Lend Lease Pty Ltd

Barangaroo South - R8 & R9 Residential Buildings

Transport Management and Accessibility Plan (TMAP) Supplementary - Project Application

Rev B | 5 November 2012

Job number 220316

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1 Introduction

This report supports a Project Application (MP11_0002) submitted to the Minister for Planning pursuant to Part 3A of the Environmental Planning and Assessment Act 1979 (EP&A Act). The Application seeks approval for construction of two residential flat buildings (known as Buildings R8 and R9) and associated works at Barangaroo South as described in the Overview of Proposed Development section of this report.

1.1 Overview of Proposed Development

The R8 and R9 Project Application seeks approval for the construction and use of two residential flat buildings comprising 159 apartments, ground floor retail, allocation of car parking spaces from the Bulk Excavation and Basement Car Parking Project Application, and the construction of the surrounding ancillary temporary public domain and landscaping.

1.2 Site Location

Barangaroo is located on the north western edge of the Sydney Central Business District, bounded by Sydney Harbour to the west and north, the historic precinct of Millers Point (for the northern half), The Rocks and the Sydney Harbour Bridge approach to the east; and bounded to the south by a range of new development dominated by large CBD commercial tenants.

The Barangaroo site has been divided into three distinct redevelopment areas (from north to south) – the Headland Park, Barangaroo Central and Barangaroo South.

The R8 and R9 Project Application Site area is located within Barangaroo South. The Project Application Site extends over land generally known and identified in the approved Concept Plan as Block X.

1.3 Purpose of this Report

This report has been prepared to accompany the Project Application for the R8 and R9 Residential Building and associated works at Barangaroo South. It addresses the relevant Director-General Requirements for the project. These Director-General Requirements are discussed in the Environmental Assessment Report (EAR) that has been prepared to support the application.

1.4 Document Structure

The diagram below illustrates the document structure established for Traffic and Transport Planning related reporting for the R8 and R9 Residential Buildings. There are three supporting documents to inform and feed into the required responses to the Director General's Requirements (DGR's). They are:

1. Transport Management and Accessibility Plan (TMAP) Supplementary to Barangaroo TMAP Stage 1 published by the NSW Government in September 2008.

2. Travel Demand Management Plan
3. Construction Traffic Management Plan

These supporting documents are the Project Application reports which respond to the DGR issues relating to Transport.

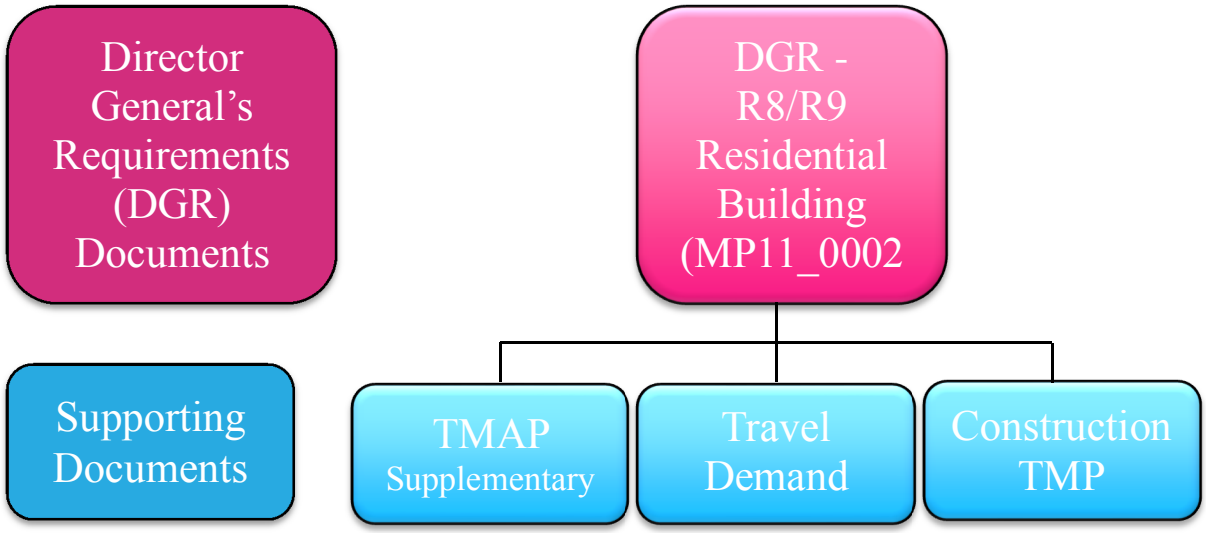


Figure 1 Document Structure

1.5 Purpose of this Report

This report has been prepared to accompany the Project Application for the R8 and R9 residential buildings at Barangaroo South. It responds to the transport related issues addressed in the DGR MP11_0002 as summarised in Table 1.

Table 1 DGR Summary

No.	Issue	Response
1	Justification of proposed quantum of on-site parking for the proposal having regard to the Concept Plan Approval (as amended) RTA guidelines and accessibility of the site to public transport, including the proposed light rail expansion	See Section 4
2	A Supplementary TMAP with particular regard to: • transport and traffic management within the overall Barangaroo precinct, including the demonstration of a minimalist approach to car parking provision; • pedestrian and cycle access/circulation to meet the likely future demand within the precinct and connections to the external networks; • measures to promote public transport usage and pedestrian and bicycle linkages; and	See Sections 0, 4, 5 and 6
3	Daily and peak traffic movements likely to be generated by the proposed development, including modelling and assessment of the performance of key intersections providing access to the site, and any upgrades (road/intersections) required as a consequence of the proposal.	See Sections 2 and 0
4	Identification of Travel Demand Management (TDM) measures that will optimise the opportunity provided by the project site's proximity to public transport, including the preparation of a work place travel plan	A Travel Demand Management Plan has been prepared as a separate document as outlined in Section 1.4.
5	Preparation of a Construction Traffic Management Plan outlining: • Cumulative impacts associated with other construction activities on the Barangaroo site; • Details of anticipated truck movements to and from the site; • Details of access arrangements for workers to/from the site, emergency vehicles and service vehicle movements; • Impacts on the temporary cruise ship terminal; and • Details of any proposed transportation of waste materials via the Harbour and proposed locations for handling materials;	A Construction Traffic Management Plan has been prepared as a separate document as outlined in Section 1.4

2 Key Assumptions

2.1 Proposed Land Use Mix

Current planning for the R8 and R9 residential buildings achieves the following number of dwellings as outlined in Table 2.

Table 2 Dwelling Mix for Buildings R8 and R9

Dwelling Type	Building R8	Building R9	Combined
1 Bedroom Unit	23	24	47
2 Bedroom Unit	47	53	100
3 Bedroom Unit	12	0	12
Total	**82**	**77**	**159**

Up to 2,120m^2 of retail floor space will supporting the residential development.

2.2 Mode split

The mode split target for the R8 and R9 residential buildings is consistent with the overall mode split target for the Barangaroo South development presented in Table 3. Low car parking rates in line with City of Sydney guidelines have been adopted. These low rates, complemented by provision of a pedestrian and cycle friendly environment and planned public transport initiatives will help to achieve this target.

Table 3 Comparison of the commuter transport task for the Journey to Work

Mode	2006 Census	R8/R9 Residential Building Final Target*
Car	18.8%	4.0%
Bus/Light rail	22.4%	20.0%
Train	47.6%	63.0%
Ferry	2.7%	1.0%
Other (pedestrian, cyclists, motorcycles, taxi)	8.5%	12.0%
Total	**100%**	**100%**

* Based on overall mode split target for the Barangaroo South development

3 Transport and Access

3.1 Vehicular Access

It has been assumed that prior to the occupancy of the R8 and R9 residential buildings, Globe Street would be in place between Lime Street and Hickson Road and all access points to the car park basement would be operational. Following the opening of Globe Street and the completion of the Wynyard Walk development, the northern section of Shelley Street would be closed to vehicular traffic.

As shown in Figure 2 below, access to the basement car park for residential vehicles is proposed to be provided via an access adjoining Lime Street in the south-west corner of the basement. This serves as an entry and exit. Entry and exit to the commercial car park can be via the northern or southern accesses as the car park is linked via level B1.

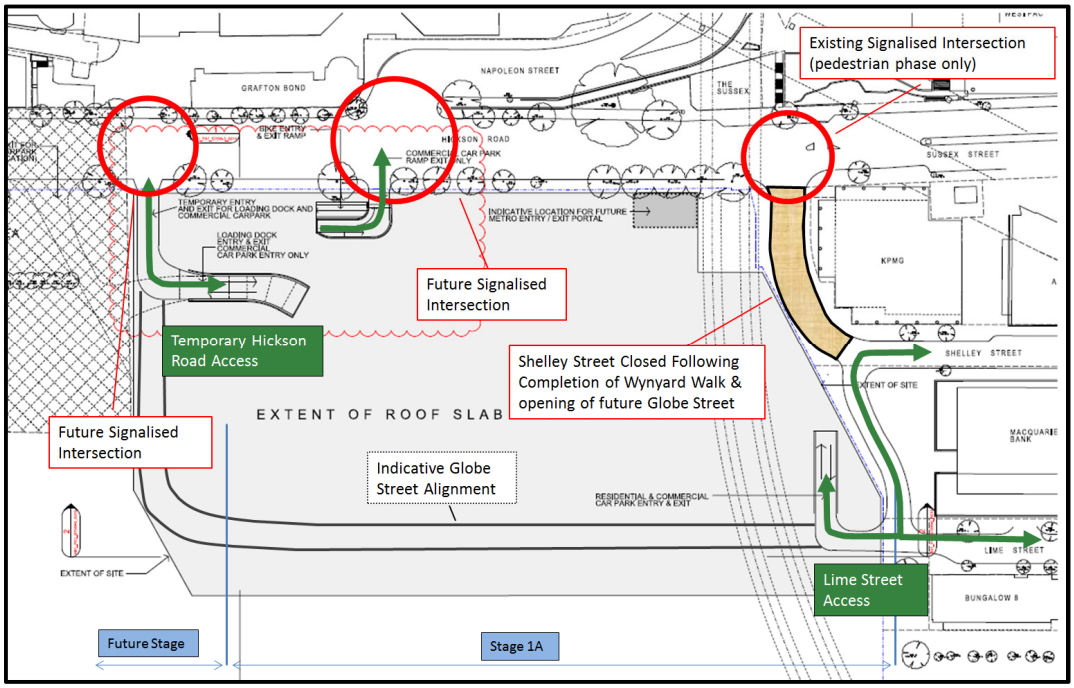


Figure 2 Vehicular access to the basement servicing the R8/R9 Buildings

3.2 Access by taxi

It is envisaged that taxis will use both Globe Street and Hickson Road for drop off/pick up activity. Sections of No Parking zones will be used initially on Globe Street and Hickson Road to allow for this activity. At a future stage a defined Taxi Zone will be introduced to align with usage patterns and the opportunities available as construction of future stages progresses.

3.3 Future Road Operations

3.3.1 Road Network Modelling

This report examines in detail the current and future stage traffic operations of the five nearest and most relevant intersections to the site for R8 and R9 Residential Buildings, namely:

- Hickson Road & Globe Street, **Traffic Signals (Future)**
- Napoleon Street & Hickson Road, **Priority Controlled (Existing), Traffic Signals (Future)**
- Sussex Street & Shelley Street, **Traffic Signals**
- Sussex Street & Erskine Street, **Traffic Signals**
- Erskine Street & Shelley Street, **Traffic Signals**

The traffic modelling for this study has utilised the intersection traffic counts undertaken by AECOM in November 2011. Arup was provided a copy of the AECOM LinSig model used for the Barangaroo South Traffic Study, which has considered the impact of the closure of Shelley Street following the Wynyard Walk construction works. Arup has updated the LinSig model to extend the right turn bay on the southern approach at the Hickson Road Napoleon Street intersection to 105m following the closure of Shelley Street. The design of this right turn bay would be co-ordinated with the new pedestrian crossing proposed on the Wynyard Walk alignment by Transport for NSW.

