



**Sydney
Airport**

The right future.
Starting now.



The background of the image shows a multi-level highway interchange. In the foreground, a road with several cars and a truck is visible. Above it, an elevated roadway carries more traffic, including a dark SUV and a white truck. The sky is a clear, pale blue. The overall scene is a busy urban or suburban transportation hub.

7.0

GROUND TRANSPORT DEVELOPMENT CONCEPT

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Key points

- On Airport Drive, non-airport through traffic accounts for up to 52% of movements in the morning and afternoon peaks. General commuters and Port Botany traffic place a significant additional load on the roads surrounding the airport.
- The proposed ground transport solutions result in improved road and intersection performance in and around Sydney Airport in 2018 and beyond. With minor enhancements these solutions support the forecast road traffic associated with airport activity to beyond the 2033 horizon of the PDMP.
- These proposed solutions include:
 - A new one way roadway configuration for the T2/T3 precinct by 2018, providing a dedicated entrance and exit roadway to the precinct, significantly improving traffic flows for all vehicles including taxis, limousines and coaches.
 - Consideration of the recently announced WestConnex motorway project.
- The creation of integrated international, domestic and regional terminal precincts has significant benefits for road and intersection performance.
 - There will be a substantial reduction in passengers transferring by road between the terminal precincts as passengers will be able to transfer between international and domestic flights within one terminal
 - There will be a more even distribution of road traffic across the airport precincts because international and domestic departure and arrival peaks are complementary.
- Sydney Airport has consulted with the NSW Government transport agencies in developing and testing the proposed solutions using the standard Roads and Maritime Services (RMS) model, as used in the Joint Study. This was enhanced with up-to-date travel data, localised traffic intersection modelling and new road solutions making this modelling very robust.
- Sydney Airport continues to advocate for improved public transport to the airport, including additional buses and competitive rail fares, to:
 - Provide improved public transport options for all airport users including passengers and staff to further reduce congestion and improve environmental outcomes
 - Sydney Airport is working with NSW Government stakeholders and private infrastructure owners to further increase the attractiveness and competitiveness of public transport access modes, in particular rail services, with a view to achieving an even greater public transport mode share in the future.
- Sydney Airport has invested more than \$200 million over the past decade in ground transport facilities to improve the customer experience of Sydney Airport.
- Completion of the WestConnex motorway will allow 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.



Sydney Airport has identified ground transport solutions that are designed to improve the performance of the roads and intersections in and around Sydney Airport. To function at an optimal level these proposed solutions will require work both inside and outside the airport boundary. Once completed, the ground transport modelling predicts that the forecast traffic demand can be met in 2018 and, with minor enhancements, beyond the 2033 horizon of the PDMP.

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

Expert transport modelling and design team

The detailed ground transport 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 number one in transportation globally for 10 consecutive years.¹

AECOM's transportation division has been operating in Australia for over 30 years, during which time it has delivered strategic and detailed transportation modelling and design services for private and government projects. Specifically relevant to this work for Sydney Airport, AECOM has completed ground access planning for airports including Melbourne, Brisbane and the Gold Coast, and has performed transport studies and modelling for major NSW transport projects including the Sydney CBD corridor modelling and the Port Botany transport improvement plan.

The AECOM team assembled for this work included leading transport planners, strategic modellers, simulation specialists, urban planners, aviation specialists and civil engineering specialists. AECOM has extensive Australian and international teams who were drawn upon to ensure that global skills and experience were applied to this work.

1 Engineering News Record Magazine, July 2012

T1 precinct – five year ground transport plan

The proposal to remove the existing car park entry and exit gates will allow a new road to be constructed directly in front of the existing multi-storey car parks, providing an easy and free-flowing entry to, through and out of the car park. This reduces the likelihood of queues at the entry gates extending back and disrupting the flow of traffic onto Departures Road.

The construction of a proposed new exit point in the open air parking area for traffic travelling to the city and eastern suburbs will facilitate a quicker exit from the precinct for all traffic.

T2/T3 precinct – five year ground transport plan

Modelling shows that planned road changes in the T2/ T3 precinct, together with NSW Government initiatives outside the airport boundary, will deliver improved traffic flow around the precinct with increased capacity for traffic throughput.

