Roads and Maritime Services/Sydney Airport Corporation Limited

Sydney Gateway Road Project

Environmental Impact Statement/ Preliminary Draft Major Development Plan

Chapter 9 Traffic, transport and access

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Chapter 9

Traffic, transport and access

This chapter provides a summary of the traffic, transport and access assessment. It describes the existing environment, identifies potential impacts during construction and operation, and provides measures to mitigate and manage the impacts identified. Further information is provided in Technical Working Paper 1 (Transport, Traffic and Access).

The SEARs and MDP requirements relevant to traffic, transport and access are listed below. Full copies of the SEARs and MDP requirements, and where they are addressed in this document, are provided in Appendices A and B respectively.

Reference	Requirement	Where addressed
Key issue SEARs		
1	**Transport and traffic**	
1.1	The Proponent must assess construction transport and traffic (network, vehicle (including freight traffic) pedestrian and cyclists) impacts, including, but not necessarily limited to:	
	(a) a considered approach to route identification and scheduling of construction vehicle movements, with particular consideration of traffic impacts and transport movements outside standard construction hours including cumulative impacts;	Chapter 8 and section 5.1.5 of Technical Working Paper 1
	(b) the indicative number, frequency and size of construction related vehicles (passenger, commercial and heavy vehicles, including spoil management movements);	Chapter 8 and section 5.1.7 of Technical Working Paper 1
	(c) construction worker parking;	Chapter 8 and section 5.1.4 of Technical Working Paper 1
	(d) the nature of existing traffic (types and number of movements) on construction access routes (including consideration of peak traffic times, pedestrians and cyclists and parking arrangements);	Sections 9.2.2 (traffic volumes), 9.2.5 (active transport) 9.2.6 (parking)
	(e) access constraints and impacts on public transport, pedestrians and cyclists (infrastructure and services);	Sections 9.3.4 and 9.3.5
	(f) the need to close, divert or otherwise reconfigure elements of the road, pedestrian and cycle network associated with construction of the proposal and the duration of these changes;	Sections 8.3.3, 8.6.5 and 9.3.1
	(g) impacts to on street parking, including for residents and businesses;	Section 9.3.7
	(h) cumulative impacts on the road, pedestrian and cycle network from other key infrastructure proposals including but not limited to the Botany Rail Duplication and New M5.	Section 9.5.1
1.2	The Proponent must assess (and model) the operational transport impacts of the proposal, including:	
	(a) forecast travel demand and road traffic volumes for the proposal and the surrounding road, airport, freight, port, cycle and public transport network;	Sections 9.4.1 (traffic demand and volumes), 9.4.6 (public transport), and 9.4.7 (active transport)
	(b) travel time analysis for the different road transport modes	Section 9.4.2
	(c) performance of key interchanges and intersections by undertaking a level of service analysis at key locations;	Sections 9.4.3 and 9.4.4

Reference	Requirement	Where addressed
	(d) wider transport interactions (local and regional roads, cycling, public transport, airport, port and freight transport);	Sections 9.4.1 to 9.4.7
	(e) induced traffic and operational implications for public transport (particularly with respect to strategic bus corridors and bus routes) and consideration of opportunities to improve public transport;	Sections 9.1.2 and 9.4.6
	(f) property and business access and on-street parking.	Sections 9.4.8 and 9.4.9
4	**Place making and urban design**	
4.2	The Proponent must describe the accessibility elements of the proposal including relevant accessibility legislation and guidelines, including: (a) impacts on public transport infrastructure and services;	Sections 9.3.4 and 9.4.6
	(b) impacts on cyclists and pedestrian access, amenity and safety across and adjoining the proposal, including the relocation of cycle routes and delivery of new cycleways around the airport and Alexandra Canal; and	Sections 7.9, 8.6.4, 9.3.5 and 9.4.7
	(c) opportunities to integrate and enhance accessibility including the provisions for public and active transport infrastructure as a result of the proposal.	Section 9.6.2
Major development plan requirements *(in accordance with Section 91 of the Airports Act)*		
91(1)(ga)	The likely effect of the proposed developments that are set out in the major development plan, or the draft of the major development plan, on: (i) traffic flows at the airport and surrounding the airport	Section 9.4.10

9. Traffic, transport and access

9.1 Assessment approach

Constructing and operating new road infrastructure has the potential to affect existing traffic and transport conditions, and change access arrangements. This can impact the local and regional community, as well as access to critical infrastructure. It is important that these potential impacts are identified and understood prior to construction. The assessment addresses the potential impacts on all forms of transport, with a primary focus on the operation of the road network.

An overview of the approach to the assessment is provided below, including the legislative and policy context and a summary of the assessment methodology.

9.1.1 Legislative and policy context to the assessment

The assessment has been undertaken in accordance with the SEARs and MDP requirements (provided in Appendices A and B) and with reference to the following:

- Relevant legislation, including the EP&A Act, the Airports Act and associated regulations
- *Traffic Modelling Guidelines* (Roads and Maritime, 2013a)
- *Guide to Traffic Generating Developments* (Roads and Traffic Authority, 2002)
- *Guide to Traffic Management: Part 3 Traffic Studies and Analysis* (Austroads, 2017)
- *Sydney Airport Master Plan 2039* (SACL, 2019a)
- *Sydney Airport Environment Strategy 2019-2024* (SACL, 2019b).

9.1.2 Methodology

Study area

The study area for the assessment generally extends from St Peters and Erskineville in the north to Banksia in the south-west and Botany in the south-east. It includes the road and transport networks surrounding Sydney Airport, including those within Mascot, St Peters and Tempe. The study area is shown on Figure 9.1.

A different (larger) area was used for the traffic modelling to facilitate evaluation of changes to the regional transport networks and the potential impacts these changes may have on the project in future years.

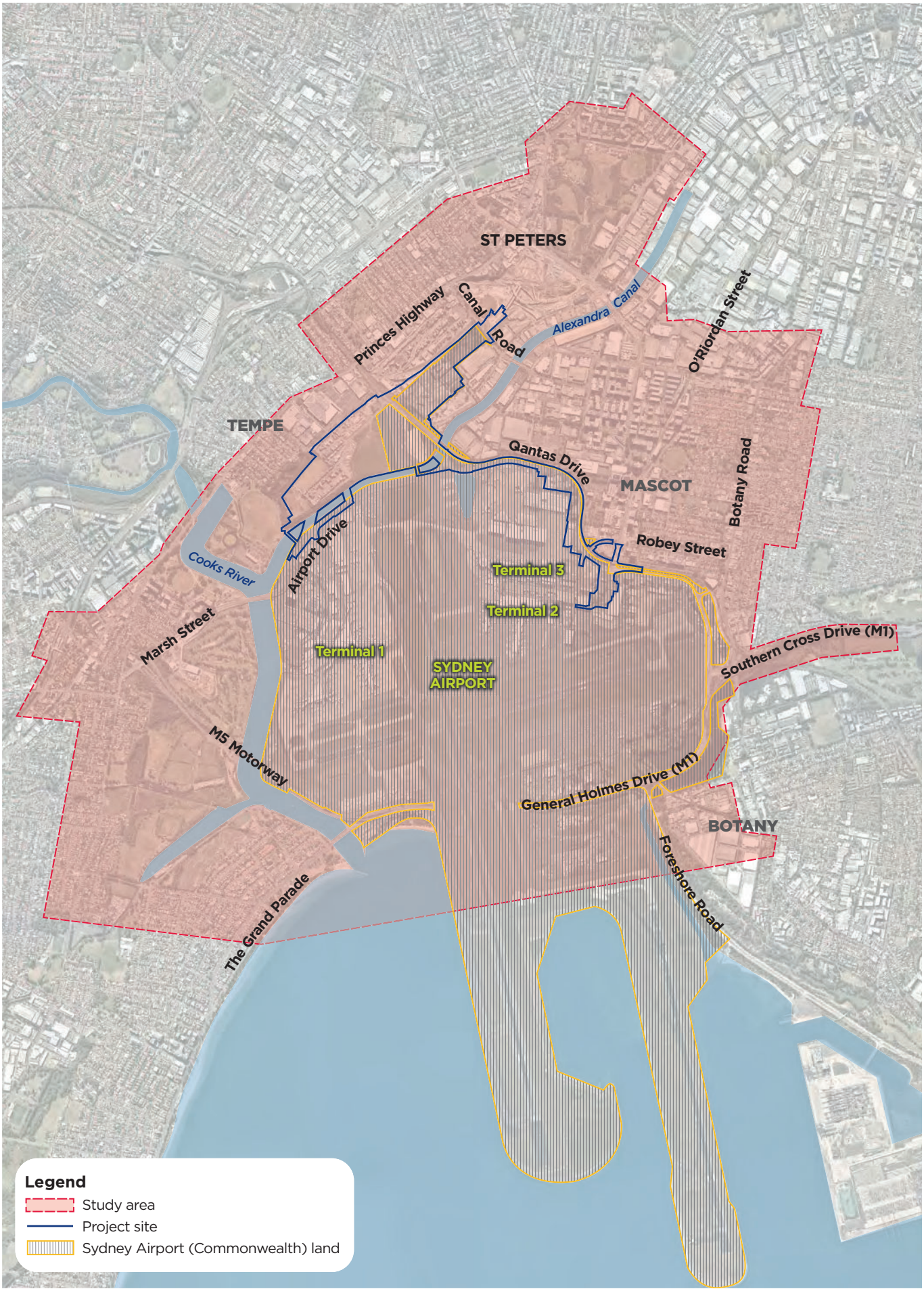

Figure 9.1 **Traffic and transport assessment study area**

Key tasks

The assessment involved:

- Identifying existing traffic conditions, including traffic patterns, mode share, public and active transport networks, car parking arrangements, and access
- Analysing existing and future traffic volumes using traffic models (described below)
- Modelling future road network performance with and without the project
- Reporting on the operational performance of the existing and future road network in the vicinity of the project site, considering the potential impacts of the project and other road projects
- Identifying measures to manage and mitigate the identified impacts.

A flowchart summary of the methodology is shown on Figure 9.2. A detailed description of the assessment methodology is provided in section 3 of Technical Working Paper 1 (Transport, Traffic and Access).

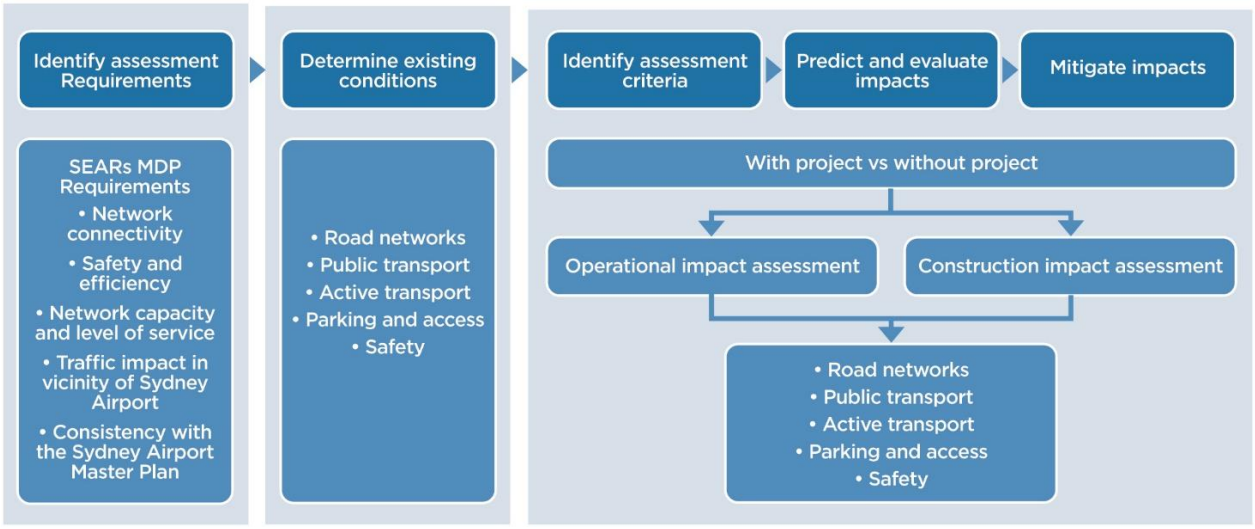

Figure 9.2 Methodology overview

Overview of traffic network modelling

Modelling approach

Traffic modelling was undertaken to make realistic predictions about the potential future traffic conditions in the study area, including travel demand and likely traffic volumes. These predictions were used to assess the operational performance of the road network, with and without the project in place.

The modelling comprised three stages using three different models. It included strategic and operational modelling to assess the potential impacts of the project at:

- The regional level – on the wider Sydney road network
- The local level – on the road network in the immediate vicinity of the project site.

The following models were used for this staged approach:

- Sydney Strategic Travel Model – this model was used for the first stage of modelling to predict travel demand as a result of future population, employment and infrastructure changes
- Strategic Motorway Planning Model – this model was used for the second stage of modelling to evaluate road travel demand across Sydney under different land use, transport infrastructure and pricing scenarios, using the forecasted travel demand from the Sydney Strategic Travel Model

- The Sydney Gateway Operational Model – this model was used for the third stage of modelling, taking the outputs from the Strategic Motorway Planning Model to predict the operational performance of the road network in the study area.

Following selection and development of a baseline model representing the baseline year, the Sydney Gateway Operational Model was calibrated and validated by matching observed traffic volumes and travel times. The model was reviewed by Roads and Maritime and deemed suitable for assessing the potential impacts of the project.

The main outputs from modelling that were used to assess the potential impacts of the project were changes to:

- Traffic volumes, patterns and travel demand
- Intersection/interchange performance (average delay and level of service)
- Vehicle travel times for a given trip distance.

The Strategic Motorway Planning Model considers induced traffic demand, including latent demand. For the project, induced demand is less relevant because the project involves completing a 'missing link' between the Sydney motorway network and Sydney Airport. As a result, it is unlikely that the project would generate new vehicle trips and there would be minimal latent demand associated with Sydney Airport. In other words, the primary traffic impact of the project would be to take existing traffic away from local roads and alleviate pressure on the local road network, while at the same time reducing travel time to areas in and around Sydney Airport. Any induced demand considered as part of the Strategic Motorway Planning Model has been included in the road network performance predictions in sections 9.3 and 9.4.

Construction stage modelling

The Sydney Gateway Operational Model was also used to undertake the construction traffic modelling assessment for both the morning and afternoon peak periods. A 2022 future baseline model scenario was created, excluding construction-related traffic. This baseline scenario acts as a benchmark against which the potential impacts of the project can be assessed. It takes into account future traffic volume increases and road upgrades/modifications that have occurred, or are expected to occur, without the project.

To simulate various construction activities and changes over the construction period, three construction scenarios were assessed as being representative of the most disruptive changes to traffic conditions. The location of these changes focussed on the most affected portions of the road network, in the vicinity of Terminals 2/3, Qantas Drive, Airport Drive, and the access to Marsh Street and Terminal 1. Each scenario comprised changes at or near Airport Drive/Link Road and along Qantas Drive between Robey and O'Riordan streets. The following construction scenarios were considered by the modelling:

- Scenario 1:
  - Eastbound Airport Drive traffic reduced to two lanes in the vicinity of Link Road and uses new Terminal 1 connection bridge
  - Reconfigured Airport Drive/Link Road intersection, including second northbound right turn lane at Link Road intersection removed
  - Existing westbound kerbside lane removed from Qantas Drive between Ninth Street and west of Robey Street
  - Existing southbound kerbside lane removed on Sir Reginald Ansett Drive
  - Signals removed at Lancastrian Road and intersection converted to left in/out only.
- Scenario 2 – same as scenario 1 with the addition of:
  - Left turn from Seventh Street reconfigured to double left turn slip lane, merging to a single lane
  - Median lane removed eastbound on Qantas Drive both west and east of Robey Street
  - Ninth Street deceleration and acceleration lanes removed.

- Scenario 3 – same as scenario 2 with the addition of:
  - Westbound traffic uses the Terminal 1 connection bridge to Airport Drive west of Link Road
  - Existing westbound Airport Drive carriageway removed
  - Second northbound right turn lane at Link Road intersection re-introduced.

Operational stage modelling

Operational modelling considered a number of future scenarios factoring in changes to the road network over the following years:

- 2016/18 – the adopted baseline year for the strategic and operational models
- 2022 – the adopted year in which construction impacts would be assessed
- 2026 – the adopted year of project opening
- 2036 – the period ten years after the adopted project opening year, as required by the *Traffic Modelling Guidelines* (Roads and Maritime, 2013a).

'Cumulative' scenarios were also assessed (for 2026 and 2036) to predict the potential cumulative impacts of all planned projects, including the F6 Extension Stage 1 and Western Harbour Tunnel and Beaches Link.

Table 9.1 summarises the operational stage scenarios that were modelled.

Table 9.1 Summary of model assessment scenarios

Scenario	Details
Without project (2026)	Future network without the project, including other road network improvements (NorthConnex, M4 Widening, M4 East, New M5, M4-M5 Link and Rozelle Interchange)
With project (2026)	Consistent with the 'without project (2026)' scenario, but with the project open to traffic
With project cumulative (2026)	Consistent with the 'with project (2026)' scenario, but with F6 Extension Stage 1 open to traffic
Without project (2036)	Future network without the project, including NorthConnex, M4 Widening, M4 East, New M5, M4-M5 Link and Rozelle Interchange
With project (2036)	Consistent with the 'without project (2036)' scenario, but with the project open to traffic
With project cumulative (2036)	Consistent with the 'with project (2036)' scenario, but with F6 Extension Stage 1, F6 Extension Stage 2, Rozelle Interchange, Western Harbour Tunnel and the Beaches Link open to traffic

Impact assessment

The performance of a road traffic network can be assessed in a number of ways, including:

- At a network level, which includes total vehicles using the network, their average speed and average travel time
- At a midblock level (ie the volume of vehicles crossing an arbitrary line some distance from an intersection), which represents changes to travel routes and the impacts of these changes
- At an intersection level, which represents changes to the performance of intersections.

The traffic models were used to establish baseline conditions so that changes associated with constructing and operating the project can be isolated and analysed using the above measures, to determine whether impacts can be mitigated.

Traffic volumes and patterns

Traffic volumes and patterns were assessed by comparing the changes to traffic volumes between the 2026 and 2036 conditions, with and without the project. This provides an assessment of the changes to traffic volumes as a result of the project. It also provides an indication of the potential induced or additional traffic attracted to the local area as a result of the new road infrastructure.

Outputs from the Strategic Motorway Planning Model and Operational Model have been used to show the changes to average daily traffic volumes and morning and afternoon peak traffic volumes. The traffic volumes output by the models represent average weekday volumes and exclude public and school holidays. The changes to traffic volumes also included heavy vehicles and total vehicles (light vehicles and heavy vehicles combined).

Travel demand and traffic shifts

Travel demand and traffic shifts were also assessed using outputs from the Strategic Motorway Planning Model and Operational Model to indicate average weekday traffic, and morning and afternoon peak period traffic volumes, moving across ‘screenlines’. A screenline is an imaginary line on a map (or in a model) at which point changes to traffic volumes (and patterns) can be consistently measured and compared for different scenarios. Three screenlines were analysed for the project (see Figure 9.3):

- Sydney Gateway screenline
- F6 screenline
- Port Botany screenline.

The following were analysed for each screenline, for existing and 2026/2036 conditions, with and without the project:

- Directional and two-way traffic volumes
- Proportion of the total screenline traffic volume
- Total traffic volumes crossing the screenline.

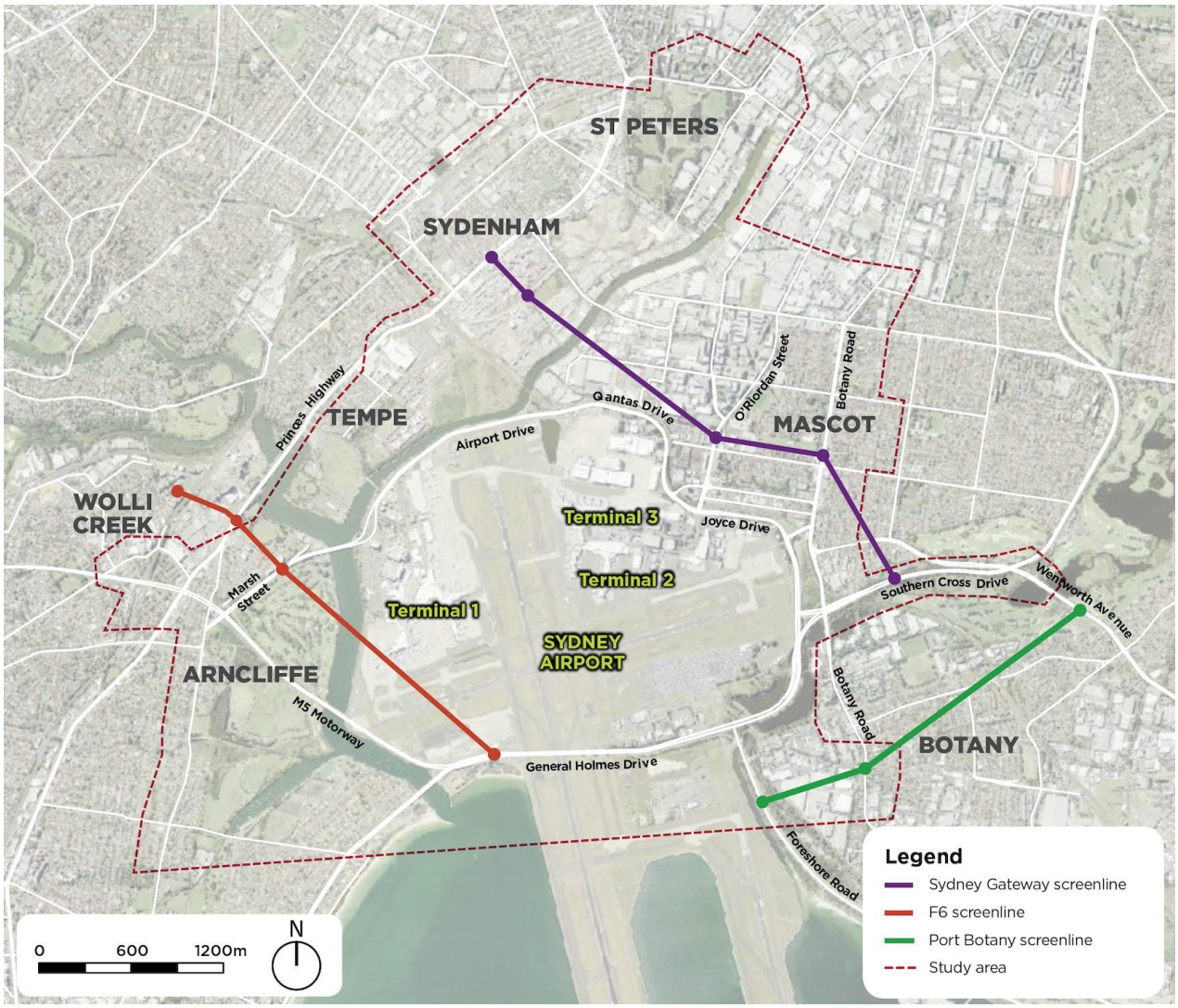

Figure 9.3 Location of assessment screenlines

Intersection assessment

The potential for impacts during both construction and operation were considered for the following key intersections, due to their proximity to the project site (shown in purple on Figure 9.4):

1. Robey Street/O'Riordan Street
2. Seventh Street/Qantas Drive
3. Joyce Drive/O'Riordan Street/Sir Reginald Ansett Drive
4. Airport Drive/Link Road.

