

APPENDIX A

APPENDIX A FIVE YEAR GROUND TRANSPORT PLAN

1.0 Airports Act 1996 S71(2)(ga) requirements

This appendix provides details of the five year ground transport plan that is summarised in Chapter 7. **Table A1** outlines where the requirements of Section 71(2)(ga) of the Airports Act regarding the contents of five year ground transport plans are addressed within this appendix.

Table A1 Master Plan compliance for five year ground transport plan

Airports Act 1996 S71(2)(ga) requirements		Section
a.	A road network plan	2
b.	The facilities for moving people (employees, passengers and other airport users) and freight at the airport	3
c.	The linkages between those facilities, the road network and public transport system at the airport, and the road network and public transport system outside the airport	4
d.	The arrangements for working with the state or local authorities or other bodies responsible for the road network and the public transport system	5
e.	The capacity of the ground transport system at the airport to support operations and other activities at the airport	6
f.	The likely effect of the proposed developments in the master plan on the ground transport system and traffic flows at, and surrounding, the airport	7

2.0 Road network plans

Airport/Qantas Drive is used as a major arterial road on the Sydney road network. Studies have concluded that up to 52% of the traffic on Airport Drive in the AM and PM peaks is non-airport traffic. General commuters and Port Botany traffic place a significant additional load on the roads surrounding the airport.

Sydney Airport has identified ground transport solutions that improve the performance of the roads and intersections in and around Sydney Airport. The forecast ground transport traffic demand can be met in 2018 and beyond the 2033 horizon of the Master Plan.

Completion of the WestConnex motorway within the 20 year horizon of the Master Plan will allow some non-airport traffic to bypass the airport and will provide the opportunity for journey times to and from the CBD to either precinct to be more reliable.

This ground transport plan has been developed in consultation with Transport for NSW (TfNSW) and NSW Roads and Maritime Services (RMS).

Figure A1 provides a layout of the airport precinct identifying where each of the road network plan diagrams is located.