The development of an additional road connection from Shiers Avenue to Qantas Drive at Robey Street will allow the creation of a one way road system within the precinct with incoming traffic allocated to the current junction and outgoing traffic to the new junction.

The additional road and junction capacity, and the more efficient one way road system, support a higher traffic throughput within the precinct by:

- Increasing road capacity for traffic into and out of the precinct
- Increasing 'green light' time by about 33% for the key traffic movements.

The conversion of the lower sections of Robey Street and O'Riordan Street, outside Sydney Airport's boundary, into one-way roads northbound and southbound respectively would smooth both the entry and exit of traffic onto the roads surrounding the airport.

Modelling shows that this configuration can support the forecast volume of traffic for 2018 and beyond at an improved service level when compared with today.

Sydney Airport will continue to advocate for the widening of Joyce Drive and General Holmes Drive between O'Riordan Street and Mill Pond Road as this will result in higher traffic throughput capacity to and from the airport for non-airport through traffic including Port Botany heavy vehicle traffic.

Twenty year ground transport strategy

Ground transport modelling undertaken by AECOM demonstrates that the proposed strategy and the NSW Government initiatives, including the WestConnex motorway system, have the ability to meet the forecast traffic demands around the airport beyond the 2033 horizon of the PDMP.

Better outcomes can be achieved if the public transport mode share is increased by reducing the station access fee on rail and adding new bus routes to the airport.

Integrated terminal precincts, servicing a mix of international, domestic and regional passengers, as envisaged in the proposed development concept, will:

- Reduce transfer passengers between T1 and T2/T3 using road and rail
- More evenly distribute road traffic between the precincts

Further road network enhancements are proposed as part of the 20-year (2033) ground transport strategy including ground access upgrades for non-terminal areas. These include the northern lands precinct (north of Airport Drive) which will accommodate aviation support services and vehicle storage facilities, and the South East Sectors, which will accommodate new maintenance and engineering facilities, aircraft parking, ground support equipment parking, etc.

The development of the ground transport plans has benefited from the assistance of TfNSW and RMS with the use of detailed models and more up-to-date data than any previous analysis.

TfNSW has provided 2012 regional traffic and forecast regional traffic for the 2018 and 2033 periods. This information was based on the broad assumptions used for the Joint Study. It provides a baseline for traffic to and from the airport and a baseline for traffic through the airport precinct.

A comprehensive survey of over 14,000 passengers, visitors and staff was jointly commissioned by Sydney Airport and TfNSW in June 2012. This provided information on the journeys people took to and from the airport, including how they travelled, and their origin and destination. Previous studies have relied on less comprehensive and now out-of-date data. There have been significant increases in public transport usage in recent years, which reduces the relevance of the older data.

The analysis has included detailed modelling of all of the roads and intersections on and immediately adjacent to the airport, and key roads and intersections in the vicinity.

Public transport facilities to be expanded

Sydney Airport believes there is a great opportunity for public transport mode share to be increased and has advocated for the reduction of the station access fee on rail and the provision of additional public bus services to the airport.

To facilitate a transition to rail and bus transport, 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. Additional increases in public transport will further improve the performance of the road system beyond those shown in the models.

Sydney Airport has identified a site within the T2/T3 precinct for the future location of a public bus facility designed to allow a greater frequency and volume of public bus services to and from the airport for the benefit of passengers and staff. The T1 precinct already has a very convenient and prominent location for public bus services which can be expanded to support new bus routes.

The 2012 traveller survey, jointly commissioned with TfNSW, shows that the public transport mode share has increased by one percentage point a year over the past five years from 12% to 17%. A continuation of this increase through to 2018 has been assumed. This is supported by the commitment by the NSW Government to an additional two trains per hour in the peak periods from 2013.

Ten years of investments and improvements

Over the past decade Sydney Airport has invested over \$200 million in on-airport ground transport facilities, including roads, public transport, taxis and car parks.

- Capacity has been substantially and continually increased for taxis, limousines, buses, coaches, drop-off and car parking
- Sydney Airport has introduced discounted on-line offers for car parking
- Improved signage and the introduction of automated parking guidance systems within the public multi-storey car parks has made way-finding easier.

The five year ground transport plan and twenty year strategy continue the trend of substantial investment by Sydney Airport to improve access to each airport precinct.

