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Homebush Station Upgrade

Traffic, Transport and Access Impact Assessment

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Client: Transport for New South Wales

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Prepared by

AECOM Australia Pty Ltd
Level 21, 420 George Street, Sydney NSW 2000, PO Box Q410, QVB Post Office NSW 1230, Australia
T +61 2 8934 0000 F +61 2 8934 0001 www.aecom.com
ABN 20 093 846 925

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1.0 Introduction

1.1 Background

Transport for NSW (TfNSW) has proposed the upgrade of Homebush Station (the 'Proposal'). The Proposal forms part of the Transport Access Program, a NSW Government initiative to provide accessible, modern, secure and integrated transport infrastructure. The aim is to provide accessible station precincts for the mobility impaired, the elderly and parents/carers with prams and to meet the needs of a growing population. Interchange facilities must allow for seamless transfer between all modes, and for all customers, and safety must be given priority to all design options.

In 2015, Parsons Brinkerhoff (commissioned by TfNSW) produced accessibility upgrade concept plans and undertook options development and assessment for the Homebush Station Precinct. The report developed alternative concept plans to address station precinct deficiencies and a preferred concept was identified using a Multi-Criteria Assessment methodology.

The preferred concept has since been refined and is being progressed towards construction and implementation. As part of the Review of Environmental Factors (REF), AECOM has been commissioned by TfNSW to undertake a Traffic, Transport and Access Impact Assessment of the construction and operation of the Proposal.

1.2 Proposal context

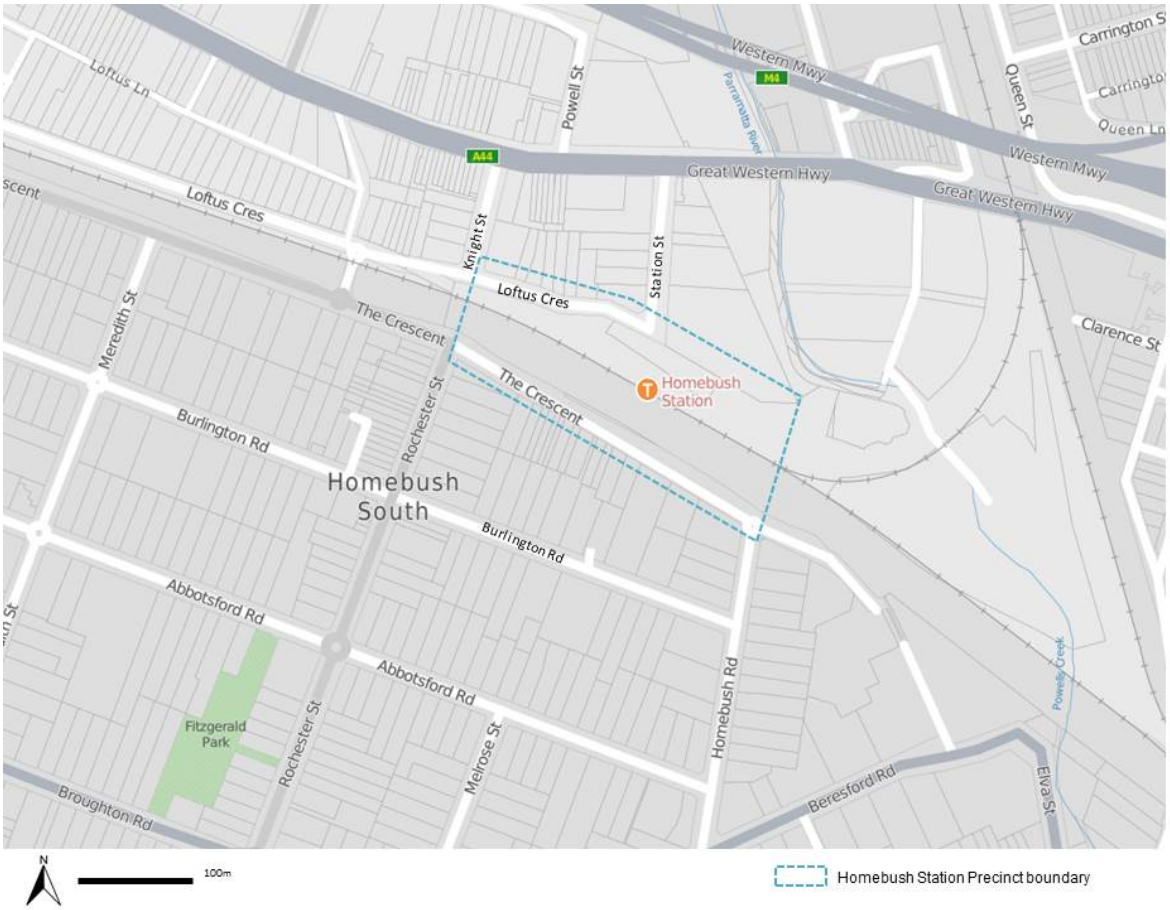
The objective of TfNSW's Transport Access Program is to "provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport infrastructure". The program aims to provide station upgrades which will deliver components of this objective, as summarised below:

- stations that are accessible to those with disabilities, the ageing, parents/carers with prams and customers with luggage
- 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, lift alarm, 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.

1.3 Study area

Homebush Station is located between Loftus Crescent and The Crescent within the suburb of Homebush. The Homebush Station Precinct includes the station, associated interchange structures and buildings, gates, pedestrian and cycle access paths, pedestrian access, pedestrian linkages to the adjacent streets and bus stops, kiss and ride locations and bicycle facilities. The indicative boundary definition of Homebush Station Precinct (i.e. the study area) is shown in Figure 1. The broader Homebush area was also considered in terms of the road network and potential traffic impacts on the northern and southern side of the station.

Figure 1 Location map



Source: AECOM, 2016

1.4 Proposed works

The Proposal involves an upgrade of Homebush Station as part of the Transport Access Program that would improve accessibility and amenities for customers. The Proposal would provide a number of features to provide an accessible station and improved interchange facilities, including:

- installation of four new lifts and upgrades to existing station access stairs to provide access to the existing footbridge
- installation of new canopies along the existing footbridge and lift landings for weather protection
- upgrades to the northern and southern station entrances
- refurbishment of the Amenities Building with a new family accessible toilet and new station office at footbridge level
- refurbishment of the Booking Office with a new lift lobby and new communications room at platform level
- new undercover bicycle rack on the northern side of the station
- provision of two new accessible parking spaces, a new taxi rank with provision for one space and a new kiss and ride space on the southern side of the station
- provision of a new kiss and ride space, a new bus bay and relocation of the existing bus shelter on the northern side of the station
- installation of a new pedestrian crossing on Loftus Crescent on the northern side of the station
- new kerb ramps to provide an accessible path of travel to new and existing interchange facilities

- ancillary works including services diversion and/or relocation, station power supply upgrade, platform regrading, minor drainage works, adjustments to lighting, upgrades to fencing and landscaping, new ticketing facilities including additional Opal card readers, improvements to station communication systems (including CCTV cameras and hearing loops) and wayfinding signage.

