SYDNEY FOOTBALL STADIUM REDEVELOPMENT

STATE SIGNIFICANT DEVELOPMENT APPLICATION

Concept Proposal and Stage 1 Demolition

SSDA 9249

APPENDIX J:

Transport Impact Assessment (including Construction, Traffic and Pedestrian Management Plan)

NSW GOVERNMENT

Infrastructure New South Wales

Sydney Football Stadium Redevelopment

Transport Assessment Report | May 2018

ARUP

Infrastructure New South Wales

Sydney Football Stadium Redevelopment

Transport and Accessibility Strategy

Issue | 28 May 2018

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Executive Summary

Infrastructure New South Wales (INSW), on behalf of Sydney Cricket Ground Trust, is seeking approval for the redevelopment of Sydney Football Stadium located in the Sydney Cricket Ground Precinct. The proposal includes a new 45,000 seated stadium with new hospitality facilities and new basement for service vehicles.

Existing Environment

The site is located at 40-44 Driver Avenue, Moore Park. The site is located approximately 3km from the Sydney CBD and approximately 2km from Central Station, the site is connected to Sydney's transport network through existing bus routes and will benefit from a dedicated stop on the soon to be completed Sydney CBD and South East Light Rail (CSELR).

The current stadium has a seated capacity of approximately 45,000 people and is the home ground for three football codes as well as hosting other entertainment events.

Central Station is approximately 1.8km away from the entrance to the SFS, with major walking routes via Foveaux Street, Devonshire Street and Cleveland Street. Event buses run from Central Station and carry people directly into the Moore Park precinct, using the event bus loop located to the west of the SFS. Flinders Street acts as the key route for pedestrians walking from the Sydney CBD into Moore Park.

On the northern and eastern side of the stadium there are residential pockets with grid-like streets which are permeable for pedestrians. The recently opened Albert Tibby Cotter Walkway pedestrian bridge assists pedestrians accessing the stadium from the west via Moore Park West and Surry Hills.

By car the stadium is accessible by Driver Avenue which runs north- south on the western side of the SFS. Driver Avenue is accessed by Moore Park Road from the north and Lang Road from the south. This road is closed as a thoroughfare prior and during events and it used for car park entries and also pick up and drop off locations pre and post-match. There are a number of bus stops that service the stadium located along Anzac Parade and the eastern side of Moore Park Road.

Travel behaviour surveys were undertaken in person prior to the commencement of events to understand how people arrive to the SFS. Driving was the dominant mode of travel to SFS across each of the events surveyed, with between 43% and 66% of respondents arriving by car as a driver or passenger. There was an average of 2.7 people in each vehicle. Walking was common across all events, combining the complete journey made by foot or walking from Central Station with mode share between 10% to 20% for all events.

Surveys of people entering the precinct indicated that approximately 70% of people arrive to the SFS in the hour immediately prior to the start of the event.

Operational Transport Assessment

The travel demand is heavily influenced by the type of the event held. Consequently, several scenarios were assessed to represent a typical event (half capacity), peak event (full capacity) and double header (two peak events occurring within the precinct). Based on the transport mode under a range of different scenarios, the future transport network has the capacity to accommodate the expected travel demand to the SFS. As the stadium capacity will remain at 45,000, the peak travel demand will not increase compared to current conditions.

The opening of the CBD and South East Light Rail in 2019 will significantly improve public transport accessibility and further increase the attractiveness of public transport as a means of access to the SFS. Up to 11,000 passengers per hour can be accommodated on special event light rail services, which is a significant increase compared to the existing special event bus arrangements.

The walking network and experience from Central Station to the SFS via Devonshire Street will be significantly enhanced following the completion of the CBD and South East Light Rail in 2019. The pedestrian environment will include improved wayfinding, a more activated and legible evening route, upgraded footpaths, reduced traffic and a new pedestrian bridge over South Dowling Street.

The SFS redevelopment project does not propose to increase car parking in the precinct compared to existing levels. This policy of no additional car parking complements the strategy of promoting public transport, walking and cycling to access the stadium and reducing the reliance on private vehicles.

As the proposal does not involve any increase in stadium capacity, it is envisaged the volume of traffic on the road network on event days will reduce in future (compared to current levels) for the following reasons:

- The CBD and South East light rail will offer a significantly improved level of service for people travelling to the SFS by public transport.
- With the completion of the light rail, a significant number of bus routes that travel between the Sydney CBD and Moore Park will be discontinued.
- Greater promotion of sustainable transport modes

Travel Demand Management

The SFS redevelopment provides an opportunity to heavily promote to patrons, staff and visitors the sustainable modes of accessing the SFS and strongly encourage travel behaviour change. A suite of measures have been proposed to reduce the reliance of private vehicles as a means of accessing the SFS and promoting sustainable means of transport. These measures include:

- Increased number of bicycle parking for visitors throughout the precinct
- Secure bike parking and end of trip facilities (including showers and change rooms) for 5% of permanent SFS and precinct staff.
- Provision of new pedestrian and cyclist facilities on key travel routes, particularly the walking route between Central Station and Moore Park

- Development of a transport access guide for the Moore Park precinct.
- Updated travel information on the SCG Trust website.
- Working with ticketing agencies to provide customers with travel information to customers after they purchase their tickets online

Construction traffic and pedestrian management plan

A preliminary Construction Pedestrian and Traffic Management Plan (CPTMP) has been prepared for the demolition of the SFS. To ensure the safety of pedestrians and cyclists, the following measures may need to be put in place during the construction period.

- Minimising the level of construction activity on match days at the SCG. For major events no construction works may be possible
- Erection of hoardings, site fencing and gates at key locations
- Installation of signage indicating recommended pedestrian routes
- Maintaining safe crossings of Moore Park Road and Driver Avenue for pedestrians accessing the precinct
- Ensuring traffic controllers with appropriate accreditation are in place to hold construction vehicles at cross-over points and allow pedestrians to cross these work areas.

Further detail regarding additional measures for pedestrians and cyclists will be provided in the detailed Construction Pedestrian Traffic Management Plan, to be developed by the appointed contractor prior to the commencement of works on the site.

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1 Introduction

1.1 Purpose

This report supports a State Significant Development (SSD) Development Application (DA) for the redevelopment of the Sydney Football Stadium which is submitted to the Minister for Planning pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). A staged approach to the planning applications is proposed which includes:

- **Stage 1** – Concept Proposal for the stadium envelope and supporting retail and functional uses as well as development consent for the carrying out of early works, including demolition of the existing facility and associated structures.
- **Stage 2** – detailed design, construction and operation of the stadium and supporting business, retail and functional uses.

This report relates to the Stage 1 Concept DA and detailed Early Works package.

Infrastructure NSW is the Proponent for the Stage 1 planning application.

1.2 Background

The Sydney Football Stadium (SFS) is a significant component of the sports facilities that comprise the Sydney Cricket and Sports Ground (SC&SG). Completed in 1988, the SFS has hosted numerous sporting events in its 30 years of operation for a number of sporting codes including football (soccer), rugby league and rugby union as well as occasional music concerts.

In 2012, the NSW Government announced the *NSW Stadia Strategy 2012* which provided a vision for the future of stadia within NSW, prioritising investment to achieve the optimal mix of venues to meet community needs and to ensure a vibrant sports and event environment in NSW. A key component of the strategy included development of master plans for Tier 1 stadia and their precincts covering transport, integrated ticketing, spectator experience, facilities for players, media, corporate and restaurant and provision for entertainment. SFS is one of three Tier 1 stadia within NSW, the others being Stadium Australia (Olympic Park) and the Sydney Cricket Ground.

In order to qualify for Tier 1 status, a stadium is required to include:

- Seating capacity greater than 40,000;
- Regularly host international sporting events;
- Offer extensive corporate facilities, including suites, open-air corporate boxes and other function/dining facilities; and
- Be the home ground for sporting teams playing in national competitions.

Following release of the NSW Stadia Strategy, the Sydney Cricket and Sports Ground Trust (SCSGT) undertook master planning culminating in the 2015

Preliminary SCG Master Plan. This master plan defines the context for future redevelopment of the SCG, SFS and related sports infrastructure to ensure that the precinct continues to meet the needs and expectations of visitors and tenants into the future.

In a competitive national landscape, the existing Allianz Stadium (SFS) is now facing serious commercial and operational challenges to remain relevant and competitive. The SFS was constructed many years ago and therefore it fails to meet certain criteria for modern Tier 1 stadiums. The stadium has aged poorly and fails to meet expectations with regards to patron experience, crowd management, safety/security, accessibility, facilities for core tenants, operational efficiency, premium hospitality and food/beverage offerings and media requirements.

On 24 November 2017, the NSW Premier announced the redevelopment of the SFS into a world-class stadium with up to 45,000 seats. The redevelopment will include demolition of the existing facility and replacement with a modern, globally competitive stadium that achieves the requirements for a Tier 1 stadium to meet future requirements. Redevelopment of the SFS will assist in supporting the realisation of the Master Plan principles to:

- Create a flexible venue suitable for sports, e-sports and major events alike;
- Include technology for the future;
- Create a venue for the growth of men's and women's elite sport, as well as the ability to adapt to new sports and the rise of e-sports;
- Create a publicly accessible entertainment and recreational facility;
- Create a stadium integrated with its surrounds including Centennial and Moore Parks and the surrounding residential and business areas; and
- Create a sustainable future.

1.3 Secretary's environmental assessment requirements

The Department of Planning and Environment (DP&E) issued a list of the Secretary's Environmental Assessment Requirements (SEARs) which inform the Environmental Impact Statement (EIS). Table 1 lists the SEARs that are specific to transport and accessibility.

Table 1 Compliance with SEARs

SEARS	Sections addressed
Include a preliminary traffic and transport accessibility impact assessment, which includes details of, but is not limited to, the following:	
Accurate details of the current daily and peak hour vehicle, existing and future public transport networks, special event bus network and pedestrian and cycle movement provided on the road network surrounding the stadium on a typical weekday and weekend (event day) with consideration of simultaneous events within the Moore Park Precinct and parking occupancy on a typical weekday and weekend (event day);	Section 3
Indicate likely activities at the stadium, including type of events, number of events and capacity of the various type of events;	Section 3.1.5 Section 4.1
Details of estimated total daily and peak hour trips generated by the completed stadium including vehicle (including point-to-point transport), public transport, coaches, special event buses, pedestrian and bicycle trips based on surveys of comparable stadiums for concerts (including field and seated capacity), major events (full capacity), minor events (half capacity) and no event scenarios and the impact upon the surrounding road network with consideration of simultaneous events within the Moore Park Precinct;	Section 3.4, Section 4.1, Section 4.8
The adequacy of existing public transport or any future public transport infrastructure within the vicinity of the site including the Sydney Light Rail, pedestrian and bicycle networks and associated infrastructure, including future enhancements, to meet the likely demand for the future development;	Section 4.5, Section 4.5.4
The estimated future daily and peak hour trips and movements for each event scenario in the surrounding road network, including cumulative impact from nearby development, within and outside of the Moore Park Precinct, including from point to point transport and continued operation of special event buses;	Section 4.1, Section 4.8
The impact of trips generated (pedestrians, bicycle, public transport and motor vehicles) by the development on nearby intersections, with consideration of the cumulative impacts from other approved developments in the vicinity and simultaneous events within the Moore Park Precinct, and the need/associated funding for, and details of, upgrades or road improvement works, if required, supported by appropriate modelling and analysis to the satisfaction of RMS and TfNSW	Section 4.8
The identification of infrastructure required to ameliorate any impacts on transport efficiency and public transport operation (including the Sydney Light Rail and special event buses) and road safety impacts associated with the future development, including details on improvements required to affected intersections	Section 4.5, Section 4.5.4, Section 4.12
The impact of increased demand generated by operations of the stadium on the existing and future public transport network, pedestrian and bicycle networks and the adequacy of the network to cater for the development;	Section 4.1

SEARS	Sections addressed
Integration of the development with the existing/future public transport network including the Sydney Light Rail;	Section 4.5
Proposed future design measures to encourage worker and travel by public transport, walking, cycling and car sharing, including minimal on-site parking for spectator use and provision of adequate bicycle parking and end of trip facilities and improved connections between the stadium and public transport and pedestrian and bicycle networks, and, consideration of a Green Travel Plan;	Section 5
The proposed wayfinding strategy and associated infrastructure to support the movement of large crowds to and from public transport servicing the Moore Park Precinct (including from the CBD), special event buses, coach and point to point transport pick-up and drop-off locations, including consideration of signage height and illumination and decision points;	Section 4.3.2 Section 5.2
The proposed operational access arrangements, including internal circulation network (for motor vehicles, pedestrians and cyclists), and measures to mitigate any associated traffic and road safety impacts and impacts on the road network, public transport and pedestrian and cycle networks;	Section 4.2, Section 0
The impact of any proposed roads or driveways	No new roads / driveways are proposed
Access arrangements for emergency vehicles, including protocol procedures for emergency vehicles access to protected areas during emergencies	Section 3.9
Strategies to segregate hostile vehicles from public transport users (including paths between stadium and public transport) and areas of people congregation;	Section 4.12
Provisions of set-down/pick-up facilities for buses, coaches, taxis and ride-share vehicles for each event scenario;	Section 3.10, 4.6 and Section 4.12
Compliance with the relevant and Australian Standards for vehicle parking with accessible areas close to main entries incorporating lighting and passive surveillance;	Section 4.7.2
Service vehicle access, delivery and loading arrangements and estimated service vehicle movements (including vehicle type, routes and the likely arrival and departure times) including the potential for latent capacity in the development's loading and servicing facilities to be made available to third party logistics operators.	Section 4.9
A Transport Impact Assessment must be prepared that assess the transport impacts of Stage 1 works.	
Detail access arrangements for Stage 1 works and measures to mitigate any associated pedestrian, cyclist or traffic impacts, including the preparation of a Draft Construction Traffic and Pedestrian Management Plan (CTPMP) for Stage 1 works addressing but not limited to, the following:	
Assessment of cumulative impacts associated with other surrounding construction activities, including the Sydney Light Rail project;	Section 6.11
Detail of measures to mitigate any Stage 1 impacts to traffic, public transport, special event buses, pedestrian or cyclist within the Moore Park Precinct, including during concurrent events;	Section 6.11, 6.12 and Section 6.13
An assessment of road safety at key intersections and locations subject to heavy vehicle traffic movements and high pedestrian activity;	Section 6.11, Section 6.13

SEARS	Sections addressed
Details of Stage 1 works program detailing the anticipated duration and highlighting significant and milestones stages and events during the demolition process;	Section 6.4
Details of anticipated peak hour and daily vehicle movements to and from the site including details of vehicle size and heavy routes (including turn paths);	Section 6.5 and Section 6.6
Details of on-site car parking and access arrangements of construction vehicles, construction workers to and from the site, emergency vehicles and service vehicles, including measures to reduce construction worker private vehicle trips;	Section 6.7
Details of any crane locations and road closures;	Section 6.7 Section 6.14
Details of temporary cycling and pedestrian access during Stage 1;	Section 6.11
Details of a consultation strategy for liaison with surrounding stakeholders prior to and during the Stage 1 works.	Section 6.10

1.4 Scope of work

The objective of this traffic and transport assessment is to support the Stage 1 planning report by assessing and reporting the existing and future conditions. Specifically, the assessment includes the following:

- Parking environment
- Pedestrian and cycling routes
- Key roads into the precinct
- Existing performance of the key intersections providing access to the site
- Travel demand analysis, including existing and future mode share
- Typical current daily and peak hour movements of existing facility
- Public transport availability (standard bus routes and event buses)
- Arrangements for taxis and other point to point services
- Arrangements during construction
- Demolition traffic management during Stage 1 works

1.5 Report structure

This report has been structured into the following chapters:

- Chapter 2 provides a description of the proposal and site location;
- Chapter 3 details the existing stadium environment, including an overview of facilities, event management plan, active and public transport networks, summary of existing mode share, traffic volumes and operational performance of the road network
- Chapter 4 provides an operational assessment of transport and accessibility of the proposed stadium under typical and major event scenarios
- Chapter 5 outlines the strategies and monitoring mechanisms to reduce the private vehicle impacts arising from the proposed development
- Chapter 6 includes an assessment of traffic and transport impacts from the staged demolitions and removal of the existing stadium and ancillary infrastructure
- Chapter 7 summaries the key findings of the transport assessment

2 Description of the Proposal

2.1 Site location

The site is located at 40-44 Driver Avenue, Moore Park within the Sydney Cricket Ground Precinct. It is bound by Moore Park Road to the north, Paddington Lane to the east, the existing SCG stadium to the south and Driver Avenue to the west. The site is located within the City of Sydney local government area.

The site is legally described as Lots 1528 and 1530 in Deposited Plan 752011 and Lot 1 in Deposited Plan 205794. The site is Crown Land, with the SCSGT designated as the sole trustee under the *Sydney Cricket and Sports Ground Act 1978*. The site is wholly contained within designated land controlled by the Sydney SCSGT under Schedule 2A of the *Sydney Cricket and Sports Ground Act 1978*.

In a broader context, the site is largely surrounded by Centennial and Moore Parks, the Fox Studios and Entertainment Quarter precincts and the residential suburb of Paddington. Located approximately 3km from the Sydney CBD and approximately 2km from Central Station, the site is connected to Sydney's transport network through existing bus routes and will benefit from a dedicated stop on the soon to be completed Sydney CBD and South East Light Rail.

The locational context of the Site is shown in Figure 1 whilst the site boundaries and existing site features are shown in Figure 2.

Figure 1 Regional site context

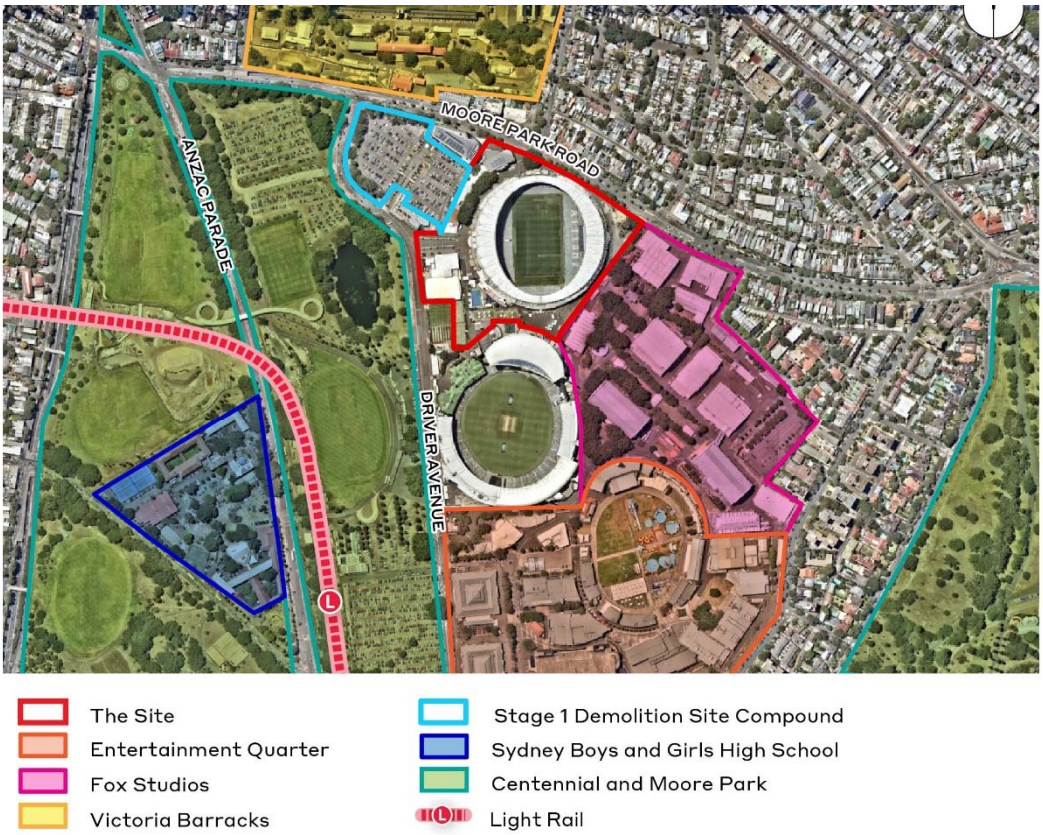


Figure 2 Site area and local context

2.2 The Proposal

The SFS Redevelopment Stage 1 application includes a Concept Proposal and Early Works package.

The Concept Proposal comprises:

- A new stadium with up to 45,000 seats on the site of the existing stadium including:
  - New facilities for general admission;
  - New playing pitch;
  - Hospitality facilities; and
  - Ancillary food and beverage and entertainment facilities
- New basement with service vehicular access for servicing and bump-in/bump-out.
- New public domain works surrounding the stadium, building on the venue's unique parkland setting.
- Urban Design and Public Domain Guidelines.
- Signage strategy.

Indicative concept building envelope plans are included within the Environmental Impact Statement for the project. These plans outline the extent of the proposed stadium building envelope and surrounding public domain to be included in the Stage 1 planning application.

From a capacity, operational and mix-of-use perspective, the new stadium will be consistent with the existing Allianz Stadium.

The Stage 1 Early Works comprises:

- Site establishment, including erection of site protection fencing and temporary relocation of facilities;
- Decommissioning and demolition of the existing stadium and associated structures including the existing Sheridan, Roosters and Waratahs buildings and the administration building of Cricket NSW to ground level and 'make safe' of the site;
- Use a proportion of the existing Moore Park 1 (MP1) car park for construction staging; and
- Make good of the site suitable for construction of the new stadium (subject to separate Stage 2 application).

The SFS Redevelopment will create a new stadium with up to 45,000 seats through a range of seating styles and corporate facilities. The stadium will include state of the art technology with new digital screens throughout to improve the fan experience. Sightlines will be improved and facilities including catering, amenities and accessibility will be designed to service future needs, creating a world-class customer experience befitting a global city such as Sydney.

3 Existing environment

3.1 Facilities

3.1.1 Overview

Figure 3 below illustrates the layout of the existing Sydney Football Stadium. The SFS was opened in 1988 and is one of the main sporting grounds for rugby league, rugby union and football events in Sydney. It is a Tier 1 multi-purpose outdoor sporting facility that can accommodate approximately 45,000 seated spectators. The 140m x 79m ground has nine entry/exit gates to two seating levels.

Source: https://www.scgt.nsw.gov.au/allianz-stadium/visit-us/stadium-map/

Figure 3 Stadium seating map

3.1.2 Access points

The SFS has two main access points on the northern side and on the western side of the stadium. The northern access point is located off Moore Park Road near the intersection of Regent Street. This entry point is stair access only, shown in Figure 4. The western access point is located off Driver Avenue, between the Rugby League and Cricket administration buildings as shown in Figure 5. The western access point generally accommodates a higher volume of pedestrians due to the location of the car parks, bus loop and Central Station to the west of the SFS.

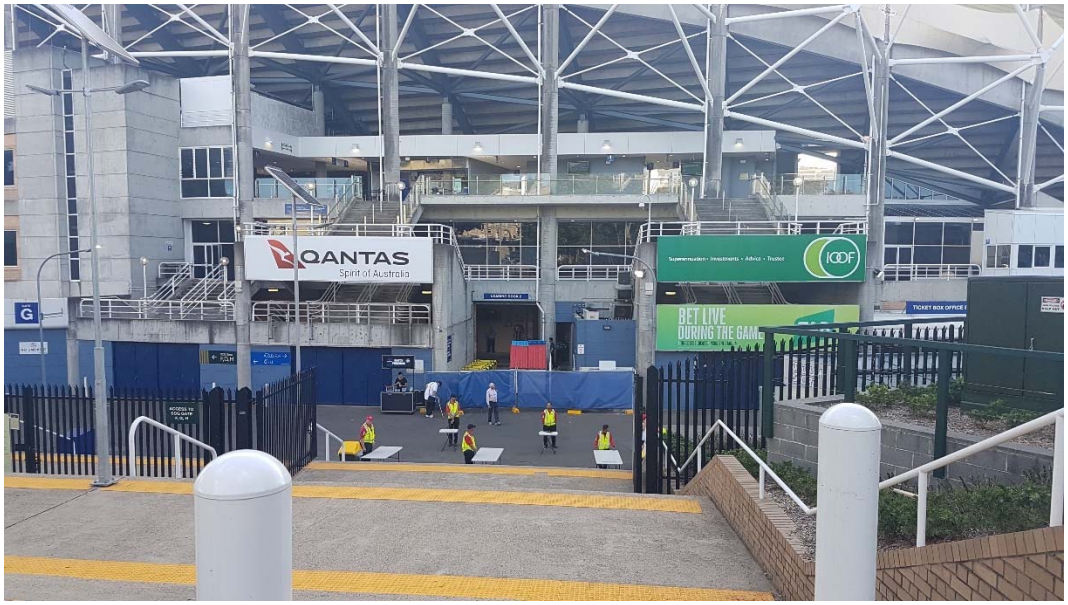


Figure 4 Northern access point off Moore Park Road

Figure 5 Western access point off Driver Avenue

In addition vehicular and pedestrian access is also provided to the Sheridan building which fronts Moore Park Road.

3.1.3 Workforce

The workforce at the SFS varies greatly between event and non-event days. There is approximately 130 full time staff on a regular day at the SFS. On event days there is up to 1,200 staff which includes stadium staff, security, police, first aid officers and precinct staff.

3.1.4 Hours of operation

Events are held at the SFS throughout the day and evening dependent on the calendar of the sporting code or concerts. Events must typically finish before 22:30 for both concerts & sporting events due to noise restrictions, however may continue until 23:00 if an occurrence beyond the control of the Trust delays the event.

3.1.5 Events

The SFS is a rectangular venue for rugby league, rugby union and soccer. The major tenants are Sydney Roosters (rugby league), NSW Waratahs (rugby union) and Sydney FC (soccer/football).

Table 2 shows the highest attended events recorded at Sydney Football Stadium since it was opened in 1988. The largest attendance was in 2017 at the Coldplay concert where 49,785 people attended.

Table 2 Highest attendances from past events

Date	Code	Event	Attendance
14/12/2017	Concert	Coldplay	49,785
13/12/2017	Concert	Coldplay	48,037
9/12/2015	Concert	Ed Sheeran	47,641
25/06/2016	Rugby Union	Wallabies v England	44,063
21/06/2014	Rugby Union	Wallabies v France	43,188
7/05/2017	Football	A-League Grand Final: Sydney FC v Melbourne Victory	41,546
25/04/2018	Rugby League	St George Illawarra Dragons v Sydney Roosters	41,142

3.2 Transport access overview

The stadium is relatively accessible being situated on the outskirts of the Sydney CBD. Directly south of the stadium is the Sydney Cricket Ground and The Entertainment Quarter.

Central Station is approximately 1.8km away from the entrance to the SFS, with major walking routes via Foveaux Street, Devonshire Street and Cleveland Street. Event buses run from Central Station and carry people directly into the Moore Park precinct, using the event bus loop located to the west of the SFS. Flinders Street acts as the key route for pedestrians walking from the Sydney CBD into Moore Park.

The South East Light Rail will open in 2019 has a dedicated stop serving the Moore Park sports and entertainment precinct connecting people travelling from Sydney CBD and Kingsford/Randwick.

On the northern and eastern side of the stadium there are residential pockets with grid-like streets which are permeable for pedestrians. The recently opened Albert Tibby Cotter Walkway pedestrian bridge assists pedestrians accessing the stadium from the west via Moore Park West and Surry Hills.

By car the stadium is accessible by Driver Avenue which runs north- south on the western side of the SFS. Driver Avenue is accessed by Moore Park Road from the north and Lang Road from the south. This road is closed as a thoroughfare prior to and during events and it used for car park entries and also pick up and drop off locations pre and post-match. There are a number of bus stops that service the stadium located along Anzac Parade and the eastern side of Moore Park Road.

Figure 6 summarises transport access to the existing SFS.

Figure 6 Integrated transport map

3.3 Event traffic management plan

All events held at the SFS require the development of a traffic management plan (TMP). The TMP outlines the strategy to ensure safe access to the site for staff and patrons arriving in all transport modes. This includes any staffing, barricading, gate closures, signage and marshalling required. The plan aims to minimise interruptions on general traffic flow on the surrounding road network.

Figure 7 and Figure 8 summarise key vehicle movement changes for ingress and egress TMP measures used for a regular event held at the SFS.

Figure 7 Event ingress TMP

Figure 8 Event egress TMP

3.4 Data collection

3.4.1 Overview

To better understand how people travel to the SFS, transport surveys were undertaken for a number of football codes. A summary of the data collected is shown in the Table 3.