The LinSig model was further updated to consider the impact of the additional basement exit at the Hickson Road / Napoleon Street intersection. The model has assumed the intersection will operate with four phases, including a diamond phase for right turning vehicles out of the car park.

3.3.2 Traffic Generation

Traffic generation rates for the R8 and R9 residential buildings have been adopted based on those utilised in the Masson Wilson Twiney Modified Concept Plan (July 2008) which informed the September 2008 TMAP. A peak hour vehicle trip rate of 0.14/ residential dwelling was adopted in the analysis. The generation rate for the retail component of the development was adopted as 0.4 trips/car parking spce.

Trips are split 80% out / 20% in during the AM peak hour and 80% in / 20% out during the PM peak hour. This produces the following peak hour traffic generation:

- AM Peak Hour: 18 trips out, 6 trips in (24 total)
- PM Peak Hour: 6 trips out, 18 trips in (24 total)

All service vehicle activity (e.g. waste management) associated with the residential buildings has been assumed to occur outside of the commuter peak hours.

The total peak hour traffic generation for the Barangaroo South precinct, including the traffic generated by the C3, C4 and C5 commercial buildings[1], is summarised in Table 4.

Table 4 Traffic Generation in Peak Hours

Traffic Generation	**AM Peak Hour**			**PM Peak Hour**		
	No. of trips	In	Out	No. of trips	In	Out
C3/C4/C5 Buildings	419	255	164	389	149	240
R8/R9 Buildings	24	6	18	24	18	6
Total Traffic Generation	**443**	**261**	**182**	**413**	**167**	**246**

3.3.3 Traffic Distribution

The traffic distribution as outlined in the Barangaroo South Traffic Study (AECOM, 2011) has been adopted for this analysis. This distribution is indicated in Figure 3. All traffic associated with the R8/R9 residential buildings is assumed to enter the site via the Lime Street access at the southern end of the precinct.

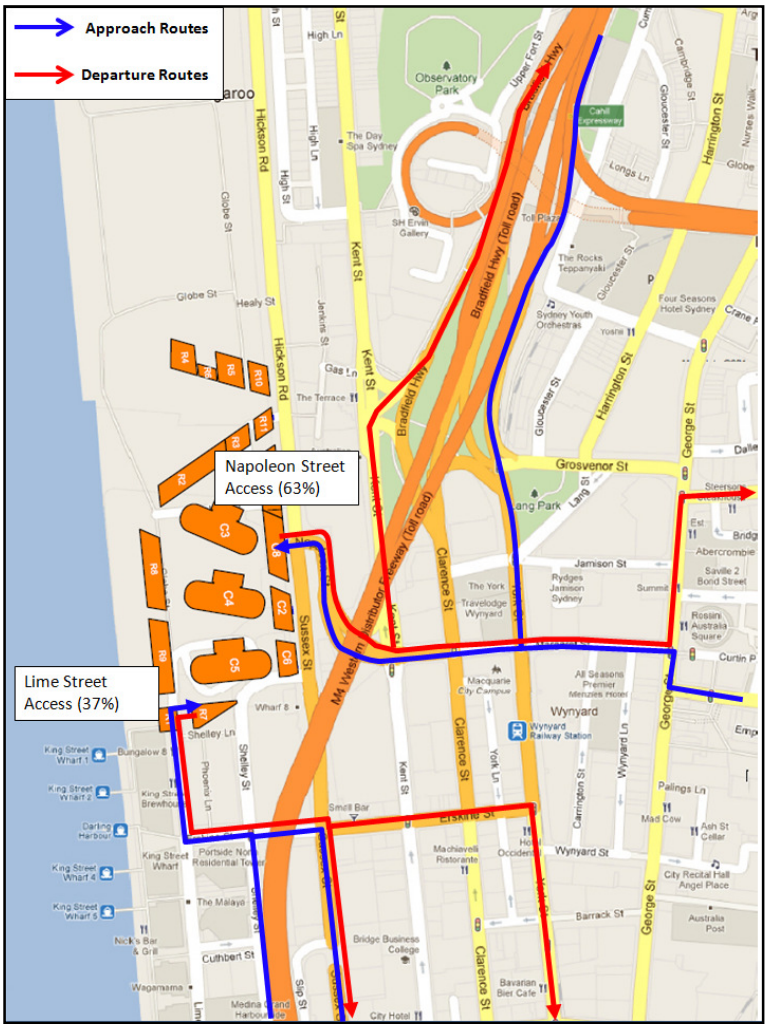


Figure 3 Barangaroo South Traffic Distribution

[1] Traffic generation for commercial buildings as per those outlined in the relevant traffic reports prepared for the major project planning approvals for each building

For commercial vehicles using the basement car park exit, it has been assumed:

- All vehicles accessing the site via Hickson Road utilise the basement exit
- 50% of vehicles accessing the site via Lime Street utilise the basement exit

This is a simplified distribution model appropriate for the purposes of this study. The assumption that 50% of vehicles accessing the site via Lime Street will utilise the basement exit is considered conservative and has been adopted to assess the capacity of the proposed reconfigured intersection opposite Napoleon Street.

3.3.4 Road Network Impacts

The LinSig analysis is summarised in Table 5 and detailed in Appendix A.

Table 5 Intersection Analysis

Peak	Intersection	Future Road Layout (C3/C4/C5 traffic included)			Future Road Layout (C3/C4/C5 & R8/R9 traffic)		
		LOS	DOS	AVD (sec)	LOS	DOS	AVD (sec)
AM	Hickson Rd & Globe St	C	0.69	30	C	0.69	30
	Hickson Rd & Napoleon St	B	0.79	25	B	0.79	25
	Sussex St & Shelley St	A	0.48	7	A	0.48	7
	Sussex St & Erskine St	C	0.88	40	C	0.89	41
	Erskine St & Shelley St	B	0.80	16	B	0.80	16
PM	Hickson Rd & Globe St	B	0.75	24	B	0.75	24
	Hickson Rd & Napoleon St	C	0.82	38	C	0.85	38
	Sussex St & Shelley St	A	0.70	11	A	0.70	11
	Sussex St & Erskine St	F	1.10	127	F	1.11	132
	Erskine St & Shelley St	A	0.35	13	A	0.35	13

The results of the LinSig intersection analysis forecast minimal changes in the operation of key intersections surrounding the site as a result of the additional R8/R9 residential traffic, when compared with the base case scenario. The additional vehicles associated with the residential buildings has only a minor impact on forecast road network performance compared to that previously forecast (and subsequently approved) in the C3, C4 and C5 commercial building applications.

The analysis forecasts the intersection at Sussex Street and Erskine Street to be operating at or above capacity in the PM peak hour. It is recognised that significant vehicle queuing currently occurs in the southbound direction on Sussex Street during this time as a result of more congested traffic operating conditions in the vicinity of the cross traffic movements at the King Street and Market Street intersections. These intersections effectively act as the ‘masters’ along Sussex Street and impact on vehicle queues and delays of intersections to the north, particularly Sussex / Erskine Street. This intersection is forecast to operate at capacity in the PM peak hour, both with and without the additional traffic generated by the residential buildings.

It is noted that as a component of the Wynyard Walk bridge works, the following improvements will be implemented at the Sussex Street / Erskine Street intersection[2]:

- Introduction of continuity lines to guide motorists into the correct lanes
- Providing lane designations for key movements at the intersection

The benefits of these upgrades in relation to intersection operation are difficult to quantify. Therefore, consistent with the analysis contained in the Wynyard Walk bridge works, no increase in capacity at the intersection has been assumed.

[2] Wynyard Walk Bridge Works - Traffic Management Plan BPL-R-GN-053, Revision D, May 2012

4 Car Parking

4.1 Basement Car Parking

In the Approved Concept Plan for the site, it is recognised that the parking policy for the development should support public transport and non car (walk/cycle) travel. Low car parking provision is considered important because it will also act to limit potential traffic generation by the site's activity to a level which will not unduly compromise the operation of the CBD's existing road network.

In accordance with the approved Concept Plan approval, City of Sydney parking rates have been adopted in the planning for the residential buildings, which are outlined in Table 6.

Table 6 Proposed On-Site Parking Provision

Apartment Type	**Number of Units Proposed**	**Parking Rate**	**Car Parking Provision**
1 Bedroom Unit	47	0.5	24
2 Bedroom Unit	100	1.2	120
3 Bedroom Unit	12	2.0	24
Sub-Total: Residential Units			***168***
Retail Parking Provision			4
Total Car Parking Provision			**172**

4.2 Service Vehicle Arrangements

A dedicated parking area is to be provided within the loading dock of the Stage 1A basement for use by service vehicles associated with the residential buildings. Access to the loading dock will be via Globe Street at the north eastern corner of the site, shared with the access for commercial service vehicles.

4.3 Compliance with Concept Plan

4.3.1 Residential Parking

Condition C4(b) of the approved Barangaroo Concept Plan provides maximum car parking rates for residential developments as follows:

- 1 bedroom/bedsitter unit: 1 space/2 units
- 2 bedroom unit: 1.2 spaces/unit
- 3+ bedroom unit: 2 spaces/unit

The residential parking provision of 168 spaces is in accordance with these requirements as outlined in Table 6.

4.3.2 Retail Parking

Condition C4(c) of the approved Barangaroo Concept Plan advises parking rates other than commercial or residential land uses are to be in accordance with City of Sydney car parking rates. Based on a total FSA of 430,275m^2 and a site area of 44,160m^2, the 2,120m^2 of retail can provide up to:

$$\text{Max number of cars} = = \frac{2{,}120\ (Total\ Other\ FSA)}{430{,}275\ (Total\ FSA)} x \frac{44{,}160\ (Site\ Area)}{50} = 4 \text{ spaces}$$

Therefore the total parking provision of 4 retail spaces for the R8 and R9 buildings is in accordance with the above parking rates, and is thus compliant with the Barangaroo Concept Plan.

4.4 On-street parking

There will be approximately 12 short stay on-street car parking bays along Globe Street. Some of these will be defined as a No Parking zone to allow for drop-off and pick-up activity by private vehicles and taxis.

5 Pedestrian and Cycling Access

5.1 Pedestrian Linkages

The R8 and R9 residential buildings will have pedestrian friendly access with low vehicular traffic and wide footpaths along both Shelley Street and Globe Street adjacent to the precinct. As presented in **Error! Reference source not found.**, the majority of building residents are expected to walk to work on a typical day. The location of the residential buildings in a CBD environment provides good opportunities for residents to walk to their place of employment.

As well as walking to work, residents of the R8 and R9 buildings will have high quality walking connections to key transport nodes and other land uses. These include retail areas provided within Barangaroo South, Wynyard transport interchange and the future Barangaroo Ferry terminal.

The R8 and R9 buildings will be one of a series of buildings forming the Barangaroo South development. Ultimately it will have pedestrian friendly access with low vehicular traffic and wide footpaths along Shelley Street, Napoleon Street extension and Globe Street.

For the ultimate Barangaroo South development the following pedestrian linkages are proposed:

- **Wynyard Walk**: A new high-volume pedestrian tunnel from Barangaroo to the frequent rail and bus services at Wynyard Station and George Street (currently under construction)
- **City Walk Wynyard Connection**: A new pedestrian link bridge over Sussex Street/Hickson Road located close to the intersection of Hickson Road and Napoleon Street which links into the Wynyard Walk.
- **189 Kent Connection**: A new pedestrian link bridge over Hickson Road to be constructed and coordinated with the future development of 189 Kent Street.
- **Maritime Staircase**: A new staircase at the junction of Napoleon Street and Hickson Road which connects to the Maritime Centre providing a link to Kent Street.