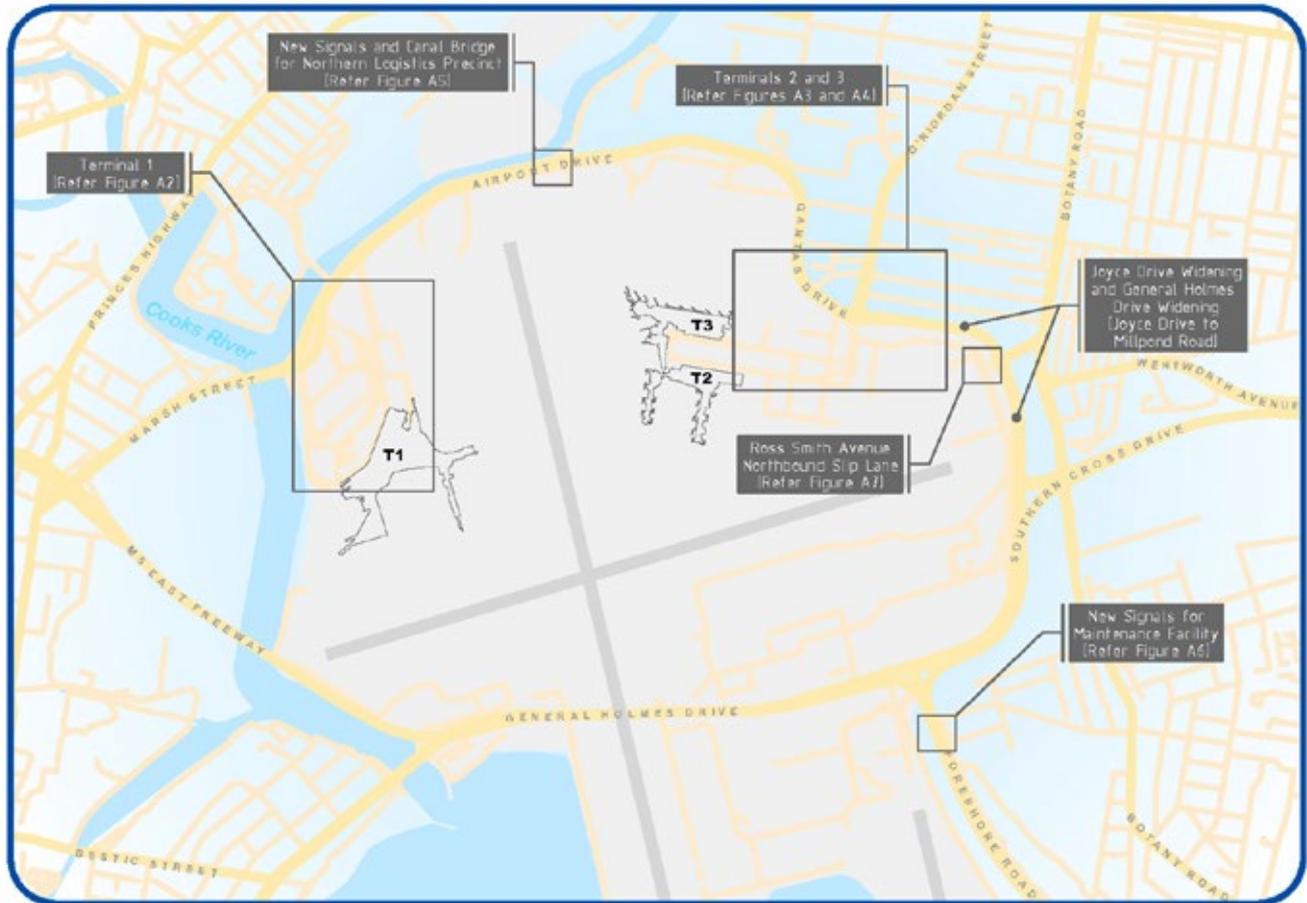
2.1 Terminal 1

The reconfiguration at Terminal 1 (T1) to create a centre road is designed to deliver a free flowing traffic corridor for the expected volume of traffic through the car park with faster exits. Relocating the boom gates away from the perimeter of the current car park to the entries and exits of the multi-storey car parks (MSCP) and the open-air car park area increases the available queuing space for vehicles. In turn this minimises the possibility of queues in peak periods interfering with the flow of traffic on the road network in the precinct. The open-air area would be configured to provide a convenient location for those vehicles seeking to drop-off or pick up quickly.

In addition, it is proposed that the existing Cooks River entrance gates would be converted into an east-bound exit to the city and eastern suburbs. Providing this additional exit point will help spread the exiting traffic and lower the demand on the main exit point providing the opportunity for smoother merging onto Airport Drive. The current entry ramp from Airport Drive and exit ramp to Marsh Street are planned to be widened to two lanes each, with the exit ramp optimised by a tidal lane configuration to provide capacity for exiting traffic onto Giovanni Brunetti Bridge.

By separating traffic heading towards the car parks and the departures kerb, the construction of new access roads will

Figure A1 Airport precinct map



significantly reduce existing congestion points for traffic merging from Marsh Street and Airport Drive, This will improve efficiency and reliability for all road users entering the T1 precinct (see images below).

The works comprise six projects. Project 1 involves minor civil works which are already under way on the Airport Drive intersection with Link Road and a development application for Projects 2 to 6 has been lodged for the planned reconfiguration of traffic flow through the car park. The development application identifies the components of each project as follows:

Project 2A

- Widening of the Departures Road up ramp to two lanes
- Relocation of entry plazas to all car park entry points
- Relocation of exit plazas to all car park exit points
- Reconfiguration of open air west parking including public pick-up and drop-off (new line-marking and passenger waiting facilities)
- Provision of a 3m wide shared path for pedestrians and cyclists from Cooks River through the open air west parking area to the terminal
- Provision of additional bicycle racks on the ground floor of the Central MSCP
- Provision of a new city express exit from open air west parking area
- Cooks River Avenue to Centre Road circulation road and reconfigured parking area for the Customs office building
- Enlargement of taxi holding bay (new line marking)
- New connection to taxi holding bay from Arrivals Court for vacant taxis

Project 2B

- Construction of ramp from Marsh Street to Centre Road
- Reconfiguration of Centre Road with traffic and pedestrian management measures
- Installation of traffic furniture and pedestrian crossing facilities on Centre Road

- Enlargement of limousine pick-up area (new line-marking)
- New pre-booked taxi area between taxi holding bay and limousine parking area
- New signalised intersection of Centre Road and Cooks River Avenue

Project 3

- Construction of Airport Drive exit to Arrivals Court for rental cars, bus operations, loading dock, hotel, office and fresh taxi access and staff parking
- Delineation of Departures Road weaving section to significantly reduce weaving movements

Project 4

- Construction of exit (down) ramp from Northern MSCP to Centre Road

Project 5

- Widening of Airport Drive to Centre Road to two lanes
- Widening of inbound Marsh Street off ramp to Departures Road

Project 6

- Tidal lane configuration for eastbound Marsh Street to Airport Drive, westbound Airport Drive to Marsh Street, and Cooks River Avenue to Marsh Street
- Widening of Cooks River Avenue ramp to Marsh Street

Figure A2 presents a plan of the road layout proposed at Terminal 1.