A detailed description of the Proposal and its associated works are provided in Section 3 of the Homebush Station Upgrade Review of Environmental Factors (AECOM, 2016).

Construction is anticipated to commence in early 2017 and would take approximately 18 months to complete. It is likely that around 13 weekend rail shutdowns would be required. The construction methodology would be further developed during the detailed design of the Proposal by the nominated contractor in consultation with TfNSW.

1.5 Scope of the study

This Traffic, Transport and Access Impact Assessment provides a high level assessment of the potential impacts of the Proposal on transport, traffic, access and road safety. The purpose of this report is to:

- assess the existing traffic and transport conditions in and around Homebush Station Precinct
- evaluate the potential traffic generation caused by the Proposal and assess potential traffic impacts on the road network
- assess the impacts associated with construction and operation of the Proposal
- recommend mitigation measures to manage impacts, if required.

A site visit was undertaken on Friday 12 August 2016 to observe the existing conditions at the site. In addition, a number of technical documents were reviewed to inform the assessment of Homebush Station, including:

- Homebush Station – Concept Design Report Volume 1 (Parsons Brinkerhoff, 2015a)
- Homebush Station – Concept Design Report Volume 3 – Appendix I – Traffic, Transport and Access Impact Assessment (Parsons Brinkerhoff, 2015b)
- Homebush Station Upgrade – Design Reports Volume 5 – Drawings (Downer, 2016a)
- Homebush Station Upgrade – Traffic Impact and Access Report (Road Safety Audit) (Downer, 2016b)

2.0 Existing conditions

2.1 Homebush context

The suburb of Homebush is located approximately 11 kilometres west of the Sydney central business district, within Strathfield Local Government Area (LGA).

Homebush is bordered by the suburbs of Homebush West to the west, Concord to the east, Strathfield to the south and North Strathfield to the north. The suburb is served by the T2 Airport, Inner West and South Line providing connections to the suburban Sydney Trains network. The adjacent stations to Homebush are Flemington (west) and Strathfield (east).

The land use surrounding Homebush Station comprises primarily low and high density residential areas and mixed use centres. Figure 2 illustrates some of the key roads and land use features in Homebush, including community facilities, schools, parks and reserves.

Figure 2 Homebush context

Source: AECOM, 2016

2.2 Homebush Station

Homebush Station is served by the T2 Airport, Inner West and South Line providing train services between Campbelltown and the City. Figure 3 shows Homebush Station on the Sydney Trains network.

Figure 3 Location of Homebush Station on the Sydney Trains network

Source: Sydney Trains, 2016 (modified by AECOM 2016)

The main station entrances are from Loftus Crescent to the north and The Crescent to the south. The station is currently accessed by non-BCA compliant stairs on either side of a footbridge which crosses the railway. The station consists of three island platforms (platforms 1 to 6) and one side platform (platform 7). Stairs provide the only means of access from the footbridge to the island platforms. A ramp is provided to access platform 7 from The Crescent. The footbridge and stairs also provide an access point for pedestrian and cyclists to cross the railway. The existing footbridge is only partially covered by a small central canopy for weather protection and there are no canopies above the station access or platform access stairs.

Platforms 1 to 3 and 5 are currently used for through train services. Platform 4 provides limited afternoon services to Central & the City Circle. Platform 6 provides terminating services to & from Central & the City Circle and platform 7 provides limited morning peak services to Campbelltown via Granville. The number of services at Homebush Station during the AM and PM two hour peak periods are shown in Table 1.

Table 1 Rail services at Homebush Station

Key Destination	AM Weekday Peak (07:00-09:00)	PM Weekday Peak(16:00-18:00)
Homebush to City	8 services	9 services
City to Homebush	10 services	9 services

Source: Sydney Trains, 2016

2.2.1 Current train passenger travel demand

Station barrier counts obtained from the Bureau of Transport Statistics reveal Homebush Station is the 118th busiest station on the Sydney Trains network with approximately 4,240 trips per average weekday recorded in 2014. A breakdown of the 2014 station entries and exits are provided in Table 2.

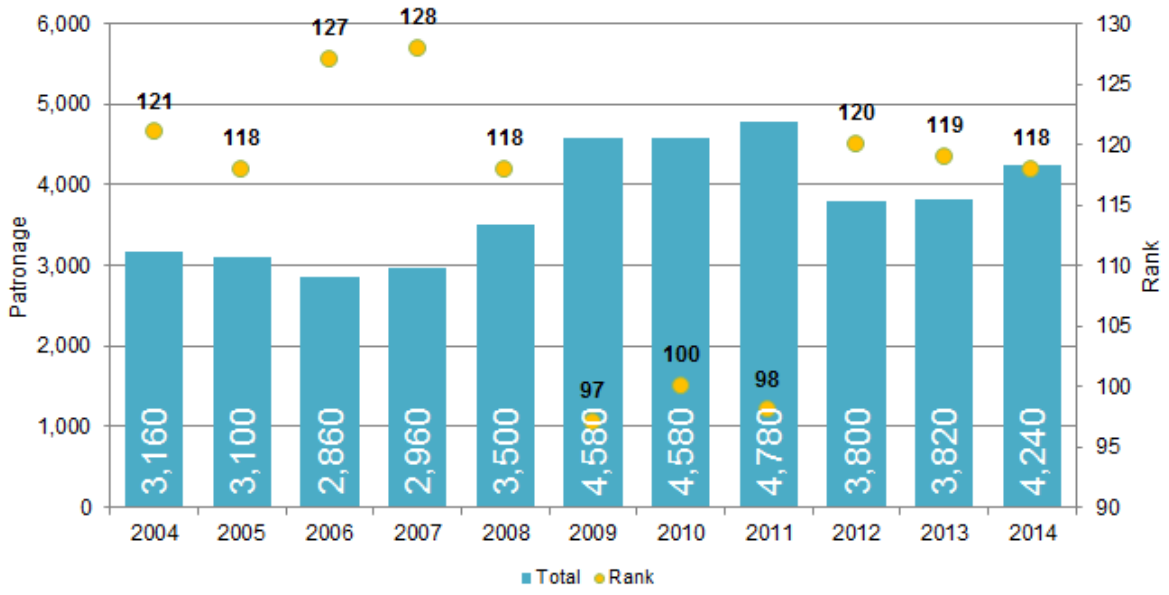
Table 2 Homebush Station 2014 barrier counts

Time period	In (number of customers)	Out (number of customers)
0200 – 0600	20	20
0600 – 0930	1,030	330
0930 – 1500	470	460
1500 – 1830	520	950
1830 – 0200	80	360
Total (24 hours)	**2,120**	**2,120**

Source: Station Barrier Counts – 2004 to 2014, Bureau of Transport Statistics, 2014

Historical patronage figures for Homebush Station are provided in Figure 4. The general trend in the data shows trips have fluctuated in the past 10 years. Between 2004 and 2006, trips gradually declined and then significantly increased to a peak of around 4,800 by 2011.