The potential for operation impacts was considered at the following intersections (shown in red on Figure 9.4):

5. West Botany Street/Marsh Street
6. Marsh Street/M5 motorway
7. General Holmes Drive/Mill Pond Drive
8. Botany Road/Mill Pond Drive
9. Joyce Drive/General Holmes Drive
10. Botany Road/General Holmes Drive
11. King Street/O'Riordan Street
12. O'Riordan Street/Bourke Road
13. Bourke Street/Coward Street
14. Coward Street/O'Riordan Street
15. Gardeners Road/Bourke Street
16. Kent Road/Ricketty Street
17. Botany Road/Gardeners Road
18. Kent Road/Coward Street
19. Canal Road/Burrows Road
20. O'Riordan Street/Gardeners Road
21. Kent Street/Gardeners Road.

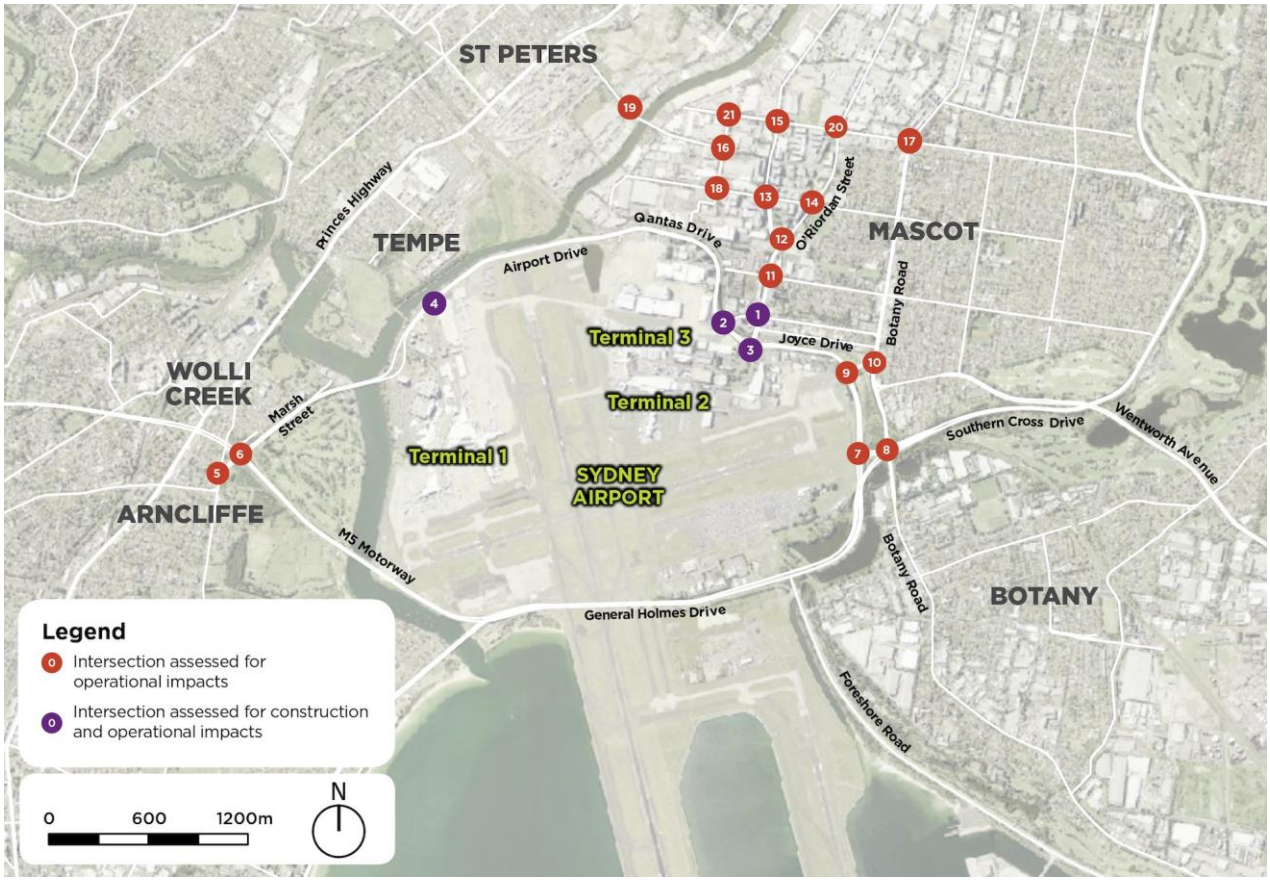

Figure 9.4 Location of key intersections for assessment

Travel time changes

Travel times along key routes were used to determine the relative impacts or benefits of the project by comparing changes with and without the project. Modelling of travel time was undertaken for the following routes (see Figure 9.5):

Construction stage:

- Airport Drive – Flora Street to Robey Street
- O'Riordan Street – Terminals 2/3 to Gardeners Road
- General Holmes Drive – the M5 East to Mill Pond Road.

Operational stage:

- Princes Highway – May Street (St Peters) to Wickham Street/Forest Road
- Princes Highway/West Botany Street – May Street (St Peters) to Bestic Street
- M5 East – Marsh Street to the M1 at Southern Cross Drive
- M5 East – Marsh Street to Botany Road via the M1
- Marsh Street – M5 intersection with Marsh Street to Joyce Drive/General Holmes Drive
- Canal Road – Princes Highway to Botany Road/Gardeners Road
- Botany Road – Gardeners Road to Mill Pond Drive/Botany Road
- Robey Street – Qantas Drive to Botany Road
- O'Riordan Street – Joyce Drive to Gardeners Road
- O'Riordan Street – Joyce Drive to Bourke Road
- Coward Street – Kent Road to Botany Road
- Unwins Bridge Road – May Street/Princes Highway to Railway Road.

These routes were selected as they provide good coverage of the study area and are representative of travel times experienced by road users.

The following additional routes were analysed to determine the relative impacts or benefits in terms of access to Sydney Airport and Port Botany:

- Between Sydney Airport and Mascot, via St Peters interchange
- Between Foreshore Road near Port Botany and Mascot, via St Peters interchange
- Between Foreshore Road near Port Botany and the M5 East.

Figure 9.5 Routes used for travel time analysis

Public and active transport, parking and access assessment

The following were used to identify and assess potential impacts on services or existing conditions:

- Changes to existing conditions (eg bus services, active transport routes, parking provisions or accessibility)
- Changes to connectivity with the surrounding network/other facilities
- Impact on users (eg increased walking distances, changes to travel times, etc).

9.1.3 Assessment criteria

Intersection level of service

Road network performance was evaluated using average delay and level of service. Average delay is commonly used to assess the operational performance of intersections, with level of service used as an index. Level of service is measured on a scale from A to F, with A representing optimal operating conditions and F representing the worst operating conditions. When roadway performance falls below a level of service D, investigations are generally initiated to determine if suitable remediation can be provided. However, limited road capacity and high demand often mean that a level of service E or F are regularly experienced during peak periods at pinch points on Sydney's road network.

A summary of the intersection level of service and average delay criteria is shown in Table 9.2.

Table 9.2 Level of service criteria for intersections

Level of service	Average delay/vehicle (secs)	Traffic signals/roundabouts	Give way and stop signs
A	<14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Good with acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity; at signals incidents would cause excessive delays	At capacity; requires other control modes
F	>70	Roundabouts require other control modes	At capacity; requires other control modes

Source: *Guide to Traffic Generating Developments* (Roads and Traffic Authority, 2002)

Midblock level of service

Midblock performance is also measured using level of service. The level of service for freeway or motorway sections where the design speed is more than 70 km/h is calculated based on the vehicle density, which is the traffic volume divided by the average passenger car speed. Density is measured in passenger car units per kilometre per lane (PCU/km/lane). The level of service for freeway or motorway sections where the design speed is 70 km/h or less is calculated based on the volume/capacity (V/C) ratio, which is the traffic volume divided by the capacity of the roadway.

Table 9.3 shows the six levels of service used for midblock assessment.

Table 9.3 Midblock level of service criteria

Level of service	Definition	Multi-lane roads[1]	Freeways[2]
		V/C ratio	Density (PCU/km/lane)
A	A condition in which individual drivers are virtually unaffected by the presence of others in the traffic stream.	≤ 0.26	≤ 7.0
B	A condition where drivers still have reasonable freedom to select their desired speed and to manoeuvre within the traffic stream.	0.27 to 0.41	7.1 to 11.0
C	A conditions where most drivers are restricted to some extent in their freedom to select their desired speed and to manoeuvre within the traffic stream.	0.42 to 0.59	11.1 to 16.0
D	Drivers are severely restricted in their freedom to select their desired speed and to manoeuvre within the traffic stream.	0.60 to 0.81	16.1 to 22.0
E	Traffic volumes are at or close to capacity, and there is virtually no freedom to select desired speeds or to manoeuvre within the traffic stream. Minor disturbances within the traffic stream would cause queuing and delays.	0.82 to 1.00	22.1 to 28.0
F	The amount of traffic approaching a point exceeds the amount which can pass it. Queuing and delays result.	> 1.00	> 28.0

Source: *Guide to Traffic Management: Part 3 Traffic Studies and Analysis* (Austroads, 2017)

Notes: 1. Free flow speed is taken as 70 kilometres per hour
2. Free flow speed is taken as 90 kilometres per hour

9.1.4 Risks identified

An environmental risk assessment was undertaken as an input to the impact assessment (see Appendix G). This involved identifying potential environmental risks during construction and operation, and rating the potential risks according to likelihood, consequence and overall level of risk, in general accordance with *AS/NZS ISO 31000:2009 Risk management – Principles and guidelines*. Traffic, transport and access risks with an assessed risk rating of medium or above, identified by the environmental risk assessment, included:

- Changes to intersection and traffic performance during construction, including as a result of heavy vehicle movements, narrowing of lanes, speed restrictions and lane closures
- Disruptions and delays to public transport and emergency services during construction
- Impacts on access to commercial properties during construction
- Impacts on the shared paths in Tempe and along Alexandra Canal during construction
- Cumulative traffic and transport impacts during construction, taking into account other projects in the study area (particularly the Botany Rail Duplication)
- Impacts on access to Sydney Airport during construction and operation
- Impacts associated with the closure of Swamp Road and changes to access arrangements along Burrows Road during construction and operation.

The traffic, transport and access assessment included consideration of these potential risks.

9.2 Existing environment

Key traffic, transport and access features of the study area are described below and shown on Figure 9.6 and Figure 9.7. Further information on the regional transport context, including significant transport infrastructure in the study area (ie Sydney Airport and freight facilities), is provided in section 2.2.1.

9.2.1 Existing road network

Key roads within and adjacent to the project site are described in Table 9.4 and shown on Figure 9.6 and Figure 9.7.

The roads used by traffic accessing Sydney Airport are listed in Table 9.4 and include:

- Terminal 1 is accessed from the south and west via Marsh Street from the M5, and from the east via Airport Drive/Qantas Drive/Joyce Drive, which connects with General Holmes Drive/Southern Cross Drive (the M1)
- Terminals 2/3 are accessed via Qantas Drive from the west, Joyce Drive from the east, and O'Riordan Street from the north
- Lancastrian Road provides access to other Sydney Airport facilities off Qantas Drive. Lancastrian Road also provides access across Qantas Drive and Botany Rail Line to Qantas facilities north of the rail line.

To improve traffic flow into and out of Terminals 2/3, a one-way road system was constructed to provide access to Terminals 2/3 from Qantas Drive. Traffic enters Terminals 2/3 via Sir Reginald Ansett Drive and exits via Seventh Street and Robey Street.

Heavy vehicle routes

Many of the roads around Sydney Airport and within the study area are designated heavy vehicle routes. These roads can accommodate large vehicles, including B-doubles that are used to move road and container freight. These include routes to and from Sydney Airport and Port Botany such as the M5, General Holmes Drive, Southern Cross Drive and Foreshore Road.

Qantas Drive and Airport Drive, along with Robey and O'Riordan streets, are also used for the movement of freight to/from Sydney Airport. Airport Drive and Qantas Drive are also used by over height vehicles travelling between the M1 and M5 motorways, due to the height restrictions of the M1 tunnel under the Sydney Airport runways.

Roads identified as B-double routes are described in Table 9.4.

Table 9.4 Roads within and adjacent to the project site

Road	Description	Road function and responsible authority
M1/Southern Cross Drive/ General Holmes Drive/A1	These roads extend along the southern and eastern boundaries of Sydney Airport, connecting the M5 East and the Eastern Distributor. Southern Cross Drive is six lanes, while General Holmes Drive has up to eight lanes with a section operating as a tidal flow system for peak periods. The roads are limited access motorways with no at-grade intersections.	Motorways (Roads and Maritime) B-double access route
M5 East	The M5 East is a four-lane motorway connecting the M5 South Western Motorway to the M1 at General Holmes Drive. The M5 East runs along the southern boundary of Sydney Airport and then proceeds via a tunnel west of Marsh Street. It then emerges at Bexley Road in Kingsgrove. The interchange with Marsh Street is the primary access route from the motorway network to Terminal 1.	Motorways (Roads and Maritime) B-double access route
Princes Highway	The Princes Highway begins at the intersection of Broadway and City Road, extending south through Sydney towards Wollongong. In the vicinity of the project site, the Princes Highway is a six-lane road with sections operating as tidal flow to increase lane capacity in the peak direction.	Arterial road (Roads and Maritime) B-double access route
Marsh Street/Airport Drive/ Qantas Drive	These roads are the key accesses to Terminal 1 and Terminals 2/3 respectively. Airport Drive and Qantas Drive run along and within the northern boundary of Sydney Airport, and have two lanes in each direction. These roads provide an important east–west connection, including between Terminals 1 and 2/3, and for over-height or restricted freight vehicles that cannot use General Holmes Drive/M1 due to the low clearance tunnel under the runway. Marsh Street is a six-lane road that links Terminal 1 to the M5 East across the Cooks River	Arterial roads (Marsh Street - Roads and Maritime, Airport Drive/Qantas Drive - Sydney Airport Corporation) B-double access route (Qantas Drive/ Airport Drive)
Joyce Drive/ General Holmes Drive	Joyce Drive/General Holmes Drive is a state road beginning at the intersection of Qantas Drive and O'Riordan Street, extending to meet the M1 on the eastern side of the airport.	Arterial Road (Roads and Maritime) B-double access route
Botany Road	Botany Road is a state road and an important north–south connection between the Sydney central business district in the north and Port Botany in the south via Mascot town centre. The road is generally four to six lanes wide, with bus lanes north of Wentworth Avenue. Some sections of Botany Road are prohibited from use by heavy vehicles.	Arterial road (Roads and Maritime)
Canal Road, Ricketty Street, Kent Road and Gardeners Road	These roads provide a key east–west function across the northern edge of the study area linking the Princes Highway with the eastern suburbs at Kingsford. The road varies between four and six lanes.	Arterial road (Roads and Maritime) B-double access route
Foreshore Road	Foreshore Road is a four-lane divided road that connects Port Botany to General Holmes Drive/M1. It is an important link for road freight to and from the port.	Arterial road (Roads and Maritime) B-double access route
O'Riordan Street, Robey Street (west of O'Riordan Street)	These streets form part of the main north–south corridor between the Sydney central business district and Sydney Airport. Robey Street is a one-way couplet with O'Riordan Street, which allows traffic entering the airport to use O'Riordan Street, and traffic exiting the airport to use Robey Street.	Local road (Roads and Maritime and Sydney Airport) B-double access route

Road	Description	Road function and responsible authority
	O'Riordan and Robey streets are state roads. O'Riordan Street is generally four to six lanes wide and has many signal-controlled intersections.	
Bourke Street/ Bourke Road	Bourke Street/Bourke Road runs in a north–south direction, beginning at O'Riordan Street in Mascot, through the Mascot Station precinct and continuing north through Green Square to Alexandria/Redfern. It accommodates a separated cycleway between Coward Street and the central business district.	Local (Bayside Council) B-double access route along sections
Bellevue Street/ Swamp Road	Bellevue Street is located on both sides of the Botany Rail Line. Bellevue Street west (on western side of the rail line) provides access from the Princes Highway south towards the project site, where it becomes Swamp Road.	Local (Inner West Council) B-double access route

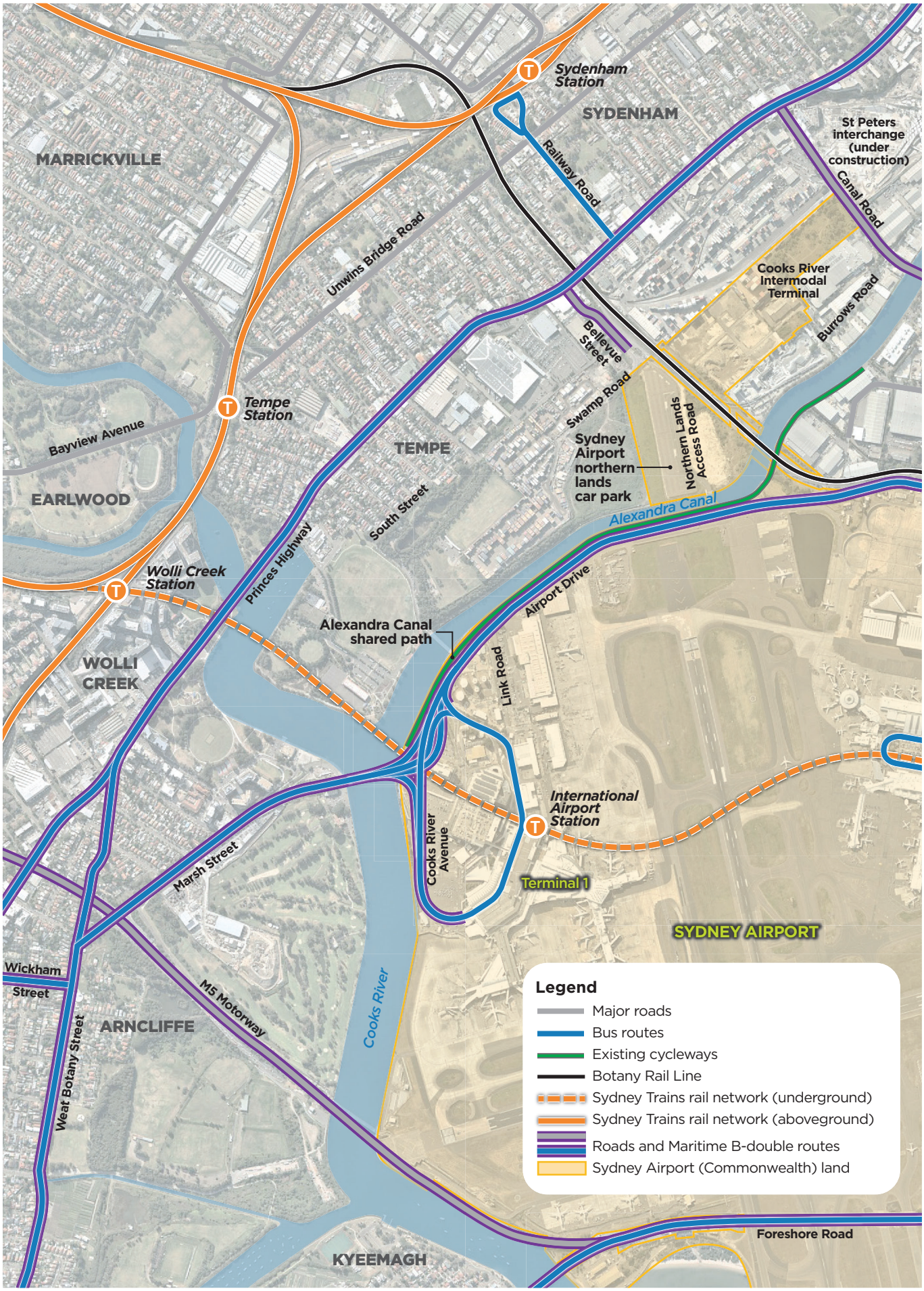

Figure 9.6 **Existing transport environment - map 1**

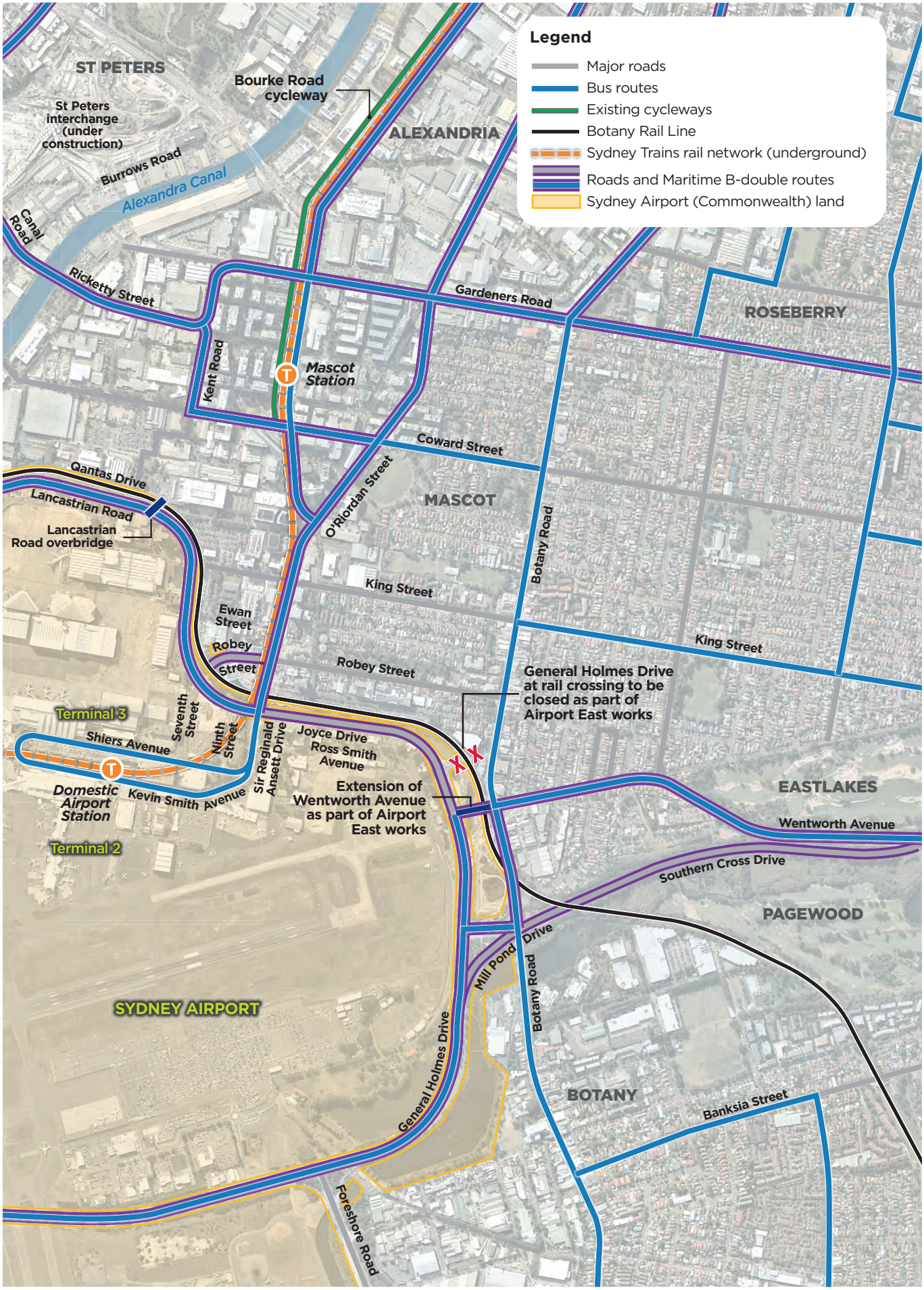

Figure 9.7 **Existing transport environment - map 2**

9.2.2 Traffic volumes and patterns

In addition to providing access to/from Sydney Airport and towards Port Botany, the roads around Sydney Airport play a vital role in providing north–south and east–west arterial functions within the regional road network. They also provide access to surrounding land uses in Mascot. This multitude of roles results in competition between through traffic and local traffic, leading to congestion, which is more pronounced in the morning peak period.