BEFORE: Existing view southwards from Airport Drive



AFTER: View of access improvements looking southwards from Airport Drive



2.2 Terminals 2 and 3

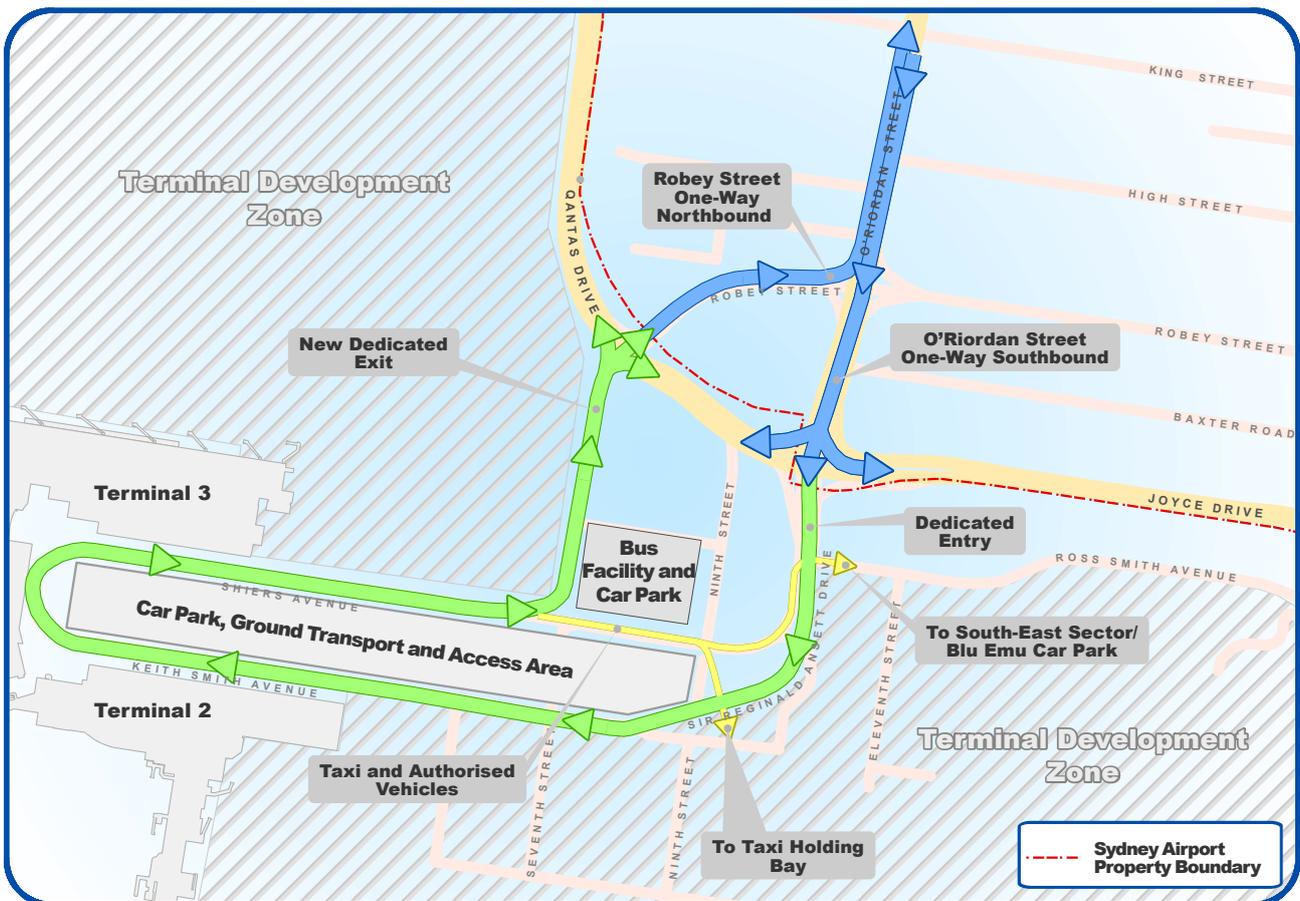
The primary challenge in the vicinity of Terminal 2/Terminal 3 (T2/T3) is the large volume of non-airport through traffic using the intersection at the entrance to the T2/T3 precinct competing with airport traffic using this intersection as the main ingress and egress point.

Sydney Airport has consulted with TfNSW and RMS in developing this plan and will continue to work closely with them to ensure the transport network is consistent with the road network proposals identified in the NSW Long Term Transport Master Plan (LTTMP).

Sydney Airport sees the key development proposals of this integrated network including:

- Inside Sydney Airport boundary
 - Extension of Seventh Street between Shiers Avenue and Qantas Drive to create a one-way system with vehicles entering the precinct via Sir Reginald Ansett Drive, and exiting via the new extension of Seventh Street
 - Optimisation of the Sir Reginald Ansett Drive/Ross Smith Avenue intersection to ensure that vehicles entering the precinct receive the most 'green time'. A low volume of authorised vehicles requiring access from the terminal precinct to the South East Sector will be permitted to access Ross Smith Avenue from this point
 - Widening of Qantas Drive between Robey Street and O'Riordan Street to six lanes
 - Other localised changes to the precinct roadway system

Figure A3 Access strategy and proposed infrastructure for Terminals 2 and 3



b) Outside Sydney Airport boundary

- Robey Street becoming one-way northbound from Qantas Drive to the intersection of O'Riordan Street and O'Riordan Street becoming one-way southbound between Robey Street and Joyce Drive with associated intersection improvements at Joyce Drive and O'Riordan Street
- The widening of Joyce Drive and General Holmes Drive to six lanes between Mill Pond Road and O'Riordan Street to provide consistent traffic access to the airport. The broad precinct strategy is presented in **Figure A3**.