Figure 4 Historical patronage data at Homebush Station



Source: Station Barrier Counts – 2004 to 2014, Bureau of Transport Statistics, 2016

2.2.2 Access mode split

Sydney Trains (formerly RailCorp) conducted interview surveys at Homebush Station to determine how rail customers accessed the station in 2008. The results are presented in Table 3, which show the primary mode of

access is by foot, accounting for 88 per cent of trips during the AM peak. During the off peak period, there was an increase in the proportion of rail customers accessing the station via kiss and ride.

Table 3 Homebush Station access modes - 2008

Access Mode	AM peak (06:00-09:30)	Off Peak (After 09:30)
Walk	88%	81%
Bus	0%	0%
Car park (park and ride)	5%	0%
Car lift (Kiss and Ride)	7%	19%
Other	0%	0%

Source: Sydney Trains 2008

2.2.3 Station accessibility

The station is located between Loftus Crescent and The Crescent, with an existing footbridge joining the two access points above the railway. The footbridge is accessed via staircases at the northern and southern entrances of the station. Access to platforms 1 to 6 is via stairs from the existing footbridge and access to platform 7 is via a ramp from The Crescent.

The majority of the station facilities are located on the platform level and there are currently a number of interchange facilities provided at Homebush Station, as shown in Table 4.

Table 4 Homebush Station facilities

Accessibility	General facilities	Transport interchange
- Ramp to Platform 7 - Stairs - Hearing loop - Portable boarding ramp - Wheelchair accessible carspace	- Opal ticketing machine - Toilets - Payphone - Real-time information display screens - Help point - Ticket office - Platform canopies and seating	- Bus stops - Motorbike parking - Bicycle rack on The Crescent

Source: Sydney Trains, 2016

2.2.4 Pedestrian facilities

Pedestrian access to Homebush Station is provided from Loftus Crescent and The Crescent, via stairs and a footbridge over the railway. Footpaths are present along both sides of Loftus Crescent, Station Street and The Crescent. There is also a pedestrian path on Rochester Road and Knight Street.

The existing footbridge and stairs provide an access point for pedestrians to cross the rail corridor between The Crescent and Loftus Crescent. The existing form of access is currently restricted for mobility impaired persons due to the lack of accessible facilities.

Figure 5 and Figure 6 highlight some of the key pedestrian crossing facilities in the vicinity of Homebush Station. A raised pedestrian crossing is provided on The Crescent on the southern side of the station providing a direct link to the station access stairs (which lead to the footbridge) and the ramp to platform 7. Two zebra crossings are provided on the southern side of the station at the intersection of The Crescent and Rochester Street, located around 120 metres southwest of the station, on the western and southern approach. In addition, refuge islands on the northern side of the station are provided on all approaches to the roundabout at Loftus Crescent and Knight Street, around 110 metres northwest of the station. These facilities provide pedestrians a safe crossing point to and from the station.

The pedestrian crossings on The Crescent have tactile ground surface indicators (TGSI) installed to assist with providing an accessible path of travel.

There are currently no formal pedestrian crossing or traffic safety measures installed on Loftus Crescent near the southern station entrance.

Figure 5 Raised pedestrian crossing on The Crescent

Source: AECOM, 2016

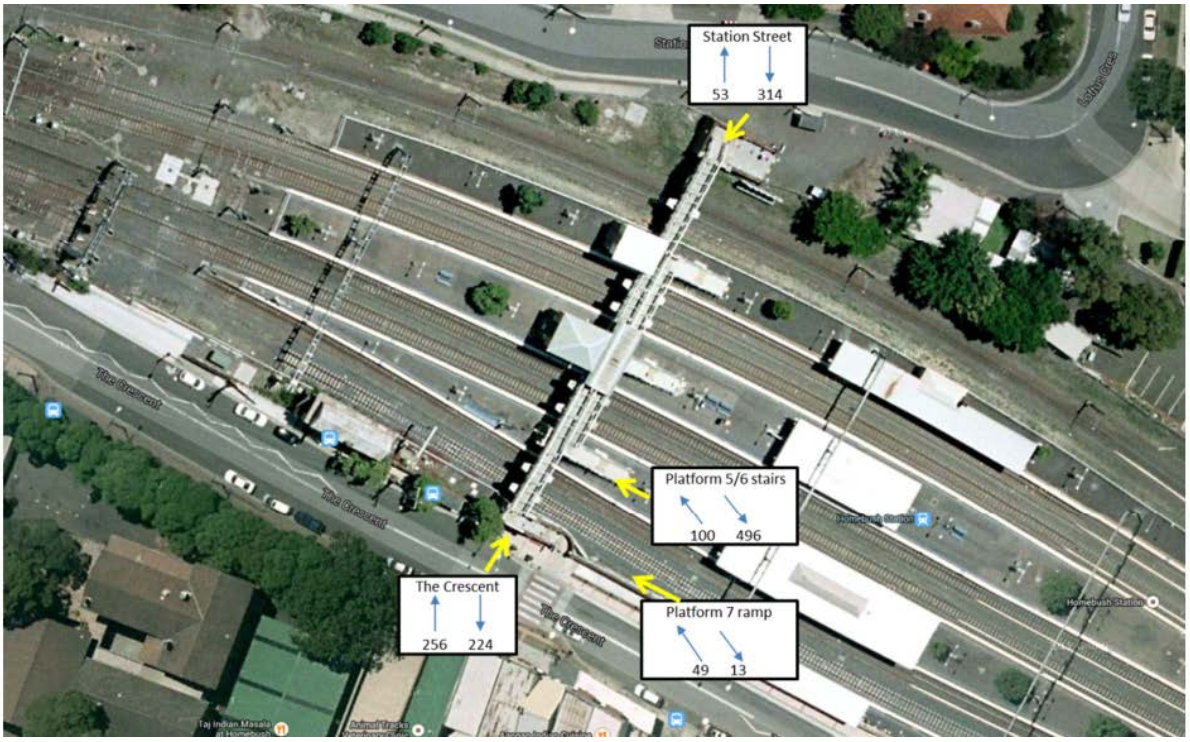
Figure 6 Refuge islands at Loftus Crescent and Knight Street intersection

A pedestrian survey was undertaken on 13 May 2015 during the AM peak period by Parsons Brinckerhoff as part of the Concept Design. Analysis of the AM peak hour pedestrian movements at the station indicated the following travel patterns:

- approximately 55 per cent of the station access movements originated from the northern side (Loftus Crescent and Station Street)
- approximately 81 per cent of the station egress movements originated from the southern side (The Crescent)
- approximately 22 per cent of pedestrian movements were cross corridor movements.

Figure 7 presents the results of the pedestrian analysis, indicating the movements for pedestrians accessing and exiting the station. It is anticipated that the PM peak periods would have comparable distributions in terms of the entrances used but in the reverse direction.