Key walking routes from the R8 and R9 buildings are presented in Figure 4.

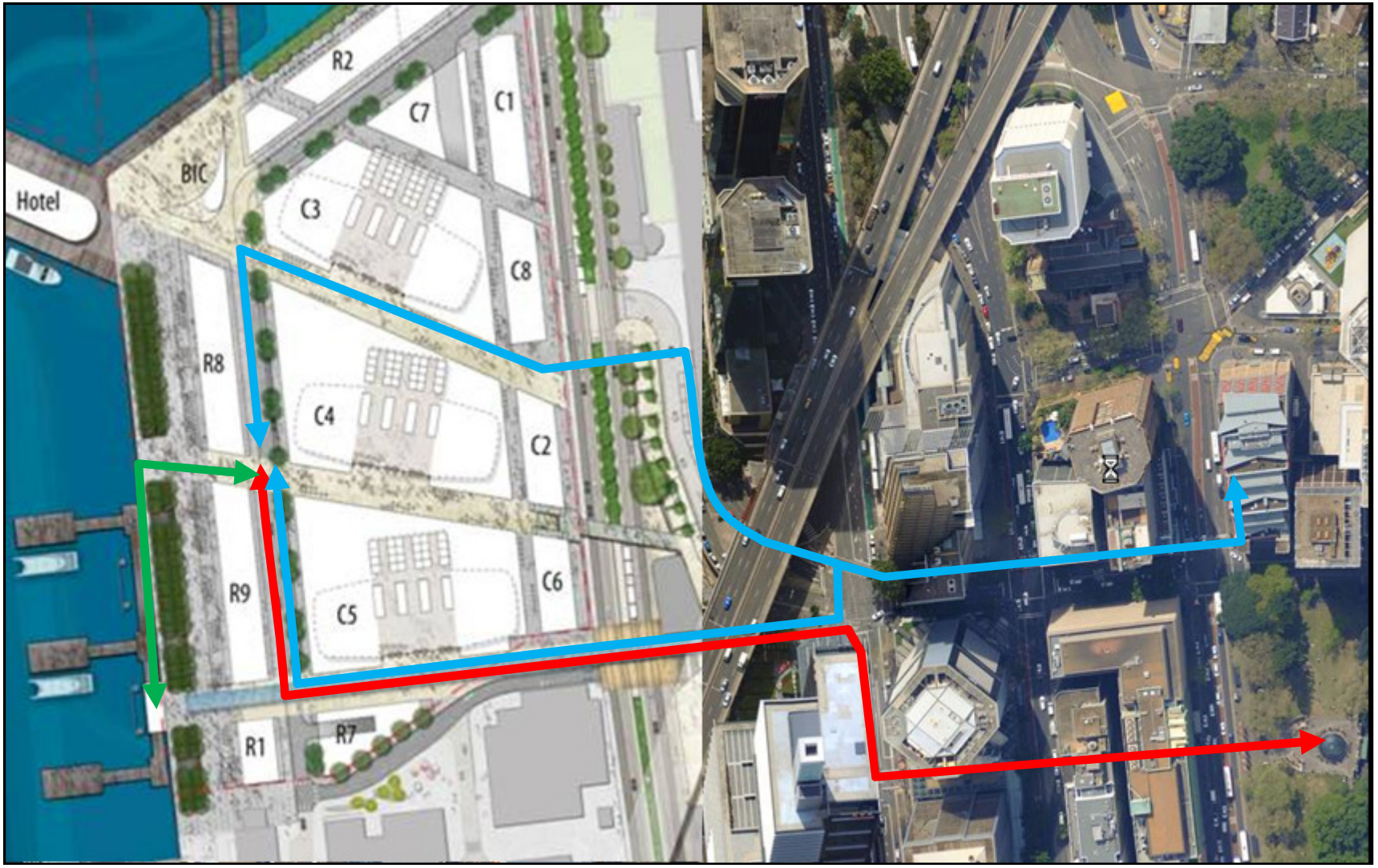


Figure 4 Key Walking Routes from the R8 and R9 Residential Buildings

5.2 Cycling Access

The R8 and R9 buildings will have on-site secure bicycle parking for all residents. One secure (caged) bicycle parking space per apartment (i.e. 159 spaces) has been adopted which aligns relevant Green Star requirements. Short term visitor parking will also be provided near the entrance to the buildings, visible to the public eye.

There will be public bike parking available in near proximity to the R8/R9 entry lobbies for short term visitor use. A cycling strategy for the entire Barangaroo South site which responds to the external connections and the various cycling activities anticipated is being developed to inform the ground plane design development.

The City of Sydney has recently commenced a roll out of a cycleway network where dedicated cycle lanes are being constructed throughout the CBD as part of its Cycle Strategy and Action Plan 2007-2017[3]. The Barangaroo cycling strategy will include integration with this cycleway network.

New separated cycleways along both King Street and Kent Street in close proximity to the R8 and R9 buildings have recently been completed. These routes provide a connection between the Anzac Bridge and Sydney Harbour Bridge cycleways. It is anticipated the majority of cyclists will arrive to the Barangaroo South precinct using these dedicated cycling facilities.

The main cycling routes to and from the site are indicated in Figure 5.

[3] Refer City of Sydney's publication entitled Cycle Strategy and Action Plan 2007-1017, City of Villages dated February 2007.

Figure 5 Key Cycling Routes to and from the R8/R9 Buildings

6 Public Transport

The site is well located to a number of public transport hubs, including rail, bus and ferry. Public transport accessibility to Barangaroo is a key area where there has been further development since the TMAP 2008. At the time of the TMAP 2008 assessment, the mode share to public transport was focused on train and bus with a very low ferry mode share. There is now the potential for a number of changes to transport modes to influence the mode of choice to Barangaroo; these being Sydney Light Rail and Ferry services.

6.1.1 Ferry

Existing commuter ferry services providing access to Barangaroo and the CBD in general arrive and depart from King Street Wharf (number 3) and Circular Quay. The potential for a new Barangaroo Wharf Ferry terminal adjacent to the R8 and R9 residential buildings has the potential bring additional ferry services and routes, contributing to an to increase ferry mode share. The current TMAP assigns only a 1% mode to ferry for journey to work. Larger tenants in the Circular Quay area have recorded ferry mode share as high as 7% indicating that there is good potential for an increased ferry mode share with increased services and improved frequencies.

6.1.2 Wynyard Walk

The NSW Government's 2012-13 Budget includes $61 million to building the Wynyard Walk (previously Barangaroo Pedestrian Link), a direct pedestrian link between the new Barangaroo development and Wynyard Station and transport interchange. The Wynyard Walk, expected to be complete by 2015, will provide a high level of access to public transport for the growing western corridor of the CBD, including Barangaroo and the King Street Wharf.

6.1.3 Sydney Light Rail

The first stage of the inner-west light rail extension is a 5.6km extension running between Lilyfield and Dulwich Hill. It will run from the current light rail terminus at Lilyfield, along the disused freight rail corridor, to Dulwich Hill. The NSW Government's 2012-13 Budget has allocated $116 million for the construction of the railway, which is expected to be operational by 2014. It could be expected that public transport patronage to Barangaroo from the inner west would shift mode from bus and rail as a result of these extensions.

The NSW Government has allocated $25m in the 2012-13 Budget to plan for future light rail development across Sydney. The Government recently appointed consultants to prepare a Light Rail Strategic Plan for an area approximately 10km in radius from the Sydney CBD to consider light rail extensions as part of a wider integrated light rail network. This plan will specifically investigate the feasibility of extending light rail through the CBD, to the University of NSW and to Sydney University. The integration of existing and planned light rail networks would further enhance patronage by this mode to Barangaroo. The preferred light rail corridor, as recently published in the Draft NSW Long Term Transport Masterplan, is presented in

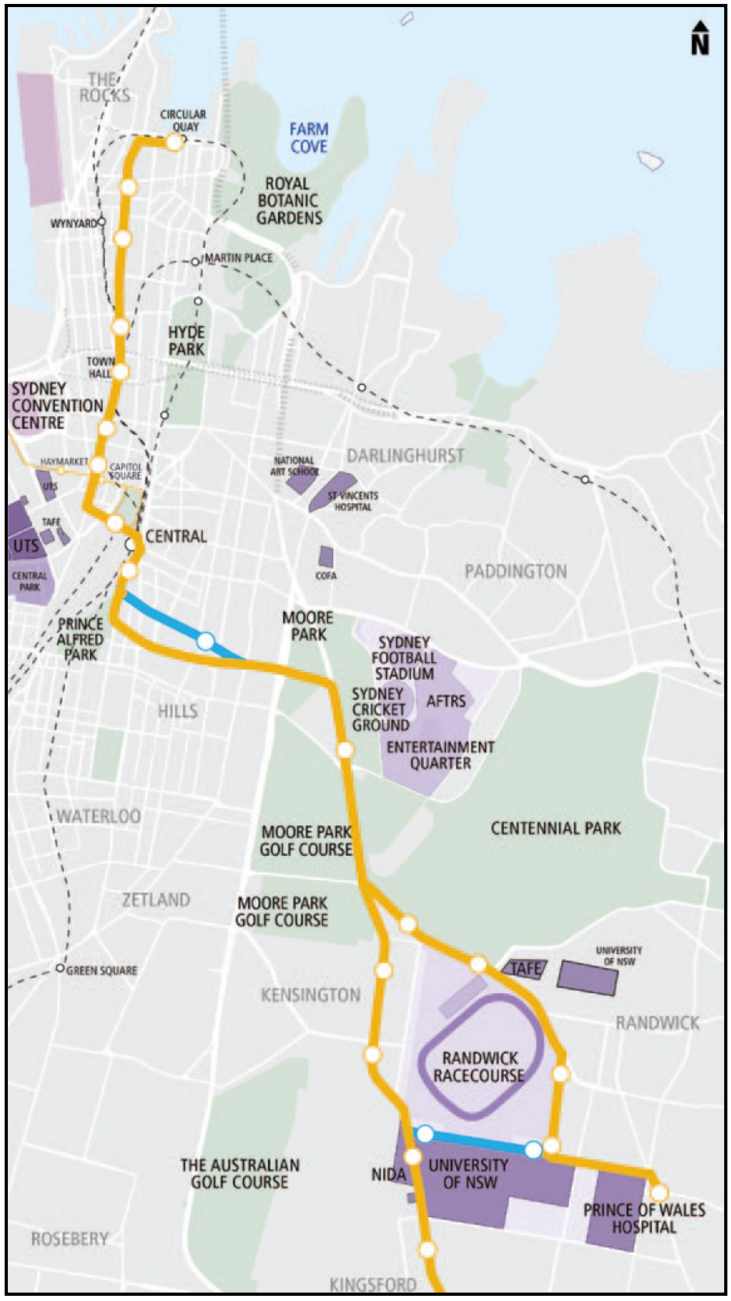


Figure 6 Sydney Light Rail Preferred Route

The Draft NSW Long Term Transport Masterplan presents the key findings from the Sydney Light Rail Study, highlighting that a light rail option serving Barangaroo via The Rocks would *'provide fewer customer benefits, and therefore (is) considered a lower priority.'*

6.1.4 North West/South West Rail Links

The NSW Government is committed to building the North West Rail Link and South West Rail Link, allocating more than $750 million to continue work on the projects in the 2012-13 Budget which includes:

- $360 million to develop the 23km North West Rail Link between Epping and Rouse Hill. This includes funding the preparation of major construction sites,

property acquisition and the development of a second Environmental Impact Assessment (EIS). An EIS for the major civil construction works was placed on public exhibition in April 2012

- $397 million to continue construction of the South West Rail Link, which includes 10.5km of twin track between Glenfield and Leppington, two new stations at Edmondson Park and Leppington, car parking and a train stabling facility at Rossmore. The project will be finalised in 2016

The North West Rail Link is planned by the NSW Government to run as a shuttle service between Chatswood and Cudgegong Road in the North West growth sector. The proposed alignment is presented in Figure 7.

