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# PART B

## ENVIRONMENTAL ASSESSMENT

CABRAMATTA  
LOOP PROJECT

—  
ENVIRONMENTAL  
IMPACT STATEMENT

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## 8 Traffic, transport and access

*This chapter provides a summary of the traffic, transport and access impact assessment undertaken by GHD. A full copy of the assessment report is provided as Technical Report 1-Traffic, transport and access impact assessment. The report was written to address the relevant SEARs which are outlined in Appendix A.*

### 8.1 Assessment approach

#### 8.1.1 Methodology

##### 8.1.1.1 Study area

The study area for the assessment includes all local and State roads that would be affected by the project. These include the Hume Highway and Cabramatta Road East, which act as key arterial road links that provide access and egress to local roads adjacent to works sites. Local roads within the study area that provide direct access to works sites are Broomfield Street, Junction Street and Liverpool Street, Sappho Road and Mannix Parade.

##### 8.1.1.2 Key tasks

The assessment involved:

- reviewing the reference design for the project
- reviewing existing road features, traffic, transport services, pedestrian and cyclist facilities, parking, and available traffic survey data
- estimating the traffic that would be generated during construction
- assessing the potential impacts of construction, including impacts to the operation of the local road network, pedestrians, cyclists, parking, and public transport in accordance with *Traffic Modelling Guidelines* (RMS 2013)
- assessing the potential impacts to the local road network and parking during operation
- assessing potential operational impacts on the wider transport network, including impacts to motorists, cyclists, pedestrians, and public transport
- providing mitigation measures to manage the potential impacts identified.

In addition to the above, the Transport for NSW website was accessed for information relating to bus route and timetables (January 2019).

##### 8.1.2 Risks identified

The preliminary environmental risk assessment undertaken for the project included potential risks associated with traffic, transport and access. Potential risks were considered according to the impacts that may be generated by the construction and/or operation of the project, pre-mitigation. The purpose of the preliminary environmental risk assessment was to inform the impact assessment. Further information on the preliminary risk assessment, including the approach and methodology is provided in Appendix D.

The assessed risk level for the majority of potential traffic, transport and access risks was high. Risks with an assessed level of medium or above include:

- construction traffic impacts, including temporary delays to local traffic
- construction staff parking resulting in impacts to street parking

- congestion in surrounding road networks due to diversion of road users during construction due to partial or full road closures
- reduced pedestrian and cyclist access during construction due to works on the shared path
- impacts to existing parking spaces on the western side of Broomfield Street due to the works encroaching in this area during the construction stage
- short-term impacts to land owners and occupiers due to access restrictions during services relocation work
- permanent loss of parking along Broomfield Street
- additional traffic generated by maintenance activities due to the passing loop
- impacts to emergency services through delays in access due to works.

These potential risks and impacts were considered as part of the assessment. The assessment also considered matters identified by the SEARs and stakeholders, as described in Chapter 3 (Approval and assessment requirements) and Chapter 4 (Consultation).

### **8.1.3 How potential impacts have been avoided/minimised**

As described in Chapter 6 (Project features and operation) and Chapter 7 (Construction), design development and construction planning has included a focus on avoiding and/or minimising the potential for environmental impacts during all key phases of the process.

Potential traffic, transport and access impacts have been avoided/minimised where possible by:

- maintaining existing functionality of Broomfield Street by minimising widening of rail corridor
- minimising closure of roads and active transport routes and maintaining access along Broomfield Street through staging of the construction works
- providing a temporary shared path to minimise impacts to pedestrians and cyclists
- designing the retaining walls proposed for Broomfield Street to be as narrow as possible to minimise operational impacts along Broomfield Street
- choosing a parking configuration that minimises the loss of car parking capacity in Broomfield Street.

## **8.2 Existing environment**

### **8.2.1 Regional transport context**

Roads in the vicinity of the project consist of the following:

- State roads – major arterial links through NSW and within major urban areas
- Regional roads – roads of secondary importance that provide the main connections between smaller towns and perform a sub arterial function in major urban areas
- Local roads – the remainder of generally council controlled roads.

The surrounding road network is shown on Figure 8.1.