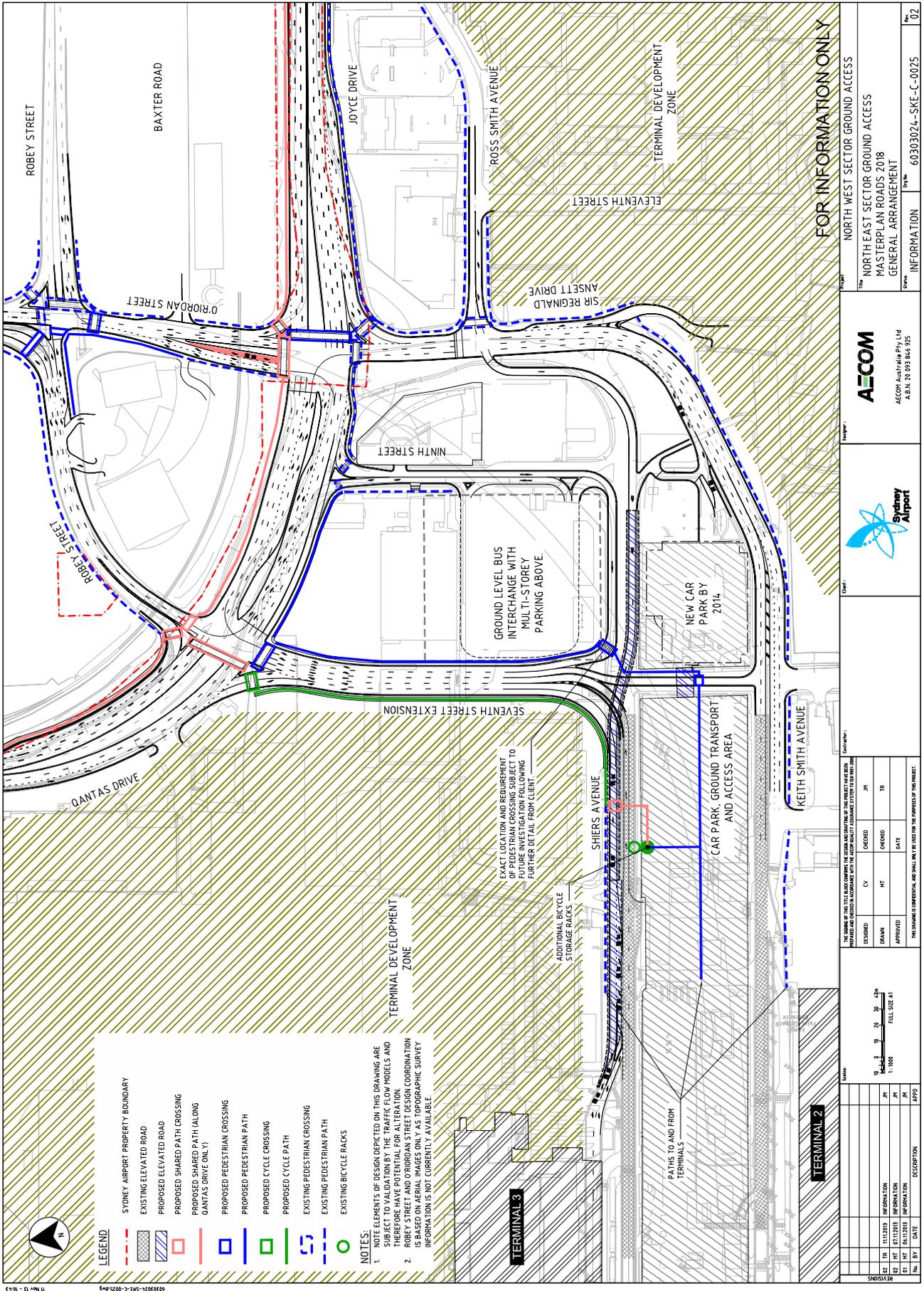
The proposed one-way system is a step-change from the previous Master Plan proposals and one which enables a demonstrably effective solution to the road transport network. The many benefits of this system, which have been verified through detailed traffic modelling (refer Section 6) include:

- Reducing conflicting movements at existing intersections and thereby greatly increasing capacity
- Enhancing traffic signal coordination and efficiency. With the proposed infrastructure in place, average vehicle delays will reduce from levels currently observed
- Increased throughput into, within and out of the precinct with improved traffic distribution and clearer way-finding
- An at-grade solution that is implementable with manageable disruption to existing movements
- The ability for public buses to enter and exit the precinct efficiently via Ninth Street and without significant delay due to otherwise circuitous routing.