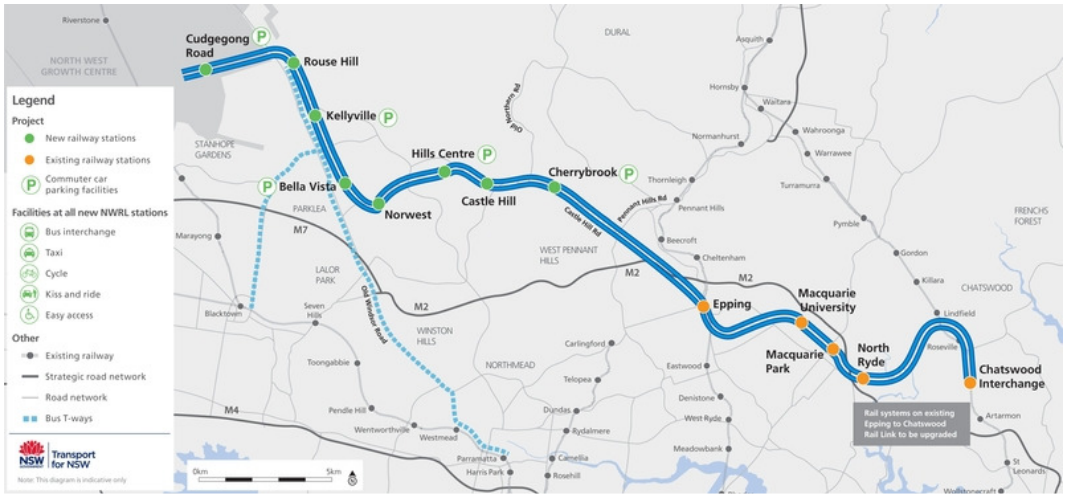


Figure 7 North West Rail Link Proposed Alignment

6.1.5 Improving Public Transport Services and Facilities

The NSW Government's 2012-13 Budget includes a range of improvements to public transport including:

- $124 million towards delivering electronic ticketing for ferries, trains, buses and light rail.
- $127 million to acquire 269 buses for Sydney and the outer Metropolitan area
- $148 million for the new transport access program to improve access to the public transport network, including station upgrades, better access to CityRail Stations, improved transport interchanges and commuter wharf improvements.
- $95 million for infrastructure upgrades for the rollout of the new Waratah trains.
- $22m for capital improvements on the Sydney Ferry fleet and infrastructure

6.1.6 Long Term Transport Masterplan

The draft NSW Long Term Transport Masterplan was released in September 2012 and outlines a 20 year plan for the direction of transport services across NSW. The plan presents an integrated approach to transport planning and identifies the roles different modes of transport play in meeting the future needs of the State population.

The *Draft NSW Long Term Transport Masterplan* confirms that the proposed Barangaroo Ferry Hub is an integral component of Sydney's transport network, supporting commercial development of Barangaroo and take pressure off Circular Quay.

The masterplan aims to integrate public transport services to maximise future use as well as improve the overall customer experience. The masterplan discusses the implementation of the 'Opal' card – the future integrated public transport ticketing system for NSW.

6.1.7 Barangaroo Integrated Transport Plan

In August 2012 the BDA released the Barangaroo Integrated Transport Plan, which was prepared by a taskforce chaired by Transport for NSW and included City of Sydney, BDA, Lend Lease and other Government agencies. The plan outlines a series of transport strategies and actions to accommodate the significant employment growth in the northern CBD over both the short and long term. A selection of the recommended actions include:

- Plan for investigation of a future bus corridor along Hickson Road in lieu of light rail;
- To accommodate the significant increase passenger throughput over the short and long term (up to 26%), prepare a costed implementation plan to upgrade the station and improve capacity;
- Investigate options to relieve congestion at the Wynyard bus interchange and increase the number of bus stops and layovers;
- Commence planning for a new ferry interchange at Barangaroo;
- Complete the Sydney Light Rail strategic plan to determine the feasibility of light rail on George Street and Hickson Road;
- Construct Wynyard Walk, City Walk Bridge and other bridges over Hickson Road as per existing planning approvals;
- Improving cycling access to Barangaroo by extending the City of Sydney's bicycle network, including upgrading existing bicycle shoulder lanes on Hickson Road; and
- Locate sufficient taxi ranks in consultation with City of Sydney, BDA and the Taxi Council.

7 Conclusion

The project application for the R8 and R9 Residential Buildings is lodged under the existing Approved Concept Plan December 2010 (Modification 4). The R8 and R9 buildings sits within Stage 1 which involves construction of that part of the basement that relates to the approved GFA for blocks 1, 2, 3 (in part), and X, which allows 779 car spaces.

The predominant vehicle routes for access to and from the site are to be via Sussex Street and Hickson Road. Access to the basement car park for residential vehicles is proposed to be provided via an access adjoining Lime Street in the south-west corner of the basement. This serves as an entry and exit. A dedicated parking area is to be provided within the loading dock of the Stage 1A basement for use by service vehicles associated with the residential buildings.

A total parking provision of 172 spaces is to be provided for the R8 and R9 buildings, which is in accordance with the parking rates outlined in Condition C4 of the approved Barangaroo Concept Plan and the City of Sydney car parking requirements.

Traffic modelling of key intersections surrounding the site using LinSig forecast minimal changes in the operation of key intersections compared with that previously forecast (and subsequently approved) in the C3, C4 and C5 commercial building applications.

The key area where there has been further development since the TMAP 2008 is in the area of public transport access to the site. At the time of the TMAP assessment, the mode share to public transport was focused on train and bus with a very low ferry mode share. There is now the potential for of a number of changes to transport modes to influence the mode of choice to Barangaroo; these being Sydney Light Rail and Ferry services. These alternatives improve the potential to support the mode split towards public transport and the concepts of the TMAP.

The NSW Government's 2012-13 Budget includes investment in new transport services for Sydney including funding for planning for future light rail development across Sydney, funding to building the North West and South West Rail Links, funding for construction of the Wynyard Walk and improvements to bus and ferry services. The draft NSW Long Term Transport Masterplan, released in September 2012, outlines a future direction for transport services across NSW including measures to the increase the attractiveness of non-car modes of transport. The recently published Barangaroo Integrated Transport Plan provides a series of short and long term actions to ensure transport management policies are in place to meet the needs of Barangaroo commuters. These will all assist Barangaroo to achieve a high public transport mode share.

Appendix A

LinSig Intersection Results

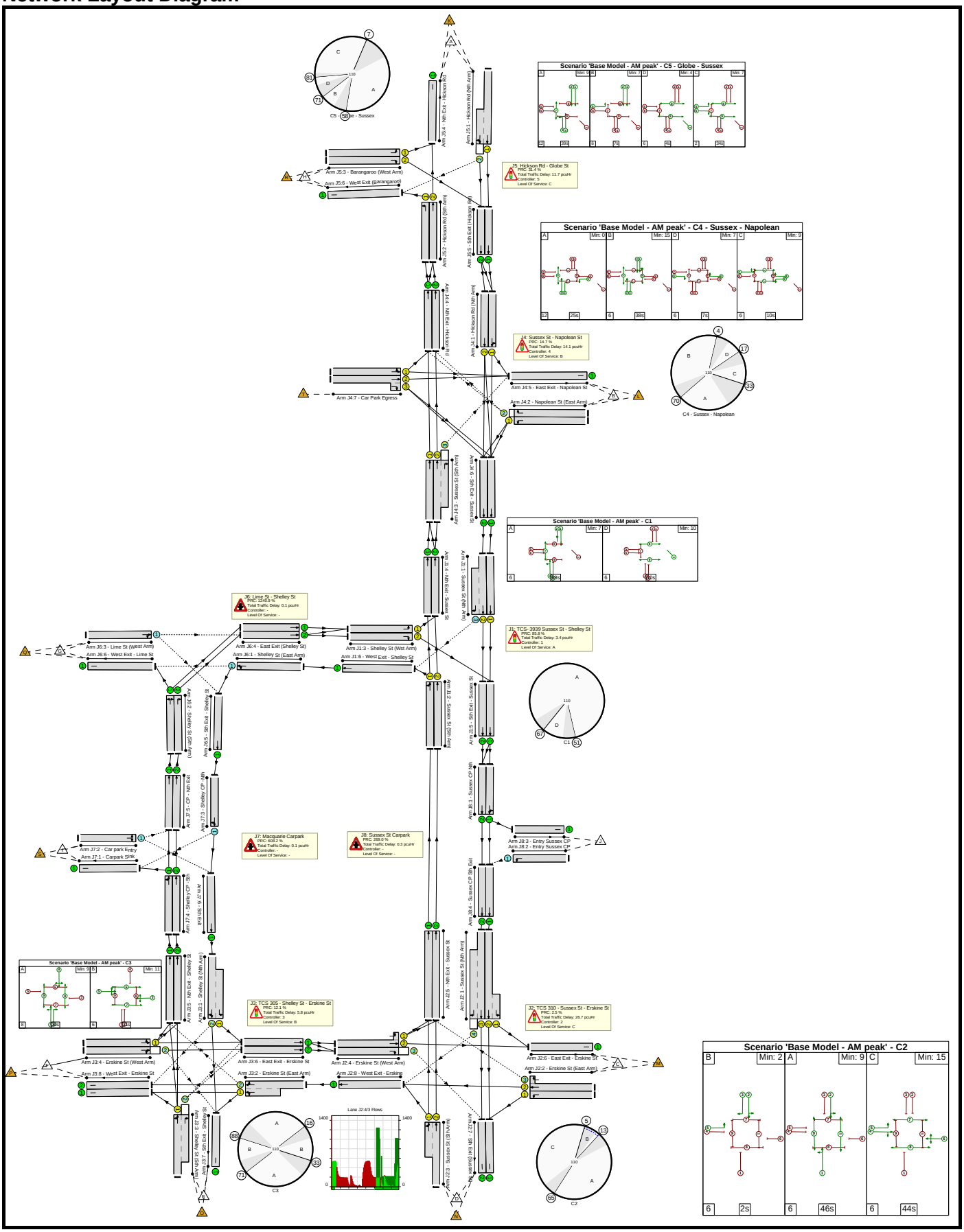
Basic Results Summary

User and Project Details

Project:	
Title:	**R8 and R9 Residential Buildings Project Application**
Location:	
File name:	AM Peak_With Exit_C3-C4-C5 only.lsg3x
Author:	
Company:	ARUP
Address:	
Notes:	

Scenario 1: 'Base Model - AM peak' (FG1: 'Flow Group 1', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Network Results