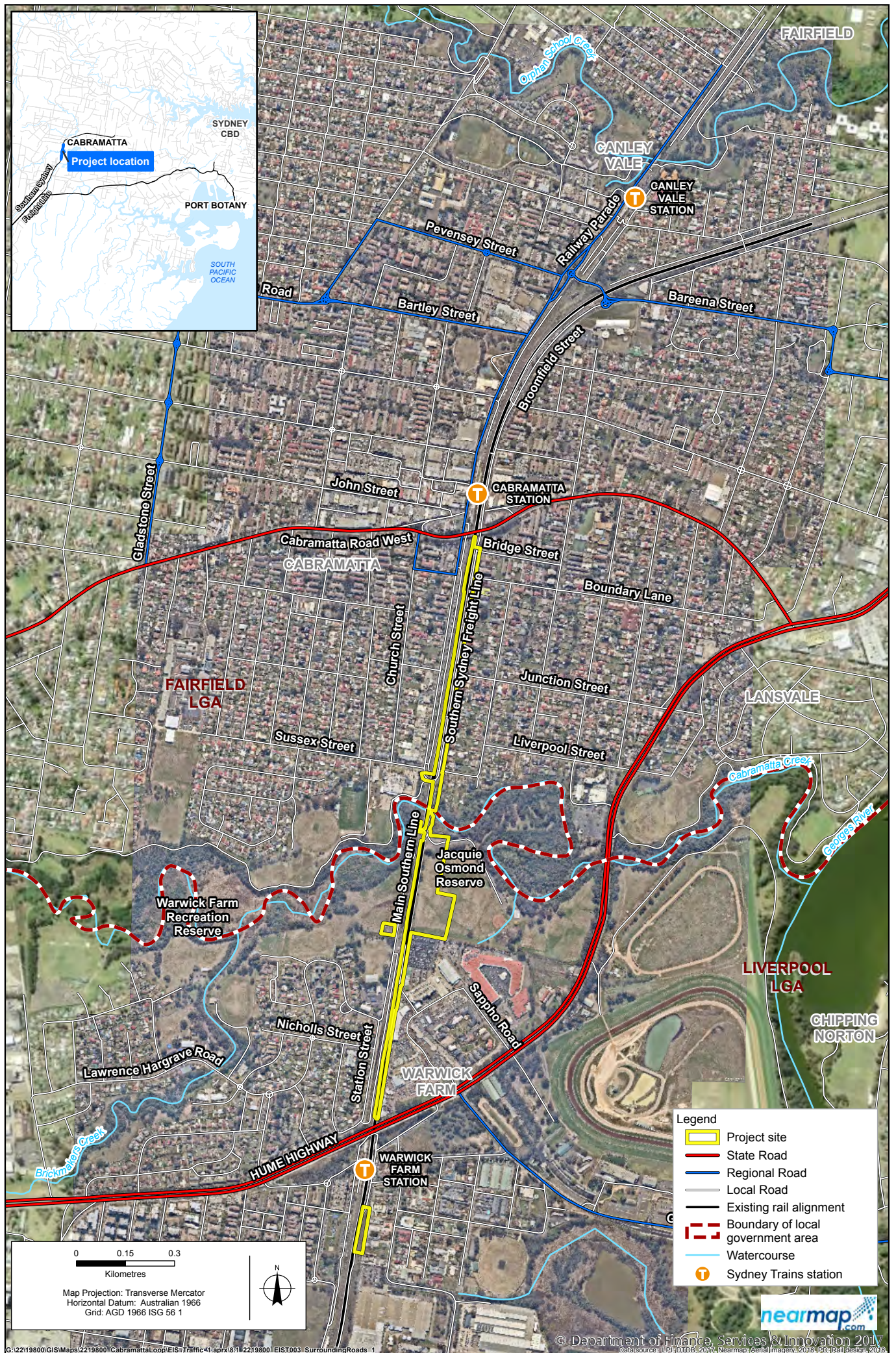


Figure 8.1 Surrounding road network



### **8.2.2 State roads**

The key arterial road that links to and from connector roads to the site is the Hume Highway. The Hume Highway allows the entry and exit of traffic to the project site at a number of locations, primarily at Cabramatta Road East and Mannix Parade. The key features of the Hume Highway within proximity to the project site are described in Table 3.1 of Technical Report 1.

### **8.2.3 Local road network and access arrangements**

The following roads are located within the vicinity of the project:

- Broomfield Street
- Cabramatta Road East
- First Avenue
- Mannix Parade
- Liverpool Street
- Junction Street.

Some of the key features of each of the above roads are summarised below.

#### **8.2.3.1 Broomfield Street**

Broomfield Street functions as a collector road that runs adjacent to the eastern side of the T2/T5 railway line. Broomfield Street has one lane in each direction south of Cabramatta Station and a 50 kilometres per hour speed limit, reducing to 40 kilometres per hour within 200 metres of the town centre.

#### **8.2.3.2 Cabramatta Road East**

Cabramatta Road East is a sub arterial road forming part of Cabramatta Road, positioned east of the T2/T5 railway line. Cabramatta Road East provides a link between the Cabramatta town centre, Cabramatta Station and the Hume Highway. Cabramatta Road East has two lanes in each direction and a range of speed limits between 40 (in school zones) and 60 kilometres per hour.

#### **8.2.3.3 First Avenue**

First Avenue is a local no-through road providing access to Canley Vale Station and a residential area to the north of the train line. First Avenue connects to Broomfield Street via Bareena Street. First Avenue has one lane in each direction and a speed limit of between 40 (in school zone) and 50 kilometres per hour.

#### **8.2.3.4 Mannix Parade**

Mannix Parade is a local road intersecting the Hume Highway in the south and Lawrence Hargrave Road in the north. It provides access to the residential area of Warwick Farm. It has one lane in each direction and a speed limit of 50 kilometres per hour.

#### **8.2.3.5 Liverpool Street**

Liverpool Street is a local road, located about 100 metres to the east of the project. To the east, it forms a priority controlled intersection with Hume Highway. To the west, it provides connectivity to Broomfield Street via National Street and Sussex Street. It has one lane in each direction and a speed limit of 50 kilometres per hour.

#### **8.2.3.6 Junction Street**

Junction Street is a local road running in an east to west direction. It links Broomfield Street to the Hume Highway and has one lane in each direction and has a speed limit of 50 kilometres per hour.

### 8.2.4 Traffic volumes

Traffic survey data was collected during peak hours in October and November 2018. The location of these counts is shown on Figure 8.2. This data was analysed to determine existing intersection operational performance. The traffic survey data collected is provided in Appendix A of Technical Report 1.

The traffic surveys indicated the following network peak hour periods adjacent to the site:

- Weekday AM peak: 7.30 am to 8.30 am
- Weekday PM peak: 16.30 pm to 17.30 pm
- Saturday peak: 12.30 pm to 13.30 pm.