Internally, the addition of a flyover across Seventh Street would allow taxis to access the taxi holding bay and for other authorised vehicles to access to the South East Sector via Ross Smith Avenue. This flyover would separate the traffic and ensure that vehicles exiting the car parks on Seventh Street are able to leave the precinct quickly.

Figure A4 presents an integrated concept plan of the road layout proposed for 2018 at Terminals 2 and 3 and the roads immediately adjacent to the airport boundary.

Figure A4 Terminals 2 and 3 road network plan 2018



2.3 Northern and South East Sectors

To facilitate access to the planned airport logistics development area, a new signalised intersection on Airport Drive and a landside bridge over Alexandra Canal is planned. This plan is shown in **Figure A5**.

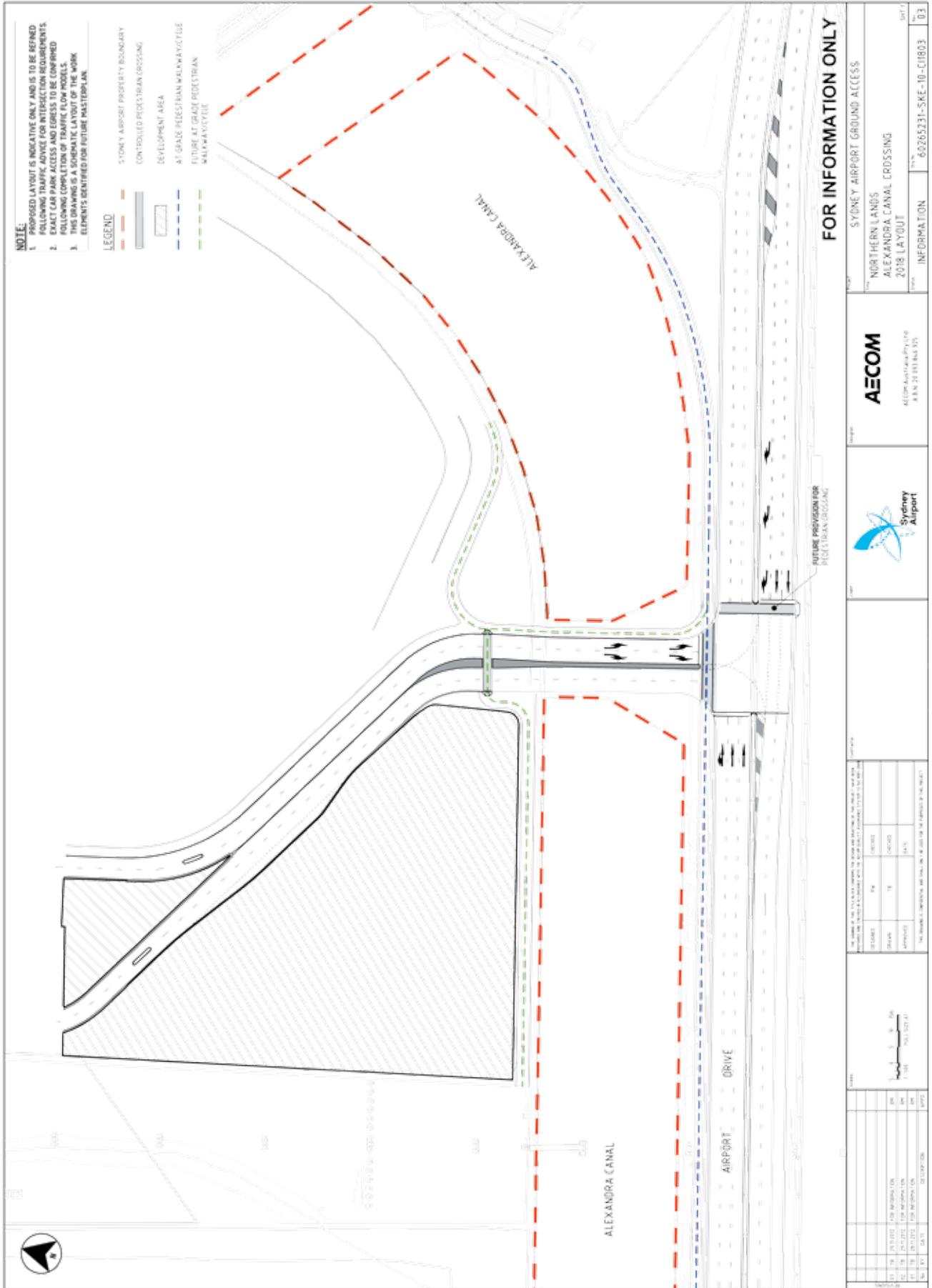
The existing landside bridge to the Qantas Jet Base provides another circulation option for access to aviation service-related functions to the north of the airport.

