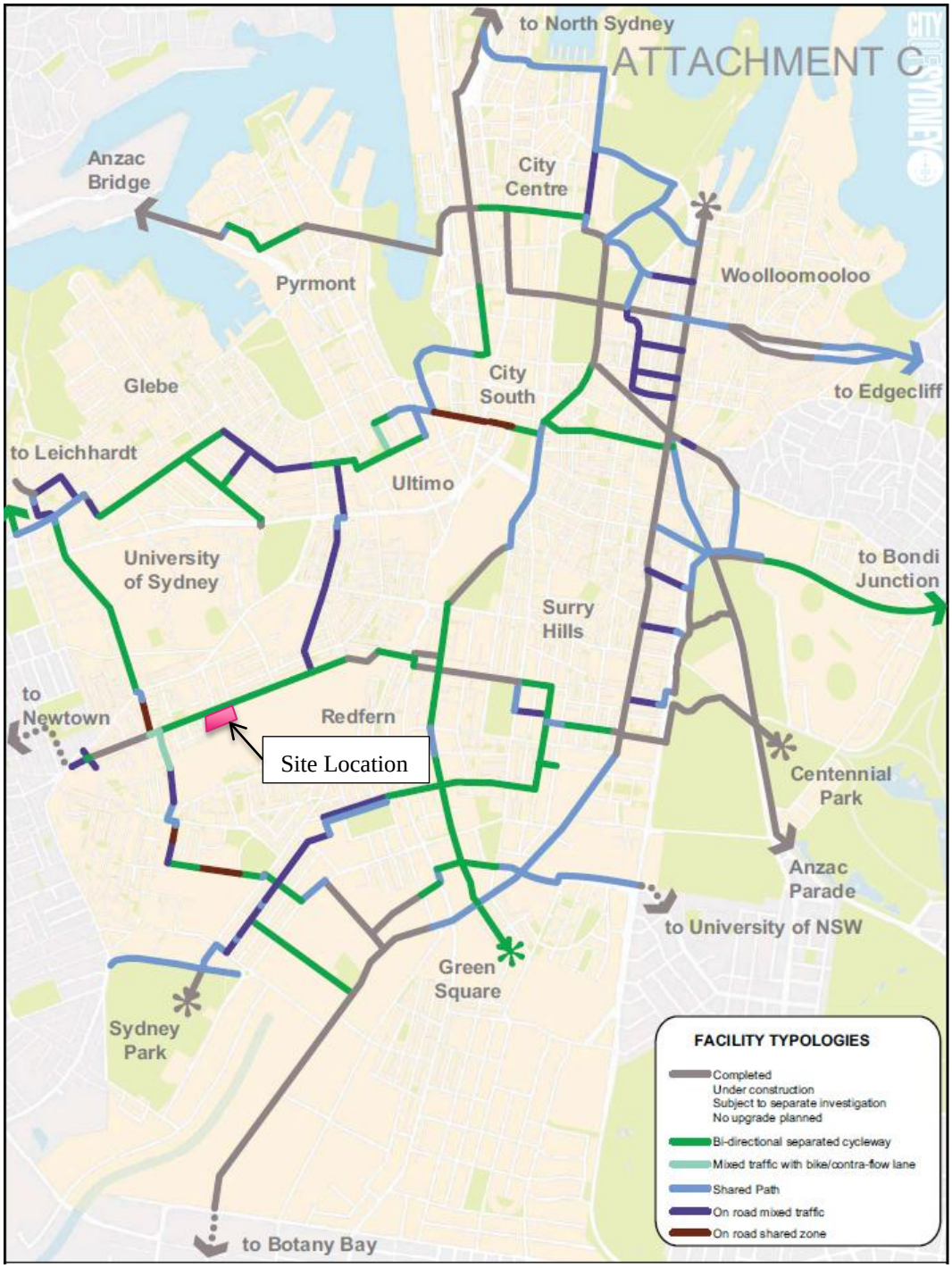


Figure 4: City of Sydney Regional Bike Network Site Improvements Program

Source: City of Sydney Council

2.6 Existing Travel Patterns

Consistent with the methodology adopted in the Stage 1 TMAP for the North Eveleigh Concept Plan site, travel statistics for the Darlington suburb have been utilised in this analysis.

2.6.1 Mode Share

The 2011 ABS Census data relating to travel mode to work stated that workers travelling from Darlington travel to work by the modes indicated in Table 4:

Table 4: Existing Mode Share

Mode	Percentage Split	
	Darlington	Greater Sydney Average
Car, as driver	18%	54%
Car, as passenger	1%	5%
Train	23%	9%
Walked only	22%	4%
Bicycle	6%	1%
Bus	5%	5%
Other	25%	22%
Total	**100%**	**100%**

Source: 2011 Census (Australian Bureau of Statistics, 2012)

The data shows that approximately 18% of workers drive themselves to work from the area –significantly lower that the Sydney wide average. The other major travel modes are by train and bicycle, ranging from 23% to 6% of the total modal split. The 'other' mode consists of people who used a different mode, work from home or did not work on the day of the census. The data also shows that approximately 75% of the residents in the workforce commuted on the day of the Census.

The key trend to emerge from the 2011 Census data is the level of non-car usage by residents of Darlington. More than 56% of people surveyed indicated they travelled to work via public train, bus, walking or cycling rather than private vehicle. This is well above the average for the greater Sydney region of 19%, and reflects the good public transport availability in the area.

2.6.2 Trip Distribution

The 2006 ABS Census data[3] is the latest published data relating directions to Journey to Work. The Census data is grouped into zones in order to compare differences between travel patterns in areas. The Stage 1 North Eveleigh development in 'Travel Zone 0256' which is bound by Queen Street to the west Darlington Road to the north, Codrington Street to the east and the railway line to the south. Figure 5 below, illustrates the area covered by 'Travel Zone 0256'.

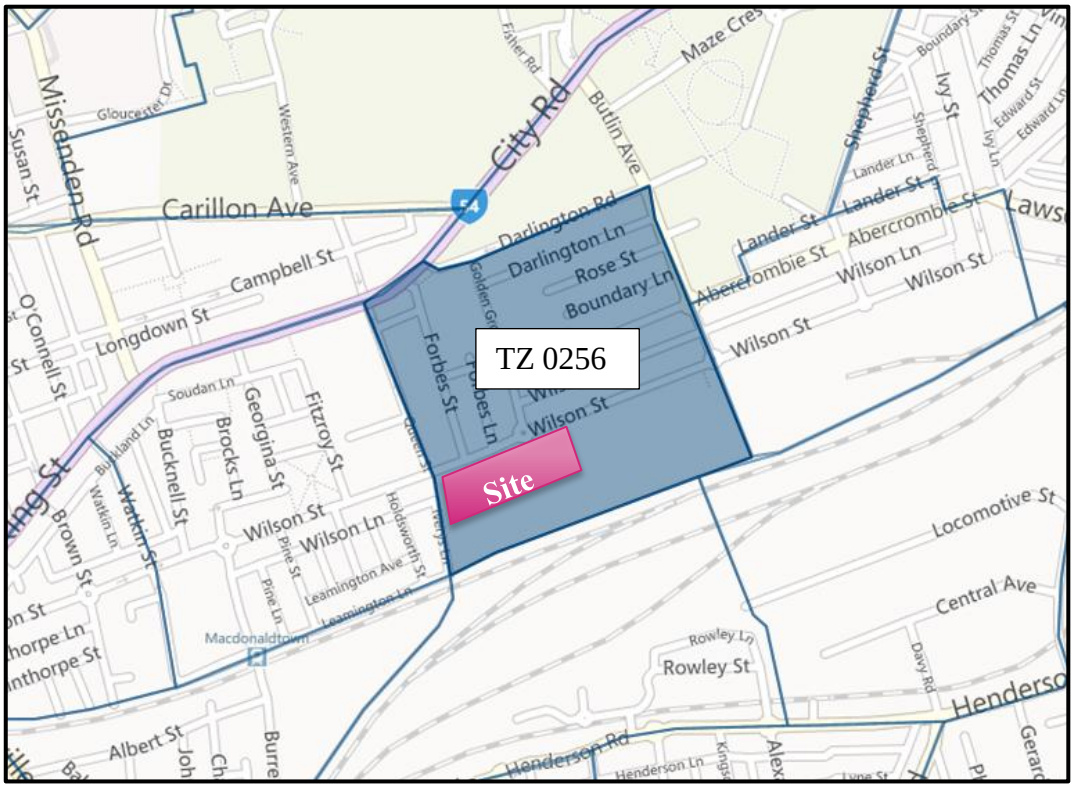


Figure 5: Travel Zone 0256 – Darlington

Source: BTS Travel Zone Finder

The survey data states that commuter workers travelling to work by private vehicle from Travel Zone 0256 containing the proposed development site travel in the directions as stated in Table 5:

Table 5: Directional Split

Direction	Percentage Split
North	38%
East	29%
South	10%
West	23%
Total	**100%**

[3] At the time of writing this report full 2011 JTW Census data has not been published.