Table 3 Summary of data collected

Type of Data	Method of collection	Event			
		NSW Waratahs (24.02.18)	Sydney FC (25.02.18)	Sydney Roosters (16.03.18)	Sydney FC (17.03.18)
Vehicle, pedestrian and bicycle counts	Counts at the following locations: Driver Avenue / Moore Park Road Anzac Parade / Moore Park Road Moore Park Road / Regent Street Anzac Parade / Lang Road Lang Road / Driver Avenue Landing of Tibby Cotter Bridge	✓	✓		
Parking counts	Counts at the following locations (access to car parking areas Entry to car park EP1 Entry to car park EP2	✓	✓		
Travel behaviour (mode share)	Interview surveys of patrons as they enter the stadium precinct. The surveys focus on mode of travel	✓	*	✓	✓

* Not undertaken due to inclement weather

3.4.2 Mode share

Travel behaviour surveys were undertaken in person prior to the commencement of each event. The number of people surveyed at each event is noted below:

Table 4 Summary of travel behaviour surveys

Football Code	Home Team	Date	# responses	% of total attendance
Rugby Union	NSW Waratahs	24.02.2018	877	18%
Rugby League	Sydney Roosters	16.03.2018	619	12%
Football	Sydney FC	17.03.2018	915	21%

The surveys were conducted at each of the entrance gates to the SFS, those being on the western side adjacent to Driver Avenue and on the northern side adjacent to Moore Park Road. The surveys were undertaken from the time the gates opened at the ground to the start of the match. Respondents were asked to nominate their mode of travel to the SFS. Figure 9 shows the mode share splits at the events.

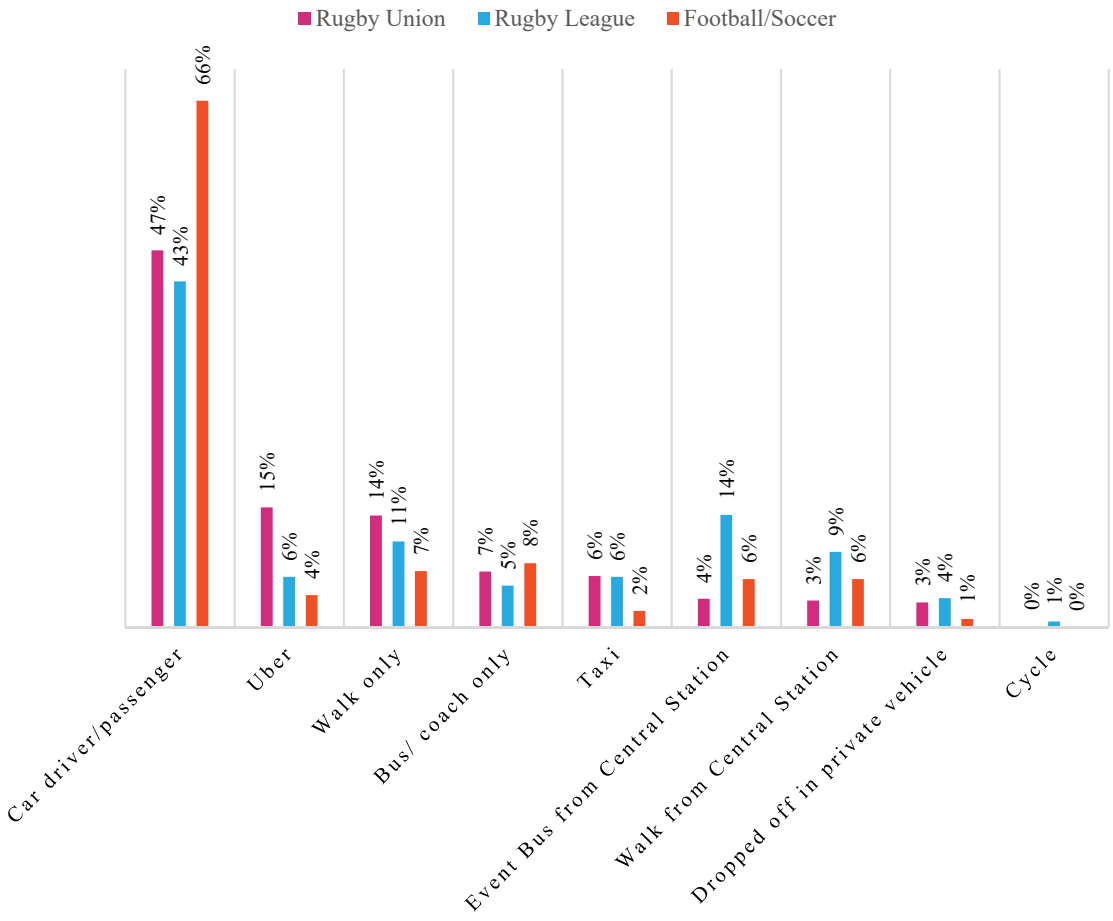


Figure 9 Mode share split for surveyed events

Driving was the dominant mode of travel to SFS across each of the events surveyed; 47% rugby union, 43% rugby league and significantly higher at football with 66% of people surveyed arriving by car as a driver or passenger. Car mode share was particularly high for the Sydney FC match due to the low attendance and opposition team outside of Sydney.

Point to point services which includes taxi and Uber together had a mode share of 21% for rugby union which was the second most common mode. For rugby league the second most common mode was 19% by bus. Walking was common across all events, combining the complete journey made by foot or walking from Central Station with mode share between 10% to 20% for all events.

3.4.3 Arrival profile

The pedestrian and vehicle arrival profile were obtained using the traffic and pedestrian counts that were undertaken on the 24th and 25th of February 2018. For both events the arrival profiles are relatively similar. The pedestrian arrival profile grows steadily from when the gates open up until kick off, as shown in Figure 10 and Figure 12. The results indicate that approximately 70% of people arrive to the match in the hour immediately prior to the start time.

Vehicle arrival shows there are more vehicle arriving initially after the gates open and less arrive closer to kick-off. This is reflective of people arriving earlier to secure a parking spot. The vehicle arrival profiles are shown in Figure 11 and Figure 13, and indicate a more distributed arrival profile when compared to people arriving by other modes of transport.

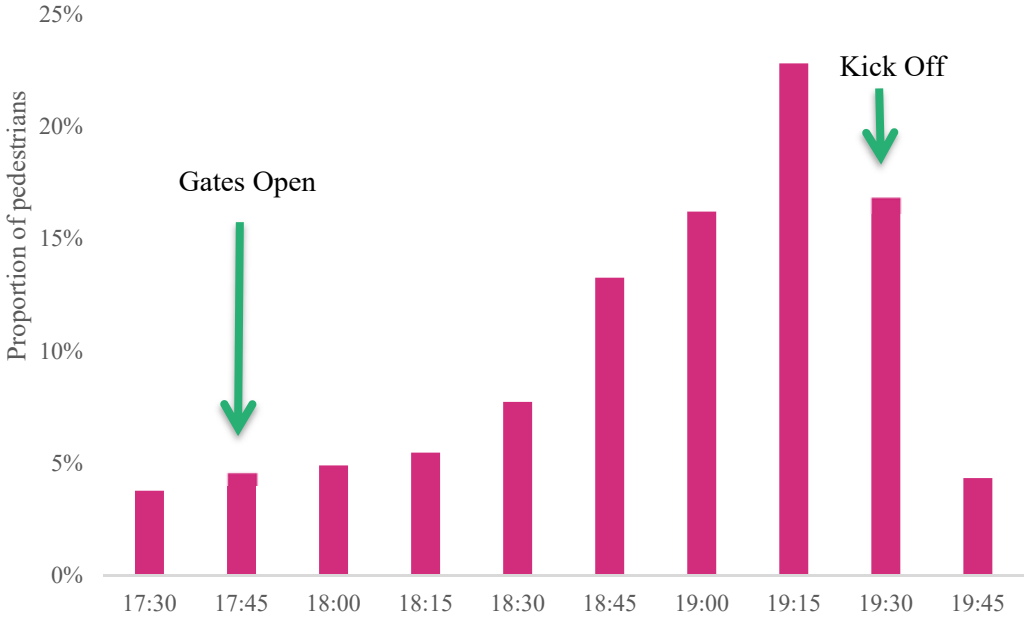


Figure 10 Rugby union pedestrian arrival profile

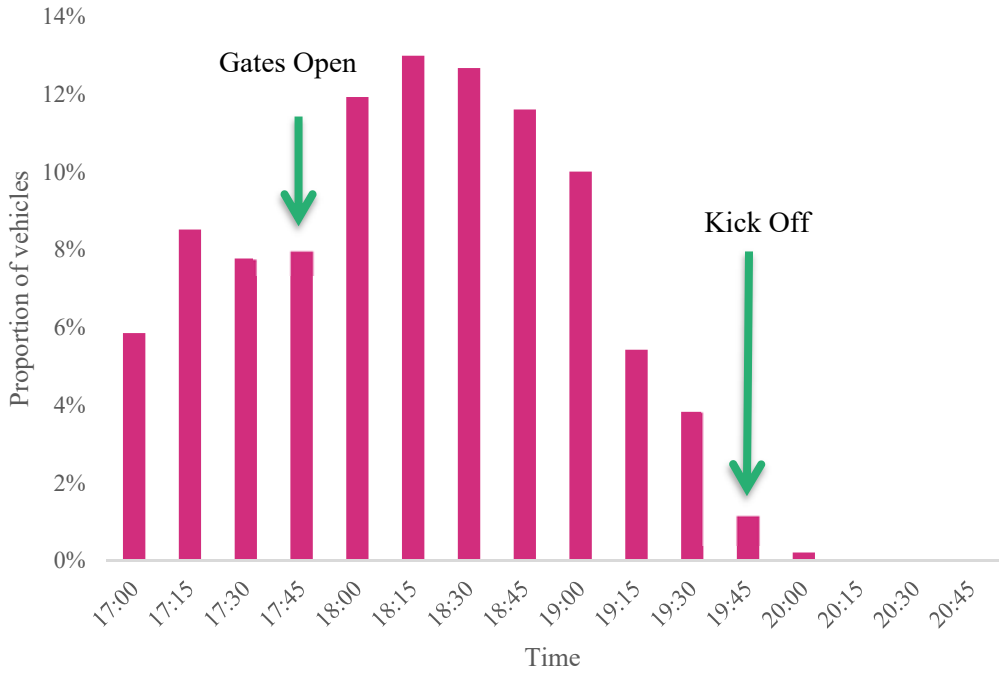


Figure 11 Rugby union vehicle arrival profile

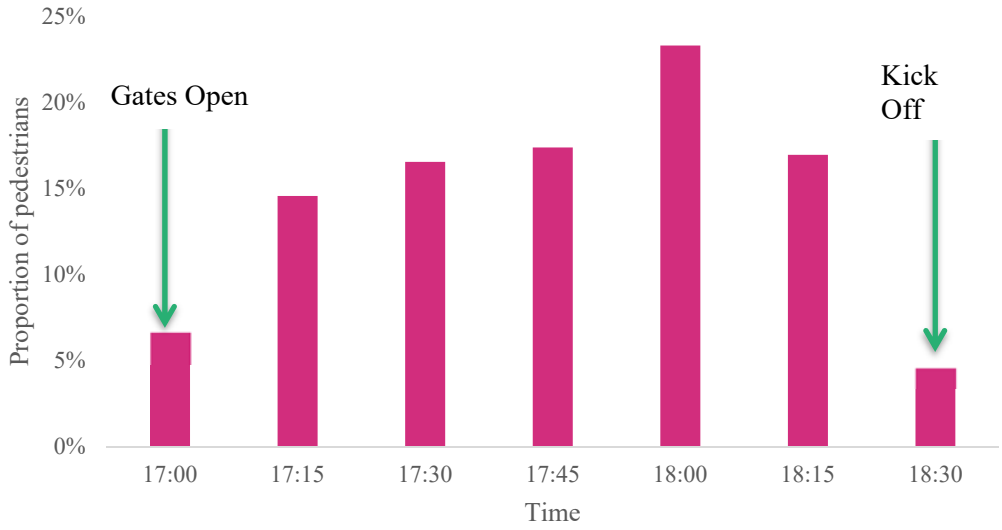


Figure 12 Soccer/football pedestrian arrival profile

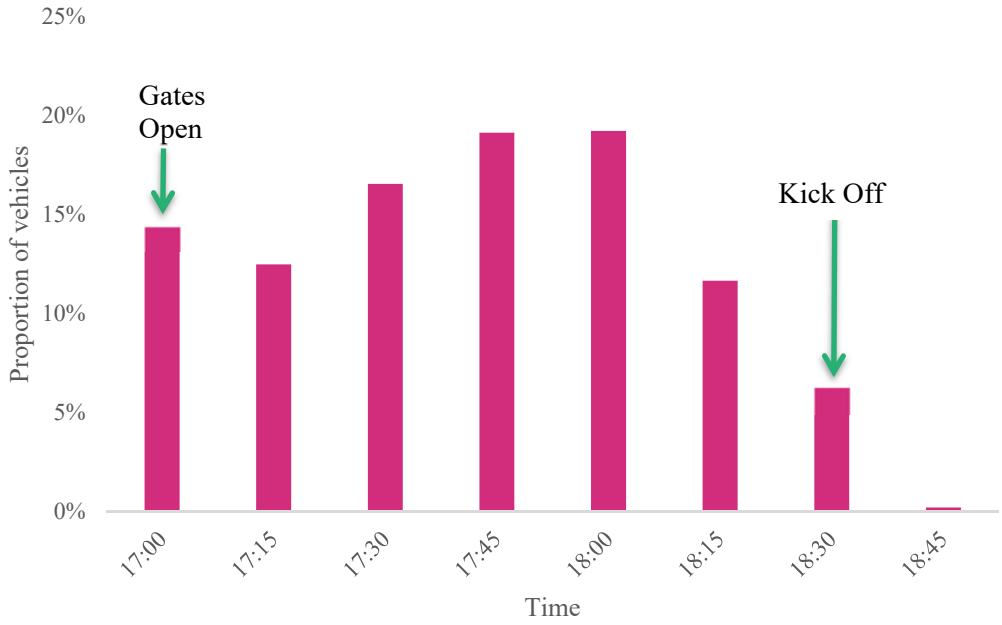


Figure 13 Soccer/football vehicle arrival profile

3.4.4 Vehicle occupancy

Vehicle occupancy of was captured in the travel behaviour survey. The values are based of patrons arriving to the stadium by a private vehicle as a passenger or driver. Results are summarised in Figure 14 and include:

- 90% of vehicles had two or more passengers
- 26% of vehicles four or more passengers
- The average vehicle occupancy was 2.70 people per vehicle.

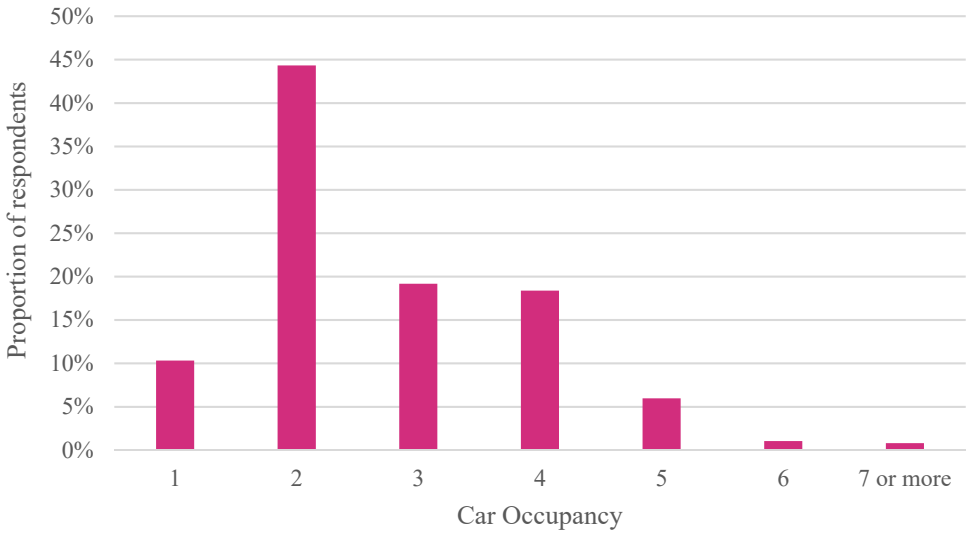


Figure 14 Vehicle occupancy

3.5 Walking

3.5.1 Pedestrian network

There is an extensive pedestrian network which connects the stadium to its surroundings. This network supports walking as a transport mode accessing the stadium, whether it is the whole trip being made by foot or it is the final leg of the journey from another transport mode. The pedestrian experience varies greatly across the precinct. Terrain surrounding the SFS is relatively flat to the north, east and south however approaching the stadium from the west it is relatively steep.

A popular way of travelling to the SFS is walking from the west from Central Station through Surry Hills. Pedestrians use several streets in Surry Hills to get to the stadium including:

- Foveaux Street and Fitzroy Street (~1.5km walk)
- Cooper Street and Arthur Street (~1.8km walk)
- Devonshire Street and Parkham Street (~ 1.8km walk)
- Elizabeth Street and Cleveland Street (~2.4km walk)

The key pedestrian routes to the SFS are highlighted in Figure 15.

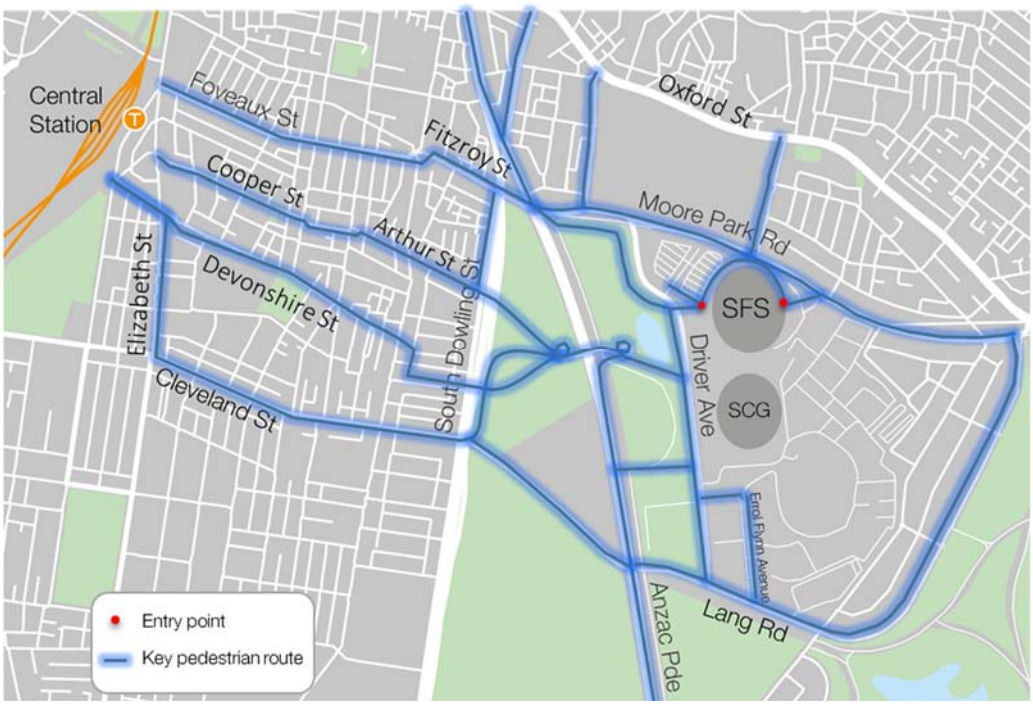


Figure 15 Existing key pedestrian routes

Currently the highest volumes of pedestrians are seen along Foveaux Street and Fitzroy Street, which is perceived by most people to be the quickest and most direct route. There are also a number of activated street frontages along this route, with people commonly stopping at venues on their way to or from events. Currently wayfinding signage directs people walking to Central via this route, with an example shown in Figure 16. The walking experience along this route however is not ideal due to the narrow footpaths in certain locations, high passing traffic flows as well as the crossings of major roads required of South Dowling Street and Anzac Parade. Further, this route directs people to 'Drivers Triangle' (intersection of Moore Park Road / Anzac Parade / Flinders Street) which is a major source of pedestrian and vehicle conflicts due to the lack of crossing facilities and minimal footpath space for the high volumes of pedestrians.

Figure 16 Wayfinding signage outside the SFS to Central Station

The pedestrian route via Devonshire Street is not currently heavily utilised due to the ongoing construction for the Sydney Light Rail project. There is also limited wayfinding, lighting and signage in the surrounding streets along this route, particularly in Moore Park West. Once completed, the route via Devonshire Street will be attractive to more people given the low traffic volumes, improved legibility due to the introduction of the light rail and grade separated pedestrian crossings of South Dowling Street and Anzac Parade (via the Albert Tibby Cotter Bridge). Devonshire Street would be the easiest walking route and was the key walking route during the 2000 Sydney Olympic Games.

The pedestrian experience through currently Moore Park East currently is poor due to limited lighting and not well defined footpaths.

The footpaths on the south west side of the stadium are mostly wide shared paths through parklands and open space which creates a pleasant pedestrian

environment. There is a shared path along Anzac Parade which provides access for a number of people accessing the stadium. The directional proportion of pedestrians arriving at the station is shown in Figure 17.

Figure 17 Direction of travel for people walking to the SFS

3.5.2 Pedestrian flows

Figure 18 and Figure 19 respectively show the pedestrian volumes towards the stadium in the hour prior to start of and immediately following the event on the 25th of February (Sydney FC). It highlights that the majority of pedestrians arrive to the stadium from the north-west through the Moore Park Road / Anzac Parade intersection. This is the result of Foveaux Street being the most common walking route from Central Station while light rail construction takes place on Devonshire Street. The relatively low usage of the Albert Tibby Cotter Bridge, particularly post match, indicates the requirement to improve wayfinding and lighting along this route.

Figure 20 and Figure 21 show the same movements during peak hour on a non-event day. These volumes are significantly lower, showing the main pedestrian activity in the precinct is generated on match days.

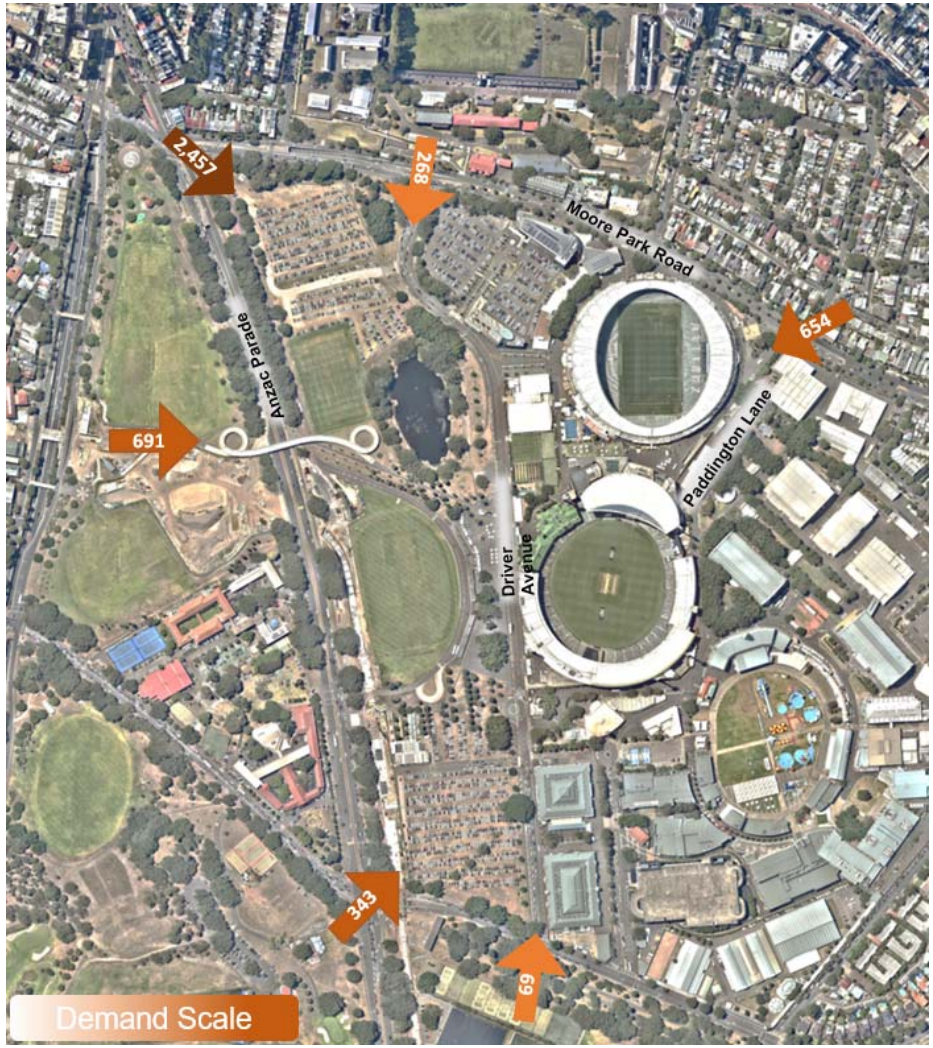


Figure 18 Pedestrian flows in hour prior to start of event (25th Feb)

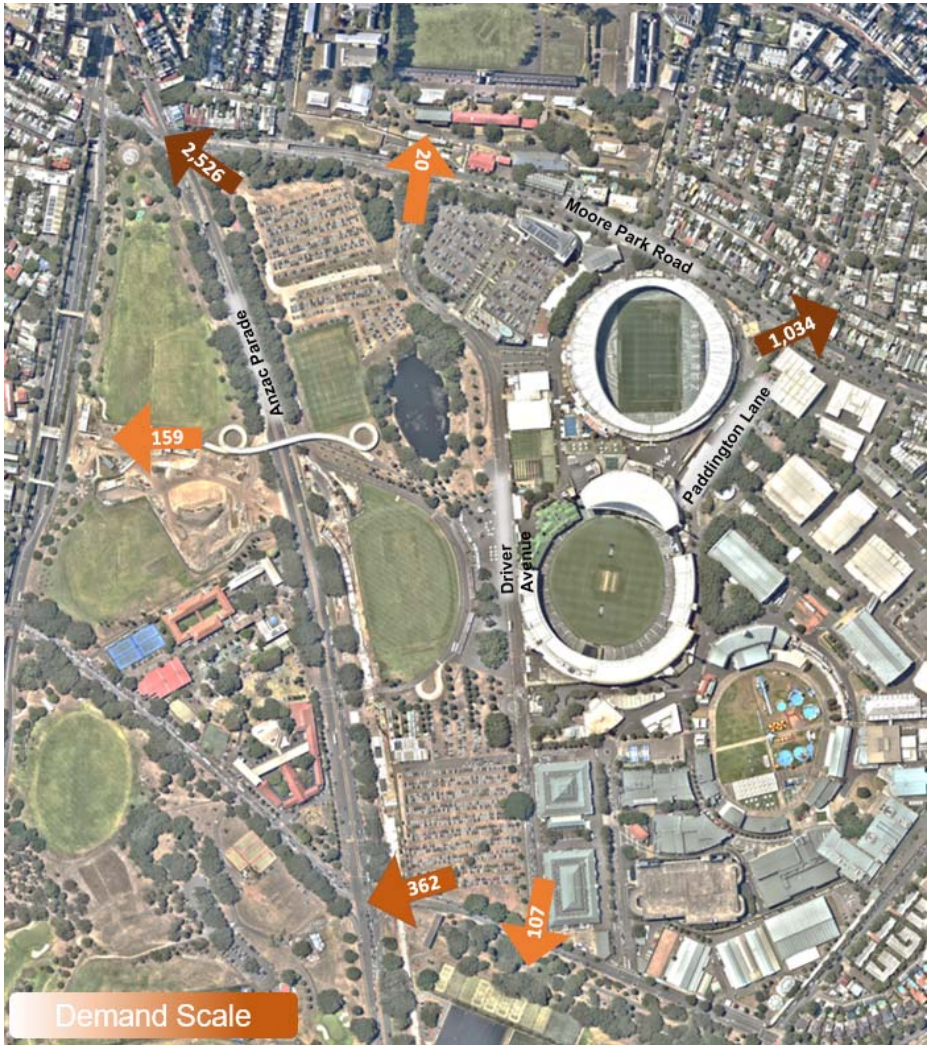


Figure 19 Pedestrian flows in hour following conclusion of event (25th Feb)