Figure 7 Pedestrian access analysis – AM peak hour

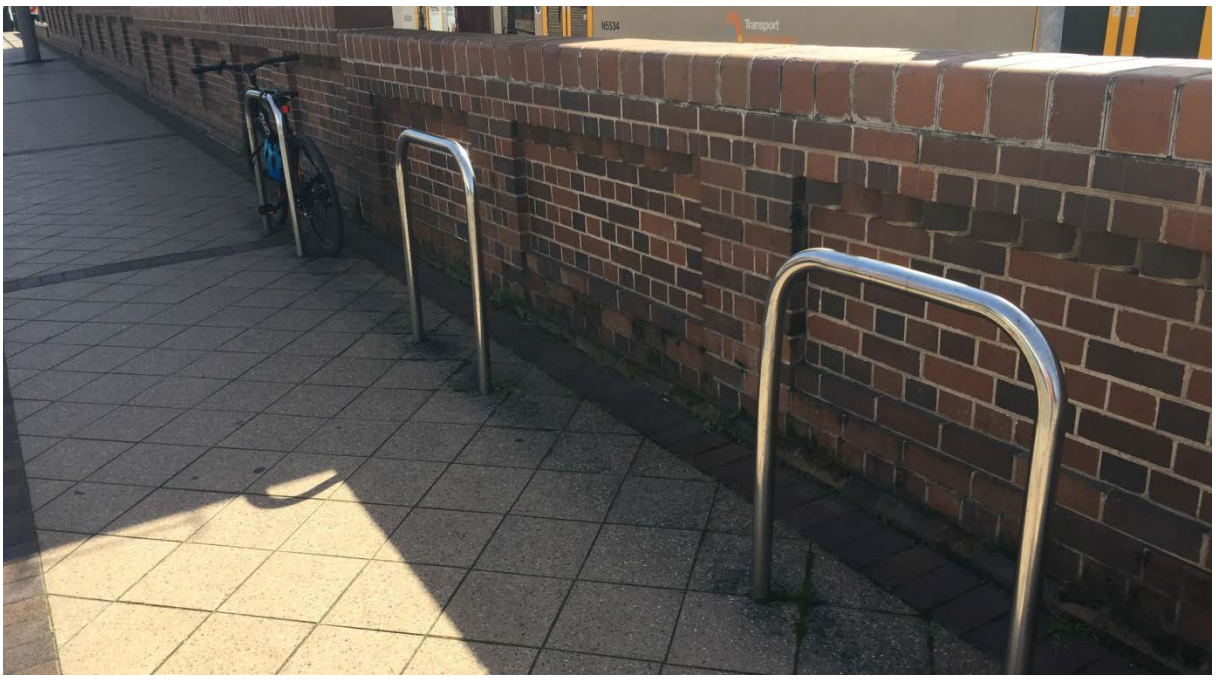


Source: Homebush Station Concept Design Report Volume 3, Parsons Brinckerhoff, 2015

2.2.5 Cycling facilities

Cycle connectivity to Homebush Station is currently limited with no formal cycle routes in the vicinity of the station. Bicycle storage facilities are provided on the southern side of the station with capacity for six bicycles in the form of three u-rails (shown in Figure 8). This bicycle rack is located around 50 metres east of the southern station entrance and is not currently sheltered. There are no formal bicycle racks provided on the northern side of the station.

Figure 8 Bicycle racks near the southern entrance



Source: AECOM, 2016

2.2.6 Bus services and facilities

Figure 9 presents the bus stops and bus services which serve Homebush Station. There are five bus stops located in the vicinity of the station:

- four are located on The Crescent (south of the station), which provide regular and NightRide services
- one is located on Loftus Crescent (north of the station), which provides local school bus services.

One bus route currently serves Homebush Station and operates along The Crescent. The 408 operated by Sydney Buses runs between Burwood to Rookwood via Flemington. Bus services are provided around every 60 minutes between 9:40 am to 3:40 pm from Monday to Friday. It is understood that school buses also use the existing bus stops on The Crescent to pick up and drop off students.

NightRide services (late night buses) also stop at Homebush Station. The N60 operates between Town Hall and Fairfield via Homebush and the N61 operates between Town Hall and Carlingford via Homebush.

The existing bus stop on the southern side of The Crescent (in front of Homebush Public School) is sheltered with an accessible wheelchair spaces. The NightRide buses on The Crescent and school bus services on Loftus Crescent are also sheltered. The bus stop (408 regular services) on the northern side of The Crescent currently provides seating, however with no shelter facility.

Figure 9 Bus stops and services surrounding Homebush Station

Source: AECOM, 2016

2.2.7 Parking facilities

There are currently no commuter parking facilities available around Homebush Station. On-street restricted parking is provided on the surrounding local road network including The Crescent, Rochester Street, Station Street and Loftus Crescent. However, these spaces are located within the local centre and due to their time restrictions are not available exclusively to rail customers.

An off-street Council car park with timing restrictions is provided off The Crescent and Burlington Road (west of Rochester Street) and motorcycle parking is provided on The Crescent (northern side) at the eastern side of the station.

Three accessible parking spaces are provided in close proximity to the station, these include:

- one located on the southern side of The Crescent – east of the raised pedestrian crossing (see Figure 10)
- one located on the eastern side of Station Street
- one located within the off-street Council car park.

Figure 10 Existing accessible parking space on The Crescent

2.2.8 Kiss and ride facilities

There is currently no formal kiss and ride zone for the Homebush Station Precinct. A pick-up and drop off zone, for three car spaces, is provided on The Crescent, west of Rochester Street. The pick-up and drop-off area operates between 8:30 am and 10 am, and 2:30 pm and 7:30 pm from Monday to Saturday, which is more likely to be used by visitors to the Homebush Town Centre.

Short-term parking and no parking / stopping zones on The Crescent and Loftus Crescent within close proximity to the station entrances are more likely to be used as informal kiss and ride areas.

2.2.9 Taxi facilities

There is currently no taxi rank provided at Homebush Station.

2.3 Road network

The key existing roads in the vicinity of the study area include Loftus Crescent, Station Street and The Crescent as shown in Figure 1. This section outlines the road network with respect to the Homebush Station Precinct, providing a description of each key road.

2.3.1 Loftus Crescent

Loftus Crescent is a local collector road with an east-west alignment (north of the station), connecting to Smallwood Avenue to the west and turning into Station Street to the east. Loftus Crescent is a two lane, two-way

street with on-street parking on both sides. Close to the station, parking is only provided on the northern side of the road as shown in Figure 11. The sign-posted speed limit is 50 km/h.

Figure 11 View of Loftus Crescent (westbound)

Source: AECOM, 2016

2.3.2 Station Street

Station Street is local street with a north-south alignment (north of the station) which links to Parramatta Road to the north and turns into Loftus Crescent to the south. Station Street is a two lane, two-way street with on-street parking provided on both sides as shown in Figure 12. It has a posted speed limit of 50 km/h.

Figure 12 View of Station Street (northbound)

Source: AECOM, 2016

2.3.3 The Crescent

The Crescent is a local collector road with an east-west alignment (south of the station) which provides a connection to Eastbourne Road to the west and Beresford Road to the east. The Crescent is a two lane, two-way street with on-street parking on both sides. Close to the station, parking is only provided on the southern side of the road as shown in Figure 13. It has a posted speed limit of 50 km/h with the exception of a school zone (40 km/h during school zone times) near Homebush Public School.

