

# Merrylands Commuter Car Parks

## Traffic, Transport & Access Impact Assessment

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# 1 Introduction

## 1.1 Background

Seca Solution was commissioned by KMH Environmental on behalf of Transport for NSW to prepare a Traffic, Transport & Access Impact Assessment (TT&AIA) for the proposed expansion of the Merrylands Commuter Car Park under the Transport Access Program (TAP 2). The report will form part of a Review of Environmental Factors (REF) to support an Environmental Impact Assessment (EIA) process under Part 5 of the EP&A Act, being prepared by KMH Environmental.

The TAP is an initiative to provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport infrastructure.

The program aims to provide:

- Stations that are accessible to the disabled, ageing and parents with prams
- Modern buildings and facilities for all modes that meet the needs of a growing population
- Modern interchanges that support an integrated network and allow seamless transfers between all modes for all customers
- Safety improvements including extra lighting, help points, fences and security measures for car parks and interchanges, including stations, bus stops and wharves
- Signage improvements so customers can more easily use public transport and transfer between modes at interchanges
- Other improvements and maintenance such as painting, new fencing and roof replacements.

This report is based on a review of:

- The previous traffic report prepared for the Commuter Car Parking Assessment and Concept Design Project (Arup February 2015)
- Existing operations at the Merrylands Railway Station carpark
- Traffic and pedestrian movement data collected by Seca Solution
- Site visit to the Merrylands Station and environs and analysis by Seca Solution.

This assessment has been prepared in accordance with Austroads Guidelines and the "RTA Guide to Traffic Generating Developments" published by the Roads and Maritime Services (Roads and Maritime).

## 1.2 Scope of Report

The scope of this report is to review the external traffic arrangements for the proposed carpark expansions for both the construction and ongoing operation of the facilities. The report provides advice on traffic, transport and access issues including active travel opportunities.

- a) The preparation of the TT&AIA requires:
  - (i) assessment of key environmental impacts as they relate to traffic generated by the project
  - (ii) assessment of cumulative impacts during both construction and operation
  - (iii) identification of any impact mitigation measures as they relate to the project
  - (iv) assessment of traffic, transport and access impacts.

### 1.3 Issues and Objectives of the study

The issues relative to the proposal are:

- Assess impact on the local road network due to additional construction and operational traffic flows
- Assess the impact of the additional parking generated by the proposed project, during both construction and operation
- Review the access arrangements for the project
- Review the service arrangement for the project
- Assess any other transport impacts associated with the project.

The objective of the report is to document the impacts of the proposed development and provide advice on any infrastructure work or measures required to mitigate the impact of the project.

## 2 Existing Situation

### 2.1 Site Description and Proposed Activity

The proposed expansion for the Merrylands Commuter Car Park capacity requires modifications to two sites and involves the construction of 3 additional part levels over the existing council/commuter car park off Terminal Place at the station (Site 1) to provide 65 additional car parking spaces as well as creating 20 additional 90 degree parking in the road reserve along Railway Terrace (Site 2). The existing commuter carpark provides 155 spaces and provides a mixture of time limited and all day parking within the car park whilst Railway Terrace allows for a mix of angled parking, drop off and bus zones and parallel parking along its length.

### 2.2 Site Context

#### 2.2.1 Location

The site for the single deck expansion is located on Terminal Place, to the immediate west of the railway station within the Merrylands Town Centre with access via Pitt Street / Terminal Place to the north and Military Road to the south. To the east of the site is the railway corridor whilst to the west is the commercial precinct. North of the site is the Holroyd Gardens Park whilst the residential suburb of Merrylands surrounds the greater area.

East of the railway station Railway Terrace runs parallel to the railway line to the south through to Fairfield whilst to the north it diverts and provides connection to Woodville Road.

The railway station is located with pedestrian access off both Terminal Place/Military Road and Railway Terrace. The carpark site is immediately adjacent to the station whilst the proposed angle parking is 390 metres north of the station. The location of the two sites and station is shown below in Figure 2-1.

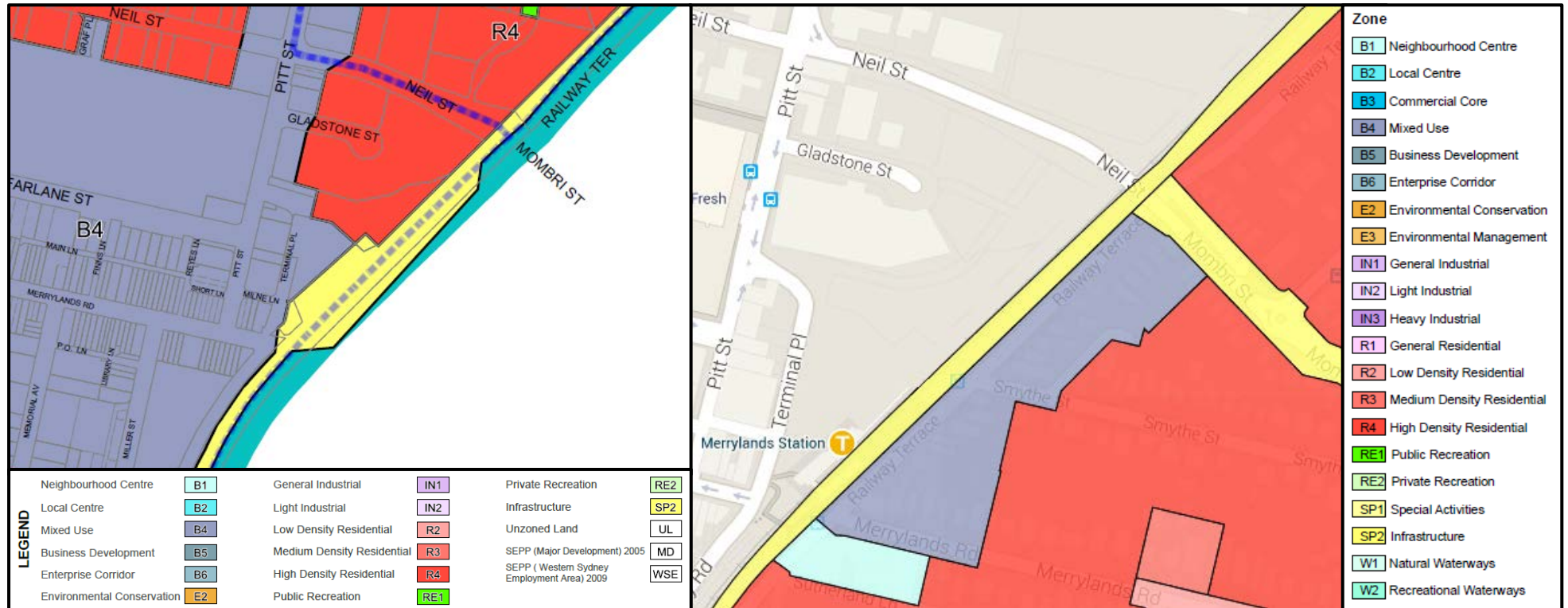
Figure 2-1 - Site Location (Source: Google maps)



### 2.2.2 Zoning and Adjacent Land Use

The existing land use immediately to the west of the site consists primarily of commercial developments whilst mixed use and residential flat buildings are being developed to the east. The surrounding land use is predominately residential, consisting of low density housing and increasingly townhouses and units. The zoning context of the site and its surrounds are shown below in Figure 2-2.

Figure 2-2 - Land Use Zoning (Source: Holroyd City Council (left), City of Parramatta Council (right)).





### 2.2.3 Existing Station Facilities

Merrylands Station currently services the T2 Inner West & South Line and the T5 Cumberland Line. It is attended by station staff and provides the following facilities as listed in Figure 2-3. Merrylands Station is an accessible station.

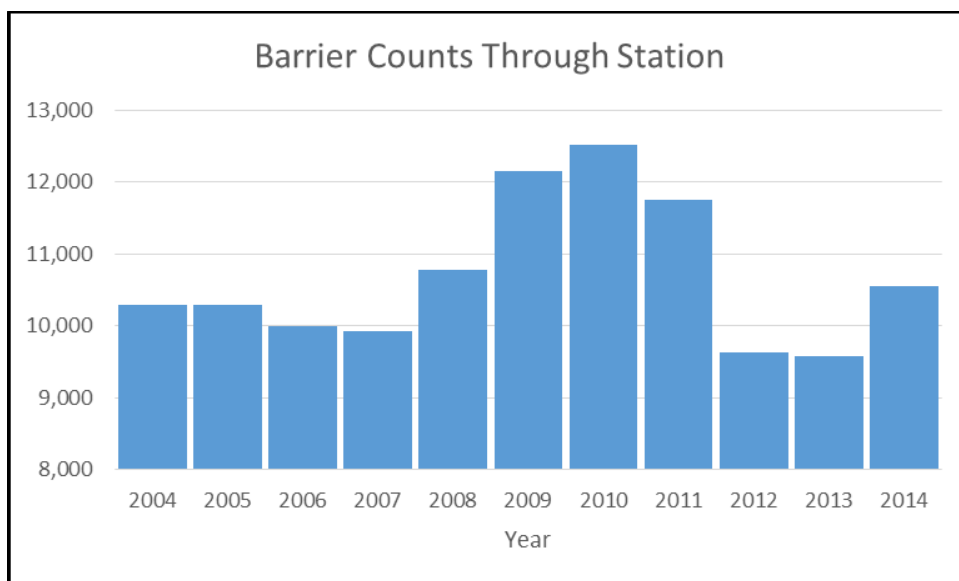
Getting around the station		Accessibility	
Stairs	✓	Hearing loop	✓
Escalator	✗	Platform tactile tiles	✓
Lift	✓	Portable boarding ramp	✓
Ramp (1:7 gradient)	✓	Wheelchair accessible toilet	✓
Level crossing	✗	Wheelchair accessible payphone	✗
		Wheelchair accessible carspace/s	✓
General facilities		Transport interchanges	
Ticket vending machine	✓	Bus stop close by	✓
Eftpos	✓	Ferry wharf close by	✗
Toilet	✓	Taxi rank close by	✓
Payphone	✗	Bike racks or bike lockers	✓
Passenger display screens	✓	Kiss and ride	✓
Help point	✓	Car park close by	✓

Figure 2-3 – Existing Station Facilities (Source: Sydney Trains)

### 2.2.4 Current Demands and Patronage

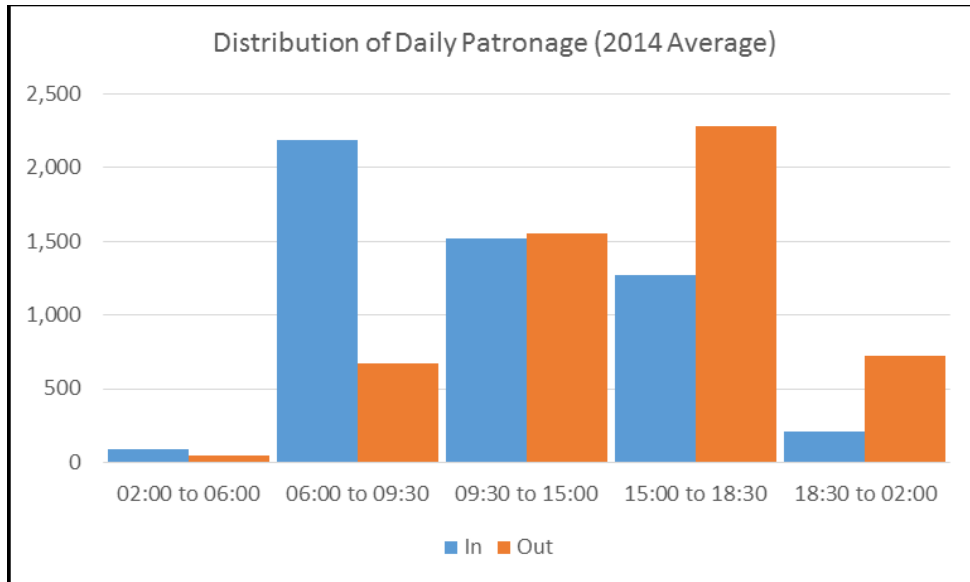
Data collected by the Bureau of Transport Statistics indicated that in 2014 there was an average of 10,500 people using the Merrylands Station on any given week day. Although commuter numbers are consistent with those of 10 years prior, Figure 2-4 below shows that there was an increase in daily patronage during the period 2008-2011 which decreased in 2012.

Figure 2-4 – Merrylands Station Patronage 2004-2014 (Source: Bureau of Transport Statistics).



The majority of the demand at the Merrylands Station occurs during the typical peak periods for commuter trips. A review of transport statistics shows that the majority of people arrive at the station between 6.00am and 9.30am and travel from the surrounding area to work opportunities in Parramatta or Sydney's Inner City as shown in Figure 2-5. The majority of commuters return to the station at the end of the working day between 3.00pm and 6.30pm.

Figure 2-5 –Merrylands Station Distribution of Daily Trips over 24 hours (Source: Bureau of Transport Statistics)



### 2.2.5 Distribution of Commuter Trips

A review of the 2011 Journey to Work data shows that a significant proportion of people who live in Merrylands currently work in the local area or travel to Parramatta (13% of residents) or the inner city of Sydney (13% of residents) for work. The majority of those living in Merrylands travel to work by car (71% as a vehicle driver or passenger) with 20% of residents travelling to work by train.

A significant percentage of people who work in Merrylands are local residents (44% of workers). Only 7% of commuters currently travel to work in the Merrylands area by train, with the majority of commuters travelling by car, representing 81% of the modal share (including drivers and passengers).

### 2.2.6 Future Demands and Patronage

Data provided by TfNSW indicates that the expected growth in the demand for rail services at Merrylands Station will increase daily patronage from around 10,500 trips per day to 20,665 trips per day by 2036. This represents an increase in the order of 96% with associated increases in the demand for on-street and off-street commuter parking.

### 3 Site 1: Multi Deck Car Park

#### 3.1 Existing Site 1 Access

##### 3.1.1 Road

Access to the carpark is provided via a separate entry and exit ramp with an initial ramp driveway off Terminal Place with a separate access for buses using the raised deck of the transport interchange which is located above the carpark. Access to the carpark is then provided by a down ramp into the carpark with the exit provided via an up ramp back to the roadway. This exit movement is controlled by the traffic signals at the intersection of Terminal Place and Military Road.

Each access provides for one way traffic movements only.

Figure 3-1 – Car park adjacent to train station and bus station, Merrylands



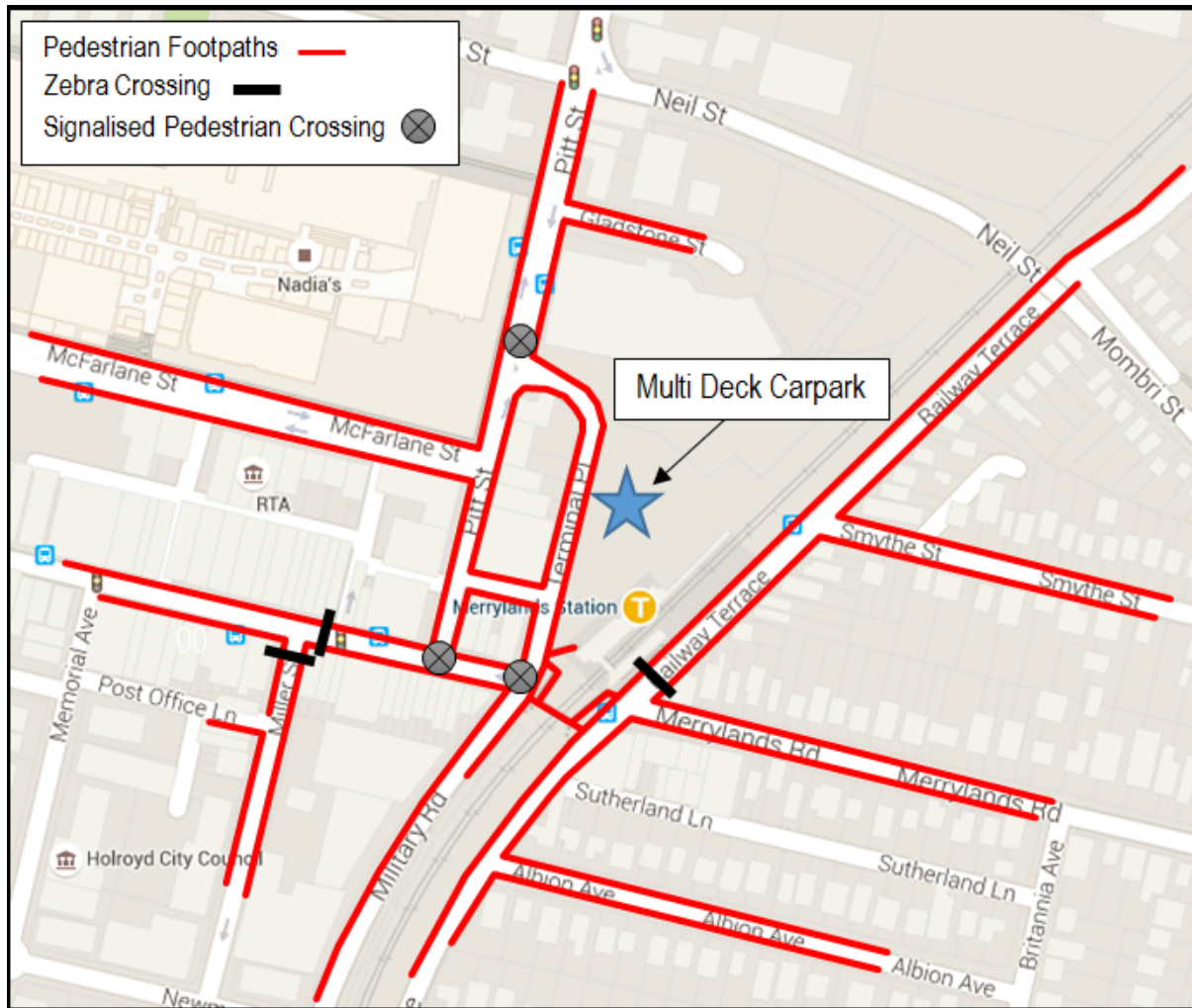


### 3.1.2 Pedestrian Pathways

The streets within the vicinity of the railway station provide a good network of pedestrian pathways which connect between the town centre and the railway station. There are signalised pedestrian movements allowed on all legs of the Merrylands Road/Terminal Place/Military Road intersection ensuring safe pedestrian connectivity to the railway station.