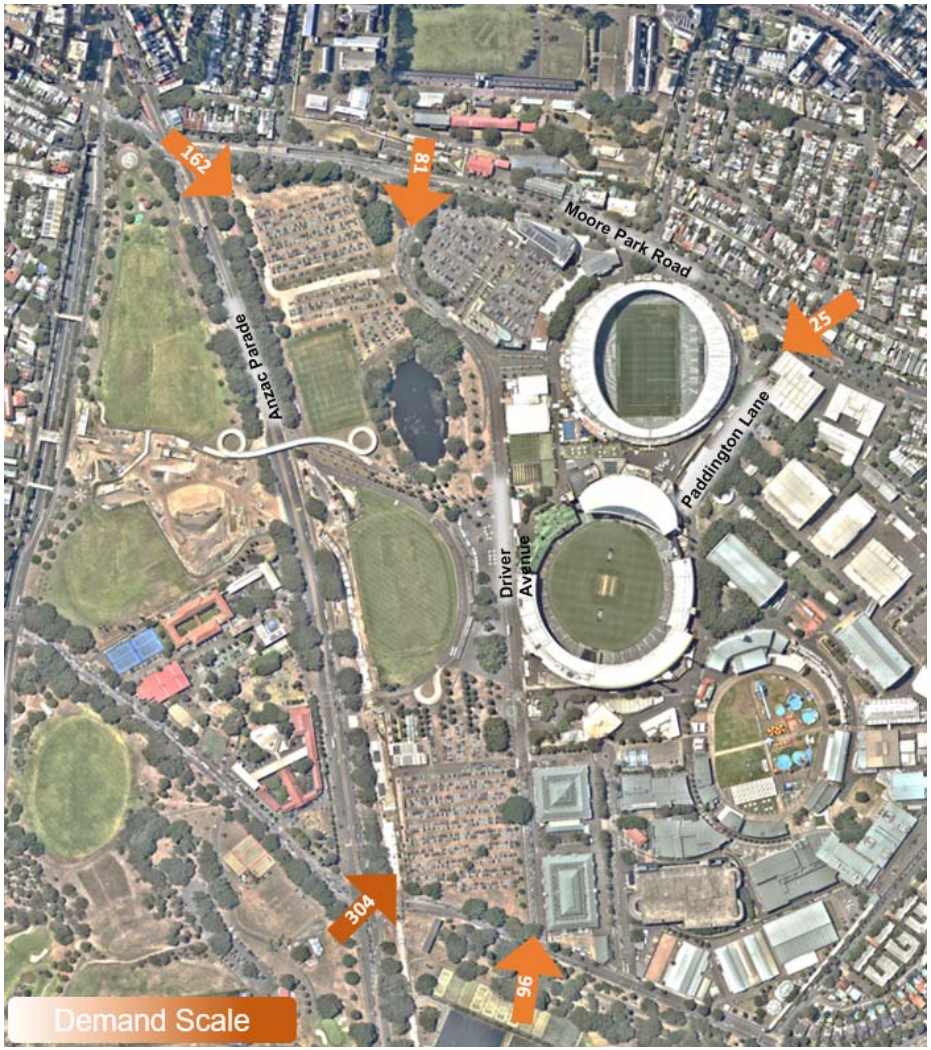


Figure 20 Pedestrian flows towards SFS on non-event day (5.30pm-6.30pm)

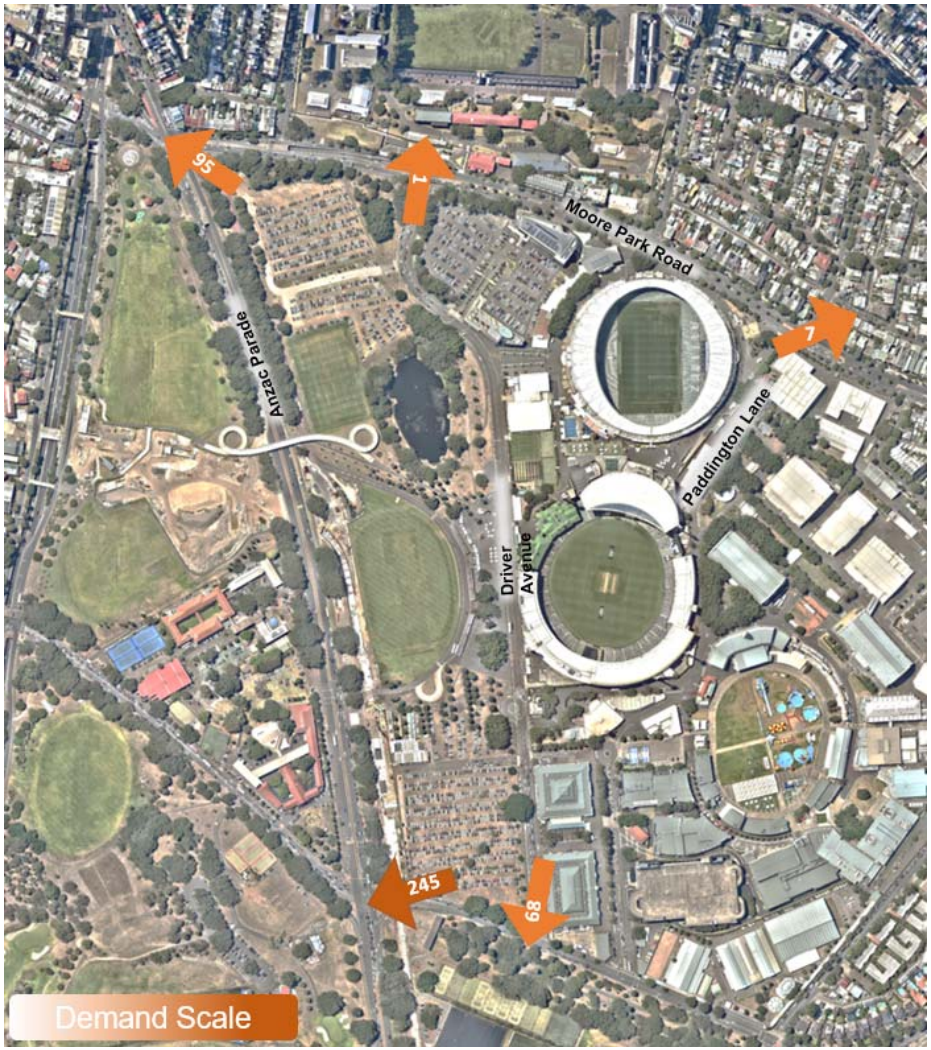


Figure 21 Pedestrian flows away from SFS on non-event day (5.30pm-6.30pm)

3.6 Cycling

The SFS sits within an extensive regional and local bicycle network. Figure 22 highlights cycle network and parking surrounding the SFS, and includes the following facilities:

- On-road bicycle lane provided on each side of Moore Park Road, providing a connection up to Oxford Street in Paddington.
- An off-road shared path along Anzac Parade which provides a key connection to the precinct from both the Sydney CBD and the south-east.
- An off-road shared path on the southern side of Lang Road, providing a connection into Centennial Park.
- An off-road shared path on the southern side of Cleveland Street, which provides a connection across South Dowling Street into Surry Hills and Redfern.
- An off-road shared path on the southern side of Fitzroy Street, providing a connection from Surry Hills.
- An on-road cycle lane on Greens Road, providing a connection from the SFS through to Paddington and Darlinghurst.

Figure 22 Cycle network around the SFS

There are a number of bicycle parking facilities in close proximity to the SFS which are used by people attending events. These are provided in close proximity to the entry points, with an example shown in Figure 23.

Figure 23 Bicycle parking at the SFS

3.7 Public transport

3.7.1 Rail

Central railway station is the closest station to the stadium, with pedestrian connections previously described in section 3.5. Sydney Trains often provides additional services, particularly for intercity Services, for major events at Moore Park. When there is scheduled track work that impact services in the CBD, TfNSW operates additional bus services from Moore Park to locations such as Wynyard or rail replacement buses.

3.7.2 Bus and coach

The SFS is serviced by both regular buses routes and special event buses, both operated by TfNSW. Key bus stops for SFS patrons are located along Anzac Parade, Lang Road and Oxford Street and the bus station at Moore Park East is for event shuttles. Bus routes servicing the station are described in the sections below.

TfNSW services

Bus stops along Anzac Parade are serviced by bus routes travelling between the Sydney CBD, Surry Hills and the eastern suburbs. Many of these routes are serviced by a bus only road that runs adjacent to Anzac Parade

Bus stops along Oxford Street are serviced by bus routes travelling between the city, Chatswood, Marrickville, Rozelle to Bondi Junction. These routes illustrated in Figure 24, and typically run at frequencies of between 5 and 30 minutes on weekdays.

Figure 24 Bus services surrounding the SFS

Event day services

Event shuttle bus services are a popular method of travelling to the station. The event bus services are operated to link patrons to the wider Sydney public transport network – in particular Central Station. Event buses use the Moore Park bus loop to pick up and drop off. The bus loop has a turnaround facility and has the capacity to host 26 buses at one time, and will continue to operate once light rail is completed however the number of services will be reduced.

Figure 25 Event bus loop

Depending on the event and geographic spread of the crowd (e.g. to the Northern Beaches or Sutherland Shire), event buses are also operated as charter services paid for by various codes. Route 1 shuttle operates between Central Station (departing Eddy Avenue) and Moore Park. After the event these shuttle services run for approximately one hour. The route runs from Central Station up Albion Street and into Anzac Parade. On departures Fitzroy Street and Foveaux Street is used to travel back to Central Station, as shown in Figure 26.

Coaches

Coaches currently use Moore Park Road and the southern end of Driver Avenue on event days to drop off and pick up passengers.

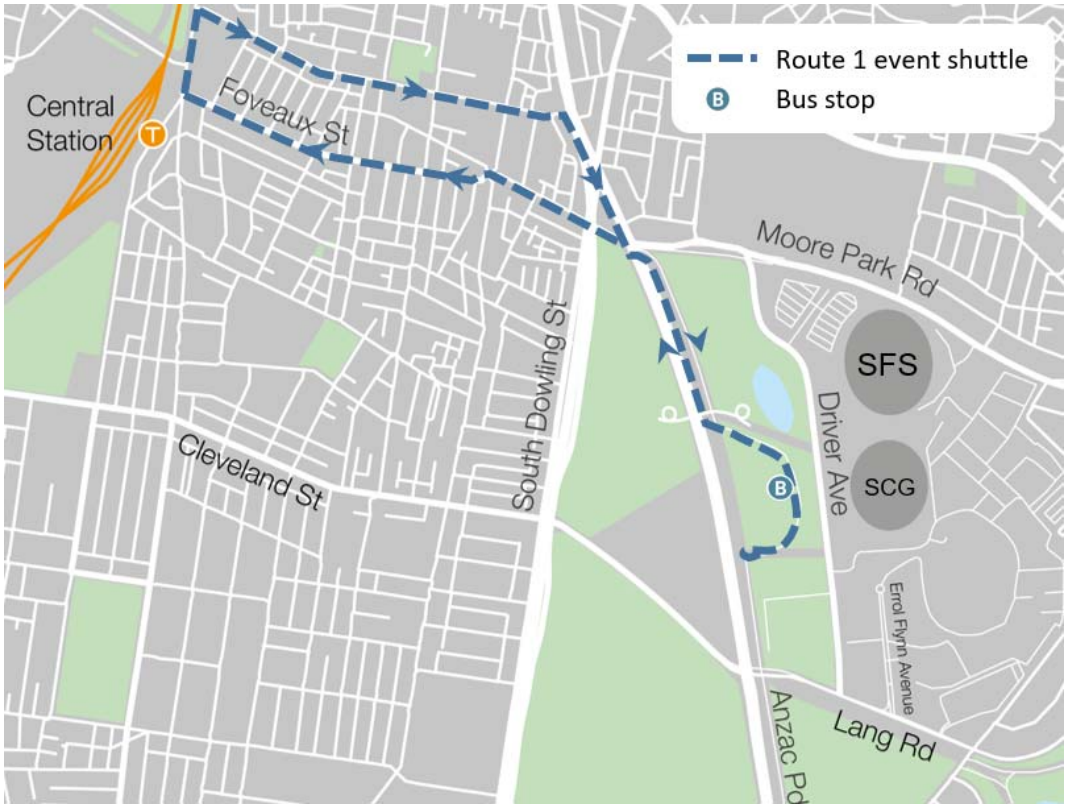


Figure 26 Route 1 shuttle service route

Figure 27 Route 1 special event bus

3.7.3 Integrated ticketing

Currently public transport is included in the price of admission for events hosted by the NSW Waratahs and Sydney FC. Other codes such as the Sydney Roosters and Sydney Swans are required to negotiate terms of potential integrated ticketing arrangements directly with Transport for NSW.

3.8 Vehicle access

3.8.1 Road network overview

Anzac Parade

Anzac Parade is classified as a state route which runs north-south to the west of the stadium. The road is three lanes in each direction and provides access to the Eastern Distributor tunnel as well as other key destinations. During peak school hours there are 40km/hour restrictions (8:00-9:30am and 2:30-4:00pm) outside Sydney Girls and Boys High School for both directions.

Moore Park Road

Moore Park Road is classified as a regional route on the northern side of the stadium, connecting Anzac Parade to Oxford Street in Paddington. It provides two lanes of traffic in each direction, with additional turning lanes at intersections. There is an eastern distributor exit east of the intersection of Moore Park Road and Anzac Parade. The speed limit is 50km/hour.

Lang Road

Lang Road is a local road on the southern and eastern side of the stadium. It connects Anzac Parade and Moore Park Road. The road is two lanes each way between Cook Road and Anzac Parade and one lane each direction between Cook Road and Moore Park Road. It is a key road to access the stadium from the south.

Driver Avenue

Driver Avenue is under the control of Centennial Park and Moore Park Trust, directly west of the stadium and is the road used to access some of the main parking facilities. It is one lane each way and connects Moore Park Road and Lang Road.

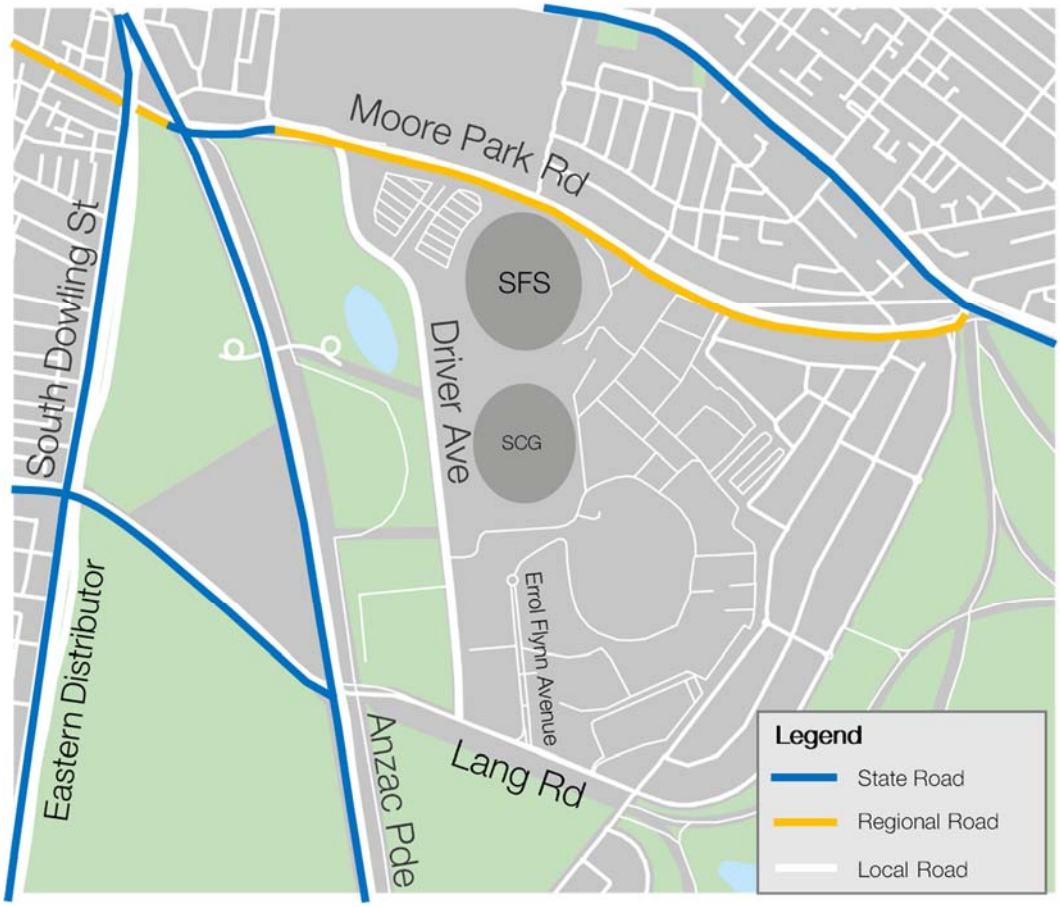


Figure 28 Road network classification

3.8.2 Site access

There are three primary access points to major car parks / drop off areas in the Moore Park precinct which service the SFS, as shown in Figure 29 . The northern end of Driver Avenue provides access to the EP2 car park with a right turn and the MP1 car park with a left turn. The south side of the precinct is accessible using Lang Road from both approaches, where vehicles can turn onto Driver Avenue to access EP3 or Errol Flynn Avenue for the Entertainment Quarter car park.

In addition, Paddington Lane is used before, during and after events which provides access for service vehicles into the stadium precinct.

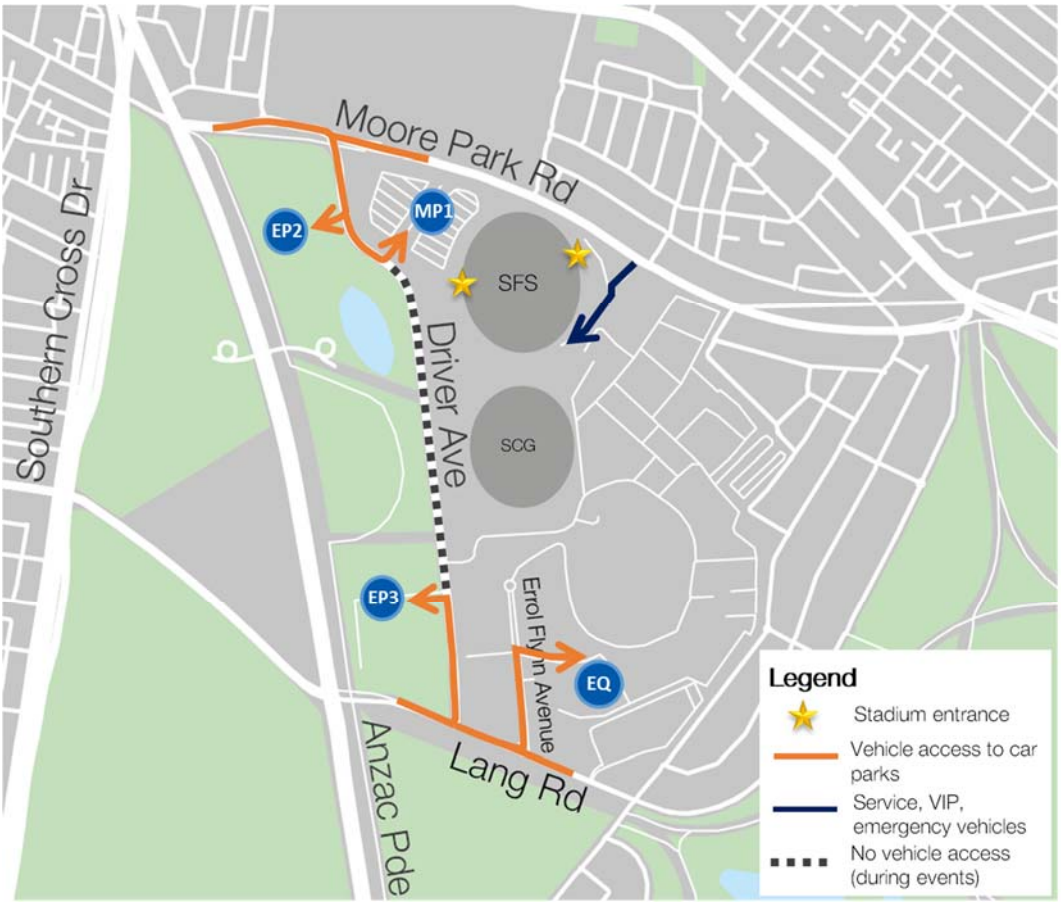


Figure 29 Vehicle access to Moore Park Precinct

3.8.3 Servicing

Service, VIP and emergency vehicles currently access the site using Paddington Lane on the eastern side of the stadium. Service vehicles are not permitted during events. No vehicles are permitted to access the laneway during events except VIP vehicles, team buses and emergency services.

3.8.4 Existing traffic volumes

Vehicle intersection counts were undertaken at key locations around the SFS for a four-hour period between 5:00pm-9:00pm on the 24th, 25th and 26th February; which are representative of ruby union game day, soccer game day and a non-event day respectively. The following figures show a comparison between movements for each day highlighting the movements towards the stadium pre-game and movements away from the stadium post-game.

Figure 30 and Figure 31 compare vehicle volumes a non-event day peak hour and the hour prior to kick off on an event day at the northern and southern end of Driver Avenue. There is more than double the amount of vehicle movements across the hour in an event day scenario and it should be noted Driver Avenue is closed as a thoroughfare before, during and after events. This comparison highlights that the main use of Driver Avenue is to access car parking and for drop off on event days.

Figure 32 and Figure 33 are the vehicle volumes at the surrounding intersections during the hour before the event. The key movements are shown highlighting the demand towards the stadium before the event and away from the stadium after the event. Figure 34 and Figure 35 show the same key movements highlighted during the peak hour on a non-event day. This comparison shows that the volumes of vehicles arriving to the stadium prior to a game is comparative to the volumes experienced during a weekday PM peak. Higher volumes are seen however along Lang Road.

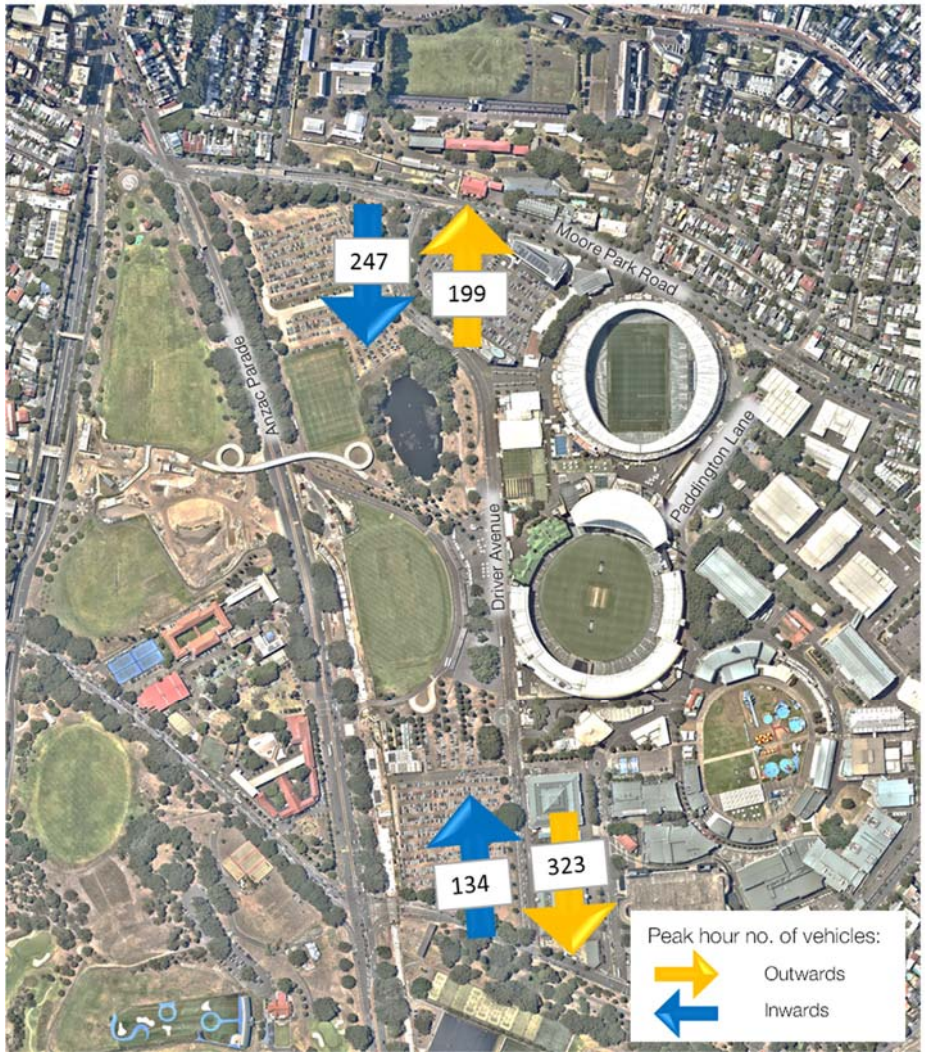


Figure 30 Vehicles using Driver Avenue on a non-event day

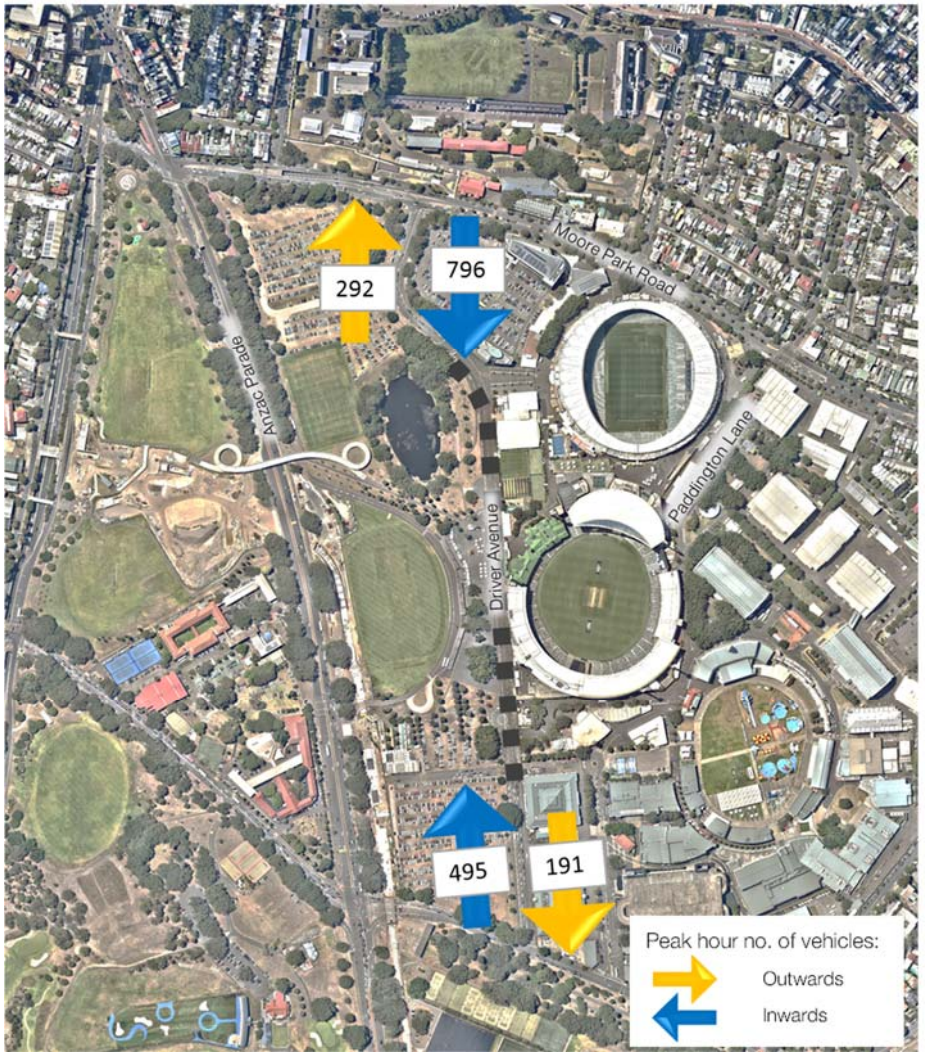


Figure 31 Vehicles using Driver Avenue on event day (25th February)