Traffic profiles from Roads and Maritime fixed traffic counters provide a profile of traffic volumes and patterns across a typical weekday, and are shown on Figure 9.8. The morning and afternoon peak periods are evident from these profiles and correlate with the peak periods selected for use by the Sydney Gateway Operational Model.

Figure 9.8 shows that in the morning peak, traffic volumes begin to rise steeply from 4am, peaking between 6am and 7am. This increase, which is earlier than the typical road network (commuter) peak, is a result of the earlier commencement of airport operations. In the afternoon, peak traffic volumes occur between 4pm and 7pm. The commuter peak is shown to carry more traffic than the airport peak at these locations.

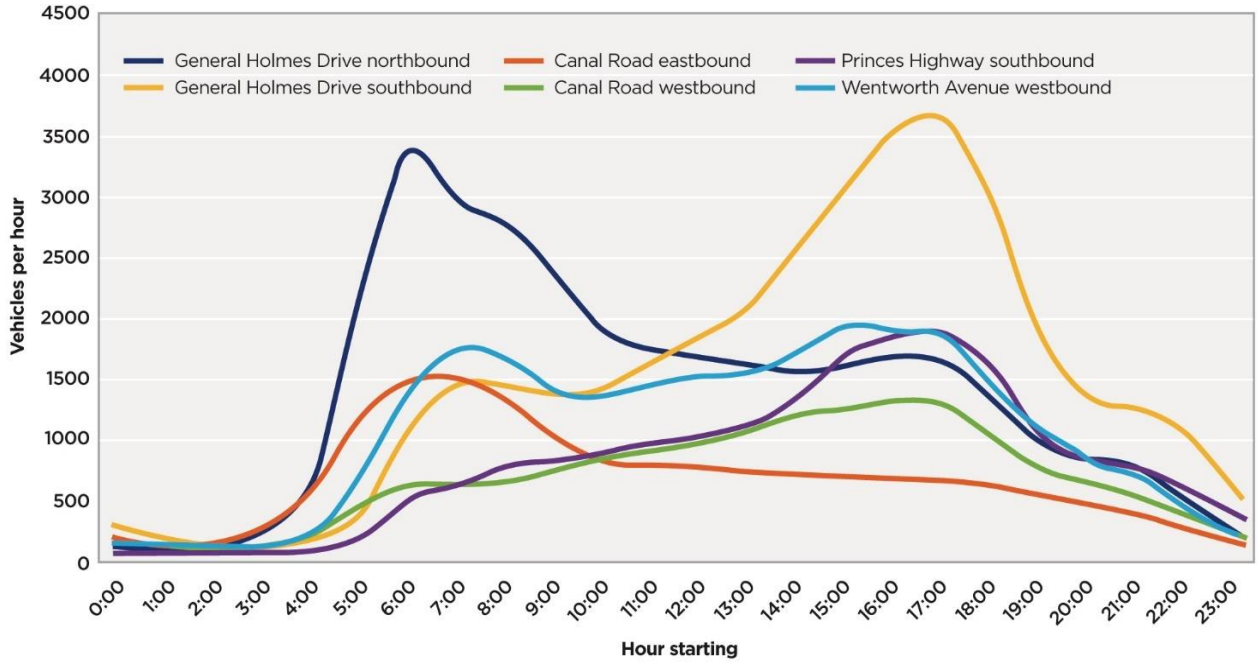

Figure 9.8 24-hour traffic volumes at fixed traffic counter locations in 2018

Morning and afternoon peak hour traffic volumes, and average weekday traffic volumes for key roads within the study area, are summarised in Table 9.5. The percentage of heavy vehicles is also provided.

Table 9.5 2016 morning and afternoon peak and average weekday traffic volumes

Location	Direction	Morning peak (8am-9am)		Afternoon peak (5pm-6pm)		Average week day volumes	
		Vehicles per hour	Heavy vehicles[1] (%)	Vehicles per hour	Heavy vehicles[1] (%)	Vehicles per day	Heavy vehicles[1] (%)
Airport Drive – west of Link Road	Eastbound	2,490	7	1,300	8	28,500	8
	Westbound	1,350	6	2,130	6	24,500	7
	Eastbound	2,420	7	1,360	7	28,700	8

Location	Direction	Morning peak (8am-9am)		Afternoon peak (5pm-6pm)		Average week day volumes	
		Vehicles per hour	Heavy vehicles[1] (%)	Vehicles per hour	Heavy vehicles[1] (%)	Vehicles per day	Heavy vehicles[1] (%)
Qantas Drive – east of Seventh Street	Westbound	1,530	5	2,080	6	24,800	6
M1/General Holmes Drive/A1	Eastbound	6,880	8	4,360	8	81,700	10
	Westbound	3,910	13	7,200	6	87,000	10
Princes Highway – west of Railway Road	Northbound	2,470	6	1,470	6	27,900	8
	Southbound	920	16	2,150	6	28,700	9
O'Riordan Street – south of King Street	Northbound	2,120	8	1,530	8	28,800	10
	Southbound	1,280	9	1,910	6	25,100	9
Bourke Street – south of Gardeners Road	Northbound	610	7	650	2	9,600	4
	Southbound	630	2	380	3	5,400	4
Princes Highway – south of West Botany Street	Northbound	1,610	6	920	5	17,400	7
	Southbound	430	12	1,590	4	17,600	7
Robey Street – west of O'Riordan Street	Eastbound	1,410	9	620	11	14,600	11
	Westbound	700	9	1,100	6	13,000	9
M1/Southern Cross Drive – east of Botany Road	Eastbound	3,850	4	3,360	4	57,500	4
	Westbound	3,520	4	4,330	3	62,500	4
O'Riordan Street – south of Church Avenue	Northbound	1,000	8	830	5	18,100	8
	Southbound	900	6	1,110	5	16,500	7
Botany Road – south of Coward Street	Northbound	1,580	8	1,020	9	16,800	9
	Southbound	890	10	1,240	8	15,600	10
Foreshore Road – south of the M1	Northbound	1,160	34	1,850	17	22,400	30
	Southbound	1,530	20	910	29	18,700	33
General Holmes Drive – south of the M5 East/M1 interchange	Northbound	4,440	3	2,100	4	44,200	5
	Southbound	1,500	7	4,820	3	45,000	5
Canal Road	Eastbound	1,450	6	630	13	13,900	12
	Westbound	670	18	1,220	7	17,200	11
Gardeners Road – east of Bourke Road	Eastbound	580	7	940	5	11,000	6
	Westbound	550	11	260	8	5,200	9

Location	Direction	Morning peak (8am-9am)		Afternoon peak (5pm-6pm)		Average week day volumes	
		Vehicles per hour	Heavy vehicles[1] (%)	Vehicles per hour	Heavy vehicles[1] (%)	Vehicles per day	Heavy vehicles[1] (%)
Burrows Road	Northbound	440	7	390	5	5,300	12
	Southbound	240	17	310	13	4,500	15

Note: 1. Heavy commercial vehicles are classified as a class 3 vehicle (a two-axle truck) or larger, in accordance with the Austroads Vehicle Classification System.

Table 9.5 shows that traffic volumes towards the Sydney central business district are typically higher during the morning peak. Conversely, traffic in the westbound and southbound directions are higher in the afternoon peak hour. This pattern indicates a strong demand for movement between employment areas in central Sydney and/or the eastern suburbs, and residential areas to the south and west. However, Foreshore Drive experiences higher southbound traffic volumes during the morning peak and higher northbound volumes during the afternoon peak, as it is a major freight route to/from Port Botany.

Table 9.5 also shows that:

- Traffic volumes in the morning peak are generally higher than during the afternoon peak, except along the M1/A1 corridor, where traffic volumes are marginally higher during the afternoon peak
- About five to 10 per cent of traffic on the network is heavy vehicles, increasing to 20 to 35 per cent on Foreshore Road
- The M1/General Holmes Drive carries the highest daily traffic volumes, with more than 80,000 vehicles per day using the corridor in each direction
- The M1/Southern Cross Drive and the A1 also carry a high proportion of daily traffic, with around 60,000 and 40,000 vehicles per day in each direction, respectively.

9.2.3 Road network performance

Network performance

Existing road network performance for the morning and afternoon peak periods are summarised as follows:

- Congested conditions are apparent throughout the study area during both the morning and afternoon peaks, with low average speeds of about 25 kilometres per hour
- Both peak periods have similar traffic demands and trip lengths
- The road network is more congested during the morning peak period than in the afternoon peak, as represented by longer average trip times due to lower average speeds and more stops.

Intersection performance

Table 9.6 shows the existing performance of intersections within the study area that may be affected by the project. Both the average delay and level of service is provided for each intersection.

Table 9.6 Existing intersection performance

Intersection	2018 morning peak (8am-9am)		2018 afternoon peak (5pm-6pm)	
	Average delay (seconds)	Level of service	Average delay (seconds)	Level of service
West Botany Street/Marsh Street	51	D	26	B
Marsh Street/M5	43	D	68	E

Intersection	2018 morning peak (8am-9am)		2018 afternoon peak (5pm-6pm)	
	Average delay (seconds)	Level of service	Average delay (seconds)	Level of service
General Holmes Drive/Mill Pond Drive	100	F	39	C
Botany Road/Mill Pond Drive	101	F	103	F
Joyce Drive/General Holmes Drive	152	F	41	C
Botany Road/General Holmes Drive	90	F	49	D
Robey Street/O'Riordan Street	56	D	26	B
Joyce Drive/O'Riordan Street	130	F	52	D
Seventh Street/Qantas Drive	108	F	64	F
King Street/O'Riordan Street	69	E	33	C
O'Riordan Street/Bourke Street	43	D	31	C
Bourke Street/Coward Street	106	F	58	E
Coward Street/O'Riordan Street	78	F	51	D
Gardeners Road/Bourke Street	56	E	43	D
Kent Road/Ricketty Street	36	C	42	C
Botany Road/Gardeners Road	81	F	65	E
Kent Road/Coward Street	103	F	59	E
Canal Road/Burrows Road	59	E	93	F
Airport Drive/Link Road	6	A	6	A
O'Riordan Street/Gardeners Road	98	F	119	F

The information in Table 9.6 shows that:

- In the morning peak, most of the intersections operate at a level of service E or F, with only four intersections operating at a level service D or better. This indicates a generally high level of delay at most intersections, which is consistent with the overall network performance
- Intersection performance improves slightly during the afternoon peak, with eight of the modelled intersections operating at a level of service D or better
- The two intersections that provide access to Terminals 2/3 (O'Riordan Street/Joyce Drive/Sir Reginald Ansett Drive and Seventh Street/Qantas Drive) experience longer delays (longer than the 120 second traffic light cycle times), which results in substantial delays to vehicle movements at these locations. Despite the delays at these intersections, the existing network is generally able to accommodate the existing traffic demands in the morning and evening peaks
- Similar to intersection performance, average delays are generally greater in the morning than the evening.

9.2.4 Public transport

Public transport within the study area includes rail and bus services. According to 2016 census data (ABS, 2016), a relatively high proportion of people use public transport within the area, predominantly rail.

Rail

The T8 Airport and South Line passes underground, with stations at Mascot (Mascot Station), Terminal 1 (International Airport Station) and Terminals 2/3 (Domestic Airport Station). The T8 line crosses under

Joyce Drive and the Botany Rail Line and follows the alignment of O'Riordan Street to the north. Services are operated by Sydney Trains. The stations in the study area are privately owned.

The location of the line and stations are shown on Figure 9.6 and Figure 9.7.

Bus networks

Several bus routes operate along key roads in the study area. In the immediate vicinity of the project site, routes 305, 400, 420 and 420N operate along Qantas Drive and Airport Drive, including stops on Qantas Drive at Lancastrian Road within the project site. These routes, which include stops at Terminal 1 and Terminals 2/3, are shown on Figure 9.6. The bus stops on Qantas Drive are used by relatively few passengers, with historical Opal card data indicating that less than 20 passengers per day use these stops.

Route 400 operates between Bondi Junction and Sydney Airport. Routes 420 and 420N operate between Burwood and Eastgardens Shopping Centre in the east. These routes have a frequency of about 20 minutes. Other bus routes are generally located around Mascot Station to the north of the project site and along Princes Highway to the west.

Botany Road serves the highest frequency of buses overall with up to 35 buses per hour in the peak period. As a major bus corridor, bus lanes are provided on Botany Road north of Wentworth Avenue. These are the only bus lanes located in the study area.

9.2.5 Active transport

Active transport (ie pedestrian and cyclist) networks within the study area are described below. Recent upgrades to these networks have improved active transport connections across the study area.

Cycle networks

The cycle network consists of a combination of types, including cycleways, shared paths, recreational and on-road facilities. The quality of this infrastructure varies from poor (most notably along parts of Qantas Drive) to excellent, such as the new facilities along the recently upgraded Marsh Street. Local councils have proposed cycling infrastructure within or adjacent to the project site. The key cycling infrastructure in the study area is made up of three off-road links:

- The Alexandra Canal cycleway
- Cooks River shared path and its connections
- The Bourke Road cycleway.

The Alexandra Canal cycleway is located within the project site (shown on Figure 9.6) and forms the main east–west and north–south connections for active transport across the study area. The path runs adjacent to Airport Drive and connects to Terminal 1 via Tempe Recreation Reserve and Wolli Creek, and surrounding areas via Marsh Street. To the east, the path continues north along Alexandra Canal before joining Coward Street to connect with the Bourke Road Cycleway in Mascot, which travels to the Sydney central business district.

Less than one per cent of journeys to work in the Bayside local government area are made by cycling. About three per cent of journeys to work within the Inner West local government area are made by cycling.

Pedestrian networks

The pedestrian network generally consists of footpaths, shared paths (pedestrian/cyclist) and dedicated road crossings. The local and arterial roads in the study area provide typical footpaths along their length. Streets in Mascot (including around Mascot Station and in Mascot generally) provide a higher degree of pedestrian amenity due to the network of small or detailed streetscapes and mix of residential and commercial land uses.

Pedestrian facilities are generally limited near Sydney Airport, with many facilities of poor quality due to uneven pavements and limited separation from busy roads.

Pedestrian accessibility to Terminal 1 via Marsh Street and Airport Drive is poor due to narrow footpaths on the Giovanni Brunetti bridge and flyovers at Airport Drive. However, there is a direct link from the Alexandra Canal shared path to the Terminal 1 precinct via a pedestrian/cycle bridge and overpass.

Terminals 2/3 is linked to the Mascot Station precinct with pedestrian access provided via Robey and O'Riordan streets. Upgrades to the pedestrian network on Seventh Street, Sir Reginald Ansett Drive and Qantas Drive have recently been completed by Roads and Maritime. There is a narrow footpath continuing from the Alexandra Canal cycleway on the northern side of Airport Drive and into Qantas Drive linking to the west of Robey Street.

A footpath on Canal Road provides access over Alexandra Canal between Ricketty Street and Princes Highway.

Nearly four per cent of journeys to work in the Bayside local government area are made by walking only. About 5.5 per cent of journeys to work within the Inner West local government area are made by walking.

Active transport activity

Roads and Maritime collected pedestrian and cyclist data along the Alexandra Canal cycleway in March 2019. The data indicates that, on average, the Alexandra Canal cycleway carries around 600 cyclists and 100 pedestrians per day. Peak usage occurs during the weekday morning and afternoon peak periods, when the cycleway carries around 90 cyclists and 10 pedestrians during the morning peak and afternoon peak hours.

9.2.6 Parking

Off-street parking

The following off-street parking areas are located within and adjacent to the project site:

- The Sydney Airport northern lands car park located on the western side of Alexandra Canal, which is accessed from Airport Drive via the Nigel Love bridge, and is used by Sydney Airport employees at times of peak demand
- A car parking area east of Terminals 2/3, located south of AMG Sydney and accessed off Ninth Street
- Two car parking areas east of Terminals 2/3, accessed off Ross Smith Avenue and Sir Reginald Ansett Drive respectively, which are leased to DHL
- Parking within the Sydney Airport Terminal 1 freight facilities.

Public car parks are also located adjacent to Terminal 1 (P7 and P9) and Terminals 2/3 (P1, P2 and P3). The car parks at Terminal 1 have capacity for about 4,000 vehicles. The car parks at Terminals 2/3 have capacity for about 4,200 vehicles. None of these car parks are located within the project site.

Recent capacity upgrades to public car parks are discussed in section 9.2.8.

On-street parking

No roadways close to the project site provide on-street parking. The following streets, along proposed haulage routes, include parking:

- Botany Road, outside of clearway and bus lane operating periods
- Ricketty Street, outside of clearway periods.

9.2.7 Future road network and upgrades

New motorway connections

WestConnex is a new regional motorway serving Western Sydney, which will improve accessibility along the employment corridor from the Sydney central business district to Sydney Airport and Port Botany. The WestConnex program of works includes:

- M4 Widening and M4 East (New M4) – Widening of the existing M4 from Parramatta to Homebush and the tunnelled extension of the M4 between Homebush and Haberfield via Concord. The M4 East project includes interchanges at Concord Road, the City West Link and Parramatta Road at Haberfield, with a future underground connection to the M4–M5 Link. The M4 Widening and M4 East are complete.
- New M5 and St Peters interchange – Duplication of the M5 through new twin tunnels from Kingsgrove to a new interchange at St Peters to the north of the project site. The St Peters interchange will provide underground connections to the M4–M5 Link and the future F6 Extension, and surface connections to Gardeners Road (via a new bridge over Alexandra Canal) and the Alexandria to Moore Park Connectivity Upgrade at Euston Road. The New M5 is anticipated to be open to traffic in 2020.
- M4–M5 Link and Rozelle Interchange – New mainline tunnels to connect the M4 East at Haberfield with the New M5 at St Peters interchange, creating a continuous motorway network in the Inner West. The Rozelle Interchange will connect the M4–M5 Link to the Anzac Bridge, Victoria Road via the Iron Cove Link, and a future connection to the Western Harbour Tunnel. The Iron Cove Link will also provide an un-tolled tunnelled bypass of the congested Victoria Road between the Anzac Bridge and the Iron Cove Bridge. Both the M4–M5 Link and Rozelle Interchange are anticipated to be open to traffic in 2023.

These projects, shown on Figure 9.9, are underway, and some will be finished before the Sydney Gateway road project opens. The Sydney Gateway road project would enable the full benefits of the above projects to be realised.

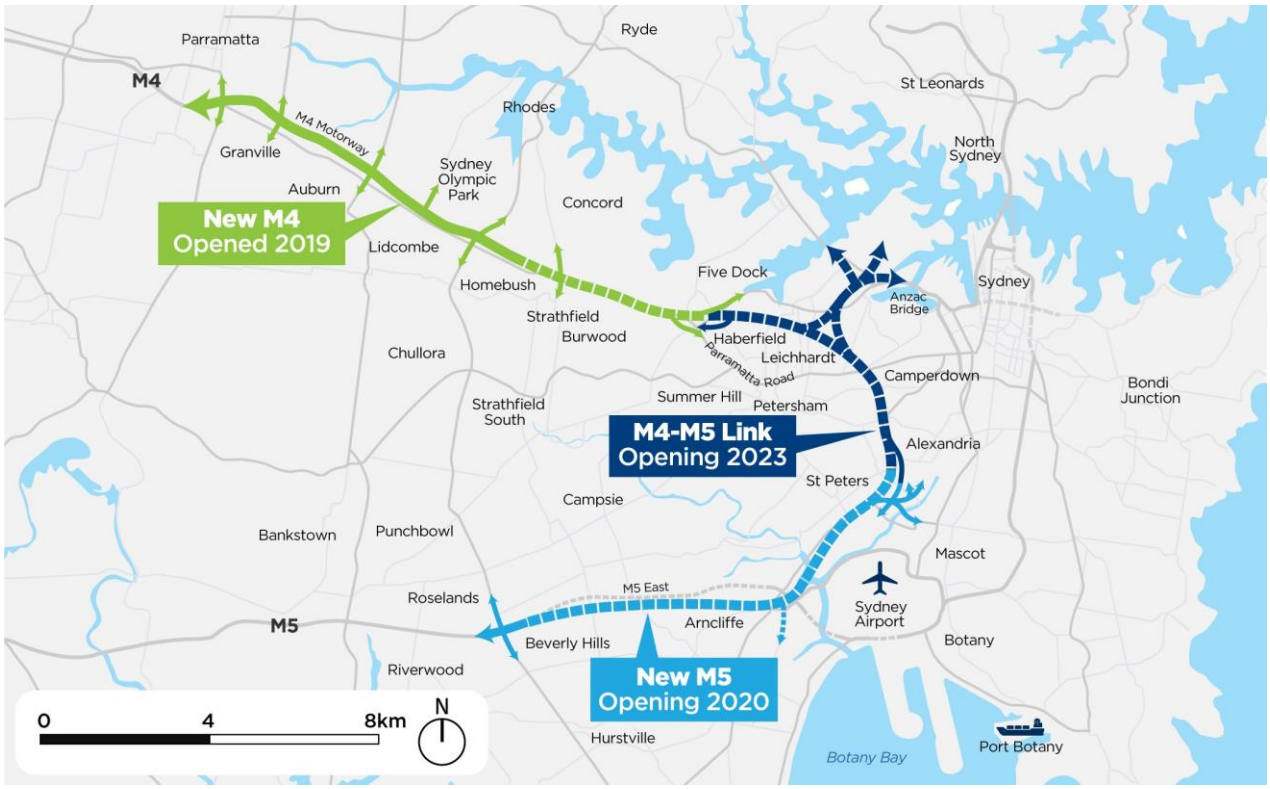

Figure 9.9 Sections of the WestConnex motorway

Other projects currently in the planning phase include (see Figure 9.10):

- Western Harbour Tunnel – A western bypass of the Sydney Harbour Bridge and Western Distributor running from the Warringah Freeway in North Sydney to the M4–M5 Link at the Rozelle Interchange
- Beaches Link – An underground bypass of Military Road and Spit Road, connecting the Wakehurst Parkway and Burnt Bridge Creek Deviation to the Warringah Freeway in North Sydney
- F6 Extension – A proposed link between the New M5 at Arncliffe and the M1 Princes Highway at Loftus. The first stage of the F6 Extension would extend to President Avenue at Kogarah with connections to Taren Point and Loftus to be delivered in future stages.

The cumulative effect of the Sydney Gateway road project, WestConnex and related projects would be to alter travel patterns across the city and unlock access and improve travel times between Sydney Airport, Port Botany and the rest of the Sydney transport network.