The existing carpark is located immediately adjacent to the railway station with pedestrian connection available between the two via steps and an accessible ramp.

Figure 3-2- Existing Pedestrian Facilities (after: Google Maps 2016).



### 3.1.3 Pedestrian Movements

Pedestrian movements within the vicinity of the station, at the signalised crossings at the intersection of Merrylands Road/Military Road and Terminal Place were surveyed. The peak period for pedestrian movements occurs between 7.30am and 8.30am in the morning, whilst the afternoon movements are spread more evenly across the period 4.15pm to 6.30pm.

### 3.1.4 Cycling Facilities

An on-road cycling route is available along McFarlane Street between the railway station and Treves Street west of the station. This route connects with an off-road route north to Holroyd Gardens and west to Merrylands Park. This route is shown below in Figure 3-3.

There are eight bicycle lockers currently provided on Terminal Place around 80 metres to the north of Merrylands Station.

Figure 3-3 Cycling routes in the vicinity of the subject site



### 3.1.5 Road Hierarchy

The major road through the locality is **Merrylands Road**. Merrylands Road is a two-way road with an overall width in the order of 13 metres and is generally aligned in an east-west direction. It is a regional road providing an important connection between the Cumberland Highway to the west and Merrylands town centre and railway station. It connects with a number of roads within the town centre (Pitt Street, Memorial Avenue and Treeves Street) at signalised intersections. At its connection with Military Road/Terminal Place, Merrylands Road is one-way only west bound providing three lanes of traffic, two of which direct traffic into Pitt Street north bound. Within the town centre Merrylands Road has a speed limit of 40km/hr due to the high pedestrian activity.

To the east, Merrylands Road connects with Woodville Road however it is discontinued at the railway line with east-west traffic crossing the railway line at the Neil Street bridge providing a by-pass of the town centre. This roadway has a speed limit of 50km/hr.

Merrylands Road offers intermittent kerbside parking along its length.

**Military Road** is a local road running along the western side of the railway line, connecting the town centres of Merrylands with Guildford to the south. It provides a single lane of travel in both directions with an overall pavement width of 10 metres and is generally aligned in a north-south direction. It is located on the western side of Merrylands Railway Station and connects with Merrylands Road and Terminal Place, however as both of these streets are one way north bound, traffic along Military Road is directed onto Merrylands Road west bound.

90 degree parking available along the eastern side of Military Road is restricted for the use of patrons of Merrylands RSL Club only, with one hour parking time restricted parallel parking generally available along the western side within the vicinity of the station.

**Terminal Place** is a one way local road that serves the Merrylands transport interchange. It provides two lanes of travel southbound and a third lane on the eastern side for bus and taxi drop off.

### 3.1.6 Roadworks

Observations on site show that there are currently no road works occurring in the vicinity of the subject site. This area of the road network currently operates reasonably well with some delays created by the traffic signals which allow for the high level of pedestrian activity to and from the railway station. These delays would represent a level of service of B or C during the peak periods for road users.

## 3.2 Traffic Flows

### 3.2.1 Peak Hour Flows

As part of the project work, Seca Solution completed traffic surveys to determine the current peak hour flows at the key intersections likely to be impacted upon by this development. Surveys were completed on Monday 22 February 2016 at the intersection of Military Road and Merrylands Road throughout the typical morning (between 7.00am and 9.30am) and evening (between 4.00pm and 6.30pm) commuter periods. The results of these surveys are included in Attachment B.

A summary of the peak hour traffic flows along the local roads is shown in Table 3-1 and Table 3-2.

*Table 3-1- Peak Hour Traffic Flows – Morning Peak Hour*

Roadway	Volume	Period	Peak Hour
<b>Terminal Place</b>	499	AM	8.00am to 9.00am
<b>Military Road (two-way)</b>	697	AM	8.00am to 9.00am
<b>Merrylands Road (west of Military Road)</b>	760	AM	8.00am to 9.00am

*Table 3-2- Peak Hour Traffic Flows – Evening Peak Hour*

Roadway	Volume	Period	Peak Hour
<b>Terminal Place</b>	743	PM	4.15pm to 5.15pm
<b>Military Road (two-way)</b>	729	PM	4.15pm to 5.15pm
<b>Merrylands Road (west of Military Road)</b>	693	PM	4.15pm to 5.15pm

### 3.2.2 Daily Traffic Flows

The Roads & Maritime Services guidelines indicate that peak hour flows typically represents 10% of the daily traffic flows. This would indicate that the daily traffic flows along Terminal Place, to the north of Merrylands Road, could be in the order of 6,300 vehicles per day, with daily flows in the order of 7,300 vehicles along Merrylands Road to the west of Military Road, and slightly lower along Military Road to the south of Merrylands Road.

### 3.2.3 Daily Traffic Flow Distribution

Traffic flows on the west side of the railway station show a dominant movement in the morning towards the town centre and the railway station. Merrylands Road carries significant volumes west away from the town centre. In the afternoon the flows are away from the town centre however are influenced by the one way movements along Merrylands Road and Terminal Place.

### 3.2.4 Vehicle Speeds and Accident Data

No speed surveys were completed as part of the study work. It is considered however that traffic does not speed through the Terminal Place sector due to the interaction with intersections, driveways and traffic lights as well as vehicles, including buses, that park along the roadways.

A review of accident data provided by the Roads & Maritime Services for the period January 2010 – December 2014 shows that along Terminal Place, between Pitt Street and Military Road, there have been three accidents. This reflects the low speed environment along this roadway.

### 3.2.5 Existing Site Flows

The site currently operates as a commuter car park and a bus and taxi interchange so existing site flows reflect this demand.

A review of morning peak one- hour passenger flows on trains arriving from the Inner West Line to Central Station shows that the peak arrival time occurs between 7.50am and 8.50am with the majority of arrivals occurring in the first half hour (2012 *Compendium of Sydney Rail Statistics*). Allowing for train travel between Merrylands and Central taking 35-45 minutes and commuters parking ten minutes prior to the train departure times this would equate to the peak commuter parking demands occurring between 7.00am and 8.00am. This confirms observations on site which were that the commuter parking was full by 7.30am. As the carpark currently provides parking spaces for 155 vehicles, the inbound traffic equivalent to this would be expected to occur during the hour prior to 7.30am, i.e. before the local road network peak of 7.45am-8.45am.

Surveys show that 30 vehicles exited the interchange during the on-road AM peak (7.45am-8.45am) being both cars and buses. This represents bus movements (16) as well as light vehicles moving through the carpark in search of a parking space and then exiting.

For the outbound traffic movements in the PM period, 50% are considered to be outbound between 5.00pm and 6.00pm and the remaining 50% outbound between 6.00pm and 7.00pm. This is consistent with the afternoon peak period on the Inner West Line being trains departing Central between 5.20pm - 6.20pm. Allowing for a travel time of between 30-40 minutes, commuters would return to their vehicles in the carpark between 5.50pm and 6.50pm.

During the on road PM peak (4.15pm - 5.15pm) 77 vehicles exited the site. The bulk of the commuter movements are expected to be later than this, with a review of the survey data confirming that 94 vehicles, including 19 buses, exiting between 5.00pm - 6.00pm.

### 3.2.6 Heavy Vehicle Flows

Although there are a very limited number of heavy vehicles along the local roads the interchange brings a high number of buses within the vicinity of the site. There are also local deliveries to businesses within the town centre.

### 3.2.7 Current Road Network Operation

The road network to the west of the train station currently operates well, with some delays and congestion occurring during the peak periods created by the traffic signal controlled intersections in this location. The road way adjacent to the western side of the train station operates as a one-way clockwise circuit to manage traffic movements in a more efficient manner and maximise the capacity of the traffic signals. The traffic signals also provide for pedestrian movements across Military Road / Terminal Place which allows for the high pedestrian demands from the west of the station to access the station. The traffic signals manage the traffic flows and also allow for maximum green time for pedestrians to safely and efficiently cross the roads.

Observations during the morning and afternoon peak periods show that the traffic signals at the exit to the bus interchange work well with minimal delays and congestion for all users (level of service of A). The traffic signals provide a priority for through traffic movements on Terminal Place and only change to allow for exit movements from the car park or bus interchange when a vehicle triggers the signals to change. The design also caters for the high pedestrian demands but observations on site show that the through traffic movements on both Terminal Place and Military Road suffer from minimal delays.

The major delays on the western side of the train station are generated by the high pedestrian movements crossing the length of Merrylands Road adjacent to the shopping strip, as well as the interaction of through traffic



movements and kerb side parking movements. It is noted that there are limited through traffic movements in this location, with the through traffic movements using Treves Road and Neil Street to avoid this area to the west of the train station.

To the east of the railway line, along Railway Terrace the traffic flows are reasonably low and as such there are no delays for traffic. There are no traffic signals along this length of road to create delays for traffic movements and observations on site during the morning and afternoon peak period show that there are no traffic delays or congestion along the length of Railway Terrace in the vicinity of the railway station.

Roads & Maritime Services provides guidance on the performance of intersections and provides indicative values for delays and queues with a scale of operation of A (very good) to F (very poor). An extract from the RTA Guide to Traffic Generating Developments is provided below:

Figure 3-4 – Table 4.2 from RTA Guide to Traffic Generating Developments

**Table 4.2**  
**Level of service criteria for intersections**

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Signs
A	< 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays Roundabouts require other control mode	At capacity, requires other control mode

### 3.3 Parking Supply and Demand

#### 3.3.1 On-street Parking Provision

The survey of the local area by Arup in 2014 identified a total of 630 commuter parking spaces including 209 on-street spaces.

Parking within the vicinity of the town centre is generally time restricted, however, as the streets on the eastern side of the station are primarily residential they offer on-street parking opportunities for commuters.

#### 3.3.2 Off-Street Parking Provision

155 off -street parking opportunities are provided in the car park (subject site) with a mixture of all day parking and 2 hour time limited parking available. There are also 300 all-day spaces available in the Stockland Merrylands shopping centre (Arup 2014), which replaced the former at-grade public parking in this location as part of the Stockland Merrylands redevelopment.

#### 3.3.3 Motorcycle Parking

There are no formal motorcycle parking spaces in the general locality of Merrylands Station or the existing commuter car park.



### 3.3.4 Parking Demand and Utilisation

There is a significant demand for unrestricted (commuter) parking throughout Merrylands which is a major transport interchange. Observations on site indicated that local parking opportunities are heavily utilised with the local parking generally reaching full capacity by 7.00am on weekday mornings. There is also significant demand for on- street commuter parking spaces along Railway Terrace to the east of the station.

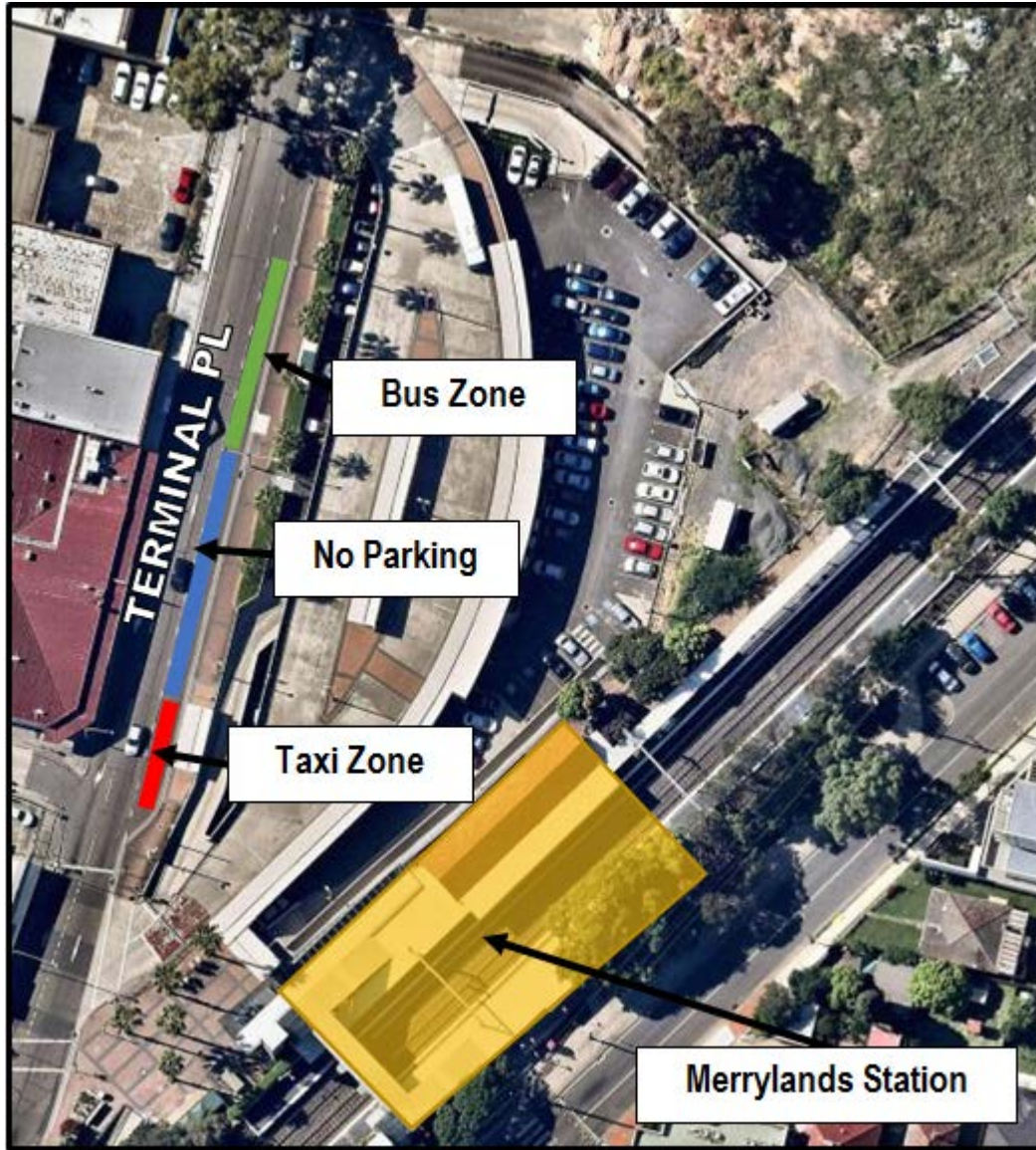
The public parking within the all-day public parking area in the Stockland Merrylands shopping centre was full at 8.00 AM with a number of cars noted to be parked outside of the marked parking areas, albeit in locations that do not block the through traffic movements in the car park. This would indicate that the demand for commuter parking in this location is high.

### 3.3.5 Short term set down or pick up areas

There is a taxi zone located on Terminal Place to the front of the transport interchange as shown in Figure 3-5. This has the capacity to hold two vehicles.

There is a 'No Parking' zone also provided along Terminal Place which allows drivers to stop for up to two minutes (remaining within three metres of the vehicle at all times). This acts as a kiss and ride zone and provides for patrons of either bus or train services to alight from vehicles. This No Parking zone can accommodate up to five vehicles at any one time.

*Figure 3-5 – Location of short-term set down or pick-up areas.*



3.4 Public Transport

3.4.1 Buses

Merrylands is serviced by a number of local bus services which provide a connection to the surrounding areas including Parramatta, Westmead and Guildford and Liverpool. Local bus routes operating within the locality of the proposed carpark are shown in Figure 3-6 and Figure 3-7.

Figure 3-6 – Transit Systems bus routes through Merrylands Transport Interchange (Source: Transit Systems).