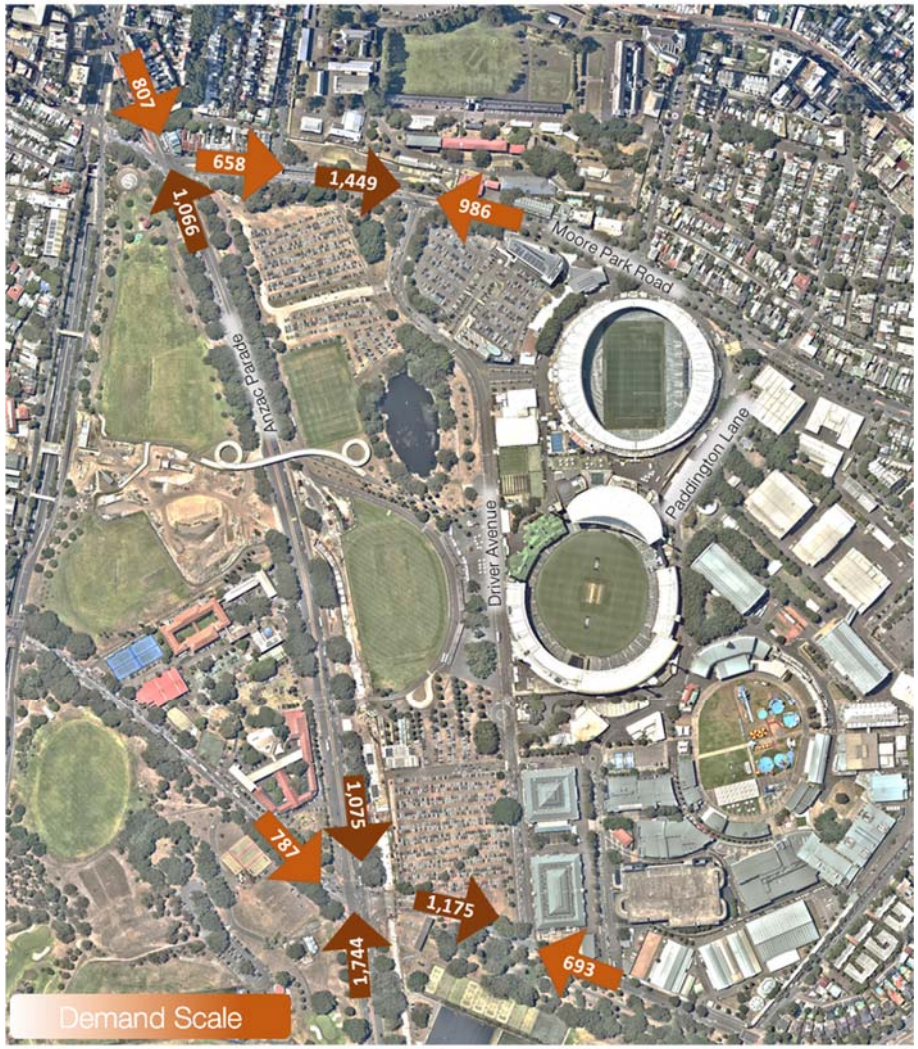


Figure 32 Intersection vehicle volumes hour before kick-off (25th February)

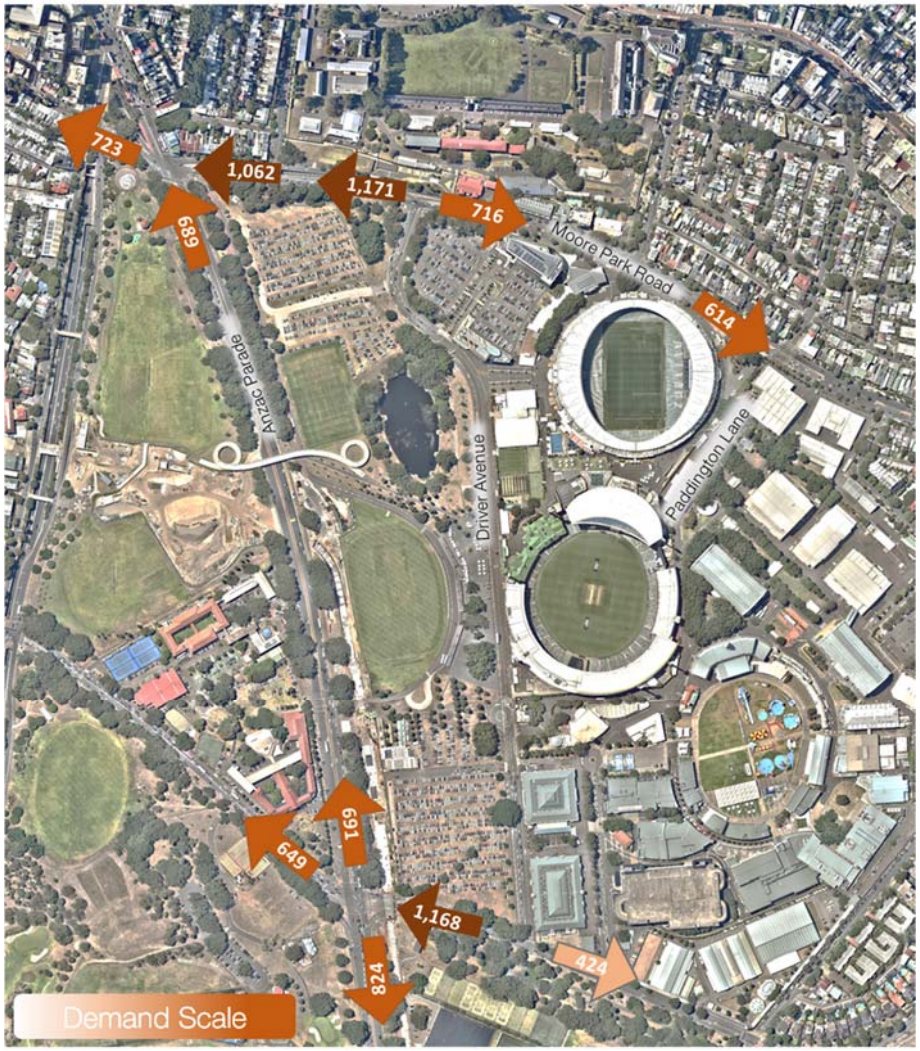


Figure 33 Intersection vehicle volumes hour after kick-off (25th February)

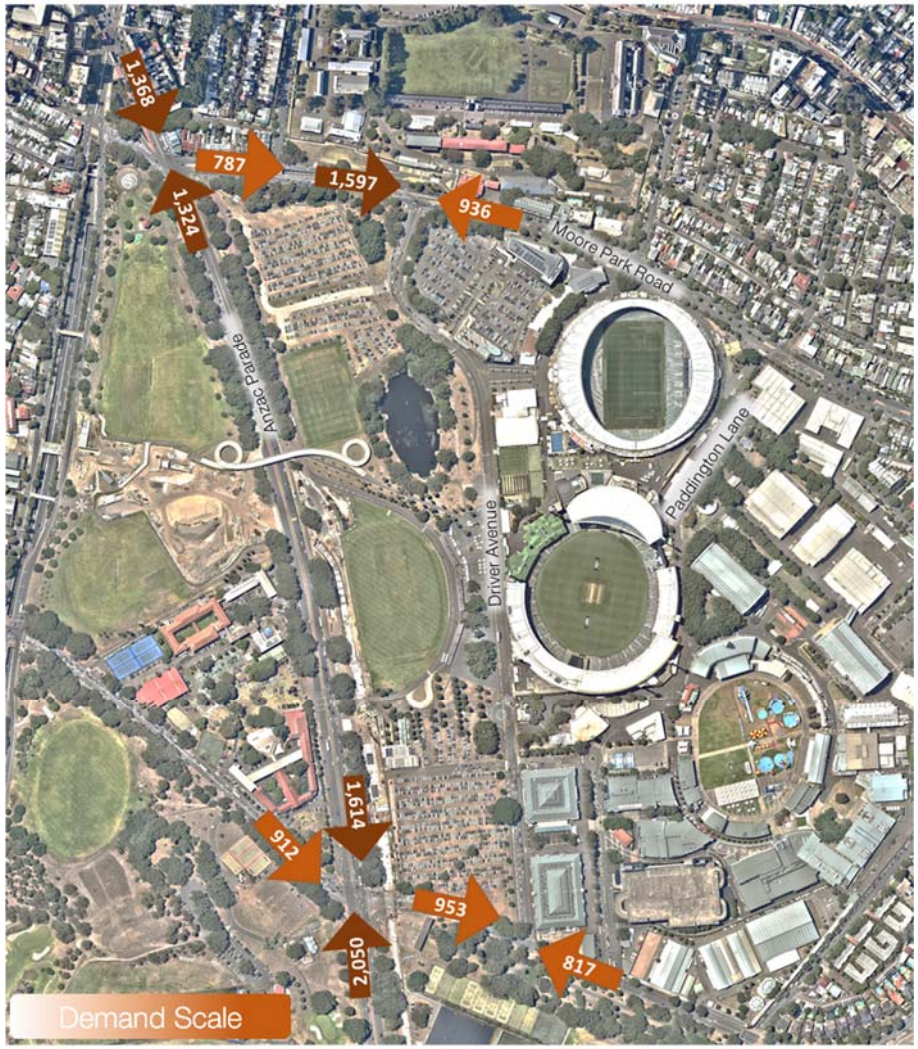


Figure 34 Non event day peak hour 5:30-6:30pm traffic flows (towards stadium)

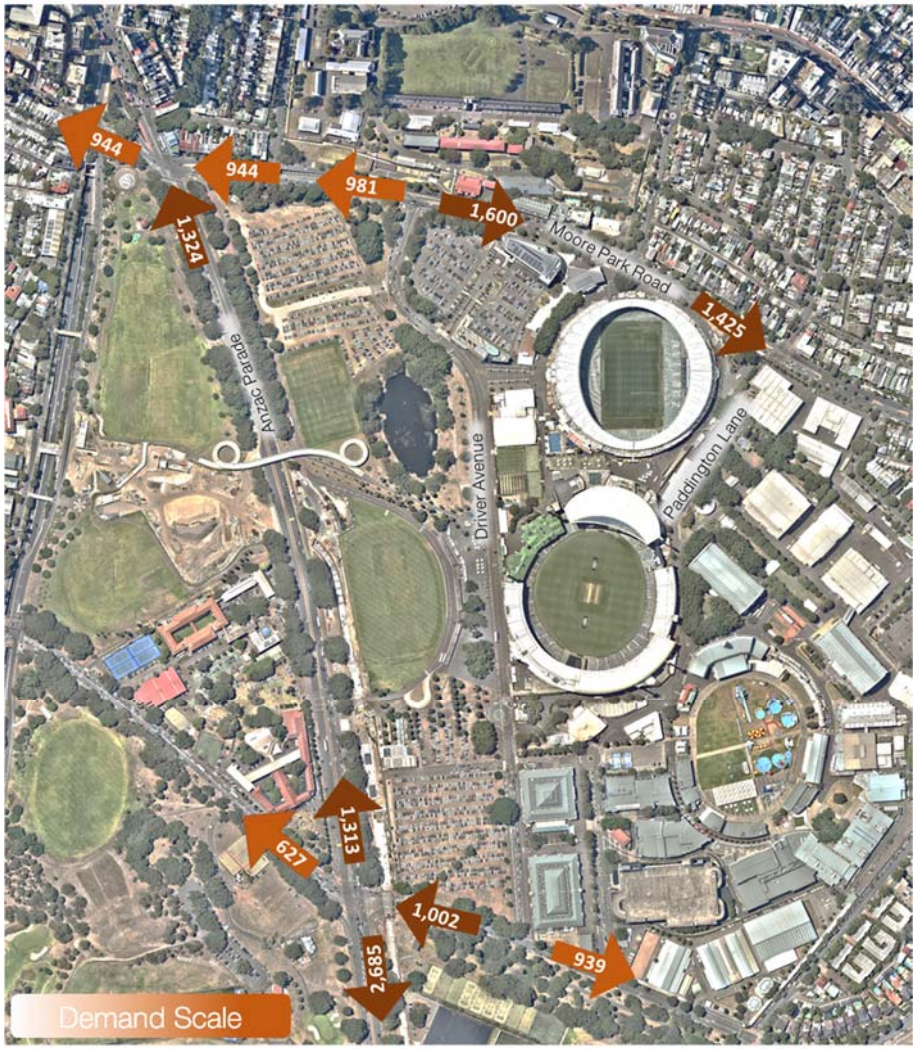


Figure 35 Non event day peak hour 5:30-6:30pm traffic flows (away from stadium)

3.8.5 Road network performance

An assessment of the existing network performance was undertaken using SIDRA intersection modelling software. The models were built using SIDRA (v7) intersection modelling software and the performance assessed using the following metrics:

- **Level of service (LoS):** LoS expresses how well the intersection is performing overall. The score ranges from A (free flow, excellent conditions) to F (long delays, queues are not clearing each cycle).
- **Degree of saturation:** Degree of saturation measures the ratio of the actual volume to the capacity of the intersection.
- **95th percentile back of queue:** A 95th percentile queue length is the length of the queue that is only exceeded 5% of the time.

The SIDRA modelling was based on traffic volume counts carried out at the dates and times shown in Table 5.

Table 5 Traffic Counts

Day	Date	Event	Peak Hour Modelled
Saturday	24/02/18	Rugby Event	6:30PM - 7:30PM
Sunday	25/02/18	A-League Event	5:30PM – 6:30PM
Monday	26/02/18	Non-event day	5:00PM – 6:00PM

The SIDRA results were calibrated via site inspections of queue lengths and the modelling results are summarised in the following tables and figures. Full SIDRA modelling outputs are provided in Appendix A.

Table 6 SIDRA Intersection Performance (24th February 2018)

Intersection	24/02/18		25/02/18		26/02/18	
	DoS	LoS	DoS	LoS	DoS	LoS
Moore Park Road & Driver Avenue	0.81	B	0.82	B	0.67	A
Moore Park Road, Anzac Parade, Flinders Street, M1 & Fitzroy Street	0.76	B	0.74	B	0.80	B
Moore Park Road & Regent Street	0.87	B	0.88	B	0.78	A
Anzac Parade, Cleveland Street & Lang Road	0.87	C	0.76	C	0.94	D
Lang Road & Driver Avenue	0.78	B	0.80	B	0.73	A

Figure 36 Intersection Performance Overview

The intersections were found to generally perform acceptably during the surveyed periods. The Anzac Parade / Lang Road intersection typically approaches capacity with queues of over 100m on both the Anzac Parade south and north legs. Certain legs of the intersection were found to be busy prior to the events, particularly the right turn from Anzac Parade into Lang Road which people use to access the event day car parks for the SFS.

On standard weekdays the performance of these intersections can be significantly influenced by traffic conditions at downstream and upstream intersections – particularly the Alison Road / Anzac Parade intersection. The modelled queue length on a normal weekday for Anzac Parade (northern leg) was found to be over 300m which is fairly typical for the area.

3.9 Servicing

Service vehicles currently access the site using Paddington Lane on the eastern side of the stadium. Service vehicles are not permitted during events. No vehicles are permitted to access the laneway during events except VIP vehicles, team buses emergency services.

3.10 Point to point transport

Pre-event set down spaces for taxis and private vehicles are currently provided in the north and south, on the eastern side of Driver Avenue. These areas are monitored by event staff to ensure vehicles keep moving. Post-event vehicles that are picking up passengers are not allowed to enter Driver Avenue, this is to improve pedestrian safety and assist in clearing the car park. The only dedicated post event private vehicle pick-up area is on Errol Flynn Avenue adjacent to the Entertainment Quarter, however these vehicles may get caught in congestion due to vehicle existing car parks. Informal private vehicle pick-up occurs on the southern side of Moore Park Road.

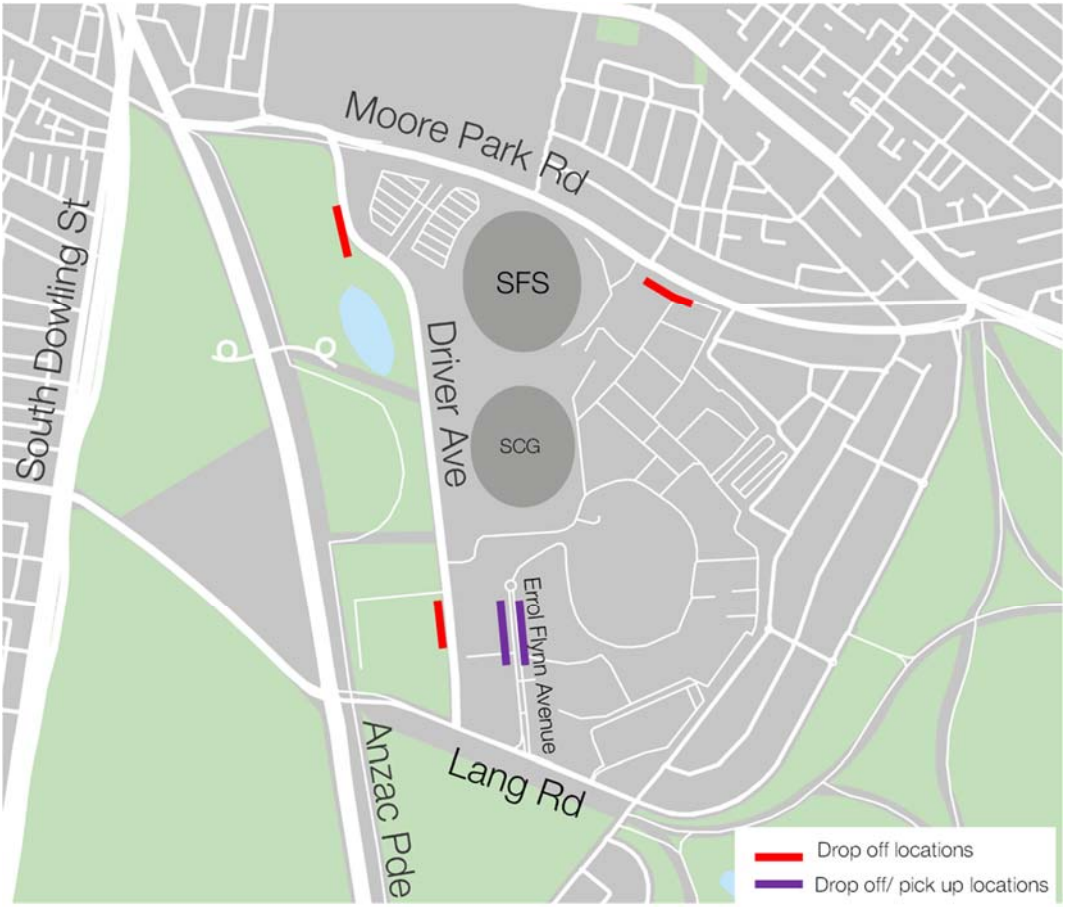


Figure 37 Point to point locations

3.11 Parking

Currently there are approximately 5,450 car parking spaces in the precinct for events days. A summary of car parking facilities at the SFS is shown in Table 7 and Figure 38.

Table 7 Car parking facilities at Sydney Football Stadium

Car Park Name	Approx. No. of Spaces	Entrance	Event Day Only/ Permanent	Management
MP1	600	Driver Avenue	Permanent	SCG Trust
EP2 (Kippax)	1000	Driver Avenue	Event day only	Centennial Park and Moore Park Trust
EP3 (Showground)	1100	Driver Avenue	Event day only	Centennial Park and Moore Park Trust
Entertainment Quarter carpark	2,000	Lang Road	Permanent	Entertainment Quarter
Sydney Boys and Sydney Girls High School	750	Cleveland Street	Selected events	Sydney Boys and Sydney Girls High School

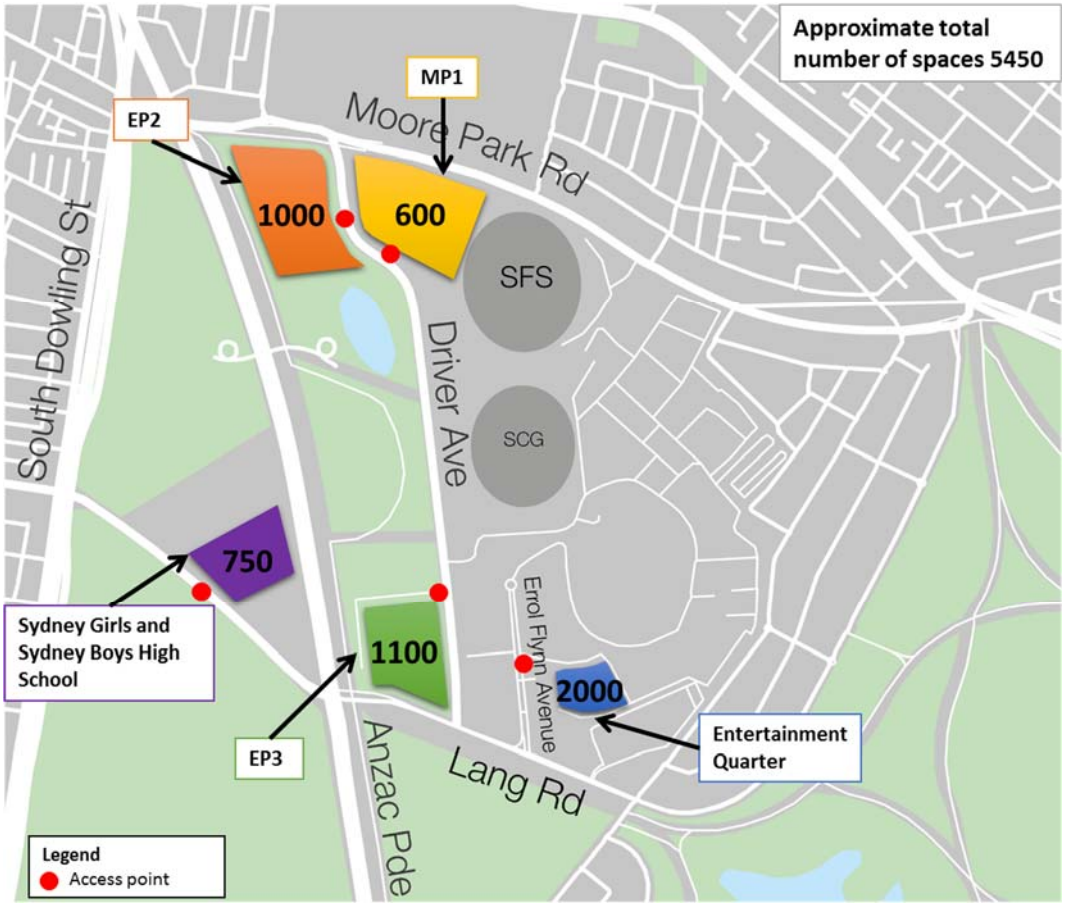


Figure 38 Car parking locations

3.12 Precinct coordination

Given the number of stakeholders with an interest in the Moore Park precinct, the Moore Park Transport Working Group was established to better coordinate transport activities in the precinct. This group includes representatives of the following organisations:

- Transport for NSW (Sydney Coordination Office)
- Roads and Maritime
- SCG Trust
- Australian Turf Club
- City of Sydney Council
- Botanic Gardens & Centennial Parklands

4 Operational Transport Assessment

4.1 Travel demand

It is anticipated that an average of 49-52 events per year will be undertaken at the redeveloped SFS. This will include:

- Rugby Union
- Rugby League
- Football (soccer)
- Concerts
- Major international events e.g. Commonwealth Games, FIFA.

Attendance at the redeveloped stadium is anticipated to increase by up to 15 percent. The redeveloped stadium will also off the opportunity to support new sporting product supported via:

- Professionalisation of the women's game in football, rugby and rugby league
- Introduction of AFL X, AFL on rectangular pitch

Based on the findings of the travel behaviour surveys undertaken, as well as the likely change in transport modes associated with future transport infrastructure (e.g. light rail), future year mode share and associated travel demands to the SFS have been estimated. This has been completed for the following scenarios:

- Typical event (half venue capacity)
- Major event (full venue capacity)
- Concert mode at SFS
- Double header with concurrent start time (full event at both SCG and SFS)

The travel demands forecast are based on available capacities of various transport modes in the hour prior to the start of the event – noting that the data collection as part of this study determined that approximately 70% of people arrive in the hour prior to the start of the event. Should the start times for the double header event be staggered, the light rail mode share has the capacity to increase from that stated.

It should be noted that the transport mode share for events can vary based on a number of factors, including the type of event, start time, weather, opposition team location etc. Patrons will actively shift their mode and time of travel based on these factors. The analysis does however indicate that the future transport network has the capacity to accommodate the expected travel demand to the SFS under a range of different scenarios.

As the stadium capacity remains unchanged from current conditions, the peak travel demand on the transport network will not increase due to the proposal. The proposal does involve a small increase in the number of event day staff to support the improved food and beverage offer and better corporate facilities. However the travel period for staff does not coincide with the peak travel periods for spectators, given staff are required to arrive prior to the gates opening and leave well after the conclusion of the event. Therefore the small increase in event day staff has been considered and will not change the number of movements of people during the peak travel periods for events at the SFS.

Table 8 Current and forecast for future mode share split for spectators

Game Details	**Stadium**	**Existing Stadium**						**Proposed Stadium**							
	Scenario	Half Full		Peak Event		Concert		Half Full		Peak Event		Concert		Double header	
	Year	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.
	Attendance	22,500		45,000		55,000		22,500		45,000		55,000		95,000	
Mode Choice	Driver / passenger	46.0%	10,350	33.0%	14,850	33.0%	18,150	43.0%	9,675	31.0%	13,950	31.0%	17,050	17.0%	16,150
	Dropped off in private vehicle	3.0%	675	3.0%	1,350	8.0%	4,400	3.0%	675	3.0%	1,350	8.0%	4,400	3.0%	2,850
	Taxi/Uber	13.0%	2,925	13.0%	5,850	16.0%	8,800	13.0%	2,925	13.0%	5,850	16.0%	8,800	13.0%	12,350
	Train to Central & walk	7.8%	1,755	16.0%	7,200	12.0%	6,600	5.0%	1,125	7.0%	3,150	7.0%	3,850	21.8%	20,710
	Special event Bus	10.0%	2,250	11.0%	4,950	7.0%	3,850	0.0%	-	0.0%	0	0.0%	-	5.0%	4,750
	Light Rail	0.0%	-	0.0%	-	0.0%	-	15.8%	3,555	22.0%	9,900	15.8%	8,690	15.0%	14,250
	Walk Only	14.0%	3,150	17.0%	7,650	17.0%	9,350	14.0%	3,150	17.0%	7,650	17.0%	9,350	17.0%	16,150
	Bus/ coach	6.0%	1,350	6.8%	3,060	6.8%	3,740	6.0%	1,350	6.8%	3,060	5.0%	2,750	8.0%	7,600
	Cycle	0.2%	45	0.2%	90	0.2%	110	0.2%	45	0.2%	90	0.2%	110	0.2%	190
Total		**100.0%**	**22,500**	**100.0%**	**45,000**	**100.0%**	**55,000**	**100.0%**	**22,500**	**100.0%**	**45,000**	**100.0%**	**55,000**	**100.0%**	**95,000**

4.2 Stadium access and circulation

The development of the SFS provides a significant opportunity to create a permeable open space available to the public. The full extent of the public domain surrounding the stadium will be accessible day-to-day with a range of different security lines and zones on event days.

The arrival experience will be significantly enhanced under the proposal, with more space provided for both entry/egress as well as circulation. In particular, the Moore Park Road entry point will be widened to create a more inviting environment with greater capacity. It is the intention the final design provides for greater permeability, allowing for improved pedestrian connectivity between Moore Park Road and Driver Avenue.

Wayfinding should be clear and direct people to the Moore Park Road frontage for bus access on Oxford Street. Wayfinding should direct patrons and visitors to Driver Avenue for access to trains, light rail and buses.

Further details regarding the stadium access and circulation strategy will be provided in the Stage 2 Planning Application.

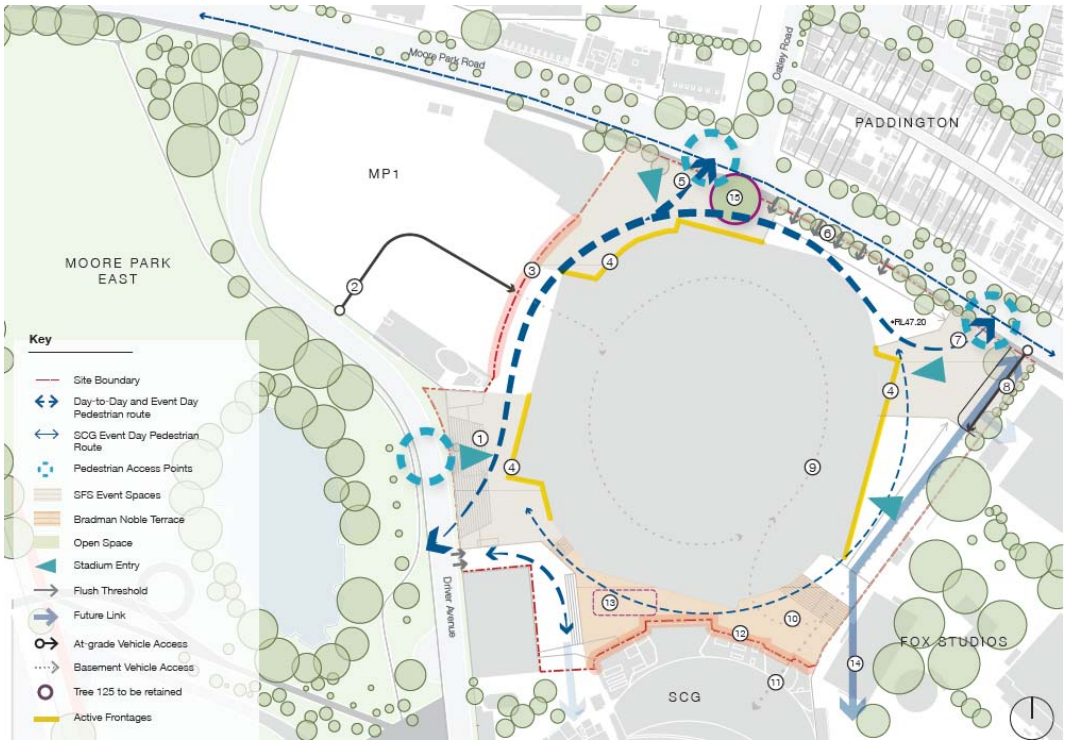


Figure 39 Stadium access and circulation

4.3 Walking

4.3.1 Pedestrian network

The walking network and experience from Central station to the SFS will be significantly enhanced following the completion of the Sydney Light Rail line in 2019. Devonshire Street is to the nominated key street for patrons walking to the SFS from Central Station. The pedestrian environment will include improved wayfinding, a more activated and legible evening route, upgraded footpaths, reduced traffic and a new pedestrian bridge over South Dowling Street. A minimum 4m wide footpath will be provided along this route, which will include grade separated crossings of major roads including South Dowling Street and Anzac Parade. The future improvements are illustrated in Figure 40.