Item	Lane Description	Lane Type	Deg Sat (%)	Av. Delay Per PCU (s/pcu)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Max. Back of Uniform Queue (pcu)	Mean Max Queue (pcu)
Network: Bulk Excavation and Basement Car Parking Modification	-	-	**87.8%**	-	-	-	-	-
J1: TCS- 3939 Sussex St - Shelley St	-	-	**48.4%**	-	-	-	-	-
1/1	Sussex St (Nth Arm) Ahead	U	48.4%	5.3	549	1401	2.5	3.0
1/2+1/3	Sussex St (Nth Arm) Ahead Right	U+O	28.3%	10.3	326	1423:1338	5.2	5.4
2/1	Sussex St (Sth Arm) Ahead Left	U	26.6%	7.3	257	1196	2.7	2.9
2/2	Sussex St (Sth Arm) Ahead	U	46.2%	6.5	644	1722	5.9	6.3
3/1	Shelley St (Wst Arm) Left	U	0.0%	0.0	0	1670	0.0	0.0
3/2	Shelley St (Wst Arm) Right	U	0.0%	0.0	0	1440	0.0	0.0
4/1	Nth Exit - Sussex St Ahead	U	0.0%	0.0	257	Inf	0.0	0.0
4/2	Nth Exit - Sussex St Ahead	U	0.0%	0.0	644	Inf	0.0	0.0
5/1	Sth Exit - Sussex St Ahead	U	0.0%	0.0	549	Inf	0.0	0.0
5/2	Sth Exit - Sussex St Ahead	U	0.0%	0.0	326	Inf	0.0	0.0
6/1	West Exit - Shelley St Ahead	U	0.0%	0.0	0	Inf	0.0	0.0
J2: TCS 310 - Sussex St - Erskine St	-	-	**87.8%**	-	-	-	-	-
1/2+1/1	Sussex St (Nth Arm) Left Ahead	U	47.6%	19.0	304	1115:1385	5.1	5.6
1/3+1/4	Sussex St (Nth Arm) Ahead Right	U+O	61.6%	39.6	436	1343:1348	23.2	24.0
2/1	Erskine St (East Arm) Left	U	74.8%	43.7	325	1062	8.4	9.8
2/2+2/3	Erskine St (East Arm) Right Ahead	U+O	17.7%	24.4	92	1224:1224	1.5	1.6
3/2+3/1	Sussex St (Sth Arm) Ahead Left	U	87.8%	42.0	733	1722:1385	15.0	18.4
4/2+4/1	Erskine St (West Arm) Left Ahead	U	65.5%	28.6	345	1200:1200	6.7	7.7
4/3	Erskine St (West Arm) Right	O	83.6%	77.8	206	1239	4.9	7.1
5/1	Nth Exit - Sussex St Ahead	U	0.0%	0.0	257	Inf	0.0	0.0

5/2	Nth Exit - Sussex St Ahead	U	0.0%	0.0	644	Inf	0.0	0.0
6/1	East Exit - Erskine St	U	0.0%	0.0	224	Inf	0.0	0.0
7/1	Sth Exit (Sussex St)	U	0.0%	0.0	549	Inf	0.0	0.0
7/2	Sth Exit (Sussex St)	U	0.0%	0.0	565	Inf	0.0	0.0
8/1	West Exit - Erskine Ahead	U	0.0%	0.0	202	Inf	0.0	0.0
J3: TCS 305 - Shelley St - Erskine St	**-**	**-**	**80.3%**	**-**	**-**	**-**	**-**	**-**
1/2+1/1	Shelley St (Nth Arm) Left Ahead Right	O+U	4.8%	7.3	40	1309:1208	0.2	0.2
2/2+2/1	Erskine St (East Arm) Right Left Ahead	O+U	41.5%	23.6	202	1304:1272	1.2	1.5
3/1+3/2	Shelley St (Sth Arm) Ahead Right Left	U+O	80.3%	14.5	1088	1385:1395	6.6	8.6
4/1	Erskine St (West Arm) Left Ahead	U	9.9%	24.8	26	1204	0.3	0.4
4/2	Erskine St (West Arm) Ahead Right	O	7.2%	24.9	18	1150	0.2	0.3
5/1	Nth Exit - Shelley St Ahead	U	0.0%	0.0	231	Inf	0.0	0.0
5/2	Nth Exit - Shelley St Ahead	U	0.0%	0.0	0	Inf	0.0	0.0
6/1	East Exit - Erskine St Ahead	U	0.0%	0.0	347	Inf	0.0	0.0
6/2	East Exit - Erskine St Ahead	U	0.0%	0.0	204	Inf	0.0	0.0
7/1	Sth Exit - Shelley St	U	0.0%	0.0	56	Inf	0.0	0.0
8/1	West Exit - Erskine St	U	0.0%	0.0	527	Inf	0.0	0.0
8/2	West Exit - Erskine St	U	0.0%	0.0	9	Inf	0.0	0.0
J4: Sussex St - Napolean St	**-**	**-**	**78.5%**	**-**	**-**	**-**	**-**	**-**
1/1	Hickson Rd (Nth Arm) Left Ahead	U	37.3%	22.1	183	1385	2.0	2.3
1/2	Hickson Rd (Nth Arm) Ahead	U	45.2%	27.7	276	1722	4.5	5.0
2/1	Napolean St (East Arm) Left	U	69.0%	33.1	492	1634	12.0	13.1
2/2	Napolean St (East Arm) Right	O	51.0%	48.8	163	1724	4.3	4.8
3/1	Sussex St (Sth Arm) Ahead	U	28.2%	3.9	335	1722	2.5	2.7
3/2+3/3	Sussex St (Sth Arm) Ahead Right	U+O	78.5%	21.0	566	1722:1348	21.7	23.4

4/1	Nth Exit - Hickson Rd Ahead	U	0.0%	0.0	418	Inf	0.0	0.0
4/2	Nth Exit - Hickson Rd Ahead	U	0.0%	0.0	236	Inf	0.0	0.0
5/1	East Exit - Napolean St	U	0.0%	0.0	511	Inf	0.0	0.0
6/1	Sth Exit - Sussex St Ahead	U	0.0%	0.0	549	Inf	0.0	0.0
6/2	Sth Exit - Sussex St Ahead	U	0.0%	0.0	326	Inf	0.0	0.0
7/1	Car Park Egress Left Ahead	U	3.6%	49.8	8	1634	0.2	0.2
7/2+7/3	Car Park Egress Ahead Right	U	13.6%	64.4	17	1724:1722	0.5	0.6
J5: Hickson Rd - Globe St	**-**	**-**	**68.5%**	**-**	**-**	**-**	**-**	**-**
1/1+1/2	Hickson Rd (Nth Arm) Ahead Right	U+O	24.6%	15.7	190	1722:1800	2.0	2.2
2/1	Hickson Rd (Sth Arm) Left	U	45.0%	18.1	225	1196	3.8	4.2
2/2	Hickson Rd (Sth Arm) Ahead	U	68.5%	34.6	429	1722	9.0	10.1
3/1	Barangaroo (West Arm) Left	U	54.1%	29.3	293	1385	5.2	5.8
3/2	Barangaroo (West Arm) Right	U	63.4%	43.4	272	1348	7.0	7.9
4/1	Nth Exit - Hickson Rd	U	0.0%	0.0	722	Inf	0.0	0.0
5/1	Sth Exit (Hickson Rd) Ahead	U	0.0%	0.0	57	Inf	0.0	0.0
5/2	Sth Exit (Hickson Rd) Ahead	U	0.0%	0.0	402	Inf	0.0	0.0
6/1	West Exit (Barangaroo)	U	0.0%	0.0	228	Inf	0.0	0.0
J6: Lime St - Shelley St	**-**	**-**	**6.7%**	**-**	**-**	**-**	**-**	**-**
1/1	Shelley St (East Arm) Left Ahead	O	0.0%	0.0	0	1800	0.0	0.0
2/1	Shelley St (Sth Arm) Right Left	U	6.7%	1.1	126	1800	0.0	0.0
2/2	Shelley St (Sth Arm) Right	U	0.0%	0.0	0	1800	0.0	0.0
3/1	Lime St (West Arm) Ahead Right	O	5.8%	3.2	35	1600	0.0	0.0
4/1	East Exit (Shelley St) Ahead	U	0.0%	0.0	0	Inf	0.0	0.0
4/2	East Exit (Shelley St) Ahead	U	0.0%	0.0	0	Inf	0.0	0.0
5/1	Sth Exit - Shelley St Ahead	U	0.0%	0.0	35	Inf	0.0	0.0
6/1	West Exit - Lime St	U	0.0%	0.0	126	Inf	0.0	0.0
J7: Macquarie Carpark	**-**	**-**	**12.7%**	**-**	**-**	**-**	**-**	**-**

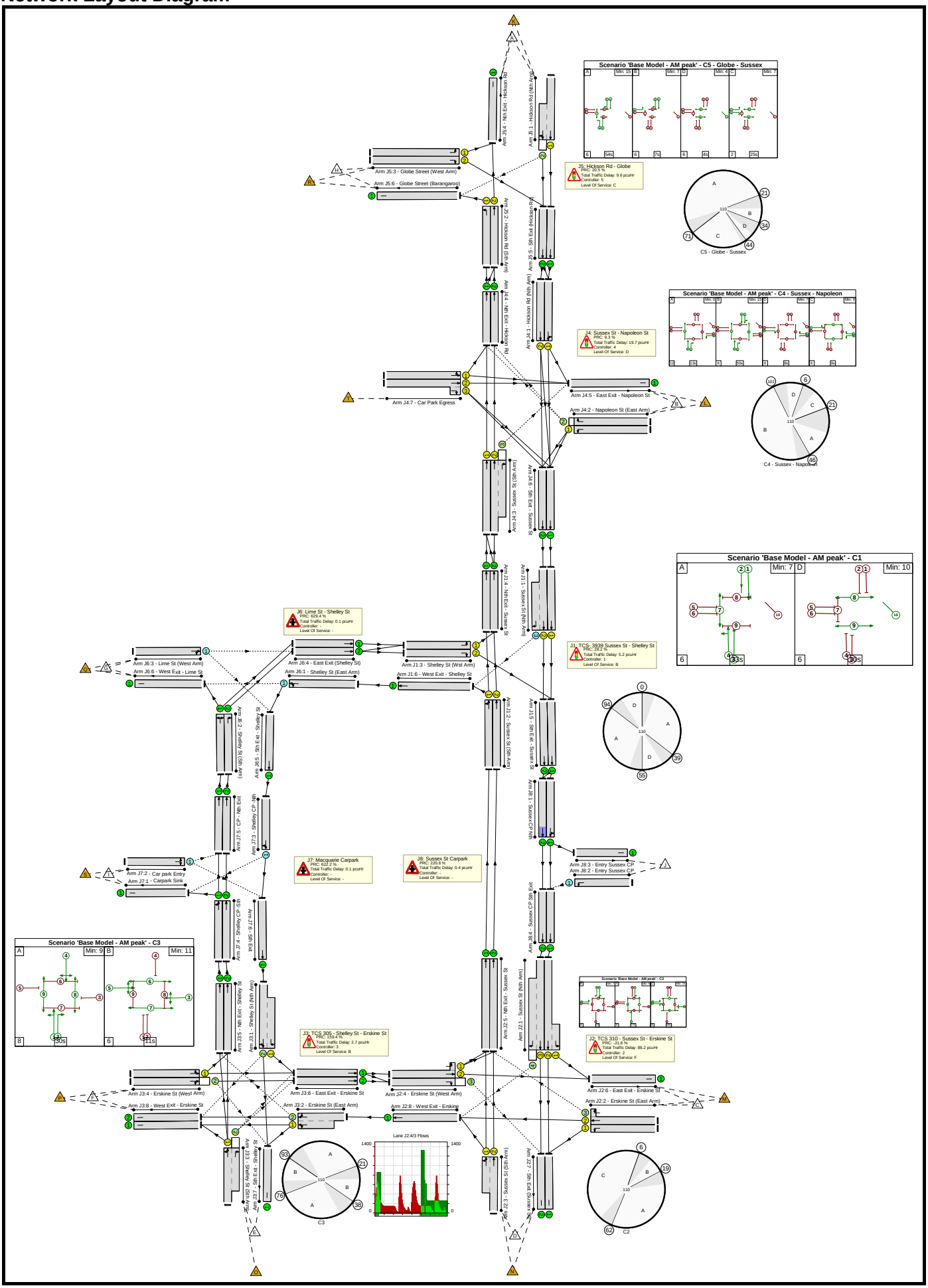
Basic Results Summary

User and Project Details

Project:	
Title:	**R8 and R9 Residential Buildings**
Location:	
File name:	PM Peak_With Exit_C3-C4-C5 only.lsg3x
Author:	
Company:	ARUP
Address:	
Notes:	