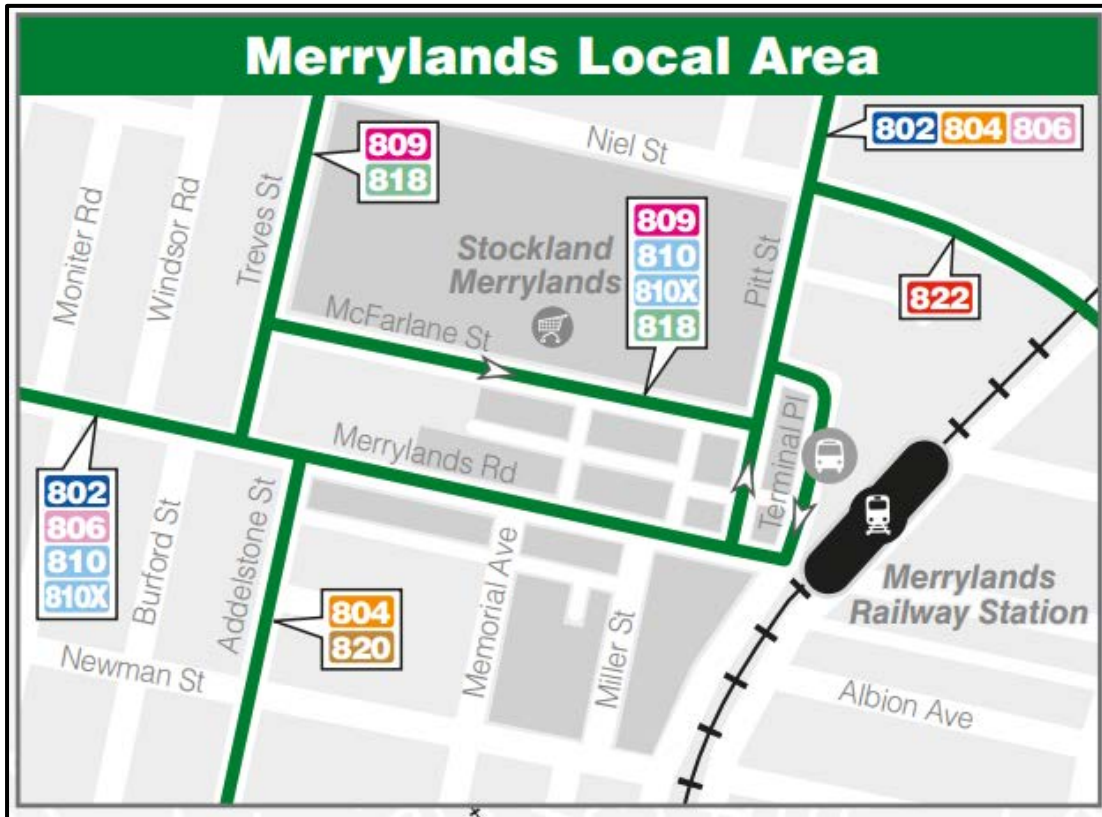
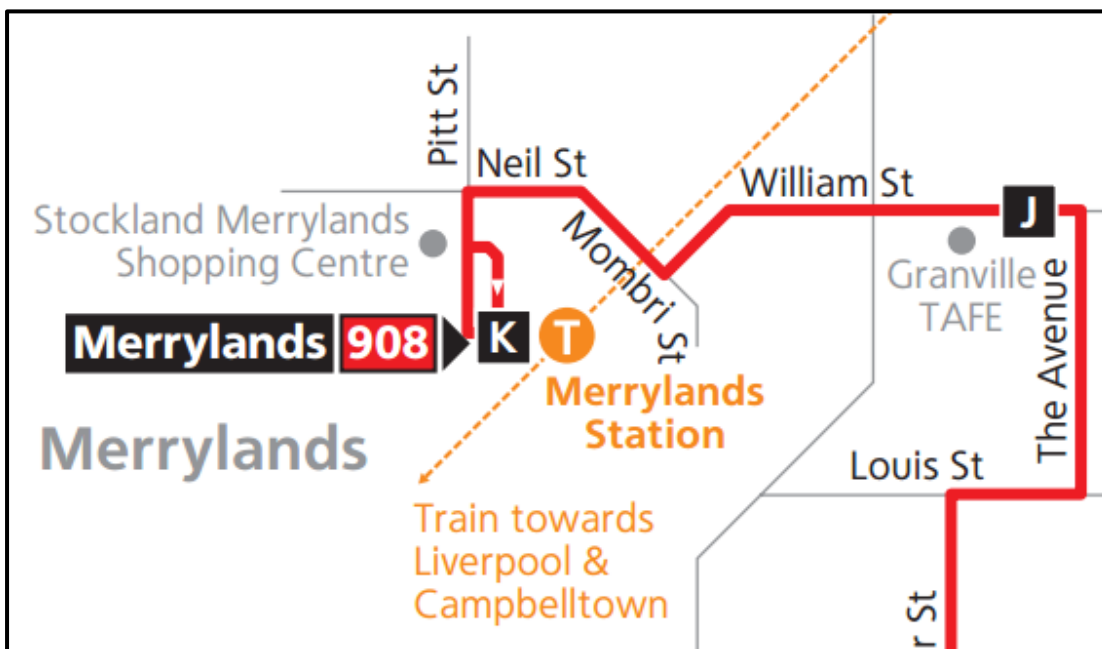


Figure 3-7 – Transdev bus routes through Merrylands Transport Interchange (Source, Transdev)



Bus stops are located along Pitt Street and at the transport interchange on Terminal Place, adjacent to the location of the proposed Merrylands Commuter Car Parks.

The majority of these routes offer multiple services each hour during the typical periods of peak demand throughout morning and evening commuter period. The frequency of bus services operating in Merrylands (through the transport interchange) during these peak periods is summarised in Table 3-3

Table 3-3– Merrylands Station Bus Route Frequencies

Route	Description	No. of Services AM Peak (7.00-8.00am)	No. of Services PM Peak (5.00-6.00pm)	No. of Services PM Peak (6.00-7.00pm)
802	Parramatta to Liverpool	2	4	3
	Liverpool to Parramatta	4	2	2
804	Parramatta to Liverpool	4	4	2
	Liverpool to Parramatta	4	4	4
806	Parramatta to Liverpool	2	4	3
	Liverpool to Parramatta	4	2	2
809	Merrylands to Pemulwuy	2	2	2
	Pemulwuy to Merrylands	2	2	2
810/810X	Merrylands to Parramatta	2	2	1
	Parramatta to Merrylands	2	2	1
818	Merrylands to Westmead	1	1	1
	Westmead to Merrylands	1	0	0
820	Merrylands to Guildford	2	2	1
	Guildford to Merrylands	2	2	1
822	Merrylands to Guildford	0	0	0
	Guildford to Merrylands	0	0	0
908	Bankstown to Merrylands	2	1	0
	Merrylands to Bankstown	2	1	0
<b>Total</b>		<b>38</b>	<b>35</b>	<b>25</b>

### 3.4.2 Trains

As noted in Section 2.2.3, Merrylands Station is currently serviced by the T2 Inner West and South Line and the T5 Cumberland Line with a high frequency of services provided throughout the day. Table 3 shows the frequency of trains passing through Merrylands Station during the morning and evening commuter period.

Table 3-4 – Merrylands Station Train Frequencies

Line	Description	No. of Services AM Peak (7.00-8.00am)	No. of Services PM Peak (5.00-6.00pm)	No. of Services PM Peak (6.00-7.00pm)
T2 Inner West and South	Campbelltown or Leppington to City	10	6	6
	City to Campbelltown or Leppington	6	7	10
T5 Cumberland	Campbelltown to Schofields	2	2	2
	Schofields to Campbelltown	2	2	2
<b>Total</b>		<b>20</b>	<b>17</b>	<b>20</b>



## 4 Proposed Development - Site 1: Multi Deck Car Park

### 4.1 The Development

The preferred option proposes to construct three additional part levels of parking above the existing car park and adjacent to the existing transport interchange. The three part levels provide:

- A ground level above the existing lower ground level; and
- A mid lower ground level and mid upper ground level adjacent the existing lower ground level.

The proposed car park will provide 220 car parking spaces including six accessible car parking spaces in accordance with DDA requirements, compared with the existing car park which provides 155 spaces (121 untimed and 34 timed spaces). This provides a net increase of 65 untimed commuter car parking spaces.

Access will be provided via a new access ramp located adjacent to the current down ramp that provides access to the car park located on the site. This up ramp will allow for one-way movements only. A down ramp is provided in the southern corner of the new car park level with access into the existing ground level car park via a one-way ramp. Vehicles will then circulate through the existing car park and exit via the existing exit ramp back on to Terminal Place via the signal controlled intersection.

#### 4.1.1 Hours and days of operations

The car park will allow for access 24 hours per day, 7 days per week with the peak use expected to be Monday to Friday 6.00am to 7.00pm associated with commuter parking demands.

### 4.2 Access

#### 4.2.1 Driveway Location

The proposed access is consistent with the current arrangements.

All vehicle access to the car park adjacent to the interchange site will be via the existing access points off the bus interchange roadway, with a second entry ramp provided adjacent to the existing entry down ramp to the car park within the site. This ramp will replace one of the existing down ramps and will allow for one-way entry movements only and provide direct access to the new upper level of car parking.

This ramp access is located within the site and is approached via the existing driveway cross over to the interchange and car park off Terminal Place. This cross over is 10 metres wide and provides a smooth entry movement for both light vehicles to the car park and the buses which use this cross over to access the bus interchange. This cross over allows for entry movements only with a separate exit to the south of this location.

Photo 1 – View of the access for the entry ramps off Terminal Place



Photo 2 – Aerial view for proposed access ramp to car park off Terminal Place





All traffic exiting the new car park level will drive down a one-way ramp to the existing ground floor level of car parking and then circulate via the existing aisles to utilise the existing exit ramp from the car park. Traffic movements from this exit ramp are controlled by the existing traffic signals at the intersection of Terminal Place / Merrylands Road and Military Road.

*Photo 3 – View of exit point to car park, noting traffic signal control for exit with separate bus phase*



#### 4.2.2 Sight Distances

The critical sight line requirement is for drivers exiting the site. This movement is controlled by the traffic signals as shown above and the forward visibility to these traffic signals allows drivers to safely exit the site. Traffic movements on Terminal Place are halted by these traffic signals with drivers exiting the site not required to observe any traffic approaching from the right.

For the entry movement, drivers can observe the entry driveway and cross over when approaching on Terminal Place and adjust their vehicle speeds to allow for a safe entry movement. The pedestrian volume is relatively low at this location and there is minimal potential conflict between pedestrians and vehicles at this location. The pedestrian path through the driveway crossing is highlighted with a different colour surface treatment and allows for pedestrian connection to the interchange in this location.

#### 4.2.3 Service Vehicle Access

The development will require minimal service vehicle access, with the only servicing being for lighting maintenance and lift maintenance of the multi-level car park. Both of these will have minimal requirements and typically only require access for a small van such as a Toyota HiAce. These vehicles are able to park within the car park as required to allow for maintenance work to be completed.

No dedicated service area is required for the car park.



#### 4.2.4 Queuing at entrances

Traffic will predominantly be inbound in the AM peak and outbound in the PM peak. During the peak arrival and departure periods vehicle movements are staggered due to variations in train arrivals and departures as well as different arrival and departure times by commuters. This reduces the queues accordingly compared with a carpark where all vehicles would be arriving at the start or finish together (e.g. event parking).

For the AM peak period, the inbound traffic movements reflect train arrival times. Between 6.30am - 7.30am 13 trains depart Merrylands Station with a frequency between 5 and 15 minutes. Commuters typically arrive throughout the time approaching departure, allowing adequate time between parking and their train departure time. Traffic would approach the car park from the north on Terminal Place and turn left into the site. In the PM peak, traffic is also dispersed due to the difference in train arrival times and the length of commuter's working days.

The existing car park has no control point to hinder vehicle entry movements. The proposed expansion allows for the separation of the two decks of parking, together with the separate ramps, which means that any queue for the two separate areas of parking are physically separated and entering vehicle movement are separated over these two ramps. The existing car park ramp allows for free flow entry into the car park and the new ramp will operate in a similar way.

AS2890 indicates that where a car park has over 100 spaces and control points at entrances, a queue area of three spaces for the first 100 cars should be provided plus two spaces for the next 100 and one additional space for each 100 spaces over this. Should a control point be included in the new car park (e.g. for future card readers), given the spread of arrival and departures and allowing for the difference in train times and demands, it is considered that five spaces between any control point and the road way would be considered appropriate in this location. This is equivalent to 30 metres.

Advice from the study team indicates that the lower level will remain with the current parking controls whilst the new level will allow for all day commuter parking.

#### 4.2.5 Current access compared with proposed access

The Proposal allows for a new entry ramp to be located adjacent to the existing car park entry ramp, with this existing ramp being retained. There is no change to the exit movements from the car park.

#### 4.2.6 Access to Public Transport

There will be no need for public transport to access the car park.

### 4.3 Circulation

#### 4.3.1 Pattern of circulation

Traffic will enter the car park adjacent to the railway station off Terminal Place southbound, with a left turn required into the car park access in a similar manner to the existing car park access. Drivers can then choose to either proceed up the ramp to the new commuter car park level or use the existing down ramp to enter the existing at grade car park. For drivers using the new upper level, if this parking area is full they will head down the new down ramp to access the lower level of existing car park to locate a space. If this area is also full, then vehicles will exit via the existing exit ramp onto Terminal Place.

If a driver enters the lower level direct off Terminal Place and can't find a parking space, then they cannot drive to the upper level but will have to exit the car park back onto Terminal Place. These drivers can then, if they choose, turn right onto Merrylands Road then right into Pitt Street to then turn into Terminal Place to re-enter the upper level of the car park to find a parking space.

It is considered that drivers will become familiar with the additional car park and access arrangements and as such, the majority of the drivers entering the car park will enter via the new ramps to access the upper level of car park first before accessing the lower level.

All vehicles will be able to enter and exit the car park in a forward direction.

#### 4.3.2 Internal Road width

The car park layout, including the ramps and the aisles, would be designed in accordance with AS2890 allowing for one-way and two-way traffic movements as appropriate.

#### 4.3.3 Internal Bus Movements

It is considered that there will be neither internal bus movements nor a requirement for a bus to travel within the car park site. Height restrictions will not permit a bus to enter the lower level of the parking structure and the entry ramps do not allow for the turning paths. There is a height restriction bar at the entry to the lower level of parking and a new height restriction bar will also be provided for the new up ramp for the entry to the new parking level as all exit movements must be completed via the exiting car park level, with the existing height limits of 2.2m.

#### 4.3.4 Service Area Layout

No dedicated service area will be provided for the development. Service vehicles can park within the car park as required and will typically only be small vans such as a Toyota HiAce.

#### 4.3.5 Pedestrian and Bicycle Facilities

Pedestrian access to the railway station will be provided with a direct linkage to the existing interchange concourse off Terminal Place. The new car park level will be located at the same level as this concourse so that drivers can exit the car park on foot and connect directly to the concourse of the interchange. There is a direct level pedestrian path connecting between this concourse and the railway station access.

There are no cyclist facilities or parking provided within the parking structure. Commuter cyclists are catered for with lockers along Terminal Place. As the new level of parking is exposed to the weather and there is no free surface area, bicycle parking should not be provided here. Additional cycle parking could be considered however within the existing ground level of parking, to allow for safe and secure storage of bicycles as required.

### 4.4 Assessment of Car Park Design Requirements

The Australian Standard AS2890.1: *Off-street car parking facilities* provides standards for the design of an off-street car parking structures including parking space dimensions, access and circulation requirements. Australian Standard AS2890.6: *Off-street parking for people with a disability* provides additional standards for the design of accessible parking spaces. A comparison of the proposed car park layout with the standards provided in AS2890.1 and AS2890.6 is summarised in Table 4-1.

Table 4-1 – Assessment of the proposed car park to Australian Standards for parking spaces.

Description	Proposed Design Parameters	Australian Standards
Standard Parking Space	2.5 m wide. 5.4 m long.	2.4 m wide. 5.4 m long.
Disabled Parking Space	2.5 m wide. 5.4 m long. 2.4 m wide and 5.4 m long shared space.	2.4 m wide. 5.4 m long. 2.4 m wide and 5.4 m long shared space.
Parking Aisles (One Way)	Varying widths, 5.4 – 6.2 m.	6.2 m wide.

Table 4-2 – Assessment of the proposed car park to Australian Standards for circulation ramps.

Description	Proposed Design Parameters	Australian Standards
Width of One-Way Ramp	Down Ramp (southern side of carpark): 2.9 m between kerbs. All other ramps: >3 m between kerbs.	Minimum of 3 m between kerbs.
Grade of One-Way Ramp	Not Specified	Maximum of 1 in 5 ( $\leq 20$ m long), or Maximum of 1 in 5 ( $> 20$ m long). Grade transitions may be required.

The final design of the car park layout would comply with the requirements of the Australian Standard AS2890.

## 5 Transportation Analysis- Site 1: Multi Deck Car Park

### 5.1 Traffic Generation

The commuter car park adjacent to the railway station will show a strong inbound traffic movement in the AM period and a strong outbound movement in the PM period.

For the inbound traffic movements, based on the capacity of the car park being 220 spaces and allowing for the peak demand to occur between 6.30am and 7.30am , all spaces will be filled during this period resulting in 220 inbound traffic movements.

A review of morning peak one hour passenger flows on trains arriving from the Inner West Line to Central Station shows that the peak arrival time occurs between 7.50am and 8.50am with the majority of arrivals occurring in the first half hour (2012 *Compendium of Sydney Rail Statistics*). Allowing for train travel between Merrylands and Central to take 35-45 minutes and commuters parking ten minutes prior to the train departure times this would equate to the peak commuter parking demands occurring between 7.00am and 8.00am. As commuters will park in commuter parking as a first preference the demands for the carpark are expected to continue to reflect the existing demands with the majority of the carpark filling prior to 7.30am.

For the outbound traffic movements in the PM period, 50% are considered to be outbound between 5.00pm and 6.00pm with the remaining 50% outbound between 6.00pm and 7.00pm. This is consistent with the afternoon peak period on the Inner West Line being trains departing Central between 5.20pm and 6.20pm. Allowing for a travel time of between 30-40 minutes, commuters would return to their vehicles in the carpark between 5.50pm and 6.50pm. This is consistent with the survey data collected for the existing carpark.

Based on the existing car park providing 155 spaces, this represents an increase of 65 movements inbound in the AM peak hour period and 33 outbound in the PM peak hour period.

#### 5.1.1 Daily and Seasonal Factors

The nature of the commuter demands requires the car park to be highly utilised Monday through to Friday with much lower use over the weekend. There will be minimal seasonal demands, although there are typically reduced demands during Christmas / New Year periods and school holidays periods.

#### 5.1.2 Pedestrian Movements

Pedestrian access between the site and the railway station will be reasonably high. Assuming a car occupancy rate of 1.2 people per vehicle, the commuter car park could create demands of 264 people walking between the car park and the train station in the peak periods. However the existing car park level pedestrian access will continue via the stairs and the ramp and are separated from the interchange concourse. Thus the new levels of parking (69 spaces; allowing for 65 new spaces and a reallocation of 4 spaces from the existing lower level) will generate 83 pedestrian movements during the peak periods between these new levels of parking and the railway station via the interchange concourse level.

There is no requirement for pedestrians to cross any roadway between the new car park levels and the adjacent railway station.