Figure 40 Improved pedestrian connection from Central to Moore Park

4.3.2 Wayfinding

The approach to wayfinding and signage commences outside the site and extends through to the area of play inside the stadium. All wayfinding should be legible, consistent with the stadium branding and integrated into the wayfinding styles utilised in the areas surrounding the precinct, including that used by City of Sydney, Centennial Parklands and Moore Park, Entertainment Quarter, UTS and Fox Studios. The location of signage should be focussed around key stadium access routes, decision points including points of transition between transport modes and in locations where direct lines of sight towards the stadium are not available.

Primary signage on-site should address key entries to the site at Driver Avenue and Moore Park Road and should be consistent with the City of Sydney

Guidelines. Wayfinding on-site should highlight accessibility through the site to Moore Park, Moore Park Light Rail and Paddington.

Wayfinding should be approached holistically and also utilise materiality, lighting, and the visibility of the stadium itself.

The SCG Trust should work collectively will key stakeholders such as Transport for NSW, City of Sydney Council and CPMPT through the Moore Park Transport Working Group to ensure a consistent wayfinding strategy is adopted for the precinct.

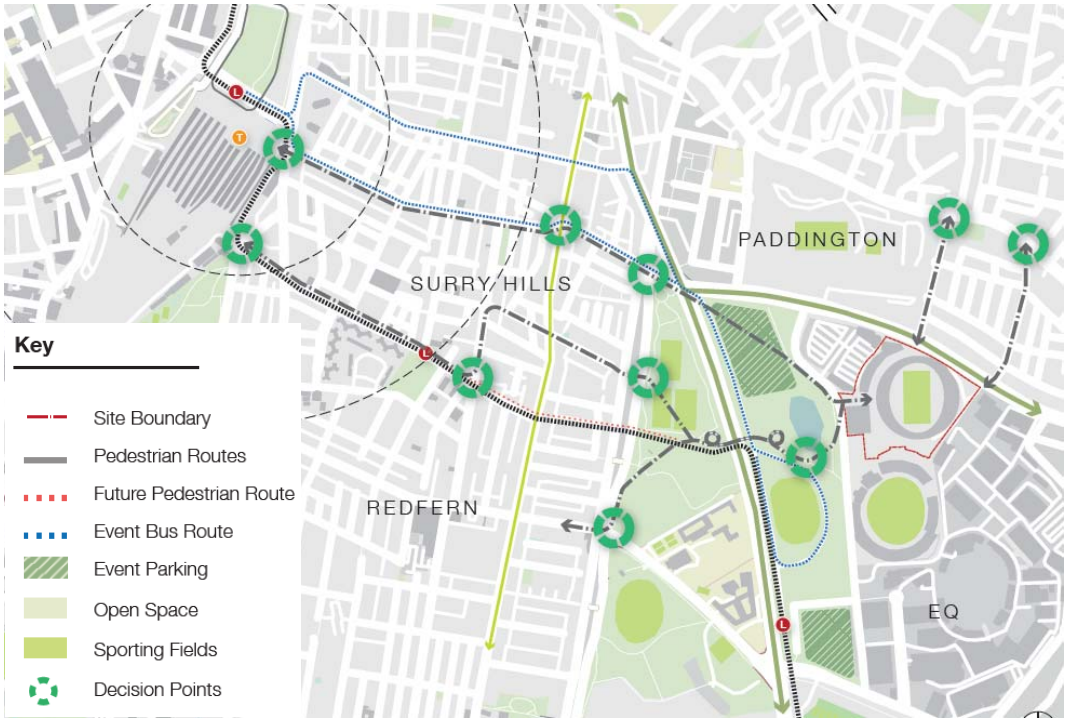


Figure 41 Wayfinding principles

4.4 Cycling

The SFS is already well connected by a number of local and regional cycle paths. A key reason for the low bicycle mode share currently observed is the lack of awareness from many patrons that cycling to the SFS is a viable mode of transport, and on-site facilities (e.g. parking) are available.

Future planning for the stadium will take advantage of this good connectivity by ensuring cycling is better promoted as a mode of transport to the venue. This will involve:

- Significantly increasing the number of bicycle parking spaces within the precinct. Currently there are approximately 50 spaces, this will increase significantly (dependent on further planning to be undertaken in detailed design phase). At a minimum 100 visitor bicycle parking spaces will be provided. Opportunities to increase this number will be considered as part of the Stage 2 DA. Facilities will be provided in accordance with Australian Standards 2890.3 2015 Bicycle Parking Facilities.
- Promotion of cycling as a mode of transport on the SCG Trust website, and potentially following the purchase of event tickets on ticketing websites
- Improved wayfinding from the local and regional cycling network to bicycle parking locations within the precinct
- Improved awareness of existing and future bicycle parking through the development of a transport access guide for the precinct.

Further initiatives / measures which will improve cycling access to the SFS are outlined below.

Fitzroy Street shared path

With an upgrading of Devonshire Street through the introduction of light rail, it is likely that this pedestrian route will become more attractive and gain a higher profile for walking to the current route via Foveaux Street and Fitzroy Street. This will in turn free up some capacity for cyclists utilising the Fitzroy Street shared path.

Bondi Junction to City cycleway

City of Sydney Council is planning the construction of a new cycleway for people travelling by bike from Bondi Junction to the city centre. The route includes a new two-way separated cycleway along the complete length of Moore Park Road and will connect to the existing cycleway on Bourke Street in Surry Hills and the cycleway in Centennial Park.

The cycleway design makes provision for the demands generated by the SFS by allowing pedestrians to utilise the cycleway before and after events.

Detailed design documentation for the project is currently being finalised, however no funding has been committed. It is expected that this cycleway and its integration with SFS redevelopment will be a key item for discussion at the Moore Park Transport Working Group.

Figure 42 Impression of proposed cycleway along Moore Park Road
Source: City of Sydney

Moore Park Masterplan 2040

The Moore Park Masterplan 2040, developed by the Centennial Park and Moore Park Trust, outlines a number of additional measures to improve cycling as a mode of transport to the precinct. These initiatives, outlined below, will be progressively introduced over the next 20 years and have informed the initial design of the Sydney Football Stadium and surrounding precinct.

- Improve connection to Moore Park and Centennial Park from the growing urban areas to the south-west with a new shared pathway for cycling and walking along Dacey Avenue, an extension of Federation Way along Cleveland Street, and a new connection into the Park from O'Dea / Todman Avenue.
- Reconfigure the golf course (while maintaining its championship length) to allow for greater pedestrian and cycle access around the perimeter
- Upgrade network of pathways for both pedestrians and cyclists to improve access across the Park and provide a continuous loop approximately10 km in length. They will also better link to the wider City of Sydney network, surrounding suburbs and the coast, such as along Moore Park Road to Bondi, and Dacey Avenue to Green Square
- Increase the number of cycle parking stations around the Park, particularly within the Entertainment Quarter and adjacent to the Sports Stadia Create a pedestrianised boulevard along Driver Avenue with 'pop' up events. Increasing the pre- and post- game activities will help reduce traffic congestion at peak times
- Create a safe and attractive pedestrian / cycle path providing a direct connection between the Sports Stadia and Central Station. Opportunity to extend the pre-game experience along this approach to the Stadia

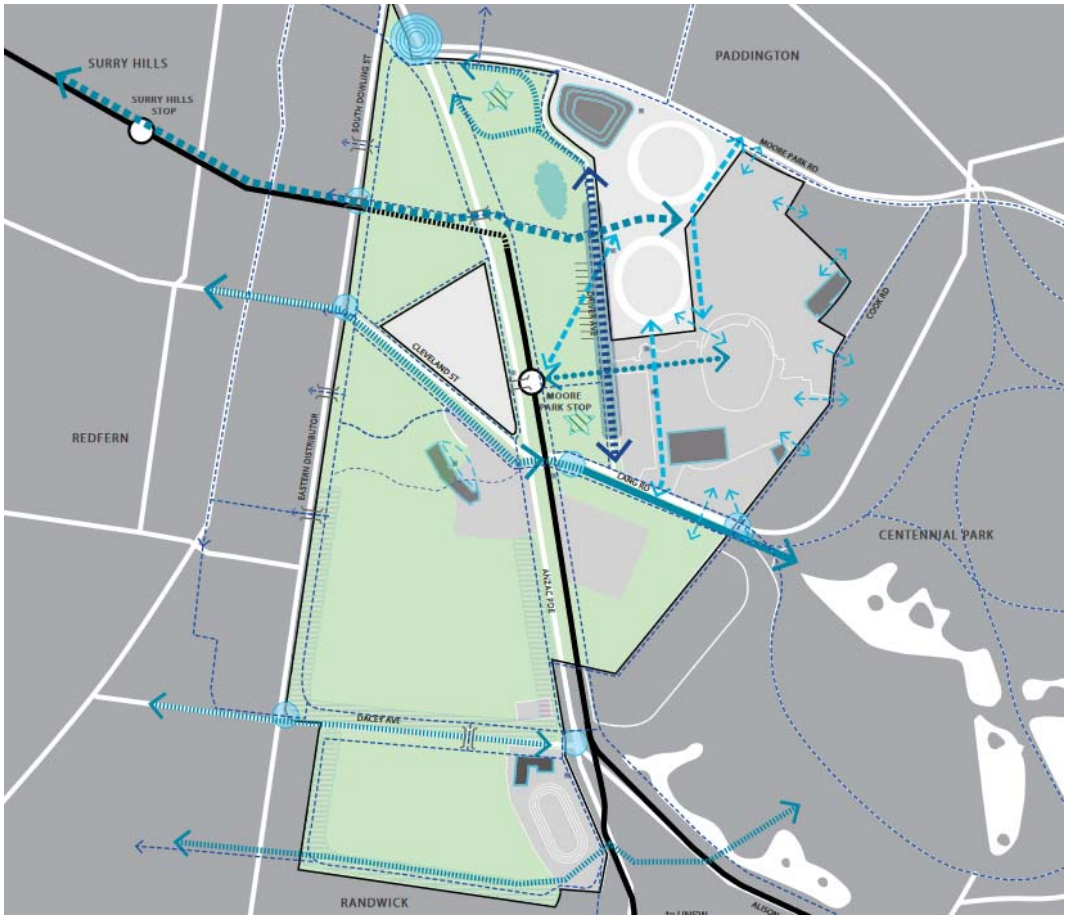


Figure 43 Moore Park masterplan – walking and cycling initiatives
Source: Centennial Park and Moore Park Trust, 2017

4.5 Light rail

4.5.1 Route overview

The opening of the CBD and South East Light Rail in 2019 will significantly improve public transport accessibility and further increase the attractiveness of public transport as a means of access to the SFS. Light rail services will travel between the Sydney CBD and Moore Park approximately every four minutes, and approximately every eight minutes between Moore Park and either Kingsford or Randwick. . The light rail route has a dedicated stop serving the Moore Park sports and entertainment precinct, and will significantly enhance access to the SFS by public transport. The light rail route and stops are shown in Figure 44.

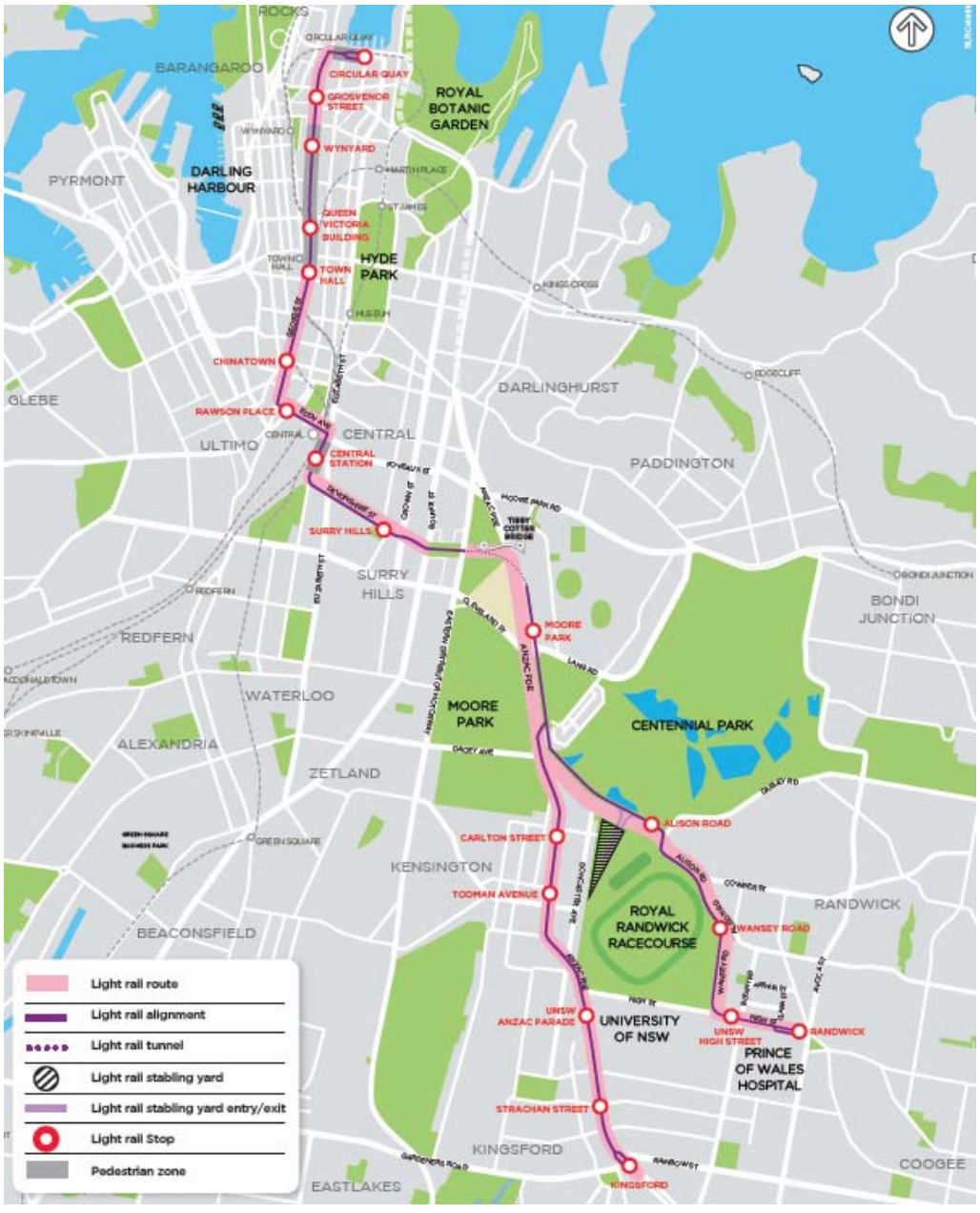


Figure 44 CBD and South East Light Rail route
Source: Transport for NSW

4.5.2 Moore Park light rail stop

The Moore Park light rail stop will be located on the eastern side of Anzac Parade approximately 100m north of Lang Road. The stop will provide a separated crossing for passengers over the light rail tracks to the east to Moore Park with a six-metre-wide path to the Moore Park forecourt. The stop also has an underground crossing to connect the centre island and event platforms at the southern end of the stop to Moore Park

The pedestrian bridge also provides access to the western side of Anzac Parade, which will particularly benefit students and staff travelling to Sydney Boys and Girls High Schools.

Figure 45 Impression of Moore Park light rail stop
Source: http://sydneylightrail.transport.nsw.gov.au

4.5.3 Light rail capacity

Recent discussions with Transport for NSW have indicated that different levels of capacity will be provided depending on the type of event to be held at Moore Park (or Randwick Racecourse).

The light rail will be a key mode of travel for patrons travelling to and from the station. The services and operations of the light rail will be dictated by the size of the event. Table 9 summarises the light rail capacity under different scenarios, and indicates up to 11,000 passengers per hour can be accommodated on special events. This also demonstrates that the light rail will offer a significantly enhanced level of capacity for transport people to the SFS compared with the existing event bus arrangements, which have capacity to transport between 3,000 and 4,000 passengers per hour during peak times.

Table 9 CSELR Infrastructure Capacity

Scenario	**Light rail capacity (People per hour - one direction)**		**Event crowd size**
	Central to Moore Park (before event)	**Moore Park to Central (after event)**	
Regular	5,400	7,200	Between 5,000 and 20,000
Regular plus special event	7,200	10,800	Between 20,000 and 30,000
Major event	10,800	10,800	Greater than 30,000

4.5.4 Pedestrian route from light rail stop

The pedestrian route between the Moore Park light rail stop and the SFS is shown in Figure 46. The location of the light rail stop south of the existing event bus loop provides the opportunities for pedestrians to have an unencumbered route to the Driver Avenue entry point of the SFS. The stop will provide connections to pedestrian paths within Moore Park and then to the section of Driver Avenue which is closed to vehicular traffic on match days.

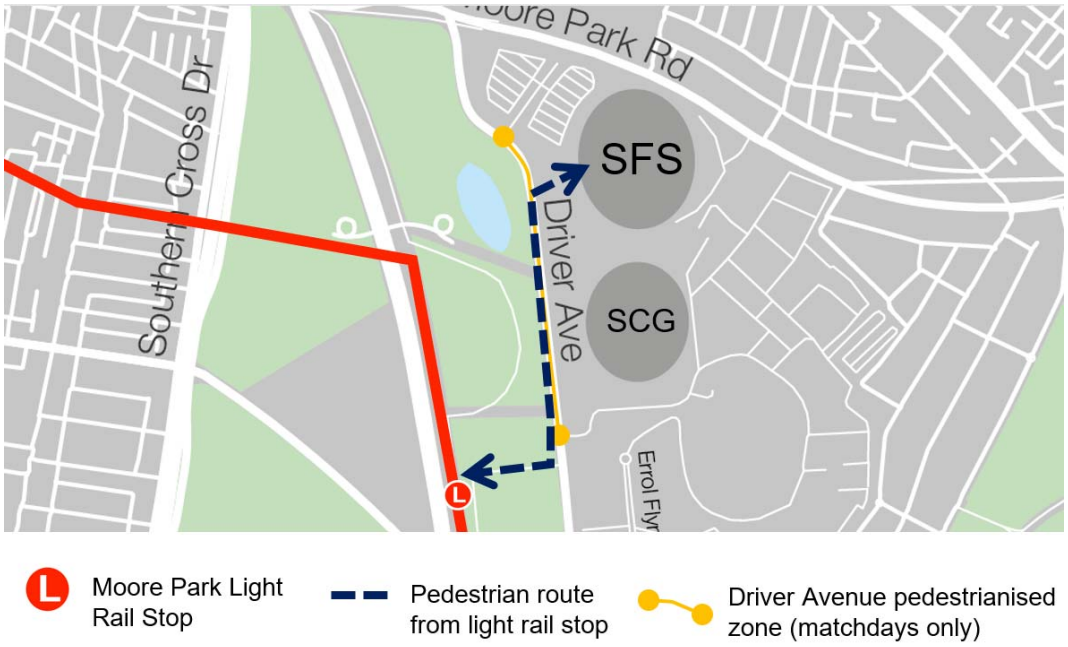


Figure 46 Pedestrian route from light rail stop

4.6 Buses and coaches

To maintain a good level of access for people arriving by bus, Transport for NSW has no plans to change the existing event bus loop on the western side of Driver Avenue.

It is expected that for the majority of events at the SFS, the event shuttle bus that currently operates between Central Station and Moore Park will no longer operate and be fully replaced by the light rail. For major events or double headers at Moore Park, TfNSW may decide to supplement the light rail service with additional special events buses to be run from Central or other transport interchanges.

It is important to note that, even with the addition of the light rail service running parallel to Anzac Parade, the existing bus-way will be retained for regular TfNSW bus services. This will ensure existing and future bus customers travelling to and from the SFS are afforded a good level of service.

The bus network servicing the SFS will change with the completion of the CBD and South East light rail in 2019. This will likely include changes to regular TfNSW services and special event buses. The extent to the changes to the regular TfNSW services is yet to be confirmed and is expected to be identified by TfNSW in the second half of 2018.

Coaches currently use Moore Park Road and the southern end of Driver Avenue on event days to drop off and pick up passengers. With the expected reduction in event bus shuttles to be operated between Central and Moore Park, there may be opportunities to use the existing bus loop for other services such as coaches or regular bus routes.

4.7 Parking

4.7.1 Event parking

The SFS redevelopment project does not propose to increase car parking in the precinct compared to existing levels. This will have the effect of not inducing increased levels of traffic to the stadium. This policy of no additional car parking complements the strategy of promoting public transport, walking and cycling to access the stadium and reducing the reliance on private vehicles.

It should be recognised that the only car park under the direct control of the SCG Trust is the MP1 car park, which is primarily used for members, officials and players on event days. The remaining car parking in the precinct comes under the control of other stakeholders, including the Centennial Park and Moore Park Trust, Entertainment Quarter and Sydney Girls High School. There are no intentions in the short term by any of these stakeholders to modify event day parking arrangements.

The Moore Park Masterplan 2040 proposes the gradual removal of parking on green space in the precinct (i.e. EP2 and EP3). The strategy however acknowledges that such measures will not be implemented until supplementary parking in dispersed locations (such as the Entertainment Quarter, E.S. Marks Athletics Field, Moore Park Golf and the SCG) has been created – thereby ensuring there is no net loss of event related parking.

Should parking not be available (in the short term) on the existing sites of EP2 and EP3, there would be sufficient capacity in the transport network to accommodate the reduction in parking capacity. As is the case for when ‘double header’ events are held in the precinct (i.e. concurrent events at the SCG and SFS) a significant number of people walk from the Sydney CBD, Central Station and other nearby areas. Light rail and public transport would have additional capacity to transport people to the SFS to offset the loss of parking in the event EP2 and EP3 are no longer available.

4.7.2 On-site parking

Following the completion of construction, the existing MP1 car park will be returned to its current state. This provides parking on non-event days for members and other visitors to the precinct.

The proposal involves a providing a small number (approximately 50) parking spaces at a basement level of the new stadium. These spaces will generally be used by service vehicles as well as VIPs on match days. The detailed design of the new car parking area will be provided in the Stage 2 planning application for the site, however will be designed in accordance with relevant Australian Standards AS 2890.1, AS2890.2 and AS2890.6.

4.8 Road network assessment

The proposal involves no change in the overall stadium capacity of 45,000 people. As described in Section 4.7, no additional parking in the precinct is proposed compared to that currently available. In this context, it is forecast that the proposal will result in no additional private vehicle trips to events compared to the current environment. It is envisaged the volume of traffic on the road network on event days will reduce in future for the following reasons:

- The CBD and South East light rail will offer a significantly improved level of service for people travelling to the SFS by public transport. Associated with the light rail opening, the walking experience between Central and Moore Park will be enhanced. These factors are likely to induce a mode shift away from private vehicle towards public transport and walking for certain people.
- With the completion of the light rail, a significant number of special event bus shuttles that travel Central Station and Moore Park will be discontinued. This will reduce the number of buses on the road network surrounding the SFS on event days and improve the traffic flow, especially at the Moore Park Road / Anzac Parade / Flinders Street intersection which is a common source of congestion.
- Greater promotion of sustainable transport modes as described in Section 5 of this report.

For these reasons, no infrastructure upgrades or road improvement works are required to support the proposal.

As is currently the case, Traffic Management Plans are to be developed prior to special events to manage vehicle and pedestrian movements before, during and after the event. These are prepared by the SCG Trust in consultation with key stakeholders including the NSW Police and Sydney Coordination Office.

Currently a source of congestion following major events is the flow of traffic out of Driver Avenue and the Entertainment Quarter car park west towards Anzac Parade. Due to current restrictions, vehicles departing the Entertainment Quarter must turn right onto Lang Road towards Anzac Parade, with left turns not permitted after 10pm in the evening. This arrangement should be reviewed in conjunction with key stakeholders to better distribute traffic out of the precinct following events.

Improved post event vehicle egress from EP2 and MP1 has already been achieved by converting the northern section of Driver Avenue into one way out to Moore Park Road, providing direct access to the Eastern Distributor.

There are no known / committed developments in the immediate vicinity of the site that would contribute to increased traffic movements.

4.9 Service vehicles

Currently, vehicular and servicing access for the SCG and Fox Studios extends down Paddington Lane off Moore Park Road and through the SFS site. The redeveloped SFS proposes to use Driver Avenue and the existing MP1 car park as the primary access and egress point for service vehicles to the stadium. A 360 degree service road will be provided under the general concourse under to allow full circulation of services vehicles within the stadium. Driver Avenue may also be used for service vehicle egress onto Moore Park Road. This approach is illustrated in Figure 47.

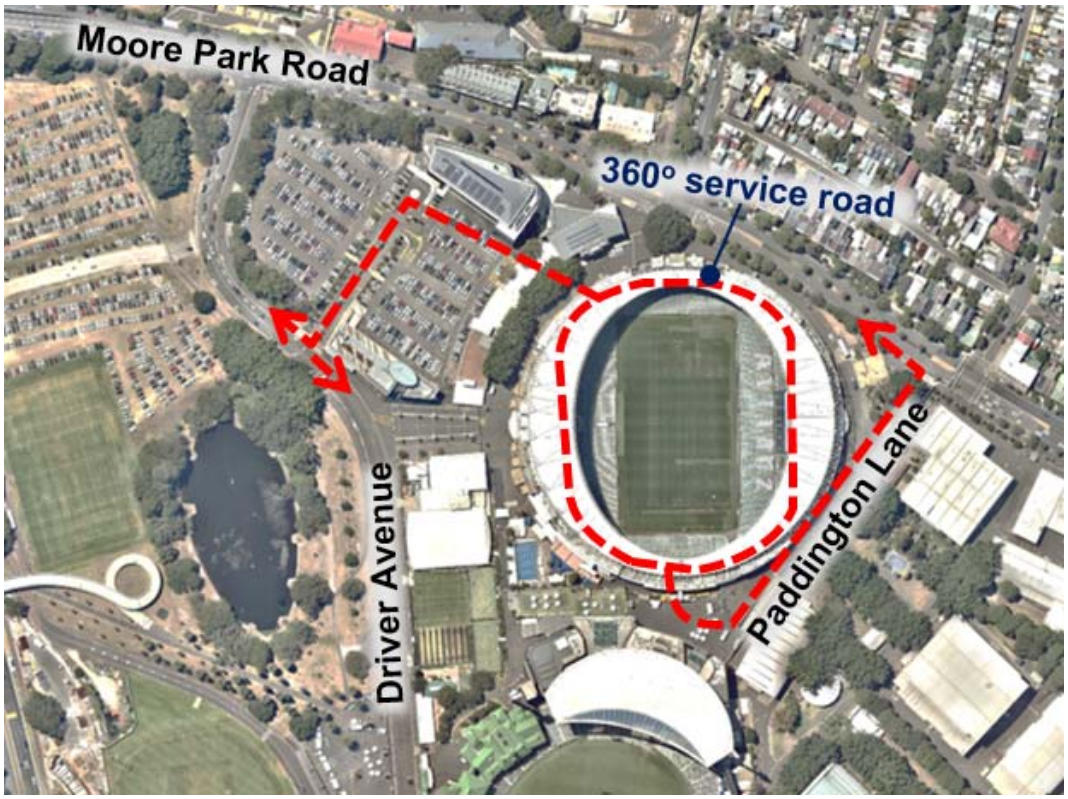


Figure 47 Proposed service vehicle access

Management strategies are already in place to manage the interaction between pedestrians and vehicles on Paddington Lane, and these would remain in force in future. One of the key strategies currently in place is the restriction of service vehicle movements on Paddington Lane before, during and after events.

It is not expected the servicing task for the stadium will change significantly compared to current operations. The proposal for the new stadium includes an improvement arrangement for service vehicles which allows greater accessibility and circulation within the stadium site. A new basement 50 space car park which will predominantly be used for service and VIP vehicles.