These peak periods were adopted for assessment of impacts on the surrounding road network for the worst case scenario. Table 8.1 summarises the peak hour traffic volumes in the study area.

**Table 8.1 Mid-block traffic volumes**

Location	Road classification	Direction	AM Peak Hour (vehicles per hour)	PM Peak Hour (vehicles per hour)
Hume Highway between Mannix Road and Sappho Road	Arterial road	Eastbound	2,150	1,890
		Westbound	1,650	1,885
		Total	3,800	3,775
Cabramatta Road East	Sub arterial	Northbound	390	935
		Southbound	840	800
		Total	1,230	1,735
Broomfield Street	Local road	Northbound	135	140
		Southbound	150	160
		Total	285	300
Mannix Parade	Local road	Northbound	125	120
		Southbound	165	135
		Total	290	255
Lawrence Hargrave Road	Local road	Northbound	80	80
		Southbound	65	65
		Total	145	145
Sappho Road	Local road	Northbound	205	275
		Southbound	45	200
		Total	250	475

The weekday AM and PM peak hour volumes at each location are typically similar, apart from Cabramatta Road East, where the PM peak has significantly higher volumes than the AM peak. Further, the Saturday peak total volume at Sappho Road is higher than the weekday peak, which is assumed to be as a result of the high density commercial activities accessed via Sappho Road (ie car sales yards and retail establishments, including Homemaker Warwick Farm and Peter Warren Automotive).





Figure 8.2 Intersection traffic surveys locations



#### **8.2.4.1 Heavy and light vehicle mix**

The average heavy vehicle percentage for major roads within the immediate vicinity of the project is outlined in Table 3.11 of Technical Report 1. The data indicated that heavy vehicles constitute between one and five percent of the overall traffic volumes recorded.

In proximity to the project site Hume Highway and Cabramatta Road are approved freight routes that can accommodate vehicles up to the size of a 26 metre B-Double (Roads and Maritime Services, 2019).

The Roads and Maritime Services Restricted Access Vehicle Map identifies the following approved freight routes in the vicinity of the project site to accommodate vehicles up to the size of a 26 metre B-Double.

- Hume Highway
- Cabramatta Road East.

As shown on Figure 7.5 access to the project site would utilise these approved freight routes, minimising impacts to the local road network.

#### **8.2.5 Intersection performance**

The performance of the existing road network is largely dependent on the operational performance of key intersections, which are critical capacity control points. Existing intersection performance was assessed by developing traffic models using the AM and PM weekday peak hour surveyed data (2018) and the Saturday peak hour data at the Sappho Road/Hume Highway intersection. A summary of the results including Level of Service (LoS) is outlined in Table 8.2 and Table 8.3. Detailed modelling results are provided in Appendix A of Technical Report 1.

Table 8.2 Existing intersection operations

Intersection	AM Peak				PM Peak			
	Average Delay* (s)	LoS	Control Type	Deg. of Sat.*	Average Delay* (s)	LoS	Control Type	Deg. of Sat.*
Site 1: Hume Highway/ Mannix Parade	25	B	Signal	0.882	30	C	Signal	0.929
Site 2: Lawrence Hargrave Road/ Nicholls Street	8	A	Roundabout	0.056	8	A	Roundabout	0.055
Site 3: Lawrence Hargrave Road/ Mannix Parade	7	A	Roundabout	0.098	7	A	Roundabout	0.082
Site 4: Hume Highway/ Junction Street	8	A	Priority	0.36	7	A	Priority	0.485
Site 5: Hume Highway/ Liverpool Street	150+	F	Signal	1.0+	150+	F	Priority	1.0+
Site 6: Sappho Road/ Hume Highway (Weekday)	8	A	Signal	0.534	13	A	Signal	0.523
Site 7: Broomfield Street/ Cabramatta Road East	13	A	Signal	0.222	12	A	Signal	0.242
Site 8: Hume Highway/ Cabramatta Road East	26	B	Signal	0.688	26	B	Signal	0.810

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Table 8.3 Existing Saturday intersection operations

Intersection	Saturday Peak			
	Average Delay* (s)	LoS*	Control Type	Deg. of Sat.*
Site 6: Sappho Road/ Hume Highway	19	B	Signal	0.846

\*Notes:

- The average delay for priority-controlled intersections is selected from the movement on the approach with the highest average delay.
- The level of service for priority-controlled intersections is based on the highest average delay per vehicle for the most critical movement.
- The degree of saturation (Degree of Saturation) is defined as the ratio of the arrival flow (demand) to the capacity of each approach.
- Average delay is given in seconds per vehicle.

Table 8.2 shows that most of the signalised intersections and roundabouts analysed currently operate with an acceptable LoS (ie better than LoS E in accordance with the *Guide to Traffic Generating Developments* (RMS, 2002)) with spare capacity in both the weekday morning and evening peak periods. The right turn movements at the Hume Highway/Liverpool Street intersection were shown to operate at LoS F both in the morning and evening peak periods, indicating that the intersection is operating at, or close to capacity. Table 8.3 shows that the Sappho Road/Hume Highway intersection operates satisfactorily for the weekend peak hour (LoS B).

### 8.2.6 Road safety

Crash history data was obtained for a five year period from 2013 to 2017 for roads in the study area from the Transport for NSW Centre for Road Safety. Data was used to analyse road safety to determine:

- any road safety concerns in close proximity to the main work sites
- additional construction traffic and shared road users impact on the existing situation.