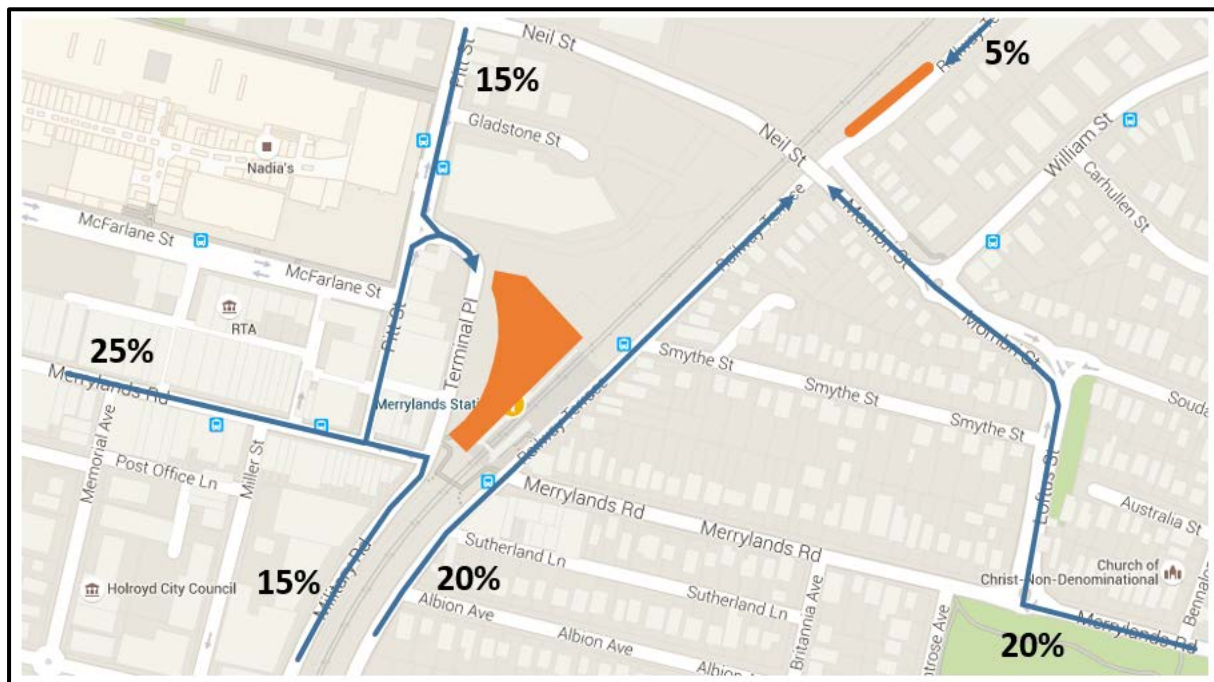
### 5.2 Traffic Distribution and Assignment

#### 5.2.1 Origin / destinations assignment

It is considered that the carpark structure users will typically have an origin / destination to the west of the railway line. Whilst this car park may be more appealing for all day commuter parking, the increased travel time to access this parking from the east of the railway line will discourage most of these users.

The expected travel patterns to / from the station are provided below from the Arup report which are confirmed by current travel patterns in the area.

Figure 5-1 Diagram of future development traffic flows



### 5.3 Impact on Road Safety

It is considered that the additional traffic flows associated with the development of the additional parking spaces will have a minimal impact upon road safety. For the new car park structure adjacent to the railway station, the entry point is located off a one way road way, ensuring that all traffic movements will be a left turn only. Visibility at this location for drivers entering the car park ramps is good. Drivers are able to observe the access point and adjust their vehicle speed accordingly, to take into account the turning movement required and the presence of any pedestrian at this location. It is noted that this will operate in a similar manner to the existing access point to the car park which currently operates in a safe and appropriate manner.

For the exit movement from the existing car park adjacent to the railway station, the exit ramp does not allow for drivers to travel at a quick pace and the connection to the external road network is controlled by traffic signals, which cater for vehicle and pedestrian movements. Drivers can clearly observe these traffic signals and there is a dedicated phase for drivers exiting the car park.

### 5.4 Impact of Generated Traffic

The major impact of the traffic movements associated with the car park structure development adjacent to the railway station will occur at the entry ramp off Terminal Terrace and the exit ramp at the signal controlled intersection with Terminal Terrace. Observations on site show that currently both of these access points operate in a very efficient manner, with minimal delays for all road users (level of service of A or B in the AM and PM periods). The increased use of the entry ramp during the morning peak period (arrivals) and the exit ramp in the afternoon peak period (departures) will have a minimal impact upon the overall operation of this length of the road network.

#### 5.4.1 Peak Hour Impact on Intersections

Intersections within the immediate vicinity of the Merrylands Commuter Car Park are considered to be operating at an adequate level of service in the peak hour and are expected to continue to do so with the additional traffic associated with the carparks. It is considered that the level of service will remain at B to C in the peak periods at the key intersection of Terminal Place / Military Road / Merrylands Road, with the operation of this intersection mainly governed by the pedestrian demands rather than the vehicle demands.

Car parks in their own right are not generators of traffic but rather represent the end point for vehicle movements associated with a generator of traffic. The proposed car park will provide an alternative end point for traffic to Merrylands Station and as such the broader road network will not experience a significant change. Vehicles that park in the new facility would have otherwise parked on street having already entered the broader road network.

The potential traffic impacts on key intersections within the local road network has been assessed by the application of the Austroads Guidelines and RTA Guide to Traffic Generating Developments to determine the need for a detailed traffic analysis. Based on these guidelines, and with consideration to the observed operation of these intersections and the potential changes in local traffic associated with this development, the need to undertake detailed modelling (Sidra Analysis) is not considered necessary. This is supported by a peer review of similar assessments of traffic impacts for other similar commuter carparks in busy urban centres.

## 6 Impact of Construction Activities-Site 1: Multi-Deck Carpark

The construction work will create a number of impacts upon the local road network, due to the requirement for the existing car park to be closed for the duration of the works.

The construction work on site will last for less than 12 months on site and will require between 30-40 people to work on site at any one time. There will be intense periods of work on site, associated with concrete pours for the floor and piers which will create associated intense truck movements to and from the site. For the balance of the works on site, the extent of heavy vehicle movement will be much lower and associated with material drop off. The constrained nature of the site will require a works zone to be provided on Terminal Place to allow for material deliveries etc. for the duration of the construction works which will be required Monday through to Saturday. Heavy vehicles cannot access the construction site as the only exit movement is via the existing ramp which cannot accommodate the swept path movements of the heavy vehicles and there is an existing height restriction due to the interchange terminal.

This work zone on Terminal Place will impact upon the existing bus layover area / mail zone as well as the kiss and ride located in this location. This will require discussion with other users and the road authority to determine the exact controls and length of this works zone to minimise disruption for all users.

**Demolition hours** would be carried out during standard hours i.e. between 7.00am and 6.00pm Monday to Friday and 8.00am to 1.00pm Saturday. Demolition work may need to be carried out on a Sunday or public holiday so as not to impact interchange operations, but this would be subject to formal application and approval by TfNSW.

**Construction hours** would be carried out during standard hours i.e. between 7.00am and 6.00pm Monday to Friday and 8.00am to 1.00pm Saturday. Construction work may need to be carried out on a Sunday or public holiday so as not to impact interchange operations, but this would be subject to formal application and approval by TfNSW.

Work may be undertaken outside standard hours where the following occurs:

- The delivery of fill or material may occur outside these hours if required by the Police or other authorities
- Council provides permission for working out of hours
- It is required in an emergency to avoid loss of life, damage to property and / or to prevent environmental harm
- The work is approved under a Construction Noise and Vibration Management Plan
- Residents likely to be affected by the works are notified of the timing and duration of these works at least 48 hours prior to the commencement of the works.

The maximum number of people on the site at any one time associated with the demolition and construction is expected to be around 40 personnel. The typical numbers will be in the order of 30 people with the maximum occurring during the pouring of concrete etc. Allowing for the heavy parking demands in the area workers should be encouraged to use public transport or car pool to the work site.

A detailed Construction Traffic Management Plan (CTMP) incorporating a Traffic Control Plan will be prepared during the detailed design stage of the project in consultation with Council as the road authority. This will provide controls on traffic and material movement between the work zone and the construction site to ensure safety is maintained for all workers as well as the general public walking between these two zones and the buses that enter the interchange off Terminal Place in this location.



A separate Traffic Control Plan will be prepared for the construction work off Railway Terrace and will cater for the pedestrian and cyclist movements that currently occur along the footpath across the site frontage to the new parking area.

All works on site will be governed by the relevant EP&A rules.

Details of the construction site zones are provided in Appendix C to this report.

## 6.1 Construction Traffic Generation

### 6.1.1 Heavy Vehicles

TfNSW has advised that during peak construction periods, the number of heavy vehicles accessing the site could be up to 50 heavy vehicles per day. There would typically be up to 15 heavy vehicles per day accessing the site outside of peak periods. Peak construction would occur over approximately a six months period. Typically heavy vehicles do not access construction sites during the AM and PM peak hours, however for a robust assessment it has been assumed that 10% of construction heavy vehicle traffic would access the site during the weekday AM and PM peak period (i.e. 5 vehicles).

It is proposed that all construction storage containment will be within the site.

### 6.1.2 Light Vehicles

Up to 40 construction workers may be expected to be on site during peak periods, with around 30 workers at the site on a typical day. Allowing for the convenience of travel on the adjacent rail line it has been assumed that up to half of the workers would travel by train whilst some could share trips. This would result in typically 20 vehicles accessing the site and its vicinity during the peak construction period and 15 during more typical construction days.

It is expected that workers would arrive to commence work at the start of the day (6.30am - 7.00am) and depart at the end of the construction working day with the majority leaving between 3.00pm - 3.30pm and all staff off site by 5.00pm.

### 6.1.3 Total Construction Traffic

The construction traffic generation for the site is summarised in Table 6-1 below.

*Table 6-1 Peak Hour Construction Traffic Generation*

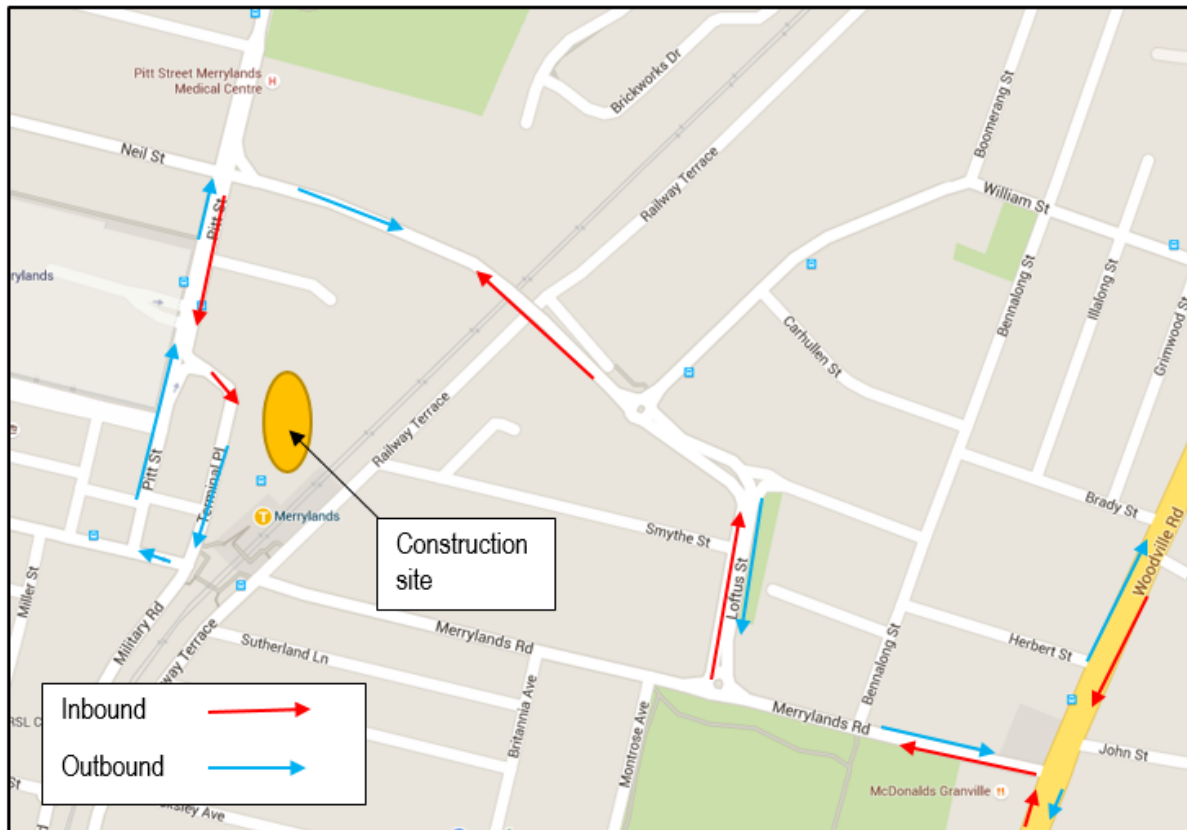
Construction Traffic	AM - In	AM - Out	PM - In	PM - Out
Heavy Vehicles	5	5	5	5
Light Vehicles (workers)	20	0	0	20
Total	25	5	5	25

### 6.1.4 Construction Traffic Routes

Traffic access routes for construction vehicles to access the two separate sites are provided below.



Figure 6-1 – Construction Access routes for Site 1 adjacent to the railway station off Terminal Place



## 6.2 Construction Parking Impacts

The current car park has a capacity of 155 spaces including 121 untimed (commuter) spaces and 34 timed spaces for other/council use. This indicates that typically there will be a need for 155 vehicles to be parked in the general locality of the site for commuters and town centre patrons during the construction phase. This may require the following options to be considered:

- Construct the angle parking on Railway Terrace prior to commencing the construction work in the commuter car park off Terminal Place to increase the supply of parking
- Utilise the current vacant development land along the northern boundary of the site. Whilst this site has been identified for development, until this development proceeds there is the opportunity for parking to be provided within this site to allow for commuter parking
- Utilise the sealed car park further north off Gladstone Street. Whilst this is a private car park some of the parking spaces could be leased over the duration of the construction work to allow for some commuter parking to occur
- Relax some of the on-street parking controls within the immediate locality of the railway station to allow for all day commuter parking. This could be located away from the station so as to reduce the impact on the parking demands for the adjacent businesses in the vicinity of Merrylands railway station
- Allow for some commuter use in the Stockland Merrylands car park. As this is a commercial car park with free parking limited to 3 hours, commuters can park here, but the cost for the full day would typically discourage commuters.

The requirement to allow for the commuter and other/council car park use elsewhere within the immediate vicinity of the subject site will be discussed and agreed with Council (as the road authority) through the detailed design stage of the project.

### 6.3 Impacts to Other Users

#### 6.3.1 Pedestrians

The majority of the pedestrian movements in the locality of construction Site 1 are to the south of the construction area, being located at the intersection of Terminal Place and Merrylands Drive / Military Road. The movement of pedestrians across the roads in this location is via the traffic signal controls (3 legs) or marked crossing which ensures that pedestrians have priority over all vehicle movements. This ensures that all pedestrian movements can be safely managed with no safety concerns associated with construction traffic movements.

There is a pedestrian desire line between the public parking the Merrylands Stockland car park area and the railway station. These pedestrian movements are managed across Pitt Street via a signal controlled crossing and then connect to the railway station via a footpath along Terminal Place. There is then a footpath connecting via the bus interchange to ensure pedestrians can safely access the train station. This pedestrian path has priority over the access driveway, in accordance with normal road rules.

The major impact for pedestrians will be adjacent to the construction zone to be provided on Terminal Place. To ensure that pedestrian safety is not impacted upon, as part of the Traffic Control Plan for the works pedestrians will be diverted to use the other footpath on Terminal Place or the footpath through the bus interchange and avoid walking path the construction zone.

Based on the above the construction of the site would have minimal impacts to pedestrians.

#### 6.3.2 Cyclists

There is an on road cycle route that runs along Pitt Street. This will not be impacted upon by the construction of the multi-deck car park. On road cyclists on Terminal Place will not be impacted upon by the construction zone as these cyclists currently have to use the traffic lanes on Terminal Place and these will not be altered as part of the construction zone works.

There are a number of bike lockers on Terminal Place that will not be able to be accessed during the construction work. The users of these lockers will require a temporary bike storage locker to be provided in the vicinity of the bus interchange. The extent of this demand will be determined during the detailed design stage of the project and temporary lockers provided to satisfy this demand.

#### 6.3.3 Bus Services

The major impact associated with the construction work will be created by the construction zone adjacent to Terminal Place, which will be located within the existing Mail Zone / Bus Zone at the northern end of the bus zone. This construction zone will require the Mail Zone to be relocated together with the Bus Zone to be reduced in length. This will require consultation with the relevant authority to determine a suitable location for these zones to be relocated or adjusted, as required. This work will be completed as part of the detailed design stage of the project.

#### 6.3.4 Kiss and Ride

There is a 'No Parking' zone provided along Terminal Place which allows drivers to stop for up to two minutes (remaining within three metres of the vehicle at all times). This acts as a kiss and ride zone and provides for patrons of either bus or train services to alight from vehicles. It is considered that there would be minimal impact for kiss and ride patrons due to construction activities. The proposed works zone will be located further north along Terminal Place and will not extend into the 'No Parking' zone.

### 6.3.5 Motorcycle Parking

There is no dedicated motorcycle parking provided in the existing carpark on Terminal Place hence there would be no impact to motorcycle parking during the construction of the site.

### 6.3.6 Taxis

The impacted upon during construction on taxis is minimal, as the taxi zone on Terminal Place is located to the north of the construction zone. This existing taxi zone will remain during the construction period and the pedestrian link between the train station and the taxi zone is via the signal controlled exit from the bus terminal / exit ramp from car park. It is noted that during construction there will be minimal traffic flows out the car park in this location as the car park cannot be used whilst the construction work is occurring.