4.10 Emergency vehicles

The proposed arrangements for emergency vehicles is shown in Figure 48. Three entry points are proposed, those being via:

- Moore Park Road (Paddington Lane)
- Driver Avenue (MP1 entrance)
- Driver Avenue (south of main pedestrian entry point)

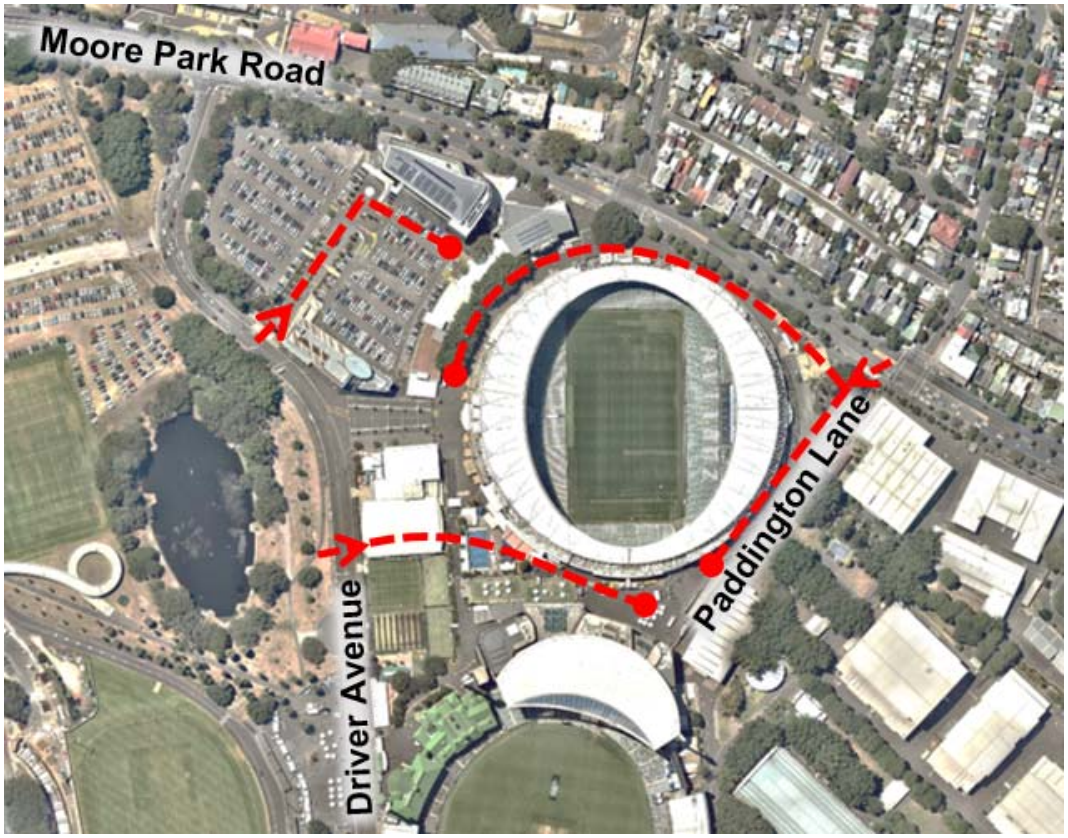


Figure 48 Proposed emergency vehicle access

4.11 Road safety

The enhancement of the walking route via Devonshire Street and its status as the preferred walking route between Central and Moore Park will reduce pedestrian demand and congestion at some key pinch points – in particular the intersection of Moore Park Road / Flinders Street / Anzac Parade. This location is currently the cause of a number of vehicle and pedestrian safety issues due to the constrained environment. Reducing the number of pedestrians through this intersection will result in significant improvements to road user safety.

The current design envisages shifting the existing stadium to the south west to create more space around the Moore Park Road entry point and providing a plaza experience. This will significantly improve pedestrian safety and efficiency at the Moore Park Road / Regent Street intersection by creating additional space for pedestrians to store and wait within the site boundary.

4.12 Point to point transport

Taxis and rideshare services require the ability to drop off and pick up passengers within close proximity to the stadium. Travel behaviour surveys indicate a significant proportion of people travelling to the SFS make use of point to point transport services. To accommodate this future demand, it is recommended the following be considered:

- Retain the existing drop off and pick up points at the southern and northern end of Driver Avenue.
- Allow point to point services to utilise the Moore Park Road kerbside prior to and following the completion of events.
- Consider using nearby major streets such as Oxford Street or Flinders Street, which are outside the immediate precinct, for use by point to point vehicles. This would reduce the volume of traffic entering the stadium precinct.
- Consult with the Entertainment Quarter regarding the potential to provide additional kerbside space for point to point services within the precinct.
- In consultation with the Centennial Park and Moore Park Trust, make use of space within car parks EP2 or EP3 for point to point transport services.

It is recommended the SCG Trust work with key stakeholders as part of the Moore Park Transport Working Group to identify suitable locations for point to point transport vehicles.

4.13 Security principles

Intelligent Risks (IR) has developed security principles in support of the planning application. The report documents the general principles for security to be considered in the final design of the stadium which will be undertaken through a separate Stage 2 SSDA process.

In relation to Hostile Vehicle Mitigation (HVM), the areas assessed to be exposed to vehicle ramming or intrusion are:

- North-east plaza and Paddington Lane (from Moore Park Road)
    - This area includes two pedestrian plazas and gates and is on a slope that would enable any entering vehicle to attain significant speed.
- External concourse between stadium structure and Moore Park Road
    - The external concourse at the north will be aligned with the road level. increasing the likelihood vehicles may intrude into pedestrian areas. Hostile vehicle mitigation measures should be installed along the extent of the site from Paddington Lane to the Rugby Australia / UTS building.
    - Base of main stairs on the western side at Driver Avenue.
    - Current arrangements during events to enact closure of Driver Avenue (e.g. police vehicles, jersey barriers) are effective, although a permanent solution (e.g. retractable/removable bollards of sufficient resilience north and south of areas in use for stadium access) should be considered.

The concept design indicates the stadium will have a podium level (at RL47), which elevates the external concourse by approx. 7 metres from the Driver Avenue road level. This concourse – the major circulation area for patrons – is therefore not exposed to vehicle hazards on the western side.

The HVM strategy shall be informed by a detailed analysis of the vulnerability to vehicle ramming (including direction of vehicle movement, vehicle mass, velocity) as per the method described in PAS 68:2013 (UK). A preliminary judgment of vehicle security requirements is that for areas adjacent to Moore Park Road, an element would need to be able to withstand an impact of at least 550kJ.

The HVM strategy should consider alternative solutions to bollards such as street furniture, hardscaping and landscaping (e.g. use of mature trees such as the heritage fig) to minimise the ‘hard’ appearance of security and positively contribute to the welcoming nature of the site. However, alternative solutions to bollards or other rated and tested elements should be able to achieve an equivalent level of performance.

4.14 Future transport access overview

The proposed redevelopment of the SFS will be serviced by the new light rail, buses and an improved walking and cycling network. Figure 49 shows the future transport network surrounding the stadium.

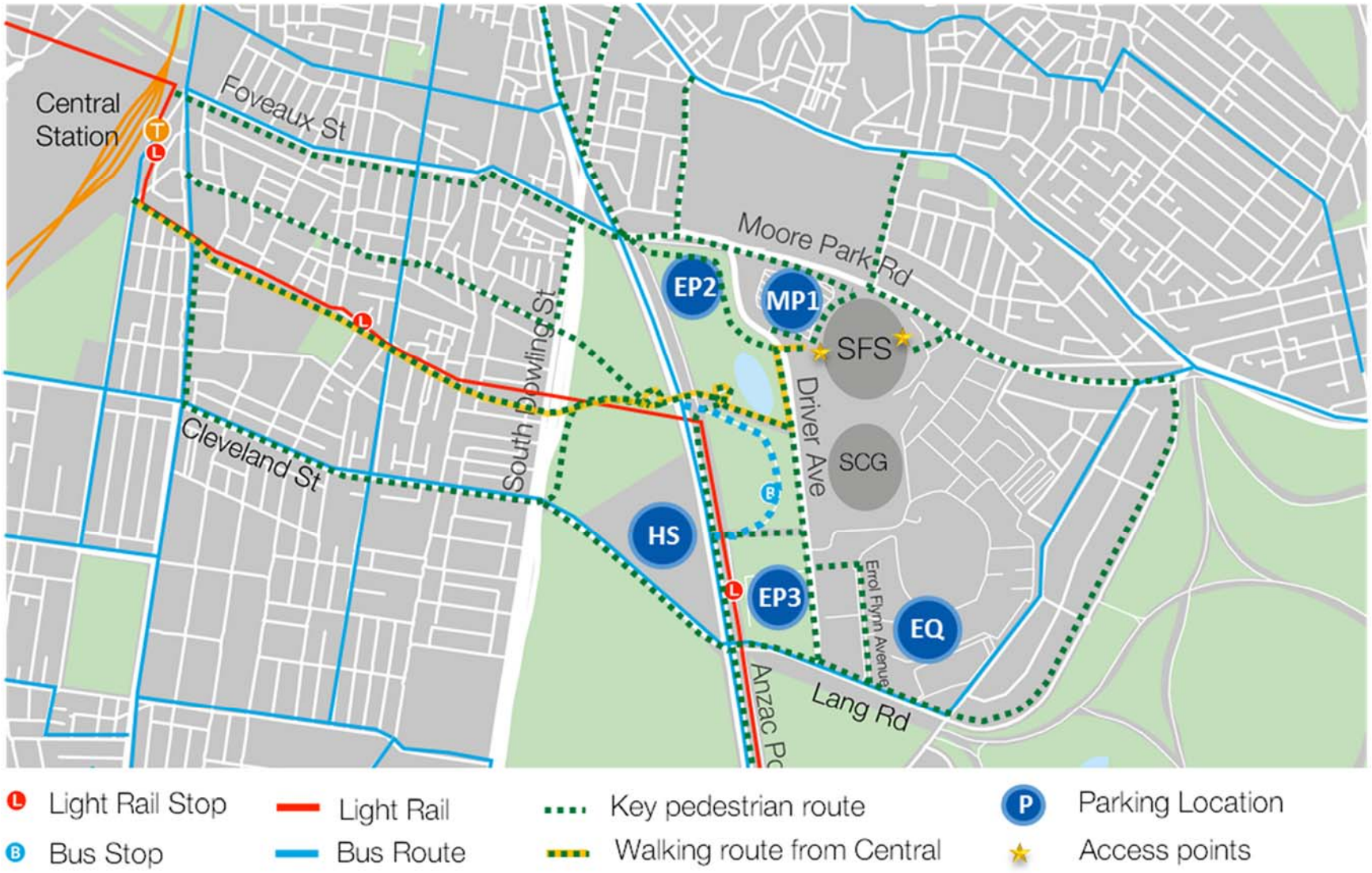


Figure 49 Integrated transport map

5 Travel Demand Management

The SFS redevelopment provides an opportunity to heavily promote to patrons, staff and visitors the sustainable modes of accessing the SFS and strongly encourage travel behaviour change. This section outlines the strategies and monitoring mechanisms to reduce the private vehicle impacts arising from the proposed development. These strategies will be further refined as the project progresses.

5.1 Objectives

The main objectives of these measures are to reduce the reliance of private vehicles as a means of accessing the SFS and promoting sustainable means of transport. This is common for any inner city tourist attraction.

The more specific objectives include:

- High modal share for public transport, cycling and walking journeys for both staff and spectators
- To ensure adequate facilities are provided at the site to enable users to travel by sustainable transport modes
- To reduce the number of car journeys associated with business travel by staff and visitors
- To facilitate the sustainable and safe travel of employees and visitors
- To raise awareness of sustainable transport amongst users.

5.2 Measures

An overview of the measures proposed are described in the following sections:

Infrastructure measures

- No increase in the number of on-site car parking spaces compared to current levels
- Increased number of bicycle parking for visitors throughout the precinct
- Secure bike parking and end of trip facilities (including showers and change rooms) for 5%-10% of SFS and precinct staff.
- End of trip facilities for staff (showers, lockers, tool kits, etc.)
- Provision of electric vehicle charging points within MP1
- Working with the City of Sydney, Transport for NSW and the Centennial Park and Moore Park Trust to improve wayfinding to public transport nodes and other key land uses

- Provision of new pedestrian and cyclist facilities on key travel routes, particularly the walking route between Central Station and Moore Park. This includes improved wayfinding and lighting along the route.

Educational and promotional measures

There are a number of tools available in encouraging behaviour change and communicating travel options that are available to all stadium users – including staff and visitors. These are summarised below, and are recommended to be developed by the completion of the redevelopment of the stadium.

- Development of a transport access guide for the Moore Park precinct. A Transport Access Guide (TAG) is a presentation of how to travel to the specific site using either active transport and public transport. The aim of a TAG is to clearly highlight the sustainable methods of travel and highlight key information for each mode choice which maybe influence a more sustainable mode choice.
- Improved travel information on the SCG Trust website. Currently there is limited information on the website about travelling to the SFS, in particular the availability of bicycle parking or recommended walking routes from public transport. The recently opened Optus Stadium in Perth provides a good example of displaying appropriate travel information, with travel by public and active transport promoted and use of private vehicles discouraged. This is shown in Figure 50.

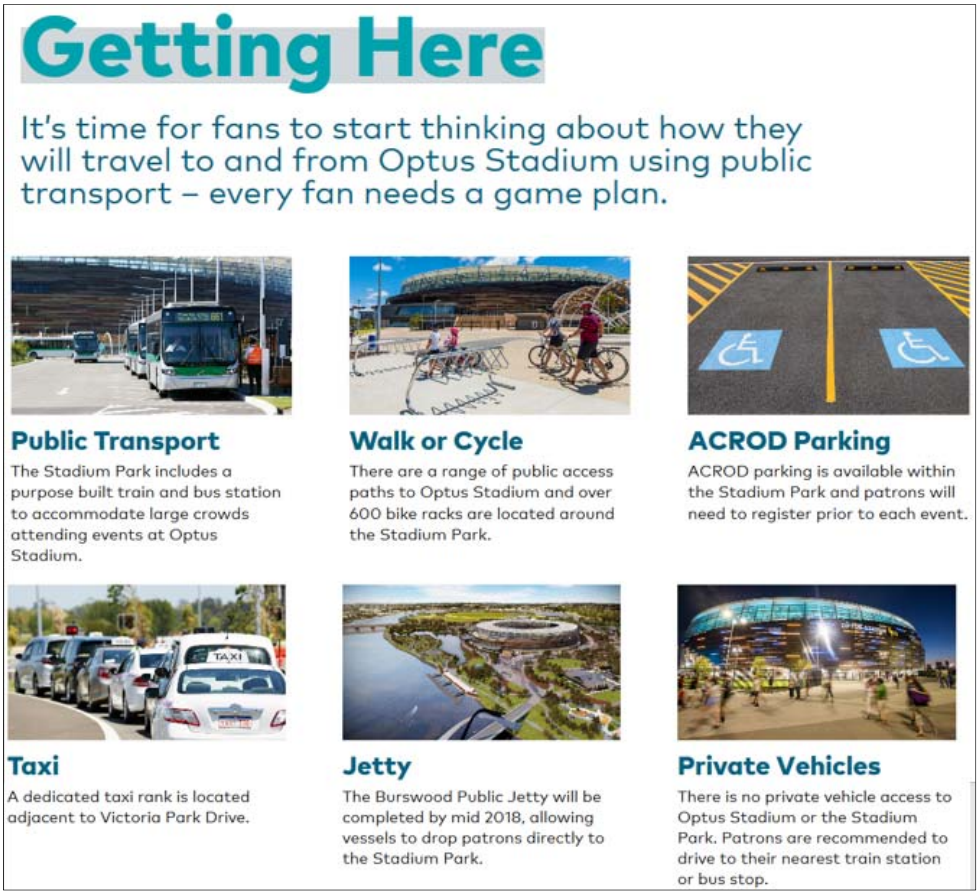


Figure 50 Example of travel information – Optus Stadium Perth

- Working with ticketing agencies to provide customers with travel information after they purchase their tickets online. Key information could be provided such as suitable public transport opportunities, walking routes and bicycle parking locations.
- Infrastructure NSW will work with Transport for NSW and a number of other stakeholders to develop a plan to introduce integrated ticketing for events at SFS. Further details will be outlined in the Stage 2 DA. Currently only the NSW Waratahs, Rugby Australia and Sydney FC have integrated ticketing arrangements in place for events.
- All event day staff members would be made aware of the green travel plan as part of their induction process, which will include a description of the available end of trip facilities on site and available non-car travel options.

5.3 Monitoring

The monitoring measures could include:

- Collecting data on employee travel patterns for journeys to work (through surveys or analysing journey to work data)
- Visitor travel patterns via interview surveys conducted prior the start of events. This would allow the SCG Trust to monitor the travel patterns of their staff and visitors on an ongoing basis.
- Review the demand for on-site car parking for different events based on entry and exit data from the various car parks in the precinct
- Undertake pedestrian counts along key walking routes (e.g. Devonshire Street) to review the number of people walking to events
- Review the number of people using public transport in the area through a review of patronage data

The SCG Trust participates in ongoing dialogue with key transport agencies and stakeholders such as Transport for NSW, City of Sydney Council and the Centennial Park and Moore Park Trust. Further engagement with these agencies following the development of the SFS will assist in designing and operating services which best support the needs to the workers and visitors, and therefore promoting high levels of sustainable transport modes. Meetings should be held periodically to undertake a review of the measures in place.

6 Construction Pedestrian and Traffic Management Plan

6.1 Overview

This section details a preliminary Construction Pedestrian and Traffic Management Plan for the demolition of the SFS (the 'works'). The purpose of the Construction Pedestrian and Traffic Management Plan is to assess the proposed access and operation of construction traffic associated with the proposed early works.

6.2 Program

The overall construction program is summarised in Table 10.

Table 10 Staging of Proposed Development

Stage	Indicative Timing
Stage 1: Site establishment	January 2019
Stage 1: Demolition of ancillary buildings (exc. Cricket NSW)	February 2019 – May 2019
Stage 1: Demolition of Cricket NSW building and indoor wickets	September 2019 – October 2019
Stage 1: Demolition of Sydney Football Stadium Roof	January 2019 – July 2019
Stage 1: Demolition of Sydney Football Stadium Structure	January 2019 – December 2019
Stage 2: Construction of new stadium (subject to further detail in Stage 2 planning application)	October 2019 – June 2021
Stage 2: Testing and commissioning (subject to further detail in Stage 2 planning application)	June 2021 – February 2022
Stage 2: Commencement of stadium operation	March 2022

6.3 Personnel and working hours

The approximate number of workers onsite for demolition is 30 workers which will be finalised by the appointed contractor. The proposed construction hours for the demolition works are as follows:

- Weekdays 7:00am to 6:00pm
- Saturdays 8:00am to 1:00pm
- Sunday and public holidays: no work

The extent of work to be conducted on days with events held at the SCG may be reduced to manage the movement and safety of pedestrians in the precinct.

6.4 Staging and activities

Infrastructure NSW is planning to commence the demolition works in December 2018. The demolition works for the existing stadium and ancillary infrastructure are planned to be undertaken over a 10-month period up to October 2019, upon which the work for the stadium construction will commence. Ancillary buildings to be demolished include the Waratahs Building, Rooster Building, Sheridan Building, café, pool and gym, Venue Services/ Merchandise and NSW Cricket.

The demolition will involve the following activities:

- Site establishment to enable the commencement of demolition activities (including the installation of hoardings, fencing and signage, establishment of office site compound, etc.)
- Decommissioning, demolition and removal of the existing stadium and related above ground structures
- Associated civil works
- Waste management activities and the removal of classified waste for offsite disposal.

6.5 Construction traffic volumes

The demolition works would generate light and heavy vehicles travelling to, from, and within the existing stadium boundary with access via Driver Avenue, driveway at Gate 4 and at Paddington Lane. Site traffic generation has been divided into light vehicles and heavy vehicles below.

6.5.1 Light vehicles

Workers will generate some additional traffic to the site. Typically, the main stage of the construction is likely to have a workforce of approximately 30 personnel. Given the public transport availability to the site and limited (likely to be zero) on-site parking opportunities, the majority of construction workers will be required to take public transport to work. Typically construction workers have a high vehicle occupancy of between 2-3 people per vehicle, particularly for sites with constrained parking environments. Therefore the likely number of light vehicles generated by the project would be in the order of 5 per day.

Additionally, construction workers generally start earlier and finish earlier than the commuter peak periods, and would likely not coincide with the site's peak periods.

6.5.2 Heavy vehicles

The number of daily vehicles accessing the site is forecast to vary from between 5 and 40 daily vehicles. The overall number of vehicle movements generated from the first two stages of the works is indicated in Table 11. As the project is in its preliminary stages, the following forecasts are approximate and may vary once a contractor is appointed.

Table 11 Construction vehicle movements by stage

Stage	Duration	Vehicles per day	Max number of vehicles per hour
Procurement and establishment	30 days	5	3
Ancillary stadium demolition works	240 days	30 - 40	6 - 7

The expected number of vehicles generated by the construction works (less than 10 per hour) is considered minimal in the context of the existing road network. Further, the volume of traffic in and out of the stadium precinct would essentially be less than existing levels as MP1 car park would no longer be available for members parking on non-game days.

6.6 Construction traffic access and routes

The site has three nominated access points which are all located off Moore Park Road to minimise any interruption along Anzac Parade from light rail construction (due to be complete in 2019). The three site access locations indicated in Figure 51, include Driver Avenue, the driveway located at Gate 4 and Paddington Lane.

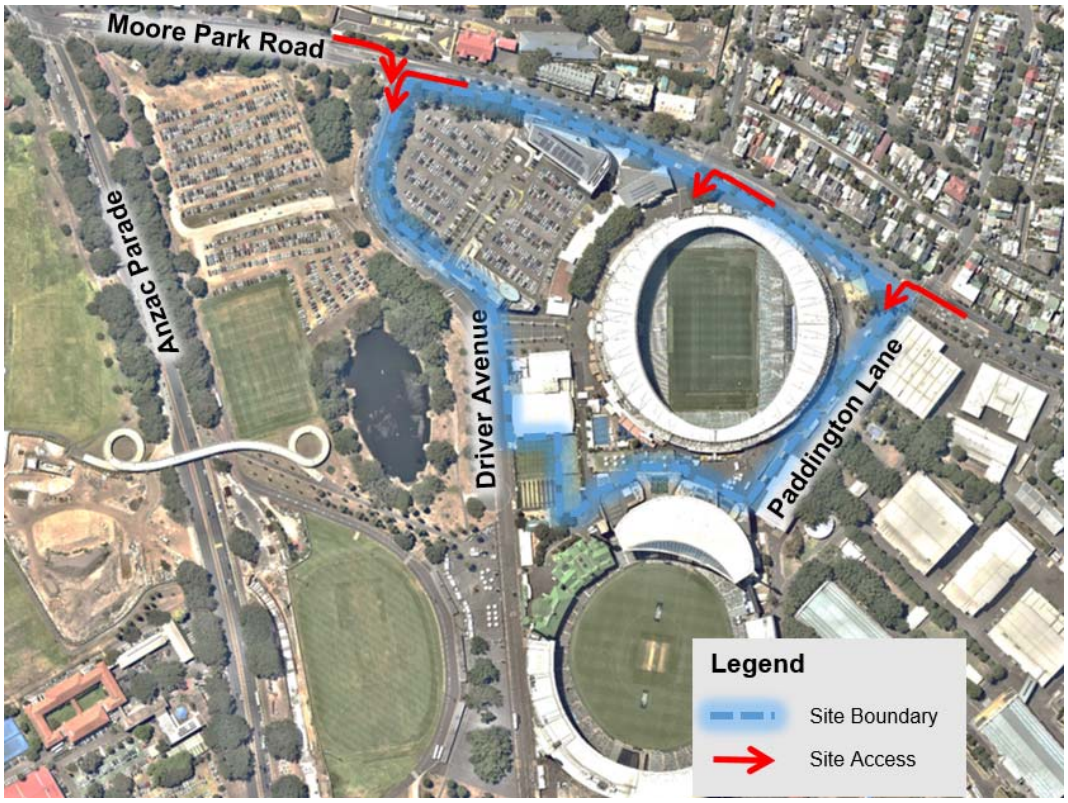


Figure 51 Nominated site access locations

Whilst Driver Avenue provides a main access point for demolition Works access is required at all times to the NRL Building on Driver Avenue. The building has two access points off Driver Avenue. The first is via a ramp from MP1 to the underground carpark and the second is the pedestrian access ramp and stairs off Driver Avenue. Site fencing is to allow for these two access points.

Site fencing is to use existing fences where possible and maintain Class B hoarding. The main fence along Moore Park Road is to be upgraded to B Class hoarding. Additional B Class hoarding to be installed to surround the entire site this includes along Driver Avenue and the connecting Paddington Lane.

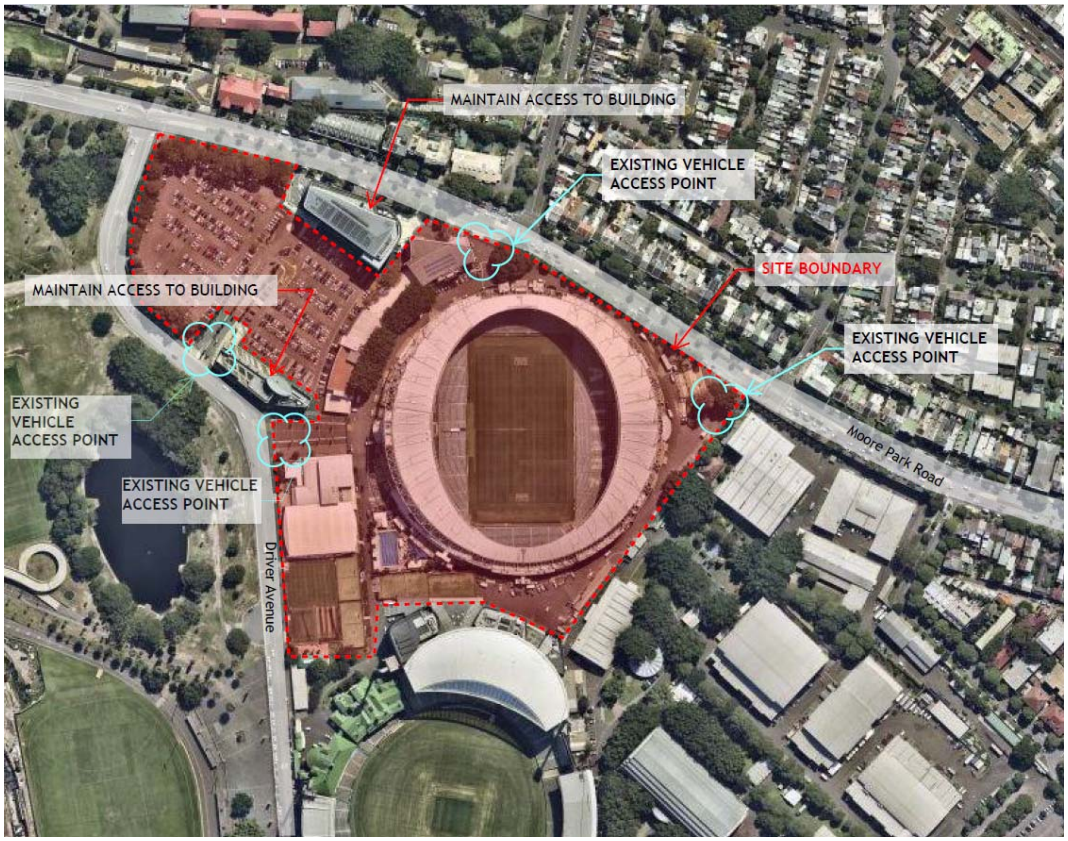


Figure 52 Site access locations

The main construction access will be via the state road network including the Eastern Distributor and Cross City Tunnel, and vehicles will likely originate from this network. Trips from the east and south may access the site via Southern Cross Drive and Anzac Parade, while those arriving from the north will use the Sydney Harbour Tunnel and Eastern Distributor.

Driver Avenue can be accessed from both the western and eastern approach along Moore Park Road, however the driveway at Gate 4 and Paddington Lane are only accessible from a left turn from the eastern approach due to an island running along the centre of Moore Park Road. For vehicles to use these access locations it is recommended South Dowling Street and Oxford Street are used. Construction traffic will not utilise Oatley Road or Regent Street.

The likely inbound and outbound routes that have been identified for demolition vehicles are illustrated in Figure 53 and Figure 54 respectively.