Figure 13 View of The Crescent (eastbound)

Source: AECOM, 2016

2.3.4 Rochester Street

Rochester Street is a local road with a north-south alignment, which connects The Crescent to the north and Beresford Road to the south (south of the station). Rochester Street is a two lane, two-way street with on-street parking on both sides. It has a posted speed of 50 km/h with the exception of a school zone (40 km/h during school zone times) near Homebush Public School.

Figure 14 View of Rochester Street (southbound)

Source: AECOM, 2016

2.3.5 Parramatta Road

Parramatta Road is a major arterial road linking the Sydney CBD and Parramatta. It has an east-west alignment and is located approximately 100 metres north of Homebush Station. It has a six-lane, two-way configuration with a posted speed limit of 60km/h.

2.4 Travel mode choice

Travel data obtained from the Bureau of Transport Statistics provides an insight into the journey to work characteristics of residents in Homebush. The Bureau of Transport Statistics uses the Australian Bureau of Statistics (ABS) data collected during the 2011 Census which includes method of travel to work at a travel zone level. Travel zone 963, 966 and 974 represents the immediate catchment area (within about 800 metres of Homebush Station), with the data from these travel zones summarised in Table 5.

Table 5 Journey to work data

Mode of travel	Homebush[1] (Number)	Homebush[1] (%)	Greater Sydney (%)
Train	1,741	48%	16%
Bus	75	2%	7%
Car – as driver	1,404	39%	61%
Car – as passenger	147	4%	5%
Walked only	169	5%	5%
Mode not stated	47	1%	2%
Other	49	1%	4%

Note 1: Excludes those who did not go to work

Source: Bureau of Transport Statistics, 2016

The 2011 journey to work data shows that the majority of trips from Homebush are made by car and train, with approximately 91 per cent of trips attributable to these two modes (including car drivers and passengers). The journey to work trips made by train accounts for 48%, which is three times the number for Greater Sydney.

The main destinations of the journey to work trips taken from Homebush are shown in Table 6. The majority of trips from Homebush are to Sydney Inner City (30 per cent). Other common destinations include Strathfield-Burwood-Ashfield, Auburn, Canada Bay, North Sydney, Ryde and Parramatta.

Table 6 Destination of journey to work travel from Homebush (2011)

Destination of travel	Percentage
Sydney Inner City	30%
Strathfield-Burwood-Ashfield	18%
Auburn	5%
Canada Bay	4%
North Sydney	4%
Ryde	4%
Parramatta	4%

Source: Bureau of Transport Statistics, 2016

3.0 Construction activities

3.1 Overview

The construction of the Proposal would include the following activities:

- establishment of site compound (erect fencing, tree protection zones, amenities and plant/material storage areas)
- establishment of temporary facilities as required (temporary ticketing office, temporary toilets)
- removal of identified vegetation along The Crescent and Loftus Crescent
- survey investigations
- relocation of services
- partial demolition of existing structures (e.g. footbridge canopy, Amenities Building and Booking Office and stairs)
- platform modifications, including piling and foundations for lift shafts
- construction of lift shafts, upgrades to stairs, fencing and new canopies over the existing footbridge and lifts
- installation of lifts
- installation of fixtures, lighting, signage and additional CCTV cameras
- platform resurfacing and installation of hearing protection loops
- refurbishment of the heritage Booking Office to allow for the new lift, lift lobby, switch room and communications room
- refurbishment of the heritage Amenities Building to allow for a new station office, family accessible toilet and staff facilities
- installation of pedestrian crossing and associated kerb ramps at Loftus Crescent
- kerb realignment along The Crescent to accommodate a new taxi rank and kiss and ride facilities and accessible car spaces
- kerb realignment along Loftus Crescent to accommodate a new kiss and ride area and bus stop bay
- installation of a new sheltered bicycle rack at the northern station entrance
- installation of wayfinding signage and other statutory/regulatory signage
- electrical and power supply upgrade works
- landscaping and fencing adjustments
- activities to test and commission power supply, lifts, lighting, new/modifications to station services, ticketing systems, communication and security systems

3.2 Construction vehicles

In facilitating these construction activities, various plant and equipment are likely to be required. These would include a combination of:

- trucks
- excavator
- generator
- mulcher
- concrete pump
- piling rig

- roller
- concrete truck
- hydreama/hirail
- franna crane
- grinder

Minor volumes of heavy vehicles are likely to be generated during the construction phase when transportation of concrete, equipment, preformed structures etc. is required. It is expected that heavy vehicles would generate around one to 10 movements per day from Monday to Friday, and up to around 20 movements during weekend rail shutdowns. It is expected that this would result in a minimal impact on existing traffic conditions. The size of vehicles used for haulage would be consistent with the access route constraints, safety and any worksite constraints. The standard vehicle would likely be either a tip truck or truck and dog, with a capacity of up to 25 tonnes.

Some construction activities (such as the delivery of precast sections) may require truck and trailer combinations or semi-trailers. Access arrangements for these vehicles would be defined in the Construction Traffic Management Plan (CTMP) prepared by the contractor during detailed design.

3.3 Working hours

Construction is expected to commence in early 2017 and take around 18 months to complete. The majority of construction work at Homebush Station would be limited to the standard construction hours as recommended by the Environmental Protection Authority (EPA):

- Monday – Friday: 7:00 am – 6:00 pm
- Saturday: 8:00 am – 1:00 pm
- Sunday / Public holidays: No work without prior approval from TfNSW

However, it may be necessary to undertake certain construction activities, such as overnight concrete pours and delivery of oversized materials, outside of the standard construction hours so as to facilitate structural design requirements and minimise traffic disruption. For any out of hours works, prior approval would need to be obtained from TfNSW by the contractor.

Weekend rail shutdowns may be necessary to undertake a number of construction activities, which would require prior approval from TfNSW as well as community notification.

The construction methodology would be further developed during the detailed design of the Proposal by the nominated contractor in consultation with TfNSW.

3.4 Site hoarding

The design of hoardings for worksite compounds would be carefully considered and installed, given the high pedestrian activity levels during peak periods of the station operation. All construction hoardings would:

- comply with relevant codes and standards
- have smooth surfaces particularly for areas adjacent to footpaths to allow pedestrians to brush past without snagging
- free of trip hazards at the base of the hoardings
- be clean and have a regular inspection of the surfaces
- have adequate lighting.

Worksite hoardings would discourage entry without approval and minimise vandalism. All access points to fenced compounds would have lockable gates and appropriate information signs would be provided at the worksites to identify the project, safety and communication protocols.

3.5 Ancillary facilities

A temporary construction compound is required to accommodate a site office, amenities, laydown and storage area for materials. The temporary construction compound would be located within the paved area at the Loftus Crescent station entrance and the immediately adjacent grassed area to the east of the paved area adjacent to the northern station entrance (within the rail corridor). Temporary storage/laydown areas may also be required on the island platforms.

The areas nominated for the temporary construction compound and laydown areas are located on land owned by RailCorp (managed by Sydney Trains). Impacts associated with utilising these areas have been considered in the environmental impact assessment, including requirements for rehabilitation.

Figure 15 shows the proposed works areas and the construction compound location.