The data shows that the majority of vehicle commuters travel north towards Sydney CBD and North Sydney.

2.7 Area Demographics

The 2011 Census data for demographics shows the suburb of Darlington as a predominantly residential area with a recorded population of 2,243 people. A review of the demographics of the suburb was conducted using the 2011 Census data to establish typical lifestyle and modes for Darlington.

2.7.1 Dwelling Occupancy

Darlington has a total of 934 dwellings with an average of 2.3 people per dwelling. The median age is 28 years old. There are a total of 360 families with an average of 1.4 children per family.

2.7.2 Car Ownership

One third of houses in the suburb of Darlington have no cars and these residents use public or active transport such as walking and cycling as their primary means of transportation. Almost half of all dwellings have one motor vehicle. Dwellings with two or more cars represent 17% of all households –significantly lower than the NSW average of more than 50%. This lower car ownership rate again reflects the good public transport availability in the precinct. This data is illustrated on Figure 6 below.

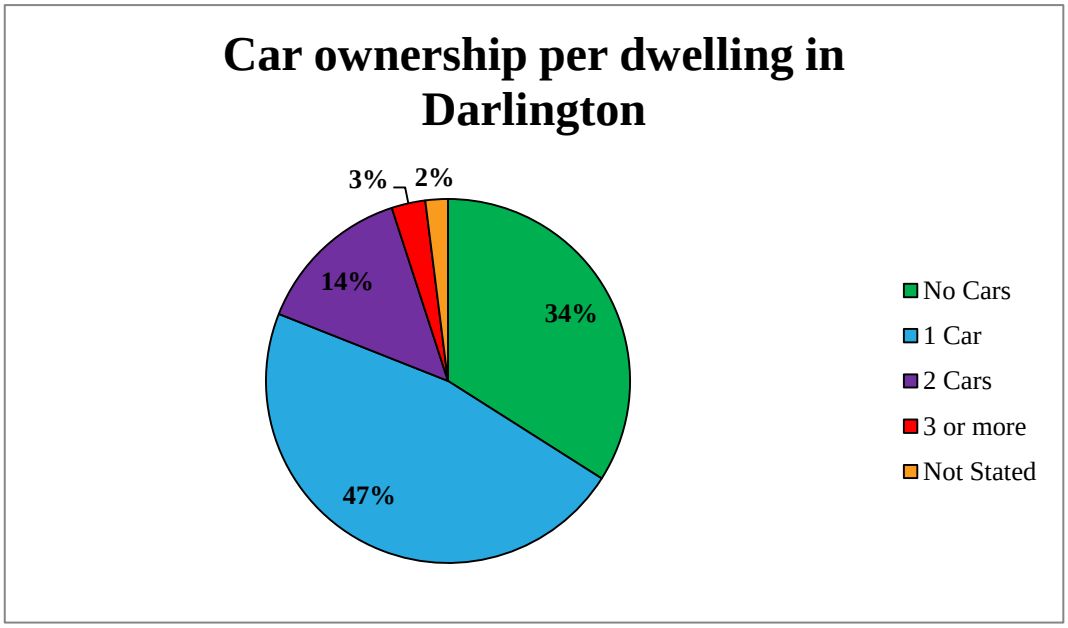


Figure 6: Car Ownership per dwelling - Darlington

2.8 Traffic Generation of Residential Developments

The primary document relating to traffic impact assessment in NSW is the RMS's *Guide to Traffic Generating Developments.* Traffic generation forecasts are typically based on rates per m^2 of GFA development for each type of land use, or

other factors including parking provision or dwelling numbers. Rates are usually derived from one of the following two sources:

- Standard rates contained in the RMS's *Guide to Traffic Generating Developments*; or
- Rates estimated on the basis of surveys of existing developments similar to the proposed development.

Traffic generation rates are influenced by factors such as public transport availability, availability and cost of parking, mixed use and complementary nature of various land use components and peak traffic generation hours. The RMS advises a peak hour traffic generation rate of 0.24 vehicle trips / dwelling is to be used for high density residential flat buildings (>20 dwellings) in metropolitan regional centres.

Arup has recently undertaken independent surveys to obtain site specific traffic generation rates for high density residential buildings with good public transport access. These included existing developments in Erskineville and Meadowbank and included more than 860 residential dwellings. The Glo and Motto residential developments is Erskineville were surveyed during the morning and afternoon peak periods to determine an appropriate traffic generation rate for apartments in this area. Glo, with 90 units, generated 0.19 trips/unit in the morning peak and 0.15 trips/unit in the afternoon peak. Motto, with 162 units, generated 0.15 trips/unit in the morning peak and 0.10 trips/unit in the afternoon peak.

Two more residential developments adjacent to the site were surveyed in April 2012. The Verve apartment complex on Coulson Street contains 106 units and was found to have an AM peak hour trip generation of 0.10 vehicles per unit and a PM peak hour trip generation of 0.14 vehicles per unit. The Zenix apartment complex on Sydney Park Road contains 224 units and was found to have an AM peak hour trip generation of 0.16 vehicles per unit and a PM peak hour trip generation of 0.28 vehicles per unit.

The results indicate the traffic generation rates for the surveyed sites are generally lower than the generic RMS peak hour rate of 0.24 trips / dwelling. Following discussions with the RMS and Transport for NSW during the development of the Stage 1 TMAP, it was agreed a generation rate of 0.24 vehicles / hour should be adopted for the North Eveleigh site. It is expected that this rate will equate to the maximum level of traffic generation.

Research shows that car ownership in affordable housing is significantly lower especially if the development is located within close proximity of public transport.

The State Environmental Planning Policy for Affordable Housing (AHSSEPP) 2009 specifies relatively low car parking rates that lead to low traffic generation rates. In the case of a development application made by a social housing provider at least 1 car parking space is provided for each 5 dwellings or in any other case at least 0.5 car parking spaces are provided in each dwelling.

For the purposes of this assessment a traffic generation rate of 0.24 trips/dwelling has been adopted.

2.9 Road Network

The suburb of Eveleigh is divided between north and south by railway tracks between Redfern Railway Station and Macdonaldtown Railway Station. The development is accessed by the road network on the northern side of the railway line.

City Road is a nearby RMS controlled road which links Parramatta Road at Broadway to King Street travelling south. Near the site, City Road is a two-way multi-lane road with a central median to separate traffic.

Abercrombie Street is a Council controlled road and has a single lane of traffic in each direction. On-street parking is available on either side of the street. To the north of the subject site, traffic calming features are in place along the street in the form of pedestrian priority zebra crossings and mini roundabouts to maintain reduced traffic speeds in the area.

Wilson Street is a Council controlled road and has a single lane of traffic in either direction, with on-street parking provided on both sides of the road. To the east, Wilson Street provides a connection to Lawson Street and Redfern Railway Station via a pedestrianised roadway and Little Eveleigh Street.

Shepherd Street is a Council controlled road and provides connections from Wilson Street through to the north of Cleveland Street. Shepherd Street is equipped with a single lane carriageway in each direction with parking provided on either side of the street. Maze Crescent is a pedestrian spine through the University of Sydney and provides links through to Shepherd Street for students travelling to and from Redfern Railway Station.

Golden Grove Street is a Council controlled road. It 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 Street. Traffic calming features are in place along the street in the form of pedestrian priority zebra crossings and mini roundabout intersections adjacent to the subject site. Abercrombie Street and Golden Grove Street are designated school zones with a 40km/h speed limit during school start and finishing times. The speed limit in the school zone is 50km/h outside of school hours. Lane widths are approximately 3.5 metres in the area.

2.10 Existing Traffic Flows

Arup conducted both intersection and 7 day automated traffic counts in the North Eveleigh precinct in October 2012 in order to establish typical traffic volumes and determine the performance of the road network. The surveys were undertaken during the University semester period and outside of school holidays to provide a typical representation of traffic flows, on the following dates:

- **Intersection Surveys**: Thursday 25 October 2012
  (7am – 9am and 4pm – 6pm)
- **Automated Traffic Count Surveys**: Wednesday 24 October 2012 through to Tuesday 30 October 2012

The locations of the surveys are shown in Figure 7.