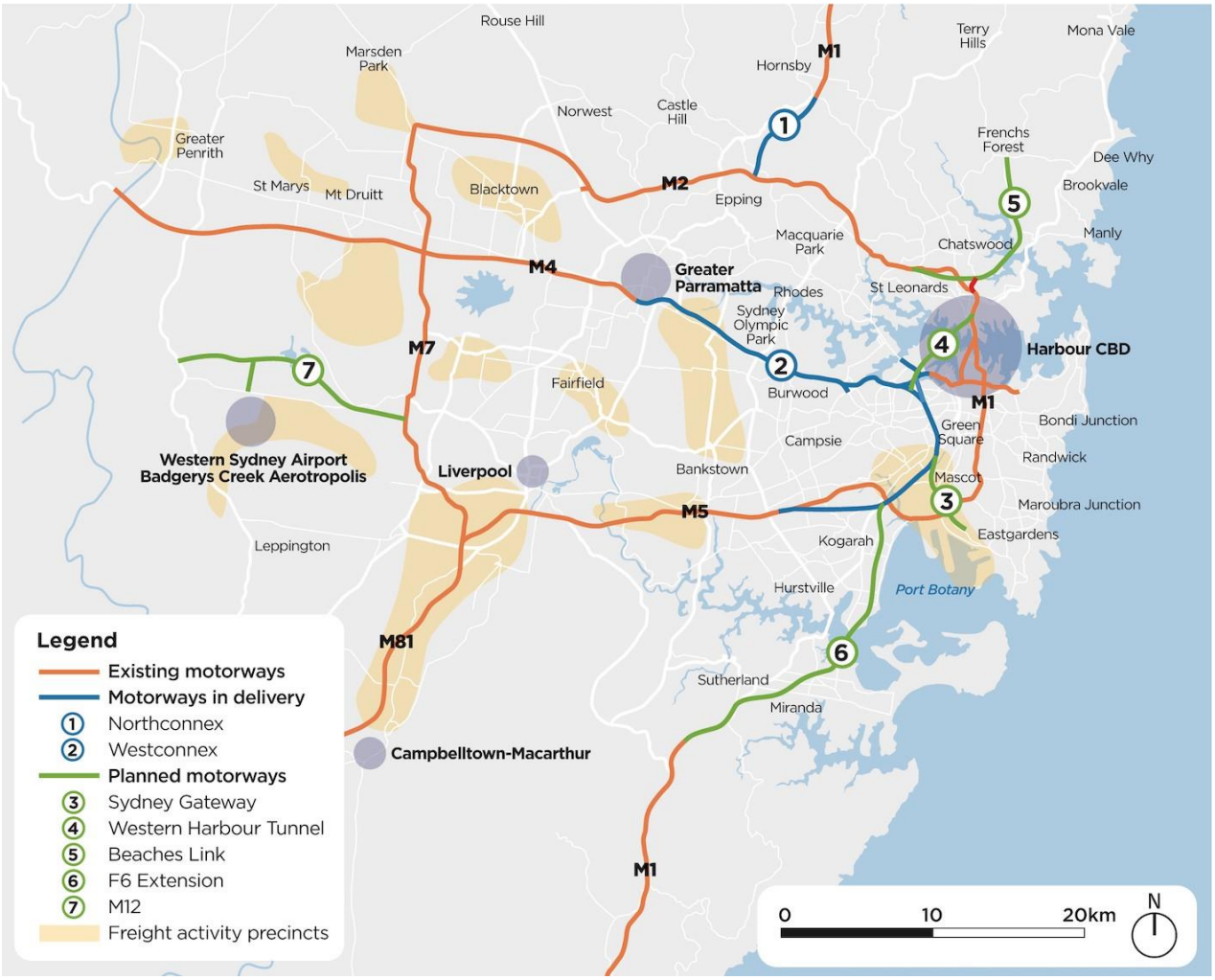

Figure 9.10 Motorway projects in Greater Sydney

Road upgrades within and around Sydney Airport

Roads and Maritime is carrying out a number of road upgrade projects around Sydney Airport to:

- Improve access to Sydney Airport, Mascot and the eastern suburbs
- Support future growth and access to Sydney Airport
- Improve traffic flow around Sydney Airport and to Port Botany

- Improve the movement of rail freight to and from Port Botany
- Reduce congestion and improve safety for road users in Mascot.

The following projects are being/have been carried out in the vicinity of the project site:

- Airport West Precinct upgrade
- Airport East Precinct upgrade
- Airport North Precinct upgrade
- Mascot intersection upgrades.

In the last few years, Sydney Airport Corporation has proposed and carried out a number of projects to improve road access and traffic flow in and out of Terminal 1 and Terminals 2/3. These projects were identified in the previous *Sydney Airport Master Plan 2033* and the *Sydney Airport T2/T3 Ground Access Solutions and Hotel Major Development Plan* (SACL, 2015).

Further information on these projects is provided in section 5.1.4.

9.2.8 Key traffic, transport and access characteristics of Sydney Airport (Commonwealth) land

The key roads and accesses to Sydney Airport have been the subject of a number of recent improvements as a result of precinct upgrades and intersection works undertaken by Roads and Maritime.

The Sydney Airport terminals are accessed from Airport Drive (Terminal 1) and Qantas Drive (Terminals 2/3). In both instances, a one-way road loop has been created to provide the necessary efficiency and capacity of movements. Link Road off Airport Drive provides access into the Terminal 1 freight facilities located to the north of Terminal 1.

The Sydney Airport terminals are serviced by both bus and train. Bus routes 305, 400, 420 and 420N operate along Qantas Drive and Airport Drive, including stops at Terminal 1 and Terminals 2/3. There are dedicated underground rail stations serving the terminals linked to the Sydney Trains network.

Public car parks are located adjacent to each of the terminal buildings with capacity for about 8,000 vehicles. Additional long-term car parking is also available at the Blue Emu car park. A staged expansion of car parking capacity, including a future new ground transport interchange, commenced in 2015, along with other roadway capacity improvements at Terminals 2/3.

Other car parks at the Sydney Airport northern lands and at Ninth Street are also used for employee parking.

9.3 Assessment of construction impacts

9.3.1 Road network changes and traffic volumes

Road network

The project can be constructed without substantial reconfiguration of the existing road network. However, there would be substantial works along Airport Drive, Qantas Drive and Sir Reginald Ansett Drive to facilitate connection of the new road links.

Two lanes would generally be maintained in each direction along Qantas Drive and Airport Drive during the operating hours of the Sydney Airport terminals when traffic volumes are highest. However, there would be a period during the day when a reduction in the number of available lanes would be required to facilitate construction, with a longer period overnight for more substantive works occupying multiple lanes.

Prolonged acceleration and turning lane reductions would occur at Airport Drive near Terminal 1 and at the Qantas Drive/Sir Reginald Ansett Drive and Seventh Street intersections. The impacts of these changes were assessed as part of the overall assessment of road network performance (see section 9.3.2).

In addition, short-term lane and carriageway closures would also be required to facilitate:

- Establishing site access points, particularly where access and egress lanes are required (eg access to the St Peters interchange connection work area and compound C1 via on Canal Road – see Figure 8.4)
- Lifting bridge segments where a crane needs to be set up in traffic lanes (eg on Qantas Drive, Airport Drive and on Canal Road, to facilitate construction of the Terminals 2/3 access viaduct, the Terminal 1 connection bridge and the Canal Road overpasses respectively)
- Connecting new roads to existing roads (eg connecting the Terminal 1 connection to Airport Drive and Terminals 2/3 connection to Qantas Drive west of Lancastrian Road)
- Widening the Qantas Drive east and westbound carriageways
- Constructing new lanes along Qantas Drive as part of the Qantas Drive upgrade and extension
- Modifying the Lancastrian Road/Qantas Drive intersection
- Traffic diversions to maintain capacity along Qantas Drive (see section 8.6.5)
- Lifting of viaduct bridge beams or segments.

To minimise the potential for traffic and access impacts, these short-term closures would be undertaken during night-time hours as far as possible. However, major crane lifts would occasionally require full weekend closures, with detours established to maintain access to Sydney Airport's terminals, Port Botany and operation of the road network.

Closures would be managed in accordance with a Construction Traffic and Access Management Plan. This plan would define the traffic management measures and communications required to manage traffic through or adjacent to work areas to ensure that access and road functionality is maintained (see section 9.6).

Swamp Road would be permanently closed (see section 7.11.1). Once the project is operational, access to properties in this area, including the Sydney Airport northern lands, would be via the proposed northern lands access and the freight terminal access.

Traffic currently using Airport Drive would be diverted onto the new sections of roadway in stages, as shown on Figure 8.12.

Traffic volumes

Based on the indicative haulage routes and estimated construction vehicle volumes (see sections 8.6.1 and 8.6.2), the largest increases in vehicle volumes are expected along Canal Road, particularly at its western extent near the Princes Highway, and on Qantas Drive and Airport Drive.

Traffic volumes on Canal Road could increase by up to 16 per cent in the morning peak, and 29 per cent in the afternoon peak, in the westbound direction. Traffic volumes on Qantas Drive and Airport Drive could increase by up to 20 per cent in the eastbound direction in the afternoon peak. These increases are considered to be manageable given the capacity of these roads and existing traffic volumes.

Holbeach Avenue would be used by workers to access compound C3, resulting in an additional 250 vehicles using this route during the morning and afternoon peak periods. The additional construction vehicles would generally be travelling in the opposite direction to other local traffic in the area. Therefore, the additional vehicle volumes are expected to be manageable.

Most of the existing properties and traffic movements that currently use Bellevue Street would be removed as a result of the project, offsetting most of the traffic expected to be generated by construction.

9.3.2 Intersection performance and travel times

As described in section 9.1.2, three construction scenarios were assessed. The intersection performance and travel time results for each scenario were compared against the without project 2022 future baseline to quantify the relative impact of construction. A description of the traffic changes between the 2018 baseline and 2022 future baseline is provided in section 5.4.1.2 of Technical Working Paper 1 (Transport, Traffic and Access). In summary, the following notable changes in terms of intersection performance are observed in the 2022 future baseline when compared with the 2018 existing conditions:

- Qantas Drive/Robey Street/Seventh Street – predicted to deteriorate in the morning peak as a result of downstream congestion and available capacity for the left turn from Qantas Drive into Robey Street
- O'Riordan Street/Robey Street – predicted to improve in the morning peak due to increased southbound capacity on O'Riordan Street (delivered as part of the Airport North Precinct upgrade project), which would offset any increased delay associated with increased northbound demand
- Airport Drive/Link Road intersection – predicted to deteriorate in the morning peak as a result of downstream congestion and available capacity at the left turn from Qantas Drive into Robey Street
- Joyce Drive/O'Riordan Street/Sir Reginald Ansett Drive – predicted to improve in the morning peak due to increased southbound capacity on O'Riordan Street (delivered as part of the Airport North Precinct Upgrade project) and increased westbound capacity on Joyce Drive (delivered as part of the Airport East Precinct upgrade project).

Travel times in 2022 are forecast to typically increase. This would be a result of increased vehicle demand and associated congestion, except for O'Riordan Street southbound in the morning peak. This location would experience reduced travel times due to the increased capacity delivered by the Airport North Precinct Upgrade project.

The results of the construction impact assessment relative to the 2022 future baseline conditions are summarised below.

Construction scenario 1 (November 2021 to May 2022)

Intersection performance

Modelling results are provided in Table 9.7 for scenario 1. The results show that in the morning peak, all intersections would experience vehicle delays lower than the 2022 future baseline, except the Qantas Drive/O'Riordan Street and Qantas Drive/Robey Street intersections. This is due to a combination of factors, including removing the signals at Lancastrian Road and traffic using the newly opened sections of the project in the Sydney Airport northern lands. At these intersections, vehicle delays would marginally increase (by five seconds); however, the existing level of service C would be maintained. It is noted that works associated with the Botany Rail Duplication would be undertaken in the vicinity of these intersections, with the potential for cumulative impacts (see section 9.5.1).

In the afternoon peak, compared to the 2022 future baseline:

- Average delays at the Qantas Drive/Seventh Street/Robey Street and the Airport Drive/Link Road intersections would reduce
- Average delays at the O'Riordan Street/Robey Street intersection would increase by 25 seconds
- Average delays at the Joyce Drive/O'Riordan Street intersection would increase by 21 seconds.

These increased delays would result in minor travel time increases for vehicles accessing Terminals 2/3, including shuttle buses, taxis and private vehicles.

Table 9.7 Morning and afternoon peak intersection performance during scenario 1

Intersection	Morning peak				Afternoon peak			
	2022 baseline		Scenario 1		2022 baseline		Scenario 1	
	Delay (seconds)	Level of service	Delay (seconds)	Level of service	Delay (seconds)	Level of service	Delay (seconds)	Level of service
O'Riordan Street and Robey Street	36	C	41	C	78	F	103	F
Qantas Drive, Robey Street and Seventh Street	213	F	159	F	44	D	37	C
Airport Drive and Link Road	36	C	15	B	12	A	7	A
Joyce Drive, O'Riordan Street and Sir Reginald Ansett Drive	74	F	74	F	110	F	131	F

Road network performance

During the morning and afternoon peak, compared to the 2022 future baseline, minor travel time increases are predicted across the road network, with the exception of Airport Drive, which is predicted to experience a reduction in travel times in both directions as a result of removing traffic signals at Lancastrian Road.

Travel times along General Holmes Drive eastbound would increase by one minute and six seconds (a 40 per cent increase).

During the afternoon peak, travel times along O'Riordan Street southbound would increase by one minute and 55 seconds (a 41 per cent increase).

These impacts are considered to be manageable with implementation of the mitigation measures provided in section 9.6.2. Details of travel time performance along these and other routes are shown in Table 9.8.

Table 9.8 Morning and afternoon peak travel time changes during scenario 1

Route	Morning peak			Afternoon peak		
	Travel time (minutes:seconds)			Travel time (minutes:seconds)		
	2022 baseline	Scenario 1	Change (%)	2022 baseline	Scenario 1	Change (%)
Airport Drive and Qantas Drive eastbound (Flora Street – Robey Street)	13:15	9:20	−03:55 (−30%)	4:30	4:30	00:00 (0%)
Airport Drive and Qantas Drive westbound (Seventh Street – Flora Street)	8:27	6:35	−01:52 (−22%)	4:27	3:46	−00:41 (−15%)
O'Riordan Street northbound	7:16	7:21	00:05 (1%)	7:11	7:24	00:13 (3%)

Route	Morning peak			Afternoon peak		
	Travel time (minutes:seconds)			Travel time (minutes:seconds)		
	2022 baseline	Scenario 1	Change (%)	2022 baseline	Scenario 1	Change (%)
(Terminals 2/3 – Gardeners Road)						
O'Riordan Street southbound (Terminals 2/3 – Gardeners Road)	4:04	4:38	00:34 (14%)	4:39	6:34	01:55 (41%)
General Holmes Drive eastbound (A1 – Mill Pond Drive)	7:13	7:38	00:25 (6%)	2:46	3:52	01:06 (40%)
General Holmes Drive westbound (A1 – Mill Pond Drive)	2:26	2:34	00:08 (5%)	3:28	3:38	00:10 (5%)

Construction scenario 2 (October 2022 to June 2023)

Intersection performance

The assessment found that intersection performance would generally be similar to scenario 1 when compared to the 2022 future baseline. Modelling results are provided in Table 9.9.

Table 9.9 Morning and afternoon peak intersection performance during scenario 2

Intersection	Morning peak				Afternoon peak			
	2022 baseline		Scenario 2		2022 baseline		Scenario 2	
	Delay (seconds)	Level of service	Delay (seconds)	Level of service	Delay (seconds)	Level of service	Delay (seconds)	Level of service
O'Riordan Street and Robey Street	36	C	41	C	78	F	112	F
Qantas Drive, Robey Street and Seventh Street	213	F	159	F	44	D	32	C
Airport Drive and Link Road	36	C	18	B	12	A	8	A
Joyce Drive, O'Riordan Street and Sir Reginald Ansett Drive	74	F	72	F	110	F	137	F

Road network performance

During the morning and afternoon peak hours, compared to the 2022 future baseline, minor travel time increases are predicted across the road network, with the exception of Airport Drive, which is predicted to experience a reduction in travel times in both directions.

During the afternoon peak, travel times along O'Riordan Street southbound would increase by two minutes and 12 seconds (a 47 per cent increase). Travel times along General Holmes Drive eastbound would increase by 48 seconds (a 29 per cent increase).

These impacts are considered to be manageable with implementation of the mitigation measures provided in section 9.6.2. Details of travel time performance along these and other routes are shown in Table 9.10.

Table 9.10 Morning and afternoon peak travel time changes during scenario 2

Route	Morning peak			Afternoon peak		
	Travel time (minutes:seconds)			Travel time (minutes:seconds)		
	2022 baseline	Scenario 2	Change (%)	2022 baseline	Scenario 2	Change (%)
Airport Drive and Qantas Drive eastbound (Flora Street–Robey Street)	13:15	9:47	−03:28 (−26%)	4:30	4:27	−00:03 (−1%)
Airport Drive and Qantas Drive westbound (Seventh Street–Flora Street)	8:27	7:45	−00:42 (−8%)	4:27	3:50	−00:37 (−14%)
O'Riordan Street northbound (Terminals 2/3–Gardeners Road)	7:16	7:28	00:12 (3%)	7:11	6:31	−00:39 (−9%)
O'Riordan Street southbound (Terminals 2/3–Gardeners Road)	4:04	4:18	00:14 (6%)	4:39	6:51	02:12 (47%)
General Holmes Drive eastbound (A1–Mill Pond Drive)	7:13	8:01	00:48 (11%)	2:46	3:34	00:48 (29%)
General Holmes Drive westbound (A1–Mill Pond Drive)	2:26	2:26	00:00 (0%)	3:28	3:58	00:30 (15%)

Construction scenario 3 (June to December 2023)

Intersection performance

The assessment found that intersection performance would generally be similar to scenario 1 when compared to the 2022 future baseline. Modelling results are provided in Table 9.11.

Table 9.11 Morning and afternoon peak intersection performance during scenario 3

Intersection	Morning peak				Afternoon peak			
	2022 baseline		Scenario 3		2022 baseline		Scenario 3	
	Delay (seconds)	Level of service	Delay (seconds)	Level of service	Delay (seconds)	Level of service	Delay (seconds)	Level of service
O'Riordan Street and Robey Street	36	C	40	C	78	F	109	F
Qantas Drive, Robey Street	213	F	162	F	44	D	33	C

Intersection	Morning peak				Afternoon peak			
	2022 baseline		Scenario 3		2022 baseline		Scenario 3	
	Delay (seconds)	Level of service	Delay (seconds)	Level of service	Delay (seconds)	Level of service	Delay (seconds)	Level of service
and Seventh Street								
Airport Drive and Link Road	36	C	17	B	12	A	10	A
Joyce Drive, O'Riordan Street and Sir Reginald Ansett Drive	74	F	76	F	110	F	120	F

Road network performance

During the morning and afternoon peak hours, minor travel time increases are predicted across the network, with the exception of Airport Drive, which is predicted to experience a reduction in travel times in the morning peak compared to the 2022 future baseline.

During the afternoon peak, travel times along O'Riordan Street southbound would increase by two minutes and 55 seconds (a 63 per cent increase). Travel times along General Holmes Drive eastbound would increase by one minute and 15 seconds (a 45 per cent increase).

Scenario 3 is predicted to have a moderate impact on the road network, with increased travel times during the afternoon peak relative to the 2022 future baseline. Measures to minimise these potential impacts are provided in section 9.6.2. Travel time performance along these and other routes is shown in Table 9.12.

Table 9.12 Morning and afternoon peak travel time changes during scenario 3

Route	Morning peak			Afternoon peak		
	Travel time (minutes:seconds)			Travel time (minutes:seconds)		
	2022 baseline	Scenario 3	Change (%)	2022 baseline	Scenario 3	Change (%)
Airport Drive and Qantas Drive eastbound (Flora Street–Robey Street)	13:15	9:59	−03:16 (−25%)	4:30	4:39	00:09 (3%)
Airport Drive and Qantas Drive westbound (Seventh Street–Flora Street)	8:27	7:48	−00:39 (−8%)	4:27	4:29	00:02 (1%)
O'Riordan Street northbound (Terminals 2/3–Gardeners Road)	7:16	7:24	00:08 (2%)	7:11	8:22	01:11 (17%)
O'Riordan Street southbound (Terminals 2/3–Gardeners Road)	4:04	4:39	00:36 (15%)	4:39	7:34	02:55 (63%)

Route	Morning peak			Afternoon peak		
	Travel time (minutes:seconds)			Travel time (minutes:seconds)		
	2022 baseline	Scenario 3	Change (%)	2022 baseline	Scenario 3	Change (%)
General Holmes Drive eastbound (A1–Mill Pond Drive)	7:13	8:00	00:46 (11%)	2:46	4:01	01:15 (45%)
General Holmes Drive westbound (A1–Mill Pond Drive)	2:26	2:32	00:05 (4%)	3:28	3:35	00:07 (3%)

9.3.3 Impacts on freight transport

Potential impacts on freight transport along the road network in the vicinity of Sydney Airport would be generally consistent with the impacts described in section 9.3.2 for general traffic. Generally, freight transport is expected to experience delays from a reduction in road network capacity during construction compared to the future 2022 baseline. This would include impacts on travel time for vehicles accessing the freight terminal near Terminal 1 via the Airport Drive/Link Road intersection.

Access to Port Botany would be via the M5, General Holmes Drive and Foreshore Road as a result of the project. No noticeable changes are predicted on the M5 or Foreshore Road. For General Holmes Drive, the predicted increases in travel time would be only minor considering the overall duration of the trip. The predicted increases would also only occur during the peak hour periods.

9.3.4 Impacts on public transport

Construction would have the potential to impact the bus services that operate along Airport Drive, Qantas Drive and O'Riordan Street (routes 305, 400 and 420). Such impacts include increased travel times compared to the 2022 future baseline, due to proposed lane closures and changes to traffic conditions. These increased travel times are outlined in section 9.3.2.

The bus stops located on Qantas Drive near the intersection with Lancastrian Road would be removed (see section 8.6.5). Historical data indicates that less than 20 passengers use these stops daily. Following removal of these stops, the closest stops serviced by the same routes would be located within Terminals 2/3 (about 750 metres away). It is expected that the existing stops would experience lower levels of use once the Qantas Flight Training Centre relocates (see Chapter 19 (Land use and property)).

The project would not directly impact passenger rail services or stations. However, the changes to road network performance described in section 9.3.1 could increase travel times for commuters travelling to stations in surrounding areas (such as Wolli Creek and Mascot stations).

9.3.5 Impacts on active transport

Overall, the project would have minimal impacts on active transport as a result of the limited number of facilities within the project site. The proposed changes to existing pedestrian and cyclist network (described in section 8.6.5), and the potential impacts of these changes, are summarised in Table 9.13.