The planned maintenance and engineering precinct in the South East Sector would require improved airside links including upgraded airside roads and new bridges over General Holmes Drive. Landside access upgrades to these new facilities may be required and may include new intersection, road and bridge works. A plan for the proposed new intersection on Foreshore Drive is shown in **Figure A6**. The development plan preserves the opportunity for a landside bridge link across General Holmes Drive to facilitate access and connectivity for airport operations.

The proposed construction of a new deck by 2018 above the existing Blu Emu Car Park would replace the 2,000 parking spaces that will be displaced due to the new aprons in the south-east. By maintaining the number of parking spaces in this area, it is not expected that there will be any impact on the ground transport access requirements.

The construction of a northbound slip lane on Ross Smith Avenue at the intersection with Lords Road has recently been completed and is facilitating improved access for service vehicles from the South East Sector to T2/T3. This plan is shown in **Figure A7**.

Figure A5 Northern lands precinct access on Airport Drive



3.0 Facilities for moving people and freight

Well established arterial road and public transport networks serve both airport users and non-airport traffic. Access is provided by the Airport and East Hills train line, public buses, coaches, mini buses, taxis, limousines, private vehicles and walking/cycling links.

3.1 Roads

Sydney Airport is served by an extensive road transport system. The M5 East Motorway, the Eastern Distributor, Southern Cross Drive, General Holmes Drive, the Princes Highway and O’Riordan Street are the main vehicular access routes. Road access to Terminal 1 is provided by Airport Drive and Marsh Street. Road access to Terminals 2 and 3 is by the Qantas Drive/Joyce Drive/O’Riordan Street intersection.

Vehicular traffic surveys undertaken in November 2011¹ found that the proportion of non-airport traffic on most of the major roads in the peak direction of travel was considerably higher than the proportion of airport traffic.

On the principal routes such as the Princes Highway, General Holmes Drive, M5 East (east of Marsh Street) and Southern Cross Drive, the proportion of airport traffic was between 11%-25%. The proportion of airport traffic estimated to use the M5 East west of Marsh Street in the peak direction was 24%. On Airport Drive, non-airport through traffic accounts for up to 52% of movements in the AM and PM peak.

Planned changes to the road network, as outlined in Section 2.0 of this appendix and Chapter 7 of the Master Plan, will require close cooperation with TfNSW and RMS. This will be facilitated through the established working arrangements between these agencies and Sydney Airport identified in Section 5.0 of this appendix.

An airport transfer bus (T-Bus) operates between T1 and T2/T3 to facilitate passenger transfer between the terminal precincts. In addition the Blu Emu express bus operates 24 hours per day transferring staff and long-stay passengers from the Blu Emu Car Park (in the South East Sector) to T2/T3.

Road access and egress arrangements to freight facilities would be provided by intersections along Airport, Qantas and Joyce drives. Access to freight facilities near T1 will continue via Link Road while access to existing and relocated facilities in the North East Sector is planned to be via Lancastrian Road and Ross Smith Avenue.

3.2 Transport facilities

Taxis, coaches and mini-buses provide an important transport choice for passengers accessing Sydney Airport and account for over one fifth of all passenger trips. This is expected to decrease slightly over the period of the five year ground transport plan as more people choose public transport.

Sydney Airport has invested in upgrading facilities for taxis, coaches and buses over recent years and these are expected to be adequate for the period through to 2018.

Many passengers prefer to access the airport in private vehicles and Sydney Airport has also invested in providing parking, drop-off and pick-up facilities to cater for this requirement. Sydney Airport provides facilities for drop-off and pick-up at both T1 and T2/T3, which has proved to be a very popular option. Over the course of the five year ground transport plan, the proportion of passengers choosing to use the facilities in the car park precinct is expected to decrease as the use of public transport grows.

However, despite the expected modal share drop in demand for private access, there will be an increase in absolute terms for the number of vehicles requiring facilities in the T2/T3 precinct. Consequently, provision has been made as part of the five year ground transport plan for a public bus and multi-purpose parking facility of up to 3,000 spaces to cater for a range of uses including car rental, valet and limousine storage as well as general parking. At T1 the recent completion of a second multi-storey car park is expected to provide enough car spaces to accommodate forecast demand through until 2018.

3.3 Public transport

The Airport Link train stations at T1 and T2/T3 facilitate rail travel to City Circle stations within the Sydney CBD and via the Airport and East Hills Line to Campbelltown and Macarthur. The Airport Link also provides an inter-terminal transfer facility for passengers transferring between the T1 and T2/T3 precincts. Airport travellers typically represent a small but significant proportion of rail patrons on the Airport and East Hills line.