Figure 7: Traffic Survey Locations (October 2012)

The locations of the traffic surveys were selected to align with the surveys undertaken for the North Eveleigh Concept Plan or previous surveys taken in the area, and were confirmed following consultation with Council, TfNSW and the RMS. The sections below describe existing traffic flow and compares these with previously collected traffic data for the area.

2.10.1 Intersection Counts

Classified turning counts were conducted during the weekly peak hour periods to establish the intersection usage in the area. The traffic counts were conducted at the following intersections:

- Wilson Street/ Forbes Street (priority intersection)
- Wilson Street/ Golden Grove Street (roundabout intersection)
- Abercrombie Street/ Shepherd Street (signal controlled intersection), and
- Abercrombie Street/ Lawson Street (signal controlled intersection)

For all of the surveyed intersections, the AM and PM peak hours were found to occur from 8am to 9am and 5pm to 6pm respectively – identical to that observed during traffic counts undertaken in April 2006 for the North Eveleigh Concept Plan. A summary of the peak hour vehicle flows is described in Table 6.

Table 6: Intersection Traffic Count Summary

Intersection	**Traffic Volumes Through Intersection**					
	AM Peak Hour (8am – 9am)			PM Peak (5pm – 6pm)		
	April 2006	October 2012	% Change	April 2006	October 2012	% Change
Wilson St / Golden Grove St	707	673	- 5%	641	613	- 4%
Wilson St / Forbes St	650	670	+ 3%	645	614	- 5%
Abercrombie St / Shepherd St	1037	893	- 14%	1093	910	- 16%
Abercrombie St / Lawson St	911	845	- 7%	1021	888	- 13%
Total Traffic	**3305**	**3081**	**- 7%**	**3400**	**3025**	**- 11%**

The results of the surveys indicate a minor reduction in peak hour traffic flows through the North Eveleigh precinct between 2006 and 2012. This largely reflects the static nature of land use development in the area during this period.

2.10.2 Automated Traffic Counts

Pneumatic tubes which record the number of vehicles in each direction on a roadway were placed at three locations within the surrounding road network. These tube counts were used to record variations in traffic flows over the course of a week. Tube counters were placed along Wilson Street, Queen Street and Codrington Street as indicated in Figure 7. These locations were used to compare with existing City of Sydney survey data collected in May 2009. The results for each are summarised in Table 7.

Table 7: Tube counts bi-directional summary

Counter Location	**Five Day ADV***			**Peak Hour Traffic Volume**[4]		
	May 2009	October 2012	% Change	May 2009	October 2012	% Change
Wilson Street (near Burren Street)	n/a	6,862	n/a[5]	718	631	- 12%
Queen Street (near Wilson Street)[6]	n/a	885	n/a	n/a	95	n/a
Codrington Street (near Rose Street)	6,055	6,434	+6%	548	580	+6%

* ADV – Average Daily Vehicles

2.10.3 Pedestrians and Cyclists

Pedestrian and cyclist turning counts were collected on Thursday 25 October 2012, coinciding with the intersection surveys. This indicated significant numbers of cyclists and pedestrians travelling through the area, with almost as many cyclists recorded on Wilson Street as cars. The results of the pedestrian and cyclist surveys are summarised in Table 8, with key pedestrian and cycle movements shown in Figure 8.

[4] Wilson Street Peak Hour 8am – 9am, Queen Street / Codrington Street Peak Hour 5pm – 6pm.
[5] City of Sydney data contained peak hour traffic data only, Five Day ADV was unavailable.
[6] No comparable 2009 data was available for Queen Street.

Table 8: Existing Pedestrian and Cycling Volumes

Intersection	Pedestrians and Cyclists Through Intersection			
	AM Peak (7am – 9am)		PM Peak (4pm – 6pm)	
	Pedestrians	Cyclists	Pedestrians	Cyclists
Wilson St / Golden Grove St	111	468	88	334
Wilson St / Forbes St	111	467	129	332
Abercrombie St / Shepherd St	1720	167	2208	108
Abercrombie St / Lawson St	911	141	1445	106

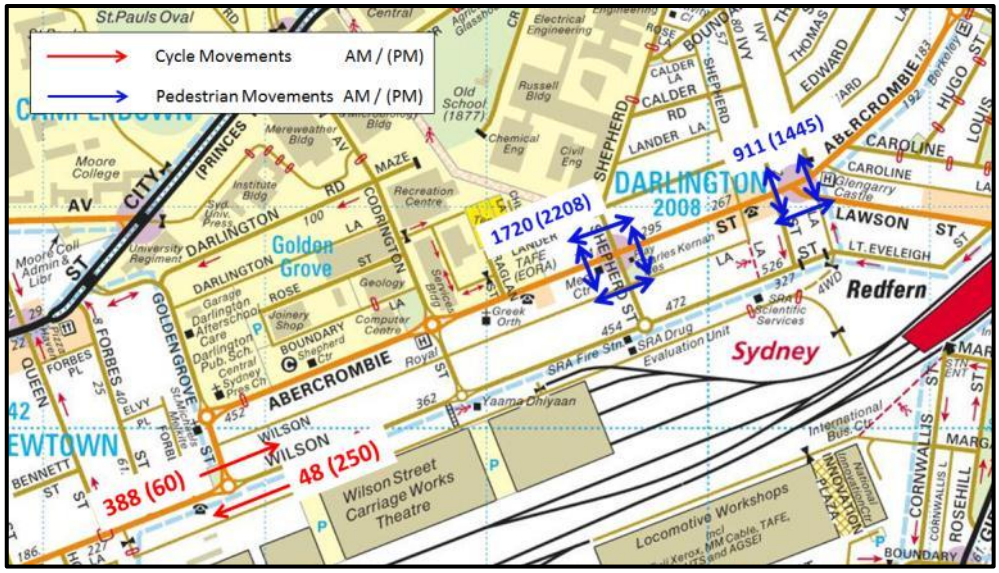


Figure 8: Pedestrian and Cyclist Volumes at Key Locations

3 Proposed Development

3.1 Description of Proposed Works

It is proposed to construct a six level residential building, with a maximum 6,480m^2 GFA on the North Eveleigh site near Wilson Street Eveleigh. It is intended the building is used for affordable housing, with a total of 88 dwellings proposed. These are comprised of:

Studio - 10 units (11%)

1 Bed - 37 units (42%)

2 Bed - 36 units (41%)

3 Bed - 5 units (6%)

Total - 88 units

3.2 Site Access

The existing internal road system connects to Wilson Street just to the east of Queen Street. The internal road system will be augmented around the Building D4 site to provide access to the basement car park as shown in Figure 9.

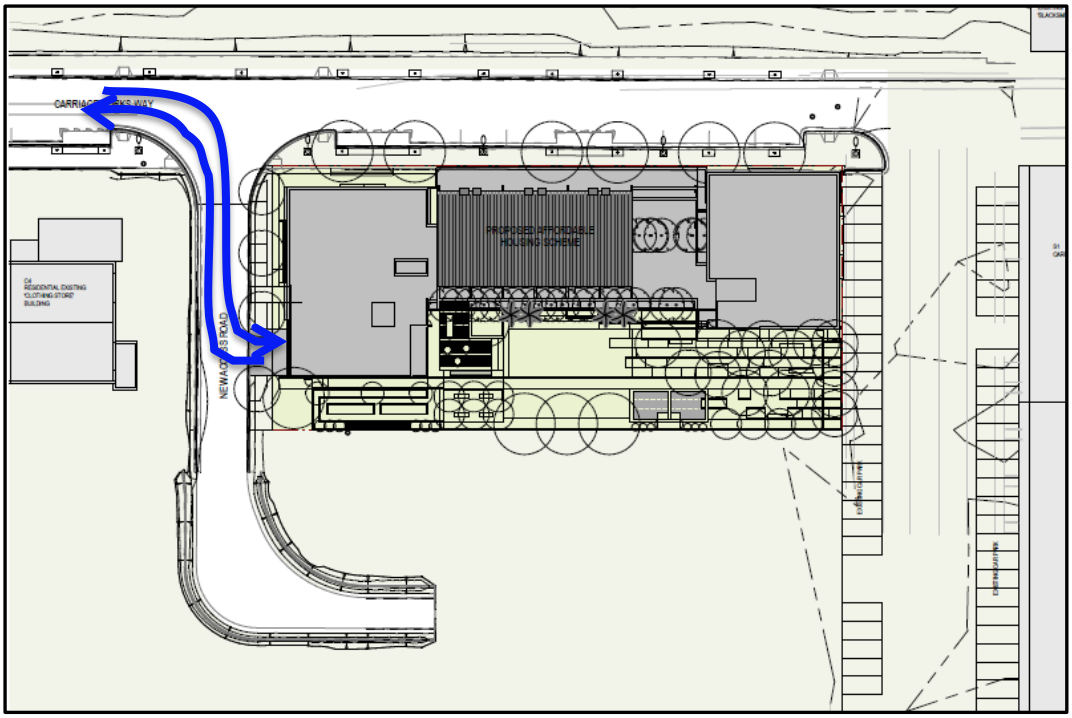


Figure 9: New site access road configuration

3.3 Car Parking

Parking for 39 cars is proposed in one underground level, including 4 accessible parking spaces. Access to the basement car park is proposed via a driveway on the site's western frontage.