Data showed that crashes typically occur at intersections along Broomfield Street, particularly at Bridge Street and Longfield Street intersections. In total there were 20 crashes on the roads assessed closest to the project. The highest number of injury related crashes recorded was at the Broomfield Street / Longfield Street intersection, which resulted in three injuries.

### 8.2.7 On and off street parking

There is generally a mix of both on street and off street parking available within walking distances to Cabramatta Station, Canley Vale Station and Warwick Farm Station.

Around Cabramatta Station there is designated on street parking provided on both sides of Broomfield Street. Off street parking within Cabramatta town centre (west of the station) is provided pre-dominantly for local business activity associated with the town centre. There is a multi-storey paid car park located to the east of the station accessible via Fisher Street and a smaller free car park accessible via Cumberland Street.

Warwick Farm Station is serviced by a multi-storey off street parking facility at the western side of the station. At grade parking facilities exist adjacent to the station to the east and the west. In addition, there is on street parking available on Hart Street, located to the west of the station.

A survey of existing parking use in the study area was undertaken in October 2018 and focused on Broomfield Street. The findings of the survey determined that there were approximately 379 parking spaces available on Broomfield Street (north and south of Cabramatta Station). Untimed on-street parking is located

on both sides of Broomfield Street. For the majority of street within the project site there is currently angled parking on the western side of the road and informal kerbside parallel parking on the eastern side. North of Broomfield Lane the parking consists of parallel parking on the western side only. The survey identified that parking utilisation on the western side of Broomfield Street north of Cabramatta Station typically reaches close to capacity between 8.00 am and 3.00 pm. Parking south of Cabramatta Station typically has some spare capacity during the highest utilised periods (76 spare spaces), with peak utilisation at approximately 60 per cent particularly on the eastern side south of Junction Street. Observed patterns of parking utilisation both north and south of Cabramatta Station, indicate that the majority of on street parking users are commuters, with an increase in parking demand noted prior to 9:00 am and a decrease in demand after 3:00 pm.

Parking utilisation surveys were also undertaken at Canley Vale Station and Warwick Farm Station to assess parking patterns in proximity to the compounds and work sites. First Avenue (Canley Vale Station) on the western kerb and Warwick Farm Station follow a similar trend to Broomfield Street parking demands with parking utilisation at capacity from 8:00 am to 3:00 pm.

### **8.2.8 Public transport**

Both bus and train services operate within the study area, including four bus routes (numbers S1, 904, 823, and N50) with stops on Broomfield Street, Cabramatta Road East, Hume Highway and Mannix Parade. No bus routes operate within the project site.

Within the study area, passenger services are provided by Sydney Trains along the T2 Inner West and Leppington Line, and the T5 Cumberland Line. Two Sydney Trains stations are located in close proximity to the project site namely Cabramatta Station, located about 130 metres north of the project site and Warwick Farm Station located about 120 metres south of the project site. Train services operating on the T2 and T5 lines services the following stations near the project:

- Canley Vale Station
- Cabramatta Station
- Warwick Farm Station.

### **8.2.9 Pedestrians and cyclists**

Footpaths are provided throughout the study area, and there are also median refuges and signalised major intersections. A pedestrian footpath and cycle path (shared path) is located on the western side of Broomfield Street and forms part of the Parramatta to Liverpool Rail Trail Cycleway, joining Canley Vale Station with Warwick Farm within the study area.

At Canley Vale Station the Parramatta to Liverpool Rail Trail Cycleway crosses the Prospect Reservoir Orphan School Creek Trail, which is one of the longest continuous off-road bike paths in Sydney. Bike racks are provide outside Canley Vale Station.

To the south of the project site, near Liverpool Station, the cycleway crosses the Mirambeena and Chipping Norton loop, which is a 27 kilometre long loop consisting mostly of off-road paths.

### **8.2.10 Taxi and drop off facilities**

There is a taxi rank adjacent to Cabramatta Station. There is a designated taxi zone (dedicated maxi taxi) located adjacent to the Warwick Farm Station at the Remembrance Avenue/Hart Street exit.

There are two kiss and ride facilities serving Cabramatta Station. The first of these is located immediately north of the taxi rank along the western side of Broomfield Street (two car spaces). The second is located on the southern kerb of Cabramatta Road East (one car space).

There is one pick up/drop off facility at Warwick Farm Station which is a designated five minute parking zone serving ten car spaces. It is located on Remembrance Avenue just east of Hart Street.

### **8.3 Assessment of construction impacts**

#### **8.3.1 Construction traffic**

Construction would generate additional vehicle movements, including light and heavy vehicles. Light vehicles would generally be generated by construction workers moving to and from the construction work areas and/or compounds. Heavy vehicle movements would generally be trucks delivering materials.

It is estimated that up to 60 light vehicles associated with the workforce and six heavy vehicles would use the Hume Highway per hour during peak periods to access the project site during possessions (peak construction activity period). Heavy vehicles consist of delivery vehicles, haulage trucks and oversized vehicle movements that may occur within the peak hour period. Construction vehicles would then distribute at a number of side roads to enter and leave the compound and work sites.

It is proposed that the Hume Highway would provide key access to and from the locality from the south and north, with Cabramatta Road East and Mannix Parade comprising the two major connection points from the Hume Highway. Liverpool Street and Junction Street would potentially be utilised as 'left in, left out' locations to and from Broomfield Street, while Sappho Road may be utilised in special circumstances to access the Jacqui Osmond Reserve. The preliminary haulage and access routes are shown on Figure 7.5. These routes would be reviewed during the detailed design stage and confirmed following the appointment of the construction contractor.