On 20 October 2013, the NSW Government delivered on its commitment to increase the number of trains passing through Sydney Airport on the Airport & East Hills line during peak hours from eight to 10 trains per hour. The NSW Government has also indicated that the rail line has the potential to provide greater long-term capacity. Upgrades to the power supply and safety measures outlined in Sydney’s Rail Future will allow for up to 20 train services per hour on the airport line in the medium to long term.

¹ Transport and Urban Planning Associates 2011

Travellers using the rail network to access the airport are subject to a station access fee on top of the base rail fare. This fee is not charged for other stations on the same rail line and consequently the cost of a ticket to the airport stations is considerably higher than any other similar length trip within the rail system. Sydney Airport has advocated for the reduction of the station access fee to increase patronage on rail for passengers as well as staff.

There is a clear opportunity to increase the provision of public buses servicing the airport and Sydney Airport has welcomed the stated intention of the NSW Government to provide additional public bus services to the airport. Currently, there is a single public bus route serving the terminals, being the Route 400 service, which connects Sydney Airport to Rockdale, Burwood and Bondi Junction. The Route 410 service operates along Airport Drive but stops only at the Qantas Jet Base.

To encourage a shift in public transport mode share, Sydney Airport has committed to providing public bus facilities at each terminal as part of its five year ground transport plan. A bus and multi-purpose parking facility is planned to be located between Ninth Street and the Seventh Street extension at T2/T3 and will provide faster and more direct access for public buses.

Preliminary investigations indicate that the planned location of the public bus facility will reduce delays for buses and therefore for passengers accessing the airport precinct by this mode of transport. Sydney Airport will continue to work closely with TfNSW to support its plans to grow the number of public buses accessing the airport as foreshadowed in the LTTMP.

The proposed public bus facility would be supported by pedestrian circulation corridors, orientation spaces, way-finding signage and flight information displays to provide airport users with a customer experience designed to encourage the use of this sustainable transport choice.

Sydney Airport will continue to work with the NSW Government, stakeholders and private infrastructure owners to further increase the attractiveness and competitiveness of public transport access modes. This could include dedicated bus priority lanes or bus priority signals on roads leading to the airport precinct.

Any increases in public transport mode share would further improve the performance of the road system.

3.4 Active transport modes

Shared pedestrian and cycle routes are provided along the Cooks River and Alexandra Canal on the north side of Airport Drive and via the Giovanni Brunetti Bridge connecting to Mascot via Coward Street. Shower facilities are provided in T1 for passengers and commuters. Secure bicycle parking facilities are provided in T1, T2/T3 and the Qantas Jet Base. These facilities will remain in place during the course of the five year ground transport plan.

More information on proposals to improve active transport access to Sydney Airport can be found in Section 7.4 of this Master Plan.

4.0 Linkages to the adjacent network

4.1 Terminal 1

At T1, the forecourt provides an important interchange function between public and private transport modes, including bus (public buses, coaches and mini-buses) and car users (public cars, limousines, rental cars, taxis, staff).

Access to the rail station will also continue to be provided from within T1. In addition to public and staff car parking, the existing car parks cater for car rental and valet parking and have been designed to facilitate a range of future ground transport uses, such as undercover bus and coach parking. Extensive cycle and pedestrian facilities are provided (refer to Figure A2 for further detail), connecting the terminal to the car parks. Internal road access is provided directly adjacent to the terminal and multi-storey car parks for ease of access.

Bus and car users enter and exit the precinct from Airport Drive and Marsh Street via an existing network of internal roads. Existing cycle and pedestrian facilities are provided, connecting to the regional network along Airport Drive. These facilities are planned to be progressively upgraded as required to improve amenity and connectivity.

4.2 Terminal 2 / Terminal 3

At T2/T3, the entrance and exit portals provide a direct interface for passengers, staff and visitors. Access to public and private transport modes is available via an existing network of dedicated pedestrian subways, lifts and footpaths. Cycle facilities are also provided (refer to Figure A4 for further detail). This gives ready access to buses, trains and taxis as well as car parking.

The circulation of buses and cars into and out of the precinct is provided via Sir Reginald Ansett Drive, connecting to Qantas Drive, Joyce Drive and O'Riordan Street. Cycle and pedestrian facilities are provided, connecting to the regional

network along Qantas Drive. These facilities, including converting Sir Reginald Ansett Drive into a dedicated entrance and the creation of a new dedicated exit (an extension of Seventh Street) between Shiers Avenue and Qantas Drive, are planned to be progressively updated by 2018 to improve amenity and connectivity between modes for all ground transport users (see Section 2.2).

4.3 Freight

Freight facilities will be retained in current locations north of T1. The landside movement of freight to and from the airport is facilitated by light and heavy commercial vehicles, with access from Link Road, Ross Smith Avenue and Sir Reginald Ansett Drive. The movement of freight from aircraft to the terminal is facilitated by dedicated ground service equipment on secure airside roads.