3.4 Bicycle Parking

A total of 88 bicycle parking spaces are to be provided for residents which complies with the Sydney DCP 2012 rate of 1 bicycle rack per unit. These are provided in racks in the basement car park. Visitor bicycle parking rails for 6 bicycles are proposed at the main entrance to the building.

4 Transport Assessment

4.1 Forecast Traffic Generation

The RMS 'Guide to Traffic Generating Developments' recommends a vehicle trip generation rate of 0.24 trips per unit in the peak hour from a high density residential development. As previously discussed this 0.24 trips per unit is considered a maximum trip generation rate for the development and has been agreed with Council and Transport for NSW as the appropriate rate for the transport assessment. The affordable housing development contains 88 units, corresponding to a peak hour trip generation of 21 vehicles.

4.2 Traffic Distribution

Using the directional split developed from Census data in Table 5, it is expected that the 21 vehicles generated from the proposed development will travel on the routes outlined in Figure 10. It has been assumed that the vehicles exiting the site in the morning will have similar patterns for returning in the evening.

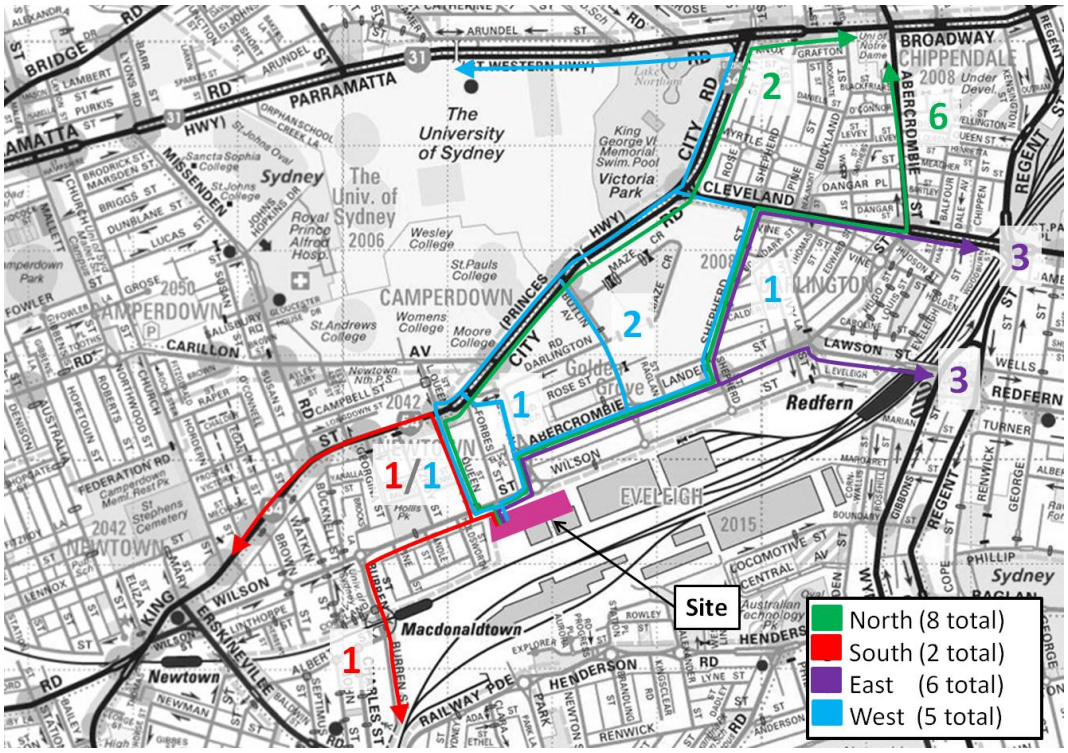


Figure 10: Peak Hour Vehicle Distribution

4.3 Intersection Operation

As part of the Stage 1 Transport Management and Accessibility Plan (TMAP) for the North Eveleigh site, the following intersections were assessed:

- Abercrombie Street/ Shepherd Street (traffic signals)
- Abercrombie Street/ Lawson Street (traffic signals)

This analysis assessed the impact on these intersections following the introduction of 200 dwellings on the stage 1 site, and are summarised in Table 9.

Table 9: Intersection Analysis

Peak Hour	Intersection	Existing			With Stage 1 Development (i.e. 200 dwellings)		
		DOS	LOS	Max Queue (veh)	DOS	LOS	Max Queue (veh)
AM Peak	Abercrombie Street/ Shepherd Street	0.66	B	14	0.71	B	15
	Abercrombie Street/ Lawson Street	0.70	B	13	0.76	B	14
PM Peak	Abercrombie Street/ Shepherd Street	0.70	B	8	0.73	B	9
	Abercrombie Street/ Lawson Street	0.81	B	9	0.84	B	9

DOS: Degree of Saturation; LOS: Level of Service

The analysis indicates that the level of service through both intersections are maintained in the AM and PM peak hours following the introduction of an additional 200 dwellings on the Stage 1 site. Given the proposed development contains only 88 dwellings, the impact on the local road network will be even lower than that indicated in Table 9. No additional works or upgrades are considered necessary to accommodate the traffic generated by the proposed development.

4.4 On-Site Car Parking

4.4.1 Car Parking Provision

The North Eveleigh Concept Plan approval (Department of Planning, December 2008) outlines maximum car parking rates to be provided on-site. These were based on the City of Sydney LEP 2005. The City of Sydney LEP 2012 outlines revised maximum parking rates for residential developments adjacent to the Concept Plan site. These rates, along with the proposed parking provision, are outlined in Table 10.

Table 10: On-Site Parking Provision

Dwelling Type	Proposed Number of Dwellings	Maximum Car Parking Rate		Maximum Car Parking Provision		Proposed Car Parking Provision
		Concept Plan Approvals	City of Sydney LEP 2012	Concept Plan Approvals	City of Sydney LEP 2012	
Studio	10	0.25 spaces / dwelling	0.20 spaces / dwelling	2.5	2.0	39
1 bed	37	0.50 spaces / dwelling	0.40 spaces / dwelling	18.5	14.8	
2 bed	36	1.2 spaces / dwelling	0.80 spaces / dwelling	43.2	28.8	
3+ bed	5	2 spaces / dwelling	1.1 spaces / dwelling	10	5.5	
Total	**88**			**64.2**	**51.1**	

* Based on the North Eveleigh Concept Plan Approvals

The proposed parking provision of 39 spaces is well below the maximum 64.2 allowable under the North Eveleigh Concept Plan approvals.

Comparing with the new City of Sydney LEP2012 however, the maximum parking rate would drop down to 51.1 spaces.

This low parking provision recognises the good public transport, walking and cycling network surrounding the site – encouraging the use of non-car modes of travel.

4.4.2 City West Housing Car Parking Policy

CWH's car parking policy is to provide approximately 40% of residential units access to a parking space. CWH does not construct multi-level basements; if underground parking is required a single level basement underneath the building is provided. Secure bicycle parking is also provided to encourage a reduced reliance on private car use.

North Eveleigh proposes a single level basement of 39 spaces for 88 units, this equates to 44% which exceeds the CWH design guidelines.

Table 11 illustrates the current parking levels in the existing CWH developments. The information illustrates that CWH promotes sustainable transport modes and does not have a large demand for private car parking. Table 12 shows the future demand for car spaces per household type on the CWH waiting list, and illustrates that approximately 43.5% of households require parking. The level of parking proposed at North Eveleigh is in accordance with current and future parking provision.