7.1 Five year ground transport plan

Further details on the five year ground transport plan are included in Appendix A.

7.1.1 Terminal 1

In 2012, Sydney Airport completed the construction of the second multi-storey car park at an approximate cost of \$47 million. This increased capacity by 50% to approximately 7,500 spaces which will accommodate forecast demand to 2018. However, the current traffic flow through the car park, as shown in **Figure 7.1**, still follows the path which existed prior to the completion of the second multi-storey car park.

Under the changes proposed in this PDMP it will be simpler and easier to enter, move through and exit the T1 precinct.

The main entry and exit gates to the existing car park would be removed and a free-flowing 'road' system would be created through the centre of the car park as shown in **Figure 7.2**.

Entry and exit boom-gates will be relocated inside the multi-storey car parks and at the new entrance to the 'open air' area. This proposed arrangement is designed to reduce the possibility of queues at the entry gates extending back and disrupting the flow of traffic onto Departures Road. A dedicated and specially configured pick-up area is proposed to be located in the 'open air' area providing separation between those vehicles parking and those seeking to drop-off or pick up quickly. The central road may also facilitate simpler access to the taxi holding area.

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 by up to two lanes each, with the exit ramp optimised by a tidal lane configuration to provide capacity for exiting traffic onto Giovanni Brunetti Bridge.

To facilitate the planned modal shift to public transport, Sydney Airport is planning to provide for a public bus facility located on Arrivals Road which would cater for both additional and re-routed public buses to easily access and exit the T1 precinct.

Passengers, visitors and the public would have simple, direct and clearly signposted routes from the car parks to the terminal.