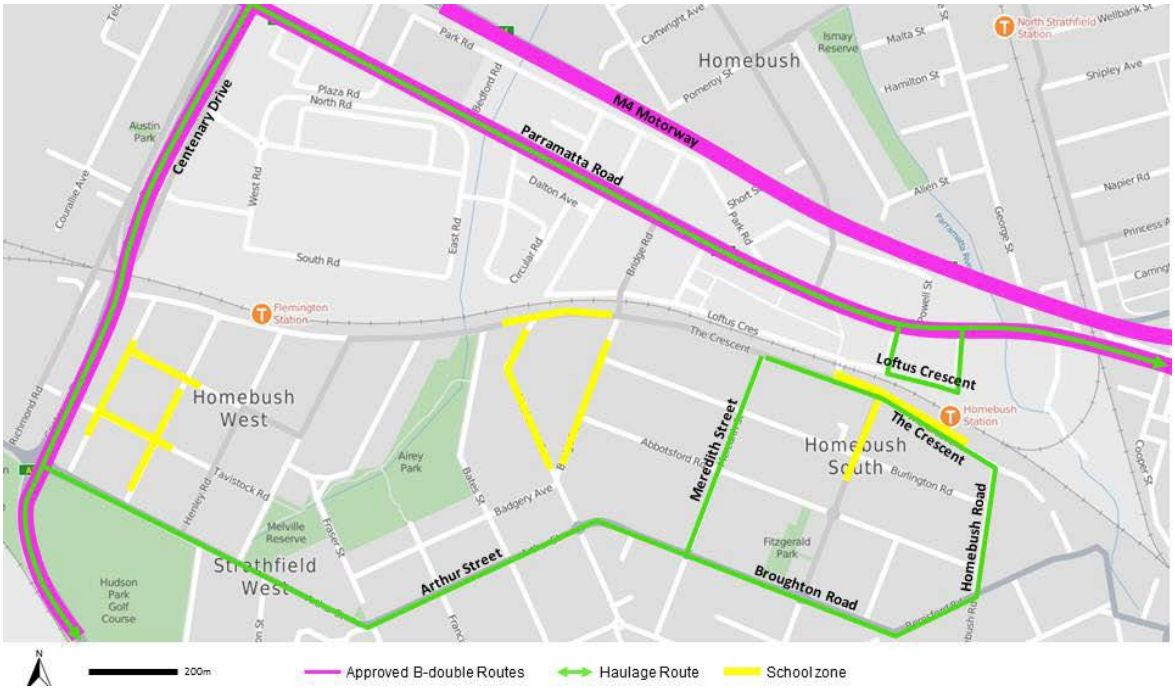
Figure 15 Proposed works area

3.6 Construction vehicle routes

Figure 16 shows the potential access routes to each side of the station entrance, as well as Roads and Maritime Services approved B-double routes within the vicinity of the station. The construction site is near the M4 Western Motorway (east-west), Parramatta Road (east-west) and Centenary Drive (north-south), which are B-double routes. These routes provide high clearances and sufficient road widths to accommodate larger vehicles, making them ideal for the haulage routes.

Heavy vehicle movements in proximity to the Homebush Local Centre and schools, including Homebush Public School, would be restricted during peak times and school zone hours.

Figure 16 Proposed haulage routes (indicative only, subject to detailed design)



Source: AECOM, 2016

3.7 Site security, site access and signage

Access to work areas would consider:

- safety of travelling public
- safety of construction workers and equipment
- impact on local communities in terms of safety, noise and road damage
- ease of access for emergency vehicles
- site security, particularly outside work hours.

3.8 Worker induction

All workers and sub-contractors engaged during the construction phase would be inducted prior to any commencement of works. The induction would identify the construction haulage routes, local speed zones, worksite protocols, staff parking facilities / public transport availability / carpooling opportunities and emergency / incident management strategies. Workers would be encouraged to travel by public transport to and from the site or park away from the station during the works.

3.9 Temporary diversions

A section of Loftus Crescent or The Crescent may be temporarily closed for access during construction activities. These works would likely to be undertaken outside of peak periods or during rail shutdowns. Temporary traffic diversions would be implemented with appropriate signage to guide vehicles. Access to properties within the locations of road closures would be maintained where possible.

The potential locations of temporary diversions will need to be identified in the CTMP and Road Occupancy Licences would be sought as required.

4.0 Construction impacts

4.1 Public transport

Bus services in the vicinity of the Proposal would not be significantly affected during construction. Minor impacts may occur during off peak times due to road works and temporary road closures (e.g. use of a crane). Existing bus stops would also be unavailable during kerb realignments to The Crescent and Loftus Crescent to relocate the bus stop. Access to the existing (or alternative) bus stop would be maintained throughout construction and any changes would be communicated to the public via signage or appropriate methods.

This would result in reduced speeds and potential diversions, however it is anticipated that buses would continue to service the bus stops on The Crescent and Loftus Crescent for the majority of the time. Any diversions or changes to bus services, or temporary relocation of bus stops, would be undertaken in consultation with bus service operators and would be adequately sign-posted with appropriate community notification of any changes.

4.2 Pedestrians

The station access stairs would be partially closed to facilitate upgrades which include reconnecting and installation of safety features such as such as stair nosing, tactiles and handrails. Existing station access via the station access stairs (to both the island platforms and across the railway line) would be maintained during construction. As access to Platform 7 via The Crescent ramp will not be impacted during construction, impacts are expected to be minimal.

During construction, pedestrian movements on the platforms would be temporarily impacted due to the reduced amount of space from construction ancillary facilities where required. The reduced space on the platforms may increase pedestrian congestion and reduce the amount of standing area for customers. However, the majority of proposed works on the platforms, particularly for the new lifts, would be restricted to the western end of the platform away from the existing platform buildings, canopies and seating where customers are likely to wait for trains. Appropriate directional signage would be provided to minimise any potential impacts to pedestrian movement on the platform.

Construction works would be undertaken in a manner to ensure that public access routes to the station are maintained. A temporary ticket office is to be provided during the reconfiguration of the Booking Office on the existing footbridge.

Platform regrading works would also temporarily impact pedestrian access to, from and around the platform. During re-grading, temporary surfacing would be provided to eliminate trip hazards for customers using the platforms. Regrading and re-surfacing works would also be scheduled to be completed during low pedestrian flows (such as during the night).

Due to the hoarding reaching the road edge during the construction of the southern lift on The Crescent, a temporary walkway will be required to maintain pedestrian access.

The proposed works may cause temporary disruptions to the existing pedestrian facilities in the local roads surrounding the station including The Crescent and Loftus Crescent, particularly during the installation of the new and upgraded interchange facilities. This has the potential for increased safety risks for pedestrians due to interactions with construction plant and vehicles. Appropriate signs or traffic controllers would be positioned to notify pedestrians of the temporary arrangements. Any interaction between construction vehicles and pedestrians would be managed and controlled by traffic controllers. Impacts to pedestrians during construction would be managed through the CTMP.

Mitigation measures would be subject to further consideration during detailed design and construction planning in consultation with the relevant authorities. Notification would be provided to the community on alternative transport arrangements (including details of rail replacement buses, nearby stations and changes to pedestrian access).

4.3 Cyclists

There would be no impacts to bicycle facilities provided at Homebush Station with the existing bike racks remaining accessible during the construction phase.