The Darlington area to the north of the site is Parking Area 32. Multi-unit developments are not usually eligible for parking permits to limit parking impacts on local streets. For this reason, the parking provision for this development has been increased above the usual low rate of provision.

Table 11: Current parking levels in our existing developments

Building	No. of Units in Building	No. of Spaces	Percentage
68–80 Mary Ann St	7	0	0%
346-348 Bulwara Rd/99 Hackett Lane	12	0	0%
54-60 Macathur St/9 Henson Lane	32	0	0%
223 Harris St/4 Ada Pl	61	28	46%
17-21 Pyrmont Bridge Road	45	10 Residential 2 Commercial	27%
137 Murray St	14	0	0%
14A Quarry Master Drive	25	13	52%
6-10 Wattle St	57	31	54%
15 Jones St	24	8	29%
17 Jones St	27	9	33%
88 John St	81	29 Residential, 1 service	37%
3 Grandstand Pde	16	16	100%
29-33 Lachlan St	29	9	31%
35 O'Dea Ave	57	35	61%

Table 12: Demand for Car parking per unit type on our waiting list

	1 Bedroom	2 Bedroom	3 Bedroom	Total
Number of Applicants	248	115	30	393
Number of Applicants requiring car spaces	93	58	20	171
Percentage	37%	50%	66%	43.5%

4.5 Public Transport Provision

As discussed in Section 2.2 and 2.3, the proposed development location is within close proximity to a range of good public transport options. This is reflected in the existing strong public transport mode share for the area, well above the Sydney average.

In order to encourage a high use of public transport from the development, strong accessible links should be provided between the development and public transport nodes. These are discussed in further detail in Section 4.6 of this report.

Redfern Railway Station is proposed to undergo upgrades to facilitate access and connectivity, increased station capacity and improved links to multi-modal connections such as surrounding bus stops, pedestrian and cycle links.

4.6 Walking and Cycling Provision

A number of improvements are planned both internally within the site and externally on the road network to facilitate improved walking and cycling connections for future residents. These are summarised in Figure 11 and described in the sections below.

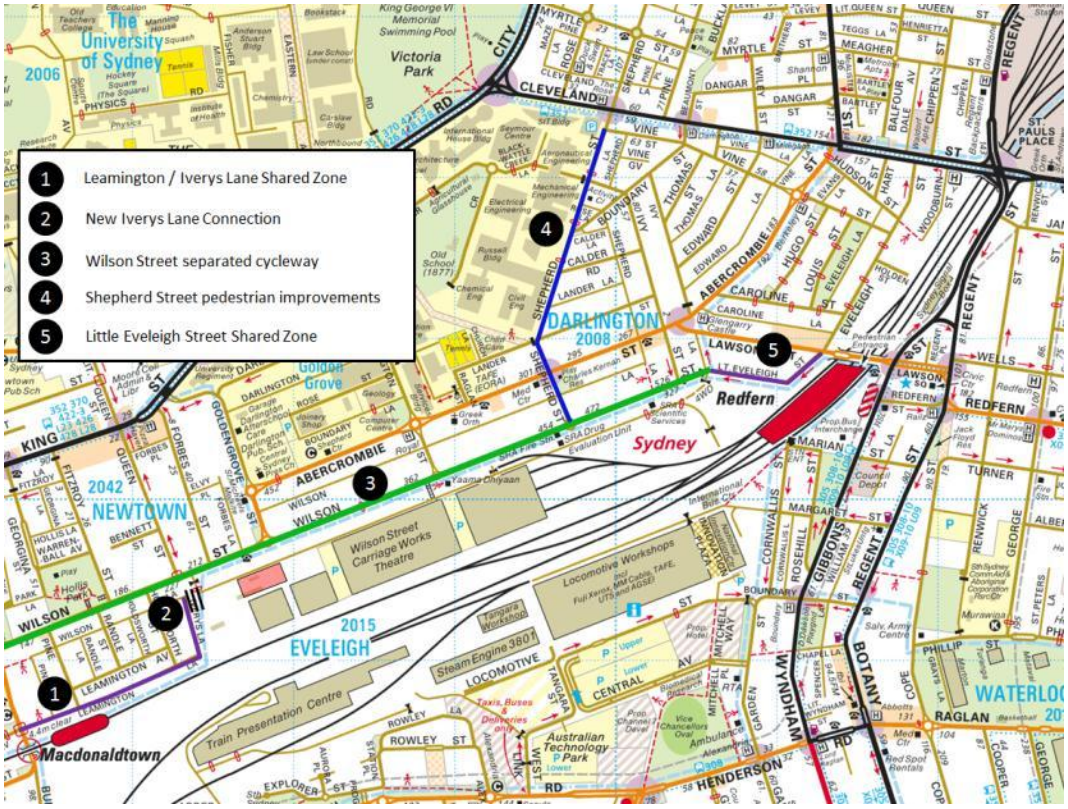


Figure 11: Future Pedestrian and Cycling Improvements

4.6.1 Wilson Street Cycleway

As part of the City of Sydney's cycleway program, a bi-directional separated bicycle facility is proposed to be implemented on the southern side of Wilson Street. This will provide high quality local and regional connections for residents of the Stage 1 site. Existing traffic counts in the area already indicate a significant number of cyclists utilise this corridor in peak hours, with this figure expected to grow following the introduction of this cycleway. Council is currently investigating an additional route which links the Wilson Street cycleway with Broadway via Shepherd Street. This is still at concept stage and further designs are currently taking place.

4.6.2 Access to Macdonaldtown Station

No formal pedestrian or cyclist access currently exists linking the Concept Plan site with Iverys Lane – providing the most direct path to Macdonaldtown Station. Access is obtained through a broken fence and stepping up a retaining wall. Pedestrian access will be improved through a proposed connection at the western end of the site, facilitating pedestrian movement to the station which is

approximately 650m away. A new accessible access will be provided at the western end of the North Eveleigh site.

Existing City of Sydney Council Pedestrian Cycling & Traffic Calming (PCTC) Plans for the precinct indicate Council is currently investigating the implementation of shared zones west of the Concept Plan site (see Figure 12). Introduction of shared zones at these locations will improve the pedestrian environment in the area and encourage additional walking trips to Macdonaldtown station. Additional improvements are being provided by the UGDC as part of the infrastructure works to support affordable housing on the site. The infrastructure works include:

- The provision of stairs opposite Forbes Street
- The provision of an accessible access west of the site's vehicle access
- Improved pedestrian connections to Macdonaldtown Station

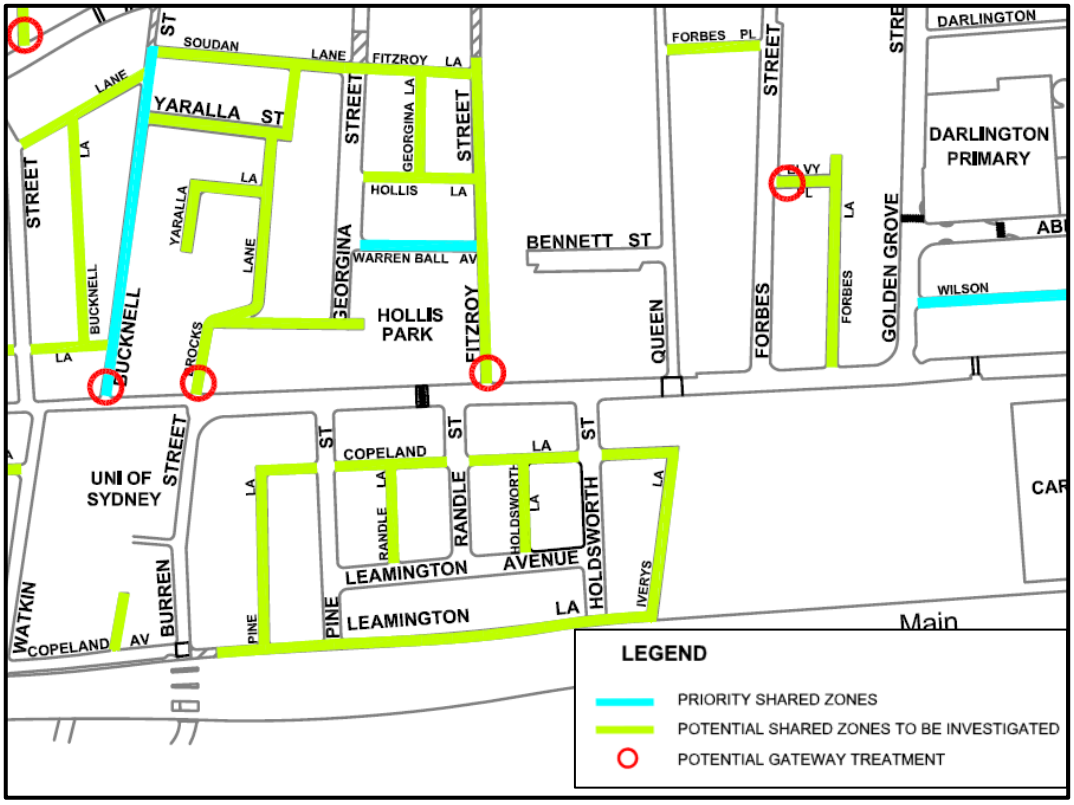


Figure 12: Council Pedestrian Cycling & Traffic Calming Plans (Darlington)

4.6.3 Access to Redfern Station

Redfern Station is approximately 1200m away from the proposed development (15 minute walk), with existing pedestrian connections provided that link Wilson Street and Little Eveleigh Street. City of Sydney Council has identified Little Eveleigh Street as a priority future shared zone (see Figure 13), with possible implementation in the next 3-4 years. This link will provide good walking access for pedestrians between Redfern Station and the proposed development.