Table 9.13 Indicative changes to active transport networks

Location	Changes	Potential impacts
Canal Road	Short-term closures of footpaths on both sides of the road to facilitate construction. Closure would only occur on one side of the road at a time, with pedestrians redirected to the other side during each closure.	There would be a negligible increase in walking times and distances travelled where pedestrians need to cross Canal Road to continue their journey. Traffic management would be implemented to facilitate pedestrians crossing Canal Road during major road closures.
Alexandra Canal cycleway	Permanent closure of the shared path (cycleway) on the eastern side of Alexandra Canal, between the existing pedestrian bridge and the Nigel Love bridge. A temporary active transport link (described in section 8.6.4) would be established until the proposed new active transport link is operational.	The temporary path would be about 580 metres longer than the existing path. This could result in a minor travel time increase for cyclists and an additional travel time of about nine to ten minutes for pedestrians.
	Temporary short-term closures of the cycleway east of Nigel Love bridge during some construction activities (eg major crane lifts for the Qantas Drive and terminal link bridges).	No impacts are anticipated as a temporary route is planned to accommodate pedestrians and cyclists for the duration of construction.
Qantas Drive	Permanent removal of the pedestrian crossing at Lancastrian Road.	This pedestrian crossing is used to access the bus stop on Qantas Drive, which would be closed as part of the project (see section 9.3.4). As the bus stop would be removed, and there are no other destinations in the area, the crossing would become redundant.
	Permanent removal of the concrete path (informal footpath) on the northern side of Qantas Drive between Robey Street and west of Lancastrian Road.	The existing path is narrow and generally of poor quality, except for a short section near Robey Street that was recently completed. The western section of the path was historically used by Qantas employees to cross the rail line and access the Sydney Airport Jet Base facilities and bus stops at Lancastrian Road, which would be removed as part of the project (see section 9.4.6). The path is disconnected from the surrounding active transport network, does not currently serve any nearby land uses. Its use is discouraged by Sydney Airport and other agencies due to its narrow width and proximity to Qantas Drive. Removal of this path would therefore have a negligible impact on pedestrians.
	Temporary removal of the pedestrian footpath located on the northern side of Qantas Drive, between Robey and O'Riordan streets to facilitate construction of the Terminals 2/3 access viaduct.	The footpath would mainly be used by pedestrians east of Sir Reginald Ansett Drive accessing the bus stop in Robey Street. The impact is considered limited as there is a parallel footpath on the other side of Qantas Drive which would be used.
Robey Street	Adjustment of the pedestrian footpath on the northern side extending north from Qantas Drive to facilitate revised kerb alignment.	The footpath would be replaced in accordance with current design and accessibility requirements.
Link Road	Removal of the pedestrian crossing at Link Road.	The existing pedestrian crossing at Link Road would be removed, with access to the freight facilities provided by existing paths located near Terminal 1. This route would be about 775 metres longer than the current route.

9.3.6 Impacts on access

Access to properties not required for construction would generally be maintained at all times. However, some temporary impacts on access may be unavoidable during certain work periods or for some activities. In these instances, consultation would be undertaken with the property owner/occupant to ensure that satisfactory alternative access is provided and/or the impact is minimised.

The potential for impacts on access to Sydney Airport are considered in section 9.3.8.

9.3.7 Impacts on parking

On-street parking

Impacts would be limited as no on-street parking is available along roads that would be directly affected by construction (such as Airport Drive, Qantas Drive, Joyce Drive, and impacted sections of Robey Street and O'Riordan Street). Some local roads within walking distance of some construction compounds, particularly in Mascot near compounds C4 and C5, have on-street parking available. However, the on-street parking is generally restricted to up to three-hour parking, limiting the ability for construction workers to use these spaces.

As described in section 8.6.3, parking for the construction workforce would be provided within the construction footprint, including at every compound. This would avoid the need for workers to park in nearby streets. It is estimated that about 980 spaces would be provided within the construction footprint. There may be a shortfall (of about 110 spaces) during peak periods. This would be managed by the measures provided in section 9.6, including:

- Developing and implementing a worker parking strategy, including measures to encourage workers to use alternative transport arrangements, such as public transport
- Use of shuttle buses to move workers between compounds and work areas where capacity in one parking area is limited but other parking areas have capacity
- Further consideration of the need for additional parking within the construction footprint, particularly near work areas that are not directly serviced by a construction compound.

It is anticipated that there would be limited impact on on-street parking for local businesses and the community. Businesses would still be accessible and, where permitted, time restricted on-street parking would still be available. To ensure that street parking remains available, parking restrictions would need to be enforced by the relevant council.

Off-street parking

The main areas of off-street parking that would be affected during construction are described below.

Sydney Airport northern lands car park

There would be a reduction in the amount of parking available in the Sydney Airport northern lands car park, as this land would be required to accommodate part of construction compound C2 and ultimately for the project's operational footprint. This car park is used by Sydney Airport employees at times of peak demand. The car park has sufficient capacity such that the reduction of about 24 spaces during construction would have minimal impact on the overall availability of parking. Some additional spaces may also be affected due to the need to reconfigure the internal car park access roads.

Parking near Terminals 2/3

The car parking area near Terminals 2/3 that is accessed off Ninth Street and owned by Sydney Airport would be affected during construction. This car park, which currently has capacity for about 100 vehicles, would become part of construction compound C5. The temporary loss of these spaces would be managed by Sydney Airport Corporation.

Two car parking areas near Terminals 2/3 that are accessed off Ross Smith Avenue and Sir Reginald Ansett Drive respectively, used by the adjacent DHL business, would also be affected during construction. These car parks have a combined capacity for about 81 vehicles and would become part of the construction footprint. Only one of these car parks would be able to be used for construction at any one time, which would reduce the impact on the users.

Sydney Airport Terminal 1 freight facility parking

About 40 car parking spaces would be temporarily removed along the northern boundary of the mail handling facility located adjacent to Airport Drive near Terminal 1. These changes would be managed by Sydney Airport as part of the future re-leasing of this area.

There would also be a loss of an areas of about 500 square metres from the operational area of the livestock transfer facility at the Terminal 1 freight facility, which is currently used to park and queue delivery trucks.

9.3.8 Summary of impacts on Sydney Airport (Commonwealth) land

Traffic flows to/from and around Sydney Airport

As outlined in section 9.3.1, the intersections analysed would generally continue to operate with the same or better level of service to existing conditions when compared with the future 2022 baseline. The exception would be traffic flows to/from Terminals 2/3 via the key intersections of Qantas Drive/Sir Reginald Ansett Drive/Joyce Drive/O'Riordan Street and Qantas Drive/Seventh Street/Robey Street.

During construction, the average delay at the intersection of Qantas Drive/Joyce Drive/O'Riordan Street would increase by 27 seconds.

In the wider study area, construction would result in minor changes to travel times, with the exception of southbound on O'Riordan Street, where travel times would increase by around three minutes during the afternoon peak. This travel time increase would have a moderate impact on traffic and buses that use this route to access Terminals 2/3.

Impacts on the flow of traffic into and out of Airport Drive/Link Road and the freight terminal adjacent to Terminal 1 are also predicted. The results indicate that this intersection would operate with reduced capacity during some construction scenarios. However, this intersection is considered to have sufficient capacity during all scenarios.

To ensure satisfactory levels of road network capacity and accessibility to Sydney Airport terminals is maintained, potential impacts would be managed by the measures provided in section 9.6. Measures include developing and implementing a Construction Traffic and Access Management Plan and additional traffic management in the vicinity of Terminals 2/3. Communication to inform road users of changes during construction, and real time monitoring of incidents with emergency response resources would also be implemented.

Impacts on access

The results of the assessment indicate that the surrounding road network would operate similar to existing conditions. Some localised worsening of congestion would occur along O'Riordan Street.

While construction has the potential to result in some delays for traffic accessing Sydney Airport and other facilities on Sydney Airport land, access would be maintained to terminals and facilities at all times. Any short-term changes to access would be managed by implementing the measures provided in section 9.6, including the Construction Traffic and Access Management Plan and measures to provide additional traffic management in the vicinity of the Qantas Drive/Seventh Street/Robey Street intersection.

Parking

As described in section 9.3.7, there would be a minor reduction in the number of parking spaces at the Sydney Airport northern lands car park. However, there is considered to be sufficient spare capacity to meet the parking needs at this location.

Construction would also affect a Sydney Airport parking area located near Terminals 2/3, accessed off Ninth Street which provides parking for up to 100 vehicles.

Two other car parks leased to DHL (with a combined capacity of 81 spaces) would also be occupied during construction, although only one of these two car parks would be occupied at any time.

About 40 car parking spaces would be temporarily removed from within the Sydney Airport mail handling facility adjacent to Airport Drive. These changes would be managed with Sydney Airport Corporation as part of the future lease of this area.

There would also be a temporary loss of about 500 square metres from the operational area of the livestock transfer facility, which is currently used to park and queue delivery trucks.

9.4 Assessment of operation impacts

9.4.1 Forecast travel demand and traffic volumes

Overview of results

The project has been designed to provide high capacity, direct connections between Sydney Airport and the Sydney motorway network, to cater for predicted growth in travel demand to the airport and through traffic to Port Botany. Modelling indicates that the project would provide additional network capacity for up to 60,000 vehicle trips per day in 2036 and that more than half of this capacity would be airport-related.

The project is predicted to carry around 85,000 and 88,000 vehicles per day in 2026 and 2036 respectively. While modelling indicates that total traffic volumes in the study area would marginally increase, the road network would operate overall with substantially less congestion than it would have without the project being implemented. This would improve access to/from Sydney Airport, with improved travel times and reliability.

The forecast demand for the project would also attract traffic away from other local and arterial roads within the study area, resulting in lower traffic volumes on most roads compared with the volumes predicted without the project. Most of the predicted traffic demand would shift from O'Riordan Street and Botany Road in Mascot town centre. It is predicted that these roads would carry between 25 to 30 per cent less traffic in 2036 than they would have without the project. As a result, the project would allow vehicles to bypass the surrounding road network, minimising traffic through Mascot and surrounding local roads. The project would also reduce traffic growth on the M5, General Holmes Drive, Southern Cross Drive, and forecast traffic growth along local roads, including in and around Mascot.

As well as providing additional network capacity, the project would result in an increase in average vehicle speeds of between 26 and 47 per cent. Average trip times would decrease by between 15 and 22 percent in 2026 and 2036 respectively, indicating a substantial improvement in network conditions.

For freight traffic, the project would provide an alternative route for heavy vehicles accessing Sydney Airport's freight terminals, reducing the volumes of heavy vehicles on Airport Drive. The project would also provide an alternative to the current route via Botany Road/General Holmes Drive through Mascot town centre. The new direct connection with the Sydney motorway network would be used to access Foreshore Road and Port Botany, and reduce the volume of heavy vehicles using Gardeners Road and Botany Road.

Screenline analysis

The results of the screenline analysis are summarised below. This provides an assessment of the changes to traffic movements on identified roads as a result of implementing the project.

Changes to heavy vehicle traffic patterns are similar in both 2026 and 2036 to general traffic for all screenlines assessed. It is expected that heavy vehicles would use the project, diverting from existing routes such as O'Riordan Street, Botany Road, Princes Highway and General Holmes Drive. Figures Figure 9.12, Figure 9.13 and Figure 9.14 highlight the differences between the 'with project' and 'without project' scenarios for comparison purposes.

Sydney Gateway screenline

The project is forecast to accommodate 30 per cent of two-way daily traffic crossing the screenline in both 2026 and 2036 (see Figure 9.11).

Traffic would be attracted away from parallel corridors, particularly O'Riordan Street and Botany Road, which would carry up to 30 per cent less traffic compared to without the project. The screenline results show that the project would be a preferred north–south route compared with parallel routes. This would result in some traffic bypassing Botany Road and other local roads in Mascot to travel between the Sydney motorway network and Sydney Airport.

In addition, the total north–south traffic demand across all corridors in 2026 and 2036 would be more than 15 per cent higher with the project than without the project. This indicates that the project would increase north–south capacity within the network, accommodating a greater portion of the forecast traffic demand. Traffic volumes would reduce along parallel congested corridors, thereby improving their performance.

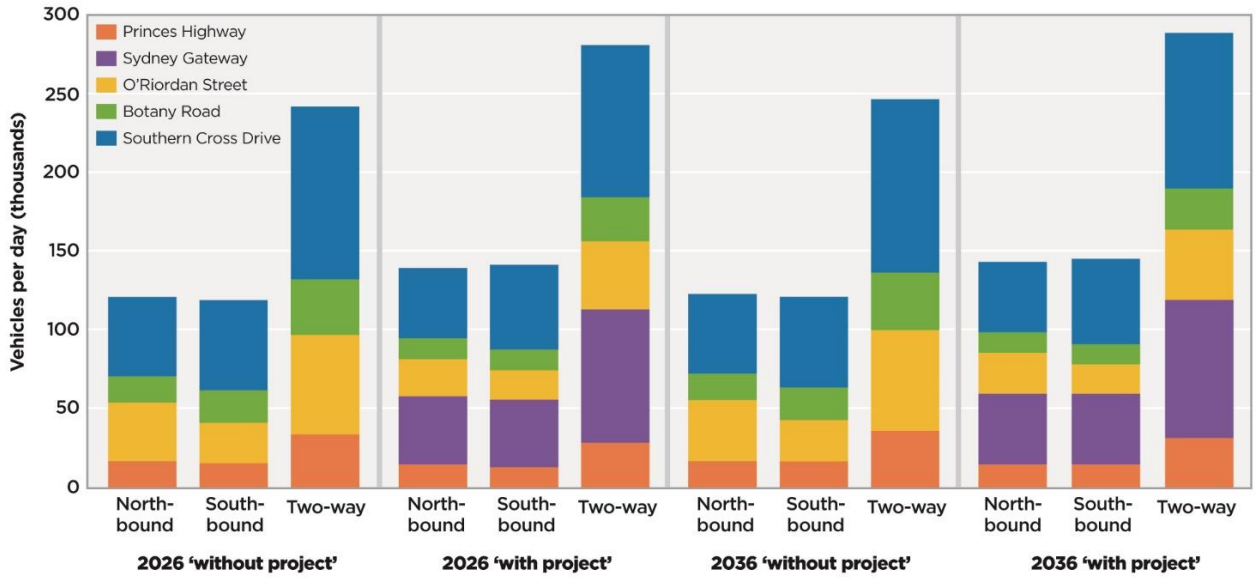

Figure 9.11 Sydney Gateway screenline analysis results

F6 screenline

The project would reduce demand on the Princes Highway by around 15 and eight per cent in 2026 and 2036 respectively (see Figure 9.12), allowing a reduction in congestion thereby improving performance. Conversely, the project would lead to a minor increase in traffic volumes along Marsh Street and the New M5 to accommodate access to/from the project.

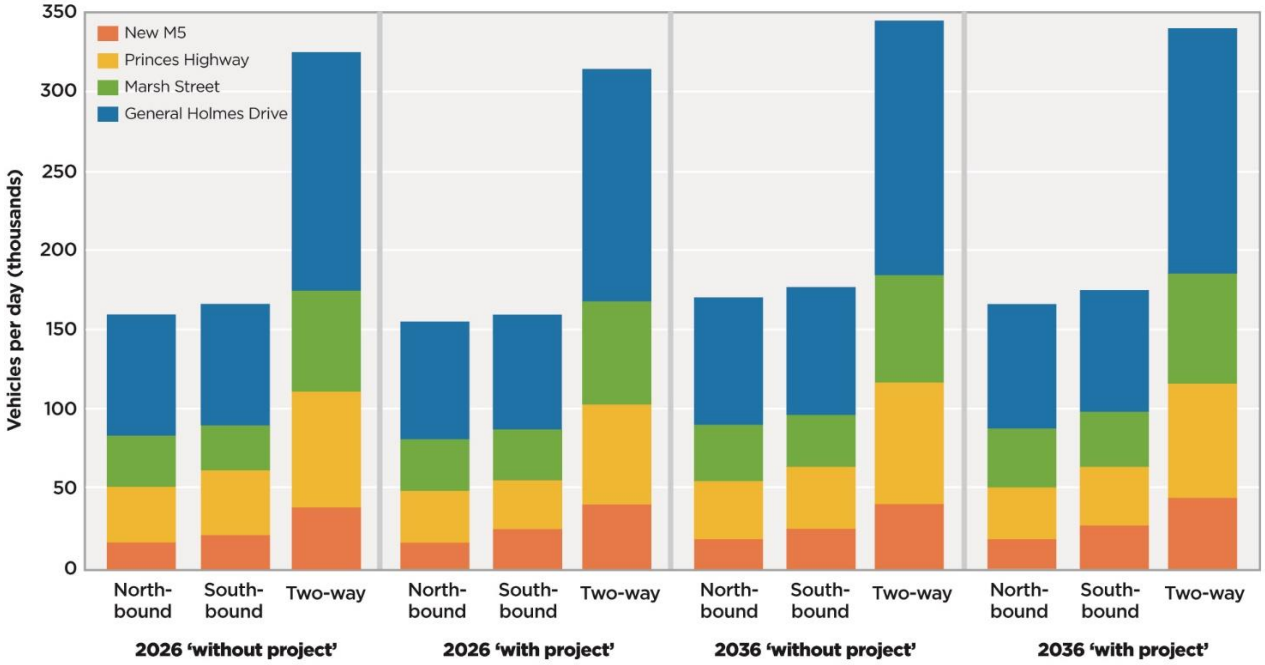

Figure 9.12 F6 screenline analysis results

Port Botany screenline

Traffic demand would increase by around five per cent along the Port Botany screenline (see Figure 9.13). However, the overall distribution of traffic across the Foreshore Road, Botany Road and Wentworth Avenue corridors would be maintained. The figure indicates that there would be no noticeable changes to port traffic along these routes. However changes to travel times (in section 9.4.2) would be substantial.

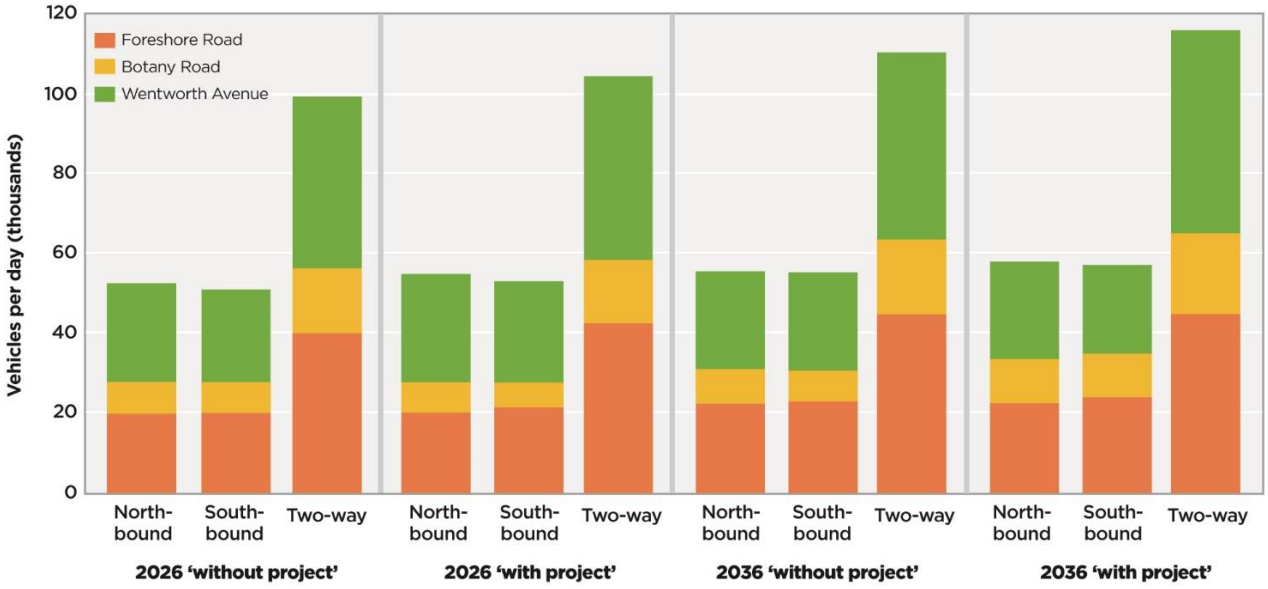

Figure 9.13 Port Botany screenline analysis results

9.4.2 Travel time analysis

Private vehicles

The forecast travel time increases in 2026 and 2036 ('without project') would be alleviated on most of the routes analysed in 2026 and 2036 ('with project') in both the morning and afternoon peaks. The travel time improvements would be more pronounced in the morning peak, with travel time improvements of between 30 to 70 per cent forecast along most of the routes, including:

- Canal Road
- Coward Street
- Botany Road
- O'Riordan Street
- Unwins Bridge Road.

These and some of the other routes that would benefit the most from the project, and indicative travel time improvements, are shown on Figure 9.14.

Conversely, eastbound travel times along Robey Street would increase by around 86 per cent in 2036 due to increased demand for this travel movement, particularly west of O'Riordan Street.

In the afternoon peak, similar travel time improvements as the morning peak are predicted, with the exception of a 22 per cent increase in travel time westbound on the M5 East to Southern Cross Drive (route 3).

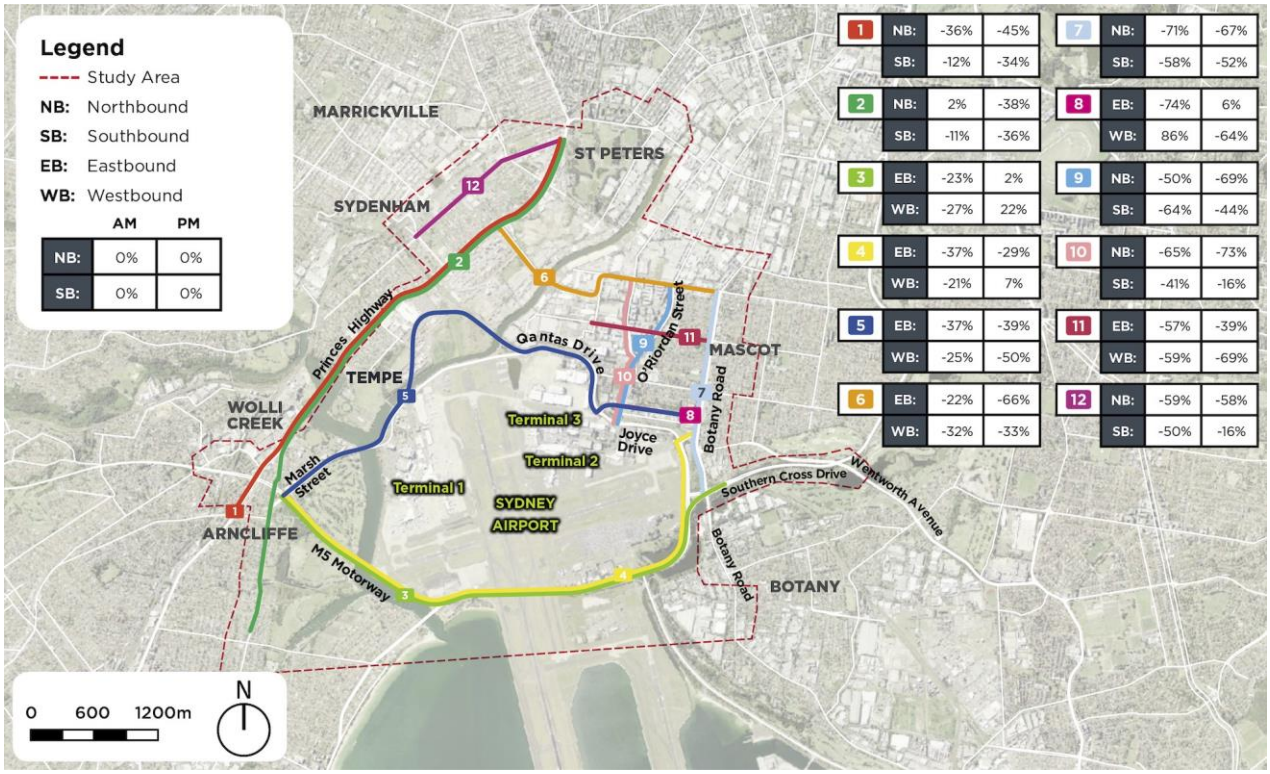

Figure 9.14 Selected 2036 travel time improvements (private vehicles)

Sydney Airport traffic

Travel times between St Peters interchange and the Sydney Airport terminals would substantially reduce with the project. In 2026, travel time improvements of up to 23 minutes would be experienced, increasing to up to 30 minutes in 2036 (see Figure 9.15 and Figure 9.16).