#### **8.3.2 Road network performance**

SIDRA modelling was undertaken using the weekday AM (morning) and PM (afternoon) peak hours and the Saturday peak hour at Sappho Road/ Hume Highway intersections based on the 2018 traffic survey data (refer Table 8.2 and Table 8.3).

The analysis indicated that most of the intersections potentially affected by the project during construction would continue to operate throughout the construction period at a level of service comparable to existing conditions. The exceptions would be:

- the Hume Highway/Mannix Parade signalised intersection where there would be a marginal decline in road network performance during the weekday morning and evening peak hour periods, however the operation of the intersection would still be considered good
- the Sappho Road/Hume Highway signalised intersection where there would be a marginal decline in road network performance during the weekday evening peak hour period, however the operation would still be considered good.

Detailed SIDRA modelling results of these intersections are provided in Appendix B of Technical Report 1.

### **8.3.3 Vehicular traffic**

Broomfield Street realignment works would occur in stages to minimise the impact on traffic and parking. In addition, staging will occur concurrently to minimise construction time. The staged and concurrent realignment works would occur as follows:

- Stage 1A
- Stage 1B and Stage 2A
- Stage 1C and Stage 2B
- Stage 1D and Stage 2C
- Stage 2D.

These stages are shown on Figure 8.3.





Figure 8.3 Construction stages along Broomfield Street



The traffic management approach proposed during construction, along with any associated impacts, is discussed in Table 8.4.

**Table 8.4 Proposed traffic management and impacts**

<b>Road</b>	<b>Proposed closure</b>	<b>Diversion/traffic management</b>	<b>Traffic Impact</b>
Broomfield Street	Northbound lane closure during realignment of the eastern side road southbound lane closure during realignment of the road of the western side of the road.	One lane would be closed at a time, allowing bi-directional traffic to travel along the remaining open lane, under traffic control.  No diversion would be implemented	Minor delays (estimated between 1 and 2 minutes) to vehicles on Broomfield Street.  Minor delays for residents that access property driveways.
	Full road closure at night time for short periods (typically one night) for specific activities such as line marking, and when changing traffic setup to progress between stages.	Potential diversions would include the adjacent local roads such as National Street.	Minor delays (estimated between 1 and 2 minutes) to vehicles due to local road diversions from Broomfield Street to adjacent roads such as National Street.  Minor delays for residents accessing property driveways.
Sussex Street	Closure of the southern lane during road alignment works and piling works associated with the Sussex Street bridge.	The northern lane would remain open with traffic management allowing bi-directional traffic	Minor delays (estimated between 1 and 2 minutes) to vehicles that travel via Sussex Street under the bridge.
	Potential full road closure (approximately 12 hours) during certain bridge construction activities (such as lifting and positioning of the girder) for safety reasons.	Road likely closed from Sussex Street bridge to Junction Street. The most likely diversion would comprise: <ul style="list-style-type: none"> <li>• Western side of the railway line - Church Street (to the west) and Cabramatta Road via Railway Parade to the east</li> <li>• Eastern side of the railway line – Junction Street, Cumberland Street and Cabramatta Road with local access maintained.</li> </ul>	Moderate delays (estimated between 2 and 5 minutes) to vehicles that travel via Sussex Street (bridge underpass) can be diverted to Cabramatta Road to cross the rail line. Vehicles that cross the rail line at this location would incur approximately 5 minutes of additional travel time.

Additional minor delays to travel may be experienced by drivers as a result of temporary closures within local streets around the work site and compounds due to deliveries of oversized equipment. The delivery of oversized equipment would generally be undertaken outside of standard construction hours to minimise impacts on the surrounding road network and in accordance with relevant safety considerations in consultation with Roads and Maritime.

Measures to manage the potential for impacts to traffic are provided in section 8.5.

### **8.3.4 Pedestrians and cycle access**

Given the nature of the works on Broomfield Street, minor diversions may be required around the construction site to the opposite side of the road and temporary crossings may be provided. Access to the

shared path on the western side of Broomfield Street would be maintained while works are being undertaken on the eastern side of Broomfield Street. When the realignment works switch to the western side of Broomfield Street access to the footpath on the eastern side would be maintained, however as this is not a shared path cyclists may be directed to dismount or use the road. Works would be staged to minimise the area of impact and impact on pedestrian and cycle access. Traffic management and signage would be established which would aim to maintain existing pedestrian capacity, amenity and safety. This would be facilitated by traffic controllers where required.

There may be a need to either divert pedestrians and cyclists to adjacent local roads or manage access of pedestrians and cyclists through traffic management when Sussex Street and Broomfield Street are closed for night works. This would cause minor delays to pedestrians and cyclists however this impact is considered minor as the roads would only be closed for periods of one night at time, when pedestrian and cyclist use would be reduced.

In order to maintain pedestrian access around worksites W4 and W3 south of the Sussex Street bridge, the existing shared path would be realigned about 15 metres to the east from the corner of Broomfield and Sussex streets and would join the existing path at the northern extent of the pedestrian footbridge over Cabramatta Creek. The impact would be negligible as the diversion is generally in the same location.