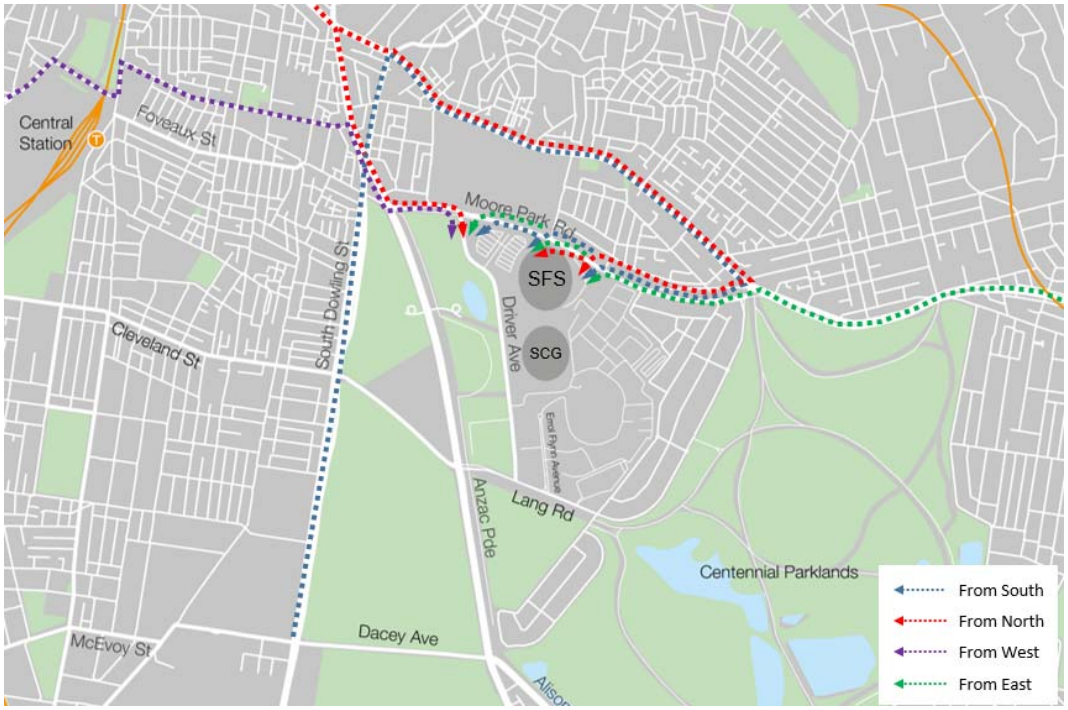


Figure 53 Inbound construction vehicle routes

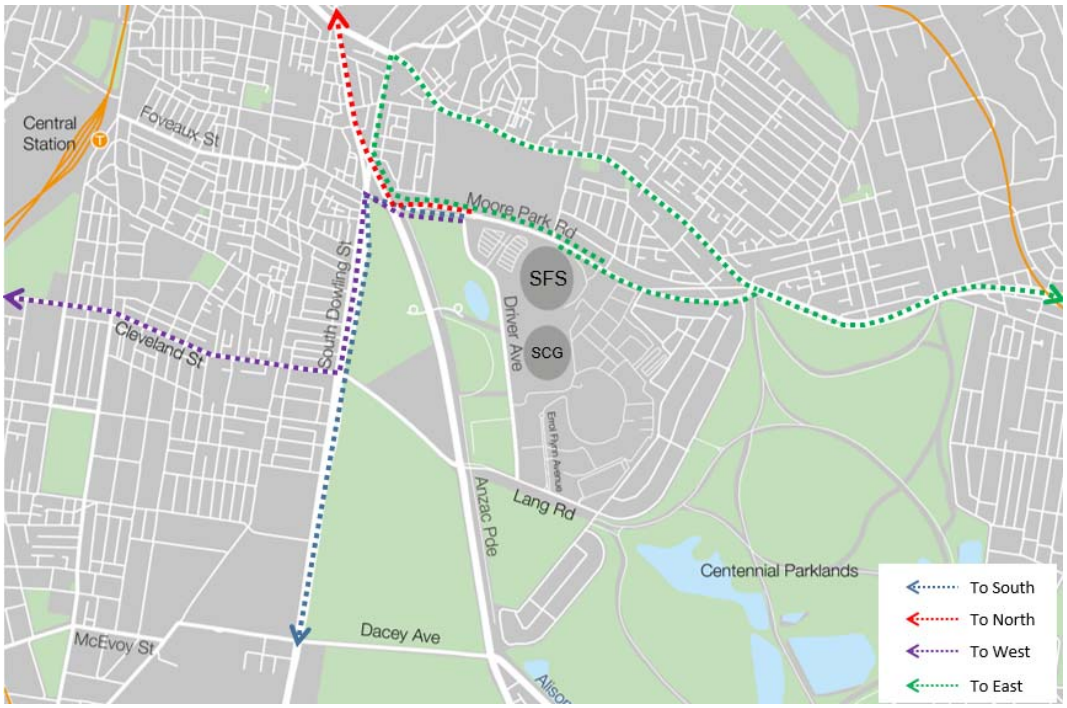


Figure 54 Outbound construction vehicle routes

6.7 Site compounds and work zones

It is currently envisaged that a portion of the existing members car park (MP1) will be used as a construction site compound during the works. This compound will provide the ability to store and handle materials or construction vehicles as required. No car parking for use by the general public (either on match or non-match days) will be permitted during the construction period.

At this stage it is not expected that on-street work zones will need to be established on Moore Park Road or Driver Avenue to facilitate the construction works. All trucks are to be held within the construction site for the demolition works, with no queueing on public roads to occur.

6.8 Emergency vehicles

If required, emergency vehicles will be able to access the site via the proposed construction vehicle access points.

6.9 Public transport services affected

It is not expected that public transport services would be affected by the works. The small number of additional construction vehicles would not impact the operation of the public transport network in the vicinity of the site. The number of daily vehicles associated with the works will be less than that currently using the MP1 car park.

The relatively close proximity of public transport servicing the site via the bus network or walking from Central Station will enable construction personnel to easily access the site via public transport, minimising the road traffic impact around the site. Further, the period of demolition overlaps with the expected opening of Sydney Light Rail in 2019, providing an additional public transport option for workers accessing the site.

6.10 Cumulative construction traffic

A number of construction activities will be occurring concurrently with the construction program of the SFS site, including a Sydney Light Rail and the construction of a separated cycleway on the southern side of Moore Park Road The appointed contractor will need to engage in ongoing consultation with Transport for NSW (Sydney Coordination Office) during the construction period to ensure any cumulative impacts with other projects are managed appropriately.

The construction works associated with the CBD and South East Light Rail were originally scheduled for completion in early 2019, coinciding with the start of the demolition works for the SFS redevelopment. However, it is now envisaged the light rail construction will continue throughout 2019.

Notwithstanding the above, the number of construction vehicles associated with the SFS Stage 1 works is low – at most 6-7 movements per hour. This number of additional vehicles is not significant enough to warrant any modifications or upgrades to the road network.

It should also be noted that the construction vehicle routes for the light rail project do not coincide with those that are to be used for the SFS works. These routes (shown in Figure 55) are focused on Anzac Parade and the Eastern Distributor (Randwick) entry/exit. The construction routes to be used for the SFS works will generally be via South Dowling Street and Moore Park Road.

Figure 55 CBD and South East Light Rail construction vehicle routes

Source: CBD and South East Light Rail Project Environmental Impact Statement Volume 2 Technical Papers Construction Traffic Management Plan prepared by Booz & Co./AECOM dated 7 November 2013

6.11 Impact on pedestrians and cyclists

On non-event days, some pedestrians and cyclists within the area may be impacted from walking past the site during construction, particularly along Moore Park Road and Driver Avenue. Generally, impacts to pedestrians and cyclists will be minimal as the work is confined to off street works.

To ensure the safety of pedestrians and cyclists, the following measures may need to be put in place during the construction period.

- Minimising the level of construction activity on match days at the SCG. For major events no construction works may be possible.
- Maintain appropriate access for pedestrians to Moore Park Road and Driver Avenue during event days
- Erection of hoardings, site fencing and gates at key locations within the site boundary to permit pedestrian movement adjacent to the construction zones and separate pedestrians from construction vehicles.
- Installation of signage indicating recommended pedestrian routes during the construction period
- Maintaining safe crossings of Moore Park Road at Driver Avenue for pedestrians accessing the precinct
- Ensuring traffic controllers with appropriate accreditation are in place to hold construction vehicles at cross-over points and allow pedestrians to cross these work areas.
- Ensure no dedicated cycleway will be impacted by the works

Further detail regarding additional measures for pedestrians and cyclists will be provided in the detailed Construction Pedestrian Traffic Management Plan, to be developed by the appointed contractor prior to the commencement of works.

6.12 Special event arrangements

As the adjacent stadium, the Sydney Cricket Ground (SCG), will be used during the demolition and redevelopment of the SFS, it will be critical to manage the movement of pedestrians accessing the SCG during the construction period. Event mode will be enacted on the site throughout the Works during major events at the SCG to reduce dust and noise associated with Works. All traffic management principles as stated above will apply during Event Mode.

The following measures may be adopted:

- Site fencing and hoarding may be altered during Event Mode to allow for general ingress and egress to the SCG via Paddington Lane from Moore Park Road.
- The Contractor is to coordinate any changes in site fencing in a timely and safe manner.
- Deliveries are to be planned by the Contractor to allow for changes in site access during events.

6.13 Measures to ameliorate impacts

6.13.1 Mitigation measures

Mitigation measures would be adopted during the demolition and construction phase to ensure traffic movements have minimal impact on surrounding land uses and the community in general, and would include the following:

- All trucks will be loaded to their prescribed weight limits, within the site boundary and be covered with a tarp (rubbish loads only) prior to exiting the Site.
- All trucks are to be held within the construction site for the demolition works, with no queueing on public roads to occur.
- Construction workers / tradespersons will be encouraged to utilise public transport and/or car pool with other construction workers.
- All demolition vehicles are to be contained wholly within the site and vehicles must enter the site before stopping. A construction zone will not be permitted on surrounding public roads.
- Hours of operation are Mondays to Friday 7:00am to 6:00pm and 8:00am to 1:00pm Saturday. No Works on Sundays and Public Holidays and materials would be delivered and spoil removed during standard construction hours
- Establishment and enforcement of appropriate on-site vehicle speed limits (20km/h), which would be reviewed depending on weather conditions or safety requirements;
- Neighbouring properties would be notified of construction Works and timing;
- No vehicles will queue on public roadways including Moore Park Road

- Deliveries would be planned to ensure a consistent and minimal number of trucks arriving at site at any one time.
- Vehicles would arrive to the site in a staged manner that will prevent the need for queuing outside the site

6.13.2 Driver code of conduct

To manage driver conduct, the following measures are to be considered for implementation:

- All deliveries are to be pre booked;
- All deliveries are to check in at the site office;
- Drivers are to give way to pedestrians.

Traffic Controllers will be used to stop traffic on the public street(s) to allow trucks to enter or leave the site. Vehicles must enter and exit the site in a forward direction. They must wait until a suitable gap in traffic allows them to assist trucks to enter or exit the site. The Roads Act does not give any special treatment to trucks leaving a construction site - the vehicles already on the road have right-of-way. Vehicles entering, exiting and driving around the site will be required to give way to pedestrians.

No bus services will be impacted by construction traffic as the work is confined to off street works.

6.14 Next steps

The Contractor (once appointed) will prepare a more detailed CPTMP prior to the commencement of works which will include the following:

- Traffic Control Plans
- Specific methods of safely managing construction vehicle and pedestrian traffic within the surrounding area
- Crane locations
- Vehicle turning paths
- Site compound layout and access
- Driver facility areas
- Additional work zones / road closures

7 Summary and Key Findings

This transport assessment has been prepared to support the planning application (SSD 9249) for the redevelopment of the Sydney Football Stadium. The concept proposal comprises a new 45,000 seat stadium on the site of the existing stadium, as well as a new basement with service vehicular access for servicing. Public domain works surrounding the stadium are also proposed, building on the venue's unique parkland setting.

A summary of the key findings of the transport study are provided in Table 12.

Table 12 Summary of transport measures

Mode	Key Finding
Stadium access and circulation	• The arrival experience will be significantly enhanced under the proposal, with more space provided for both entry/egress as well as circulation. • It is the intention the final design provides for greater permeability, allowing for improved pedestrian connectivity between Moore Park Road and Driver Avenue.
Travel demand	• As the stadium capacity will not increase from current conditions, the peak travel demand will remain unchanged • Based on the transport mode under a range of different scenarios, the future transport network has the capacity to accommodate the expected travel demand to the SFS
Light Rail	• The opening of the CBD and South East Light Rail in 2019 will significantly improve public transport accessibility and further increase the attractiveness of public transport as a means of access to the SFS. • Close to 11,000 passengers per hour can be accommodated on special event light rail services, which is a significant increase compared to the existing special event bus arrangements.
Pedestrians	• The walking network and experience from Central Station to the SFS via Devonshire Street will be significantly enhanced following the completion of the CBD and South East Light Rail in 2019. • The pedestrian environment will include improved wayfinding, a more activated and legible evening route, upgraded footpaths, reduced traffic and a new pedestrian bridge over South Dowling Street.

Cycling	• The SFS is already well connected by a number of local and regional cycle paths.
	• Cycling access to the SFS will be enhanced in future through the following measures:
	  • Increased on-site bicycle parking
	  • Better promotion of cycling facilities
	  • Improved wayfinding to the SFS
	  • New Bondi Junction to City cycleway proposed along Moore Park Road

Bus	• To maintain a good level of access for people arriving by bus, the design does not impact the existing event bus loop on the western side of Driver Avenue. • It is expected that the event shuttle bus that currently operates between Central Station and Moore Park will no longer operate and be fully replaced by the light rail.

Mode	Key Finding
Parking	• The SFS redevelopment project does not propose to increase car parking in the precinct compared to existing levels. • This policy of no additional car parking complements the strategy of promoting public transport, walking and cycling to access the stadium and reducing reliance on private vehicles.

Road network	• It is envisaged the volume of traffic on the road network on event days will reduce in future (compared to current levels) for the following reasons:
	  • The CBD and South East light rail will offer a significantly improved level of service for people travelling to the SFS by public transport.
	  • With the completion of the light rail, a significant number of special event bus shuttles that travel Central Station and Moore Park will be discontinued.
	  • Greater promotion of sustainable transport modes
	• In this context, no enhancements to the road network are considered necessary to ameliorate the impacts of the development

Point to point transport	• A significant number of people currently use point to point transport (taxis, Uber) to access the SFS.
Travel demand management	• The SFS redevelopment provides an opportunity to heavily promote to patrons, staff and visitors the sustainable modes of accessing the SFS and strongly encourage travel behaviour change.

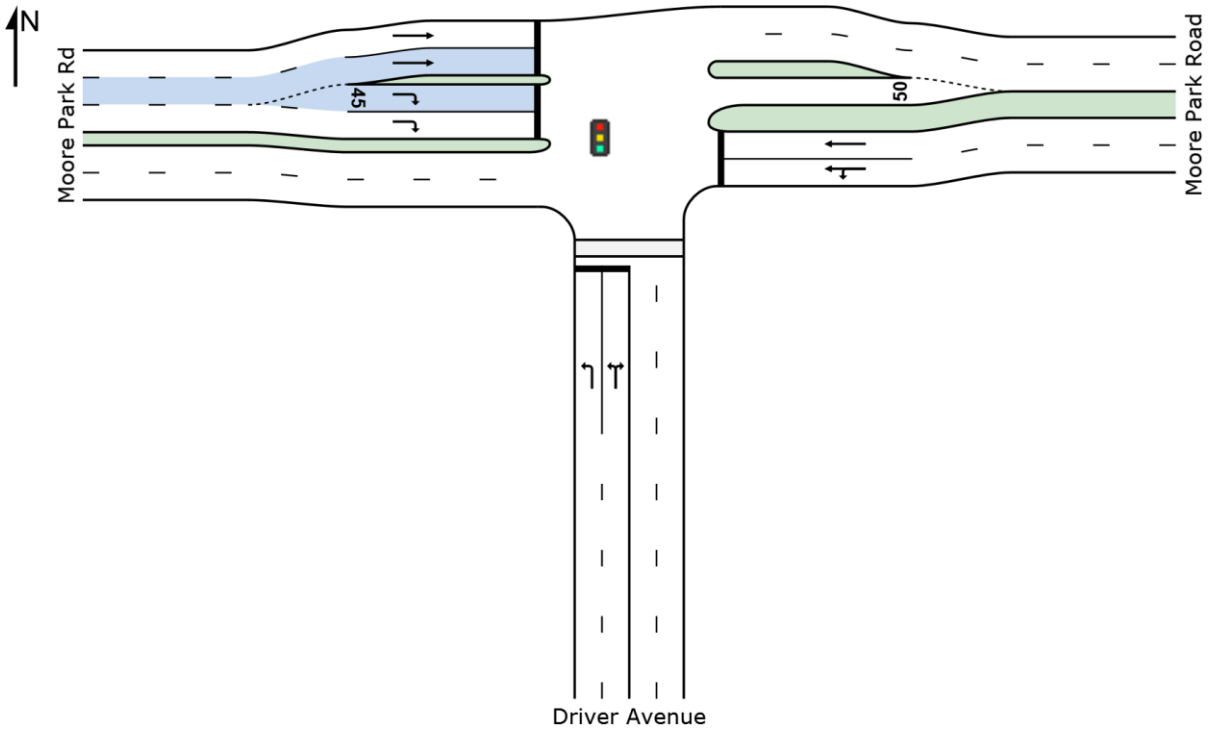
Appendix A

Traffic Modelling Outputs

SITE LAYOUT

Site: [Intersection 1 SAT Existing]

Moore Park Road/ Driver Avenue
Signals - Fixed Time Isolated



Organisation: ARUP PTY LTD | Created: Tuesday, 27 March 2018 11:45:21 AM
Project: \\global.arup.com\australasia\SYD\Projects\259000\259995-00 SFS Development Transport\Work\05 Arup Project Data\Intersection Assessment\SIDRA Modelling\Intersection 1 - Moore Park Rd, Driver Ave.sip7

MOVEMENT SUMMARY

Site: [Intersection 1 SAT Existing]

Moore Park Road/ Driver Avenue
Signals - Fixed Time Isolated Cycle Time = 60 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Driver Avenue											
1	L2	154	2.0	0.240	20.7	LOS B	3.2	23.1	0.75	0.75	40.6
3	R2	121	2.0	0.661	36.9	LOS C	3.8	27.1	1.00	0.84	32.7
Approach		275	2.0	0.661	27.9	LOS B	3.8	27.1	0.86	0.79	36.7
East: Moore Park Road											
4	L2	142	2.0	0.792	24.3	LOS B	18.8	134.2	0.92	0.91	40.9
5	T1	1212	2.0	0.792	18.6	LOS B	19.3	137.2	0.92	0.90	38.0
Approach		1354	2.0	0.792	19.2	LOS B	19.3	137.2	0.92	0.90	38.4
West: Moore Park Rd											
11	T1	1221	2.0	0.396	1.0	LOS A	2.7	19.2	0.31	0.20	57.4
12	R2	446	2.0	0.813	37.9	LOS C	7.4	52.5	1.00	0.96	32.7
Approach		1667	2.0	0.813	10.8	LOS A	7.4	52.5	0.50	0.40	45.6
All Vehicles		3296	2.0	0.813	15.7	LOS B	19.3	137.2	0.70	0.64	41.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	62	15.4	LOS B	0.1	0.1	0.72	0.72
All Pedestrians		62	15.4	LOS B			0.72	0.72

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: [Intersection 1 SUN Existing]

Moore Park Road/ Driver Avenue
Signals - Fixed Time Isolated Cycle Time = 60 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Driver Avenue											
1	L2	201	2.0	0.264	18.1	LOS B	3.9	27.8	0.69	0.75	42.2
3	R2	106	2.0	0.581	36.1	LOS C	3.3	23.3	1.00	0.80	33.0
Approach		307	2.0	0.581	24.3	LOS B	3.9	27.8	0.80	0.77	38.5
East: Moore Park Road											
4	L2	201	2.0	0.820	31.7	LOS C	14.9	106.4	0.98	1.00	36.4
5	T1	874	2.0	0.820	24.0	LOS B	18.6	132.5	0.97	0.98	34.3
Approach		1075	2.0	0.820	25.5	LOS B	18.6	132.5	0.97	0.98	34.8
West: Moore Park Rd											
11	T1	1192	2.0	0.387	1.0	LOS A	2.6	18.4	0.31	0.20	57.4
12	R2	638	2.0	0.804	34.7	LOS C	10.2	72.9	1.00	0.95	33.9
Approach		1829	2.0	0.804	12.7	LOS A	10.2	72.9	0.55	0.46	44.1
All Vehicles		3212	2.0	0.820	18.1	LOS B	18.6	132.5	0.72	0.66	40.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	224	18.6	LOS B	0.3	0.3	0.79	0.79
All Pedestrians		224	18.6	LOS B			0.79	0.79

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: [Intersection 1 MON Existing]

Moore Park Road/ Driver Avenue
Signals - Fixed Time Isolated Cycle Time = 50 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Driver Avenue											
1	L2	157	2.0	0.238	17.9	LOS B	2.7	19.5	0.74	0.75	42.2
3	R2	107	2.0	0.489	29.7	LOS C	2.7	19.0	0.98	0.77	35.7
Approach		264	2.0	0.489	22.7	LOS B	2.7	19.5	0.83	0.76	39.3
East: Moore Park Road											
4	L2	108	2.0	0.673	19.7	LOS B	10.6	75.2	0.88	0.80	43.9
5	T1	912	2.0	0.673	14.1	LOS A	10.9	77.4	0.88	0.79	41.7
Approach		1020	2.0	0.673	14.7	LOS B	10.9	77.4	0.88	0.79	42.0
West: Moore Park Rd											
11	T1	1593	2.0	0.544	1.4	LOS A	4.1	29.4	0.44	0.29	56.4
12	R2	112	2.0	0.254	28.8	LOS C	1.3	9.5	0.94	0.74	36.5
Approach		1704	2.0	0.544	3.2	LOS A	4.1	29.4	0.47	0.32	53.7
All Vehicles		2988	2.0	0.673	8.8	LOS A	10.9	77.4	0.64	0.52	47.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

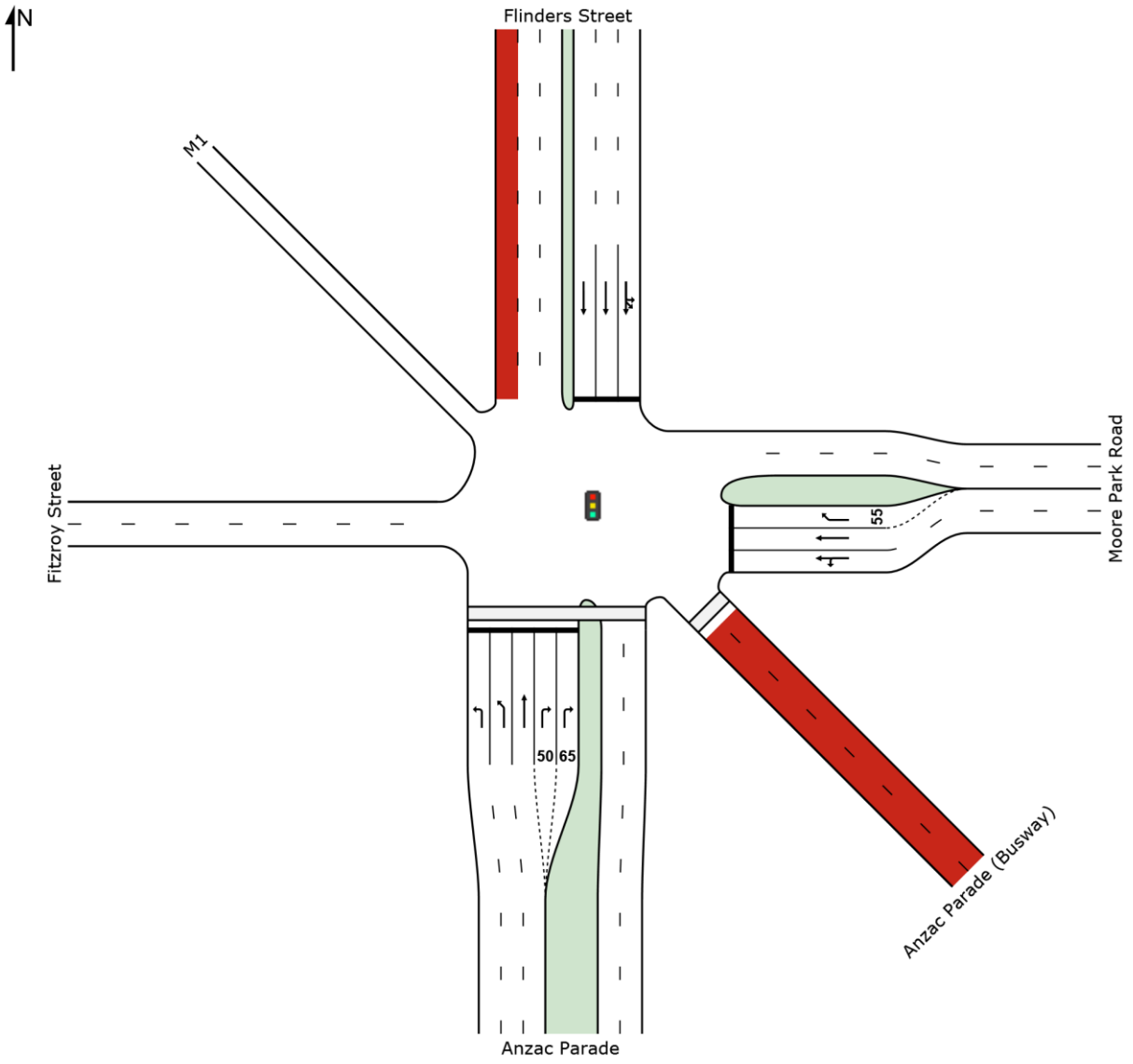
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	65	16.0	LOS B	0.1	0.1	0.80	0.80
All Pedestrians		65	16.0	LOS B			0.80	0.80

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

SITE LAYOUT

Site: [Intersection 2 SAT Existing]

Signals - Fixed Time Isolated



Organisation: ARUP PTY LTD | Created: Tuesday, 27 March 2018 11:46:35 AM
Project: \\global.arup.com\australasia\SYD\Projects\259000\259995-00 SFS Development Transport\Work\05 Arup Project Data\Intersection Assessment\SIDRA Modelling\Intersection 2 - Moore Park Rd, ANZAC Pde, Flinders St, Fitzroy St, M1.sip7

MOVEMENT SUMMARY

Site: [Intersection 2 SAT Existing]

Signals - Fixed Time Isolated Cycle Time = 70 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Anzac Parade											
1	L2	371	2.0	0.553	24.6	LOS B	10.2	72.5	0.84	0.82	33.8
1a	L1	512	2.0	0.742	27.0	LOS B	16.1	114.7	0.93	0.88	43.5
2	T1	369	2.0	0.525	18.8	LOS B	10.0	71.2	0.83	0.72	40.8
3	R2	332	2.0	0.517	32.2	LOS C	5.1	36.2	0.95	0.81	34.2
Approach		1583	2.0	0.742	25.6	LOS B	16.1	114.7	0.89	0.81	38.8
East: Moore Park Road											
4	L2	136	2.0	0.691	25.2	LOS B	14.3	101.7	0.90	0.81	38.3
5	T1	816	2.0	0.691	21.0	LOS B	14.3	101.7	0.91	0.81	29.2
6a	R1	317	2.0	0.471	21.9	LOS B	8.5	60.4	0.82	0.76	42.5
Approach		1268	2.0	0.691	21.7	LOS B	14.3	101.7	0.89	0.80	34.7
North: Flinders Street											
7	L2	418	2.0	0.354	11.3	LOS A	6.5	46.0	0.48	0.72	37.6
7a	L1	7	2.0	0.354	10.0	LOS A	6.5	46.0	0.48	0.72	46.2
8	T1	502	2.0	0.761	33.5	LOS C	9.0	64.3	1.00	0.92	32.6
Approach		927	2.0	0.761	23.3	LOS B	9.0	64.3	0.76	0.83	34.3
All Vehicles		3779	2.0	0.761	23.7	LOS B	16.1	114.7	0.86	0.81	36.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	572	25.5	LOS C	1.0	1.0	0.86	0.86
P5	SouthEast Full Crossing	176	9.3	LOS A	0.2	0.2	0.52	0.52
All Pedestrians		747	21.7	LOS C			0.78	0.78

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: [Intersection 2 SUN Existing]

Signals - Fixed Time Isolated Cycle Time = 70 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Anzac Parade											
1	L2	285	2.0	0.503	27.1	LOS B	8.1	57.8	0.86	0.81	32.5
1a	L1	377	2.0	0.646	27.3	LOS B	11.3	80.7	0.92	0.83	43.4
2	T1	261	2.0	0.438	20.9	LOS B	7.2	51.4	0.84	0.71	39.3
3	R2	341	2.0	0.640	35.7	LOS C	5.5	39.1	0.98	0.86	32.8
Approach		1264	2.0	0.646	28.2	LOS B	11.3	80.7	0.91	0.81	37.3
East: Moore Park Road											
4	L2	137	2.0	0.500	19.8	LOS B	10.0	71.2	0.76	0.71	41.1
5	T1	667	2.0	0.500	15.9	LOS B	10.2	72.4	0.78	0.69	32.8
6a	R1	162	2.0	0.208	17.1	LOS B	3.6	25.4	0.68	0.67	45.7
Approach		966	2.0	0.500	16.7	LOS B	10.2	72.4	0.76	0.69	37.3
North: Flinders Street											
7	L2	578	2.0	0.614	16.9	LOS B	14.1	100.7	0.72	0.81	33.2
7a	L1	35	2.0	0.614	15.6	LOS B	14.1	100.7	0.72	0.81	41.7
8	T1	407	2.0	0.741	34.6	LOS C	7.3	52.3	1.00	0.90	32.1
Approach		1020	2.0	0.741	23.9	LOS B	14.1	100.7	0.83	0.84	32.9
All Vehicles		3251	2.0	0.741	23.4	LOS B	14.1	100.7	0.84	0.78	36.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	1913	23.5	LOS C	3.2	3.2	0.85	0.85
P5	SouthEast Full Crossing	724	8.5	LOS A	0.7	0.7	0.50	0.50
All Pedestrians		2637	19.4	LOS B			0.76	0.76