Vehicles travelling between St Peters interchange and Sydney Airport terminals via the project would reduce demand on the existing road network through Mascot. It is predicted that the route through Mascot (route 10) would experience travel time improvements of up to 10 minutes in 2026 and 2036 as a result of the project.

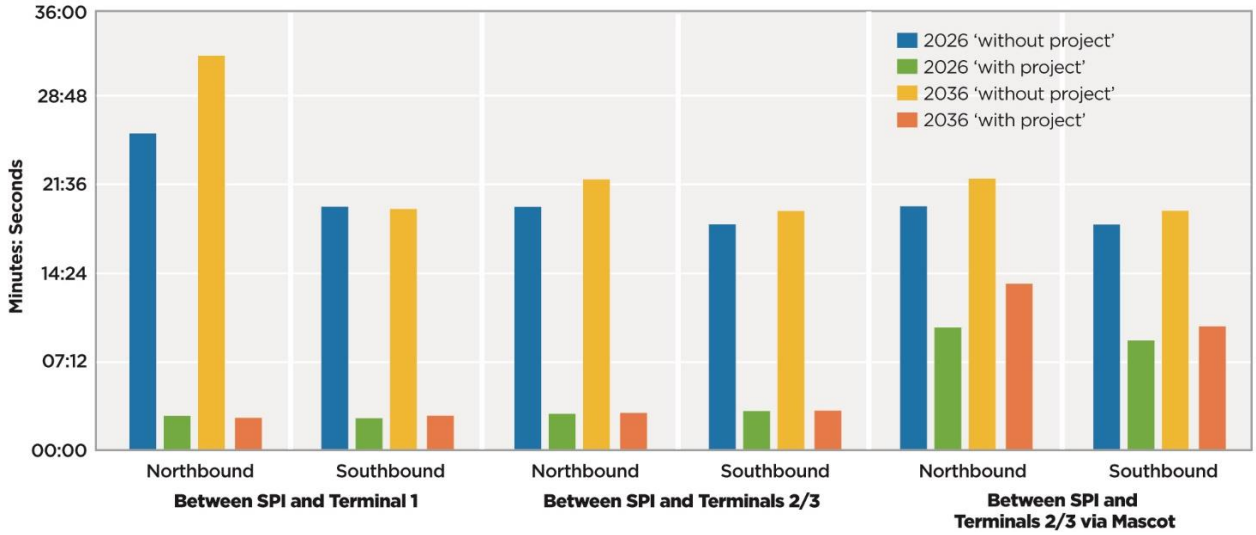

Figure 9.15 Travel time comparisons between St Peters interchange and Sydney Airport terminals in the morning peak

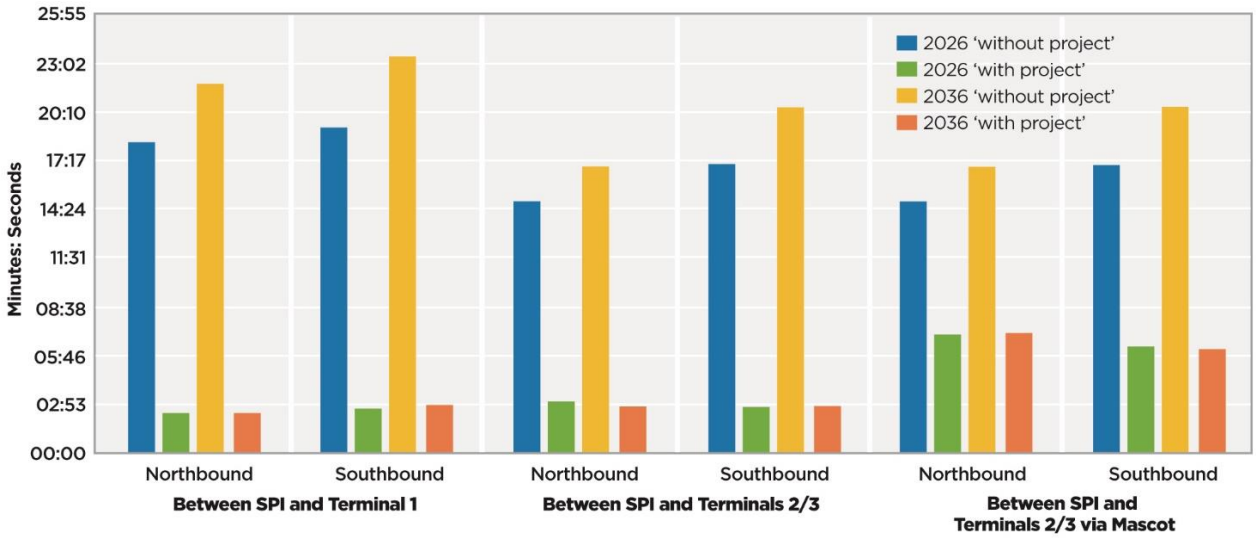

Figure 9.16 Travel time comparisons between St Peters interchange and Sydney Airport terminals in the afternoon peak

Port Botany traffic

Travel times between St Peters interchange and Foreshore Road would substantially reduce with the project (see Figure 9.17 and Figure 9.18). In 2026, travel time improvements of up to 17 minutes would be experienced, increasing to more than 20 minutes in 2036.

The project would reduce demand for the existing route between Port Botany and the M5 East via Foreshore Road. Travel times along this route would improve marginally. In particular, travel times in the westbound direction would improve by more than two minutes in 2026 and 2036.

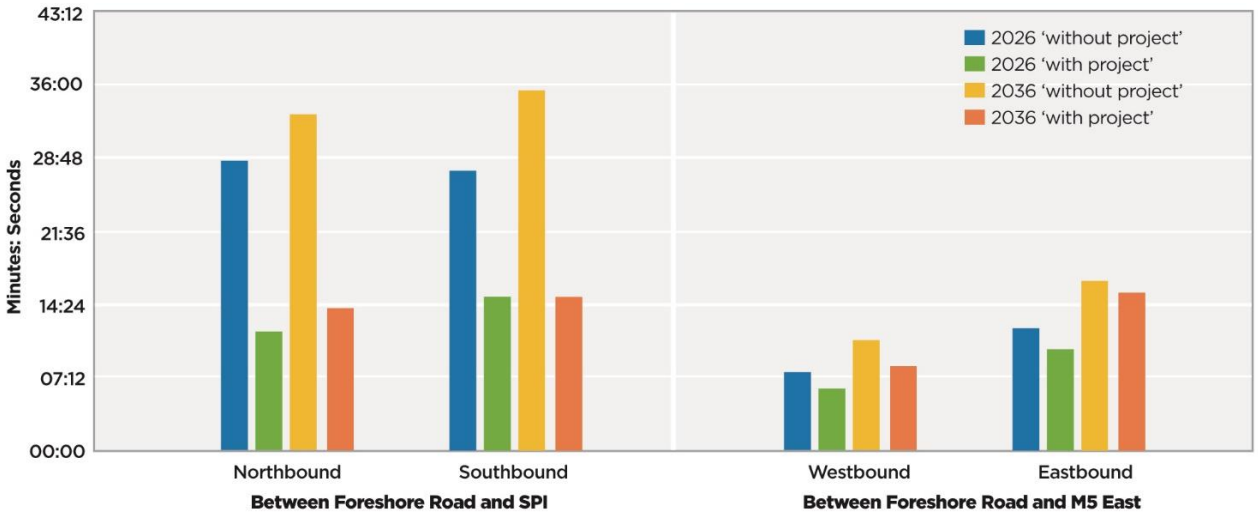

Figure 9.17 Travel time comparisons between St Peters interchange/M5 East and Foreshore Road in the morning peak

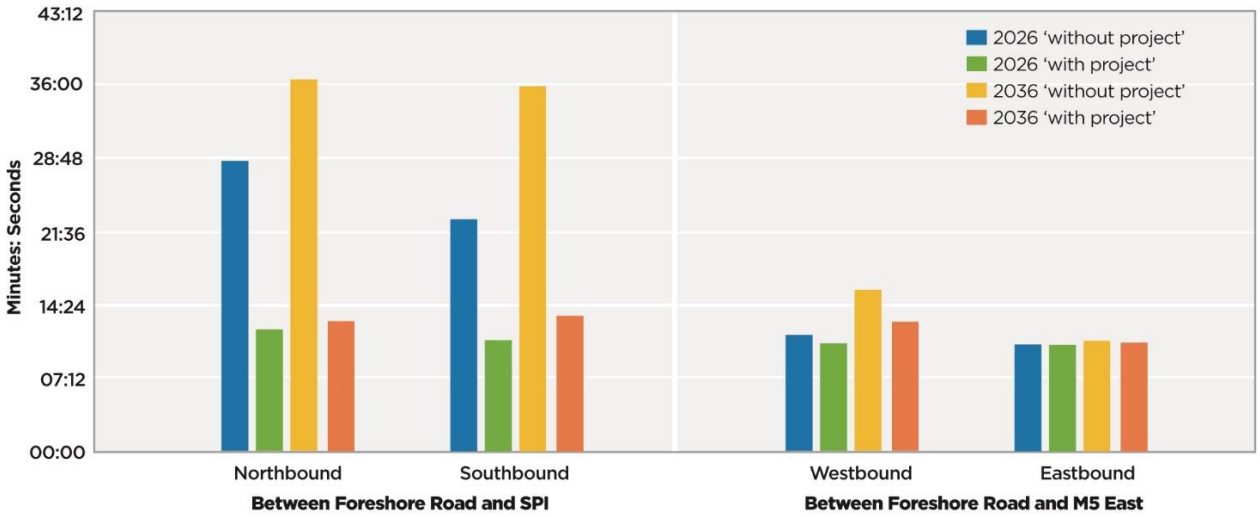

Figure 9.18 Travel time comparisons between St Peters interchange/M5 East and Foreshore Road in the afternoon peak

Public transport

No specific changes to public transport services or routes are included in the scope of the project. The identified improvements to the road network would result in improvements to public transport where buses use the assessed corridors. The project would result in substantial improvements to bus travel times along most of the assessed corridors compared to predicted travel times in 2026 or 2036 (without the project). In 2026, bus travel times would improve by a minimum of 30 per cent, with some routes experiencing improvements of up to 50 per cent. The following improvements are observed:

- Up to 50 per cent for routes M20, 309, 309X, 310 on Botany Road (Gardeners Road to Mill Pond Drive)
- Up to 30 per cent for route 303 on General Holmes Drive – Botany Road/Mill Pond Drive to the M5
- Up to 30 per cent for routes 420, 420N, and 400 on Airport Drive (Princes Highway to O'Riordan Street/Sir Reginald Ansett Drive)
- Up to 45 per cent for route 418 on Canal Road/Ricketty Street

- Up to 50 per cent for route 305 along O'Riordan Street/Qantas Drive to Gardeners Road/Bourke Road via Kent Road
- Up to 50 per cent for routes 307, 400, 420, and 420N along Coward Street (Bourke Road to Botany Road/Wentworth Avenue)
- Up to 30 per cent for routes 348 and 422 along Sydney Park Road to Brodie Spark Drive.

Additional improvements to bus travel times are forecast in 2036 and are shown on Figure 9.19.

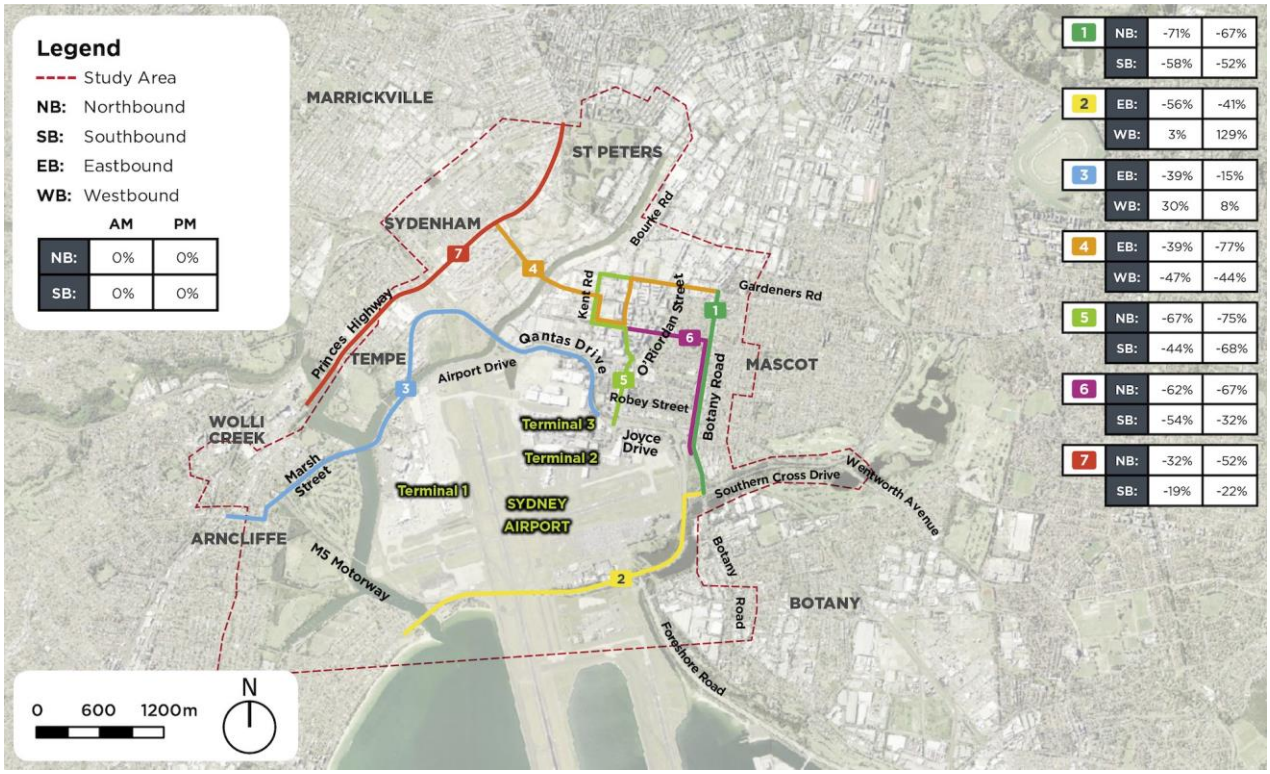

Figure 9.19 Selected 2036 travel time improvements (buses)

9.4.3 Intersection performance

Modelling shows that most intersections would continue to operate at a level of service E or F during the morning and afternoon peak periods, with and without the project, in 2026 and 2036. However, the average delay at most intersections would substantially decrease as a result of the project. Key findings in relation to intersection performance are summarised below, described in terms of changes to average delay. This provides an indication of the level of change between the 'with' and 'without project' scenarios.

As a guide to the magnitude of delays, the cycle time of a set of traffic signals (for all green and red lights to be displayed before restarting the sequence) is typically around 120 seconds for signalised intersections in the study area.

As shown on Figure 9.20, average delays would substantially improve at the following intersections in 2026:

- Joyce Drive and O'Riordan Street – decreases of 129 seconds and 189 seconds in the morning and afternoon peaks, respectively
- Qantas Drive, Robey Street and Seventh Street – decreases of 129 seconds and 81 seconds in the morning and afternoon peaks, respectively
- O'Riordan Street and Gardeners Road – decreases of 86 seconds and 82 seconds in the morning and afternoon peaks, respectively

- Botany Road and Gardeners Road – decreases of 145 seconds and 230 seconds in the morning and afternoon peaks, respectively
- Bourke Street and Coward Street – decreases of 152 seconds and 213 seconds in the morning and afternoon peaks, respectively.

As a result of these improvements, specifically at the Joyce Drive/O'Riordan Street and Qantas Drive/Robey Street intersections, the project would reduce vehicle delays and alleviate congestion that would occur at the main access points to Terminals 2/3 (without the project).

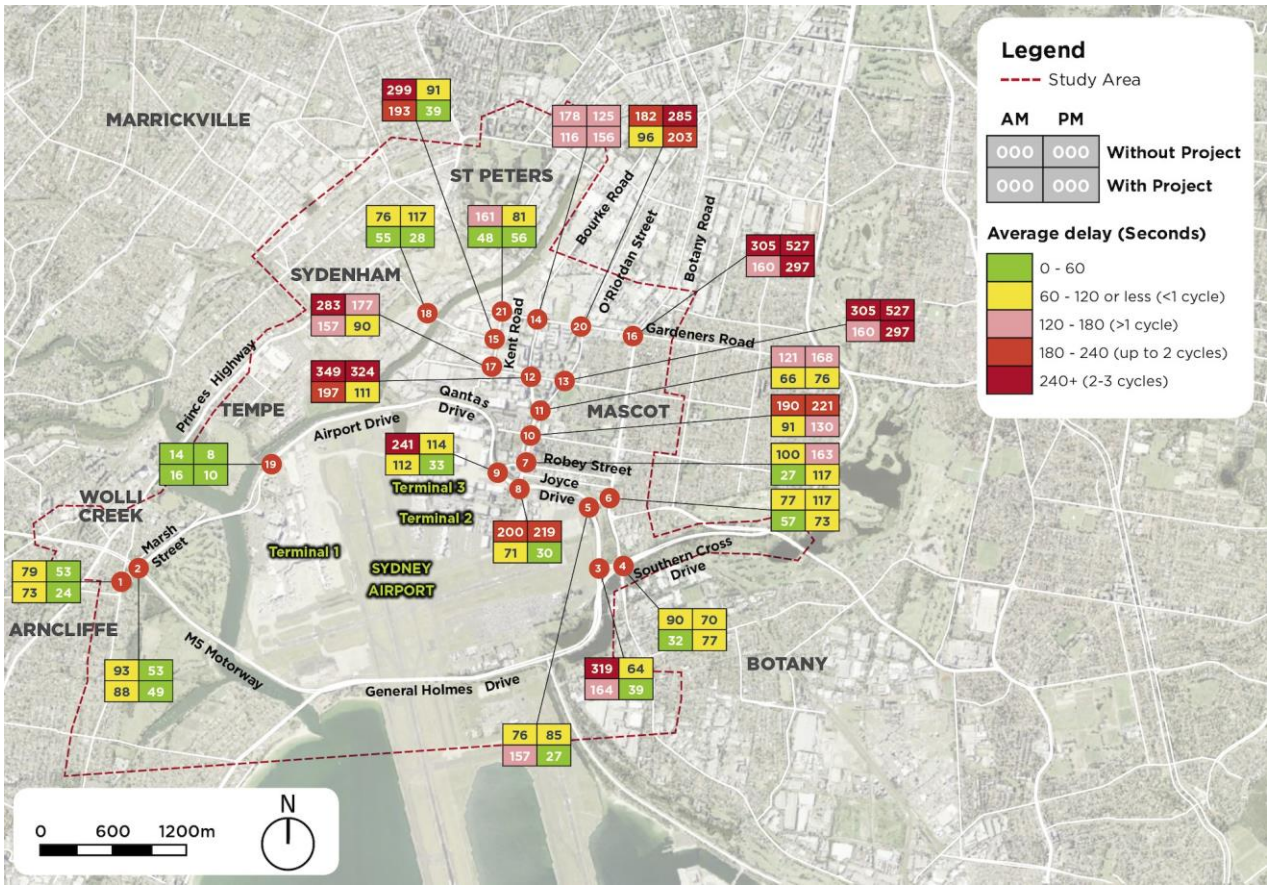

Figure 9.20 Forecast average delays at intersections with and without the project (2026)

Additional improvements would occur for the majority of the intersections in 2036. For instance, vehicle delays at the intersection of Bourke Street and Coward Street would decrease by 373 seconds and 276 seconds in the morning and afternoon peaks, respectively. This is a considerable improvement compared to the 2026 results. Figure 9.21 shows the average delays at each intersection in 2036.

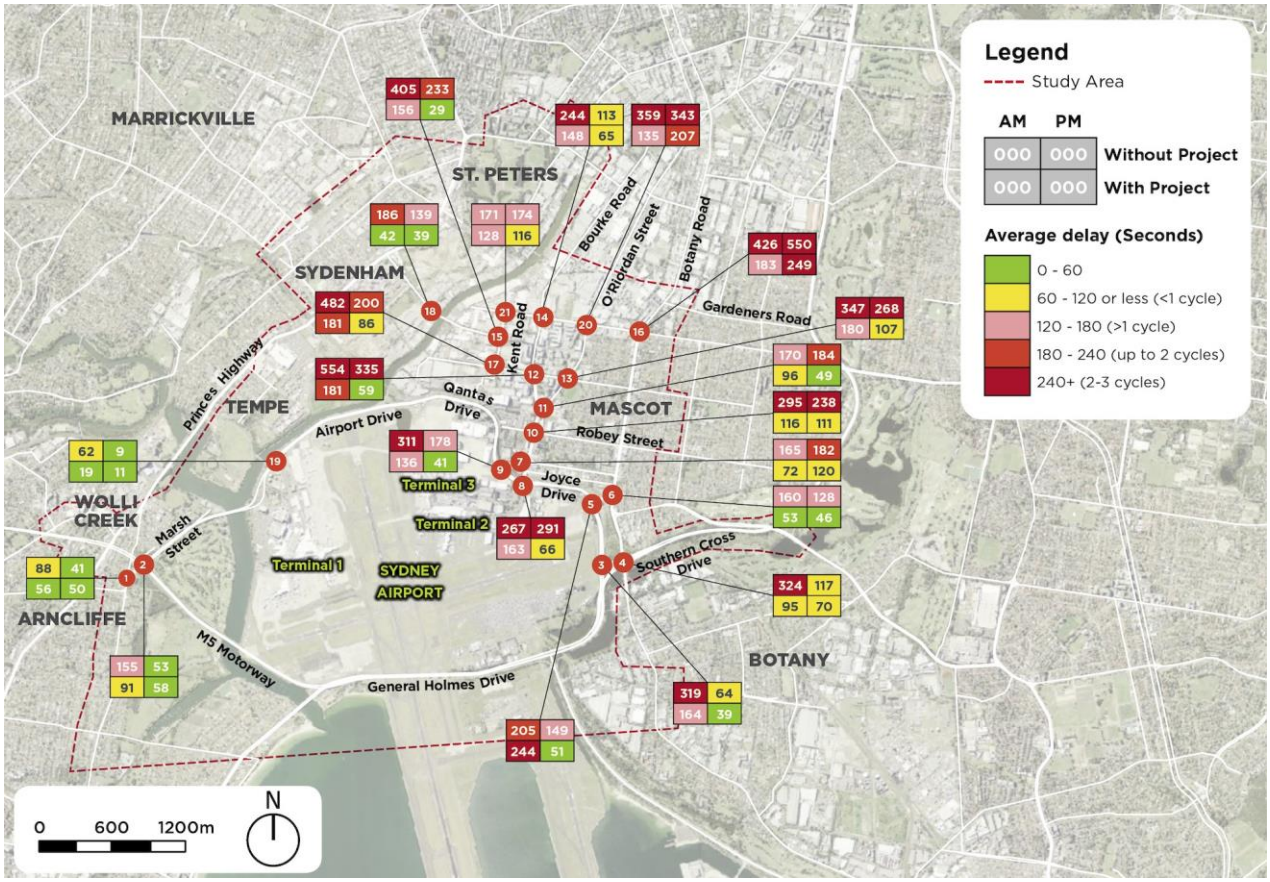

Figure 9.21 Forecast average delays at intersections with and without the project (2036)

9.4.4 Midblock performance

The 2036 density and level of service performance for the morning and afternoon periods with the project is shown on Figure 9.22 and Figure 9.23. The results are also summarised in Table 9.14.