## 7 Site 2: Railway Terrace Angle Parking

### 7.1 Existing Site 2 Access

#### 7.1.1 Road

The proposed angle parking to the east of the station is located within the Railway Terrace road corridor approximately 90 metres north of the Neil Street overbridge. This parking is within the existing verge area as shown in Figure 9-1 below.

Figure 9-1 Car park area off Railway Terrace to north of Neil Street overbridge



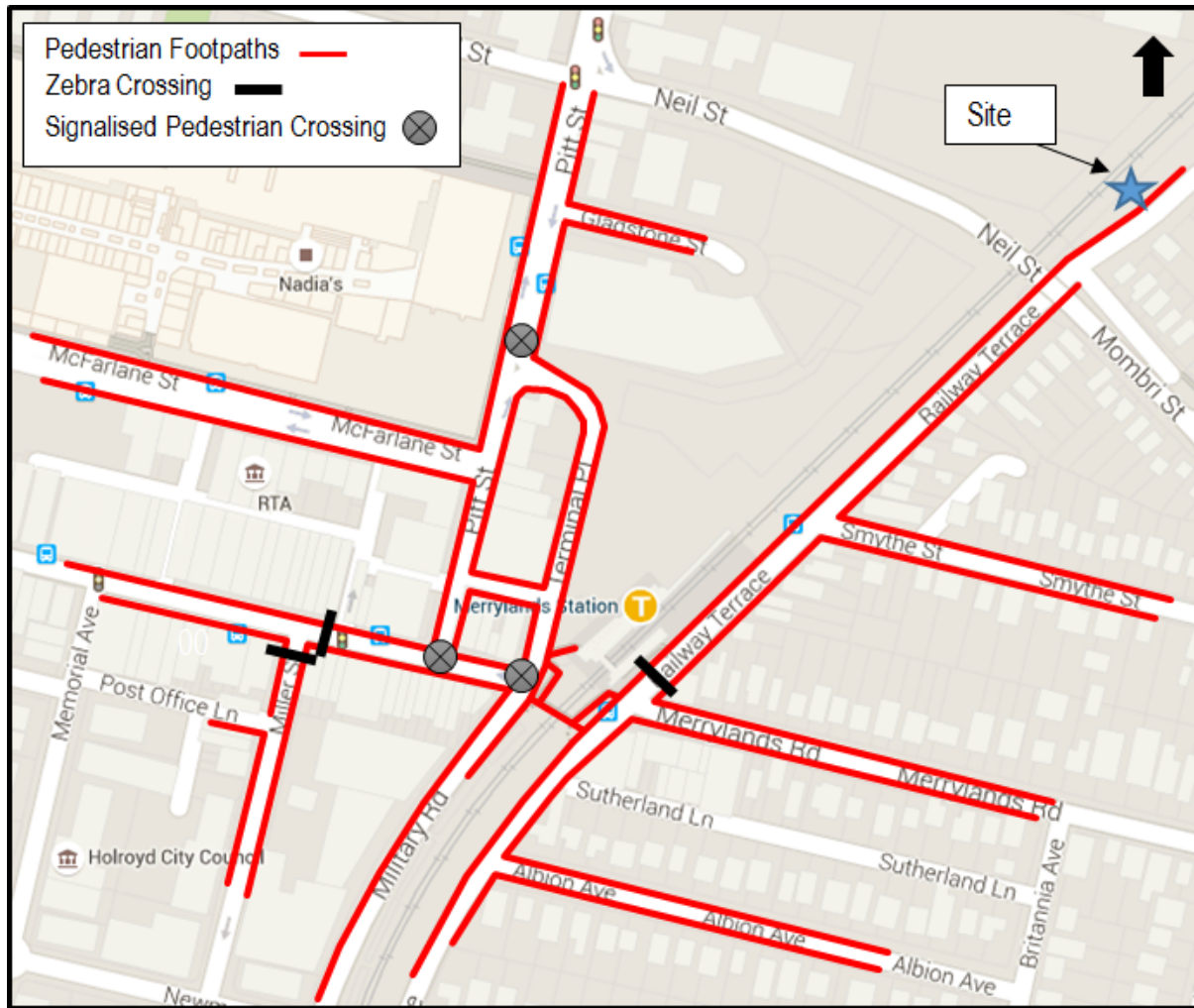
#### 7.1.2 Pedestrian Pathways

The streets within the vicinity of the railway station provide a good network of pedestrian pathways which connect between the local streets and the railway station.

The proposed angle parking will be provided along the western side of Railway Terrace with a pedestrian pathway along its length connecting to the station. This pathway has a width of 2.5 metres along its length and connects directly to the station with no requirement to cross any roads. There is a zebra crossing provided on Railway Terrace that leads directly into the station entrance.



Figure 7-1- Existing Pedestrian Facilities (after: Google Maps 2016).



7.1.2.1 Pedestrian Movements

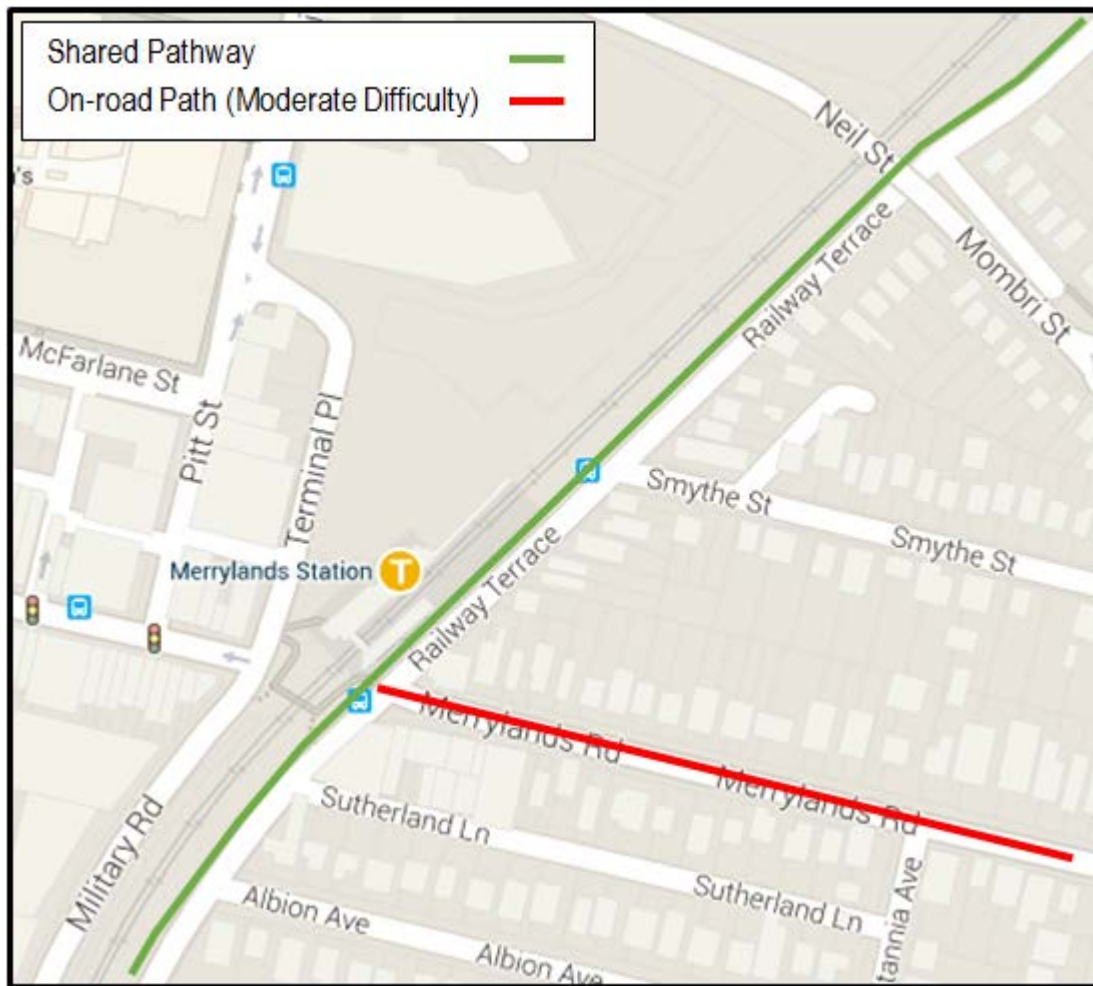
Pedestrian movements were surveyed on the eastern side of the railway station, on Railway Terrace where morning pedestrian demands were at their peak between 7.30am and 8.30am. However the evening peak is between 5.30pm and 6.30pm.

7.1.3 Cycling Facilities

There is a shared pathway running parallel to the rail corridor along the western side of Railway Terrace connecting the proposed angle parking with the Merrylands Station. This pathway is 3 metres wide increasing to around 4.5 metres past the station.

There are no bicycle storage facilities provided along Railway Terrace or at the eastern entrance to Merrylands Station.

Figure 7-2 - Existing Cycling Facilities (after: Roads and Maritime Services Cycleway Finder 2016).



## 7.2 Road Network

### 7.2.1 Road Hierarchy

**Railway Terrace** is a two way regional road which runs on the eastern side, parallel to the railway line. It provides intermittent parallel parking with 90 degree parking within the vicinity of the station. It functions under the speed limit of 60km/hr.

### 7.2.2 Roadworks

There are currently no road works occurring in the vicinity of the subject site.

## 7.3 Traffic Flows

### 7.3.1 Peak Hour Flows

As part of the project work, Seca Solution completed traffic surveys to determine the current peak hour flows at the key intersections likely to be impacted upon by this development. Surveys were completed on Monday 22 February 2016 at the intersection of Military Road and Merrylands Road and the intersection of Merrylands Road and Railway Terrace throughout the typical morning (between 7.00am and 9.30am) and evening (4.00pm and 6.30pm) commuter periods. The results of these surveys are included in Attachment B.

A summary of the peak hour traffic flows along the local roads is shown in Table 7-1 and Table 7-2.

Table 7-1– Peak Hour Traffic Flows – Morning Peak Hour

Roadway	Peak Hour		
Railway Terrace (two-way north of Merrylands Road)	510	AM	7.45am to 8.45am
Railway Terrace (two-way south of Merrylands Road)	894	AM	7.45am to 8.45am
Merrylands Road (two-way east of Railway Terrace)	470	AM	7.45am to 8.45am

Table 7-2– Peak Hour Traffic Flows – Evening Peak Hour

Roadway	Peak Hour		
Railway Terrace (two-way north of Merrylands Road)	332	PM	4.00pm to 5.00pm
Railway Terrace (two-way south of Merrylands Road)	799	PM	4.00pm to 5.00pm
Merrylands Road (two-way east of Railway Terrace)	638	PM	4.00pm to 5.00pm

### 7.3.2 Daily Traffic Flows

Roads & Maritime Services guidelines indicate that peak hour flows typically represent 10% of the daily traffic flows. This would indicate that the daily 2-way traffic flows along Railway Terrace to the north of Merrylands Road would be in the order of 4,300 vehicles per day whilst southbound the flows would be approximately 8,500 vehicles per day. Daily flows along Merrylands Road to the east of Railway Terrace would be in the order of 5,600vpd.

### 7.3.3 Daily Traffic Flow Distribution

Traffic flows on the eastern side the dominant flow is north along Railway Terrace as well as east bound from Railway Terrace along Merrylands Road. The afternoon flows are tidal on the eastern side with the dominant movement from Merrylands Road turning left onto Railway Terrace.

### 7.3.4 Vehicle Speeds and Accident Data

No speed surveys were completed as part of the study work. However it was evident that vehicle speeds along Railway Terrace appear to be above the posted speed limit and the right turns into Merrylands Road from Railway Terrace in particular were high and could lead to safety concerns for the high level of pedestrians in this location.

Advice from the Roads & Maritime Services is that there have been no reported crashes from 1 Jan 2010 to 31 Dec 2014 on Railway Terrace, within 300 metres north of the Neil Street overbridge.

### 7.3.5 Existing Site Flows

The site currently provides parallel parking for four vehicles plus a bus zone so existing site flows reflect this demand.

### 7.3.6 Heavy Vehicle Flows

There is a very limited number of heavy vehicles along the local roads mainly associated with waste collection or bus services.

### 7.3.7 Current Road Network Operation

Observations on site show that the road network to the east of the train station along Railway Terrace currently operates very well. Traffic movements along Railway Terrace flow smoothly with very limited delays. Based on the survey traffic numbers the traffic flows along this road are operating at a level of service of A or B in the peak hours. Outside of the peak periods the traffic movements along Railway Terrace are low, operating at a level of service of A.

Road & Maritime Services provides guidance on the performance of roads and provides indicative values for delays and operational characteristics with a scale of operation of A (very good) to F (very poor). An extract from the RTA Guide to Traffic Generating Developments is provided below:

Figure 7-3 – Table 4.4 from RTA Guide to Traffic Generating Developments for urban road operation in peak hours

**Table 4.4  
Urban road peak hour flows per direction**

Level of Service	One Lane (veh/hr)	Two Lanes (veh/hr)
A	200	900
B	380	1400
C	600	1800
D	900	2200
E	1400	2800

## 7.4 Parking Supply and Demand

### 7.4.1 On-street Parking Provision

On street commuter parking is available within the commuter carparks along Railway Terrace on the eastern side of the rail corridor. There is 90 degree commuter parking available to the north of Merrylands Station with the capacity 46 vehicles and angled parking spaces to the south of the station with the spaces for 9 vehicles.

Local roads to the east of the station are primarily residential and offer unrestricted on-street parking opportunities for residents and commuters. Kerbside parking along Merrylands Road in the general locality of the station is limited to 1 hour during the day.

### 7.4.2 Off-Street Parking Provision

Parking on the eastern side of the station is on-street with no public off street parking provisions. Residential lots provide off street parking for residents.

### 7.4.3 Motorcycle Parking

There are no formal motorcycle parking spaces in the general locality of Merrylands Station nor within the vicinity of the proposed angle parking on Raymond Terrace.

### 7.4.4 Parking Demand and Utilisation

There is also significant demand for on street commuter parking spaces along Railway Terrace to the east of the station. Observations on site indicated that local parking opportunities are heavily utilised with the local parking within this precinct to generally reach full capacity by 7.30am on weekday mornings.

### 7.4.5 Short term set down or pick up areas

There are no short term set down or pick up areas in the general locality of the proposed on-street carpark.

## 7.5 Public Transport

### 7.5.1 Buses

Merrylands is serviced by a number of local bus services which provide a connection to the surrounding areas including Parramatta, Westmead and Guildford and Liverpool. Local bus routes generally connect with the interchange on the western side of the station.



Figure 7-4 – Transdev bus routes along William Street and Mombri Street (Source, Transdev)

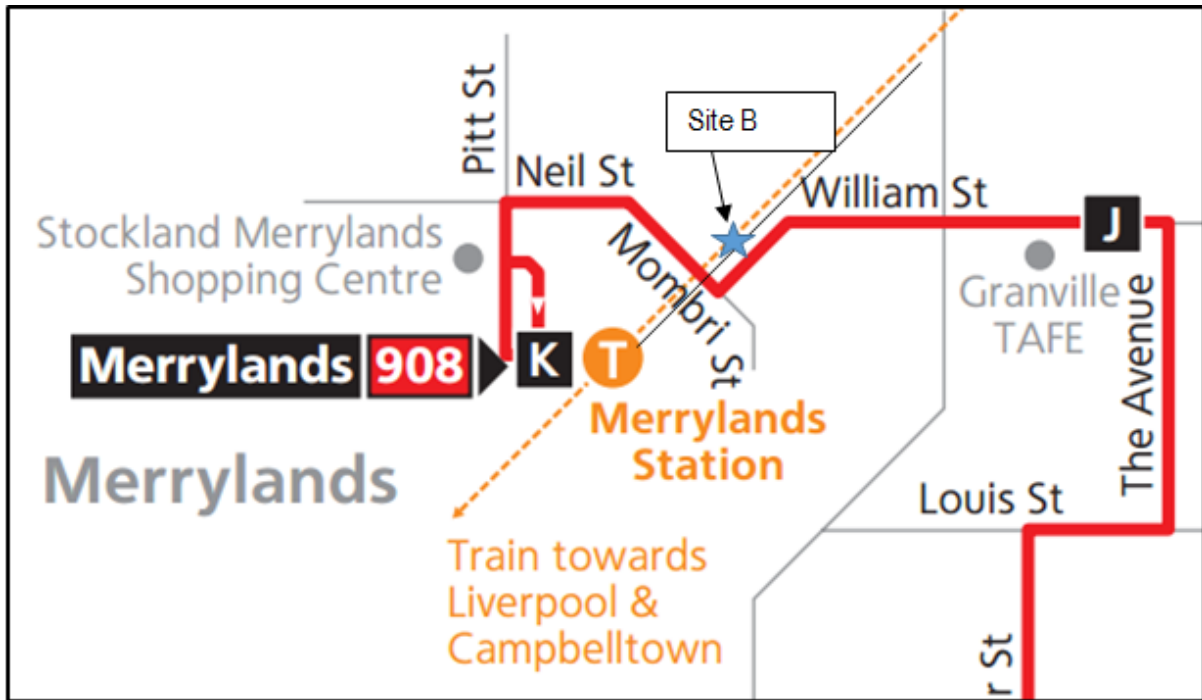
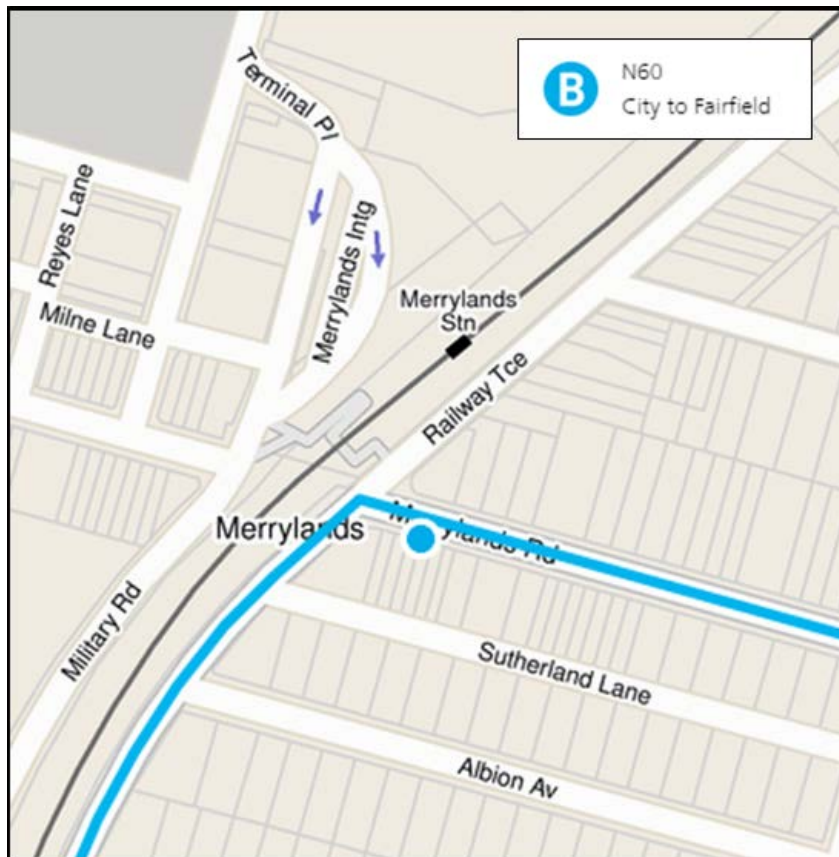


Figure 7-5 – Nightride bus routes to Merrylands Station (Source: Transport NSW)



Bus stops are located along William Street less than 400 meters from the proposed angle parking. There are pedestrian pathways connecting these to Railway Terrace and the station.