Figure 7.1 2012 T1 precinct traffic flow

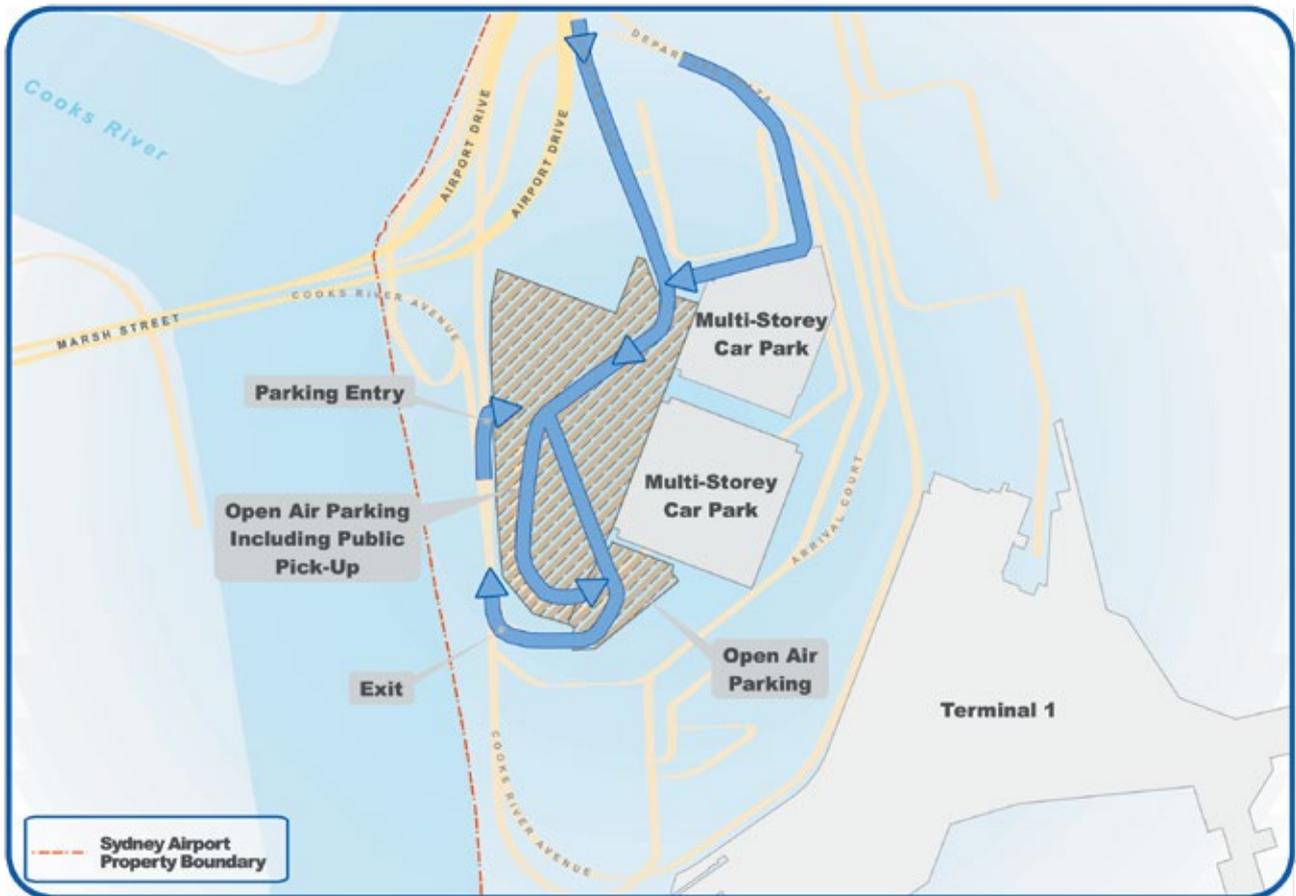
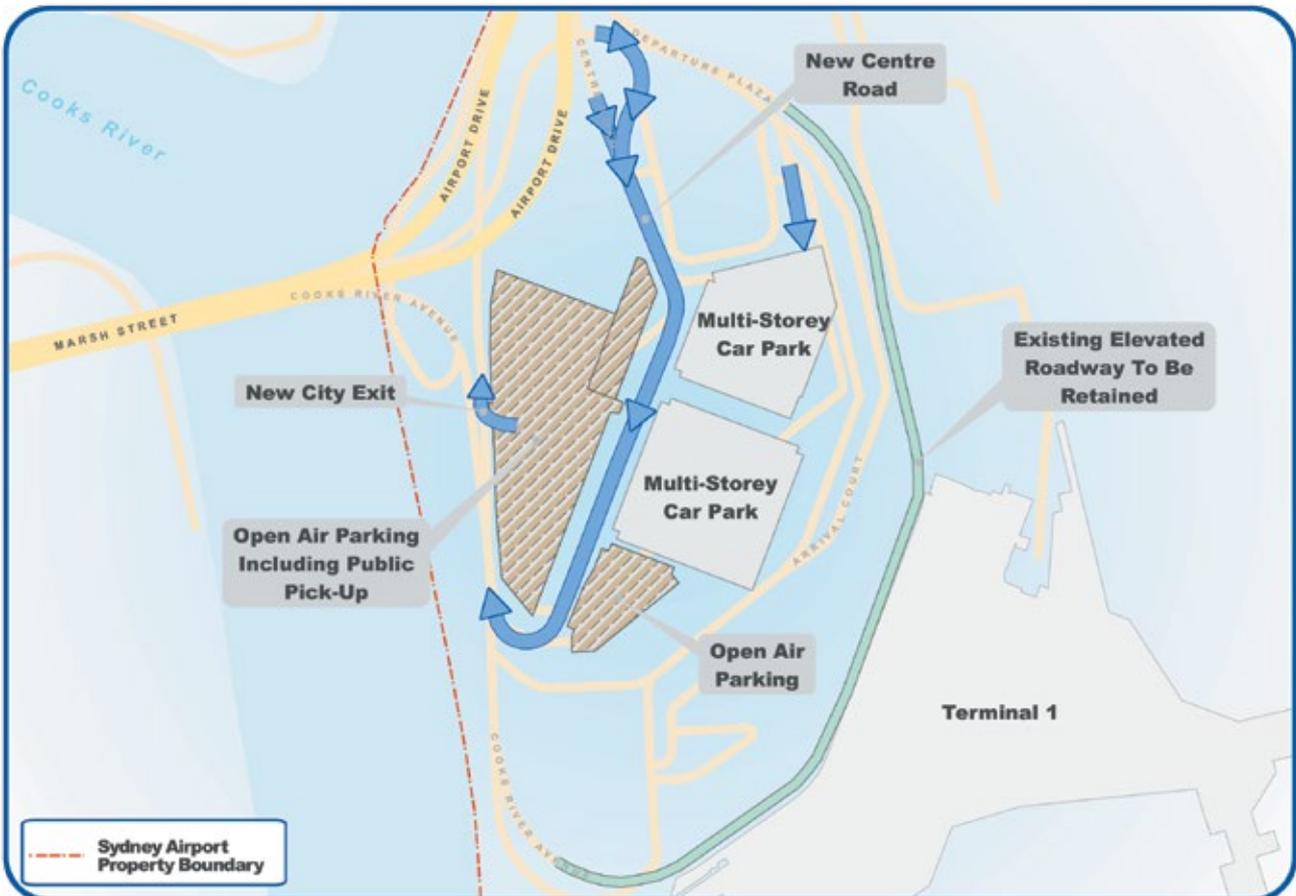