In the morning peak, the majority of midblock locations and merge/diverge sections are forecast to operate at a level of service D or better (see Table 9.14). It is predicted that, due to network delays, the following road sections would operate at a level of service E or F:

- Merge point 10 (Airport Drive and M4 to Qantas Drive)
- Diverge point 12 (Airport Drive to Qantas Drive and M4)
- Merge point 13 (Seventh Street slip lane to Qantas Drive)
- Diverge point 14 (Qantas Drive to Terminals 2/3 access)
- M3 (Midblock Qantas Drive eastbound).

The performance of merge points 10 and 13, and the midblock location on Qantas Drive eastbound, would be affected by delays and queuing on the western approach to the intersection of Qantas Drive and Robey Street.

In the afternoon peak, all midblock locations and merge/diverge sections are forecast to operate at level of service D or better, except for merge point 15 (M5 and M4 to Airport Drive), which is predicted to perform at level of service E.

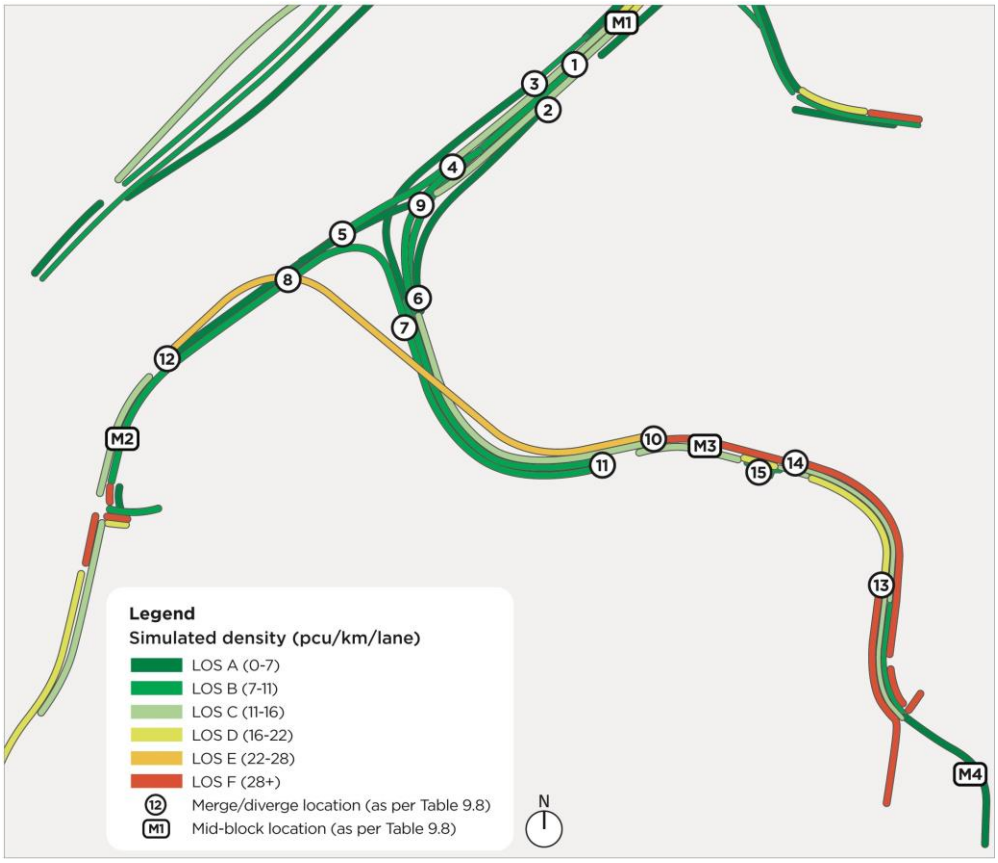

Figure 9.22 2036 morning peak density and level of service performance

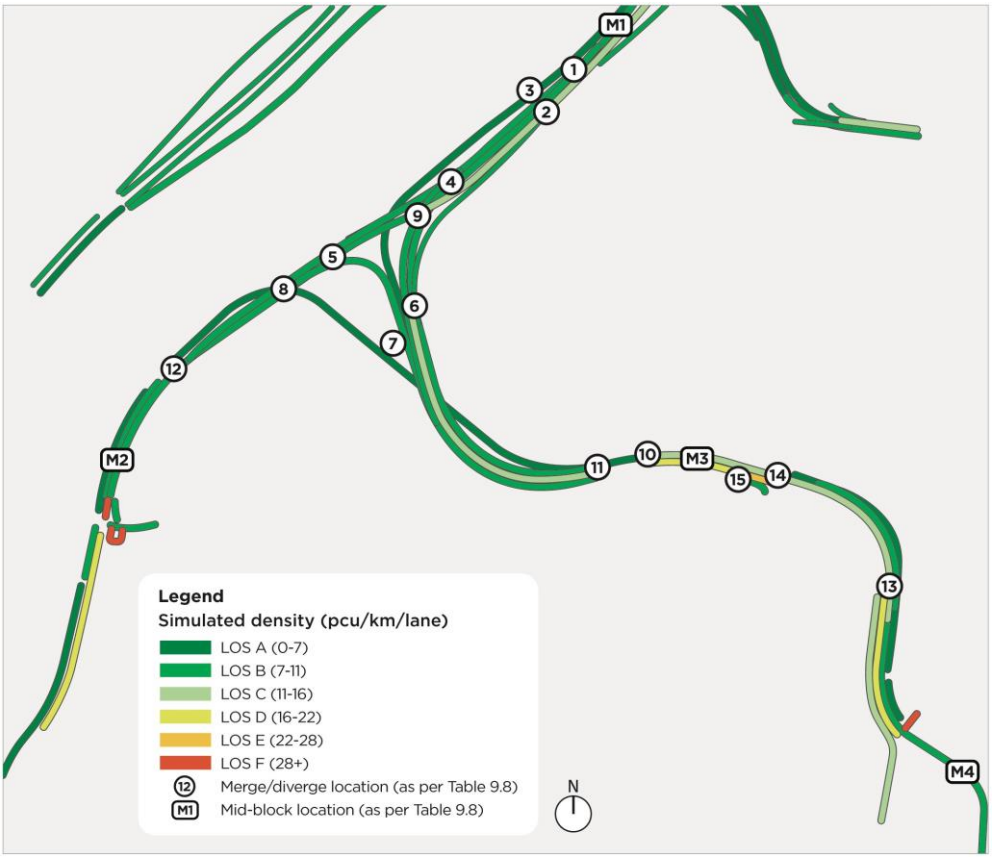

Figure 9.23 2036 afternoon peak density and level of service performance

Table 9.14 Midblock performance in 2036

Segment/location[1]	Direction	Morning peak		Afternoon peak	
		Density (PCU/km/lane)	Level of service	Density (PCU/km/lane)	Level of service
Diverge 1 M4 to Airport Dive and Qantas Drive	Southbound	14	C	18	D
Diverge 2 M5 to Airport Drive and Qantas Drive	Southbound	4	A	0	A
Merge 3 Airport Drive and Qantas Drive to M5	Northbound	5	A	6	A
Merge 4 Airport Drive and Qantas Drive to M4	Northbound	12	C	10	C
Diverge 5 Airport Drive to M4 and M5	Northbound	7	B	4	A
Merge 6 M4 and M5 to Qantas Drive	Southbound	12	C	9	B
Diverge 7 Qantas Drive to M4 and M5	Northbound	11	B	13	C
Merge 8 New Airport Drive and M4 to Airport Drive	Southbound	9	B	10	B
Merge 9 M4 and M5 to Airport Drive	Southbound	14	C	18	D
Merge 10 Airport Drive and M4 to Qantas Drive	Eastbound	39	F	12	C
Diverge 11 Qantas Drive to Airport Drive and M4	Westbound	14	C	18	D
Diverge 12 Airport Drive to Qantas Drive and M4	Eastbound	23	E	7	A
Merge 13 Seventh Street slip lane and Qantas Drive	Westbound	29	F	19	D
Diverge 14 Qantas Drive to Qantas Drive and Terminals 2/3 access viaduct	Eastbound	59	F	15	C
Merge 15 M5 and M4 to Airport Drive	Westbound	19	D	23	E
M1 Midblock north of Canal Road	Northbound	12	C	10	B
	Southbound	14	C	18	D
M2 Midblock east of Link Road intersection	Eastbound	14	C	5	A
	Westbound	8	B	10	B
M3 Midblock Qantas Drive	Eastbound	39	F	12	C
	Westbound	14	C	18	D
M4 Midblock Terminals 2/3 access viaduct	Southbound	8	B	10	B

Note: 1. Segment/locations refer to those shown on Figure 9.22 and Figure 9.23.

9.4.5 Impacts on freight transport

The improvements to the road network performance described in sections 9.4.2 to 9.4.4 would benefit the movement of freight via the road network, including freight travelling to Sydney Airport and Port Botany. Specifically, these benefits would include:

- The project would become the preferred direct access to Sydney Airport, reducing heavy vehicle traffic on other roads, including the M5, General Holmes Drive, Southern Cross Drive, O'Riordan Street and Botany Road
- The project would reduce forecast traffic growth, including freight and heavy vehicle traffic, along Botany Road and other local roads in Mascot, which would benefit the amenity of the town centre and Mascot more generally
- There would be more pronounced travel time improvements in the morning peak with decreases of between 40 to 60 per cent in 2036 across most of the routes analysed
- As a result of the predicted reduction in delays at intersections, there would be reduced congestion for forecast future traffic growth, including to Sydney Airport.

As a result of the above, improvements to the safety of the local and arterial road network would also be achieved.

9.4.6 Impacts on public transport

The improvements to the road network performance detailed in sections 9.4.2 to 9.4.4 would result in improvements to public transport where buses use roads within the study area.

The project would lead to substantial improvements to bus travel times along the assessed corridors compared to the future situation without the project. Travel times in 2026 would improve by 20 to 50 per cent, with some routes experiencing improvements of up to 70 per cent. Further improvements to bus travel times would also be experienced in 2036.

The exception to these is the 303 westbound bus route on General Holmes Drive, for which travel times are forecast to increase by up to 50 per cent in 2026 and up to 130 per cent in 2036.

Section 9.4.2 provides further details of travel time savings along specific routes, which would also apply to buses using them.

The bus stops located along Qantas Drive at Lancastrian Road would be permanently closed as a result of the project. These bus stops have low usage. Removal/relocation of some buildings/facilities at the Sydney Airport Jet Base (particularly relocation of the Qantas Flight Training Centre) are expected to reduce use of these bus stops further. Alternate stops are located within Terminals 2/3 along the same routes. As a result, the overall impacts of removing these stops are considered to be minimal.

The project would not impact train services.

9.4.7 Impacts on active transport

The project includes relocating the Alexandra Canal cycleway to the western side of the canal. This would increase the length of the cycleway by about 160 metres. This increase in length would result in an additional three to four minutes travel time for pedestrians (and less than one minute for cyclists).

Existing pedestrian facilities would be maintained along all roads affected by the project (except the Qantas Drive/Lancastrian Road and Airport Drive/Link road intersections). The existing pedestrian crossing at the Lancastrian Road intersection would be removed. The impact of this change is considered minimal, because the existing crossing provides access to bus stops that would be removed as part of the project.

The new pedestrian access to the Terminal 1 freight facility at Link Road would be along the proposed freight terminal access bridge and a signalised intersection with the Terminal 1 connection. The impact of this change would depend on the point of origin. Additional travel distances could be up to 1,400 metres.

The project would also result in amenity improvements outside the project site, including in Mascot, by reducing through traffic along roads such as Botany Road and O'Riordan Street by around 26 to 30 per cent. The average delay at intersections within the study area, including within the Mascot Station precinct, would substantially improve.

The intersection of Bourke Street and Coward Street, which accommodates high pedestrian crossing activity, would experience an improvement of average delay of more than 240 seconds (70 per cent) in 2036. This has the potential to improve permeability for travel across these roads, safety for passengers accessing Mascot Station, and the amenity in Mascot more generally. Improvements to amenity would facilitate more walking and cycling opportunities.

A number of connectivity gaps exist in the current active transport network of the area. Roads and Maritime and Sydney Airport Corporation would develop an active transport strategy, with the input of relevant stakeholders, to identify potential opportunities to enhance active transport opportunities and guide the future provision of active transport infrastructure.

9.4.8 Impacts on access

Changes to access to Sydney Airport and surrounding areas

The project would improve access to Sydney Airport and surrounding areas by providing new, direct connections between the Sydney motorway network (via St Peters interchange) and Sydney Airport's terminals, avoiding Mascot town centre. It would also improve access to local roads and areas adjacent to Sydney Airport, including Marsh Street, O'Riordan Street and Joyce Drive.

The change to the way Sydney Airport is accessed would also result in benefits to access within and around the Botany town centre, which would have otherwise become congested due to vehicles accessing Port Botany via Botany Road. The project would assist in removing through traffic from local roads to other roads such as Qantas Drive and Joyce Drive.

The new elevated access to Terminals 2/3 would accommodate more than double the existing traffic volumes than the existing Qantas Drive in 2026 and 2036. Compared to the capacity of the existing access to Terminals 2/3, the new access is predicted to accommodate:

- Greater than 20 per cent more traffic during the morning peak in both 2026 and 2036
- Eighty per cent and 90 per cent more traffic in 2026 and 2036 respectively exiting Terminals 2/3 during the morning peak
- Greater than 30 per cent more traffic entering the terminals during the afternoon peak in 2026 and 2036
- Around five per cent additional traffic exiting the terminals during the afternoon peak in 2026 and 2036.

During the morning and evening peak hours, the access to/from Terminals 2/3 would generally perform satisfactorily at level of service D or better, except for the through and right turn exiting movements at Seventh Street. These movements would continue to operate at level of service F. Notwithstanding this, in the morning peak, the average delay for these movements would reduce substantially.

Removing the right turn from Qantas Drive into Sir Reginald Ansett Drive would mean that buses travelling to the Blu Emu car park would have to traverse a longer route via Robey and O'Riordan streets to access Sir Reginald Ansett Drive and Ross Smith Avenue. As a result, it is likely that the time to complete a circuit between the airport terminals and car park would increase. Other traffic would be less affected, as an alternative route from Joyce Drive into Ross Smith Avenue is available about 600 metres further east along Qantas Drive/Joyce Drive.

Changes to access for other adjacent properties

The project is not expected to directly impact access for any properties, with existing access maintained. However, the project would result in some changes to the way a number of properties are accessed. These are summarised in Table 9.15.

Table 9.15 Changes to access due to project

Land use/road	Changes to access
Airport Drive	The project would include closing a section of Airport Drive between the proposed freight terminal access and Qantas Drive. This section of Airport Drive would be replaced by roadways forming part of the project (ie the Terminal 1 connection, terminal links and the Qantas Drive upgrade and extension). This change would increase the travel distance between Terminal 1 and Terminals 2/3 by about 1 km. However, this is not considered to be significant given the overall benefits in terms of travel time.
Freight terminal at Terminal 1	The freight terminal located north of Terminal 1 is currently accessed from Airport Drive via the intersection at Link Road. The project includes a new freight terminal access from the Terminal 1 connection. The new access would increase the distance travelled by about 1 km from both the east and west.
Sydney Airport Corporation's northern lands	Sydney Airport's northern lands (south of the Botany Rail Line) and the employee car park is currently accessed via the Nigel Love Bridge off Airport Drive. With the closure of Airport Drive, this access would no longer be available. To facilitate access to the northern lands, the project includes a new northern lands access from Burrows Road (south) (see section 7.8.2). The project also includes a stub road on the proposed freight terminal access, which would facilitate future connections to the northern lands.
Sydney Airport Jet Base off Lancastrian Road	The project would include removing the traffic signals on Qantas Drive at Lancastrian Road, resulting in the removal of the right-in/right-out turning movements from Lancastrian Road from the eastbound lanes. Left in/ left out turning movements would remain without signals. Changes to this intersection would allow for improved traffic flow on Qantas Drive and contribute to a signal-free journey to and from Terminals 2/3 using the Sydney motorway network. However, it would also increase travel distances and times for people accessing Lancastrian Road from the west or exiting to the east. Operational access between Qantas Mascot (facilities to the north of the Botany Rail Line) and the Sydney Airport Jet Base would remain unchanged.
Swamp Road and Bellevue Street	The project includes closing Swamp Road south of Bellevue Street. Access to land that is currently accessed via Swamp Road would be via the proposed northern lands access and the freight terminal access. A cul-de-sac would be installed at the southern end of Bellevue Street to the north of the project site.

9.4.9 Impacts on parking

On-street parking

The project would not impact the availability of on-street parking, as none of the roads affected by the project provide formalised on-street parking. The project does not include provision of any new on-street parking.

Off-street parking

The only area of off-street parking that would be affected during operation would be the Sydney Airport northern lands employee car park, where about 24 parking spaces at the northern end of the car park would be removed. Some additional spaces may also be lost due to the need to reconfigure the internal car park access roads.

9.4.10 Summary of impacts on Sydney Airport (Commonwealth) land

Traffic flows to/from Sydney Airport

The project would provide a more direct route from the Sydney motorway network (via St Peters interchange) to the Sydney Airport terminals. As outlined in sections 9.4.1 and 9.4.2, if the project was not constructed, traffic with a destination at or near the airport would be required to use local road networks to

access their destinations. This arrangement would result in traffic congestion within the Mascot area and would increase travel times to Sydney Airport.

The project would reduce this impact by allowing traffic with a destination or origin at Sydney Airport to travel on the Sydney motorway network without using local roads. With the majority of traffic accessing Sydney Airport via the project, local roads in the Mascot area would have greater capacity for local trips. Access to Sydney Airport from the local area to the north would also improve, because these vehicles would not be required to use the Sydney motorway network to access the airport.

The results of the assessment indicate that in 2026, travel time improvements to/from Sydney Airport of up to 23 minutes would be experienced, increasing to up to 30 minutes in 2036.

Average delays would substantially improve at key intersections in 2026 (decreases of up to 230 seconds). As a result of these improvements, specifically at the Joyce Drive/O'Riordan Street and Qantas Drive/Robey Street intersections, the project would reduce vehicle delays and alleviate congestion that would occur at the main access points to Terminals 2/3 ('without project'). Additional improvements (up to 373 seconds) would occur for the majority of the intersections in 2036.

The project would result in substantial improvements to bus travel times along most of the assessed corridors. In 2026, bus travel times would improve by a minimum of 30 per cent, with some routes experiencing improvements of up to 50 per cent. This would benefit public transport access to Sydney Airport.

Overall, the project would improve access to and from Sydney Airport. It would also improve traffic conditions on Qantas Drive benefitting users who have a destination other than the airport terminals.

Impacts on access to other areas of Sydney Airport

The project would improve access to other Sydney Airport facilities, particularly freight facilities at Terminal 1, because vehicles would not need to access the terminal via congested local roads. The project would also provide improved connections to the Sydney motorway network.

The new elevated access to Terminals 2/3 would have the capacity to accommodate more than double the existing traffic volumes that are forecast to use Qantas Drive in 2026 and 2036.

Removing the right turn from Qantas Drive into Sir Reginald Ansett Drive would affect the routing of the Blu Emu bus route, which would have to travel a longer route via Robey and O'Riordan Streets to access Sir Reginald Ansett Drive and Ross Smith Avenue.

The provision of a new northern lands access and freight terminal access would ensure access to Sydney Airport's existing and future freight facilities is maintained or improved.

As outlined in 9.4.8 the project includes modification of the Lancastrian Road intersection. This would result in increases to travel distances and times for vehicles accessing Lancastrian Road.

Parking

The project would result in in the permanent loss of about 24 spaces within the Sydney Airport northern lands employee car park.

Consistency with the Sydney Airport Master Plan

Transport planning within Sydney Airport is guided by the *Sydney Airport Master Plan 2039* (SACL, 2019a) (the Master Plan), which outlines the strategic direction for Sydney Airport's operations and development over the next 20 years. The key objectives in the plan that are relevant to the project are:

- Enhancing the experience of all passengers and airport users, which includes ground transport facilities, rail stations, terminal forecourts and commercial precincts
- Improving ground access to and from the airport and in the surrounding area, which includes increasing public and active transport use.

The Master Plan includes a five-year plan for ground transport. The ground transport plan identifies proposed solutions to reduce congestion, increase the efficiency of landside operations, and improve road network performance for access to and from Sydney Airport, taking into consideration expected continued growth in travel demand. In particular, these strategies consider potential changes to traffic volumes and patterns due to the opening of projects that form part of the WestConnex program of works.

The five-year ground transport plan includes the following objectives:

- Providing increased capacity on Airport Drive and Qantas Drive by providing additional traffic capacity
- Improving access to and from Terminals 2/3 by improving the performance of key access intersections at Qantas Drive and Seventh Street/Robey Street and Sir Reginald Ansett Drive/O'Riordan Street
- Providing a new Link Road landside access.

As shown on Figure 9.24, the project is the means by which the above objectives would be achieved.