Scenario 1: 'Base Model - AM peak' (FG1: 'Flow Group 1', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Network Results

Item	Lane Description	Lane Type	Deg Sat (%)	Av. Delay Per PCU (s/pcu)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Max. Back of Uniform Queue (pcu)	Mean Max Queue (pcu)
Network	-	-	**109.6%**	-	-	-	-	-
J1: TCS- 3939 Sussex St - Shelley St	-	-	**70.2%**	-	-	-	-	-
1/1	Sussex St (Nth Arm) Ahead	U	70.2%	8.6	608	1401	9.1	10.3
1/2+1/3	Sussex St (Nth Arm) Ahead Right	U+O	43.2%	6.8	380	1423:1338	2.2	2.5
2/1	Sussex St (Sth Arm) Ahead Left	U	25.8%	16.3	191	1196	4.8	5.0
2/2	Sussex St (Sth Arm) Ahead	U	43.5%	16.7	463	1722	10.8	11.2
3/1	Shelley St (Wst Arm) Left	U	0.0%	0.0	0	1670	0.0	0.0
3/2	Shelley St (Wst Arm) Right	U	0.0%	0.0	0	1440	0.0	0.0
4/1	Nth Exit - Sussex St Ahead	U	0.0%	0.0	191	Inf	0.0	0.0
4/2	Nth Exit - Sussex St Ahead	U	0.0%	0.0	463	Inf	0.0	0.0
5/1	Sth Exit - Sussex St Ahead	U	0.0%	0.0	608	Inf	0.0	0.0
5/2	Sth Exit - Sussex St Ahead	U	0.0%	0.0	380	Inf	0.0	0.0
6/1	West Exit - Shelley St Ahead	U	0.0%	0.0	0	Inf	0.0	0.0
J2: TCS 310 - Sussex St - Erskine St	-	-	**109.6%**	-	-	-	-	-
1/2+1/1	Sussex St (Nth Arm) Left Ahead	U	109.6%	229.7	505	920:1385	14.8	41.7
1/3+1/4	Sussex St (Nth Arm) Ahead Right	U+O	107.1%	186.0	483	920:1348	24.3	45.9
2/1	Erskine St (East Arm) Left	U	90.0%	65.4	369	920	10.4	14.2
2/2+2/3	Erskine St (East Arm) Right Ahead	U+O	19.0%	21.9	103	1224:1224	1.4	1.5
3/2+3/1	Sussex St (Sth Arm) Ahead Left	U	84.3%	45.9	587	1722:1385	11.6	14.2
4/2+4/1	Erskine St (West Arm) Left Ahead	U	42.5%	22.8	234	1200:1200	4.4	4.8
4/3	Erskine St (West Arm) Right	O	106.9%	246.2	215	1320	7.0	18.6
5/1	Nth Exit - Sussex St Ahead	U	0.0%	0.0	191	Inf	0.0	0.0
5/2	Nth Exit - Sussex St Ahead	U	0.0%	0.0	463	Inf	0.0	0.0
6/1	East Exit - Erskine St	U	0.0%	0.0	249	Inf	0.0	0.0

7/1	Sth Exit (Sussex St)	U	0.0%	0.0	806	Inf	0.0	0.0
7/2	Sth Exit (Sussex St)	U	0.0%	0.0	672	Inf	0.0	0.0
8/1	West Exit - Erskine Ahead	U	0.0%	0.0	115	Inf	0.0	0.0
J3: TCS 305 - Shelley St - Erskine St	**-**	**-**	**34.7%**	**-**	**-**	**-**	**-**	**-**
1/2+1/1	Shelley St (Nth Arm) Left Ahead Right	O+U	9.6%	6.6	98	1309:1208	0.4	0.5
2/2+2/1	Erskine St (East Arm) Right Left Ahead	O+U	26.7%	18.7	115	1304:1272	0.7	0.9
3/1+3/2	Shelley St (Sth Arm) Ahead Right Left	U+O	34.7%	8.3	404	1385:1395	2.1	2.3
4/1	Erskine St (West Arm) Left Ahead	U	21.7%	26.4	57	1204	0.7	0.9
4/2	Erskine St (West Arm) Ahead Right	O	27.9%	27.9	70	1150	0.9	1.1
5/1	Nth Exit - Shelley St Ahead	U	0.0%	0.0	75	Inf	0.0	0.0
5/2	Nth Exit - Shelley St Ahead	U	0.0%	0.0	0	Inf	0.0	0.0
6/1	East Exit - Erskine St Ahead	U	0.0%	0.0	244	Inf	0.0	0.0
6/2	East Exit - Erskine St Ahead	U	0.0%	0.0	205	Inf	0.0	0.0
7/1	Sth Exit - Shelley St	U	0.0%	0.0	53	Inf	0.0	0.0
8/1	West Exit - Erskine St	U	0.0%	0.0	138	Inf	0.0	0.0
8/2	West Exit - Erskine St	U	0.0%	0.0	29	Inf	0.0	0.0
J4: Sussex St - Napoleon St	**-**	**-**	**82.3%**	**-**	**-**	**-**	**-**	**-**
1/1	Hickson Rd (Nth Arm) Left Ahead	U	44.9%	18.4	288	1385	5.9	6.3
1/2	Hickson Rd (Nth Arm) Ahead	U	64.9%	48.3	518	1722	14.1	15.0
2/1	Napoleon St (East Arm) Left	U	58.3%	39.6	303	1634	7.7	8.4
2/2	Napoleon St (East Arm) Right	O	39.7%	46.2	119	1724	3.0	3.4
3/1	Sussex St (Sth Arm) Ahead	U	25.4%	2.6	302	1722	0.5	0.7
3/2+3/3	Sussex St (Sth Arm) Ahead Right	U+O	82.3%	44.4	352	1722:1348	23.2	25.4
4/1	Nth Exit - Hickson Rd Ahead	U	0.0%	0.0	357	Inf	0.0	0.0
4/2	Nth Exit - Hickson Rd Ahead	U	0.0%	0.0	84	Inf	0.0	0.0
5/1	East Exit - Napoleon St	U	0.0%	0.0	556	Inf	0.0	0.0

6/1	Sth Exit - Sussex St Ahead	U	0.0%	0.0	608	Inf	0.0	0.0
6/2	Sth Exit - Sussex St Ahead	U	0.0%	0.0	380	Inf	0.0	0.0
7/1	Car Park Egress Left Ahead	U	16.8%	53.2	35	1634	1.0	1.1
7/2+7/3	Car Park Egress Ahead Right	U	48.3%	72.7	68	1724:1722	2.0	2.4
J5: Hickson Rd - Globe	**-**	**-**	**74.7%**	**-**	**-**	**-**	**-**	**-**
1/1+1/2	Hickson Rd (Nth Arm) Ahead Right	U+O	74.7%	22.8	670	1722:1385	12.2	13.6
2/1	Hickson Rd (Sth Arm) Left	U	22.1%	8.0	132	1196	0.5	0.6
2/2	Hickson Rd (Sth Arm) Ahead	U	35.9%	10.3	309	1722	3.5	3.8
3/1	Globe Street (West Arm) Left	U	46.9%	34.8	189	1385	3.8	4.3
3/2	Globe Street (West Arm) Right	U	54.6%	49.2	174	1348	4.6	5.2
4/1	Nth Exit - Hickson Rd	U	0.0%	0.0	498	Inf	0.0	0.0
5/1	Sth Exit (Hickson Rd) Ahead	U	0.0%	0.0	169	Inf	0.0	0.0
5/2	Sth Exit (Hickson Rd) Ahead	U	0.0%	0.0	637	Inf	0.0	0.0
6/1	Globe Street (Barangaroo)	U	0.0%	0.0	170	Inf	0.0	0.0
J6: Lime St - Shelley St	**-**	**-**	**12.3%**	**-**	**-**	**-**	**-**	**-**
1/1	Shelley St (East Arm) Left Ahead	O	0.0%	0.0	0	1800	0.0	0.0
2/1	Shelley St (Sth Arm) Right Left	U	6.6%	1.1	119	1800	0.0	0.0
2/2	Shelley St (Sth Arm) Right	U	0.0%	0.0	0	1800	0.0	0.0
3/1	Lime St (West Arm) Ahead Right	O	12.3%	3.4	74	1600	0.0	0.1
4/1	East Exit (Shelley St) Ahead	U	0.0%	0.0	0	Inf	0.0	0.0
4/2	East Exit (Shelley St) Ahead	U	0.0%	0.0	0	Inf	0.0	0.0
5/1	Sth Exit - Shelley St Ahead	U	0.0%	0.0	74	Inf	0.0	0.0
6/1	West Exit - Lime St	U	0.0%	0.0	119	Inf	0.0	0.0
J7: Macquarie Carpark	**-**	**-**	**12.5%**	**-**	**-**	**-**	**-**	**-**
1/1	Carpark Sink	U	0.0%	0.0	14	Inf	0.0	0.0
2/1	Car park Entry Left Right	O	12.5%	3.1	82	1400	0.0	0.1
3/1	Shelley CP -Nth Right Ahead	O	4.6%	1.2	74	1600	0.0	0.0
4/1	Shelley CP -Sth Left Ahead	U	4.7%	1.2	75	1600	0.0	0.0

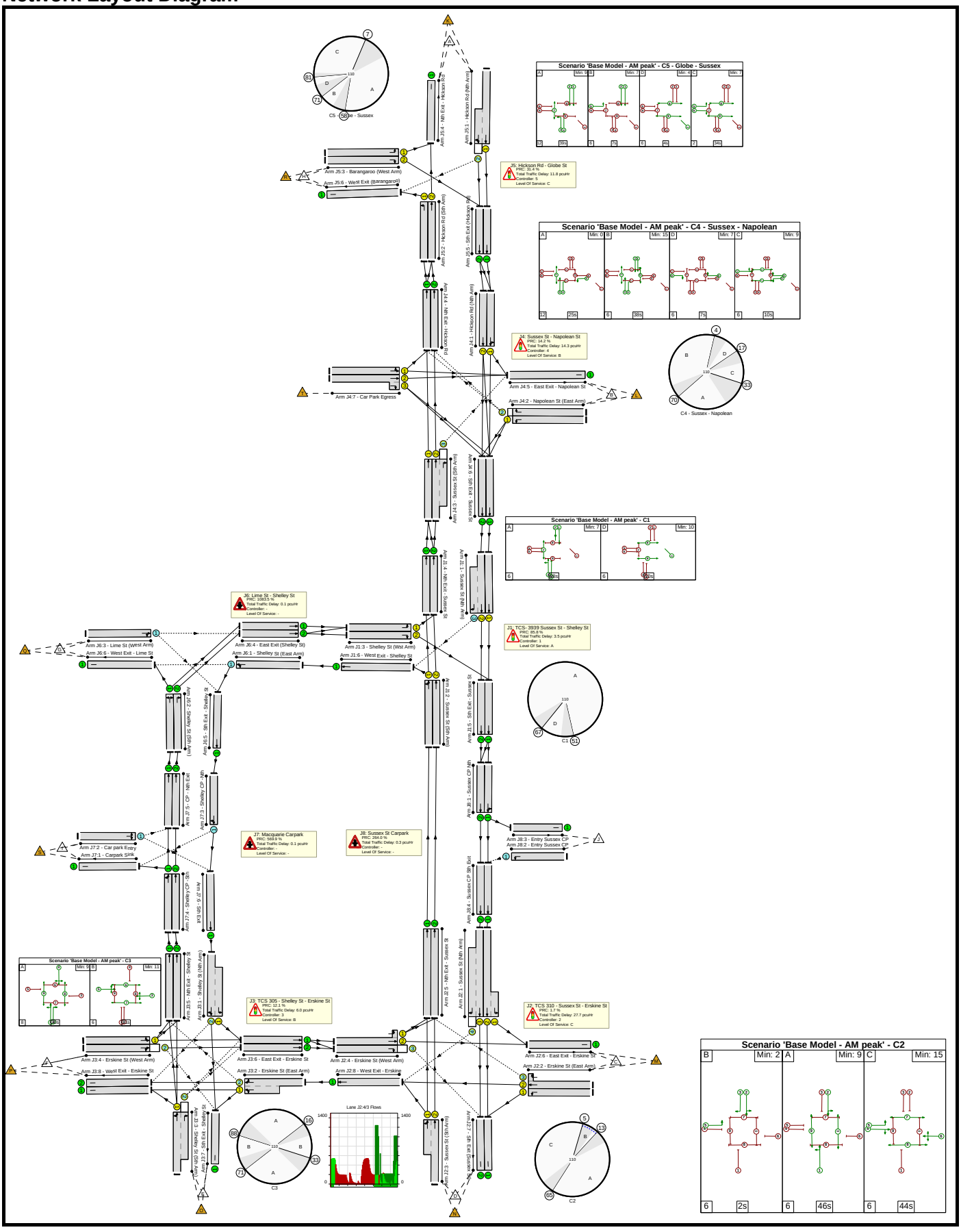
Basic Results Summary

User and Project Details

Project:	
Title:	**R8 and R9 Residential Buildings Project Appllication**
Location:	
File name:	AM Peak_With Exit_C3-C4-C5 & R8-R9.lsg3x
Author:	
Company:	ARUP
Address:	
Notes:	