Figure 7.2 2018 T1 precinct traffic flow



7.1.2 Terminals 2 and 3

The intersection at the entrance to the T2/T3 precinct² is heavily used by both airport and non-airport traffic. As shown in **Figure 7.3**, movements into Sir Reginald Ansett Drive from the north, east and west, compete with each other for access to the terminal while simultaneously competing with movements out of the precinct from the terminals. In addition, significant volumes of non-airport heavy vehicles in the morning peak turn right from Joyce Drive into O’Riordan Street which contributes to delays.

In this PDMP a proposed new one way road system through the T2/T3 precinct is designed to increase the entry and exit capacity of the area and significantly improve traffic flows in and around the precinct (see **Figure 7.4**).

In combination with work directly outside the airport boundary, this one way road system would provide a superior solution to handle airport traffic as well as providing benefits to Port Botany and general commuter traffic.

In addition, to facilitate the modal shift to public transport, Sydney Airport is proposing to construct a bus and multi-purpose parking facility located between Ninth Street and the Robey Street extension. This facility of up to 3,000 spaces would cater for a range of uses including car rental, valet and limousine storage and general parking. It would also allow for additional and re-routed public buses to easily access and exit the T2/T3 precinct. The proposed facility is planned to be supported by new pedestrian circulation corridors, orientation spaces, way-finding signage and flight information displays.

The proposed road works/changes include a southern extension of Robey Street from Qantas Drive through the current Jet Base to Shiers Avenue to create a new dedicated five lane exit road from the precinct. Traffic would enter T2/T3 via an expanded entry on Sir Reginald Ansett Drive and move one-way through the precinct and exit via the Robey Street extension onto Qantas Drive or continue north on Robey Street and then O’Riordan Street.

The existing signalised control of Ross Smith Avenue / Sir Reginald Ansett Drive is planned to be optimised to ensure effective traffic flow of the Sir Reginald Ansett Drive entry point. 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.

This design solution provides more time in each cycle at two intersections with one-way traffic than at one primary intersection with two-way traffic. This is designed to provide sufficient capacity for airport (including private vehicles, taxis, coaches, limousines and mini-buses) and non-airport traffic as well as

delivering a better level of service in 2018 than exists currently.

To function at an optimal level and to complete the integrated design solution, additional proposed road-works outside the airport boundary are required including:

- 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.

Sydney Airport will continue to work closely with the NSW Government to discuss, prioritise and coordinate these proposed works with those proposed inside Sydney Airport’s boundary, as the NSW Government is responsible for the road network changes outside Sydney Airport’s property boundary.

Passengers, visitors and the public will have simple, direct and clearly signposted routes from the car parks to the terminals.

7.1.3 North and South East Sectors

New aviation support facilities such as freight, logistics and vehicle storage are proposed to be located in the area north of Airport Drive. A proposed new signalised intersection on Airport Drive and bridge over Alexandra Canal will provide landside vehicle access to the northern logistics precinct.

New and relocated maintenance and engineering precincts and aircraft parking aprons are proposed to be developed south of T2/T3 with improved airside links and upgraded airside roads to service this precinct. Staff and goods access to the area will be provided on the landside including the proposed development of new or augmented intersections, roads and bridge works. The proposed development concept includes the opportunity for a landside and airside bridge link across General Holmes Drive to facilitate access and connectivity for airport operations.