Improvements are currently being planned to Redfern Station. The improvements will provide for greater accessibility to the surrounding area and within Redfern Station.

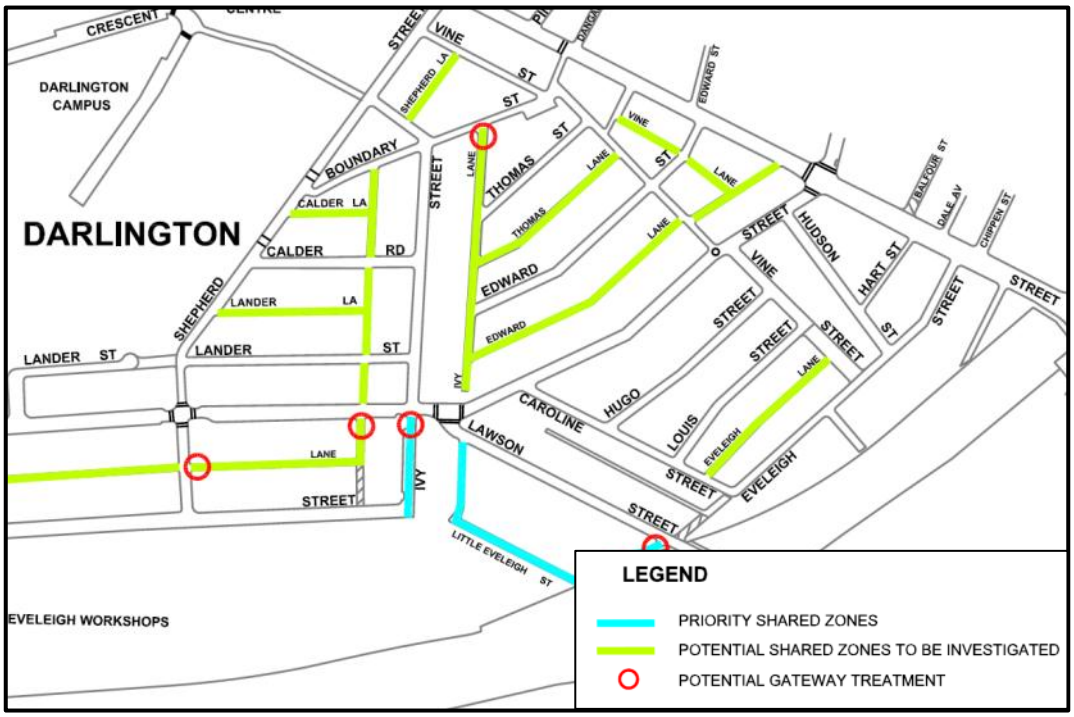


Figure 13: Council Pedestrian Cycling & Traffic Calming Plans (Redfern)

4.6.4 Other Pedestrian Improvement Works

Council, in discussion with Sydney University, are currently investigating opportunities for improvements in the pedestrian environment in the local area. It is understood that these works involve improvements to pedestrian amenities on Shepherd Street, Butlin Street and Little Eveleigh Street in order to cater for pedestrians from Redfern Station. These improvements may include local footpath widening and pedestrian amenities such as a priority shared zone on Little Eveleigh Street to relieve capacity on Lawson Street.

The University of Sydney has recently been granted planning approval for the Abercrombie Precinct Redevelopment Project. The project consists of new business school facilities within Darlington. A condition of the consent is the need to prepare a University Darlington Precinct Pedestrian and Bicycle Access Strategy and to provide pedestrian and bicycle access improvements with a minimum capital investment value of $2 million.

4.7 Basement Car Park Layout

Australian Standards for Parking Facilities Part 1: Off-street car parking AS2890.1-2004 has been used to assess the proposed car park layout, including parking bay dimensions and the vehicle ramp.

The standards allow for a ramp with a maximum grade of 1 in 4 and grade transitions of at least 2 metres in length. The proposed ramp has 2-metre length

transitions and has a maximum grade of 1 in 4, therefore complying with AS2890.1-2004.

Vehicle turning paths for the entrance ramp have been undertaken and are included in Appendix A.

4.8 Bicycle Parking Provision

As recommended in the Stage 1 TMAP for the North Eveleigh site, bicycle parking should be provided in accordance with either Austroads Standards or those outlined in The NSW Planning Guidelines for Walking and Cycling, whichever is greater. A summary of the required, and proposed, bicycle parking provision is summarised in Table 13.

Table 13: Bicycle Parking Provision

Guidelines	Bicycle Parking Rate	Requirement*	Proposed Provision
Austroads (2011) – Appendix F: Bicycle Parking Requirements	1 per 4 dwellings (residents) 1 per 16 dwellings (visitors)	22 (residents) 6 (visitors) **28 (total)**	88 (residents) 6 (visitors) **94 (total)**
NSW Planning Guidelines for Walking and Cycling	20% - 30% of total dwellings (residents) 5% - 10% of total dwellings (visitors)	18 - 26 (residents) 5 - 8 (visitors) **23 - 34 (total)**	

* Based on a total of 88 dwellings

The proposed bicycle parking provision of 94 spaces is well above the number recommended in both the Austroads Standards and The NSW Planning Guidelines for Walking and Cycling – therefore complying with the recommendations outlined in the Stage 1 TMAP.

4.9 Site Travel Plan

It is recommended that a site specific travel plan be prepared prior to the initial occupation of the affordable housing development. A recommendation of this travel plan would be the development of a transport access guide (TAG) to be distributed to residents prior to the occupancy of the building. A TAG provides site specific travel information using sustainable modes of transport – e.g. walking, cycling and public transport. The main objectives of the travel plan are to reduce the need to travel and promotion of sustainable means of transport. The more specific objectives include:

- To reduce the level of single occupancy car borne trips associated with commuting.
- To facilitate the sustainable and safe travel of visitors to the site.
- To reduce site traffic congestion and associated pollution in order to enhance, improve and make safe journeys of minority/sustainable transport mode users.
- To work in partnership with neighbouring organisations/developments, local authorities, retailers and other relevant bodies in achieving the maximum mode shift away from the private car.

- To facilitate all residents' access to key facilities such as retail, leisure, health and education
- To provide car share car parking to reduce the demand on private vehicles
- To provide a car parking provision below the maximum rate.

4.10 Construction Traffic

The construction of the development will require access for heavy vehicles travelling to and from the site. Prior to the commencement of construction, a Construction Traffic Management Plan (CTMP) is to be prepared to ensure the safest possible management of construction access.

The likely construction vehicle numbers and frequency would be covered in the CTMP based on the construction methodology and timeframe for the construction period. City of Sydney will apply suitable construction hours within the limits of 7.00am to 7.00pm Monday to Friday and 7.00am to 5.00pm Saturday. Truck movement will occur predominantly during the morning.

Construction vehicles would be restricted to collector and arterial roads, with movements along local residential streets such as Forbes Street and Queen Street prohibited. The construction route would be defined in accordance with City of Sydney requirements, which is understood to be via King Street and Golden Grove Street as outlined below in Figure 14.