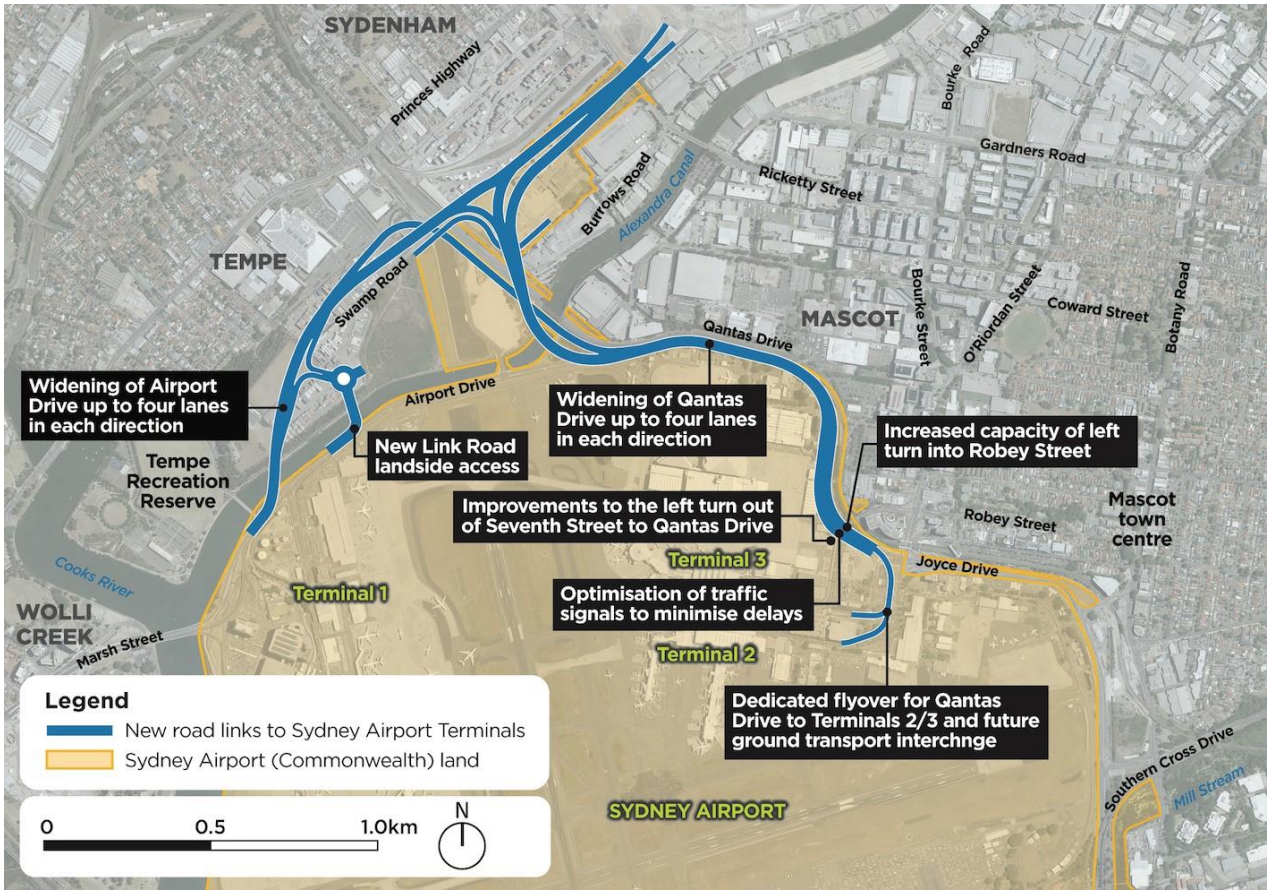

Figure 9.24 Key project features that align with ground transport solutions in the Sydney Airport Master Plan

As anticipated in the ground transport plan, the project has been developed to ensure that it meets the objectives of the Master Plan and the ground transport solutions outlined in the ground transport plan. The project would deliver the following aspects identified in the ground transport plan:

- Reconfigured access to Link Road
- Widening Airport Drive up to four lanes in each direction between Terminal 1 and St Peters interchange and Terminals 2/3
- Widening Qantas Drive to three lanes, expanding to four lanes in each direction between Terminals 2/3 and connections to Terminal 1 and St Peters interchange
- Improving the intersections of Sir Reginald Ansett Drive/O'Riordan Street/Joyce Drive and Seventh Street/Robey Street/Qantas Drive including a new dedicated access viaduct into Terminals 2/3

- Improving the left turn out of Seventh Street to Qantas Drive
- Improving the left turn from Qantas Drive to Robey Street.

The project plays a principal role in delivering the objectives of the Master Plan's five-year ground transport plan and is therefore consistent with the Master Plan.

9.5 Cumulative impacts

9.5.1 Construction

The key projects relevant to the assessment of cumulative impacts include the Botany Rail Duplication, the M4-M5 Link and the F6 Extension.

Construction traffic volumes from the above projects are summarised in section 8.7.1 of Technical Working Paper 1. These volumes represent less than three per cent of existing traffic volumes on the road network. This increase is unlikely to affect traffic network performance as it is likely within the range of daily variations currently experienced on the relevant roads. Given the minor contribution to existing traffic volumes, no significant cumulative impacts on traffic network performance are anticipated. Additionally, with the exception of the Botany Rail Duplication, construction traffic is likely to be remote from the project site.

The Botany Rail Duplication has greater potential to result in cumulative impacts during the period 2021 to 2023, because it is located directly adjacent to the project site and includes some common work areas along Qantas Drive and on Robey and O'Riordan streets. The Sydney Gateway road project would also require closures of Qantas Drive and Sir Reginald Ansett Drive for major crane lifts. Some of the rail duplication works would also need to be undertaken during rail possession periods (weekends) so as not to affect rail operations. Accordingly, a coordinated approach between the Botany Rail Duplication and the Sydney Gateway road project is required.

Potential cumulative impacts of the project and the Botany Rail Duplication include short-term closures of Robey Street and O'Riordan Street due to the reconstruction of rail bridges (and other works) over these roads. These closures would likely occur about four times a year and on weekends, which would help avoid impacts on weekday peaks when traffic volumes are at their highest. Traffic detours would be implemented during these road closures, along with communication (media) campaigns.

Modelling of travel times and intersection performance during the weekend peak, when closures of Robey and O'Riordan streets would occur and detours are needed, was undertaken. The results of modelling show that the following four intersections would experience substantially reduced performance due to the temporary closure of Robey Street:

- Qantas Drive/Robey Street – the level of service is predicted to deteriorate from D to F with an increase in delay of 141 seconds
- O'Riordan Street/Robey Street – the level of service is predicted to deteriorate from C to F with an increase in delay of 52 seconds
- General Holmes Drive/Wentworth Avenue – the level of service is predicted to deteriorate from B to F with an increase in delay of 59 seconds
- Botany Road/Wentworth Avenue – the level of service is predicted to deteriorate from C to F with an increase in delay of 146 seconds.

During the temporary closure of O'Riordan Street, the following three intersections would experience substantially reduced performance:

- Robey Street/Botany Road – the level of service is predicted to deteriorate from B to F with a predicted increase in delay of 55 seconds
- General Holmes Drive/Botany Road – the level of service is predicted to deteriorate from A to B with a predicted increase in delay of 10 seconds

- Botany Road/Wentworth Avenue – the level of service is predicted to deteriorate from C to F with a predicted increase in delay of 137 seconds.

Impacts on travel times during the use of traffic diversions would include:

- Closure of Robey Street – leading to a delay of between 8 and 20 minutes, depending on the alternative route used
- Closure of O'Riordan Street – leading to a delay of between 8 and 10 minutes, depending on the alternative route used.

Upon the completion of the Botany Rail Duplication, no further cumulative impacts are expected.

The footpaths on Robey and O'Riordan streets would be unavailable during any proposed short-term closures of Robey Street or O'Riordan Street (as long as a weekend) eg for major crane lifts for the Botany Rail Duplication. However, the potential closures would likely occur independent of each other. During the Robey Street closure, pedestrians would use O'Riordan Street, increasing walking distances by around 100 metres. Similarly, during the O'Riordan Street closure, pedestrians would use Robey Street, increasing walking distances by around 260 metres. Cyclists would also need to dismount and use these alternative routes, given that no formal cycling facilities are provided along Robey or O'Riordan streets. Where road closures are not required, pedestrians would be diverted to the opposite side of the road, via traffic control at the adjacent signalised intersections and crossings. Overall, the cumulative construction impacts to pedestrians and cyclists are considered to be manageable.

As the plans for each of the projects develop, and contractors finalise construction programs and methodologies, there would be further opportunity to co-ordinate activities likely to affect traffic in the vicinity. In addition, the proposed weekend closures of Robey and O'Riordan streets would require further clarification with the Botany Rail Duplication project team and contractor to ensure that cumulative impacts on traffic, pedestrians and cyclists are satisfactorily mitigated and managed.

9.5.2 Operation

The modelling and assessment of the potential operational impacts of the project (see section 9.4) factored in the operation of the New M4 and New M5. However, this assessment did not include the proposed F6 Extension or the Western Harbour Tunnel and Beaches Link projects, as these projects had not been approved. The following sections consider the cumulative impacts of these projects with the Sydney Gateway road project. Two modelling years were considered:

- The 2026 model, which included operation of the F6 Extension
- The 2036 model, which included both the F6 Extension and the Western Harbour Tunnel and Beaches Link projects.

Traffic volumes and patterns

Operating the F6 Extension and the Western Harbour Tunnel and Beaches Link projects, together with the Sydney Gateway road project would increase traffic volumes along the New M5 and M4-M5 Link in 2036.

Traffic volumes would decrease along the M1 (Southern Cross Drive and General Holmes Drive) and the Princes Highway (through St Peters, Sydenham and Tempe) as traffic would divert from these routes to the New M5 and F6 Extension. A marginal decrease in traffic along O'Riordan Street and Botany Road is also predicted.

The cumulative impacts of these projects would be marginal and include:

- A minor decrease in traffic volumes along Marsh Street
- A minor increase in traffic volumes to and from St Peters interchange.

Changes to heavy vehicle movements (ie on-road freight) would be similar to the changes to other traffic, with a shift to the new infrastructure, particularly from the M1 (Southern Cross Drive and General Holmes Drive) to the New M5, M4-M5 Link and F6 Extension. Overall, there would be very little change

along Foreshore Road, Botany Road and Wentworth Avenue in terms of traffic volumes and proportions, with a negligible increase in traffic volumes predicted (around one to two per cent per day).

Road network performance

Operation of the F6 Extension and Western Harbour Tunnel and Beaches Link would result in a minor cumulative improvement in traffic conditions during the morning peak period. During the afternoon peak, there would be little to no change in road network performance, indicating that the network is forecast to be at capacity in 2036.

Intersection performance

The majority of intersections would operate at a similar level of performance in 2036 once the F6 Extension and Western Harbour Tunnel and Beaches Link are operating. The exception is the Bourke Road/Gardeners Road intersection, where a deterioration in the level of service (from E to F) is predicted in the afternoon peak period.

Average delays at most intersections would reduce by up to 70 seconds. However, at eight intersections, an increase in average delay by up to 45 seconds would occur in the morning peak period. In the afternoon peak period, five intersections would experience average delays of up to 26 seconds. While noticeable, these changes would be an improvement on the conditions that would exist without the project in 2036.

In summary, the results of the assessment indicate that key intersections in the road network would perform in a similar manner (in 2036) once the F6 Extension and Western Harbour Tunnel and Beaches Link are operating in conjunction with the project.

Midblock assessment

In the morning peak period, the majority of midblock and merge/diverge sections are forecast to operate at the same level of service once the F6 Extension and the Western Harbour Tunnel and Beaches Link are operational, indicating little to no change in vehicle density. Only four locations would experience a reduction in the level of service; however, these locations would still operate at a level of service D or better.

The results for the afternoon peak period also indicate that the majority of the midblock and the merge/diverge sections are forecast to operate at the same level of service once the F6 Extension and the Western Harbour Tunnel and Beaches Link are operational. There would be a reduction in the level of service, to a level of service E or F, as follows:

- Diverge 11 (Qantas Drive to Qantas Drive and M4) westbound reduces from a level of service D to E
- Merge 13 (Qantas Drive and Seventh Street slip lane) westbound reduces from a level of service D to E
- Merge 15 (M5 and M4 to Airport Drive) westbound reduces from a level of service E to F
- M3 (midblock location on Qantas Drive) westbound reduces from a level of service D to E.

These points are all located along Qantas Drive in the westbound direction. The reduction in level of service is considered to result from traffic exiting from Terminals 2/3 heading towards St Peters interchange.

Travel times

Changes to travel time due to the opening of the F6 Extension and Western Harbour Tunnel and Beaches Link would be minimal overall during the morning and afternoon peak periods. The opening of these projects would further enhance the preference for using the project, particularly from Port Botany and Terminals 2/3.

Impacts on public transport

The assessment shows that operation of the F6 Extension Stage 1 and Western Harbour Tunnel and Beaches Link projects together with the project would lead to improvements to bus travel times and reliability along most of the assessed corridors. Substantial travel time improvements would result along Sydney Park Road, General Holmes Drive and Coward Street, indicating:

- Up to a 25 per cent reduction in travel time for routes 307, 400, 420, and 420N along Coward Street (Bourke Road to Botany Road and Wentworth Avenue) in the morning peak
- Up to a 65 per cent reduction in travel time for route 303 on General Holmes Drive in the afternoon peak
- Up to 35 per cent reduction in travel time for routes M20, 309, 309X and 310 on Botany Road (Gardeners Road to Mill Pond Drive) in the afternoon peak.

The following routes indicated a substantial increase in travel time:

- Up to a 15 per cent increase in travel time for route 303 on Canal Road/Ricketty Street in the morning peak
- Up to a 55 per cent increase in travel time for routes 420, 420N, and 400 on Airport Drive
- Up to a 30 per cent increase in travel time for routes 348 and 422 along the Princes Highway in the afternoon peak

Further information about travel time changes to other routes is provided in Appendix D of Technical Working Paper 1.

Impacts on active transport

The New M5 includes a cycleway connection to Canal Road at St Peters. The F6 Extension includes new shared cycle and pedestrian pathways. Given the proximity of these projects to the project site, there would be an opportunity for a future connection between the corridors to achieve cumulative benefits and further encourage active transport.

Impacts on parking and access

Compared with the ‘with project’ option, there were no differences identified to the impacts on parking and access under the cumulative scenario.

9.6 Management of impacts

9.6.1 Approach

Approach to mitigation and management

High capacity and efficient movements from Sydney Airport and its terminals is a critical function provided by the existing road network. Construction would result in unavoidable changes to the configuration and capacity of the existing road connections. The assessment identified that the latter stages of construction would result in moderate impacts on the local road network, particularly in the vicinity of Terminals 2/3.

Certain construction activities (eg major crane lifts over roads and Alexandra Canal) would require temporary lane and road closures. These would be predominantly undertaken at night or over the weekend periods when traffic volumes are lower. Such activities would need to be co-ordinated with adjacent projects such as the Botany Rail Duplication to ensure access, satisfactory capacity and minimum levels of service are maintained through and around the project site.

Once operational, the project would provide increased capacity and direct connections from the Sydney motorway network to Sydney Airport’s terminals and remove through traffic from other local roads.

The following measures are proposed to mitigate impacts that cannot be avoided.

Approach to managing the key potential impacts identified

A Construction Traffic and Access Management Plan would be prepared and implemented as part of the CEMP. The plan would detail processes, relevant requirements and responsibilities to minimise potential traffic, transport and access impacts during construction. Further information on the CEMP, including the requirements for the Construction Traffic and Access Management Plan, is provided in Chapter 27 (Approach to environmental management and mitigation).

Careful and detailed planning would be required during detailed design and prior to construction to ensure the capacity of the road network is maintained and access to the airport is unaffected. This would require close co-ordination with a range of stakeholders, including Roads and Maritime, Transport for NSW (various divisions), ARTC, Transport Management Centre, Sydney Coordination Office, Sydney Airport Corporation, emergency services, and any infrastructure contractors working in the vicinity of the airport.

The Construction Traffic and Access Management Plan would include a requirement to conduct further network and local area analysis to reduce the identified level of impacts during construction, particularly any revised traffic staging proposed by the construction contractors. Options for re-routing traffic during periods of lane and road closures would also be further investigated to minimise travel times.

A travel demand management strategy would also be developed to promote the diversion of unnecessary traffic around the project site. This would be implemented in conjunction with a detailed communications strategy to notify drivers (including public transport, private vehicles, heavy vehicles) of construction works, potential delays, detours and other relevant information.

Close co-ordination would be undertaken with ARTC and the Botany Rail Duplication contractor, for works in the vicinity of Robey and O'Riordan streets and Qantas Drive, Seventh and Ninth streets, to minimise the potential for cumulative impacts.

Approach to managing other impacts

An active transport network strategy, developed in conjunction with relevant stakeholders, will be prepared to integrate and enhance accessibility opportunities and future active transport infrastructure provision.

Other measures are provided in section 9.6.2.

Expected effectiveness

Roads and Maritime is experienced at managing all modes of traffic throughout construction of road projects. The proposed measures outlined in Table 9.16 are based on previous road projects in urban environments and are designed to effectively mitigate and manage construction-related impacts.

The Construction Traffic and Access Management Plan would be prepared in accordance with the relevant parts of the Austroads Guide to Road Design, *Traffic control at work sites* (Roads and Maritime, 2018b) and AS 1742.3–2009: *Manual of uniform traffic control devices – Traffic control for works on roads.*

In addition, prior to the implementation of any temporary traffic management measures outlined within the Construction Traffic and Access Management Plan, a person who is qualified in Roads and Maritime's 'Design and Inspect Traffic Control Plans' course would carry out an inspection to verify that any pavement markings, road signs and other traffic control devices have been installed appropriately. The Construction Traffic and Access Management Plan would be amended as applicable should any measures not be considered effective.

Access to properties would be maintained during the construction period. While access arrangements would be outlined in the Construction Traffic and Access Management Plan, the effectiveness of those arrangements and the need for any alternative and/or temporary access arrangements would be agreed with affected property managers/owners.

For the operational phase, the traffic modelling results outlined in sections 9.4.1 and 9.4.2 shows that the project effectively caters for increased traffic demand in 2026 and 2036 when compared to the existing networks (including other approved motorway projects) performance in the future.

9.6.2 List of mitigation measures

Measures that would be implemented to address potential impacts on traffic, transport and access are listed in Table 9.16.

Table 9.16 Traffic, transport and access mitigation measures

Impact/issue	Ref	Mitigation measure	Timing
Potential for traffic, transport and access impacts during construction	TT1	A Construction Traffic and Access Management Plan will be prepared prior to construction and implemented as part of the CEMP. The plan will detail processes and responsibilities to minimise traffic and access delays and disruptions, and identify and respond to changes to road safety during construction.	Pre-construction, construction
	TT2	The Construction Traffic and Access Management Plan will include proposed road staging of construction works along Airport Drive, Qantas Drive and key accesses to Sydney Airport's terminals to ensure these key roads maintain satisfactory capacity and minimum levels of service. The proposed road staging plans and mitigation measures will be developed in conjunction with Transport for NSW (various divisions), ARTC, the Transport Management Centre, Sydney Coordination Office, Sydney Airport Corporation, emergency services, and any contractors working in the vicinity of the airport.	Pre-construction
	TT3	The communications strategy (measure SE1) will include a mechanism to inform the community of the dates and durations of specific phases within the project, including information about specific lane and road closures and the times of day and night when works will be carried out.	Pre-construction, construction
	TT4	A travel demand management strategy will be prepared to provide: ■ A comprehensive set of travel mode options to minimise use of roads affected by construction ■ Communication strategies to reduce the number of people using the road network in the project study area during construction, where practicable.	Pre-construction, construction
Impacts on road network performance (delays) and safety	TT5	Construction staging and temporary work plans will be prepared to: ■ Ensure access to Sydney Airport is maintained at all times during operational hours ■ Stage the construction works on key parts of the network, such as Qantas Drive, Airport Drive and access to Sydney Airport terminals, to enable these roads to continue to function with as minimal impact as possible ■ Minimise conflict with the existing road network ■ Maximise spatial separation between work areas and travel lanes.	Pre-construction, construction
	TT6	Further consideration of the construction phase road geometry and construction area operations will be undertaken with the aim of optimising road performance during construction. This will include the following considerations: ■ Maintain a posted speed of 50 to 60 km/h along the construction zones ■ Maintain three lanes in each direction at the Airport Drive and Link Road intersection	Construction

Impact/issue	Ref	Mitigation measure	Timing
		■ Provide three lanes into Terminals 2/3 at Sir Reginald Ansett Drive through to Keith Smith Avenue.	
	TT7	Where reasonable and feasible, work areas, activities and construction access arrangements will be modified to address any traffic flow issues identified by key stakeholders, including the Sydney Coordination Office, Sydney Airport Corporation and the Traffic Management Centre.	Construction
	TT8	A mechanism will be provided for the community to report incidents and delays, such as a project phone number. The contact mechanism will be communicated in accordance with the project's communications strategy (measure SE1).	Construction
Impacts on access to Terminals 2/3	TT9	Further traffic management in the vicinity of the Qantas Drive/Seventh Street/Robey Street intersection will be planned and undertaken with consideration of the following potential re-routing options: ■ Divert westbound traffic from General Holmes Drive (via Joyce Drive) onto Robey Street (via the new Wentworth Avenue link provided by the Airport East Precinct Upgrade project) and Botany Road instead of using the right turn from Qantas Drive to Robey Street ■ Consolidate and support the function of the left turn from Qantas Drive onto Robey Street and traffic out of Seventh Street through the re-allocation of signal green time taken away from the diverted or banned right turn movement (from Qantas Drive to Robey Street) during peak periods or potentially ban the right turn movement in the peak periods ■ Introduce an additional left turn lane into Robey Street from Qantas Drive to improve traffic flows based on traffic modelling analyses.	Pre-construction, construction
	TT10	Access to Sydney Airport will be maintained at all times during the airport's operational hours. Any temporary changes to access arrangements will be developed, communicated and implemented in consultation with Sydney Airport Corporation.	Construction
Property, cyclist and pedestrian access	TT11	Access to properties, including residences, businesses and community infrastructure, will be maintained. Where disruption to access cannot be avoided, consultation will be undertaken with the owners and occupants of affected properties, to confirm their access requirements and to identify alternative arrangements.	Construction
	TT12	Safe pedestrian and cyclist access will be maintained around or through work areas. Where disruption to access cannot be avoided, alternative routes that comply with relevant accessibility standards and guidelines will be provided, signposted and communicated.	Construction
Impacts on the availability of parking on streets surrounding construction work areas	TT13	A worker parking strategy will be developed to identify measures to minimise worker parking on local streets. Measures to be implemented during construction will include provision of designated parking areas within the project site, encourage use of public transport and implement shuttle bus arrangements.	Pre-construction, construction
Impacts on bus stops and passengers	TT14	Where required, changes to existing bus stops and/or changes to bus service patterns will be undertaken in accordance with the following requirements: ■ Changes will be designed and implemented in consultation with Transport for NSW and bus operators ■ The users will be informed in advance of changes.	Construction

Impact/issue	Ref	Mitigation measure	Timing
Impacts of construction haulage vehicles	TT15	Construction haulage vehicles will be managed to: ■ Adhere to the nominated haulage routes and speeds identified in the Construction Traffic and Access Management Plan ■ Minimise idling and queuing on public roads ■ Minimise movement of vehicles during peak periods.	Construction
Cumulative construction traffic impacts	TT16	The potential for cumulative construction traffic impacts will be reviewed and co-ordinated with other projects. The review will include: ■ Considering other projects with the potential to affect access and capacity, particularly in the vicinity of Terminals 2/3 ■ Detailed reviews of programs for traffic staging, lane and road closures for all projects ■ Co-ordinating works and identifying efficient re-routing options during periods of road and lane closures.	Pre-construction, construction
Operational road network performance including potential increased traffic on some parts of the network	TT17	A review of operational network performance will be undertaken 12 months and five years from the commencement of operation to confirm the operational traffic impacts on surrounding arterial roads and key intersections. The review will identify measures (as required) to address impacts on road network performance. The results of the review will be considered in future operational network performance planning carried out by Roads and Maritime.	Operation
Active transport opportunities	TT18	Roads and Maritime and Sydney Airport Corporation will prepare an active transport strategy to integrate and enhance accessibility opportunities. The strategy will be prepared in conjunction with relevant stakeholders and provide a guide for future active transport infrastructure provision.	Operation

9.6.3 Managing residual impacts

Residual impacts are impacts of the project that may remain after implementation of:

- Design measures to avoid and minimise impacts (see section 6.4)
- Construction planning and management approaches to avoid and minimise impacts (see section 6.4 and 6.5)
- Specific measures to mitigate and manage identified potential impacts (see section 9.6.2).

Residual impacts would occur during construction and would include travel time delays along key routes within the study area as well as at key intersections. While the Construction Traffic and Access Management Plan would include measures to reduce impacts, there would continue to be impacts which the management measures cannot completely mitigate.