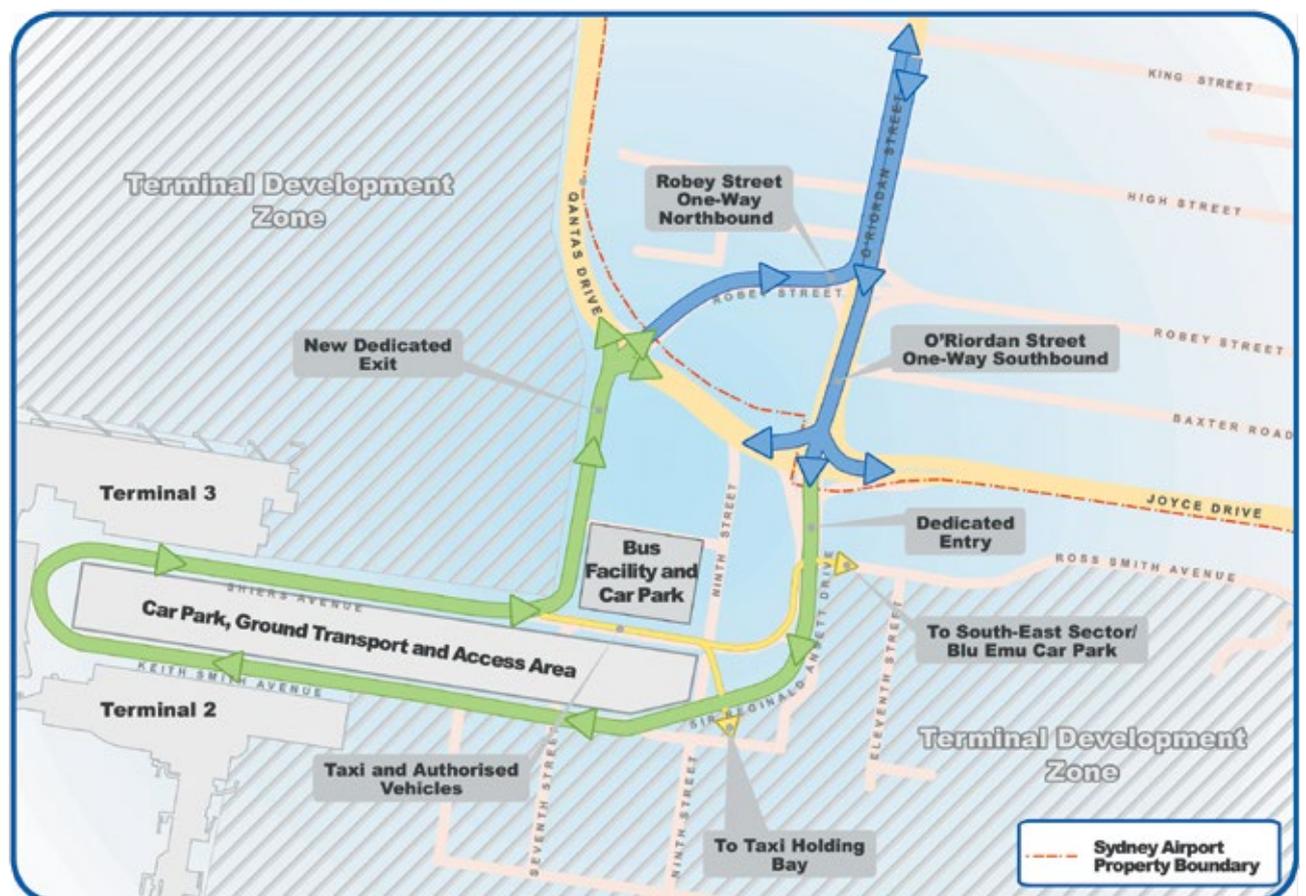
As a result of the proposed additional aircraft parking aprons, 2,000 car parking spaces will be displaced at the Blu Emu Car Park. A single deck structure is proposed to be constructed at the Blu Emu Car Park to ensure that the current capacity is retained. Implementation of a proposed northbound slip lane on Ross Smith Avenue at the intersection with Lords Road is designed to facilitate enhanced access for service vehicles to T2/T3.

2 The intersection of O’Riordan Street (north), Joyce Drive (east), Sir Reginald Ansett Drive (T2/T3) and Qantas Drive (west)

Figure 7.3 2012 T2/T3 precinct traffic flow



Figure 7.4 2018 T2/T3 precinct traffic flow



7.2 Twenty year ground transport strategy

The Ground Transport Strategy for 2033 assumes the implementation of the WestConnex motorway, including ramps that would facilitate access for T1 and T2/3 to improve capacity, network efficiency and route choice.