As noted in Chapter 8 of the Master Plan, it is expected that these T1 freight facilities will be progressively updated to promote the efficient handling of air freight. This improvement to the freight interchange function will provide opportunities to rationalise vehicle movements and improve throughput.

5.0 Arrangements for working with stakeholders

Sydney Airport has consulted and worked closely with those authorities responsible for the road network and public transport system (see Chapter 1).

The establishment of the Transport for NSW and Sydney Airport joint working group (JWG) has been instrumental in the development of the integrated road and public transport plans identified in this Master Plan. Senior representatives from TfNSW, RMS and Sydney Airport meet monthly to discuss and work on issues of common interest affecting Sydney Airport. The JWG is chaired on a rotating basis between TfNSW and Sydney Airport and is governed by an agreed terms of reference.

Representatives of Sydney Airport and the NSW Government transport agencies also have well established and long term relationships at a technical and planning level. Communication and interaction occurs on a regular but ad-hoc basis according to the requirements of the issues at hand. The scope, inputs and outputs involved with the detailed traffic modelling undertaken for this Master Plan were undertaken in consultation with RMS.

Sydney Airport will continue to work and collaborate with NSW Government agencies to achieve the planned ground transport outcomes described in the Master Plan.

6.0 Capacity of the transport system

To ensure that the transport system has sufficient capacity to support operations and other activities, a rigorous and detailed ground transport modelling approach was adopted. This modelling was prepared for Sydney Airport by AECOM, a global professional services company, providing transportation services in more than 100 countries. AECOM has been ranked No. 1 in transportation globally for 10 consecutive years.²

A demand profiling model and traffic simulation models were separately developed to assess ground transport capacity requirements for busy days in 2018 and 2033. Both models were calibrated against existing 2012 road conditions to confirm that the models produced a good representation of current day traffic volumes and behaviour at key locations.

The demand model generated hourly flow profiles for the given busy day for each modelled year. Arriving and departing vehicle volumes were derived for both T1 and T2/T3 terminal precincts. This enabled Sydney Airport to gain an understanding and appreciation of the traffic movement by both direction and location so that capacity requirements could be clearly understood.

In addition to the hourly volumes for each terminal precinct, peak hour volumes were defined for the non-terminal areas such as the northern lands precinct, the South East Sector and the jet base.

For the traffic modelling, a detailed micro-simulation model has been developed using Commuter software to encompass the roads around the whole airport. The 2012 model extents are shown in **Figure A8**.

The scope of the traffic modelling was agreed with RMS to ensure that the modelling tool, modelled area, time periods (06:00-10:00am and 15:30-19:30pm) and level of detail were in line with the expectations of RMS and other models being developed for the area.

The calibrated 2012 demand profiles for the airport were provided for incorporation to the RMS strategic highway assignment (SHA) model. This enabled RMS to recalibrate its current year model to represent existing conditions. From this, RMS provided revised traffic forecasts for the network shown in **Figure A8**. RMS's SHA model takes into consideration population and employment growth in the wider metropolitan area and also incorporates some future road network assumptions, including new motorways such as WestConnex. The derived outputs therefore provide a robust

² Engineering News Record Magazine July 2012

Figure A8 Commuter model extent



forecast of traffic volumes for the roads surrounding Sydney Airport from which assessment of local infrastructure changes could be undertaken.

The outcome of the modelling conducted by AECOM indicates that the capacity of the transport system accommodates the requirements of the operations and other activities planned at the airport in 2018 and 2033.

7.0 Likely effects of proposed developments

The package of infrastructure proposed as part of the five year ground transport plan not only supports the forecast growth of traffic but also improves the existing levels of service for road users.

The modelled performance results for key intersections adjacent to the airport show a measurable improvement in intersection performance compared to the current performance. These results are based on the modelling assessments undertaken by AECOM using the commuter microsimulation tool, and take into account the effect of the development plan (including forecast passenger growth and terminal, road, airfield and other developments) on the ground transport system and traffic flows at, and surrounding, the airport.

The most noticeable improvements occur in the T2/T3 precinct where they are most needed. With the implementation of planned road changes inside and outside the airport boundary as identified in this appendix, the intersections adjacent to the T2/T3 precinct would operate with spare capacity during both peak periods. This is attributable to the reduction of conflicting movements at the intersections of Robey Street/O’Riordan Street as well as at O’Riordan Street/Joyce Drive. In addition, the planned removal of the exit movement from the Sir Reginald Ansett Drive to the proposed northern arm of Seventh Street allows greater phase times for vehicles to enter the precinct.

The planned improvements to these intersections benefit non-airport through traffic as well as improving the travel times of passengers travelling to and from T2/T3 and to those traveling to and from T1 via Airport and Qantas Drives.