During key activities of construction of the Cabramatta Creek and Sussex Street bridges, cranes will be erected in worksites W4 and W3 to facilitate lifting of bridge items into place. To maintain pedestrian and cyclist safety, the permanent and temporary shared path would be closed between Sussex Street and Jacquie Osmond Reserve during this period. This closure would be short term, with a likely duration of two weeks. Pedestrians and cyclists would likely need to be diverted to Cabramatta Road to cross to the western side of the rail corridor, which could result in significant travel time delays. In accordance with ARTC's stakeholder engagement program users of the shared path would be notified of the closure prior to works commencing to minimise any potential impacts.

Other than the temporary diversion noted above pedestrian and/or cyclist access to Jacquie Osmond Reserve from the southern end of the project site (via Warwick Farm Recreation Reserve and the Hometown Warwick Farm car park) and from the northern end of the project site (via Cabramatta Station and Cabramatta town centre) would not be impacted.

### 8.3.5 Parking

Parking impacts are likely during construction of the project. As Construction progresses along the western extent of Broomfield Street the area which is currently angled parking would be impacted. As works progress along the eastern extent of Broomfield Street, particularly to adjust the kerb and construct the pavement, informal kerbside parallel parking would also be impacted. It is anticipated that at the largest staged area (1B with 2A – refer Figure 8.3), about 46 parking spaces would be impacted. Impacts to parking are anticipated to be less during construction of the remaining stages.

As parking is not fully utilised along the length of Broomfield Street through to Sussex Street, it is anticipated the remaining capacity (about 14 spaces) would absorb some of the impact resulting in a reduced net loss. In order to mitigate the potential impact to parking, ARTC is proposing to lease a vacant lot in close proximity to the project site and provide a temporary at-grade parking area. As the temporary site would be subject to negotiation, and was not available at the time of writing, this section details the target criteria for potential temporary car parking site.

The proposed site would:

- aim to be located within 800 metres of Cabramatta Station
- be either an existing hard stand site or site with no existing buildings to limit the need for demolition
- provide about 40 parking spaces

- provide suitable access into and out of the site to limit impacts to the traffic network as a result.

A number of potential options have been identified and include sites in order of preference:

- within the town centre, bordered by commercial activities and a multi-story car parks
- surrounded by medium to high density residential properties which each have eight or more car spaces on site
- adjacent to low-density residential properties.

It is anticipated that construction worker parking would be kept to designated compounds and areas designated for construction workers only. Approximately 60 to 80 worker's vehicles could be accommodated within the site compounds. Therefore there should be minimal impact to on street parking from construction workers. Parking locations would be detailed in the CEMP.

Measures to manage the potential for impacts on parking are provided in section 8.5.

### **8.3.6 Impacts to access**

#### **8.3.6.1 Residential access**

During the enabling works there may be temporary disruptions to access for properties directly fronting Broomfield Street during works to relocate or protect utilities. Additionally, there may be property access impacts if utility relocation works are undertaken in the streets directly adjoining the project site. Any temporary closures of driveways, if required, would be of short duration (up to one day). In many cases, these disruptions can be mitigated through scheduling of works in consultation with the landowner and utilising interim measures such as temporary road plates.

Vehicle access to properties located on Broomfield Street adjoining the works will be maintained during the main construction works.

There is likely to be minor impacts on vehicle travel times to and from properties due to the imposed one lane directional travel, which may cause minor delays to property access and egress.

#### **8.3.6.2 School access**

Lawrence Hargrave School is located adjacent to the western side of the railway corridor at the intersection of Lawrence Hargrave Road and Station Street. During school drop off and pick up times there may be increased traffic in proximity to the school which could be worsened as a result of construction traffic.

The movement of construction vehicles will be managed to minimise conflict between construction traffic and vehicles and pedestrians associated with the school, including construction traffic avoiding the peak period of school start and finish times to minimise potential conflicts.

Measures to manage the potential for impacts on school access are provided in section 8.5.



### 8.3.6.3 *Jacque Osmond Reserve*

There may be potential safety impacts to vehicles, pedestrian and cyclists that use the unnamed access track during construction due to the presence of construction vehicles using this track including where it crosses underneath the rail corridor (between Jacquie Osmond Reserve and Warwick Farm Recreation Reserve). The potential for safety impacts would be minimised through implementation of a construction traffic management plan (discussed in section 8.5) which would provide measures to minimise the conflict between construction traffic, vehicles and shared path users.

Additionally, there would be no vehicle access to Jacquie Osmond via the unnamed access road on the western side of the rail corridor while some components of the Cabramatta Creek bridge are being constructed. This would impact users of Jacquie Osmond Reserve who access the park for sporting or recreational activities and use the informal parking within Jacquie Osmond Reserve. This impact is considered minor as the works would be short-term (with a likely duration of two weeks) and would likely only impact users on the weekend when sporting events are held. During this time users would still be able to park within the adjacent Hometown Warwick Farm car park and access the park from the southern entry.

Measures to manage the potential for impacts to access are provided in section 8.5.

### 8.3.7 Public transport

Features of the project such as the Sussex Street bridge works, Cabramatta Creek bridge and track works would need to be constructed during programmed weekend rail possession periods. Possession periods typically occur for 48 hours at a time, four times a year. During these times, it is expected that train replacement services (bus services) will be offered to the public, coordinated by Sydney Trains. This is in accordance with standard operating procedures for Sydney Trains and ARTC.

No impacts on existing bus services are expected during the proposed works as no bus routes run within the project site. Additionally, no impacts on existing taxi stands or kiss and ride locations are anticipated due to the distance of these locations from the project (the nearest kiss and ride and taxi stands are located adjacent to Warwick Farm and Cabramatta stations).