NightRide bus stops are located on Merrylands Road (as shown in Figure 7.4) and immediately to the south of the Merrylands Station on Railway Terrace.

### 7.5.2 Trains

As noted in Section 2.2.3, Merrylands Station is currently serviced by the T2 Inner West and South Line and the T5 Cumberland Line with a high frequency of services provided throughout the day. Table 7-2 shows the frequency of trains passing through Merrylands Station during the morning and evening commuter period.

Table 7-3 – Merrylands Station Train Frequencies

Line	Description	No. of Services AM Peak (7.00-8.00am)	No. of Services PM Peak (5.00-6.00pm)	No. of Services PM Peak (6.00-7.00pm)
T2 Inner West and South	Campbelltown or Leppington to City	10	6	6
	City to Campbelltown or Leppington	6	7	10
T5 Cumberland	Campbelltown to Schofields	2	2	2
	Schofields to Campbelltown	2	2	2
<b>Total</b>		<b>20</b>	<b>17</b>	<b>20</b>

## 8 Proposed Development - Site 2: Railway Terrace Angle Parking

### 8.1 The Development

The preferred option proposes to provide at-grade angle parking on Railway Terrace which will allow for the provision of 24 parking spaces replacing the existing kerb side space which caters for four parallel parking spaces. TfNSW has advised that the Bus Zone in this location (School Days only) is no longer required.

#### 8.1.1 Hours and days of operation

The car park area will have no restrictions and will allow for 24 hour use, 7 days per week, with the peak use expected to be Monday to Friday 7.00am to 7.00pm associated with commuter parking demands.

### 8.2 Access

#### 8.2.1 Driveway Location

The angle parking on Railway Terrace will operate as per the existing angle parking in this area and allows for vehicles to park nose in or reverse into the spaces as required. This area of parking is located on a straight section of the road allowing for good visibility.

*Photo 4 – View over the existing verge area in location of the new angle parking*



#### 8.2.2 Sight Distances

For the angle parking on Railway Terrace, this parking is located on a straight section of the road providing good visibility for drivers entering or exiting the parking spaces to observe vehicles approaching in both directions.



Photo 5 – Photo looking north along Railway Terrace showing straight alignment and good visibility for drivers



#### 8.2.3 Service Vehicle Access

There is no need for a dedicated service area to support the angle parking.

#### 8.2.4 Queuing at entrances

As the angle parking is replacing kerb side parking the only queues associated with this will be as vehicles manoeuvre in or out of the spaces and through vehicles experience minor delays. The through movements on Railway Terrace at this location are low and any delays would be similar to the existing situation.

#### 8.2.5 Current access compared with proposed access

The proposed angle parking on Railway Terrace will operate in a similar manner to the existing angle parking further south along this road.

#### 8.2.6 Access to Public Transport

The existing pedestrian pathway network provides suitable access to the railway station and NightRide bus stop.

### 8.3 Circulation

#### 8.3.1 Pattern of circulation

There is no requirement for vehicles to circulate through this angle parking area as all access is directly from Railway Terrace.

#### 8.3.2 Internal Road width

The angle car parking on Railway Terrace has been designed in accordance with AS2890.

#### 8.3.3 Internal Bus Movements

There is no opportunity for busses to access this area. The existing school days bus zone is no longer necessary.

### 8.3.4 Service Area Layout

No dedicated service area will be provided for the development.

### 8.3.5 Pedestrian and Bicycle Facilities

The angle parking on Railway Terrace is connected to the railway station via an existing at grade footpath that connects direct to the station entry point on the eastern side of the railway line. There is no requirement to cross a road between this parking area and the station.

Parking for commuter cyclists are catered for in lockers along Terminal Place adjacent to the bus interchange and station. Cycling commuters are not expected to utilise this new parking area.

## 8.4 Assessment of Car Park Design Requirements

The Australian Standard AS2890.5: *On-street car parking facilities* provides standards for the design of an on-street car parking spaces including minimum road width. A comparison of the proposed car park layout with the standards provided in AS2890.1 and AS2890.6 is summarised in Table 4.

Table 8-1 – Assessment of the proposed car park to Australian Standards for parking spaces.

Description	Proposed Design Parameters	Australian Standards
Standard Parking Space	2.4 m wide. 5.4 m long.	2.4 m wide. 5.4 m long.
Road Width, kerb line to separation line	Not Specified.	Minimum 12.6 m.
Wheelstop Distance (from kerb line)	0.6 m	0.6 m for nose in parking, or 0.9 m for rear-in parking.



## 9 Transportation Analysis- Site 2: Railway Terrace Angle Parking

### 9.1 Traffic Generation

The commuter car park adjacent to the railway station will show a strong inbound traffic movement in the AM period and a strong outbound movement in the PM period.

For the inbound traffic movements, based on the capacity of the angle parking to accommodate an *additional* 20 spaces and allowing for the peak demand to occur between 7.00am and 8.00am, these spaces are more likely to be filled during the back half of this peak after more convenient spaces are taken. As overall demand increases for commuter parking in association with the anticipated growth in train patronage the demand for these spaces will increase and they will tend to fill earlier in the peak period, consistent with existing demands of the more popular carparks. This results in 20 inbound traffic movements in the peak AM period.

A review of morning peak one hour passenger flows on trains arriving from the Inner West Line to Central Station shows that the peak arrival time occurs between 7.50-8.50am with the majority of arrivals occurring in the first half hour (2012 *Compendium of Sydney Rail Statistics*). Allowing for train travel between Merrylands and Central to take 35-45 minutes and commuters parking ten minutes prior to the train departure times this would equate to the peak commuter parking demands occurring between 7.00-8.00am.

For the outbound traffic movements in the PM period, 50% are considered to be outbound between 5.00pm and 6.00pm and the remaining 50% outbound between 6.00pm and 7.0pm. This is consistent with the afternoon peak period on the Inner West Line being trains departing Central between 5.20-6.20pm. Allowing for a travel time of between 30-40 minutes, commuters would return to their vehicles in the carpark between 5.50pm and 6.50pm. This is consistent with the survey data collected for this area.

Based on this the outbound traffic movements for the PM period are considered to be 50% outbound between 5.00pm and 6.00pm (10 movements) and the remaining 50% outbound between 6.00pm and 7.00pm (10 vehicles) reflecting the spread of arrivals throughout the afternoon.

Based on the existing on street parking providing 4 spaces, this represents an increase of 20 movements inbound in the AM peak hour period and 10 outbound in the PM peak hour period.

#### 9.1.1 Daily and Seasonal Factors

The nature of the commuter demands requires the car park to be highly utilised Monday through to Friday with much lower use over the weekend. There will be minimal seasonal demands, although there are typically reduced demands during Christmas / New Year periods and school holiday periods.

#### 9.1.2 Pedestrian Movements

For the angle parking on Railway Terrace, there is an existing at grade footpath that provides a good safe connection to the railway station direct from the car park. This path ensures that no pedestrians between the car park and the railway station have to cross any roadways. Allowing for 1.2 people per car this would indicate 24 pedestrian movements occurring between the car park and the railway station

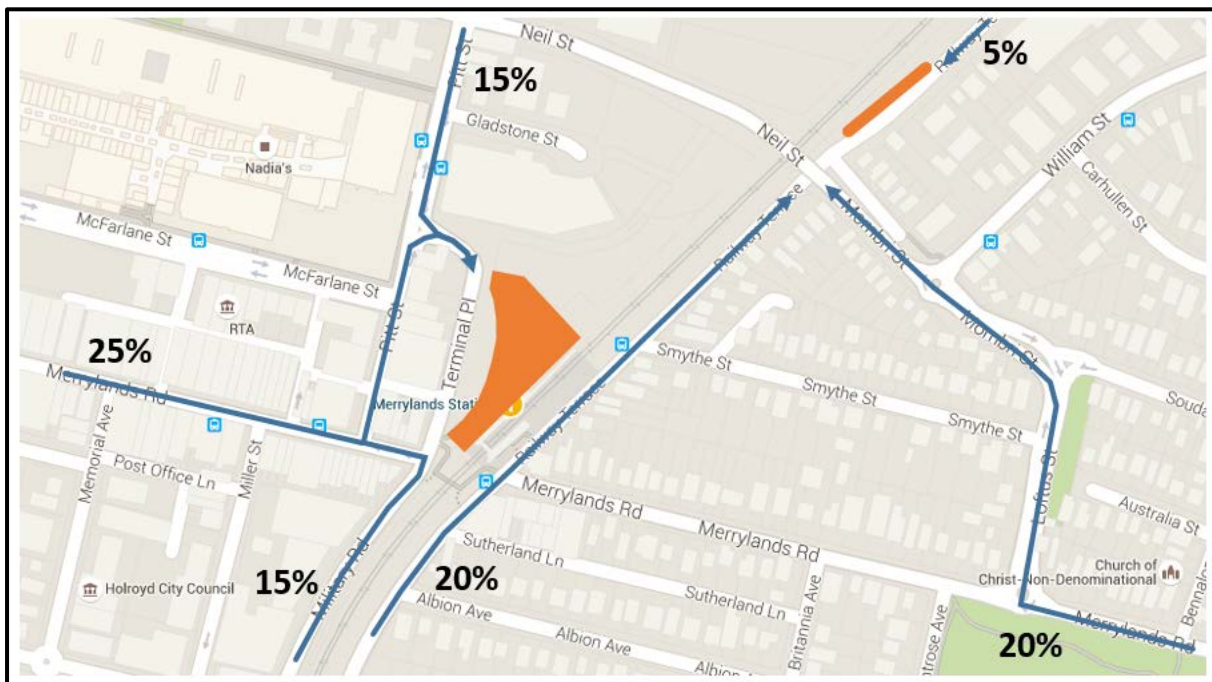
### 9.2 Traffic Distribution and Assignment

#### 9.2.1 Origin / destinations assignment

It is considered that for the angle parking on Railway Terrace the majority of users will have an origin / destination to the east of the railway line along Railway Terrace and Merrylands Road (east). Whilst the car park adjacent to the railway station may be more appealing for all day commuter parking, the increased travel time to access this parking from the east of the railway line will discourage the majority of these users and encourage the use along Railway Terrace.

The expected travel patterns to / from the station are provided below from the Arup report which are confirmed by current travel patterns in the area.

Figure 9-1 Diagram of future development traffic flows



### 9.3 Impact on Road Safety

It is considered that the additional traffic flows associated with the development of the additional parking spaces will have a minimal impact upon traffic safety.

For the angle parking on Railway Terrace, the parking is located on a straight section of Railway Terrace offering good visibility for drivers manoeuvring in and out of these spaces as well as good visibility for drivers travelling along Railway Terrace to observe vehicle movements in or out of these spaces. Whilst a driver will have to reverse into or out of the parking spaces, given the road alignment this is not considered to be a safety concern and will operate in a similar manner to the existing parking along Railway Terrace to the south of this location.

### 9.4 Impact of Generated Traffic

The provision of 20 parking spaces in this location will generate 20 vehicle movements inbound in the morning peak period and a similar volume of vehicle movements outbound in the afternoon peak period. The current traffic flows (2-way) on Railway Terrace adjacent to the site are 510 in the AM peak and 332 in the PM peak. The increased traffic movements will have a minimal impact with the traffic movements continuing to operate at a level of service of A or B.

Traffic accessing this parking area will be dispersed over a number of different routes reducing the impact at any one location further. It is considered that these traffic movements will not impact upon the operation of the intersections in the general locality of the site.

## 10 Impact of Construction Activities-Site 2: Angle Parking

The construction work associated with the construction of the new angle parking will have minimal impacts on the local road network due to the short period for construction and the small number of parking spaces affected.

Peak construction would occur over a period of approximately two months with all construction being complete in less than 6 months. The works will not require any structural construction and will include the realignment of the footpath that runs adjacent to the site.

**Demolition hours** would be carried out during standard hours i.e. between 7.00am and 6.00pm Monday to Friday and 8.00am to 1.00pm Saturday. Demolition work may need to be carried out on a Sunday or public holiday but this would be subject to formal application and approval by TfNSW.

**Construction hours** would be carried out during standard hours i.e. between 7.00am and 6.00pm Monday to Friday and 8.00am to 1.00pm Saturday. Demolition work may need to be carried out on a Sunday or public holiday but this would be subject to formal application and approval by TfNSW.

Work may be undertaken outside standard hours where the following occurs:

- The delivery of fill or material may occur outside these hours if required by the Police or other authorities
- Council provides permission for working out of hours
- It is required in an emergency to avoid loss of life, damage to property and / or to prevent environmental harm
- The work is approved under a Construction Noise and Vibration Management Plan
- Residents likely to be affected by the works are notified of the timing and duration of these works at least 48 hours prior to the commencement of the works.

During the peak periods there may be up to 10 construction workers required on site at any one. Typically there would only be around 5 people required on site. Allowing for the heavy parking demands in the area workers should be encouraged to use public transport or car pool to the work site.

A detailed Construction Traffic Management Plan (CTMP) incorporating a Traffic Control Plan will be prepared during the detailed design stage of the project in consultation with Council as the road authority. This will provide controls on traffic and material movement between the work zone and the construction site to ensure safety is maintained for all workers as well as the general public walking or cycling along the shared pathway along Railway Terrace.

Details of the proposed construction site zones are provided in Appendix C to this report.

### 10.1 Construction Traffic Generation

#### 10.1.1 Heavy Vehicles

TfNSW has advised that during peak construction periods, the number of heavy vehicles accessing the site could be up to 10 heavy vehicles per day with less vehicles accessing the site outside of the peak periods. Peak construction would occur over approximately 2 months with all construction works to be completed within a 6 month period. Typically heavy vehicles do not access construction sites during the road peak hours although for a robust assessment it has been assumed that 10% of construction heavy vehicle traffic would access the site during these peak periods (i.e. 1 vehicle).

It is proposed that all construction storage containment will be within the site.

### 10.1.2 Light Vehicles

Up to 10 construction workers may be expected to be on site during peak periods, with around 5 workers at the site on a typical day. Allowing for the convenience of travel on the adjacent rail line it has been assumed that up to half of the workers would travel by train whilst some could share trips. This would result in typically 5 vehicles accessing the site and its vicinity during the peak construction period and up to 3 vehicles accessing the site during typical construction days (based on average occupancy of 2 people per car, which allows for carpooling and public transport use).

It is expected that workers would arrive to commence work at the start of the day (6.30am-7.00am) and depart at the end of the construction working day with the majority leaving between 3.00pm and 3.30pm and all staff off site by 5.00pm.

### 10.1.3 Total Construction Traffic

The construction traffic generation for the site is summarised in Table 6-1 below.