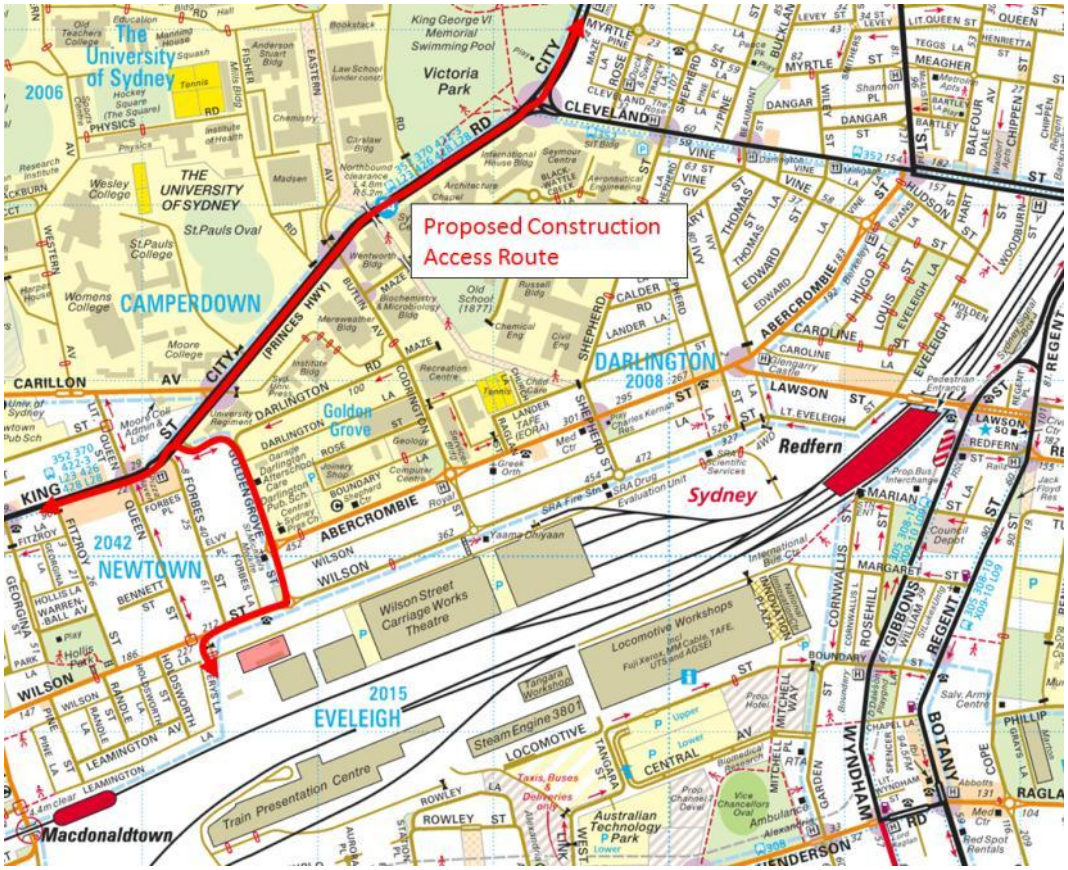


Figure 14: Proposed Construction Vehicle Access

Within the North Eveleigh precinct, construction vehicles will use the internal road network to enter the building site through a controlled gate to minimise interaction with other users of the road system and car parking.

All construction vehicle parking (including staff) will be on site so that there is no impact on parking in the traverser or on nearby streets. Traffic control will be used at the construction site access during times of busy pedestrian activity.

4.11 Access to Queen Street

The Stage 1 TMAP for the North Eveleigh Concept Plan site outlined the possible introduction of a central median on Wilson Street to restrict the right turn from the development into Queen Street – in line with the Concept Plan statement of commitments. The TMAP recommended "*Subject to the outcome of this community consultation, and following discussion with the road authority, it is recommended that the construction of a central median be investigated prior to the development of more than 100 dwellings on the Stage 1 site*"

As the proposed affordable housing project consists of less than 100 dwellings, and is the first development on the Stage 1 site, the introduction of the median has not been considered as a part of this study.

4.12 Waste Collection

All CWH buildings are registered on the council's GAR key system and the garbage men access the rooms with their key. The North Eveleigh project will include a similar arrangement for access to the single garbage room.

The garbage room is at ground level with garbage trucks emptying bins from the internal site road system. The new access connection will allow garbage trucks to loop through the site. As further development occurs across the site, the traverser two-way roadway will be used with trucks turning at the end of the roadway.

Waste would generally be collected before 7am and bins are not left out overnight so therefore there would be no impact on existing car parking in the traverser.

5 Conclusions and Recommendations

This transport assessment has been prepared for City West Housing to understand and address the travel and transport planning requirements for the affordable housing component of the North Eveleigh Concept Plan.

The proposed development provides for the introduction of 88 residential dwellings with basement parking for 39 cars proposed in one underground level, including 4 accessible parking spaces. CWH's car parking policy is to provide approximately 40% of residential units access to a parking space. The proposed 39 spaces equates to 44% provision which slightly exceeds the CWH design guidelines. The future demand for car spaces on the CWH waiting list is indicates that approximately 43.5% of households require parking. The level of parking proposed at North Eveleigh is in accordance with current and future parking provision.

The proposed parking provision of 39 spaces is well below the maximum 64.2 allowable under the North Eveleigh Concept Plan approval and also less than the 51.1 spaces maximum under the new City of Sydney LEP2012.

This level of car parking is expected to result in a total of 21 vehicles travelling to and from the site in the morning and evening peak hours respectively. Intersection analysis previously undertaken for the North Eveleigh site indicates the road network will operate satisfactorily following the introduction of these new dwellings.

The site currently has good access to local pedestrian and cycling facilities. Further connections are being implemented by the City of Sydney with the roll out of cycleway connections across the entire LGA. These routes will facilitate regional cycle connections between the North Eveleigh site and key locations with the area.

Recent Census data indicates the Darlington suburb has a low private vehicle journey to work mode share, reflecting the good public transport, walking and cycling network surrounding the site. A number of improvements are planned which will facilitate improved walking and cycling connections for future residents and support the goal of achieving a maximum 47% private car use for the site. These include:

- improved pedestrian access to Wilson Street
- bi-directional separated bicycle facility on Wilson Street
- direct routes to Macdonaldtown Station
- the implementation of a shared zone on Little Eveleigh Street for improved access to Redfern Station

The proposed on-site bicycle parking provision of 94 spaces exceeds the requirements outlined in Austroads and the NSW Planning Guidelines for Walking and Cycling. These facilities will support the goal of achieving a high non-car mode share for the site.

Prior to the commencement of construction, a Construction Traffic Management Plan (CTMP) is to be prepared to ensure the safest possible management of construction access. The construction routes would be defined in accordance with