4.4 Kiss and ride / taxi

There are currently no formal kiss and ride zones or taxi spaces provided near Homebush Station. Temporary changes to the pick up and drop off zone are considered unlikely.

4.5 Parking impacts

During construction, a section of The Crescent may be temporarily closed for access during the use of a crane required for construction activities (e.g. installation of the southern lift and platform lifts). In this location, street parking is not available on the northern side of The Crescent as the area is a dedicated bus and mail zone. These works would likely be undertaken outside of peak periods, during a weekend rail shutdown which would minimise impacts to the community. Loftus Crescent may also be temporarily impacted by the presence of construction machinery, however limited impacts to parking are anticipated as parking is not available on the southern side of Loftus Crescent.

Both post office boxes would be temporary relocated during construction to ensure associated mail zones can be access by Australian Post. Temporary and/or permanent relocations of box office boxes would be confirmed in consultation with Australia Post to manage potential impacts.

There may also be temporary loss of parking during the proposed upgrades to the interchange facilities as work zones are set up around these areas and construction materials and equipment delivered. This would increase the demand for on-street parking within the local network in the short term.

Parking provisions would not be made for staff vehicles within or adjacent to the construction site, instead construction workers would be encouraged to car-pool or utilise adjacent public transport services. However it is expected a portion of workers would travel via private vehicles which may also marginally increase the demand for on-street parking within the surrounding local streets. The CTMP would be prepared to manage the impacts of construction traffic parking.

Overall, with the current availability of on-street parking surrounding Homebush Station, the impact of a decrease in on-street parking in the short term would be minor.

4.6 Traffic

Traffic generated by construction vehicles, including staff vehicles, is likely to be minimal given the nature of the works proposed and would fluctuate dependant on the construction stage. Heavy vehicles would generate around one to 10 movements per day from Monday to Friday, and up to around 20 movements during weekend rail shutdowns. It is expected that this would result in a minimal impact on existing traffic conditions.

Some works, such as the proposed upgrades to the interchange facilities may require temporary or partial lane closures and/or traffic diversions which may require a Road Occupancy Licence for temporary road closure. Road works would be undertaken progressively and in the minimum area and timeframe required to undertake the activity. Signage would be displayed around work areas to inform the public of any changes.

In particular, a section of The Crescent may require temporary closure during the use of a crane for the installation of the lifts. This would result in the temporary loss of access along The Crescent in the vicinity of the works during these periods and would be undertaken during low pedestrian and vehicle flows (i.e. weekend rail shutdowns). Partial closure of Loftus Crescent may also be required for the purpose of lift installation and the new pedestrian crossing. Temporary diversions would be determined during detailed design and would be managed with appropriate signage and traffic control, to direct vehicles along the diversions.

It may also be necessary to undertake other construction activities, such as concrete pours and delivery of oversized materials, outside standard construction hours to minimise traffic disruption.

Access for emergency vehicles would be maintained in accordance with emergency vehicle requirements. Emergency services would be advised of all planned changes to traffic arrangements prior to applying the changes.

Overall, provided the proposed traffic management measures are implemented, the likely impact to traffic during construction is expected to be manageable and would not have a major impact on the level of service of the surrounding road network.

4.7 Property access

During construction, there is potential for temporary disruptions to private property access for residents and businesses along The Crescent, Loftus Crescent and Station Street. Property access would be maintained, where possible, to minimise the impact to local residents and businesses. However, during activities such as use of a crane and/or unloading of oversized materials, short term impacts to property access may be necessary. In such incidences, affected occupants would be notified in advance of the scheduled works.

Prior to construction, the Contractor would obtain any licences / approvals required for operating a crane within private airspace where required. Proposed works within private airspace would be undertaken in accordance with the requirement of any relevant licences / approvals and in consultation with affected properties and the Contactor would adhere to all relevant requirements to ensure the safe operation of the crane.

4.8 Emergency vehicle access

Access for emergency vehicles would be maintained at the construction sites in accordance with emergency vehicle requirements. Emergency services would be advised of all planned changes to traffic arrangements prior to applying the changes. Advice would include information about upcoming traffic disruptions, anticipated delays to traffic, extended times of work and locations of road possession.

5.0 Operational impacts

5.1 Future demand

The Bureau of Transport Statistics has provided patronage forecasts for Homebush Station based on its Strategic Travel Model, where it is expected patronage will increase to approximately 7,345 trips daily by 2036. For design assessment purposes, an additional 15 per cent has been used to account for the trips expected to be generated due to improvements in facilities as part of the proposed upgrades. Patronage forecasts are provided in Table 7.

Table 7 Patronage forecasts

Year	AM peak hour entries[2]	AM peak hour exits[2]	24 hour (entries and exits)
2014	1,030	330	4,240
2036	1,614	767	7,345
2036 (+15%)[1]	2,738	767	8,447

Notes:

1 - an additional 15% has been added to the forecast years for design assessment purposes.

2 – peak hour - 6 am to 9:30am.

Source: Bureau of Transport Statistics and TfNSW, 2016

The Proposal has been designed to account for the predicted patronage forecasts. Detailed design would consider future patronage demands as part of the design considerations.

5.2 Public transport

The Proposal does not include changes to existing bus/rail services as part of the works and would not impact on the operation (service operation or timetabling) of public transport in the vicinity of Homebush Station. While the existing bus stop locations on the northern side of The Crescent and the southern side of Loftus Crescent would be slightly adjusted, this would have a negligible impact on bus customers. The Proposal includes improved interchange facilities and improved pedestrian access to Homebush Station, which may increase rail patronage.

It is anticipated that the additional rail patronage would mainly generate walking trips. However, with improved accessibility to Homebush Station and interchange facilities (on The Crescent and Loftus Crescent), it is anticipated that the provision of formal kiss and ride facilities would be more utilised by the community in and around the precinct.

The existing bus stops on The Crescent and Loftus Crescent do not have Tactile Ground Surface Indicators (TGSIs) to indicate boarding points. Also one of the bus stop on the northern side of The Crescent (for the 408 regular bus services) is not covered for weather protection. These facilities are not proposed as part of the Proposal, and it is recommended that these be investigated as a potential additional improvement during detailed design.

5.3 Pedestrians

The Proposal would improve facilities and offer significant benefits to pedestrians, including:

- installation of four new lifts to provide an accessible path of travel to the station platforms
- installation of a new pedestrian crossing on Loftus Crescent to improve safety
- installation of new canopies along the existing footbridge and lift landings to provide weather protection and help improve customer experience
- upgrades to the northern and southern station entrances and improved wayfinding signage.

The Proposal would improve the user experience in the vicinity of the station and has the potential to encourage more customers to walk to the station.

The pedestrian modelling undertaken for the concept design by Parsons Brinkerhoff indicates that in the existing conditions and with the Proposal, the existing footbridge and station stairs achieve a LoS ‘C’ or better during the weekday AM peak with very little congestion expected and no queues forming on any set of stairs. This LoS is

considered acceptable under the National Construction Code as determined by the Building Code of Australia. However, during the weekday PM peak, the existing footbridge operates and would continue to operate at, with the Proposal, a LoS 'E' and the stairs would operate at a LoS 'C' or worse. This is due to services distributed over four trains during the weekday PM peak resulting in around 190 people alighting each train at Homebush Station.