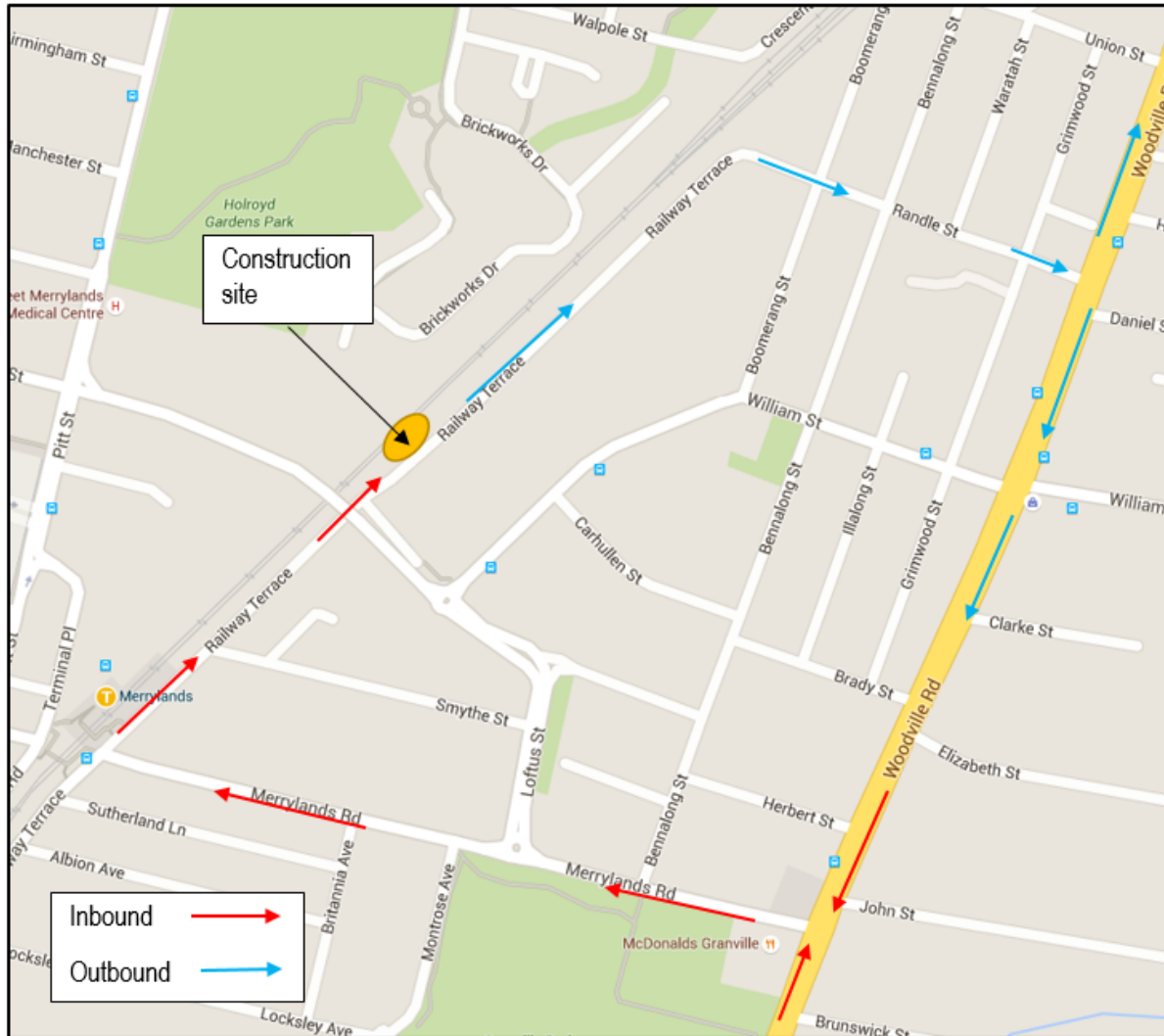
*Table 10-1 Peak Hour Construction Traffic Generation*

Construction Traffic	AM - In	AM - Out	PM - In	PM - Out
Heavy Vehicles	1	1	1	1
Light Vehicles (workers)	3	0	0	3
<b>Total</b>	<b>4</b>	<b>1</b>	<b>1</b>	<b>4</b>

### 10.1.4 Construction Traffic Routes

The transport routes for construction activities are shown below.

Figure 10-1 – Construction Traffic routes for Site 2 adjacent to Railway Terrace



A detailed traffic management plan and Traffic Control Plan will be prepared as part of the detailed design stage of the project. As part of this traffic management plan the traffic movements (light and heavy) associated with the construction activities will be detailed.

### 10.2 Construction Parking Impacts

The length of roadway along Railway Terrace designated to accommodate the angle parking currently caters for 4 vehicles parked parallel to the kerb. The loss of these spaces can be accommodated within the vicinity where there are on-street parking spaces generally available during the working day.

### 10.3 Impacts to Other Users

#### 10.3.1 Pedestrians

Pedestrian access between the site and the railway station is available along an existing shared footpath that runs along Railway Terrace on the western side of the road. This will be realigned in conjunction with the new parking area. Pedestrian controls will be required to be put in place directing pedestrians safely around the work site.



This would be addressed in the Construction Traffic Management Plan.

Based on the above the construction of the site would have minimal impacts to pedestrians.

#### 10.3.2 Cyclists

There is an off- road cycle route along the shared pathway that runs on the western side of Railway Terrace. This will be realigned in conjunction with the new parking area. Controls may be required to be put in place directing cyclists safely around the work site.

This would be addressed in the Construction Traffic Management Plan.

Based on the above the construction of the site would have minimal impacts on cyclists.

#### 10.3.3 Bus Services

There is currently an unused bus stop located within the vicinity of the new work which operates during school days. This bus stop would be removed in conjunction with the provision of angle parking.

#### 10.3.4 Kiss and Ride

There are no kiss and ride facilities within the vicinity of the subject site.

#### 10.3.5 Motorcycle Parking

There is no dedicated motorcycle parking provided along Railway Terrace within the vicinity of the new angle parking hence there would be no impact to motorcycle parking during the construction of the site.

#### 10.3.6 Taxis

There are no taxi facilities in this location so there will be no impacts upon taxis during construction of the angle parking at Site 2.

## 11 Summary and Recommendations

The following conclusions are drawn from the investigations into the proposed upgraded commuter car park adjacent to the Merrylands Station and the extension to the angle parking off Railway Terrace in Merrylands, NSW:

The proposed development is for an extension to the commuter car park, providing 65 additional untimed parking spaces for railway users. The site currently allows for commuter parking with 155 spaces provided with a mixture of time limited and all day parking. The upgrade will allow for additional parking spaces to be provided with a new level of parking at a similar level to the interchange concourse immediately adjacent to the carpark with entry and exit movements occurring in a similar manner to the existing car park ramps off Terminal Place.

Pedestrian access between the railway station and this car park structure is provided via the concourse footpath in the interchange area allowing for a good and safe all weather connection between the car park and the station.

The car park expansion will increase the number of vehicles entering the site during the typical morning arrivals period (6.30am-7.30am) and exiting during the afternoon departure period, Monday through to Friday with significantly less traffic flows in the evening and weekends. The car park will provide an additional 65 spaces, generating 65 additional traffic movements inbound to the car park in the morning and a similar additional number in the afternoon however the afternoon flows are spread over a longer period and represent 33 additional movements per hour. Given the current traffic flows in the immediate vicinity of the subject site together with the single directional traffic flows associated with the car park, this is considered to create minimal delays for road users.

The car park and the site access has been designed in accordance with AS2890 and allows for safe entry and exit movements, and utilises the existing cross overs in this location. For the exit movement, all vehicles are controlled by the existing traffic signal controlled intersection of Terminal Place / Merrylands Road and Military Road, ensuring that all exit movements are managed in a safe manner, ensuring minimal interaction with existing vehicle and pedestrian movements in this location.

For the new angle parking on Railway Terrace, the layout of the parking is similar to the existing angle parking along the western side of Railway Terrace and allows for parking in accordance with AS2890. This angle parking is located on a straight section of road allowing drivers using these spaces, as well as passing drivers, to observe vehicle movements and adjust their vehicle speed accordingly. There is an existing footpath that connects between this new parking area and the railway station entry point allowing for safe pedestrian connection to the railway station.

The key findings of the project study are:

- The proposal allows for three new part levels of car park with 65 additional spaces to be provided on the western side of the railway line adjacent to the bus terminal and above the existing carpark in this location
- The proposal will also provide a secondary extension to commuter parking, with 20 angle parking spaces provided on Railway Terrace to the east of the railway line
- Access to the carpark on the western side of the train station will be via the existing entry and exit driveways, which allow for left in and left out only with the exit movement controlled by the existing traffic signals in this location
- The angle parking off Railway Terrace will have direct access off the public road in a similar manner to the other angle parking provided along Railway Terrace to the south of the location
- During construction of the new deck of parking on the western side of the railway station, there will be considerable impact upon the operation of buses, kiss and ride and the mail zone on Terminal Place, which will require discussion and agreement with the relevant authority to relocate these facilities as

required. The construction zone in this location will also require the temporary relocation of cycle lockers within the locality as the current bike lockers on Terminal Place will be impacted upon by the construction zone

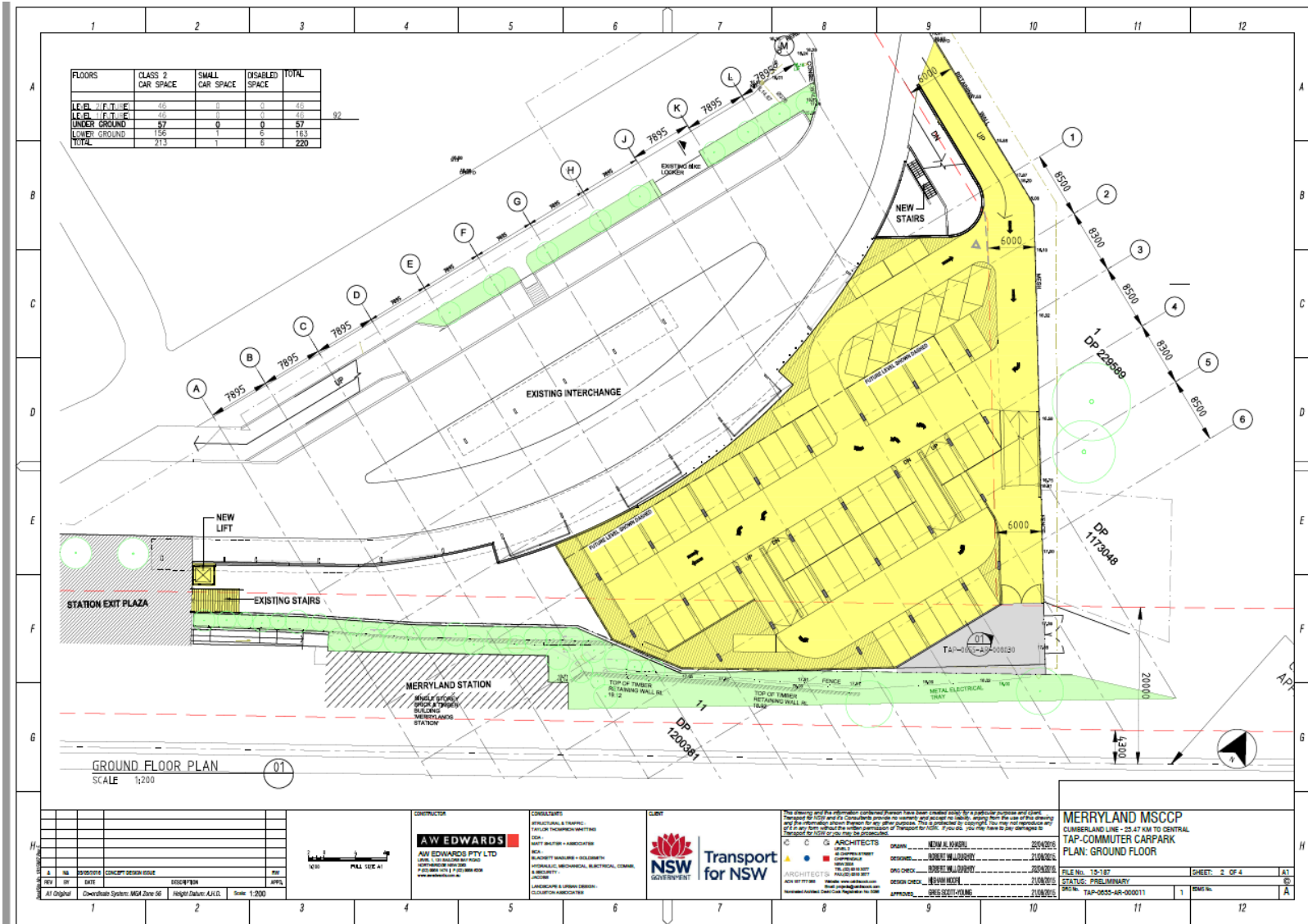
- The construction work on Railway Terrace will not impact upon traffic movements, but will require control of pedestrian and cyclists movements past or through the site during construction. The existing bus zone in this location will also be removed as part of the new parking provision.
- The major impact of the additional parking off Terminal Place will occur during construction and will require a detailed Construction Traffic Management Plan to be prepared including a Traffic Control Plan to incorporate the work zone on Terminal Place. This will need to be developed in consultation with the road authority.

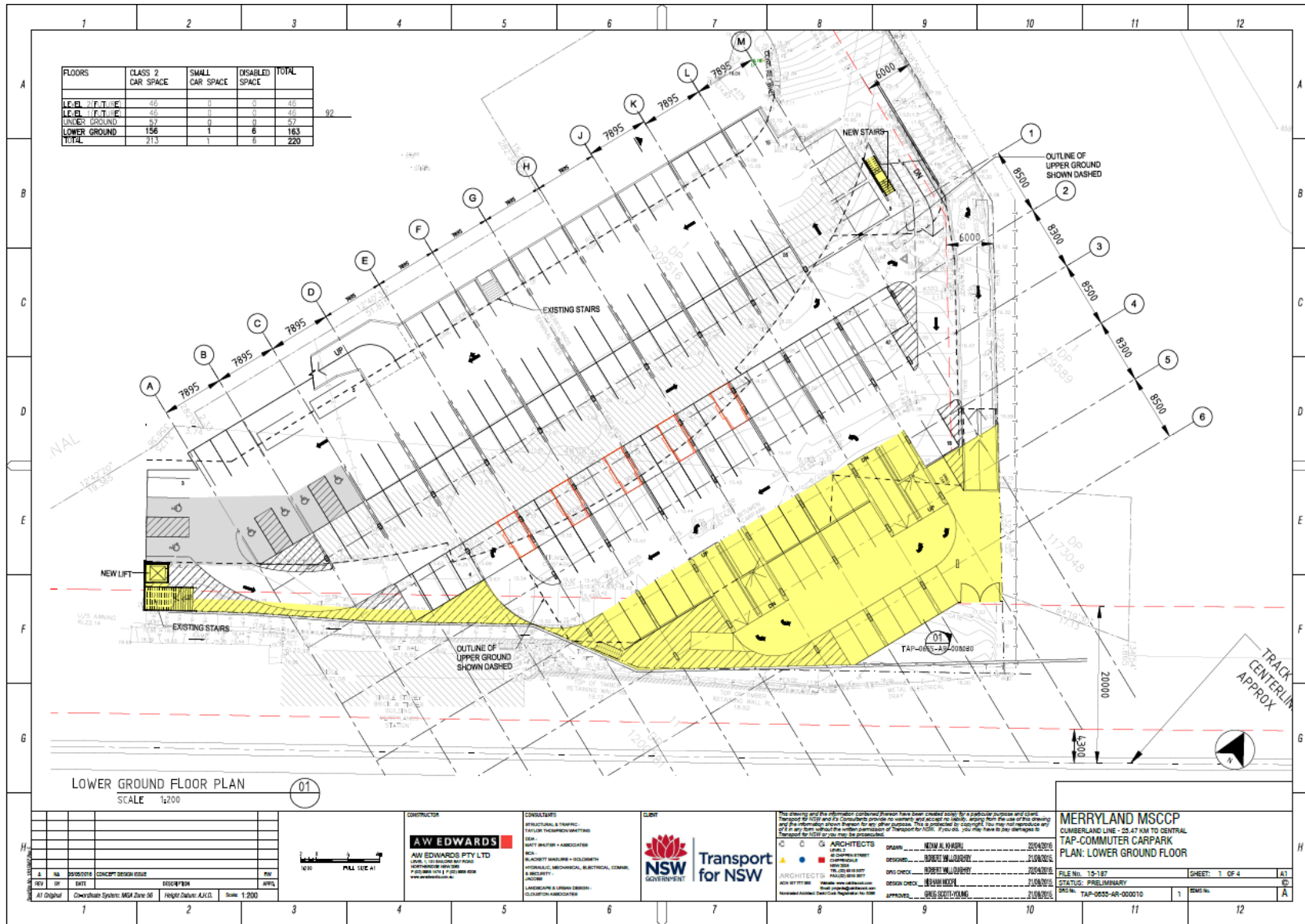
The following recommendation is made:

- To reduce the impact of the temporary closure of the existing car park adjacent to the railway station during construction, it is recommended that the angle parking on Railway Terrace be constructed prior to closing this car park for public use.

The overall conclusion from the investigations is that traffic and parking arrangements for the development proposal are satisfactory and that there are no traffic impediments to the development of the car park.