The WestConnex motorway, a plan to link the M4 Motorway to the M5 East at Sydney Airport, was identified as Sydney's motorway priority in the State Infrastructure Strategy released in October 2012. In December 2012 WestConnex was confirmed as Sydney's motorway priority in the NSW Government's Long Term Transport Master Plan.

As part of the WestConnex plan, it is expected that a motorway link will be built north of the airport and this will result in a transfer of non-airport traffic away from Airport and Qantas Drives. This non-airport through traffic is a major contributor to congestion on the airport's roads. Together with WestConnex, which is expected to further improve traffic flow around the precinct, Airport Drive, Qantas Drive and Joyce Drive may be required to be upgraded to support the forecast growth in traffic.

7.2.1 Terminal 1

The creation of an integrated international, domestic and regional terminal at T1 is designed to provide a better distribution of traffic in the precinct as the domestic and international peak departure and arrival times are complementary.

It is proposed to further improve the terminal precinct's roads by the planned widening the entry and exit roadways at Terminal 1 to two lanes each. The existing taxi, limousine and coach holding area and drop-off/pick-up facilities are proposed to be relocated and expanded within planned new multi-storey ground transport modules and car park facilities located next to the existing multi-storey car park. This is designed to improve traffic flow efficiency by centralising ground transport facilities within each structure and reduce the volume of circulating traffic on the precinct's roadways.

To facilitate the proposed revised layout, access roads may need to be realigned to the front of the car park/transport modules with new pedestrian links provided to the departures level. The provision of these new facilities may mean that direct access to kerbside facilities could be managed in a way that would minimise vehicles recirculating on the internal roadway.

By 2033 and to meet demand, total car parking provision for all airport users at T1 will comprise approximately 10,000 spaces – an increase of 2,500 from 2012.

7.2.2 Terminals 2 and 3

The creation of an integrated international, domestic and regional terminal at T2/T3 results in a better distribution of traffic in the precinct.

The dedicated one way road entry and exit points to the T2/T3 terminal as described in the five year plan will continue to operate in 2033. The proposed addition of an underpass from Qantas Drive to provide a dual lane eastbound entry to the future multi-storey car park is designed to ensure that the intersections operate at a good level of service.

A proposed elevated access ramp over Sir Reginald Ansett Drive to provide direct access between Ross Smith Avenue and future multi-storey car parks within the T2/T3 precinct is designed to provide an additional entry point for cars coming from General Holmes Drive. This would be supplemented with the widening of Ross Smith Avenue.

To improve the efficiency of transport movements, sections of the existing multi-storey car park may be replaced with a multi-modal transport facility incorporating rail, taxis, rental cars, limousines and premium parking. Passenger amenity in terms of pedestrian circulation and way finding would be improved by providing centralised taxi holding and pick-up facilities at the arrivals level and reducing the need for taxis to circulate on precinct roads.

A new facility for picking up and dropping off passengers is proposed with provision for a system to aid passenger connections to the terminal building. The provision of these new facilities would be designed to allow direct access to kerbside facilities and could be managed in a way that would minimise vehicles recirculating on the internal roadway, further improving passenger amenity.

A new pedestrian/cycle overpass is proposed over the intersection of Robey Street and Qantas Drive. The overpass is designed to support linkages between the terminal access walkway and new pedestrian/cycle share paths on the northern side of Qantas Drive and Robey Street. These paths would link to the existing share path that runs along Alexandra Canal as well as improve access to urban areas to the north and east.

New primary loading dock facilities are proposed to be developed for T2/T3 to the east for ease of access and security. Limited access would be available to the existing T2 and T3 loading docks.

To meet the forecast demand by 2033, total car parking spaces in the precinct are likely to grow by an additional 6,500 spaces over and above the 8,500³ proposed as part of the five year ground transport plan.

³ Includes existing car parks plus spaces currently under construction at Seventh Street due for completion at the end of 2013 and the multi-modal public bus facility and car park structure located near Ninth Street due for completion by 2018

7.2.3 North and South East Sectors

To facilitate further development of the freight, logistics and aviation support facilities precinct north of Airport Drive, a secure airside bridge network over Alexandra Canal is proposed.