With the Proposal, the majority of elements at the station would be upgraded to operate at a LoS 'C' or 'D'. The southern end of the existing footbridge is currently inadequate to accommodate the projected 2036 (+15 per cent) peak pedestrian demand. However the existing footbridge is of significant heritage value and development modifications are restricted. This LoS is considered acceptable as the Proposal would not worsen the existing LoS, but would continue to provide access via the existing footbridge with a width no less than the existing footbridge.

5.4 Cyclists

Homebush Station is classified as a Level B interchange, which requires a minimum of 20 undercover bicycle rack spaces[1]. The Proposal includes a minimum of 14 sheltered bicycle spaces near the northern station entrance on Loftus Crescent. This is in addition to the existing bicycle rack that has capacity for six bicycles near the southern station entrance. In total, there would be capacity for 20 bicycles which would meet the storage requirements for the station, and is consistent with the objectives of the NSW Government's Bike and Ride initiative as identified in *Sydney's Cycling Future*, which encourages improved cycling facilities at transport interchanges and better integrating bicycle riding with other modes of transport.

The introduction of additional bicycle storage facilities in the vicinity of the station is likely to encourage active transport as a mode of access to the station precinct.

5.5 Kiss and ride / taxi

The Proposal includes the provision of two kiss and ride spaces with kerb ramps installed to provide an accessible path of travel (where required). One space is proposed on the southern side of Loftus Crescent (north of the station) and one space is proposed on the southern side of The Crescent (south of the station). The Proposal would address the informal kiss and ride activity that is currently observed on roads near Homebush Station.

The Proposal also includes the provision of a taxi rank with provision for one space on the southern side of the station along The Crescent, west of the station.

5.6 Parking

The Proposal addresses the current lack of accessible parking spaces surrounding Homebush Station by providing two additional accessible parking spaces on the northern side of The Crescent to the west of the existing station entrance. This would result in the loss of three short term (1P) on-street parking spaces. The existing accessible parking space on the southern side of The Crescent to the east of the raised pedestrian crossing would also be retained.

The proposed kiss and ride area on the southern side of The Crescent would be located in an existing short term (1P) on-street parking space which would result in the loss of one short term (1P) on-street parking space.

The proposed kiss and ride area on the southern side of Loftus Crescent would not impact the availability of parking as this area is currently signed as no parking.

The proposed taxi rank on the northern side of The Crescent would be located in an existing short term (1P) on-street parking space which would result in the loss of one short term (1P) on-street parking space.

Overall, the Proposal would result in the loss of five timed on-street parking spaces. This loss would have a minor impact on the Homebush Local Centre given the availability of existing timed on-street parking spaces within the area. However it is considered that the positive impacts arising from improved accessibility and upgraded facilities at Homebush Station would outweigh the potential negative impacts associated with the loss of timed parking spaces in the precinct.

[1] Bicycle Demand at Interchange Locations 1.4, TfNSW, 2015

5.7 Traffic

The Proposal would assist in making public transport infrastructure more accessible to rail customers and in providing a seamless transition between transport modes, which would likely increase patronage. It is anticipated that the additional rail patronage would mainly generate walking trips to the station (rather than additional traffic) and the improved kiss and ride facilities would provide formal areas for customer drop-off (reducing potential illegal drop-offs which may impede road traffic movements).

No commuter parking is proposed as part of the Proposal, therefore the increase in future road traffic is expected to be minimal and it is considered that the Proposal would have a negligible impact on traffic in the local road network.

5.8 Property access

The Proposal is not expected to adversely impact on existing access to properties in the vicinity of the station. It is anticipated that the provision of formalised kiss and ride facilities would reduce the number of people using existing property access points along Loftus Crescent to set-down/ pick-up.

6.0 Recommendations

Mitigation measure would be implemented to minimise traffic, transport and access impacts during construction and operation of the Proposal.

6.1 Construction Traffic Management Plan

Prior to the commencement of construction, a Construction Traffic Management Plan (CTMP) would be prepared as part of the Construction Environmental Management Plan and would include as a minimum:

- ensuring adequate road signage at construction work sites to inform motorists and pedestrians of the work site ahead to ensure that the risk of road accidents and disruption to surrounding land uses is minimised
- maximising safety and accessibility for pedestrians and cyclists
- ensuring adequate sight lines to allow for safe entry and exit from the site
- ensuring access to railway stations, businesses, entertainment premises and residential properties is maintained (unless affected property owners have been consulted and appropriate alternative arrangements made)
- requirements around operating cranes in the airspace of adjacent properties (including any relevant permits or licences)
- managing impacts and changes to on and off street parking and requirements for any temporary replacement provision
- parking locations for construction workers away from stations and busy residential areas and details of how this will be monitored for compliance
- ensuring heavy vehicle movements in proximity to the Homebush Local Centre and schools, including Homebush Public School, would be restricted during peak times and school zone hours details for relocating kiss and ride, taxi ranks and rail replacement bus stops if required, including appropriate signage to direct patrons, in consultation with the relevant bus/taxi operators. Particular provisions would also be considered for the accessibility impaired
- measures to manage traffic flows around the area affected by the Proposal, including as required regulatory and direction signposting, line marking and variable message signs and all other traffic control devices necessary for the implementation of the CTMP
- should parking be provided for staff, it is recommended parking is provided on-site on open land within the rail corridor to mitigate the impact, with encouragement made for construction workers to carpool or use public transport.

Consultation with the relevant road authorities would be undertaken during preparation of the CTMP. The performance of all project traffic arrangements must be monitored during construction.

6.2 Additional mitigation measures

The following additional mitigation measures are recommended to minimise traffic, transport and access impacts:

- an investigation into potential improvements to bus stops on The Crescent and Loftus Crescent should be undertaken during detailed design. This would include as a minimum the potential installation of Tactile Ground Surface Indicators (TGSIs) to indicate boarding points and the provision of wheel chair spaces. Also the provision of a cover for weather protect for the bus stop on The Crescent
- ensure access to the Australian Post office boxes on The Crescent and Loftus Crescent is maintained and temporary post boxes provided where required to maintain postal services in these locations
- communication to be provided to the community and local residents to inform them of changes to parking, pedestrian access and/or traffic conditions including vehicle movements and anticipated effects on the local road network relating to construction works
- Road Occupancy Licences for temporary road closures to be obtained, where required

References

AECOM, 2016, *Review of Environmental Factors - Homebush Station Upgrade,* Sydney

Downer, 2016a, Homebush Station Upgrade – Design Reports Volume 5 – Drawings

Downer, 2016b, Homebush Station Upgrade – Traffic Impact and Access Report (Road Safety Audit)

Parsons Brinckerhoff, 2015a, *Homebush Station – Concept Design Report Volume 1*

Parsons Brinckerhoff, 2015b, *Homebush Station – Concept Design Report Volume 3 – Appendix I – Traffic, Transport and Access Impact Assessment*