### 8.3.8 Emergency vehicles

In the event of an emergency during construction of the project there is the potential for impacts to emergency vehicles by way of minor to moderate delays and longer travel times as a result of road diversions and 'stop and go' traffic control arrangements. Additional construction traffic along local haulage routes may also result in minor delays to emergency vehicles.

Measures to manage the potential for impacts to emergency vehicles are provided in section 8.5.

### 8.3.9 Road safety

No impacts to road safety are anticipated as a result of construction of the project. The safety of road users will be managed through measures provided in the construction traffic management plan (discussed in section 8.5). Potential conflicts points between construction and school access is discussed in section 8.3.6. Other potential road hazards are discussed in Chapter 20 (Health, safety and hazards).

### 8.3.10 Cumulative impacts

Other projects that have the potential to occur at the same time as the project are described in Appendix E. There are no known proposed developments immediately adjacent to the project site that may be concurrently in construction with the project.

The following proposed developments within 500 metres of the project have the potential to occur at the same time as construction of the project.

- a multi-storey residential centre at the corner of Broomfield and Cabramatta Road adjacent to the station
- a carpark development in the Cabramatta town centre
- upgrade of Governor Macquarie Drive from the Hume Highway to Newbridge Road.

Potential cumulative impacts may include an exacerbation of the traffic impacts identified in this chapter including delays resulting from reduced intersection performance, additional diversions and an additional demand for parking.

The potential for cumulative impacts would be mitigated through implementation of the mitigation measures proposed in section 8.5 of this report.

## **8.4 Assessment of operational impacts**

### **8.4.1 Traffic and access impacts**

There are no changes expected to occur to the existing road network (including pedestrian and cyclist networks) or access arrangements to public transport as a result of the project. The project is also not expected to generate any additional traffic movements or change the current arrangements of public and active transport. Road intersections reviewed within the study area are anticipated to remain at their current level of operation following the completion of the works.

Maintenance vehicles will need to access the rail corridor to undertake routine maintenance activities on the passing loop as per existing maintenance arrangements. Maintenance works would mostly be undertaken during possessions and would be managed in accordance with ARTC's existing EPL and standard operating procedures. As a result, there are no additional traffic impacts anticipated.

There would be no changes to access arrangements for properties located along Broomfield Street.

The shared path on the western side of Broomfield Street and the footpath on the eastern side of Broomfield Street would be reinstated as part of the project. The footpath on the eastern side would be improved from the existing arrangement as it is currently not concreted along the length of the road, but would be following the completion of the project.

Opportunities to integrate cycling and pedestrian elements with surrounding networks would involve the provision of wayfinding signage, which would be explored as part of development of the urban design and landscape plan during detailed design. This is described further in Chapter 17 (Landscape and visual amenity).

### **8.4.2 Parking**

As a result of changing the angled kerb parking along the western side of Broomfield Street to parallel parking, the project would impact parking with a loss of up to 11 parking spaces proposed. There is currently provision for 213 parking spaces along Broomfield Street between Cabramatta Station and Sussex Street, of which 135 are located on the western side of Broomfield Street.

No permanent impacts are anticipated to the parking spaces available along the eastern side of Broomfield Street and at Jacque Osmond Reserve as a result of the project.

As discussed in section 8.2.7, it is anticipated the parking spaces are predominantly utilised by commuters of Cabramatta Station. As indicated by the parking surveys, Broomfield Street has the capacity to absorb the reduction in parking spaces within surrounding areas, particularly between Sussex Street and Junction Street. This could result in an additional distance of up to 800 metres and up to 10 minutes for commuters walking to Cabramatta Station. As parking south of Junction Street is still within 800 metres of Cabramatta Station, spare parking capacity is within an acceptable walking distance to Cabramatta Station as defined by

the NSW Planning Guidelines for Walking and Cycling (2004) which outlines a recommended walkable distance for commuters of 400 metres (desirable) to 800 metres (maximum) to public transport and other local amenities, or a cycling distance of 1.5 kilometres.

#### **8.4.3 Cumulative impacts**

There would be no anticipated cumulative traffic impacts arising from the operation of the project.

### **8.5 Management of impacts**

#### **8.5.1 Approach and outcomes**

##### **8.5.1.1 Approach to mitigation and management**

A construction traffic management plan will be prepared prior to the commencement of works, with site inductions for all construction personnel undertaken to outline the requirements of the construction traffic management plan. The aim of the construction traffic management plan is to maintain the safety of workers and road users within and adjacent to the site. The primary objectives of the construction traffic management plan are to:

- minimise the impact of construction vehicle traffic on the overall operation of the road network
- provide continuous, safe and efficient movement of traffic for both the general public and construction workers. Traffic control plans will be prepared as part of the construction traffic management plan that will detail the measures to be implemented
- define the use of appropriate advance warning signs to inform users of the changed traffic condition
- provide a description of the construction vehicles and the volume of these construction vehicles accessing/egressing the construction site
- identify measures to mitigate the impacts of these vehicles (if required)
- provide information regarding changed access arrangements and also a description of the proposed external routes for vehicles including the construction vehicles accessing the site
- establish a safe pedestrian and bicycle riding environment in the vicinity of the site.

##### **8.5.1.2 Expected effectiveness**

ARTC and its contractors have experience managing potential traffic and transport impacts associated with the construction and operational phases of rail development projects.

It is expected that the recommendations in this chapter, along with relevant requirements from project approvals, and best practice guidelines would be developed into the construction traffic management plan prepared by the contractor to manage the relevant phases of the project. Routine auditing of the effectiveness of the implementation of the construction traffic management plan requirements would be routinely undertaken to ensure that management measures remain adequate, effective and fit for purpose.