Scenario 1: 'Base Model - AM peak' (FG1: 'Flow Group 1', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Network Results

Item	Lane Description	Lane Type	Deg Sat (%)	Av. Delay Per PCU (s/pcu)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Max. Back of Uniform Queue (pcu)	Mean Max Queue (pcu)
Network: Bulk Excavation and Basement Car Parking Modification	-	-	**88.5%**	-	-	-	-	-
J1: TCS- 3939 Sussex St - Shelley St	-	-	**48.4%**	-	-	-	-	-
1/1	Sussex St (Nth Arm) Ahead	U	48.4%	5.3	549	1401	2.6	3.1
1/2+1/3	Sussex St (Nth Arm) Ahead Right	U+O	29.1%	10.5	335	1423:1338	5.5	5.7
2/1	Sussex St (Sth Arm) Ahead Left	U	26.6%	7.3	257	1196	2.7	2.9
2/2	Sussex St (Sth Arm) Ahead	U	46.4%	6.5	646	1722	5.9	6.3
3/1	Shelley St (Wst Arm) Left	U	0.0%	0.0	0	1670	0.0	0.0
3/2	Shelley St (Wst Arm) Right	U	0.0%	0.0	0	1440	0.0	0.0
4/1	Nth Exit - Sussex St Ahead	U	0.0%	0.0	257	Inf	0.0	0.0
4/2	Nth Exit - Sussex St Ahead	U	0.0%	0.0	646	Inf	0.0	0.0
5/1	Sth Exit - Sussex St Ahead	U	0.0%	0.0	549	Inf	0.0	0.0
5/2	Sth Exit - Sussex St Ahead	U	0.0%	0.0	335	Inf	0.0	0.0
6/1	West Exit - Shelley St Ahead	U	0.0%	0.0	0	Inf	0.0	0.0
J2: TCS 310 - Sussex St - Erskine St	-	-	**88.5%**	-	-	-	-	-
1/2+1/1	Sussex St (Nth Arm) Left Ahead	U	47.6%	19.2	304	1115:1385	5.1	5.6
1/3+1/4	Sussex St (Nth Arm) Ahead Right	U+O	62.8%	43.1	445	1343:1348	23.2	24.0
2/1	Erskine St (East Arm) Left	U	74.8%	43.7	325	1062	8.4	9.8
2/2+2/3	Erskine St (East Arm) Right Ahead	U+O	17.7%	24.4	92	1224:1224	1.5	1.6
3/2+3/1	Sussex St (Sth Arm) Ahead Left	U	88.5%	42.9	742	1722:1385	15.3	18.9
4/2+4/1	Erskine St (West Arm) Left Ahead	U	65.8%	28.7	347	1200:1200	6.8	7.7
4/3	Erskine St (West Arm) Right	O	84.4%	79.6	208	1239	5.0	7.4
5/1	Nth Exit - Sussex St Ahead	U	0.0%	0.0	257	Inf	0.0	0.0

5/2	Nth Exit - Sussex St Ahead	U	0.0%	0.0	646	Inf	0.0	0.0
6/1	East Exit - Erskine St	U	0.0%	0.0	224	Inf	0.0	0.0
7/1	Sth Exit (Sussex St)	U	0.0%	0.0	549	Inf	0.0	0.0
7/2	Sth Exit (Sussex St)	U	0.0%	0.0	567	Inf	0.0	0.0
8/1	West Exit - Erskine Ahead	U	0.0%	0.0	220	Inf	0.0	0.0
J3: TCS 305 - Shelley St - Erskine St	**-**	**-**	**80.3%**	**-**	**-**	**-**	**-**	**-**
1/2+1/1	Shelley St (Nth Arm) Left Ahead Right	O+U	5.3%	7.3	44	1309:1208	0.2	0.3
2/2+2/1	Erskine St (East Arm) Right Left Ahead	O+U	45.8%	25.3	220	1304:1272	1.5	1.9
3/1+3/2	Shelley St (Sth Arm) Ahead Right Left	U+O	80.3%	14.5	1088	1385:1395	6.6	8.6
4/1	Erskine St (West Arm) Left Ahead	U	9.9%	24.8	26	1204	0.3	0.4
4/2	Erskine St (West Arm) Ahead Right	O	7.2%	24.9	18	1150	0.2	0.3
5/1	Nth Exit - Shelley St Ahead	U	0.0%	0.0	249	Inf	0.0	0.0
5/2	Nth Exit - Shelley St Ahead	U	0.0%	0.0	0	Inf	0.0	0.0
6/1	East Exit - Erskine St Ahead	U	0.0%	0.0	351	Inf	0.0	0.0
6/2	East Exit - Erskine St Ahead	U	0.0%	0.0	204	Inf	0.0	0.0
7/1	Sth Exit - Shelley St	U	0.0%	0.0	56	Inf	0.0	0.0
8/1	West Exit - Erskine St	U	0.0%	0.0	527	Inf	0.0	0.0
8/2	West Exit - Erskine St	U	0.0%	0.0	9	Inf	0.0	0.0
J4: Sussex St - Napolean St	**-**	**-**	**78.8%**	**-**	**-**	**-**	**-**	**-**
1/1	Hickson Rd (Nth Arm) Left Ahead	U	37.3%	22.1	183	1385	2.0	2.3
1/2	Hickson Rd (Nth Arm) Ahead	U	45.2%	27.7	276	1722	4.5	5.0
2/1	Napolean St (East Arm) Left	U	70.3%	33.6	501	1634	12.4	13.6
2/2	Napolean St (East Arm) Right	O	51.0%	48.8	163	1724	4.3	4.8
3/1	Sussex St (Sth Arm) Ahead	U	28.2%	3.8	335	1722	2.4	2.6
3/2+3/3	Sussex St (Sth Arm) Ahead Right	U+O	78.8%	21.3	568	1722:1348	21.7	23.5

4/1	Nth Exit - Hickson Rd Ahead	U	0.0%	0.0	418	Inf	0.0	0.0
4/2	Nth Exit - Hickson Rd Ahead	U	0.0%	0.0	236	Inf	0.0	0.0
5/1	East Exit - Napolean St	U	0.0%	0.0	513	Inf	0.0	0.0
6/1	Sth Exit - Sussex St Ahead	U	0.0%	0.0	549	Inf	0.0	0.0
6/2	Sth Exit - Sussex St Ahead	U	0.0%	0.0	335	Inf	0.0	0.0
7/1	Car Park Egress Left Ahead	U	3.6%	49.8	8	1634	0.2	0.2
7/2+7/3	Car Park Egress Ahead Right	U	13.6%	64.4	17	1724:1722	0.5	0.6
J5: Hickson Rd - Globe St	**-**	**-**	**68.5%**	**-**	**-**	**-**	**-**	**-**
1/1+1/2	Hickson Rd (Nth Arm) Ahead Right	U+O	24.6%	15.7	190	1722:1800	2.0	2.2
2/1	Hickson Rd (Sth Arm) Left	U	45.0%	18.1	225	1196	3.8	4.2
2/2	Hickson Rd (Sth Arm) Ahead	U	68.5%	34.8	429	1722	9.0	10.1
3/1	Barangaroo (West Arm) Left	U	54.1%	29.3	293	1385	5.2	5.8
3/2	Barangaroo (West Arm) Right	U	63.4%	43.4	272	1348	7.0	7.9
4/1	Nth Exit - Hickson Rd	U	0.0%	0.0	722	Inf	0.0	0.0
5/1	Sth Exit (Hickson Rd) Ahead	U	0.0%	0.0	57	Inf	0.0	0.0
5/2	Sth Exit (Hickson Rd) Ahead	U	0.0%	0.0	402	Inf	0.0	0.0
6/1	West Exit (Barangaroo)	U	0.0%	0.0	228	Inf	0.0	0.0
J6: Lime St - Shelley St	**-**	**-**	**7.6%**	**-**	**-**	**-**	**-**	**-**
1/1	Shelley St (East Arm) Left Ahead	O	0.0%	0.0	0	1800	0.0	0.0
2/1	Shelley St (Sth Arm) Right Left	U	7.6%	1.1	144	1800	0.0	0.0
2/2	Shelley St (Sth Arm) Right	U	0.0%	0.0	0	1800	0.0	0.0
3/1	Lime St (West Arm) Ahead Right	O	6.5%	3.2	39	1600	0.0	0.0
4/1	East Exit (Shelley St) Ahead	U	0.0%	0.0	0	Inf	0.0	0.0
4/2	East Exit (Shelley St) Ahead	U	0.0%	0.0	0	Inf	0.0	0.0
5/1	Sth Exit - Shelley St Ahead	U	0.0%	0.0	39	Inf	0.0	0.0
6/1	West Exit - Lime St	U	0.0%	0.0	144	Inf	0.0	0.0
J7: Macquarie Carpark	**-**	**-**	**13.4%**	**-**	**-**	**-**	**-**	**-**