Appendix A – Concept Plans

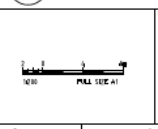




FLOORS	CLASS 2 CAR SPACE	SMALL CAR SPACE	DISABLED SPACE	TOTAL
U.G. R. 1/F T.O. E.	46	0	0	46
U.G. R. 1/F T.O. E.	46	0	0	46
LOWER GROUND	57	0	0	57
<b>LOWER GROUND</b>	<b>156</b>	<b>1</b>	<b>6</b>	<b>163</b>
<b>TOTAL</b>	<b>213</b>	<b>1</b>	<b>6</b>	<b>220</b>

LOWER GROUND FLOOR PLAN  
SCALE 1:200

NO.	REV.	DATE	DESCRIPTION	BY	APP.
1	NA	05/07/2016	CONCEPT DESIGN ISSUE		
2	NA				
3	NA				
4	NA				
5	NA				
6	NA				
7	NA				
8	NA				
9	NA				
10	NA				
11	NA				
12	NA				



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& SECURITY  
JACOBS  
LANDSCAPE & URBAN DESIGN:  
SCULPTOR ASSOCIATES

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PLAN: LOWER GROUND FLOOR

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DRG CHECK: **BORIS MILICIC** 21/04/2016  
DESIGN CHECK: **MEVY BRUNTON** 21/04/2016  
APPROVAL: **CHRIS SCOTT-YOUNG** 21/04/2016

FILE NO: 12-187  
STATUS: PRELIMINARY  
SHEET: 1 OF 4  
DATE: 21/04/2016  
DRAWN BY: MEVY BRUNTON  
CHECKED BY: BORIS MILICIC  
DATE: 21/04/2016  
DRAWN BY: MEVY BRUNTON  
CHECKED BY: BORIS MILICIC  
DATE: 21/04/2016



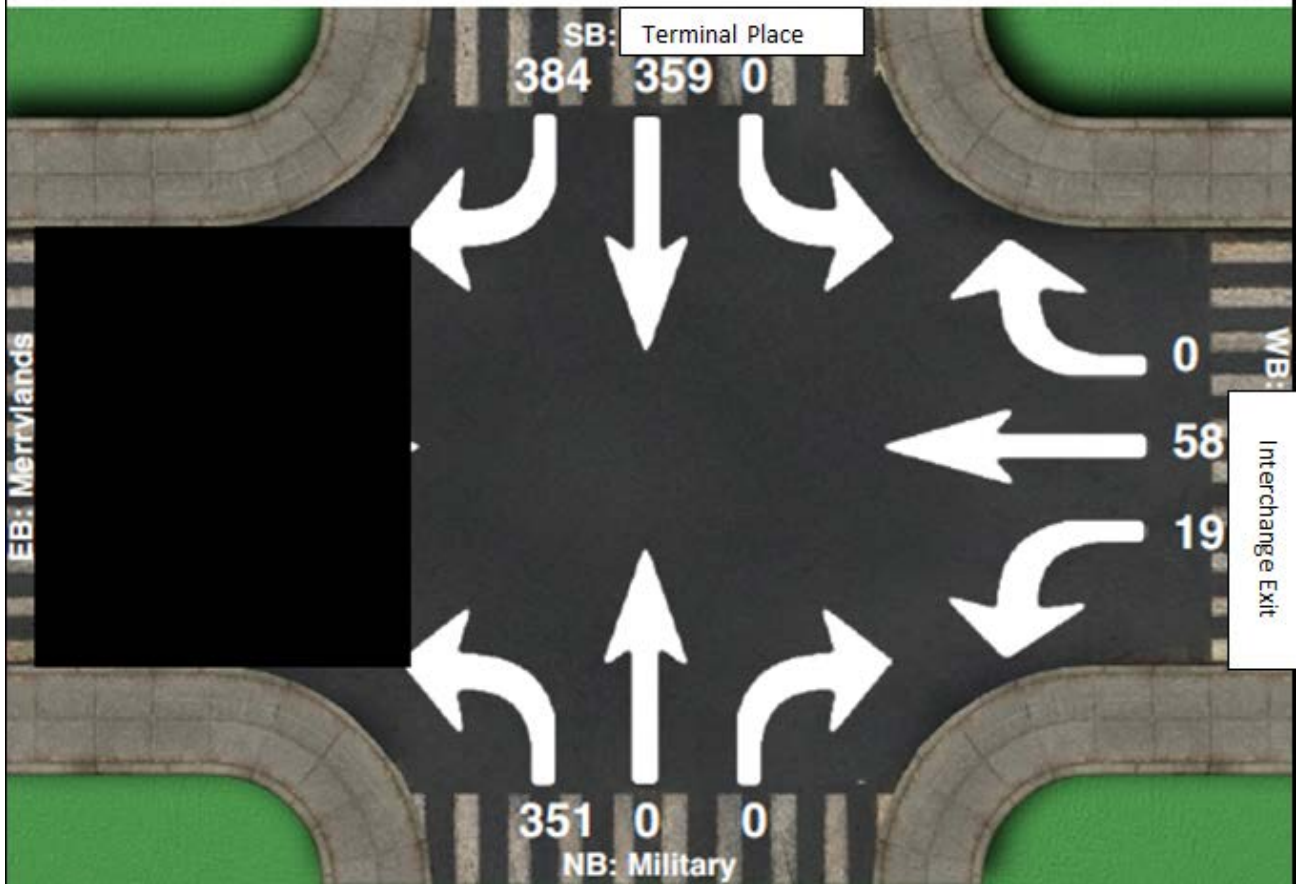
Appendix B – Traffic Surveys



### Intersection Peak Hour

**Location:** Military at Merrylands,  
**GPS Coordinates:**  
**Date:** 2016-02-22  
**Day of week:** Monday  
**Weather:**  
**Analyst:** CT

Peak 16.15 – 17.15 PM



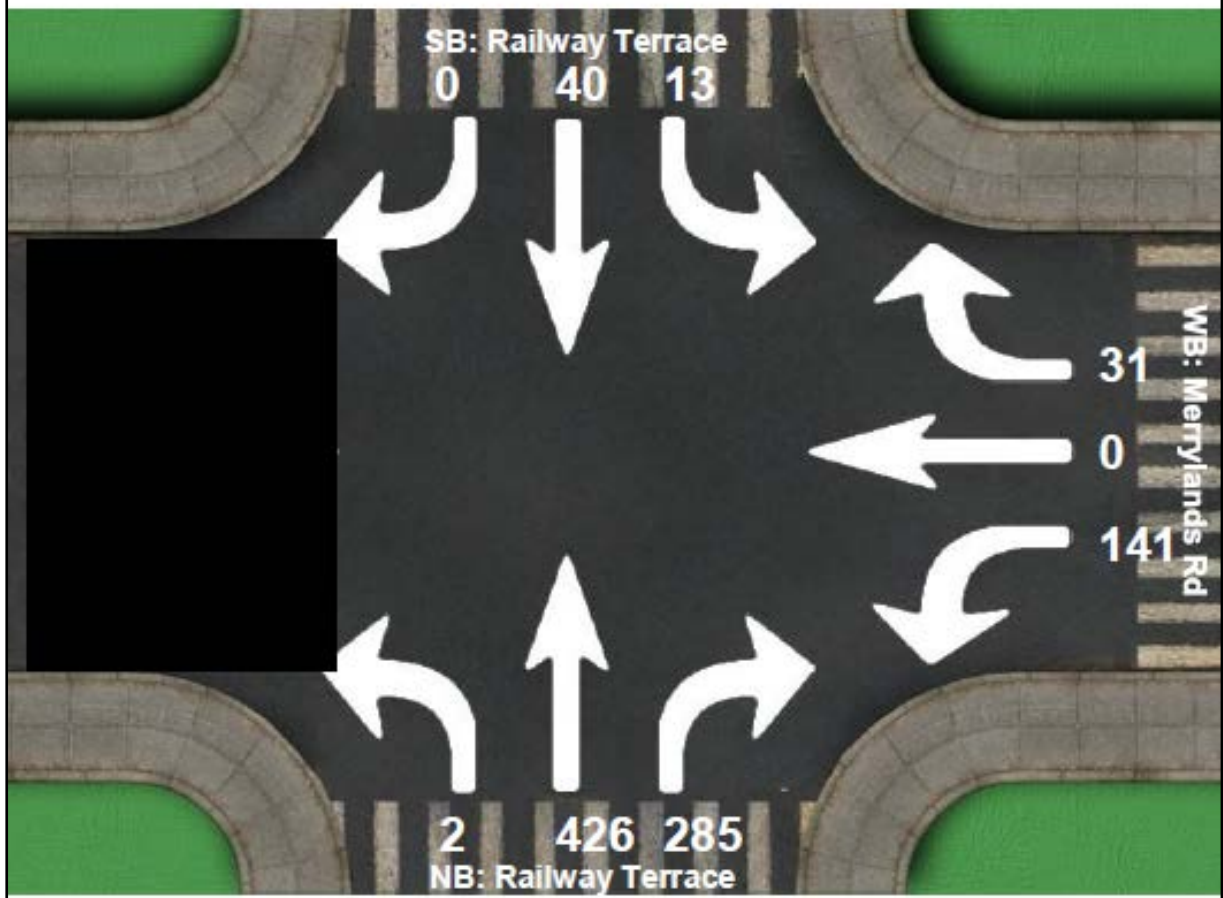
### Intersection Peak Hour

07:45 - 08:45

Location: Railway Terrace at Merrylands Rd

Date: 2016-02-22

Day of week: Monday



### Intersection Peak Hour

Location: Railway at Merrylands,

GPS Coordinates:

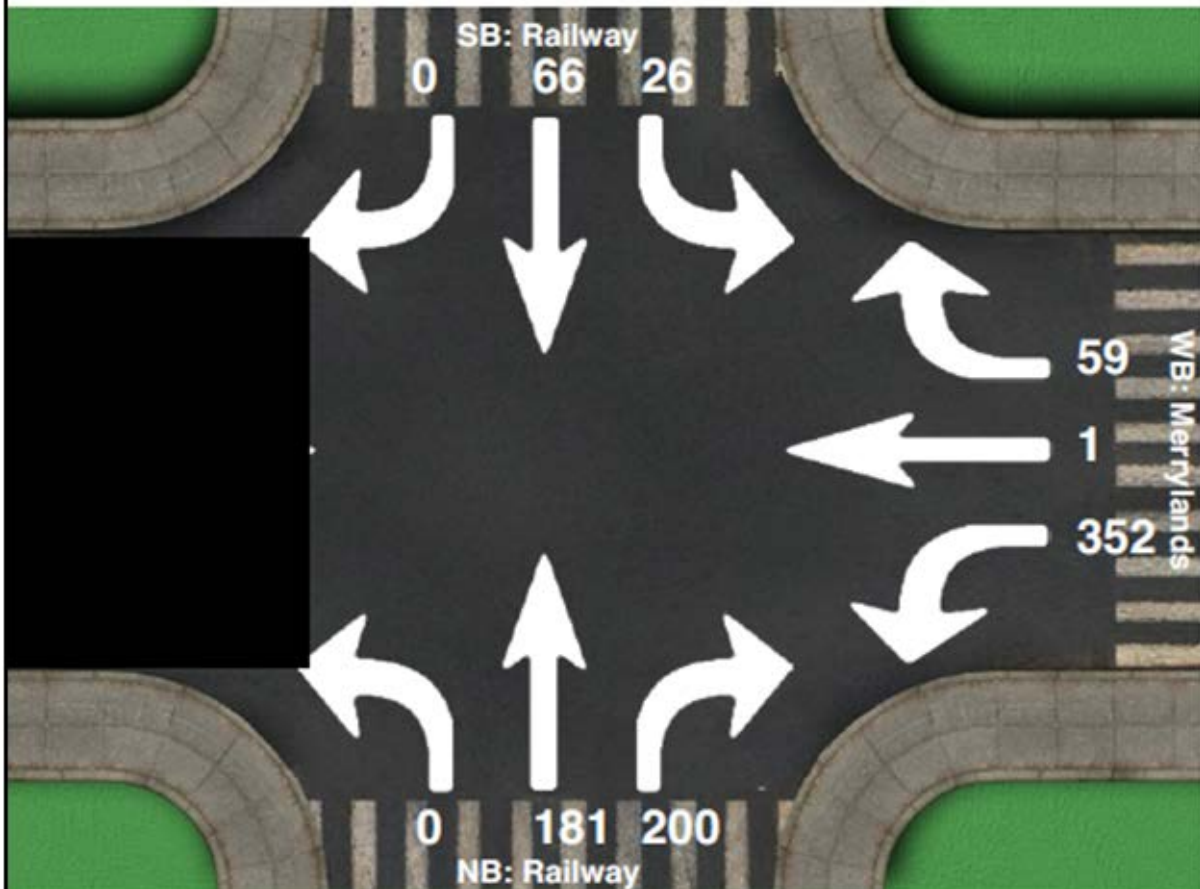
Date: 2016-02-22

Day of week: Monday

Weather:

Analyst: JM

Peak 16.00 – 17.00





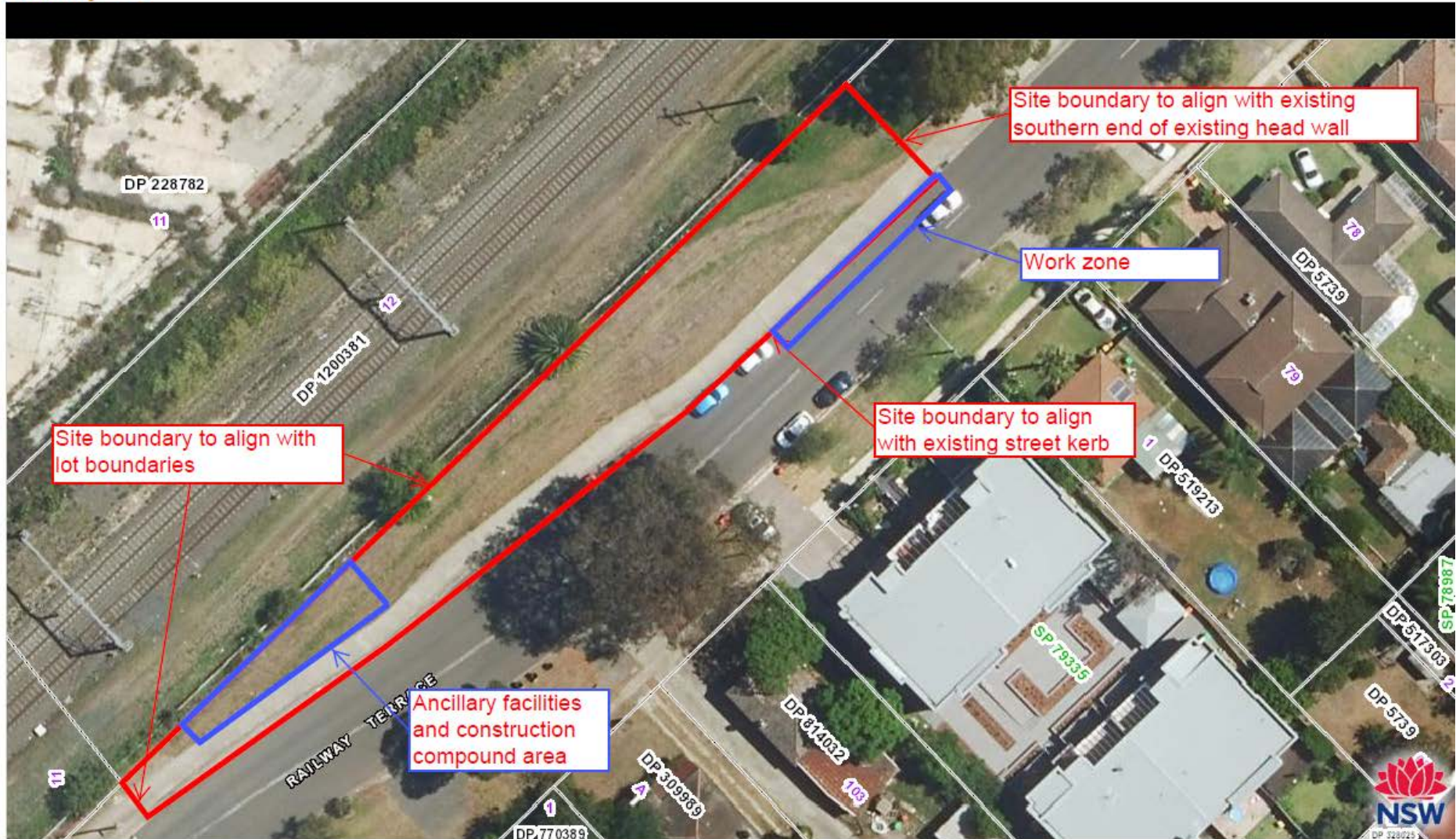
Appendix C – Construction Compounds and Ancillary Facilities

Merrylands MS






Railway Tee



Appendix D – Accident Data

Detailed Crash Report																									
																									
NOTES: 6788 - Reported crashes on Terminal PI - Pitt St to Merrylands Rd - 1 Jan 2010 to 31 Dec 2014																									
Crash No.	Data Source	Date	Day of Week	Time	Distance	ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash-Detailed	Killed	Seriously Inj.	Moderately Inj.	Minor/Other Inj.	Uncateg'd Inj.	Factors	
<b>Sydney Region</b> <b>Holroyd LGA</b> <b>Merrylands</b> <b>Milne Lane</b>																									
1034736 P		28/07/2014	Mon	09:00		at TERMINAL PL	TJN	STR	Fine	Dry	50	2	OMV U U		MILNE LANE		Unk Other forward	UC	0	0	0	0	1		
E186395698							RUM	9	Ped other				PED	M19	MILNE LANE		Other ped manoeuvre								
Terminal PI																									
812424 P		26/09/2012	Wed	17:30	25 m	N MERRYLANDS RD	2WY	STR	Fine	Dry	50	1	BUS		W in TERMINAL PL		5 Other forward	NC	0	0	0	0	0		
E49212845							RUM	93	Pkd veh runaway->obj				Utility pole												
795998 P		10/07/2011	Sun	09:00	150 m	N MERRYLANDS RD	1WY	STR	Fine	Dry	50	2	CAR F47		S in TERMINAL PL		Unk Turning left	OC	0	0	0	1	0		
E45253766							RUM	37	Left turn sideswipe				CAR M44		S in TERMINAL PL		Unk Proceeding in lane								
<b>Report Totals: Crashes: 3    Fatal Crashes(FC): 0    Serious Injury Crashes(SC):0    Moderate Injury Crashes(MC): 0    Minor/Other Injury Crashes(OC): 1    Uncategorised Injury Crashes(UC): 1    Non-Casualty Crashes(NC): 1</b> <b>Killed(K): 0    Seriously Injured(S): 0    Moderately Injured(M): 0    Minor/Other Injured(O): 1    Uncategorised Injured(U): 1</b>																									
Crashid dataset 6788 - Reported crashes on Terminal PI - Pitt St to Merrylands Rd - 1 Jan 2010 to 31 Dec 2014 Crash self reporting, including self reported injuries began Oct 2014. Trends from 2014 are expected to vary from previous yrs. More unknowns are expected in self reported data. Reporting yrs 1996-2004 and 2014 onwards contain uncategorised inj crashes.																									