While access arrangements would be outlined in the construction traffic management plan, the effectiveness of those arrangements and the requirements for any alternative and/or temporary arrangements would be agreed with the affected property managers/ owners.

Regular monitoring and inspections would be undertaken during construction to confirm the effectiveness of mitigation measures. Monitoring and inspections would include, but not be limited to Project Contractor's supervisory inspections on a daily basis and environmental representative weekly inspections.

The proposed mitigation measures are expected to be effective in providing satisfactory amenity and safety and ensuring that the road and transport network operations would be retained at an acceptable LoS.



## 8.5.2 List of mitigation measures

The mitigation measures that would be implemented to address potential traffic, transport and access impacts are listed in Table 8.5. Technical Report 1 provides further detail on recommended mitigation measures and provides a guide to what should be covered in the construction traffic management plan.

**Table 8.5 Mitigation measures**

Stage	Impact	Measure
Construction	General impacts of construction activities on traffic, transport, access, pedestrians and cyclists	<p>A construction traffic management plan will be prepared by the contractor and implemented as part of the CEMP. It will include measures to minimise the potential for impacts on the community and the operation of the surrounding road and transport environment, including those listed in this EIS.</p> <p>The construction traffic management plan will be developed in consultation with relevant emergency services, Liverpool City Council, Fairfield City Council, Roads and Maritime Services, and public transport/bus operators.</p>
	Traffic delays	<p>Oversized vehicles will use designated heavy vehicle routes or routes approved by Roads and Maritime Services.</p> <p>Oversized traffic movements will be carried out, where possible, outside of peak road network periods, minimising the impacts on the road network.</p> <p>Should oversized vehicles be required, the contractor will be responsible for obtaining necessary permits/approvals, where required. Where possible, major road networks such as Cabramatta Road East and the Hume Highway will be used for access to the site by heavy vehicles.</p>
	Temporary parking space loss	Where parking spaces are lost or access is impeded, particularly for extended periods, alternative parking will be provided wherever feasible and reasonable. This will include consideration of other privately owned (or vacant) land within close proximity to Cabramatta Station.
	Delays to Emergency services	A minimum lane width of about 3.5 m will be provided along Broomfield Street during construction to facilitate the access of emergency service vehicle.
	Parking space loss	<p>The project site will be managed to minimise construction worker parking on surrounding streets. A worker car parking strategy will be developed in consultation with the relevant local council to identify measures to reduce the impact on the availability of on street and off street parking. The strategy will identify potential mitigation measures including alternative parking locations. The strategy will encourage contractor staff to:</p> <ul style="list-style-type: none"> <li>• park within compound sites</li> <li>• use public transport</li> <li>• car share.</li> </ul>
	Traffic impacts	Where possible, heavy vehicle activity will be avoided, during school pick-up and drop-off periods (8:00 am to 9:30 am and 2:30 pm to 4:00 pm school days) in the vicinity of schools, when pedestrian and vehicle activity is generally greater.

Stage	Impact	Measure
		The extent and duration of temporary road closures along Broomfield Street and Sussex Street will be minimised to reduce the impact on local traffic, with diversions in place to the adjoining road network.
		Work areas will provide safe clearances from through traffic lanes in line with Roads and Maritime's Traffic Control at Works Sites Manual. Should road works speed zones be required, the contractor will develop necessary plans and obtain approvals by the governing authority (Roads and Maritime) in consultation with the local council.
	Residential access	<p>Driveway and pedestrian access to properties adjoining the works is to be maintained.</p> <p>Where disruptions to access cannot be avoided, consultation will be undertaken with the owners and occupants of affected properties, to confirm their access requirements and to discuss alternatives.</p> <p>Potentially affected property owners and residents will be contacted before the commencement of works. Residents will be notified via door knocks, newsletters or letter box drops providing information on the proposed works, working hours and a contact name and number should any enquiries wish to be registered.</p> <p>Open trenches will be filled or covered using road plates at the end of each day to minimise impacts on vehicular access to properties, where necessary.</p>
	Access to Jacquie Osmond Reserve	The contractor will consult with Liverpool City Council and the relevant sporting associations to minimise potential conflicts between vehicles, pedestrians and cyclists at the reserve, particularly during weekend periods when sporting activities are likely to occur.
	Informal parking within Jacquie Osmond Reserve	The contractor will consult with Liverpool City Council and the relevant sporting associations with regards to scheduling and access arrangements when works are being undertaken on Cabramatta Creek bridge, to minimise the potential impacts associated with the loss of access to informal parking in Jacquie Osmond Reserve.
	Heavy vehicles damaging local roads	A dilapidation survey will be undertaken of the Fairfield City Council and Liverpool City Council owned/managed roads within the proposed haulage routes prior to works commencing and provided to the relevant council.

### 8.5.3 Consideration of the interaction between measures

Mitigation measures proposed to mitigate any traffic and transport impacts during construction and operation are not considered to result in adverse interactions with other mitigation measures.

### 8.5.4 Managing residual impacts

A residual risk analysis was undertaken following the impact assessment summarised in this chapter. The results of the residual risk analysis are provided in Appendix D and discussed further below.

Residual impacts are the potential impacts which may remain even after the environmental management measures outlined above have been implemented.

Due to the application of effective environmental management measures, residual adverse impacts to traffic and transport from construction activities are considered to be temporary and of an acceptable nature.