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: [Intersection 2 MON Existing]

Signals - Fixed Time Isolated Cycle Time = 80 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Anzac Parade											
1	L2	395	2.0	0.417	18.0	LOS B	9.4	66.6	0.65	0.77	37.8
1a	L1	515	2.0	0.528	18.0	LOS B	13.2	93.9	0.71	0.79	48.8
2	T1	371	2.0	0.372	12.0	LOS A	8.5	60.6	0.63	0.55	46.1
3	R2	227	2.0	0.401	27.4	LOS B	3.8	26.9	0.89	0.80	36.2
Approach		1507	2.0	0.528	17.9	LOS B	13.2	93.9	0.70	0.73	43.5
East: Moore Park Road											
4	L2	81	2.0	0.804	39.8	LOS C	15.3	108.7	1.00	0.98	32.2
5	T1	660	2.0	0.804	35.5	LOS C	15.3	108.7	1.00	0.98	22.3
6a	R1	289	2.0	0.646	33.4	LOS C	10.5	74.7	0.96	0.83	36.3
Approach		1031	2.0	0.804	35.3	LOS C	15.3	108.7	0.99	0.93	27.9
North: Flinders Street											
7	L2	978	2.0	0.765	12.8	LOS A	24.0	170.9	0.67	0.81	36.3
7a	L1	24	2.0	0.765	11.5	LOS A	24.0	170.9	0.67	0.81	44.9
8	T1	625	2.0	0.448	21.1	LOS B	9.4	66.6	0.81	0.69	39.3
Approach		1627	2.0	0.765	16.0	LOS B	24.0	170.9	0.72	0.77	37.8
All Vehicles		4165	2.0	0.804	21.5	LOS B	24.0	170.9	0.78	0.79	37.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

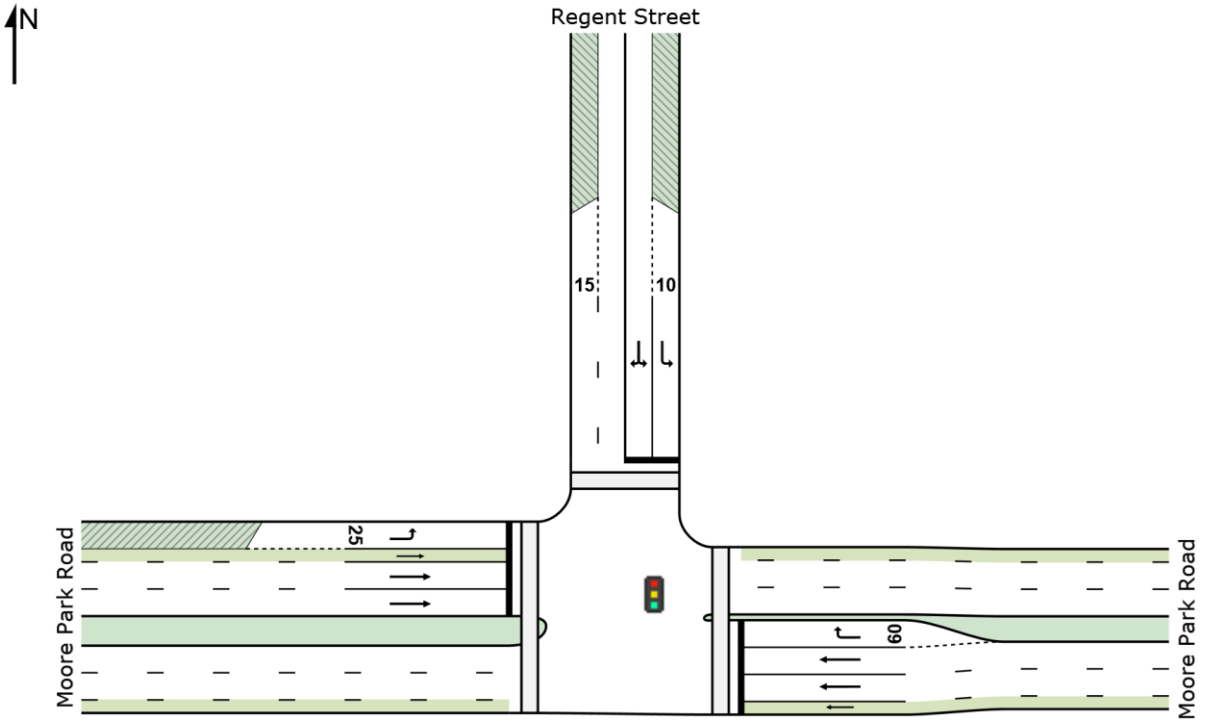
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	158	34.5	LOS D	0.3	0.3	0.93	0.93
P5	SouthEast Full Crossing	49	17.6	LOS B	0.1	0.1	0.66	0.66
All Pedestrians		207	30.4	LOS D			0.87	0.87

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

SITE LAYOUT

Site: [Intersection 3 SAT Existing]

Signals - Fixed Time Isolated



Organisation: ARUP PTY LTD | Created: Tuesday, 27 March 2018 11:47:20 AM
Project: \\global.arup.com\australasia\SYD\Projects\259000\259995-00 SFS Development Transport\Work\05 Arup Project Data\Intersection Assessment\SIDRA Modelling\Intersection 3 - Moore Park Rd, Regent St.sip7

MOVEMENT SUMMARY

Site: [Intersection 3 SAT Existing]

Signals - Fixed Time Isolated Cycle Time = 50 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Moore Park Road											
5	T1	1022	2.0	0.469	7.1	LOS A	7.5	53.1	0.64	0.56	43.2
6	R2	65	2.0	0.173	19.9	LOS B	1.3	9.0	0.87	0.71	38.2
Approach		1087	2.0	0.469	7.9	LOS A	7.5	53.1	0.65	0.57	42.7
North: Regent Street											
7	L2	33	2.0	0.041	13.2	LOS A	0.5	3.2	0.59	0.65	41.4
9	R2	31	2.0	0.093	23.8	LOS B	0.6	4.6	0.86	0.70	34.1
Approach		63	2.0	0.093	18.3	LOS B	0.6	4.6	0.72	0.67	38.0
West: Moore Park Road											
10	L2	53	2.0	0.046	8.6	LOS A	0.5	3.6	0.41	0.63	42.3
11	T1	1054	2.0	0.868	25.8	LOS B	15.8	112.8	0.99	1.11	31.8
Approach		1106	2.0	0.868	25.0	LOS B	15.8	112.8	0.96	1.09	32.2
All Vehicles		2257	2.0	0.868	16.6	LOS B	15.8	112.8	0.81	0.83	36.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	67	19.4	LOS B	0.1	0.1	0.88	0.88
P3	North Full Crossing	36	19.4	LOS B	0.0	0.0	0.88	0.88
P4	West Full Crossing	32	19.4	LOS B	0.0	0.0	0.88	0.88
All Pedestrians		135	19.4	LOS B			0.88	0.88

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: [Intersection 3 SUN Existing]

Signals - Fixed Time Isolated Cycle Time = 70 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Moore Park Road											
5	T1	966	2.0	0.527	14.0	LOS A	11.5	82.2	0.75	0.66	38.0
6	R2	101	2.0	0.372	31.2	LOS C	3.1	22.2	0.94	0.75	33.9
Approach		1067	2.0	0.527	15.7	LOS B	11.5	82.2	0.77	0.67	37.4
North: Regent Street											
7	L2	49	2.0	0.051	13.1	LOS A	0.8	5.8	0.51	0.65	41.4
9	R2	69	2.0	0.133	24.8	LOS B	1.8	12.7	0.78	0.72	33.6
Approach		119	2.0	0.133	19.9	LOS B	1.8	12.7	0.66	0.69	37.0
West: Moore Park Road											
10	L2	97	2.2	0.079	8.8	LOS A	1.1	8.1	0.37	0.63	42.1
11	T1	966	2.0	0.880	35.3	LOS C	20.5	146.1	0.98	1.10	28.1
Approach		1063	2.0	0.880	32.9	LOS C	20.5	146.1	0.93	1.05	29.0
All Vehicles		2249	2.0	0.880	24.0	LOS B	20.5	146.1	0.84	0.85	33.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	306	26.9	LOS C	0.5	0.5	0.88	0.88
P3	North Full Crossing	9	24.9	LOS C	0.0	0.0	0.84	0.84
P4	West Full Crossing	338	29.7	LOS C	0.6	0.6	0.93	0.93
All Pedestrians		654	28.3	LOS C			0.91	0.91

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: [Intersection 3 MON Existing]

Signals - Fixed Time Isolated Cycle Time = 60 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Moore Park Road											
5	T1	821	2.0	0.301	3.7	LOS A	4.5	32.0	0.41	0.35	46.1
6	R2	71	2.0	0.209	19.8	LOS B	1.5	11.0	0.81	0.74	38.3
Approach		892	2.0	0.301	4.9	LOS A	4.5	32.0	0.44	0.38	45.0
North: Regent Street											
7	L2	36	2.0	0.065	20.9	LOS B	0.8	5.4	0.74	0.69	37.8
9	R2	29	2.0	0.161	33.0	LOS C	0.8	6.0	0.95	0.71	30.4
Approach		65	2.0	0.161	26.4	LOS B	0.8	6.0	0.83	0.70	34.5
West: Moore Park Road											
10	L2	56	2.0	0.044	7.5	LOS A	0.5	3.5	0.32	0.61	43.0
11	T1	1471	2.0	0.778	15.6	LOS B	19.7	140.3	0.86	0.84	37.2
Approach		1526	2.0	0.778	15.3	LOS B	19.7	140.3	0.85	0.83	37.4
All Vehicles		2483	2.0	0.778	11.8	LOS A	19.7	140.3	0.70	0.67	39.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

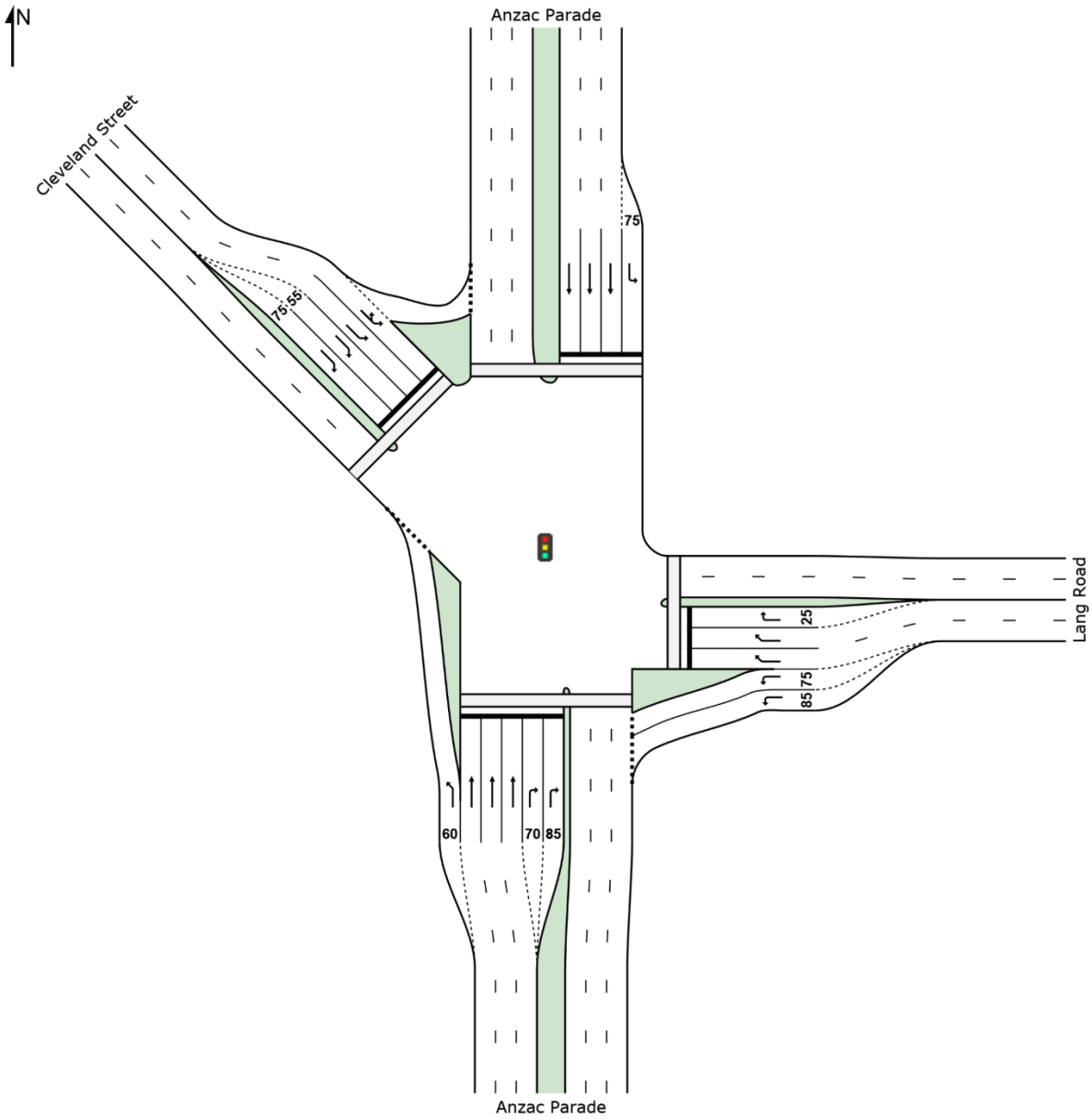
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	6	24.3	LOS C	0.0	0.0	0.90	0.90
P3	North Full Crossing	2	13.3	LOS B	0.0	0.0	0.67	0.67
P4	West Full Crossing	3	24.3	LOS C	0.0	0.0	0.90	0.90
All Pedestrians		12	22.3	LOS C			0.86	0.86

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

SITE LAYOUT

Site: [Intersection 4 SAT Existing]

Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: [Intersection 4 SAT Existing]

Signals - Fixed Time Isolated Cycle Time = 100 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Anzac Parade											
1a	L1	386	2.0	0.265	6.4	LOS A	2.7	19.3	0.23	0.63	52.7
2	T1	1045	2.0	0.433	22.0	LOS B	12.0	85.4	0.76	0.65	44.7
3	R2	548	2.0	0.836	56.5	LOS E	14.5	103.5	1.00	0.94	26.0
Approach		1980	2.0	0.836	28.5	LOS C	14.5	103.5	0.72	0.73	39.4
East: Lang Road											
4	L2	473	2.0	0.220	10.7	LOS A	4.0	28.4	0.49	0.66	47.7
6a	R1	239	2.0	0.229	32.4	LOS C	4.5	32.0	0.81	0.71	31.0
6	R2	119	2.0	0.547	51.1	LOS D	5.7	40.6	0.99	0.79	18.8
Approach		831	2.0	0.547	22.8	LOS B	5.7	40.6	0.65	0.69	36.5
North: Anzac Parade											
7	L2	321	2.0	0.584	23.4	LOS B	7.8	55.8	0.90	0.82	30.1
8	T1	900	2.0	0.866	52.1	LOS D	16.4	116.5	1.00	0.99	29.9
Approach		1221	2.0	0.866	44.6	LOS D	16.4	116.5	0.97	0.95	29.9
NorthWest: Cleveland Street											
27b	L3	97	2.0	0.471	31.3	LOS C	8.6	61.5	0.85	0.81	33.7
27a	L1	397	2.0	0.471	32.9	LOS C	10.1	71.9	0.87	0.79	30.2
29a	R1	368	2.0	0.818	56.0	LOS D	9.8	69.6	1.00	0.96	30.4
Approach		862	2.0	0.818	42.6	LOS D	10.1	71.9	0.92	0.87	30.6
All Vehicles		4894	2.0	0.866	34.0	LOS C	16.4	116.5	0.81	0.80	34.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	192	44.5	LOS E	0.5	0.5	0.95	0.95
P2	East Full Crossing	24	44.2	LOS E	0.1	0.1	0.94	0.94
P3	North Full Crossing	65	44.3	LOS E	0.2	0.2	0.94	0.94
P7	NorthWest Full Crossing	21	28.1	LOS C	0.0	0.0	0.75	0.75
All Pedestrians		302	43.3	LOS E			0.93	0.93

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: [Intersection 4 SUN Existing]

Signals - Fixed Time Isolated Cycle Time = 110 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Anzac Parade											
1a	L1	354	2.0	0.241	6.6	LOS A	2.9	20.7	0.23	0.63	52.6
2	T1	1073	2.0	0.403	20.7	LOS B	12.5	89.2	0.71	0.61	45.7
3	R2	580	2.0	0.761	53.9	LOS D	15.5	110.4	1.00	0.88	26.8
Approach		2006	2.0	0.761	27.8	LOS B	15.5	110.4	0.71	0.69	39.8
East: Lang Road											
4	L2	495	2.0	0.221	10.2	LOS A	4.2	29.9	0.45	0.65	48.2
6a	R1	287	2.0	0.303	38.3	LOS C	6.3	44.6	0.85	0.74	28.8
6	R2	122	2.0	0.576	55.9	LOS D	6.4	45.9	0.99	0.79	17.7
Approach		904	2.0	0.576	25.3	LOS B	6.4	45.9	0.65	0.70	35.1
North: Anzac Parade											
7	L2	314	2.0	0.538	23.6	LOS B	7.6	53.8	0.87	0.82	30.0
8	T1	846	2.0	0.733	46.6	LOS D	14.8	105.4	0.99	0.87	31.8
Approach		1160	2.0	0.733	40.4	LOS C	14.8	105.4	0.96	0.86	31.5
NorthWest: Cleveland Street											
27b	L3	79	2.0	0.608	41.9	LOS C	12.9	91.6	0.93	0.85	29.9
27a	L1	496	2.0	0.608	41.0	LOS C	13.8	98.3	0.93	0.83	27.5
29a	R1	324	2.0	0.731	57.4	LOS E	9.0	63.9	1.00	0.88	30.0
Approach		899	2.0	0.731	47.0	LOS D	13.8	98.3	0.96	0.85	28.8
All Vehicles		4969	2.0	0.761	33.8	LOS C	15.5	110.4	0.80	0.76	34.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	147	49.5	LOS E	0.4	0.4	0.95	0.95
P2	East Full Crossing	142	47.6	LOS E	0.4	0.4	0.93	0.93
P3	North Full Crossing	148	49.5	LOS E	0.4	0.4	0.95	0.95
P7	NorthWest Full Crossing	134	26.4	LOS C	0.3	0.3	0.69	0.69
All Pedestrians		572	43.6	LOS E			0.89	0.89

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: [Intersection 4 MON Existing]

Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Anzac Parade											
1a	L1	437	2.0	0.280	6.7	LOS A	4.8	34.2	0.21	0.62	52.5
2	T1	1359	2.0	0.481	21.5	LOS B	22.2	157.8	0.65	0.57	45.1
3	R2	499	2.0	0.935	96.1	LOS F	22.7	161.9	1.00	1.00	18.3
Approach		2295	2.0	0.935	34.9	LOS C	22.7	161.9	0.64	0.68	36.4
East: Lang Road											
4	L2	757	2.0	0.471	27.7	LOS B	16.7	118.7	0.74	0.77	35.8
6a	R1	257	2.0	0.387	60.1	LOS E	8.7	61.9	0.92	0.77	23.0
6	R2	58	2.0	0.218	65.8	LOS E	3.8	26.8	0.92	0.75	15.8
Approach		1072	2.0	0.471	37.5	LOS C	16.7	118.7	0.79	0.77	30.4
North: Anzac Parade											
7	L2	58	2.0	0.063	16.8	LOS B	1.1	8.1	0.54	0.70	34.9
8	T1	1785	2.0	0.891	59.0	LOS E	46.4	330.7	1.00	0.99	27.8
Approach		1843	2.0	0.891	57.7	LOS E	46.4	330.7	0.98	0.98	27.9
NorthWest: Cleveland Street											
27b	L3	75	2.0	0.864	77.9	LOS F	22.9	162.8	1.00	1.01	21.4
27a	L1	471	2.0	0.864	75.2	LOS F	22.9	162.8	1.00	0.99	19.9
29a	R1	465	2.0	0.910	86.8	LOS F	20.9	148.5	1.00	1.04	24.2
Approach		1011	2.0	0.910	80.8	LOS F	22.9	162.8	1.00	1.02	22.2
All Vehicles		6220	2.0	0.935	49.5	LOS D	46.4	330.7	0.83	0.84	29.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

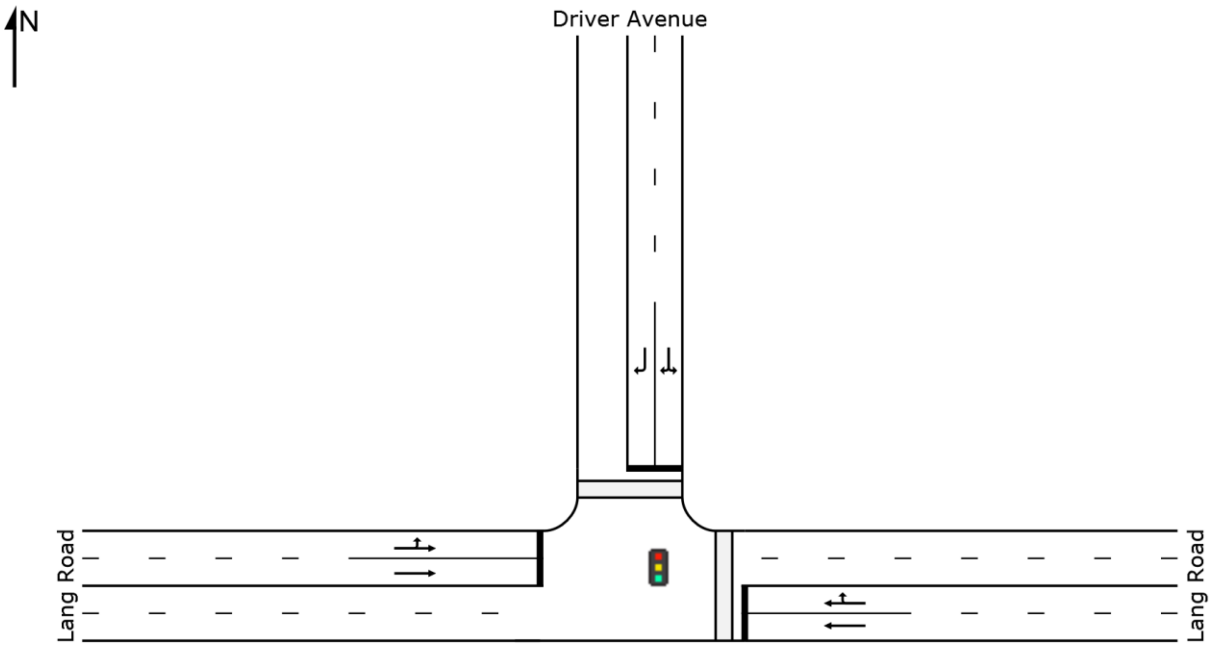
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	131	69.5	LOS F	0.5	0.5	0.97	0.97
P2	East Full Crossing	167	41.4	LOS E	0.5	0.5	0.75	0.75
P3	North Full Crossing	20	69.2	LOS F	0.1	0.1	0.96	0.96
P7	NorthWest Full Crossing	7	24.1	LOS C	0.0	0.0	0.57	0.57
All Pedestrians		325	54.0	LOS E			0.84	0.84

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

SITE LAYOUT

Site: [Intersection 5 SAT Existing]

Signals - Fixed Time Isolated



Organisation: ARUP PTY LTD | Created: Tuesday, 27 March 2018 11:50:34 AM
Project: \\global.arup.com\australasia\SYD\Projects\259000\259995-00 SFS Development Transport\Work\05 Arup Project Data\Intersection Assessment\SIDRA Modelling\Intersection 5 - Lang Rd, Driver Avenue.sip7

MOVEMENT SUMMARY

Site: [Intersection 5 SAT Existing]

Signals - Fixed Time Isolated Cycle Time = 70 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Lang Road											
5	T1	806	2.0	0.362	7.2	LOS A	7.1	50.3	0.53	0.46	36.0
6	R2	17	2.0	0.362	12.9	LOS A	6.8	48.6	0.58	0.49	41.4
Approach		823	2.0	0.362	7.3	LOS A	7.1	50.3	0.53	0.46	36.3
North: Driver Avenue											
7	L2	72	2.0	0.162	24.3	LOS B	2.2	15.6	0.77	0.73	31.9
9	R2	69	2.0	0.162	29.7	LOS C	2.2	15.6	0.85	0.73	30.6
Approach		141	2.0	0.162	27.0	LOS B	2.2	15.6	0.81	0.73	31.2
West: Lang Road											
10	L2	271	2.0	0.780	24.8	LOS B	20.2	143.9	0.90	0.87	33.9
11	T1	1046	2.0	0.780	20.3	LOS B	20.9	149.1	0.91	0.87	23.6
Approach		1317	2.0	0.780	21.2	LOS B	20.9	149.1	0.91	0.87	26.8
All Vehicles		2281	2.0	0.780	16.6	LOS B	20.9	149.1	0.77	0.72	29.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	100	29.4	LOS C	0.2	0.2	0.92	0.92
P3	North Full Crossing	68	17.2	LOS B	0.1	0.1	0.70	0.70
All Pedestrians		168	24.4	LOS C			0.83	0.83

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: [Intersection 5 SUN Existing]

Signals - Fixed Time Isolated Cycle Time = 60 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Lang Road											
5	T1	803	2.0	0.381	5.9	LOS A	6.3	44.6	0.52	0.46	37.7
6	R2	39	2.0	0.381	13.1	LOS A	5.9	41.7	0.63	0.54	41.0
Approach		842	2.0	0.381	6.3	LOS A	6.3	44.6	0.53	0.46	38.0
North: Driver Avenue											
7	L2	92	2.0	0.363	27.9	LOS B	3.4	23.9	0.91	0.77	30.3
9	R2	113	2.0	0.363	31.3	LOS C	3.4	23.9	0.94	0.76	30.0
Approach		204	2.0	0.363	29.8	LOS C	3.4	23.9	0.93	0.76	30.1
West: Lang Road											
10	L2	487	2.0	0.800	22.0	LOS B	19.6	139.8	0.88	0.90	34.6
11	T1	976	2.0	0.800	17.6	LOS B	20.8	147.8	0.90	0.90	25.3
Approach		1463	2.0	0.800	19.1	LOS B	20.8	147.8	0.89	0.90	29.8
All Vehicles		2509	2.0	0.800	15.6	LOS B	20.8	147.8	0.77	0.74	31.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	58	24.4	LOS C	0.1	0.1	0.90	0.90
P3	North Full Crossing	22	14.0	LOS B	0.0	0.0	0.68	0.68
All Pedestrians		80	21.5	LOS C			0.84	0.84

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: [Intersection 5 MON Existing]

Signals - Fixed Time Isolated Cycle Time = 50 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Lang Road											
5	T1	824	2.0	0.424	6.6	LOS A	6.5	46.2	0.62	0.53	36.6
6	R2	45	2.0	0.424	12.3	LOS A	5.7	40.9	0.68	0.57	41.5
Approach		869	2.0	0.424	6.9	LOS A	6.5	46.2	0.62	0.53	37.1
North: Driver Avenue											
7	L2	101	2.0	0.532	24.3	LOS B	4.5	31.9	0.93	0.80	31.9
9	R2	251	2.0	0.532	25.9	LOS B	4.5	31.9	0.95	0.79	32.2
Approach		352	2.0	0.532	25.4	LOS B	4.5	31.9	0.95	0.79	32.1
West: Lang Road											
10	L2	97	2.0	0.725	21.3	LOS B	11.4	81.1	0.92	0.87	36.1
11	T1	903	2.0	0.725	16.8	LOS B	11.6	82.6	0.92	0.87	26.1
Approach		1000	2.0	0.725	17.2	LOS B	11.6	82.6	0.92	0.87	27.8
All Vehicles		2221	2.0	0.725	14.5	LOS A	11.6	82.6	0.81	0.72	31.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	72	19.4	LOS B	0.1	0.1	0.88	0.88
P3	North Full Crossing	23	17.7	LOS B	0.0	0.0	0.84	0.84
All Pedestrians		95	19.0	LOS B			0.87	0.87

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.