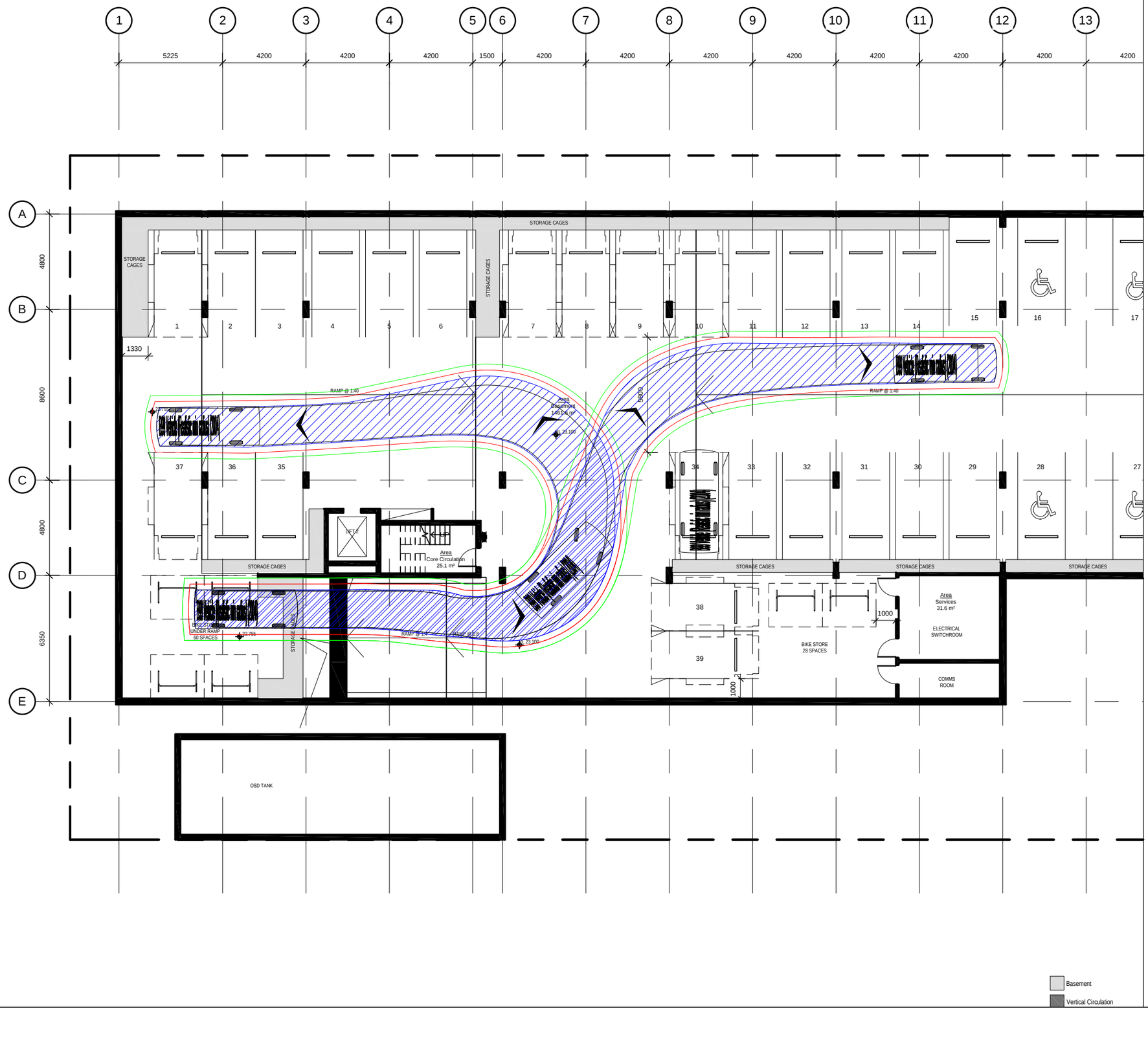
City of Sydney requirements and all construction vehicle parking (including staff) will be on site so that there is no impact on parking in the traverser or on nearby streets.

The garbage room is at ground level with garbage trucks emptying bins from the internal site road system. Waste would generally be collected before 7am and bins are not left out overnight so therefore there would be no impact on existing car parking in the traverser.

In summary, the proposed affordable housing development is considered to have a minimal impact on the local transport network.

Appendix A

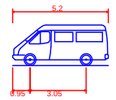
Vehicle turning paths



Legend

- Body Envelope
- 300mm Envelope
- 600mm Envelope
- Wheel Envelope

Design Vehicle(s)



B99 Vehicle (Realistic min radius) (2004)	
Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	2.200m
Min Body Ground Clearance	0.312m
Track Width	1.840m
Lock to Lock Time	4.00 sec
Curb to Curb Turning Radius	6.250m

Issue	Date	By	Chkd	Appd
B	02/04/13	JRT	AMH	AMH
	Updated plans			
A	06/03/13	JRT	AMH	AMH
	For Information			

ARUP

Arup Sydney, Level 10, 201 Kent Street
Sydney, 2000
Tel +61(02)9320 9320 Fax +61(02)9320 9321
www.arup.com.au

Client
UrbanGrowth NSW
Development Corporation

Job Title
North Eveleigh
Affordable Housing

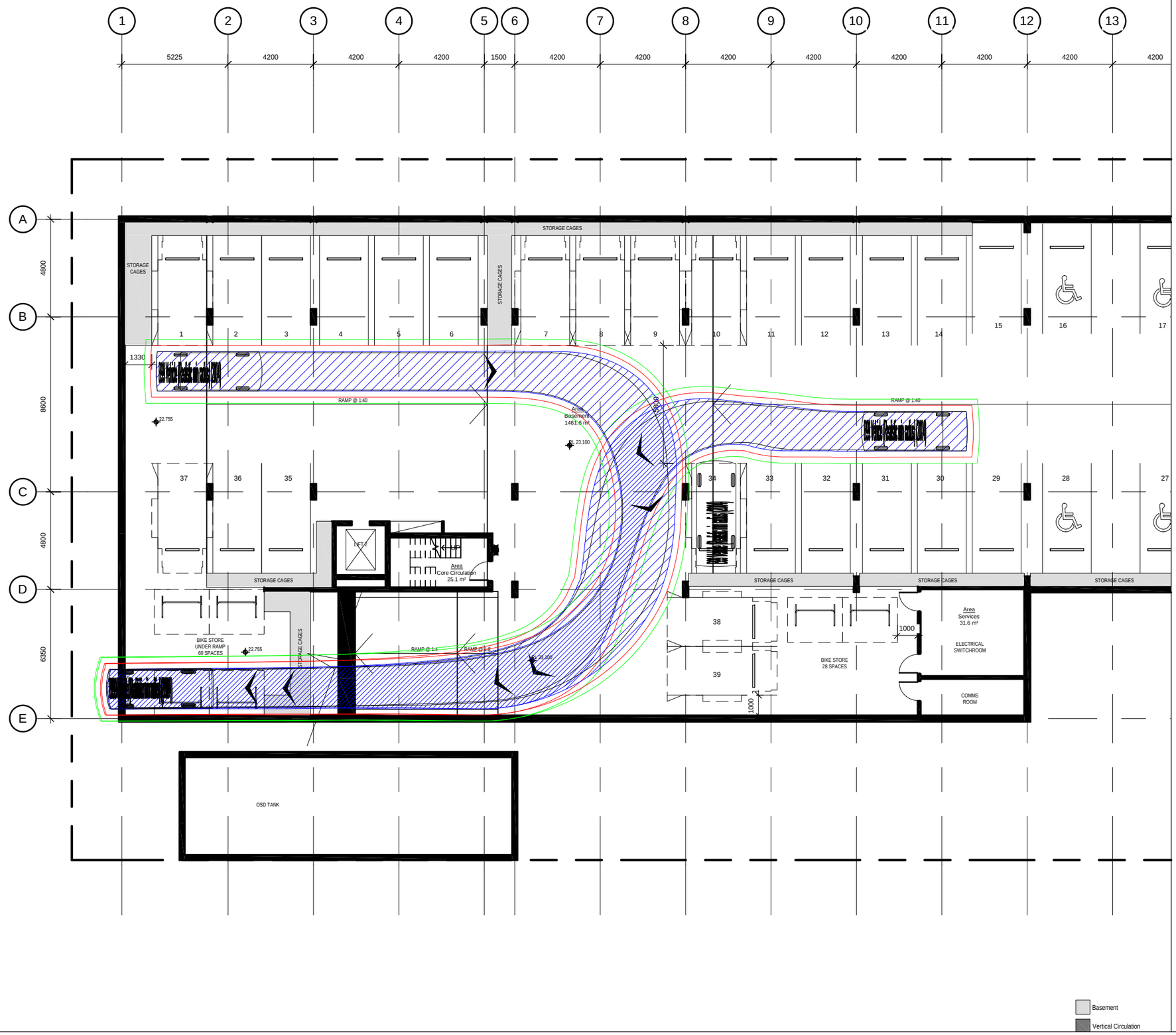
Drawing Title
Turning Paths
B99 Vehicle Entry

Scale at A3 1:200

Discipline Transport

Drawing Status
Draft

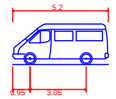
Job No	Drawing No	Issue
228749-00	**SKT001**	**B**



Legend

- Body Envelope
- 300mm Envelope
- 600mm Envelope
- Wheel Envelope

Design Vehicle(s)



B99 Vehicle (Realistic min radius) (2004)	
Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	2.200m
Min Body Ground Clearance	0.312m
Track Width	1.840m
Lock to Lock Time	4.00 sec
Curb to Curb Turning Radius	6.250m

Issue	Date	By	Chkd	Appd
B	02/04/13	JRT	AMH	AMH
	Updated plans			
A	06/03/13	JRT	AMH	AMH
	For Information			

ARUP

Arup Sydney, Level 10, 201 Kent Street
Sydney, 2000
Tel +61(02)9320 9320 Fax +61(02)9320 9321
www.arup.com.au

Client

UrbanGrowth NSW
Development Corporation

Job Title

North Eveleigh
Affordable Housing

Drawing Title

Turning Paths
B99 Vehicle Exit

Scale at A3 1:200

Discipline Transport

Drawing Status **Draft**

Job No	Drawing No	Issue
228749-00	**SKT002**	**B**

Do not scale