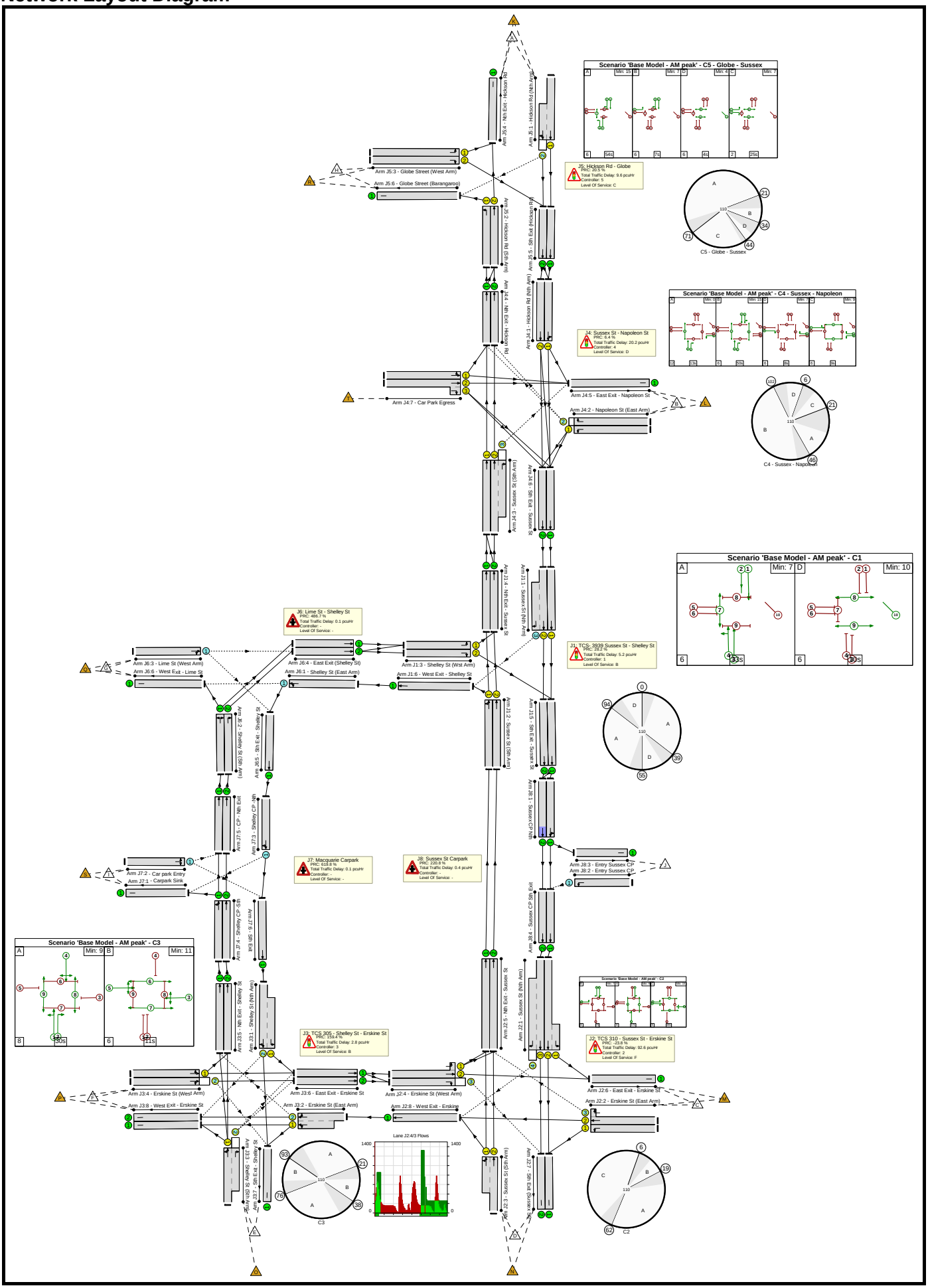
Basic Results Summary

User and Project Details

Project:	**R8 and R9 Residential Buildings**
Title:	
Location:	
File name:	PM Peak_With Exit_C3-C4-C5 & R8-R9.lsg3x
Author:	
Company:	ARUP
Address:	
Notes:	

Scenario 1: 'Base Model - AM peak' (FG1: 'Flow Group 1', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Network Results

Item	Lane Description	Lane Type	Deg Sat (%)	Av. Delay Per PCU (s/pcu)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Max. Back of Uniform Queue (pcu)	Mean Max Queue (pcu)
Network	-	-	**111.4%**	-	-	-	-	-
J1: TCS- 3939 Sussex St - Shelley St	-	-	**70.2%**	-	-	-	-	-
1/1	Sussex St (Nth Arm) Ahead	U	70.2%	8.6	608	1401	9.1	10.3
1/2+1/3	Sussex St (Nth Arm) Ahead Right	U+O	43.4%	6.9	382	1423:1338	2.2	2.6
2/1	Sussex St (Sth Arm) Ahead Left	U	25.8%	16.3	191	1196	4.9	5.0
2/2	Sussex St (Sth Arm) Ahead	U	44.3%	16.5	472	1722	10.8	11.2
3/1	Shelley St (Wst Arm) Left	U	0.0%	0.0	0	1670	0.0	0.0
3/2	Shelley St (Wst Arm) Right	U	0.0%	0.0	0	1440	0.0	0.0
4/1	Nth Exit - Sussex St Ahead	U	0.0%	0.0	191	Inf	0.0	0.0
4/2	Nth Exit - Sussex St Ahead	U	0.0%	0.0	472	Inf	0.0	0.0
5/1	Sth Exit - Sussex St Ahead	U	0.0%	0.0	608	Inf	0.0	0.0
5/2	Sth Exit - Sussex St Ahead	U	0.0%	0.0	382	Inf	0.0	0.0
6/1	West Exit - Shelley St Ahead	U	0.0%	0.0	0	Inf	0.0	0.0
J2: TCS 310 - Sussex St - Erskine St	-	-	**111.4%**	-	-	-	-	-
1/2+1/1	Sussex St (Nth Arm) Left Ahead	U	109.6%	229.7	505	920:1385	14.9	41.7
1/3+1/4	Sussex St (Nth Arm) Ahead Right	U+O	107.1%	185.8	485	920:1348	24.3	46.1
2/1	Erskine St (East Arm) Left	U	90.0%	65.4	369	920	10.4	14.2
2/2+2/3	Erskine St (East Arm) Right Ahead	U+O	18.8%	21.8	103	1224:1224	1.4	1.5
3/2+3/1	Sussex St (Sth Arm) Ahead Left	U	84.4%	46.1	589	1722:1385	11.6	14.2
4/2+4/1	Erskine St (West Arm) Left Ahead	U	44.0%	22.9	243	1200:1200	4.6	5.0
4/3	Erskine St (West Arm) Right	O	111.4%	304.1	224	1320	7.5	22.7
5/1	Nth Exit - Sussex St Ahead	U	0.0%	0.0	191	Inf	0.0	0.0
5/2	Nth Exit - Sussex St Ahead	U	0.0%	0.0	472	Inf	0.0	0.0
6/1	East Exit - Erskine St	U	0.0%	0.0	249	Inf	0.0	0.0

7/1	Sth Exit (Sussex St)	U	0.0%	0.0	806	Inf	0.0	0.0
7/2	Sth Exit (Sussex St)	U	0.0%	0.0	681	Inf	0.0	0.0
8/1	West Exit - Erskine Ahead	U	0.0%	0.0	119	Inf	0.0	0.0
J3: TCS 305 - Shelley St - Erskine St	**-**	**-**	**34.7%**	**-**	**-**	**-**	**-**	**-**
1/2+1/1	Shelley St (Nth Arm) Left Ahead Right	O+U	12.1%	6.9	116	1309:1208	0.5	0.6
2/2+2/1	Erskine St (East Arm) Right Left Ahead	O+U	31.2%	19.9	119	1304:1272	0.7	1.0
3/1+3/2	Shelley St (Sth Arm) Ahead Right Left	U+O	34.7%	8.3	404	1385:1395	2.1	2.3
4/1	Erskine St (West Arm) Left Ahead	U	21.7%	26.4	57	1204	0.7	0.9
4/2	Erskine St (West Arm) Ahead Right	O	27.9%	27.9	70	1150	0.9	1.1
5/1	Nth Exit - Shelley St Ahead	U	0.0%	0.0	79	Inf	0.0	0.0
5/2	Nth Exit - Shelley St Ahead	U	0.0%	0.0	0	Inf	0.0	0.0
6/1	East Exit - Erskine St Ahead	U	0.0%	0.0	262	Inf	0.0	0.0
6/2	East Exit - Erskine St Ahead	U	0.0%	0.0	205	Inf	0.0	0.0
7/1	Sth Exit - Shelley St	U	0.0%	0.0	53	Inf	0.0	0.0
8/1	West Exit - Erskine St	U	0.0%	0.0	138	Inf	0.0	0.0
8/2	West Exit - Erskine St	U	0.0%	0.0	29	Inf	0.0	0.0
J4: Sussex St - Napoleon St	**-**	**-**	**84.6%**	**-**	**-**	**-**	**-**	**-**
1/1	Hickson Rd (Nth Arm) Left Ahead	U	44.9%	18.4	288	1385	5.9	6.3
1/2	Hickson Rd (Nth Arm) Ahead	U	64.9%	48.3	518	1722	14.1	15.0
2/1	Napoleon St (East Arm) Left	U	58.7%	39.8	305	1634	7.8	8.5
2/2	Napoleon St (East Arm) Right	O	39.7%	46.2	119	1724	3.0	3.4
3/1	Sussex St (Sth Arm) Ahead	U	25.4%	2.7	302	1722	0.5	0.7
3/2+3/3	Sussex St (Sth Arm) Ahead Right	U+O	84.6%	47.3	361	1722:1348	23.2	25.8
4/1	Nth Exit - Hickson Rd Ahead	U	0.0%	0.0	357	Inf	0.0	0.0
4/2	Nth Exit - Hickson Rd Ahead	U	0.0%	0.0	84	Inf	0.0	0.0
5/1	East Exit - Napoleon St	U	0.0%	0.0	565	Inf	0.0	0.0

6/1	Sth Exit - Sussex St Ahead	U	0.0%	0.0	608	Inf	0.0	0.0
6/2	Sth Exit - Sussex St Ahead	U	0.0%	0.0	382	Inf	0.0	0.0
7/1	Car Park Egress Left Ahead	U	16.8%	53.2	35	1634	1.0	1.1
7/2+7/3	Car Park Egress Ahead Right	U	48.3%	72.7	68	1724:1722	2.0	2.4
J5: Hickson Rd - Globe	**-**	**-**	**74.7%**	**-**	**-**	**-**	**-**	**-**
1/1+1/2	Hickson Rd (Nth Arm) Ahead Right	U+O	74.7%	22.8	670	1722:1385	12.2	13.6
2/1	Hickson Rd (Sth Arm) Left	U	22.1%	8.0	132	1196	0.5	0.6
2/2	Hickson Rd (Sth Arm) Ahead	U	35.9%	10.3	309	1722	3.5	3.7
3/1	Globe Street (West Arm) Left	U	46.9%	34.8	189	1385	3.8	4.3
3/2	Globe Street (West Arm) Right	U	54.6%	49.2	174	1348	4.6	5.2
4/1	Nth Exit - Hickson Rd	U	0.0%	0.0	498	Inf	0.0	0.0
5/1	Sth Exit (Hickson Rd) Ahead	U	0.0%	0.0	169	Inf	0.0	0.0
5/2	Sth Exit (Hickson Rd) Ahead	U	0.0%	0.0	637	Inf	0.0	0.0
6/1	Globe Street (Barangaroo)	U	0.0%	0.0	170	Inf	0.0	0.0
J6: Lime St - Shelley St	**-**	**-**	**15.3%**	**-**	**-**	**-**	**-**	**-**
1/1	Shelley St (East Arm) Left Ahead	O	0.0%	0.0	0	1800	0.0	0.0
2/1	Shelley St (Sth Arm) Right Left	U	6.8%	1.1	123	1800	0.0	0.0
2/2	Shelley St (Sth Arm) Right	U	0.0%	0.0	0	1800	0.0	0.0
3/1	Lime St (West Arm) Ahead Right	O	15.3%	3.5	92	1600	0.0	0.1
4/1	East Exit (Shelley St) Ahead	U	0.0%	0.0	0	Inf	0.0	0.0
4/2	East Exit (Shelley St) Ahead	U	0.0%	0.0	0	Inf	0.0	0.0
5/1	Sth Exit - Shelley St Ahead	U	0.0%	0.0	92	Inf	0.0	0.0
6/1	West Exit - Lime St	U	0.0%	0.0	123	Inf	0.0	0.0
J7: Macquarie Carpark	**-**	**-**	**12.5%**	**-**	**-**	**-**	**-**	**-**
1/1	Carpark Sink	U	0.0%	0.0	14	Inf	0.0	0.0
2/1	Car park Entry Left Right	O	12.5%	3.1	82	1400	0.0	0.1
3/1	Shelley CP -Nth Right Ahead	O	5.8%	1.2	92	1600	0.0	0.0
4/1	Shelley CP -Sth Left Ahead	U	4.9%	1.2	79	1600	0.0	0.0