Further development of the aviation facilities in the south east, adjacent to General Holmes Drive, is envisaged by 2033. Access will be provided by landside and airside bridges over General Holmes Drive as well as from existing roads.

Total car parking spaces in the South East Sector are likely to be retained at approximately 6,000 spaces.

7.3 Increasing public transport mode share

Sydney Airport will continue to work with the NSW Government stakeholders and private infrastructure owners to encourage them to further increase the attractiveness and competitiveness of public transport access modes including rail and public buses.

Travellers using the rail network to access the airport are subject to a station access fee. This fee is levied over and above the normal rail fare. It is not charged for access to 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 and continues to advocate for the reduction of the station access fee to increase rail patronage for passengers as well as staff.

There is a clear opportunity to increase the provision of public buses servicing the airport and Sydney Airport would support the implementation of new or re-routed public bus services. This support is best demonstrated by Sydney Airport's commitment to providing public bus facilities at each terminal as part of its five year ground transport plan. Sydney Airport will continue to have detailed discussions with TfNSW and RMS to ensure that public bus access is integrated in a way that minimises delays to buses on external and internal roads to the airport.

Additional increases in public transport mode share will further improve the performance of the road system.

7.4 Forecast demand and modelling

Traffic around the airport includes journeys to and from the airport, and journeys for through traffic travelling to and from the CBD and Port Botany. On Airport Drive, non-airport through traffic accounts for up to 52% of movements in the AM and PM peaks.

As part of the Master Plan concept development, Sydney Airport engaged in a collaborative working relationship with TfNSW and RMS to assess the transport access needs of the airport and the wider

network around the airport. Sydney Airport will continue to work with TfNSW and RMS to further refine the proposals with an aim to achieving optimal outcomes.

7.4.1 Demand forecasts

To forecast demand for ground access, the projected passenger movements (from aircraft arrivals and departures) were plotted by time of day so the distribution of peak activity at each terminal was understood. Using the data from the 2012 traveller surveys, mode share proportions dependent on passenger type (international/domestic and arriving/departing) were applied to the passenger volumes to generate movements by mode. Vehicle occupancy rates were then applied to generate traffic volumes. Staff, freight, logistics and commercial traffic was also included in the development of the model.

The demand model was calibrated to 2012 observed data so that it provided a clear representation of existing conditions. As a result, the demand model provided a suitable basis from which future year demands for 2018 and 2033 could be derived.

7.4.2 Mode shift

For the purposes of the modelling work, mode share proportions have been adjusted for the future year demand forecasts to account for anticipated changes to the transport networks.

A total shift of 7 percentage points (from an existing base of 17 per cent) has been estimated for the Master Plan period for increases to the share of public bus and train travel, consistent with trends over recent years. This has been offset by pro-rata reductions in road based modes.

7.4.3 Traffic modelling

Using the demand model outputs received from Sydney Airport, RMS incorporated the forecasts into its standard road model which was used in the Joint Study. The RMS model considers population and employment growth in the metropolitan area as well as future road network changes. RMS provided the resultant traffic outputs for the area surrounding Sydney Airport so that an assessment of local infrastructure changes could be made.

AECOM has undertaken detailed micro-simulation traffic modelling (using Commuter software) for the roads in the vicinity of the airport. Likewise for the demand model, the traffic simulation model was developed to replicate observed conditions in 2012. This again resulted in a platform from which future year models could be developed.

Subsequently, assessment of road infrastructure and operational changes required to support the short and

long term demands was undertaken to ensure the final solution could effectively accommodate the forecast traffic movements.

7.4.4 Comparison to previous studies

The modelling methodology adopted for the PDMP includes up-to-date information and proposals that were not available at the time the Joint Study was prepared. These include:

- Updated 2012 passenger estimates
- Consideration of the current characteristics and behaviours of airport users from the 2012 traveller surveys
- Incorporating the new operational configuration, together with proposed road network changes in the local and wider areas
- Use of RMS's updated regional traffic model and microsimulation software to test road network options in the vicinity of the airport for both the morning and evening peak periods
- Calibration of the 2012 traffic models to observed 2012 conditions to provide a sound base from which to undertake the future year assessments

As a result the outcomes of this modelling are up to date, comprehensive and robust.

